TAB 10

Docket No. R-10XXX
Item 53.64 (c)(11)

Philadelphia Gas Works

Pennsylvania Public Utility Commission
52 Pa. Code §53.61, et seq.

Item 53.64(c) Thirty days prior to the filing of a tariff reflecting an increase or decrease in natural gas costs, each Section 1307(f) gas utility seeking recovery of purchased gas costs under that section shall provide notice to the public, under § 53.68 (relating to notice requirements), and shall file the following supporting information with the Commission, with a copy to the Consumer Advocate, Small Business Advocate and to intervenors upon request:

(11) If any rate structure or rate allocation changes are to be proposed, a detailed explanation of each proposal, reasons therefore, number of customers affected, net effect on each customer class, and how the change relates to or is justified by changes in gas costs proposed in the Section 1307(f) tariff filing. Explain how gas supply, transportation and storage capacity costs are allocated to customers which are primarily nonheating, interruptible or transportation customers.

Response:

PGW is not proposing any rate structure or rate allocation changes in the instant proceeding, therefore, no testimony or schedules have been provided in this pre-filing to support such changes.

PGW will provide testimony regarding gas procurement policies, strategies and the GCR calculation in its 1307f March 1 filing.

TAB 11

Philadelphia Gas Works

Pennsylvania Public Utility Commission
52 Pa. Code §53.61, et seq.

Item 53.64(c) Thirty days prior to the filing of a tariff reflecting an increase or decrease in natural gas costs, each Section 1307(f) gas utility seeking recovery of purchased gas costs under that section shall provide notice to the public, under § 53.68 (relating to notice requirements), and shall file the following supporting information with the Commission, with a copy to the Consumer Advocate, Small Business Advocate and to intervenors upon request:

(12) A schedule depicting the most recent 5-year consecutive 3-day peak data by customer class (or other historic peak day data used for system planning), daily volumetric throughput by customer class (including end-user transportation throughput), gas interruptions and high, low and average temperature during each day.

Response:

Schedule 1 – Three-day peak for FY 04-05 through FY 08-09.

There were not any gas interruptions during the period of FY 04-05 through FY 08-09.

3 DAY PEAK ANALYSIS

Winter Peak Season	Date	Average Temperature	Hi Temperature	Low Temperature	Total Sendout (mcfs)	Firm Sendout (mcfs)	Cogen Sendout (mcfs)	LBS Sendout (mcfs)	BPS Sendout (mcfs)	GTS Sendout (mcfs)	IT Sendout (mcfs)
2004-2005	Jan 21	14	22	8	578,200	539,136	77	4,744	23,858	438	9,947
2004-2005	Jan 22	19	23	14	562,716	527,118	0	4,047	22,682	435	8,434
2004-2005	Jan 23	15	24	9	590,559	552,862	22	4,526	23,429	452	9,268
2005-2006	Dec 12	30	40	18	390,077	373,832	55	1,222	1,266	159	13,543
2005-2006	Dec 13	22	30	15	463,325	442,636	56	2,086	2,161	206	16,180
2005-2006	Dec 14	21	25	18	490,906	470,977	57	1,534	1,590	210	16,538
2006-2007	Feb 5	14	18	11	589,588	546,382	39	2,361	12,330	460	28,016
2006-2007	Feb 6	18	22	13	554,591	507,463	39	2,262	11,822	447	32,558
2006-2007	Feb 7	22	28	18	537,293	495,549	39	2,293	11,423	441	27,548
2007 - 2008	Feb 10	26	49	13	440,385	383,392	24	2,227	6,470	10,844	37,428
2007 - 2008	Feb 11	23	26	18	533,349	467,873	55	2,655	8,610	9,532	44,624
2007 - 2008	Feb 12	33	48	24	454,077	394,446	57	2,340	6,784	9,841	40,609
2008 - 2009	Jan 15	21	28	15	516,111	460,730	54	854	8,570	4,480	41,423
2008 - 2009	Jan 16	15	22	10	574,126	516,475	31	858	9,197	4,556	43,009
2008 - 2009	Jan 17	24	34	16	534,063	481,924	5	696	8,263	4,767	38,408

TAB 12

Docket No. R-10XXX
Item 53.64 (c)(13)

Philadelphia Gas Works

Pennsylvania Public Utility Commission
52 Pa. Code §53.61, et seq.

Item 53.64(c) Thirty days prior to the filing of a tariff reflecting an increase or decrease in natural gas costs, each Section 1307(f) gas utility seeking recovery of purchased gas costs under that section shall provide notice to the public, under § 53.68 (relating to notice requirements), and shall file the following supporting information with the Commission, with a copy to the Consumer Advocate, Small Business Advocate and to intervenors upon request:

(13) Identification and support for any peak day methodology used to project future gas demands and studies supporting the validity of the methodology.

Response:

Please see the attached Peak Day analysis. Additionally, ICF International prepared a *Natural Gas Supply Study* on PGW's behalf. The final report is attached as PGW's response to Item 53.64(c)(14).

Peak Day Analysis

PGW performs a peak day analysis on an annual basis to determine its projected sendout requirements during peak conditions. Essentially this process is completed by collecting sendout and average temperature data for all days where the temperature is at or below 32 degrees Fahrenheit, excluding holidays and weekends. All interruptible transportation volumes are removed from total sendout to arrive at firm sendout on a daily basis.

Common statistical practices warrant that no less than thirty (30) data points be utilized in the analysis to ensure its integrity. For this analysis, PGW has utilized data from the period winter of FY 04-05 through FY 08-09 which would reflect the most current consumption behaviors of its customers. This period yielded 86 data points where the average temperature was at or below 32 degrees Fahrenheit.

Degree days are calculated by subtracting the average daily temperature from sixty-five (65).

A standard linear regression was performed on the data using the calculated degree-days and the actual firm daily sendout information. Additionally, in order to confirm the accuracy of the analysis, and to smooth the charting of the data, a quadratic and a cubic regression analysis were also completed.

A resulting R^2 (Correlation Coefficient) indicates an 82.5 % correlation between firm sendout and degree-days. The multiple regression correlation coefficient, R^2, is a measure of the proportion of variability explained by, or due to the regression (linear relationship) in a sample of paired data. It is a number between zero and one and a value close to zero suggests a poor model.

To verify the level of confidence we can ascribe to the model, we developed the attached Linear Regression Confidence Level Table. Essentially, this table compares the actual versus projected sendout to determine the level of variance expressed as a standard deviation. A standard deviation represents the positive square root of the variance where the variance simply represents the dispersion about the mean. In this analysis the sample standard deviation is 20,136 MCF.

To determine the level where the relationship between consumption and degree-days is "significant" it is necessary to incorporate Degrees of Freedom and the Student's T Statistic. Degrees of freedom refer to how many cases in the sample are free to vary.

The sample looses one degree of freedom for each estimated parameter. Thus, with a sample of 100 paired values and two estimated parameters (one for the constant and one for the coefficient of "degree days"), there are 100-2=98 degrees of freedom. In this analysis we had 86 data points and there were 84 Degrees of Freedom.

The critical value is the value the Student's T statistic must equal or exceed to conclude that there is a 97.5% chance that the relationship between consumption and degree days is not 0. A Student" T statistic of 2.04 is required for a sample with 84 Degrees of Freedom.

The Student's T statistic is the distribution of the (mean/standard deviation) of a sample of normal distributed values with unknown variance. In this case, it is a measure of the likelihood that the estimated coefficient for "degree days" is actually zero. The farther the statistic is from 0, the greater the likelihood that the sample pairs are related. The Student-T distribution varies with the number of independent values (Degrees of Freedom) from which the variance is calculated. For this example, the T-statistic is calculated as SQRT (R2* (degrees of freedom)/ (1-R2)) =19.88258. The calculated Student's T statistic of 19.88258 exceeds the critical value of 2.04. Thus, we can conclude that the relationship between consumption and degree-days is "significant" at the 97.5% level.

Finally, based upon the models developed, it can be determined that the company's projected peak day sendout should be set at 694,858 MCF per day at 0 degrees Fahrenheit. This calculation is performed using the X Coefficient (i.e. slope) multiplied by the number of degree days and adding the Constant (Y Intercept).

Winter 05-09 Data for Daily Temperatures <= 32 Degrees Fahrenheit
W/O Holidays, Weekends

Day	Date	Daily Temp	Degree Days X	X^2	X^3	Actual Firm Sendout (Mcf)	Firm Sendout Per DD (Mcf)	Linear Projected Firm Sendout (Mcf)	Quadratic Projected Firm Sendout (Mcf)	Cubic Projected Firm Sendout (Mcf)
Wednesday	03/04/2009	27	38	1,444	54,872	361,842	9,522	414,659	417,517	415,778
Tuesday	03/03/2009	22	43	1,849	79,507	432,303	10,054	466,548	473,506	469,645
Monday	03/02/2009	19	46	2,116	97,336	440,702	9,580	497,681	504,020	499,333
Tuesday	02/24/2009	30	35	1,225	42,875	349,346	9,981	383,526	380,844	382,724
Monday	02/23/2009	29	36	1,296	46,656	377,612	10,489	393,904	393,325	393,703
Friday	02/20/2009	29	36	1,296	46,656	366,505	10,181	393,904	393,325	393,703
Friday	02/06/2009	31	34	1,156	39,304	384,803	11,318	373,148	368,106	371,843
Thursday	02/05/2009	22	43	1,849	79,507	454,626	10,573	466,548	473,506	469,645
Wednesday	02/04/2009	26	39	1,521	59,319	395,771	10,148	425,037	429,228	426,789
Friday	01/30/2009	32	33	1,089	35,937	377,076	11,427	362,771	355,112	361,102
Thursday	01/29/2009	32	33	1,089	35,937	358,115	10,852	362,771	355,112	361,102
Tuesday	01/27/2009	31	34	1,156	39,304	375,153	11,034	373,148	368,106	371,843
Monday	01/26/2009	31	34	1,156	39,304	388,449	11,425	373,148	368,106	371,843
Wednesday	01/21/2009	27	38	1,444	54,872	438,203	11,532	414,659	417,517	415,778
Tuesday	01/20/2009	26	39	1,521	59,319	416,473	10,679	425,037	429,228	426,789
Friday	01/16/2009	15	50	2,500	125,000	516,475	10,330	539,192	541,112	533,430
Thursday	01/15/2009	21	44	1,936	85,184	460,730	10,471	476,926	483,934	479,846
Wednesday	01/14/2009	27	38	1,444	54,872	398,582	10,489	414,659	417,517	415,778
Wednesday	12/31/2008	29	36	1,296	46,656	374,949	10,415	393,904	393,325	393,703
Monday	12/22/2008	25	40	1,600	64,000	447,137	11,178	435,415	440,683	437,724
Monday	12/08/2008	31	34	1,156	39,304	377,137	11,092	373,148	368,106	371,843
Thursday	02/28/2008	28	37	1,369	50,653	454,604	12,287	404,281	405,549	404,735
Thursday	02/21/2008	32	33	1,089	35,937	355,857	10,784	362,771	355,112	361,102
Wednesday	02/20/2008	29	36	1,296	46,656	378,525	10,515	393,904	393,325	393,703
Monday	02/11/2008	23	42	1,764	74,088	467,873	11,140	456,170	462,822	459,195
Friday	01/25/2008	28	37	1,369	50,653	378,207	10,222	404,281	405,549	404,735
Thursday	01/24/2008	28	37	1,369	50,653	379,113	10,246	404,281	405,549	404,735
Wednesday	01/23/2008	32	33	1,089	35,937	325,432	9,862	362,771	355,112	361,102
Thursday	01/03/2008	25	40	1,600	64,000	440,624	11,016	435,415	440,683	437,724
Wednesday	01/02/2008	26	39	1,521	59,319	413,844	10,611	425,037	429,228	426,789
Thursday	12/06/2007	31	34	1,156	39,304	369,844	10,878	373,148	368,106	371,843
Wednesday	12/05/2007	30	35	1,225	42,875	361,414	10,326	383,526	380,844	382,724
Friday	03/16/2007	31	34	1,156	39,304	347,933	10,233	373,148	368,106	371,843
Thursday	03/08/2007	30	35	1,225	42,875	407,781	11,651	383,526	380,844	382,724
Wednesday	03/07/2007	24	41	1,681	68,921	453,835	11,069	445,792	451,881	448,540
Tuesday	03/06/2007	23	42	1,764	74,088	469,214	11,172	456,170	462,822	459,195
Friday	02/23/2007	31	34	1,156	39,304	379,220	11,154	373,148	368,106	371,843
Friday	02/16/2007	26	39	1,521	59,319	466,898	11,972	425,037	429,228	426,789
Thursday	02/15/2007	21	44	1,936	85,184	500,200	11,368	476,926	483,934	479,846
Wednesday	02/14/2007	24	41	1,681	68,921	474,230	11,567	445,792	451,881	448,540
Friday	03/16/2007	28	37	1,369	50,653	423,203	11,438	404,281	405,549	404,735

Day	Date	Daily Temp	Degree Days X	X^2	X^3	Actual Firm Sendout (Mcf)	Firm Sendout Per DD (Mcf)	Linear Projected Firm Sendout (Mcf)	Quadratic Projected Firm Sendout (Mcf)	Cubic Projected Firm Sendout (Mcf)
Friday	02/09/2007	29	36	1,296	46,656	434,461	12,068	393,904	393,325	393,703
Thursday	02/08/2007	25	40	1,600	64,000	482,566	12,064	435,415	440,683	437,724
Wednesday	02/07/2007	22	43	1,849	79,507	495,549	11,524	466,548	473,506	469,645
Tuesday	02/06/2007	18	47	2,209	103,823	507,463	10,797	508,059	513,678	508,531
Monday	02/05/2007	14	51	2,601	132,651	546,382	10,713	549,570	549,744	540,687
Wednesday	01/31/2007	28	37	1,369	50,653	370,862	10,023	404,281	405,549	404,735
Tuesday	01/30/2007	32	33	1,089	35,937	363,931	11,028	362,771	355,112	361,102
Monday	01/29/2007	26	39	1,521	59,319	404,015	10,359	425,037	429,228	426,789
Friday	01/26/2007	23	42	1,764	74,088	446,122	10,622	456,170	462,822	459,195
Thursday	01/25/2007	25	40	1,600	64,000	406,749	10,169	435,415	440,683	437,724
Wednesday	01/17/2007	30	35	1,225	42,875	370,772	10,593	383,526	380,844	382,724
Friday	12/08/2006	30	35	1,225	42,875	379,705	10,849	383,526	380,844	382,724
Monday	02/27/2006	30	35	1,225	42,875	393,560	11,245	383,526	380,844	382,724
Thursday	01/26/2006	30	35	1,225	42,875	373,522	10,672	383,526	380,844	382,724
Tuesday	12/20/2005	31	34	1,156	39,304	392,139	11,533	373,148	368,106	371,843
Monday	12/19/2005	29	36	1,296	46,656	378,061	10,502	393,904	393,325	393,703
Wednesday	12/14/2005	21	44	1,936	85,184	470,994	10,704	476,926	483,934	479,846
Tuesday	12/13/2005	22	43	1,849	79,507	442,637	10,294	466,548	473,506	469,645
Monday	12/12/2005	30	35	1,225	42,875	373,832	10,681	383,526	380,844	382,724
Friday	12/09/2005	32	33	1,089	35,937	359,566	10,896	362,771	355,112	361,102
Thursday	12/08/2005	31	34	1,156	39,304	365,963	10,764	373,148	368,106	371,843
Wednesday	12/07/2005	29	36	1,296	46,656	390,349	10,843	393,904	393,325	393,703
Tuesday	12/06/2005	32	33	1,089	35,937	351,082	10,639	362,771	355,112	361,102
Friday	11/25/2005	32	33	1,089	35,937	334,901	10,149	362,771	355,112	361,102
Wednesday	03/09/2005	28	37	1,369	50,653	422,369	11,415	404,281	405,549	404,735
Tuesday	03/08/2005	25	40	1,600	64,000	424,014	10,600	435,415	440,683	437,724
Thursday	03/03/2005	30	35	1,225	42,875	403,084	11,517	383,526	380,844	382,724
Wednesday	03/02/2005	30	35	1,225	42,875	402,148	11,490	383,526	380,844	382,724
Monday	02/28/2005	31	34	1,156	39,304	371,763	10,934	373,148	368,106	371,843
Friday	02/25/2005	31	34	1,156	39,304	375,106	11,033	373,148	368,106	371,843
Thursday	02/24/2005	26	39	1,521	59,319	412,696	10,582	425,037	429,228	426,789
Monday	01/31/2005	31	34	1,156	39,304	386,287	11,361	373,148	368,106	371,843
Friday	01/28/2005	22	43	1,849	79,507	507,618	11,805	466,548	473,506	469,645
Thursday	01/27/2005	15	50	2,500	125,000	541,487	10,830	539,192	541,112	533,430
Wednesday	01/26/2005	29	36	1,296	46,656	417,993	11,611	393,904	393,325	393,703
Monday	01/24/2005	22	43	1,849	79,507	506,677	11,783	466,548	473,506	469,645
Friday	01/21/2005	14	51	2,601	132,651	539,136	10,571	549,570	549,744	540,687
Thursday	01/20/2005	25	40	1,600	64,000	457,855	11,446	435,415	440,683	437,724
Wednesday	01/19/2005	25	40	1,600	64,000	486,786	12,170	435,415	440,683	437,724
Tuesday	01/18/2005	15	50	2,500	125,000	551,528	11,031	539,192	541,112	533,430
Tuesday	12/28/2004	32	33	1,089	35,937	405,227	12,280	362,771	355,112	361,102
Monday	12/27/2004	23	42	1,764	74,088	470,830	11,210	456,170	462,822	459,195
Monday	12/20/2004	17	48	2,304	110,592	521,017	10,855	518,436	523,080	517,309
Wednesday	12/15/2004	32	33	1,089	35,937	372,106	11,276	362,771	355,112	361,102
Tuesday	12/14/2004	32	33	1,089	35,937	359,005	10,879	362,771	355,112	361,102
			Count	86						

Firm Sendout Projection Based Data From 05-09
Data for Daily Temperatures <= 32 Degrees Fahrenheit

	R Squared	Change	Student's T	Degrees of Freedom	Critical Value	@ 97.5% Significant
	0.824751	0.824751	19.882582	84	2.04	Yes
	0.837127	0.012377	2.511412	83	2.04	Yes
	0.826745	0.010382	2.216693	82	2.04	Yes
Degrees of Freedom			84	83	82	
97.5% Significance Level			2.04	2.04	2.04	
95.0% Significance Level			1.65	1.65	1.65	
LinearProjection at Zero Degrees Fahrenheit		694,858	Mcf			
Linear Projection at 15 Degrees Fahrenheit		539,192	Mcf			

*Student's T = Square Root[(Increase * Degrees of Freedom)/(1 - R Squared)]*

*Linear SO = Constant + (X * X Coefficient)*

*Quadratic SO = Constant + (X * X Coeff) + (X 1u2 *X 1u2 Coeff)*

*Cubic SO = Constant + (X * X Coeff) + (X 1u2 *X 1u2 Coeff) + (X 1u3 *X 1u3 Coeff)*

Linear Regression Confidence Level Table

Count	Degree Days X	Firm Sendout (Mcf) Y	Projected Linear Firm Sendout (Mcf) Y□dc	Difference Actual Versus Projected Y - Yc	Actual Versus Projected Squared (Y - Yc)²	(Degree Days - Xm) X - Xm	(Degree Days - Xm) Squared (X - Xm)²	s□dyc	t*s□dyc	Lower Acc Lower	Upper Acc Y□dc□ + t*s□dy□d	"- 1 SD" Lower	"+ 1 SD" Y□dc□ + s□dy□d	"- 2 SD" Lower	"+ 2 SD" Y□dc□ + 2s□dy□dc
1	33	377,076	362,771	14,305	204,645,763	(5)	28	3,830	7,801	354,969	370,572	339,833	385,709	316,894	408,647
2	33	358,115	362,771	(4,656)	21,674,190	(5)	28	3,831	7,803	354,967	370,574	339,833	385,709	316,894	408,647
3	33	355,857	362,771	(6,914)	47,801,891	(5)	28	3,832	7,806	354,965	370,576	339,833	385,709	316,894	408,647
4	33	325,432	362,771	(37,338)	1,394,133,869	(5)	28	3,833	7,808	354,963	370,578	339,833	385,709	316,894	408,647
5	33	363,931	362,771	1,161	1,347,027	(5)	28	3,834	7,810	354,961	370,580	339,833	385,709	316,894	408,647
6	33	359,566	362,771	(3,205)	10,271,240	(5)	28	3,835	7,812	354,959	370,582	339,833	385,709	316,894	408,647
7	33	351,082	362,771	(11,689)	136,622,952	(5)	28	3,836	7,814	354,957	370,584	339,833	385,709	316,894	408,647
8	33	334,901	362,771	(27,870)	776,726,480	(5)	28	3,837	7,816	354,955	370,586	339,833	385,709	316,894	408,647
9	33	405,227	362,771	42,456	1,802,553,864	(5)	28	3,838	7,818	354,953	370,588	339,833	385,709	316,894	408,647
10	33	372,106	362,771	9,336	87,154,241	(5)	28	3,839	7,820	354,951	370,590	339,833	385,709	316,894	408,647
11	33	359,005	362,771	(3,765)	14,175,644	(5)	28	3,840	7,822	354,949	370,592	339,833	385,709	316,894	408,647
12	34	384,803	373,148	11,655	135,832,447	(4)	18	3,841	7,824	365,324	380,972	350,210	396,086	327,272	419,024
13	34	375,153	373,148	2,005	4,018,893	(4)	18	3,842	7,826	365,322	380,974	350,210	396,086	327,272	419,024
14	34	388,449	373,148	15,301	234,111,965	(4)	18	3,843	7,828	365,320	380,976	350,210	396,086	327,272	419,024
15	34	377,137	373,148	3,989	15,909,870	(4)	18	3,844	7,830	365,318	380,978	350,210	396,086	327,272	419,024
16	34	369,844	373,148	(3,305)	10,920,003	(4)	18	3,845	7,832	365,316	380,980	350,210	396,086	327,272	419,024
17	34	347,933	373,148	(25,215)	635,814,161	(4)	18	3,846	7,834	365,314	380,982	350,210	396,086	327,272	419,024
18	34	379,220	373,148	6,072	36,870,358	(4)	18	3,847	7,836	365,312	380,984	350,210	396,086	327,272	419,024
19	34	392,139	373,148	18,990	360,633,142	(4)	18	3,848	7,838	365,310	380,986	350,210	396,086	327,272	419,024
20	34	365,963	373,148	(7,185)	51,624,523	(4)	18	3,849	7,840	365,308	380,988	350,210	396,086	327,272	419,024
21	34	371,763	373,148	(1,385)	1,919,007	(4)	18	3,850	7,842	365,306	380,990	350,210	396,086	327,272	419,024
22	34	375,106	373,148	1,958	3,832,659	(4)	18	3,851	7,844	365,304	380,992	350,210	396,086	327,272	419,024
23	34	386,287	373,148	13,139	172,621,709	(4)	18	3,852	7,846	365,302	380,995	350,210	396,086	327,272	419,024
24	35	349,346	383,526	(34,180)	1,168,273,059	(3)	11	3,853	7,848	375,678	391,374	360,588	406,464	337,650	429,402
25	35	361,414	383,526	(22,112)	488,929,384	(3)	11	3,854	7,850	375,676	391,376	360,588	406,464	337,650	429,402
26	35	407,781	383,526	24,255	588,319,392	(3)	11	3,855	7,852	375,674	391,378	360,588	406,464	337,650	429,402
27	35	370,772	383,526	(12,754)	162,668,848	(3)	11	3,856	7,854	375,672	391,380	360,588	406,464	337,650	429,402
28	35	379,705	383,526	(3,821)	14,597,101	(3)	11	3,857	7,856	375,670	391,382	360,588	406,464	337,650	429,402
29	35	393,560	383,526	10,034	100,674,964	(3)	11	3,858	7,858	375,668	391,384	360,588	406,464	337,650	429,402
30	35	373,522	383,526	(10,004)	100,075,287	(3)	11	3,859	7,861	375,666	391,387	360,588	406,464	337,650	429,402
31	35	373,832	383,526	(9,694)	93,976,380	(3)	11	3,860	7,863	375,663	391,389	360,588	406,464	337,650	429,402
32	35	403,084	383,526	19,558	382,514,987	(3)	11	3,861	7,865	375,661	391,391	360,588	406,464	337,650	429,402
33	35	402,148	383,526	18,622	346,778,525	(3)	11	3,862	7,867	375,659	391,393	360,588	406,464	337,650	429,402
34	36	377,612	393,904	(16,292)	265,420,697	(2)	5	3,863	7,869	386,035	401,772	370,966	416,842	348,028	439,780
35	36	366,505	393,904	(27,399)	750,690,794	(2)	5	3,864	7,871	386,033	401,774	370,966	416,842	348,028	439,780
36	36	374,949	393,904	(18,955)	359,282,058	(2)	5	3,865	7,873	386,031	401,776	370,966	416,842	348,028	439,780
37	36	378,525	393,904	(15,379)	236,517,074	(2)	5	3,866	7,875	386,029	401,778	370,966	416,842	348,028	439,780
38	36	434,461	393,904	40,557	1,644,897,587	(2)	5	3,867	7,877	386,027	401,781	370,966	416,842	348,028	439,780
39	36	378,061	393,904	(15,843)	250,998,248	(2)	5	3,868	7,879	386,025	401,783	370,966	416,842	348,028	439,780
40	36	390,349	393,904	(3,555)	12,636,213	(2)	5	3,869	7,881	386,023	401,785	370,966	416,842	348,028	439,780
41	36	417,993	393,904	24,090	580,311,097	(2)	5	3,870	7,883	386,021	401,787	370,966	416,842	348,028	439,780
42	37	454,604	404,281	50,323	2,532,357,577	(1)	2	3,871	7,885	396,397	412,166	381,343	427,220	358,405	450,158

Count	Degree Days X	Firm Sendout (Mcf) Y	Projected Linear Firm Sendout (Mcf) Y□dc	Difference Actual Versus Projected Y - Yc	Actual Versus Projected Squared (Y - Yc)²	(Degree Days - Xm) X - Xm	(Degree Days - Xm) Squared (X - Xm)²	s□dyc	t*s□dyc	Lower Acc Lower	Upper Acc Y□dc□ + t*s□dy□d	"- 1 SD" Lower	"+ 1 SD" Y□dc□ + s□dy□d	"- 2 SD" Lower	"+ 2 SD" Y□dc□ + 2s□dy□dc
43	37	378,207	404,281	(26,075)	679,888,890	(1)	2	2,807	5,717	398,564	409,999	381,343	427,220	358,405	450,158
44	37	379,113	404,281	(25,168)	633,444,513	(1)	2	2,807	5,717	398,564	409,999	381,343	427,220	358,405	450,158
45	37	423,203	404,281	18,922	358,040,977	(1)	2	2,610	5,316	398,965	409,598	381,343	427,220	358,405	450,158
46	37	370,862	404,281	(33,419)	1,116,853,320	(1)	2	2,610	5,316	398,965	409,598	381,343	427,220	358,405	450,158
47	37	422,369	404,281	18,088	327,158,940	(1)	2	2,610	5,316	398,965	409,598	381,343	427,220	358,405	450,158
48	38	361,842	414,659	(52,817)	2,789,655,767	(0)	0	2,610	5,316	409,343	419,976	391,721	437,597	368,783	460,535
49	38	438,203	414,659	23,544	554,310,897	(0)	0	2,610	5,316	409,343	419,976	391,721	437,597	368,783	460,535
50	38	398,582	414,659	(16,077)	258,476,101	(0)	0	2,610	5,316	409,343	419,976	391,721	437,597	368,783	460,535
51	39	395,771	425,037	(29,266)	856,494,038	1	1	2,519	5,131	419,906	430,168	402,099	447,975	379,161	470,913
52	39	416,473	425,037	(8,564)	73,340,716	1	1	2,519	5,131	419,906	430,168	402,099	447,975	379,161	470,913
53	39	413,844	425,037	(11,193)	125,289,553	1	1	2,519	5,131	419,906	430,168	402,099	447,975	379,161	470,913
54	39	466,898	425,037	41,862	1,752,389,742	1	1	2,545	5,184	419,853	430,221	402,099	447,975	379,161	470,913
55	39	404,015	425,037	(21,022)	441,904,529	1	1	2,545	5,184	419,853	430,221	402,099	447,975	379,161	470,913
56	39	412,696	425,037	(12,341)	152,298,292	1	1	2,545	5,184	419,853	430,221	402,099	447,975	379,161	470,913
57	40	447,137	435,415	11,722	137,413,564	2	3	2,545	5,184	430,230	440,599	412,477	458,353	389,539	481,291
58	40	440,624	435,415	5,209	27,138,042	2	3	2,545	5,184	430,230	440,599	412,477	458,353	389,539	481,291
59	40	482,566	435,415	47,151	2,223,260,642	2	3	2,545	5,184	430,230	440,599	412,477	458,353	389,539	481,291
60	40	406,749	435,415	(28,666)	821,744,961	2	3	2,685	5,469	429,945	440,884	412,477	458,353	389,539	481,291
61	40	424,014	435,415	(11,401)	129,974,748	2	3	2,685	5,469	429,945	440,884	412,477	458,353	389,539	481,291
62	40	457,855	435,415	22,440	503,571,460	2	3	2,685	5,469	429,945	440,884	412,477	458,353	389,539	481,291
63	40	486,786	435,415	51,372	2,639,037,480	2	3	2,685	5,469	429,945	440,884	412,477	458,353	389,539	481,291
64	41	453,835	445,792	8,043	64,689,216	3	7	2,685	5,469	440,323	451,262	422,854	468,730	399,916	491,668
65	41	474,230	445,792	28,437	808,679,402	3	7	2,685	5,469	440,323	451,262	422,854	468,730	399,916	491,668
66	42	467,873	456,170	11,703	136,957,932	4	14	2,685	5,469	450,701	461,639	433,232	479,108	410,294	502,046
67	42	469,214	456,170	13,044	170,140,117	4	14	2,922	5,952	450,218	462,123	433,232	479,108	410,294	502,046
68	42	446,122	456,170	(10,048)	100,969,584	4	14	2,922	5,952	450,218	462,123	433,232	479,108	410,294	502,046
69	42	470,830	456,170	14,660	214,901,928	4	14	3,236	6,591	449,579	462,761	433,232	479,108	410,294	502,046
70	43	432,303	466,548	(34,245)	1,172,708,324	5	22	3,236	6,591	459,957	473,138	443,610	489,486	420,672	512,424
71	43	454,626	466,548	(11,922)	142,130,011	5	22	3,236	6,591	459,957	473,138	443,610	489,486	420,672	512,424
72	43	495,549	466,548	29,002	841,096,483	5	22	3,236	6,591	459,957	473,138	443,610	489,486	420,672	512,424
73	43	442,637	466,548	(23,911)	571,745,269	5	22	3,605	7,343	459,204	473,891	443,610	489,486	420,672	512,424
74	43	507,618	466,548	41,070	1,686,761,825	5	22	3,605	7,343	459,204	473,891	443,610	489,486	420,672	512,424
75	43	506,677	466,548	40,129	1,610,311,561	5	22	3,605	7,343	459,204	473,891	443,610	489,486	420,672	512,424
76	44	460,730	476,926	(16,196)	262,296,054	6	33	3,605	7,343	469,582	484,269	453,988	499,864	431,049	522,802
77	44	500,200	476,926	23,274	541,687,898	6	33	3,605	7,343	469,582	484,269	453,988	499,864	431,049	522,802
78	44	470,994	476,926	(5,932)	35,184,119	6	33	3,605	7,343	469,582	484,269	453,988	499,864	431,049	522,802
79	46	440,702	497,681	(56,979)	3,246,607,749	8	60	4,016	8,179	489,502	505,860	474,743	520,619	451,805	543,557
80	47	507,463	508,059	(596)	354,777	9	76	4,016	8,179	499,879	516,238	485,121	530,997	462,183	553,935
81	48	521,017	518,436	2,580	6,658,602	10	94	4,016	8,179	510,257	526,616	495,498	541,375	472,560	564,313
82	50	516,475	539,192	(22,717)	516,058,511	12	137	4,917	10,015	529,177	549,207	516,254	562,130	493,316	585,068
83	50	541,487	539,192	2,295	5,268,397	12	137	5,394	10,988	528,204	550,180	516,254	562,130	493,316	585,068
84	50	551,528	539,192	12,337	152,190,027	12	137	5,884	11,986	527,206	551,178	516,254	562,130	493,316	585,068
85	51	546,382	549,570	(3,188)	10,160,335	13	162	6,890	14,034	535,536	563,603	526,632	572,508	503,694	595,446
86	51	539,136	549,570	(10,434)	108,863,238	13	162	6,890	14,034	535,536	563,603	526,632	572,508	503,694	595,446
Tot/Avg	38	417,555	390,323		45,249,243,697		1,977								

t = 2.04

Xm = 38

Population Variance= **526,153,996**

			Upper Range	Lower Range
Population Standard Deviation of Regression =	22,938	**1s**	440,493	394,617
		2s	463,431	371,679

Standard error of sendout projection 23,210

T-factor 2.04

(T factor) * (Std error of projection) 47,276

Regression Results

Winter 05-09

Based On Data for Daily Temperatures <= 32 Degrees Fahrenheit

Regression Output:

Regression Output:		
Constant		20306
Std Err of Y Est		20136
R Squared		82.5%
No. of Observations		86
Degrees of Freedom		84
X Coefficient(s)	10377.7274	
Std Err of Coef.	521.9507	

Quadratic

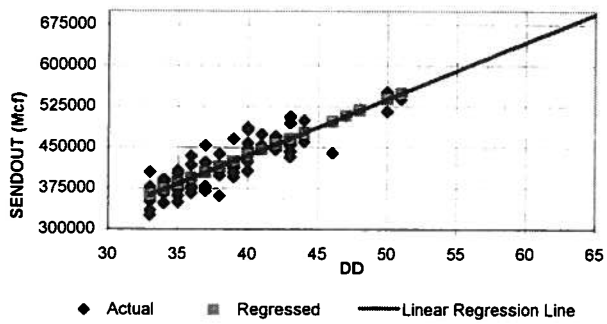
Regression Output:		
Constant		-217671
Std Err of Y Est		161201
R Squared		83.7%
No. of Observations		86
Degrees of Freedom		83
	X	X^2
X Coefficient(s)	21591.5282	-128.3173
Std Err of Coef.	8031.9020	98.8246

Cubic

Regression Output:			
Constant		367634	
Std Err of Y Est		1542998	
R Squared		82.7%	
No. of Observations		86	
Degrees of Freedom		82	
	X	X^2	X^3
X Coefficient(s)	-18882.677	803.478	-7.190
Std Err of Coef.	114119.657	2784.922	22.419

Regression Chart Analysis
Based Upon Data For Temperatures Of <=32 Degrees F.
Winters 05-09

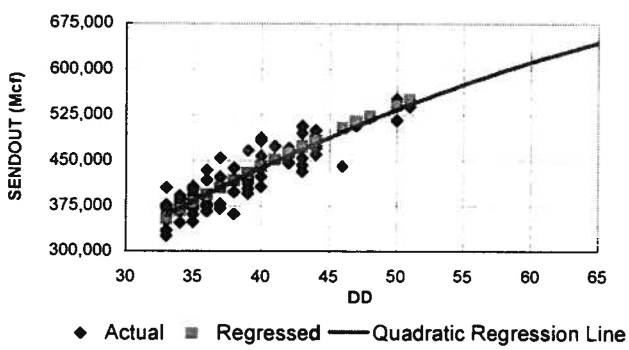
Linear Regression ofSendout (Mcf)



Linear Regression Output

Constant		20,306
Std. Error of Y Estimate		20,136
R Squared		0.825
Number of Observations		86
Degrees of Freedom		84
	X	
X Coefficient	10378	
Std. Err. Of Coefficeint	522	

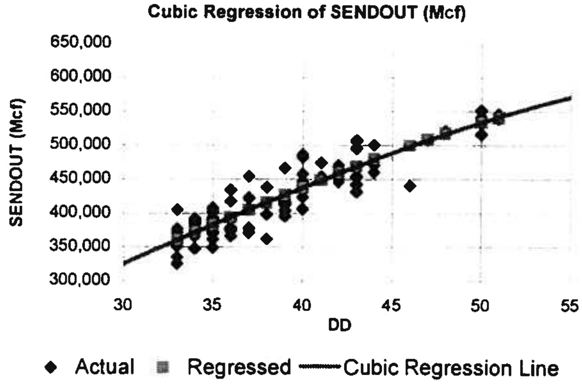
Quadratic Regression of SENDOUT (Mcf)



Quadratic Regression Output

Constant		(217,671)
Std. Error of Y Estimate		161,201
R Squared		0.837
Number of Observations		86
Degrees of Freedom		83
	X	X ^ 2
X Coefficient	21,592	-128
Std. Err. Of Coefficeint	8,032	99

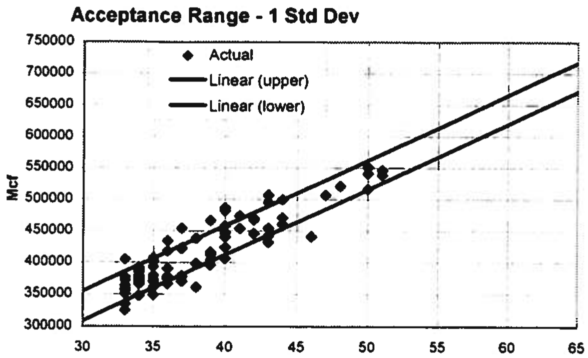
Cubic Regression of SENDOUT (Mcf)



Cubic Regression Output

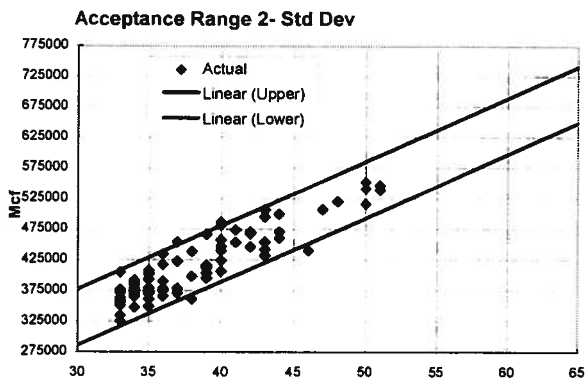
Constant		367,634	
Std. Error of Y Estimate		1,542,998	
R Squared		0.827	
Number of Observations		86	
Degrees of Freedom		82	
	X	X ^ 2	X ^ 3
X Coefficient	-18883	803	-7
Std. Err. Of Coefficeint	114120	2785	22

Regression Chart Analysis
Based Upon Data For Temperatures Of <=32 Degrees F.
Winters 05-09



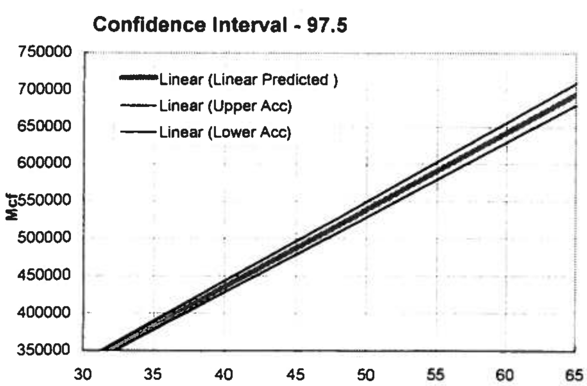
Acceptance Range @ 1 Standard Deviation

Regression Squared	526,153,996
Regression	22,938
Upper Range 1sd	440,493
Lower Range 1sd	394,617



Acceptance Range @ 2 Standard Deviation

Regression Squared	526,153,996
Regression	22,938
Upper Range 2sd	463,431
Lower Range 2sd	371,679



Confidence Interval: 97.5%

Regression Squared	526,153,996
Standard error of sendout projection	23,210
X Mean	38
T Distribution	2.04

TAB 13

Docket No. R-10XXX
Item 53.64 (c)(14)

Philadelphia Gas Works

Pennsylvania Public Utility Commission
52 Pa. Code §53.61, et seq.

Item 53.64(c) Thirty days prior to the filing of a tariff reflecting an increase or decrease in natural gas costs, each Section 1307(f) gas utility seeking recovery of purchased gas costs under that section shall provide notice to the public, under § 53.68 (relating to notice requirements), and shall file the following supporting information with the Commission, with a copy to the Consumer Advocate, Small Business Advocate and to intervenors upon request:

(14) Analysis and data demonstrating, on an historic and projected future basis, the minimum gas entitlements needed to provide reliable and uninterrupted service to priority one customers during peak periods.

Response:

In 2006, PGW contracted with ICF International for a Natural Gas Supply Study. A copy of the August, 2006 report is attached.

ICF INTERNATIONAL

PGW Natural Gas Supply Study

Prepared for
Philadelphia Gas Works

August 2006

Passion. Expertise. **Results.**

icfi.com

Outline

INTERNATIONAL

- Introduction
- Market Context
- Design Winter and Day Analysis
- Supply Analysis and Issues
- Conclusions and Recommendations

Purpose of the Study

- Update ICF's 1997 supply analysis
- Review design and peak day estimation methodologies
  - Evaluate whether the current methodology is reasonable and yields reasonable results.
- Analyze the use of pipeline and storage capacity
  - Apply an analytic framework that can address whether PGW has the appropriate levels of gas pipeline capacity, storage, and LNG
- Evaluate the effect of expanding LNG liquefaction capabilities
  - Address the question whether expanding liquefaction capabilities with lower cost technology creates benefits for the system
- Develop recommendations for optimal allocation of gas supply assets

Analytic Approach

ICF INTERNATIONAL

- Focus has been on the use of pipeline capacity, storage and LNG facilities, not on gas purchasing activities
- Reviewed both average year and design year demand characteristics
- Design year and design day estimations were examined for reasonableness
- Modeled asset usage with Energy Asset Decision Support System
  - Stochastic optimization
  - Useful for asset decision making under conditions of uncertainty
    - — Gas and oil prices
    - — Demand patterns
- Optimal solution identifies the least cost mix of assets

Key Questions Addressed

- Is PGW's approach to estimating Design Day and Design Winter demand reasonable?
- Does PGW have the correct amount of gas pipeline capacity?
- Does PGW have the correct mix and amount of gas storage capacity?
- Would expanding the liquefaction capabilities at the Richmond plant have a benefit to PGW?
- Does the asset mix allow PGW to benefit from releasing capacity and making off system sales?

Outline

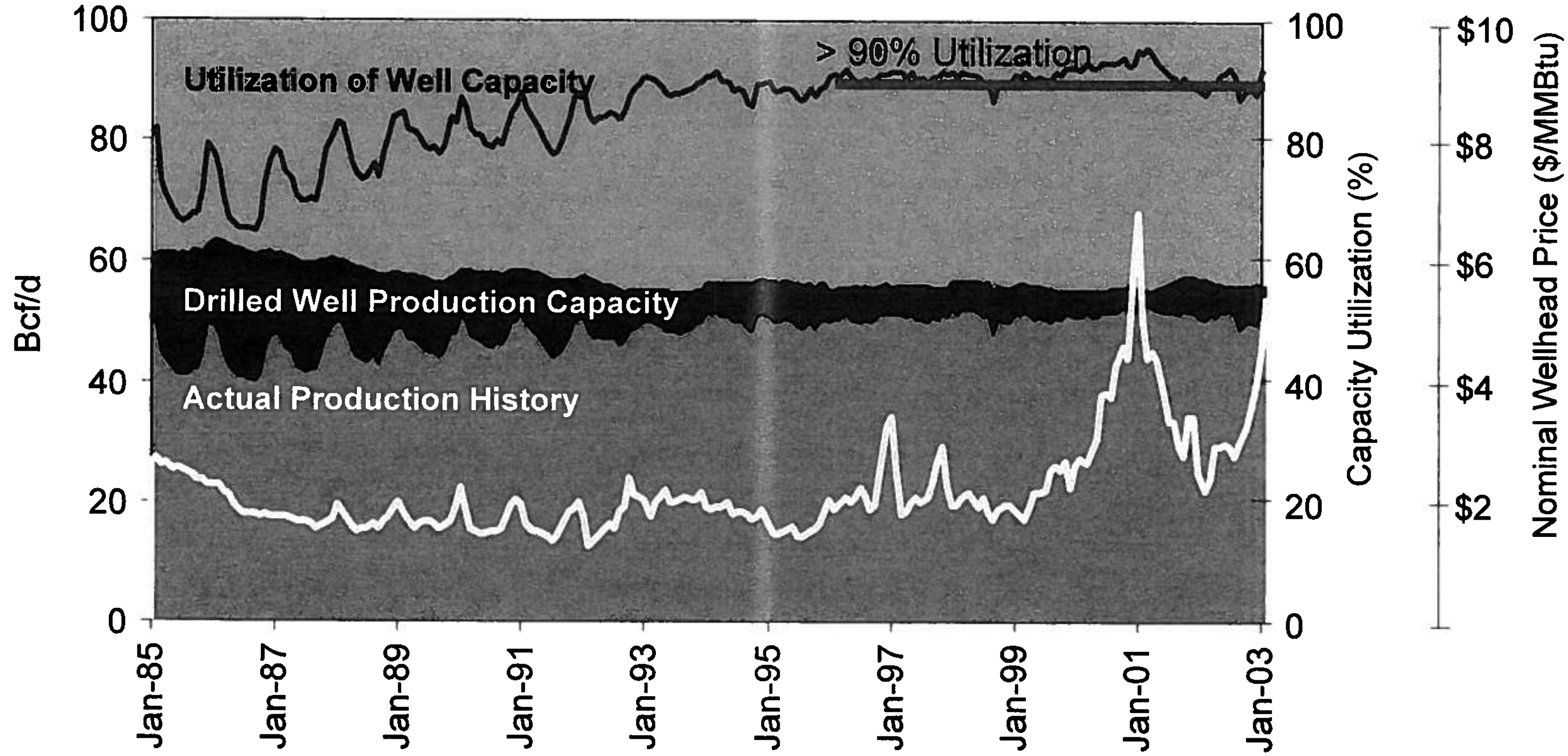
- Introduction
- Market Context
- Design Winter and Day Analysis
- Supply Analysis and Issues
- Conclusions and Recommendations

Planning in Today's Market Context

ICF INTERNATIONAL

- The market context for PGW today is very different from the 1997 study.
  - Gas prices have tripled: our average price in 1997 was about \$2.20/MMBtu, today it has averaged over \$6.00/MMBtu
  - Volatility of gas prices has increased
  - Basis spreads have widened and shown substantial volatility
  - Sophistication in gas market risk management has grown
    - — Capacity release
    - — Off system sales
    - — Financial hedges
  - Growing interest in imported LNG

Tight U.S. Supply has Created Volatility



Source: Energy Information Administration

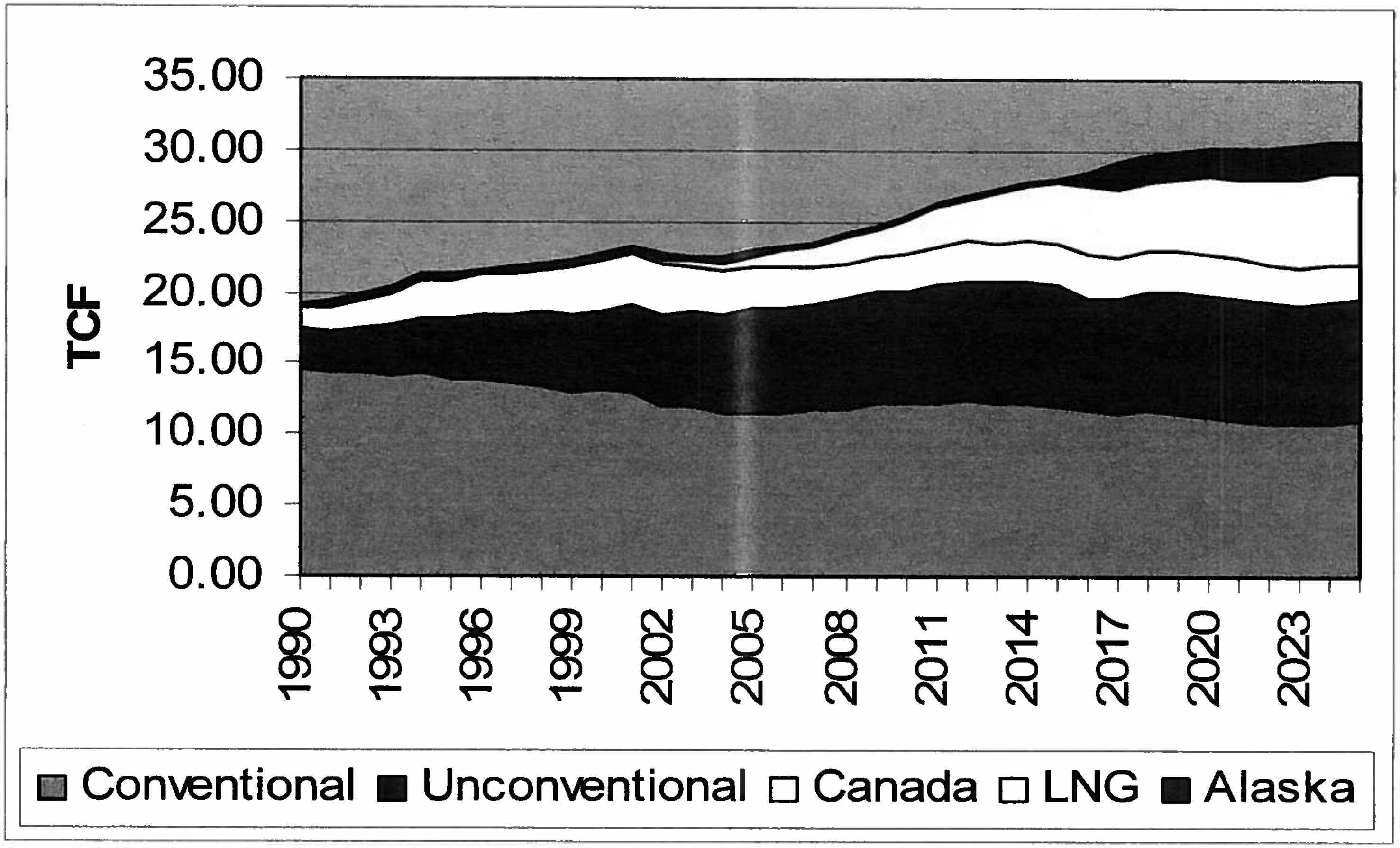
Passion. **Expertise. Results.**

Volatility is Permanent and is a Major Factor in Capacity Decision-Making

ICF INTERNATIONAL

- By 1985, seven years after the Natural Gas Policy Act of 1978, the supply incentives had created a surplus of production capacity: 60 Bcf/d with demand running about 45 Bcf/d.
- Wellhead production met much of seasonal demand, hence gas prices stayed low in the late 80s and 90s. Well utilization rates were in the 70% range.
- As the surplus was worked off (aided by FERC Orders 436, 500 and finally 636), utilization rates crept to over the 90% level. As this happened, gas prices began exhibiting volatiltiy.
- The outlook is that volatility is a permanent fixture of our gas system. Tight natural gas supplies relative to demand leads to swings in prices needed to adjust supply to swings in demand.

LNG Grows to 21% of U.S. Supply



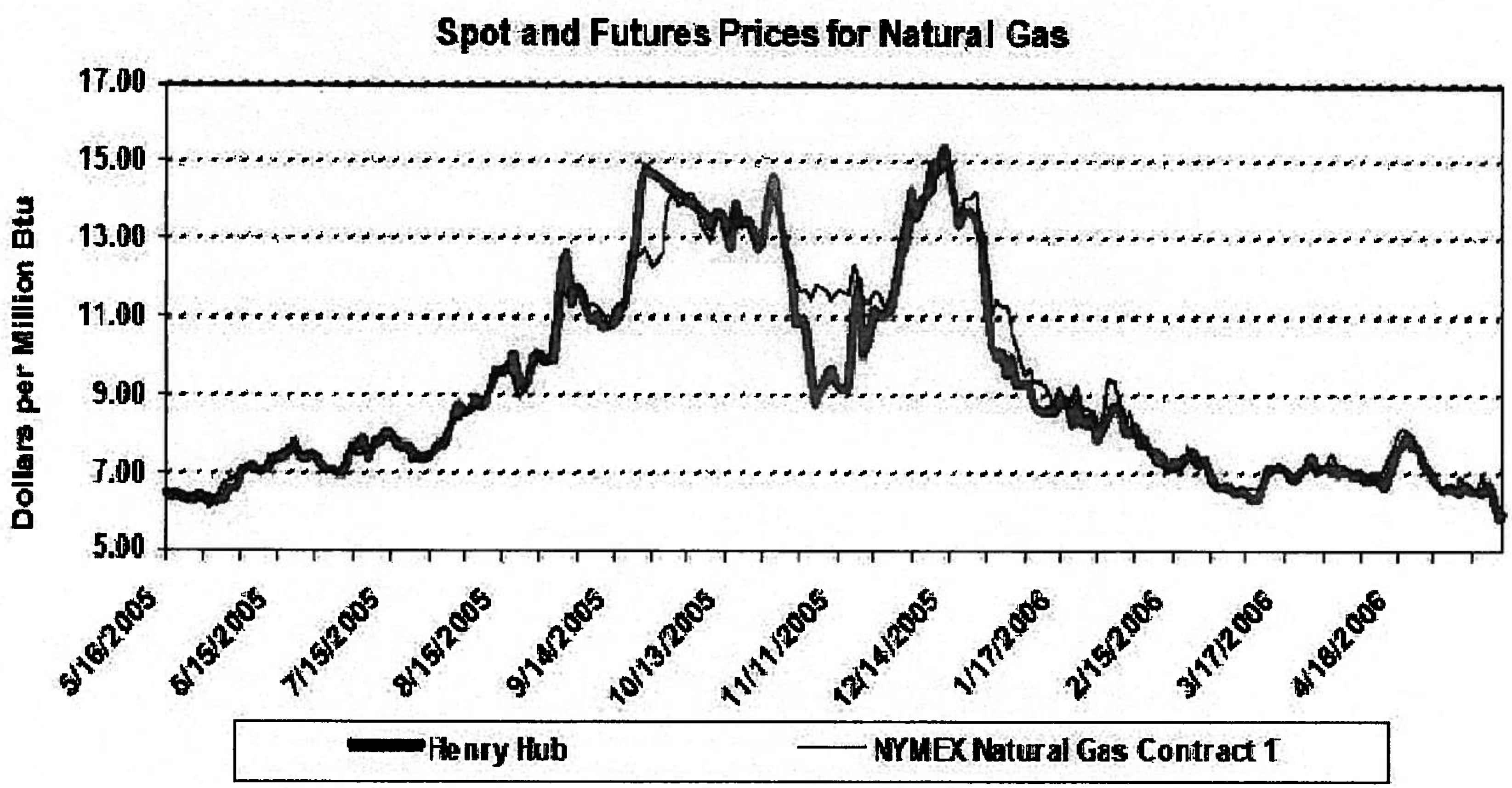
Source: Energy Information Administration, Annual Energy Outlook, 2005

Conventional Gas Production is being Offset by Imports and Unconventional Sources

ICF INTERNATIONAL

- Conventional production is in a long term decline
- Canadian imports have grown since 1990 but are beginning to level off.
- Major new sources are unconventional and LNG
- Alaska gas is expected in the post 2015 time frame

Gas Prices Have Declined from the Hurricane Hump – but Remain High Historically



Passion. **Expertise. Results.**

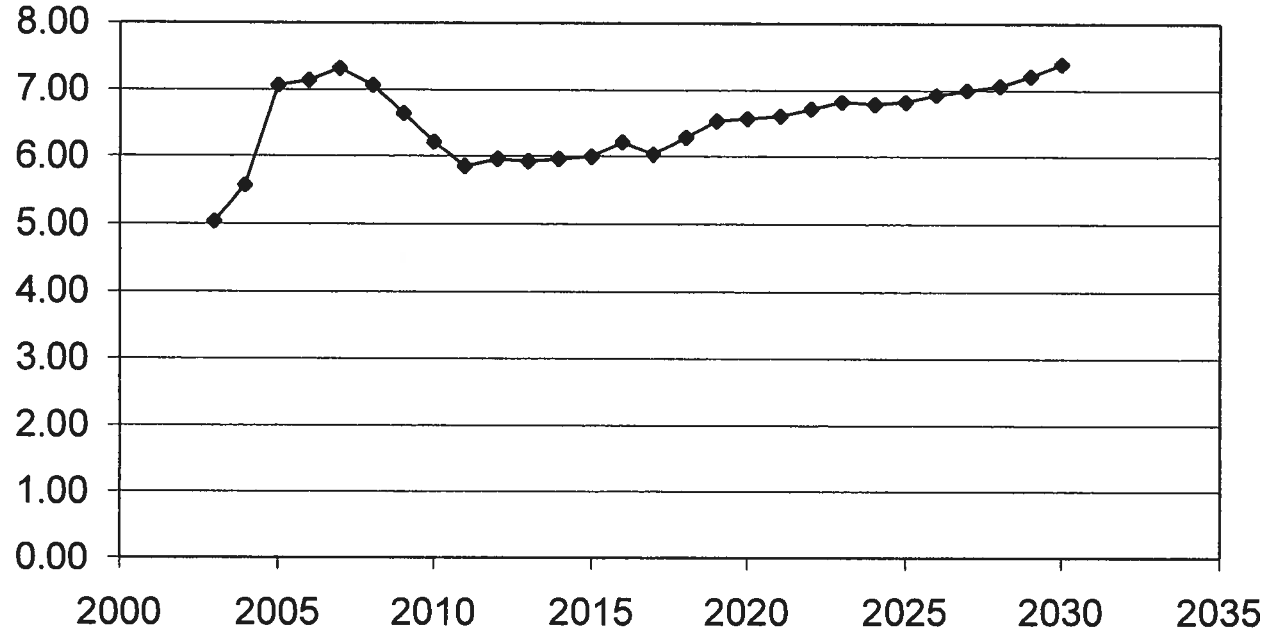
Hurricane Impact on Gas Prices Reflects Market Sensitivity to Supply Disruption

ICF INTERNATIONAL

- The hurricanes in the Gulf in 2005 reduced domestic production of gas by 40%. Gas prices responded.
- Unlike the oil industry where the oil price spike was short-lived, the Hurricane hump lasted much of the winter.
  - Oil markets responded globally: more oil was diverted to U.S. markets in response to prices alleviating the price impact
  - The U.S. is still not integrated into world gas markets so no such relief was available – we were on our own.
- As LNG becomes a larger share of the market, such events' effects may be more manageable.
- Nevertheless, volatility will remain a characteristic of the market.

ICF Reference Case Gas Price Forecast does not Anticipate Continued High Prices

Henry Hub (2003$/MMBtu)



Passion. **Expertise. Results.**

Long Term, Gas Prices will Decline from Recent Levels but will Recover

- Supply and demand responses to high gas prices will cause prices to fall through about 2010, on an annual basis.
  - Seasonal swings in prices and volatility will nevertheless dominate short term pricing monthly.
- Conventional gas (that is gas developed by conventional gas wells) will continue to decline.
- This will be offset by more gas production from unconventional settings and LNG.
  - Unconventional gas – coal bed methane, deep offshore, deep tight sands, shale – is more costly to produce
  - LNG will become a major supply source, approximately 14 Bcf/d by 2025, but will not be enough to set the price – which will be determined by unconventional resources
  - Most LNG will come through Gulf terminals to use existing pipeline capacity
- Major influencers of future gas prices are power demand growth and the availability of LNG

Significance of Volatility and Supply Uncertainty

ICF INTERNATIONAL

- Volatility makes the ability to store gas more critical and causes the value of storage to increase
  - Managing the swings in gas prices is possible only if one can store gas when the price is low
  - Volatility creates "optionality" value for storage and increases the ability to trade around storage assets
- Supply uncertainty also enhances the value of storage
  - Hurricanes in the Gulf will disrupt production and LNG deliveries
- Storage provides a hedge for price and delivery uncertainty in addition to peak day and seasonal deliverability
- Participation in secondary markets through capacity release and off system sales is enhanced by holding assets in volatile markets

Outline

ICF INTERNATIONAL

- Introduction
- Market Context
- Design Winter and Day Analysis
- Supply Analysis and Issues
- Conclusions and Recommendations

Purpose of Demand Estimation Review

- Design day and winter parameters drive investment decisions and asset allocations
  - Pipeline capacity
  - Storage capacity and utilization
  - LNG storage and vaporization
- Design parameters in turn impact system costs
  - Capacity payments
  - Inventory holding costs
- ICF used design day and design winter estimates to determine the appropriate gas asset mix

PGW's Approach to Estimating Demand

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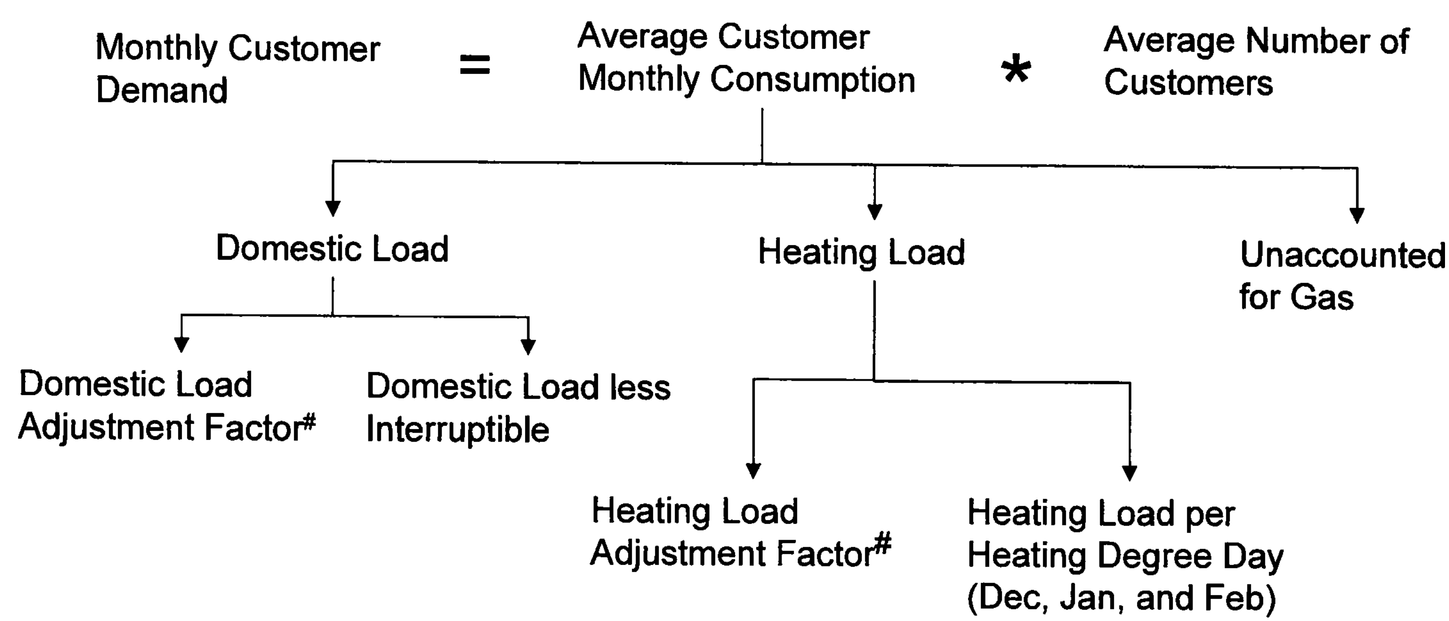
- PGW uses a combination of inputs into demand estimation
  - Historical demand trends for each customer class
  - Customer surveys
  - End use studies – appliance characteristics
  - Judgment of system operators
- Demand is related to temperature through heating degree days (HDD)
- Capacity planning focuses on the "Design Winter" and "Design Day"
  - These are concepts of peak demand that define the largest amount of gas that PGW must be able to deliver to meet system requirements and maintain system integrity
  - These represent statistically derived historical system peak limits

PGW Demand Estimation Methodology Overview



#Adjustment Factors account for error in estimation of demand in previous year

PGW Demand Estimation Methodology Evaluation

- Domestic Load is estimated by using latest year customer load thus accounting for improvements in energy efficiency of customer appliances
- Heating Load Adjustment Factor is estimated using normalized Heating Degree Days thus representing only error in estimation methodology
- Design Day demand estimated using firm load thus making the forecasting regression methodology robust
- Design Day demand estimated using four year peak day heating degree days allowing for a good fit

Philadelphia Winter Heating Degree Days

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Data Set (1976-2005)	Nov	Dec	Jan	Feb	Mar	Winter Season
Historical Mean Degree Days	533	862	1,028	844	671	3,938[b]
Historical Peak Degree Days	762	1,219	1,400	1,183	911	4,535[b]
No. of Sample Observations	30	30	30	30	30	30
Sample Standard Deviation	95	144	162	129	99	213
Data Relative to Mean[a] (%)	18	17	16	15	15	5[b]
PGW's Design Degree Days	608	1,005	1,191	973	778	4,555

Notes:

[a] It is coefficient of variation, calculated as (sample standard deviation/sample mean)*100.

[b] Individual months do not add up to this total, because it has been calculated independently using the historical winter season data or the standard deviation for the season total.

PGW Design Degree Days are higher than NOAA estimate because of the location and frequency of measurements. PGW measures several times per day at the Richmond Plant. NOAA uses a simple average of the high and low temperatures.

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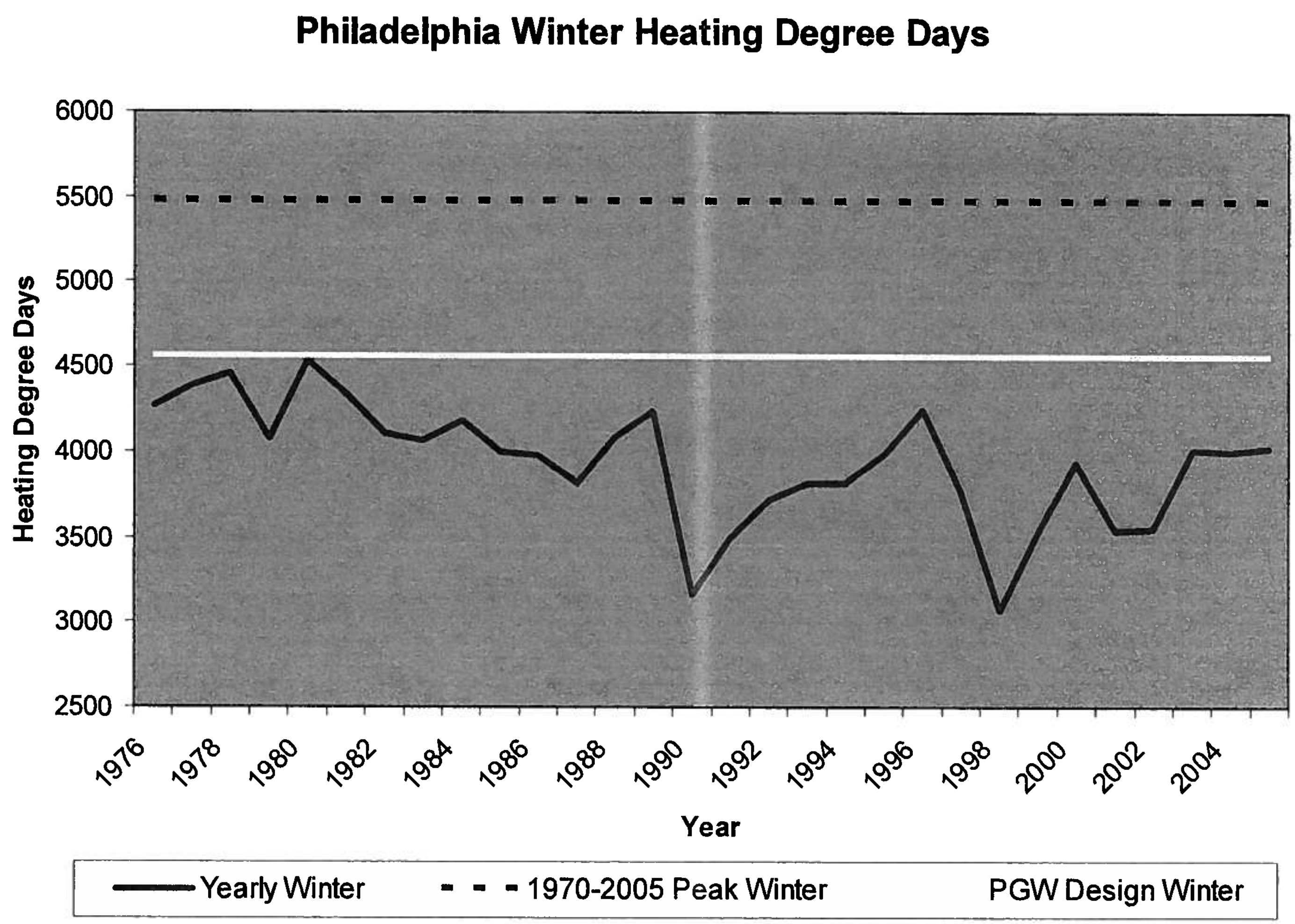
PGW Design Winter Heating Degree Days



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PGW's Design Year Estimates

- The previous slide compares the design winter based on coldest winter in 30 years with historical winter weather and the theoretically coldest winter, measured in heating degree days (HDDs).
- Recent winters have been warmer than in the 1980s, and the trend suggests warming.
- PGW's design winter is still substantially below the theoretical coldest winter
  - Theoretical coldest winter includes the coldest winter months picked from the last 30 years and assumes each month is the thirty year cold month

Findings on Peak and Winter Demand

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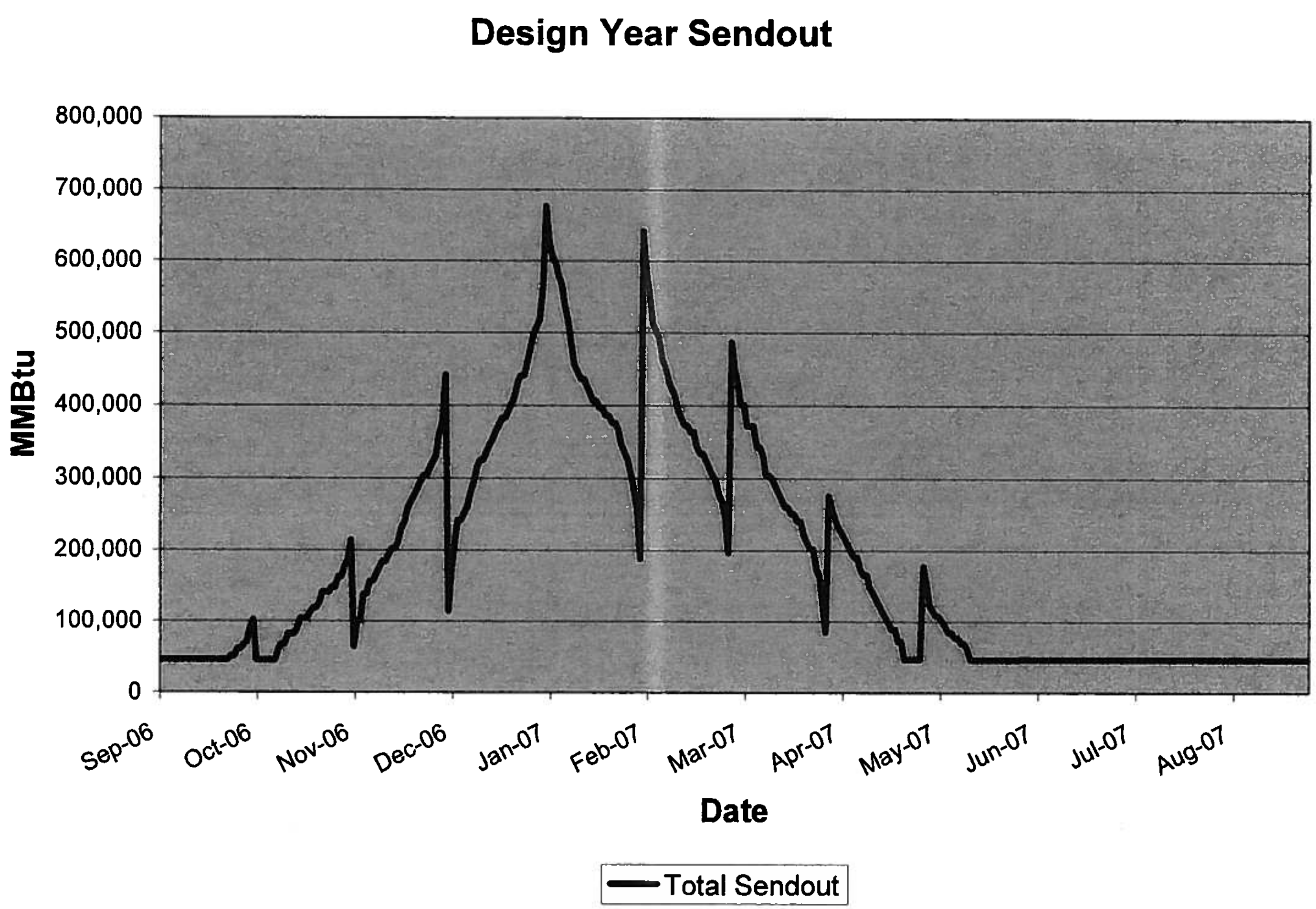
- PGW's approach remains essentially the same as was reviewed in the previous study.
- PGW's approach yields a forecast of design day and design winter that are reasonable estimations.
  - The design conditions are below "theoretical" worst case (which could yield higher than necessary investments)
  - The probability of meeting design winter conditions remains approximately once in every 16 years.
- PGW's approach incorporates recent trends in local markets towards more efficient equipment and demand response to prices.
- Potential for demand growth is modest (given local and national trends).

ICF's Approach to Estimating Design Winter Sendout

- First step is to use design winter parameters for 2006-2007 provided by PGW for its PGC filings with the Philadelphia Gas Commission.
  - These data are from September through August and in the form of load duration curves for each month.
- Data were converted to April through March and randomized to reflect typical random weather and gas pricing patterns.
  - Converting data for April through March makes modeling storage easier
  - Gas sendout and prices are correlated
- Design and average years were differentiated.
  - All the analysis is based on daily, sequential sendout
  - Average and design years differ only in winter sendout

Design Year Sendout for Planning – Sept. 1 to August 31



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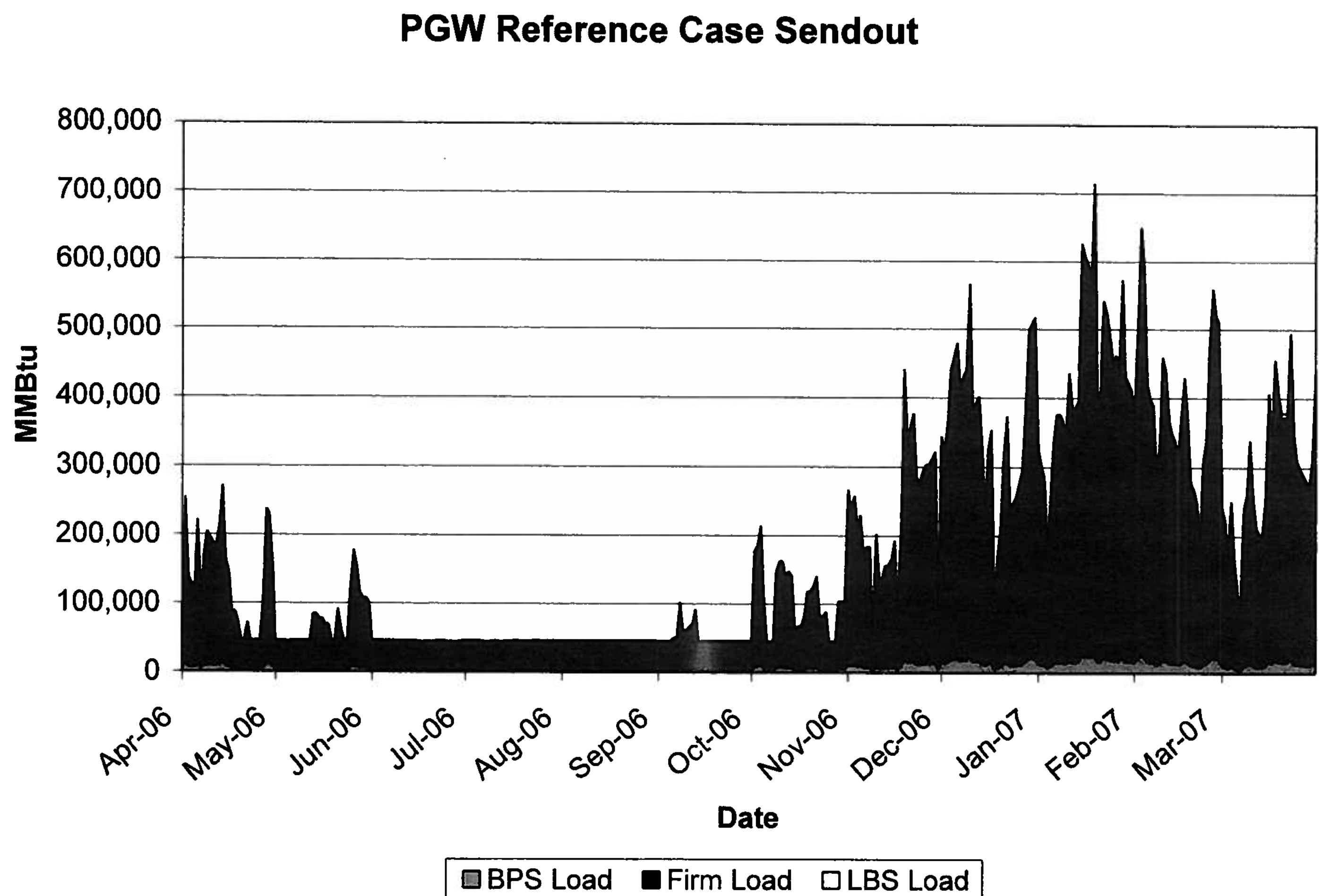
Sendout Reordered and Randomized – April 1 to March 31



Demand Patterns Modeled Consistent with Gas Prices

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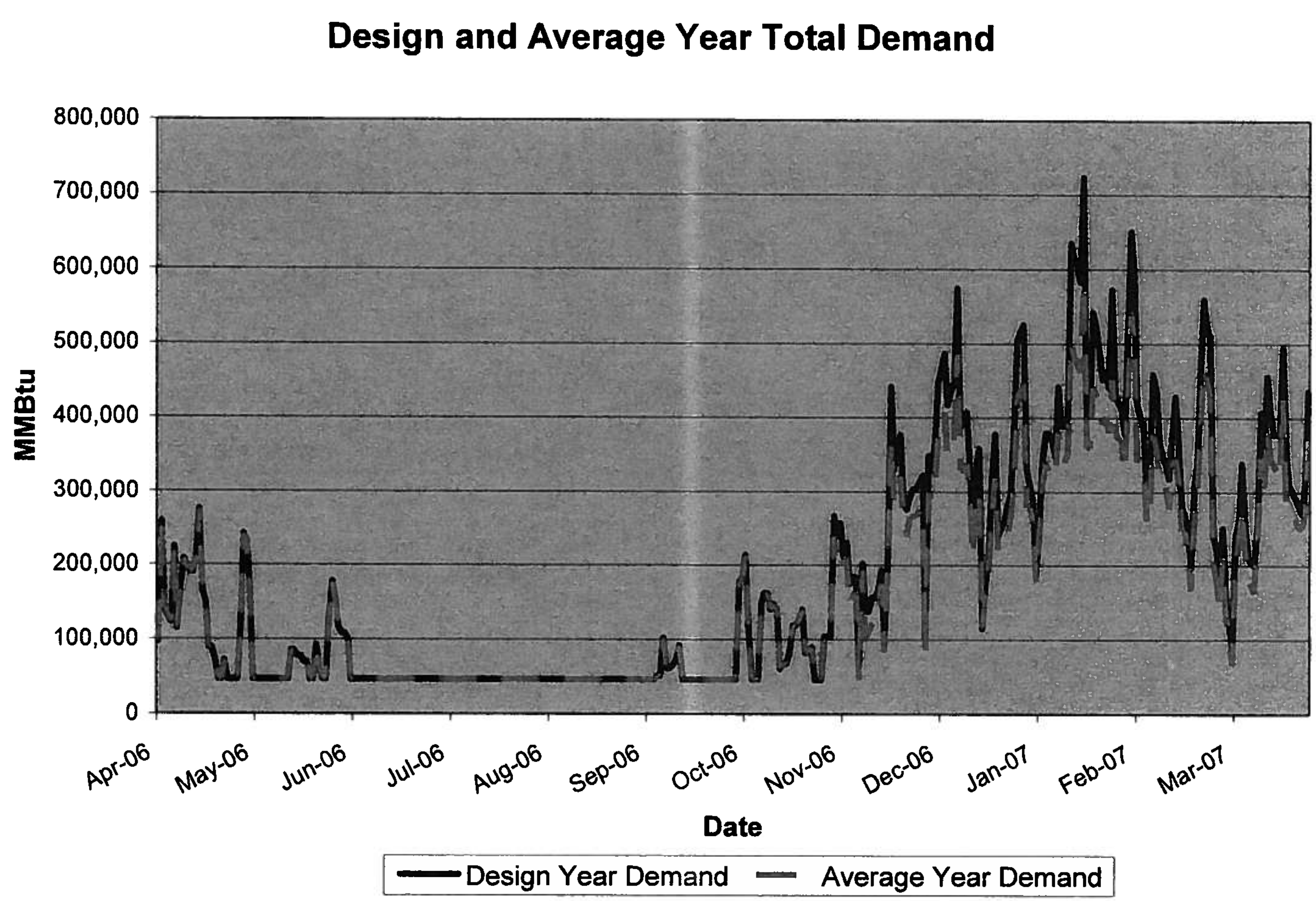

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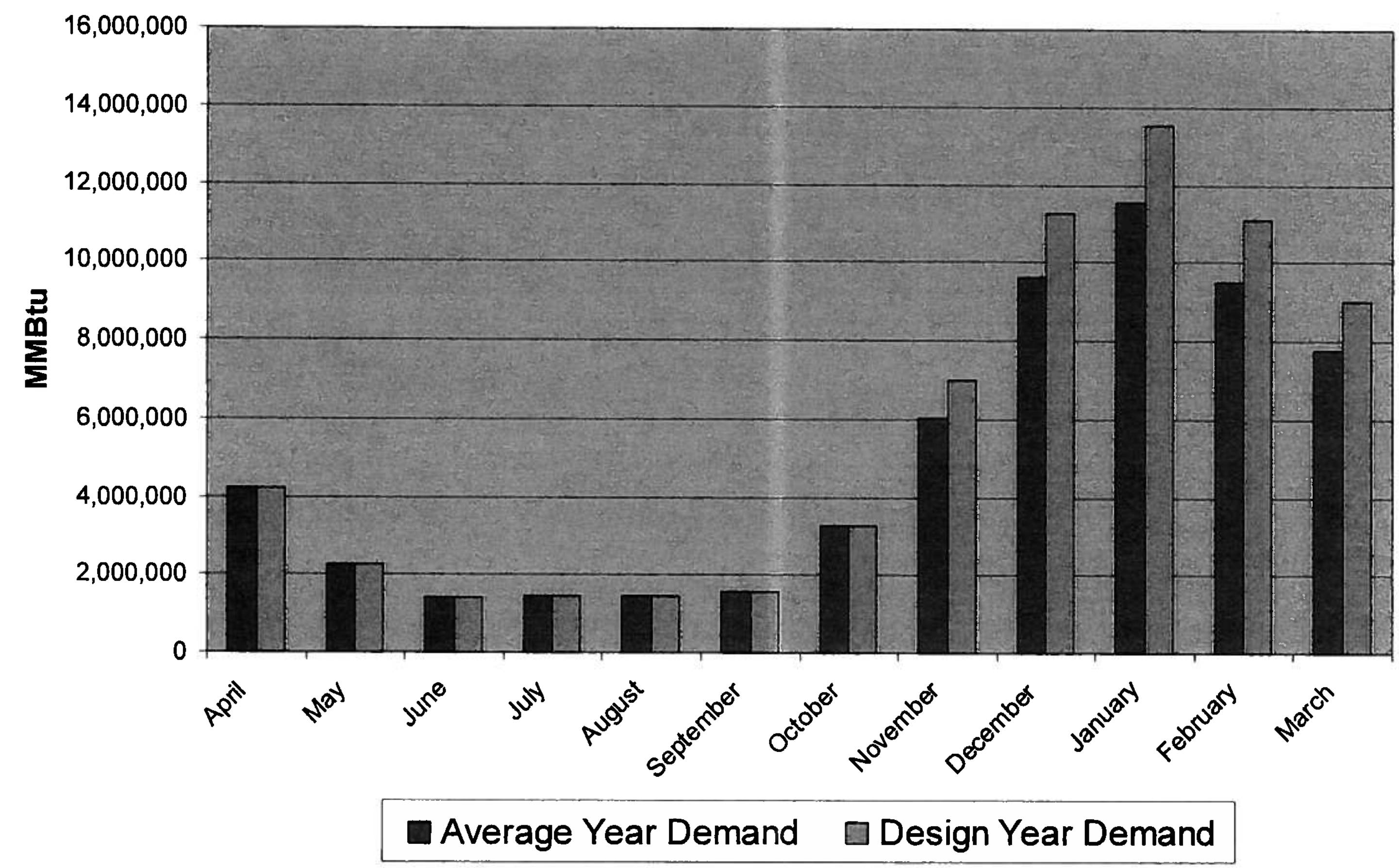
Design and Average Winter Demand -- Simplified

Design and Average Year Total Demand



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Outline

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- Introduction
- Market Context
- Design Winter and Day Analysis
- Supply Analysis and Issues
- Conclusions and Recommendations

Analytic Approach

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- Use sequential optimization to identify the least cost mix of assets when there is volatility in gas demand, prices, and storage operations
  - Traditional approaches (and what was used in 1997) employ load duration curve that are useful for optimizing pipeline capacity and gas contracts.
  - Representing demand sequentially rather than as a load duration curve captures the inter-temporal aspects of gas storage optimization and effects of price volatility
- Key inputs include
  - Sendout and sendout variability – load represented on daily basis
  - Supply system topology and options
  - Gas and oil prices and price volatility
- Once these are implemented, we model the system under different conditions
  - Design year v. average year
  - With different supply options available or not
  - With different gas price patterns

Analytic Approach (contd.)

- Demand inputs
  - ICF used PGW's own forecasts of gas demand for average and design year from the 2006 PGC filing (June 2006)
  - Used a single year rather than multiple years or future year forecasts to simplify the analysis
- Supply topology inputs
  - Gas pipelines – capacity (MDQ), receipt/delivery points, costs, fuel, storage interconnections
  - Gas storage – capacity, injection/withdrawal MDQs, withdrawal ratchets, costs, fuel, pipeline interconnections
  - LNG – liquefaction capacity and rates of liquefaction, storage capacity, vaporization capability, liquefaction expansion potential, costs.

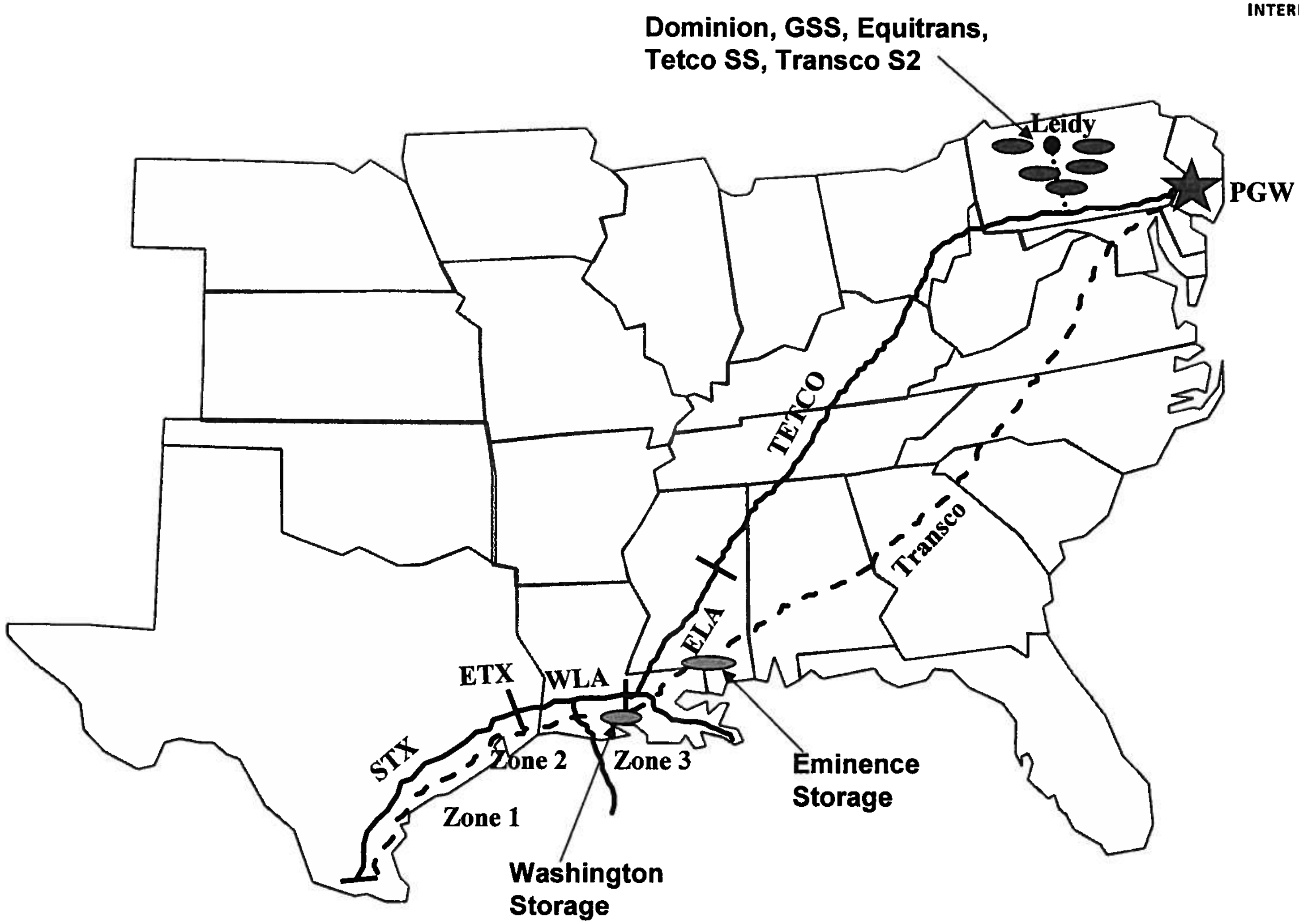
Analytic Approach (contd.)

- Gas pricing inputs
  - Used recent history gas prices and volatility
  - Deployed assumptions about first of month purchasing and spot purchasing practices – PGW sets up 64% of winter supply in firm, first of the month contracts, with spot supply meeting swing demand
  - Prices are represented for supply at each of the pipeline receipt points based on historic basis differentials

Analytic Approach -- Sensitivities

- Sensitivity analyses were undertaken to identify the least cost mix of assets and their utilization.
  - Sensitivities were examined under the design year reference case
  - An average year case was run to examine the potential for capacity release and off-system sales
- Major sensitivities tested various supply asset options
  - Availability of more LNG by expanding LNG liquefaction capacity
  - Reduction in storage capacity by alternately eliminating various storage services
    - Eminence
    - Equitrans
    - WSS
    - Transco S2
  - Demand for storage with larger summer/winter gas price swings

Supply Pipelines and Storage



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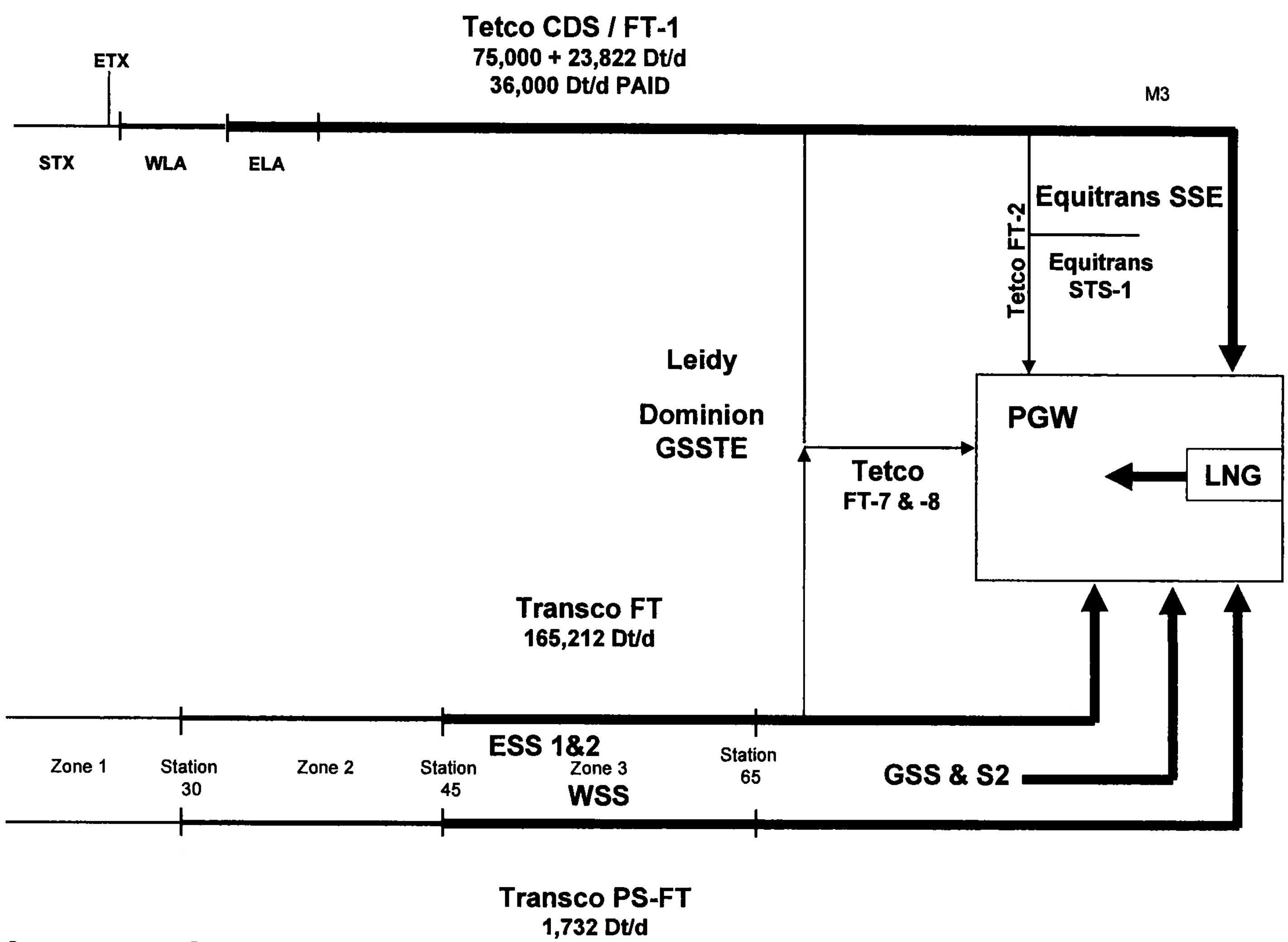
Supply Topology



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Case Descriptions

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- Reference case: Design winter, design peak day, assumes full LNG liquefaction capability is available (LNG 1 and LNG2)
  - LNG-1 case limits liquefaction capability to the current expander system
  - LNG-2 case allows a new system to be built (replacing the current cascade system, which is highly maintenance intensive and has reached the end of its useful life at 37 years)
- Average case: Average year sendout, also with full liquefaction capability
- LNG-1 case: Design winter, no expansion of LNG liquefaction
- LNG 1 Bcf case: Design winter, LNG expansion occurs, but 1 Bcf of storage is reserved for off system sales and is not available to PGW
- Storage sensitivity cases: LNG 1 Bcf case, with alternative storage services not available
  - Focused on storage services that appear in earlier cases to be on the margin

Findings – Pipeline Capacity

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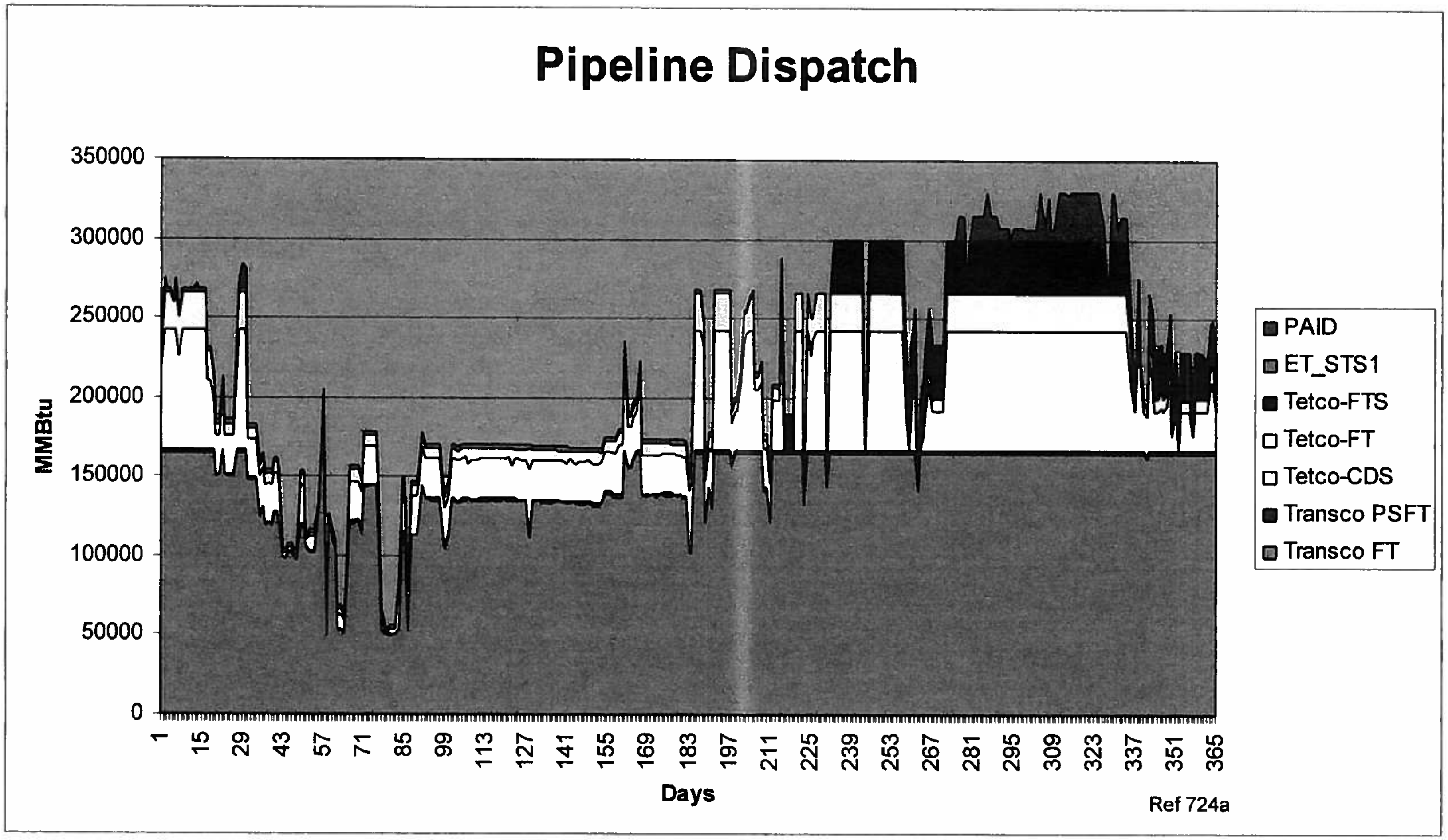
- Both long haul pipelines are necessary to meet full requirements in winter
- Transco appears to be the lowest cost and most valuable pipeline asset
  - Under design conditions, the pipeline should operate at a 89% load factor
  - This drops to about 84% during an average year
- Tetco operates at lower load factors
  - Design year: 56%
  - Average year: 46%
  - Nevetheless Tetco reaches its full capacity on some days for six months of the year even in average winter conditions
- PAID call released capacity is critical in winter

Pipeline Utilization Highlights Key Segments



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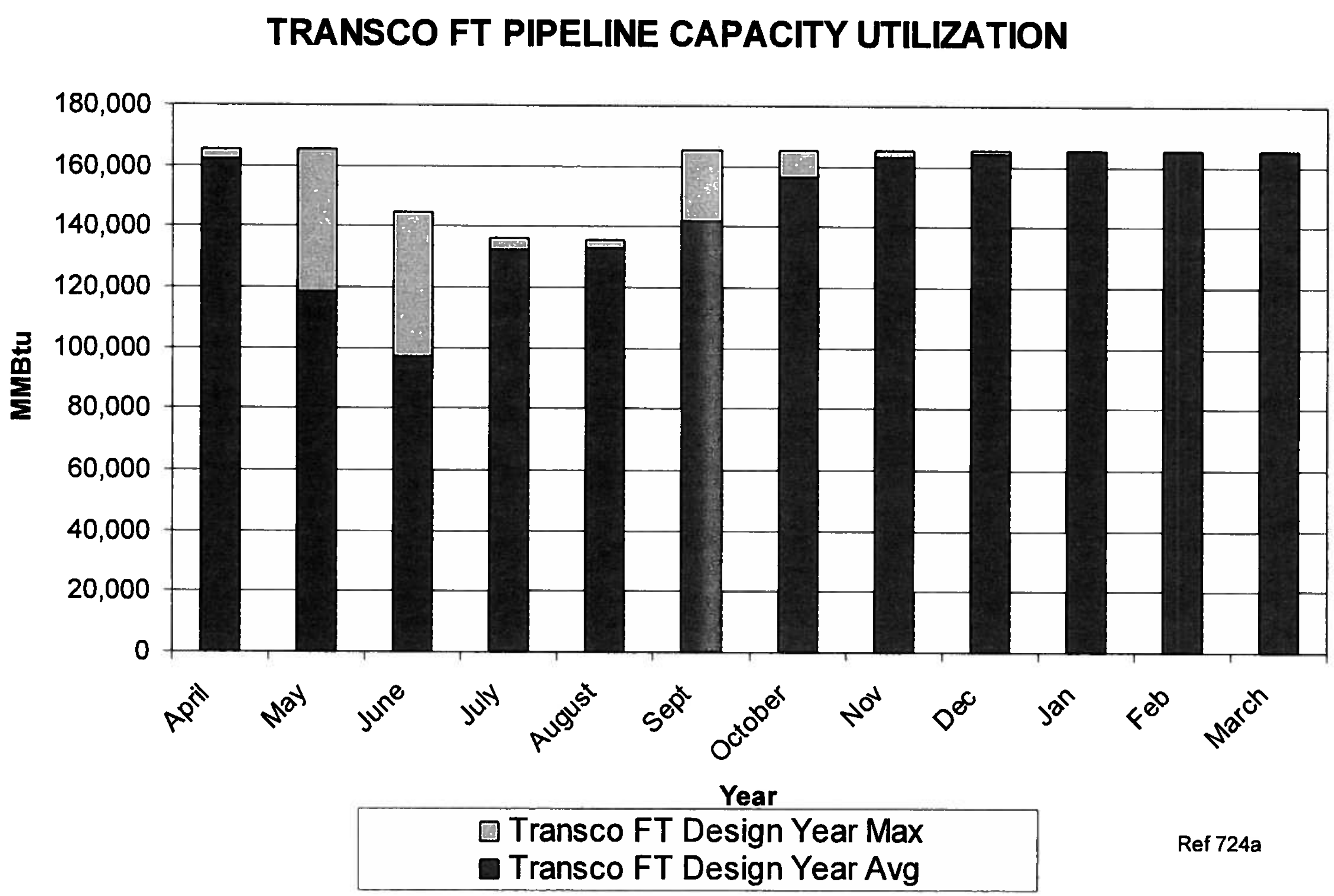
Transco FT Reference Case Utilization is 89%



Ref 724a

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Transco PSFT Reference Case Utilization is 100% in Winter

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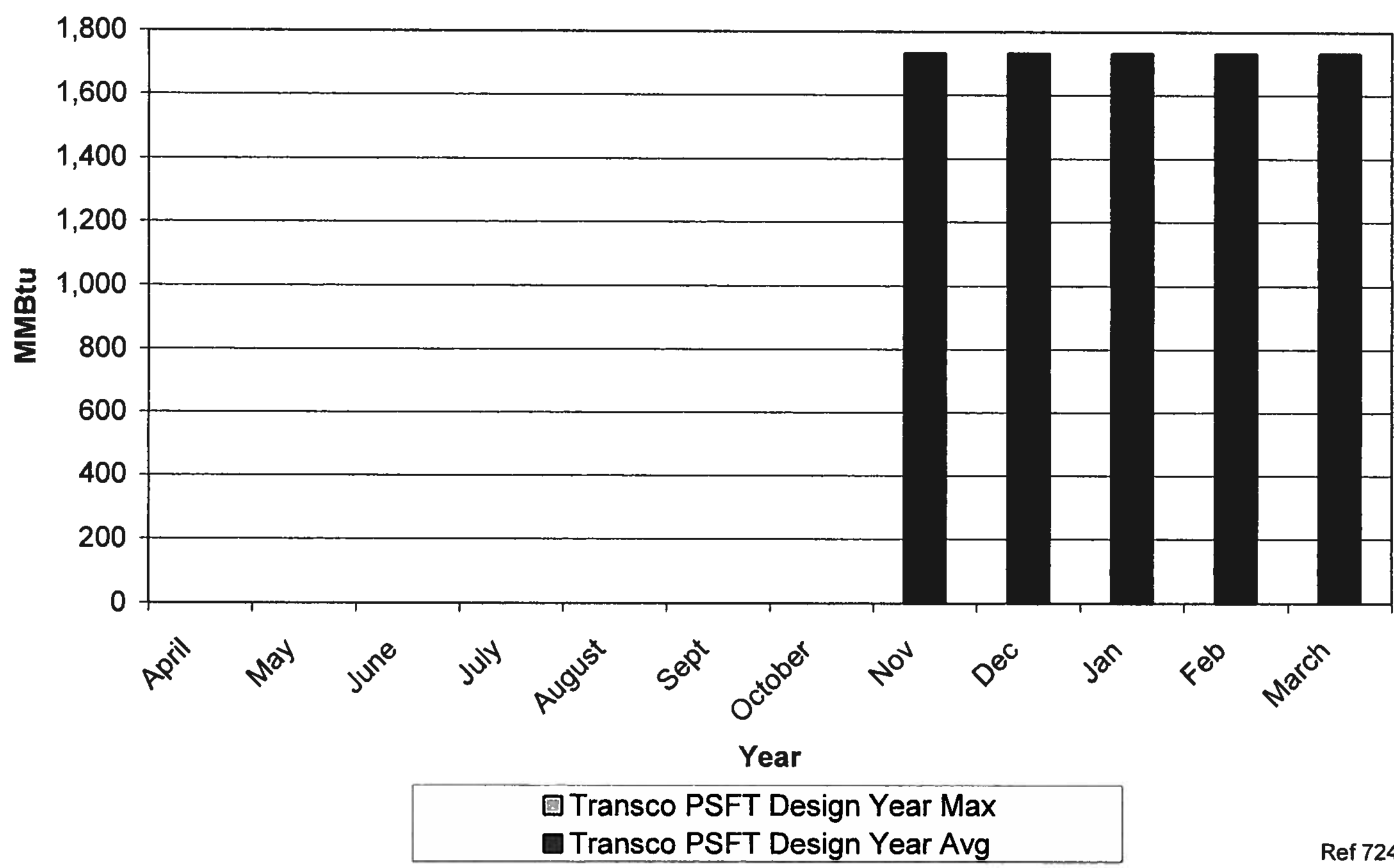

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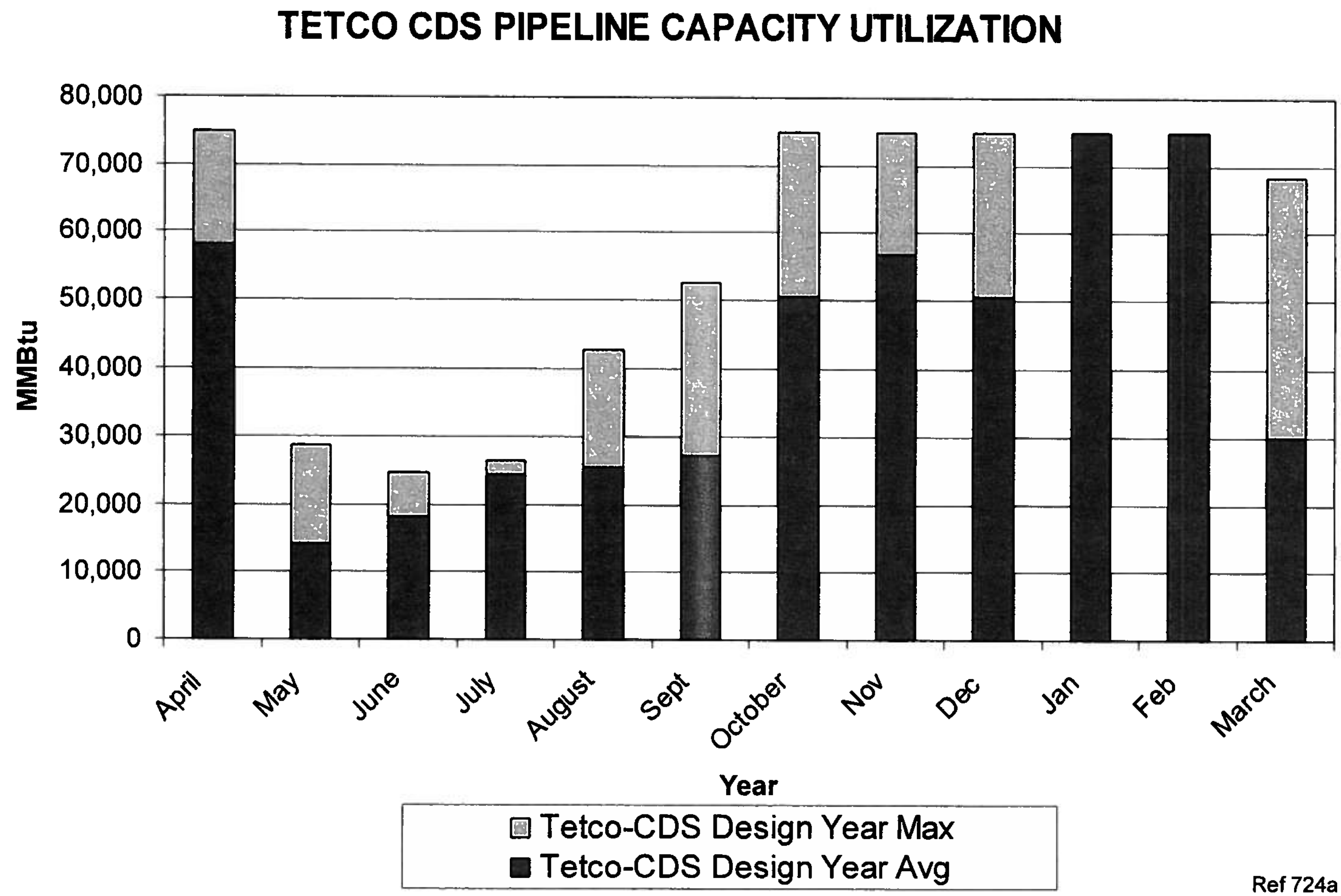
Tetco CDS Reference Case Utilization is 56%



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Tetco FT Reference Case Utilization is 53%

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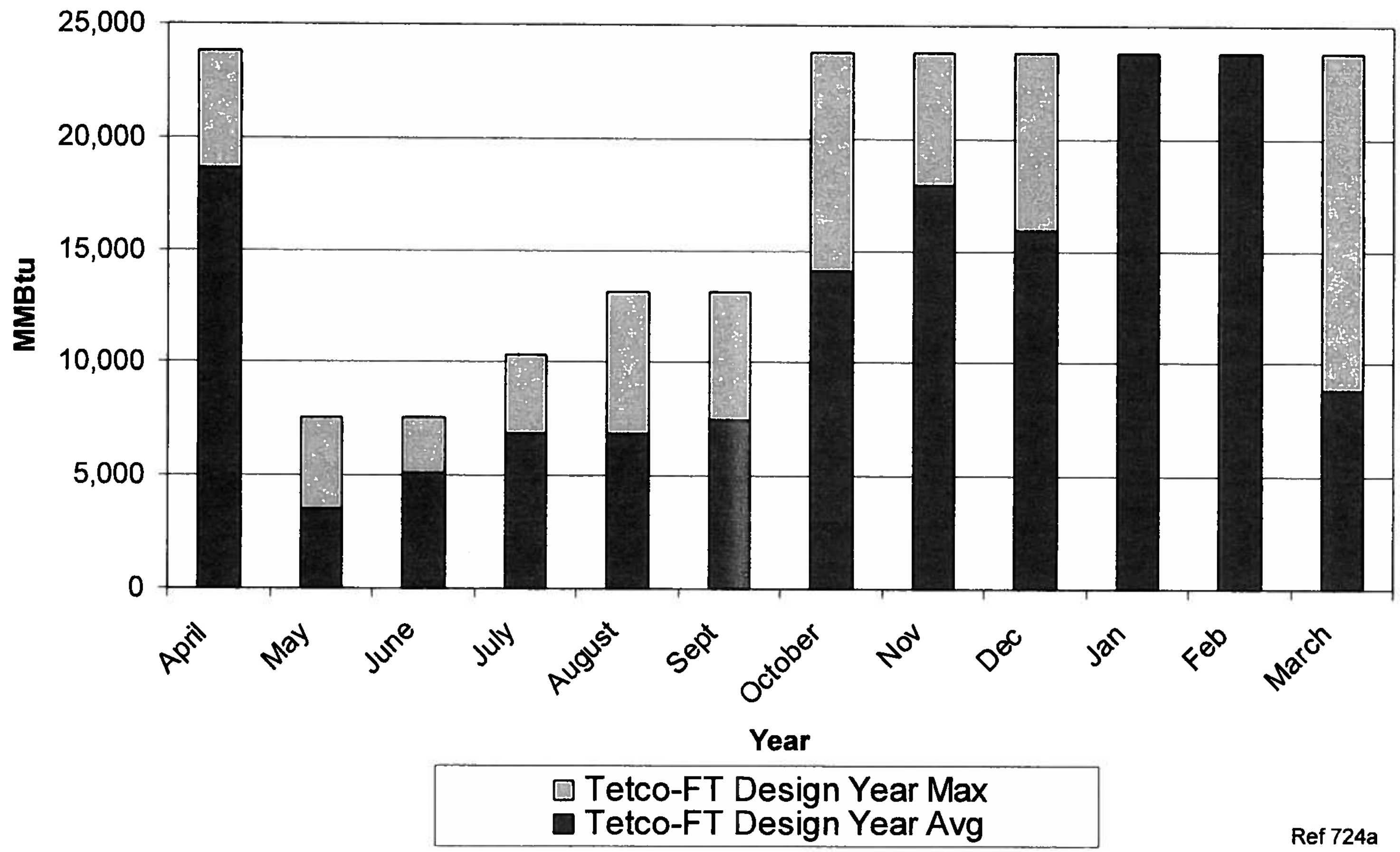
TETCO FT PIPELINE CAPACITY UTILIZATION



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PAID Capacity not Used in Average Year

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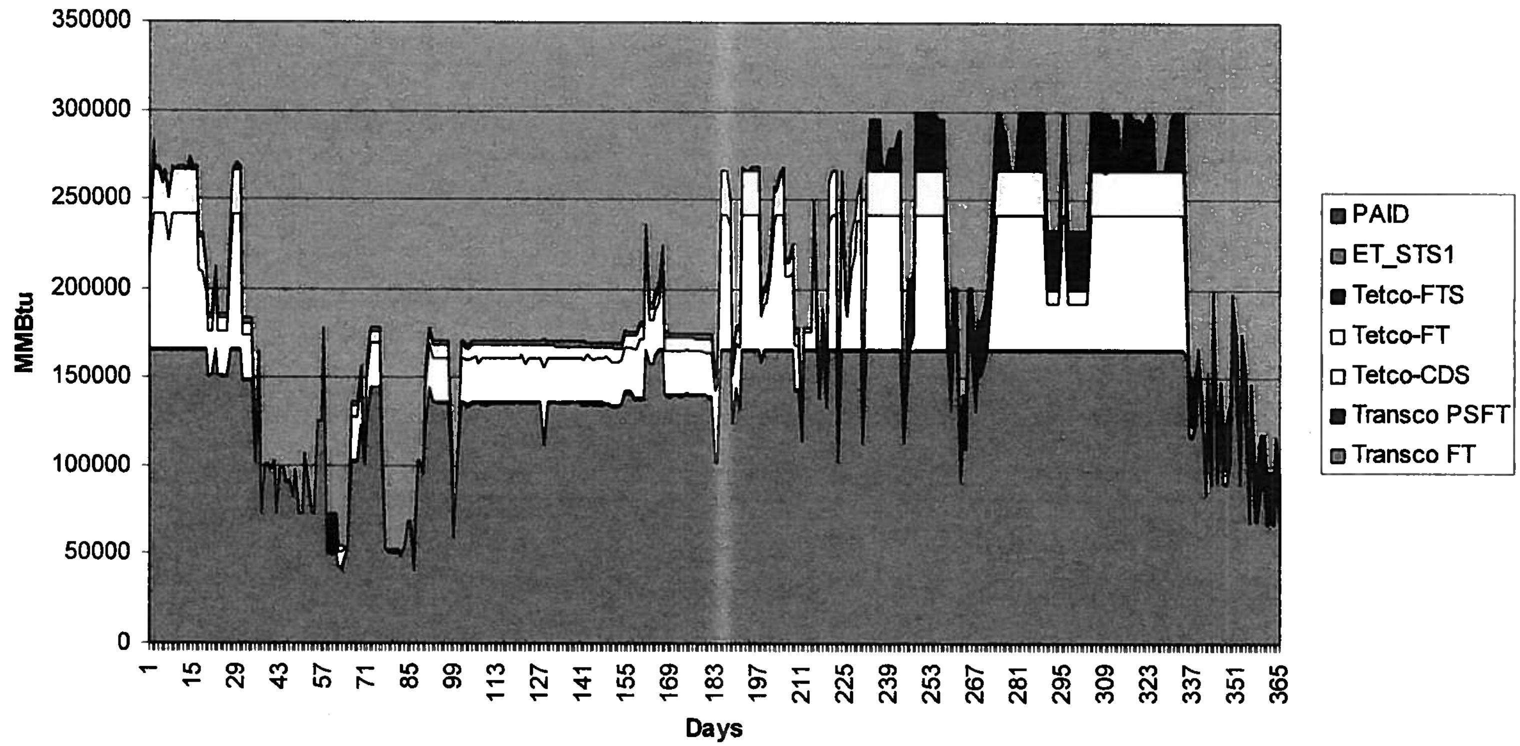

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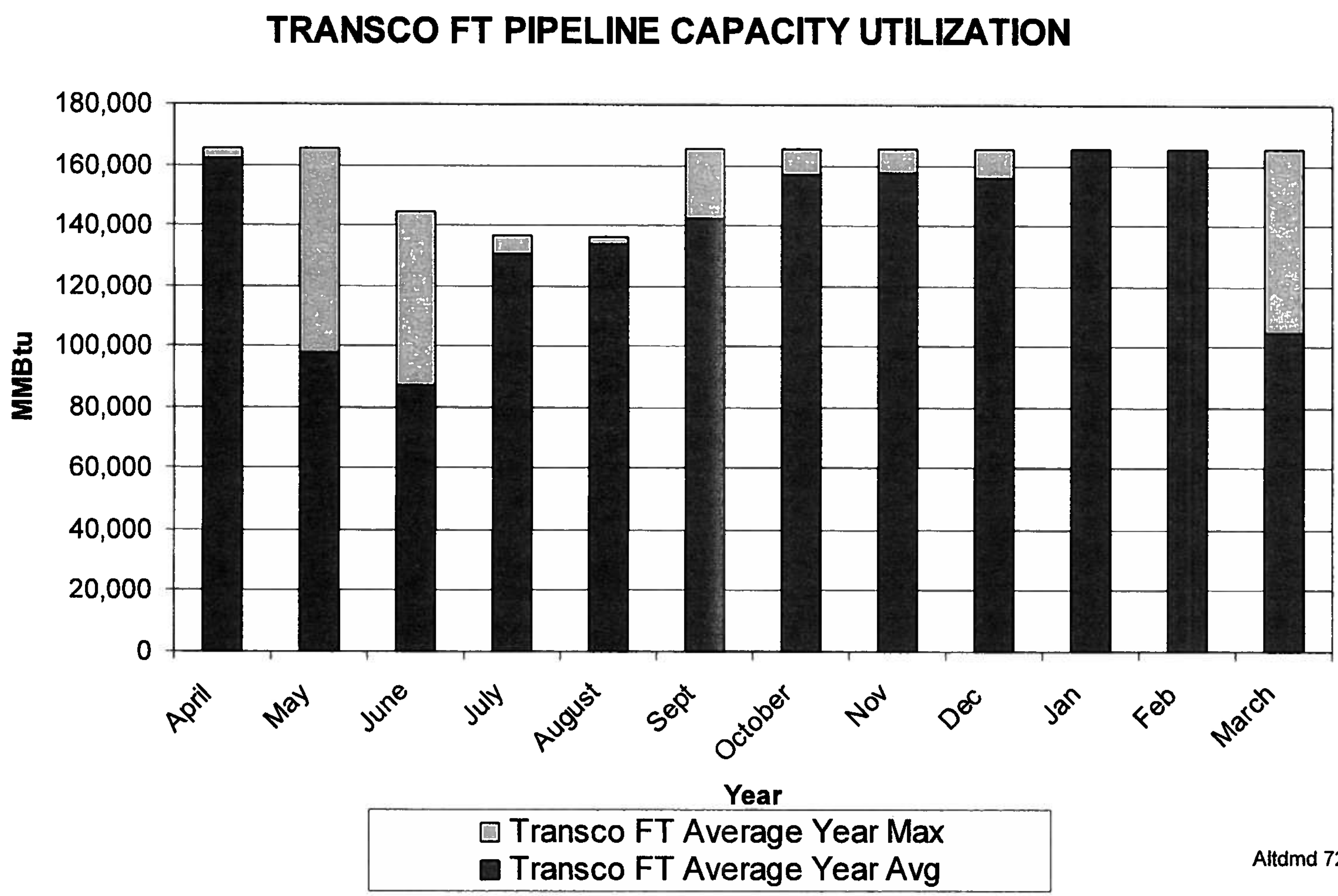
Transco FT Average Case Utilization is 84%



Altdmd 724a

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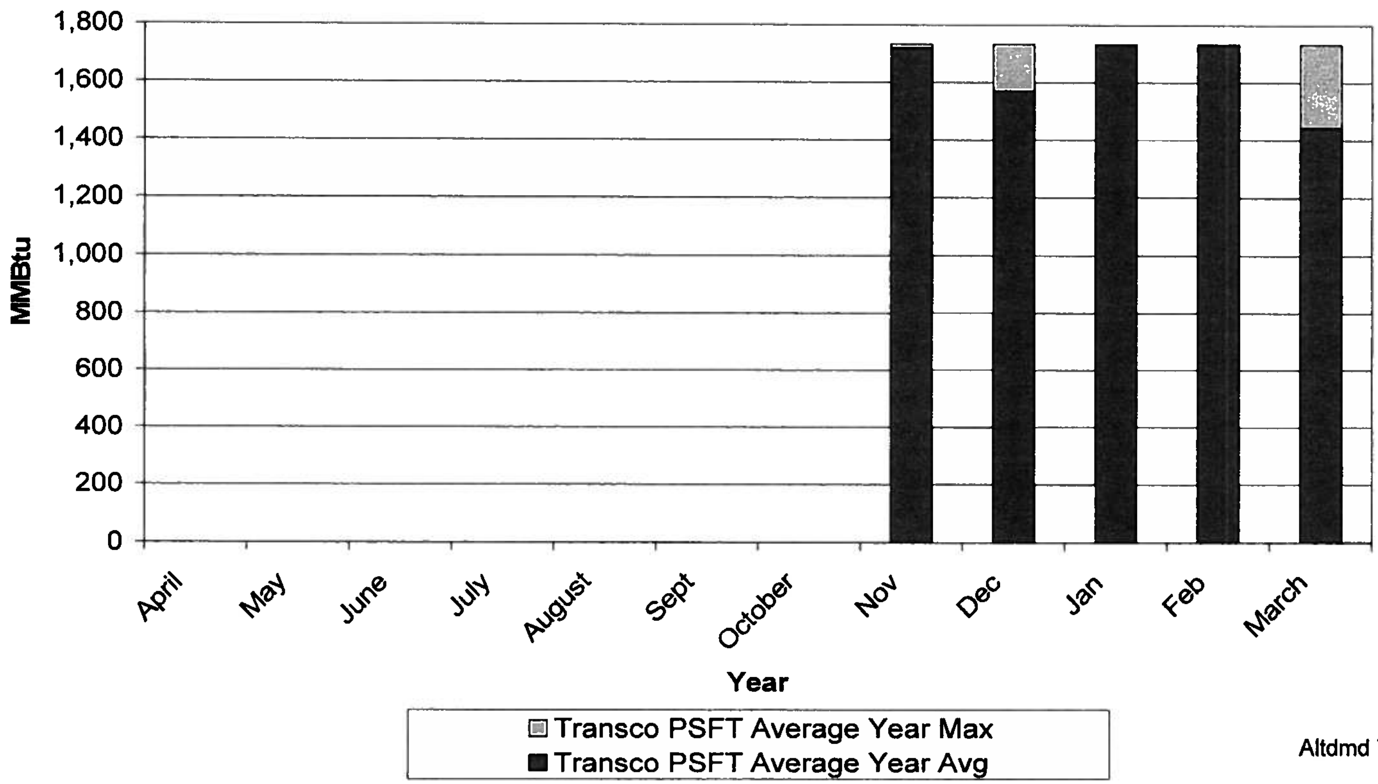
Transco PS-FT Average Case Utilization is over 90% in Winter

TRANSCO PS-FT PIPELINE CAPACITY UTILIZATION



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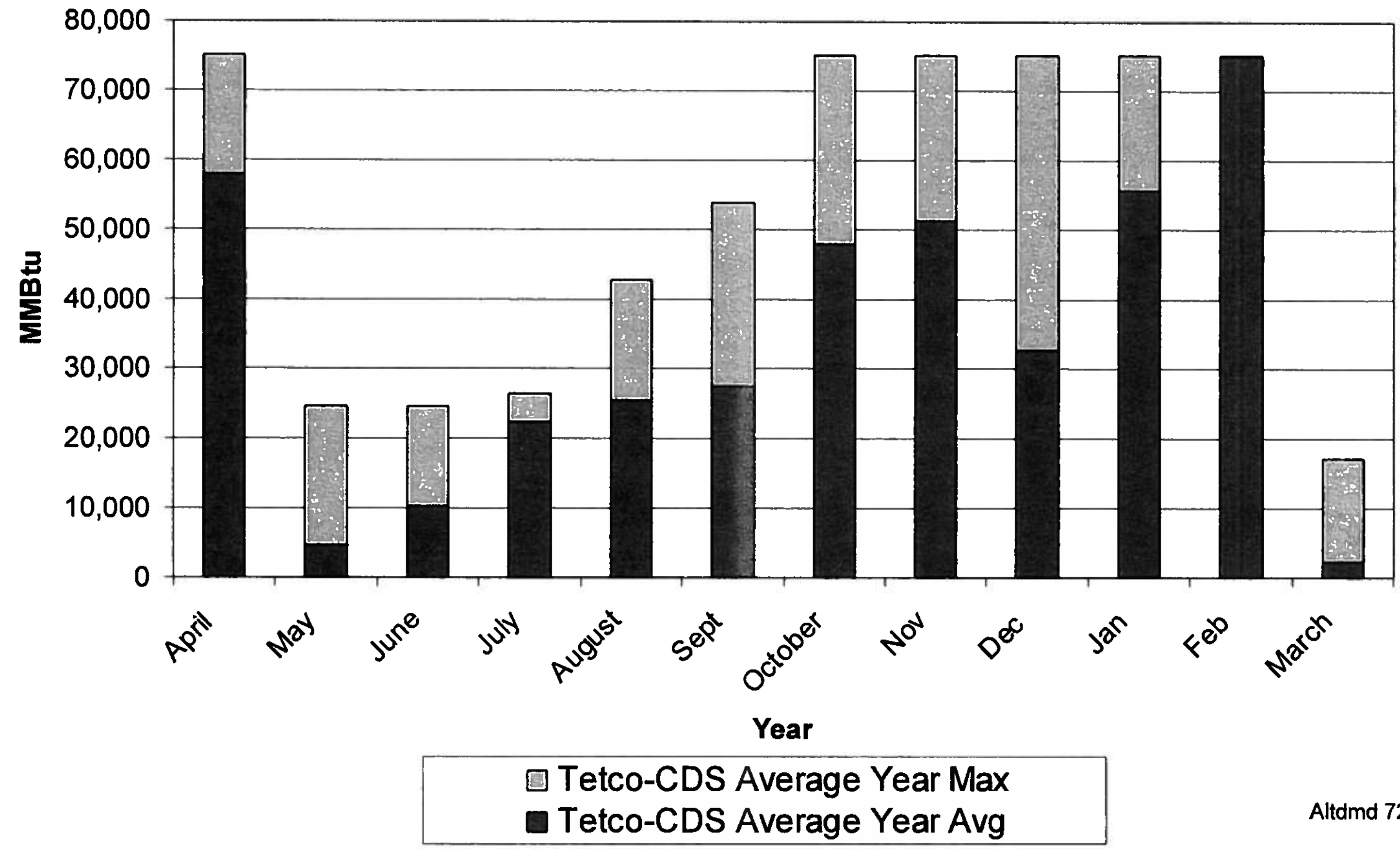
Tetco CDS Average Case Utilization is 46%

TETCO CDS PIPELINE CAPACITY UTILIZATION



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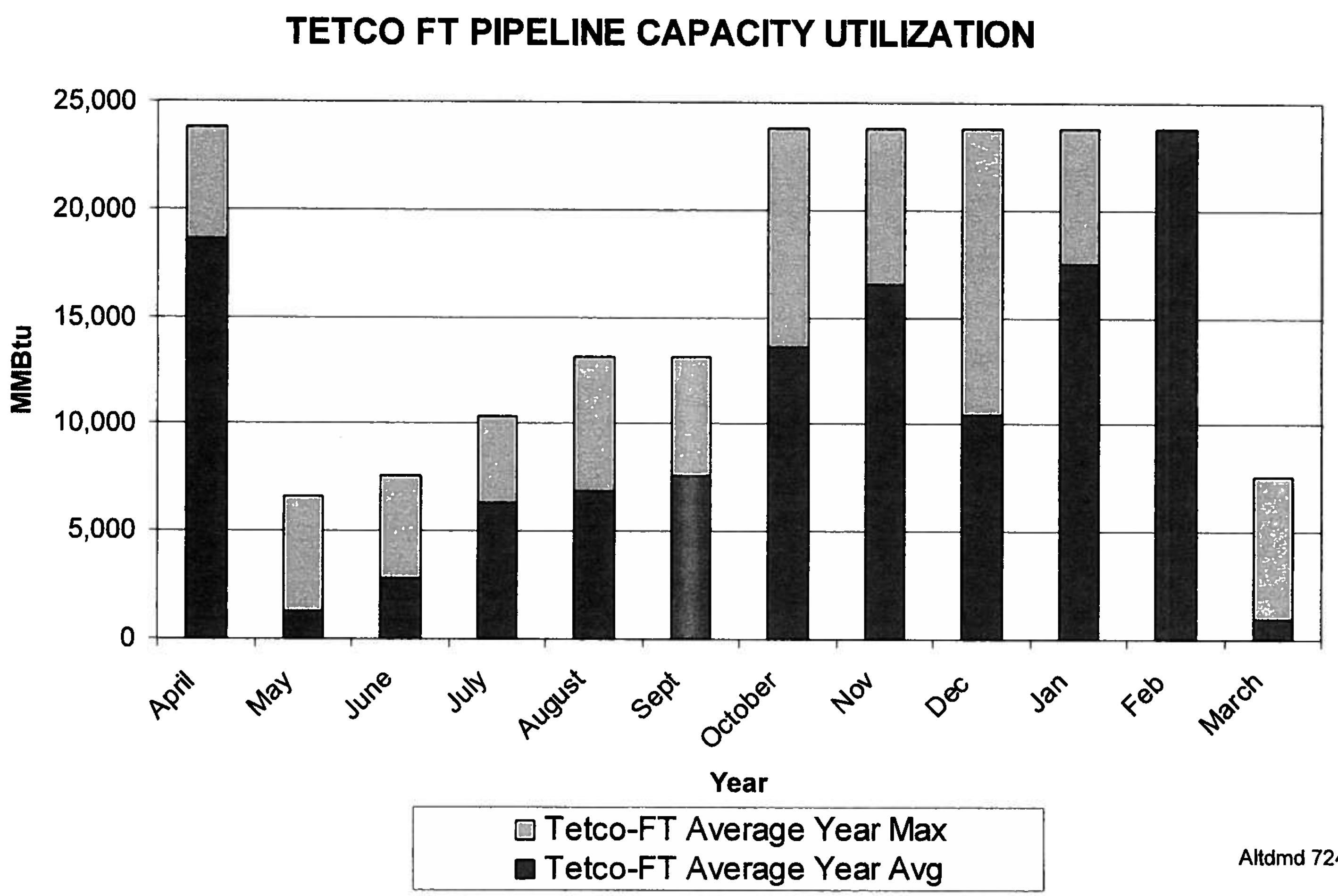
Tetco FT Average Case Utilization is 44%



Altdmd 724a

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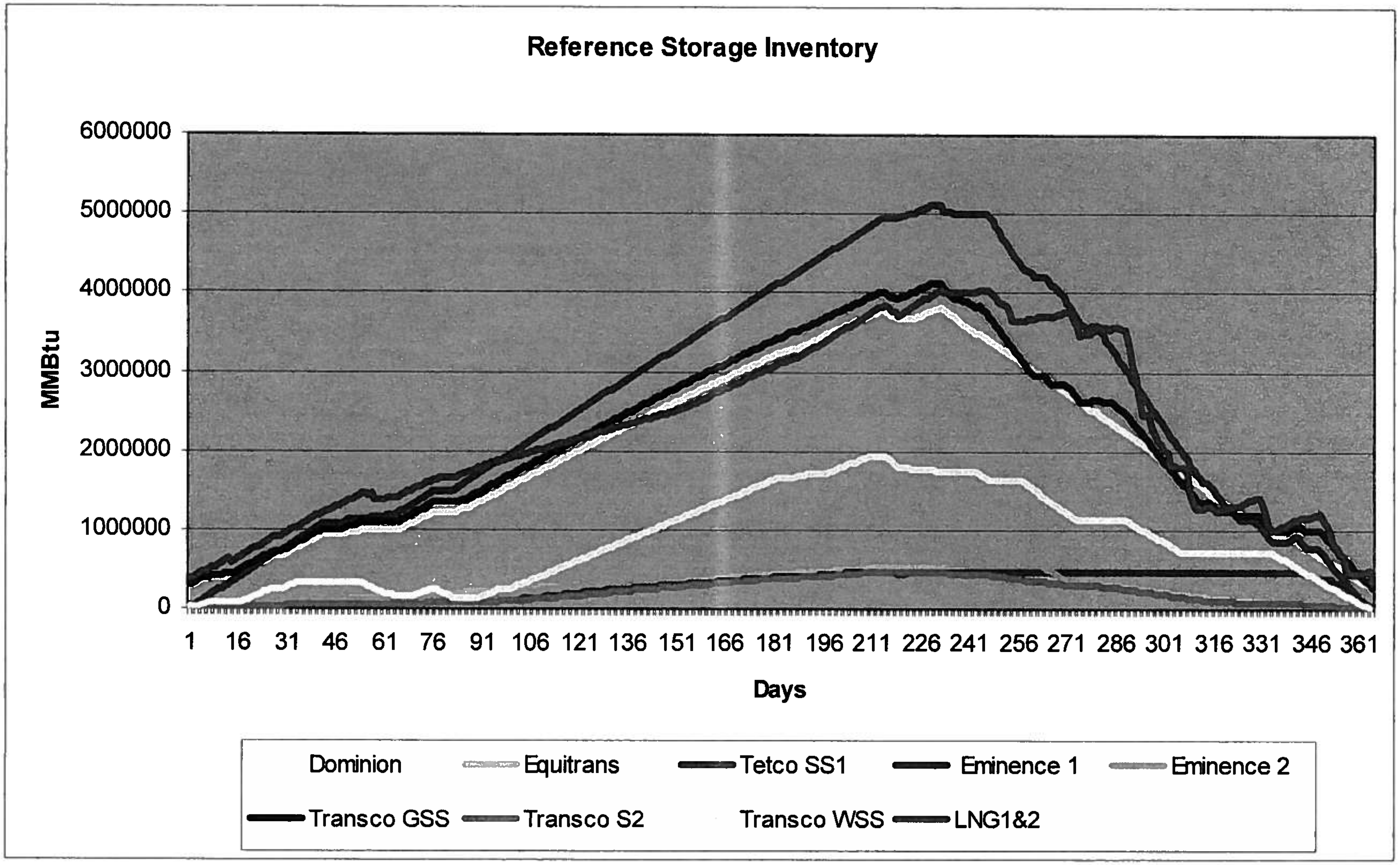
Opportunities for Pipeline Capacity Release and Off – System Sales

- Based on design year system utilization, PGW can offer firm released capacity on both systems in summer and shoulder periods.
- ICF has estimated the intrinsic value of the spare capacity.
  - For Transco FT and PSFT between $1.2 MM and $2.5 MM.
  - For Tetco FT and CDS, up to $6.2 MM
  - (Calculated as basis-sum of fuel and commodity rate x unused capacity)
- The PAID capacity is potentially very valuable in average years where it could be called and resold during peak periods.

Findings – Storage

- The optimization of the system suggests that PGW makes effective use of all of its storage services.
  - Capacity factors for the storage services are very high, even during average years.
  - Where storage services share mainline capacity, they are less valuable on peak days, but are used the rest of the season. Eminence, for example, is not used on peak days, but is fully used the rest of the year.
- Transco WSS despite its lower than contracted usage, is neverthelss a valuable storage for optimizing gas purchases and supply security.
- Equitrans storage should be examined in greater detail – it also provides benefits in supply purchasing, but these do not offset the higher fixed costs in the pricing scenarios analyzed.

Reference Case Storage Patterns



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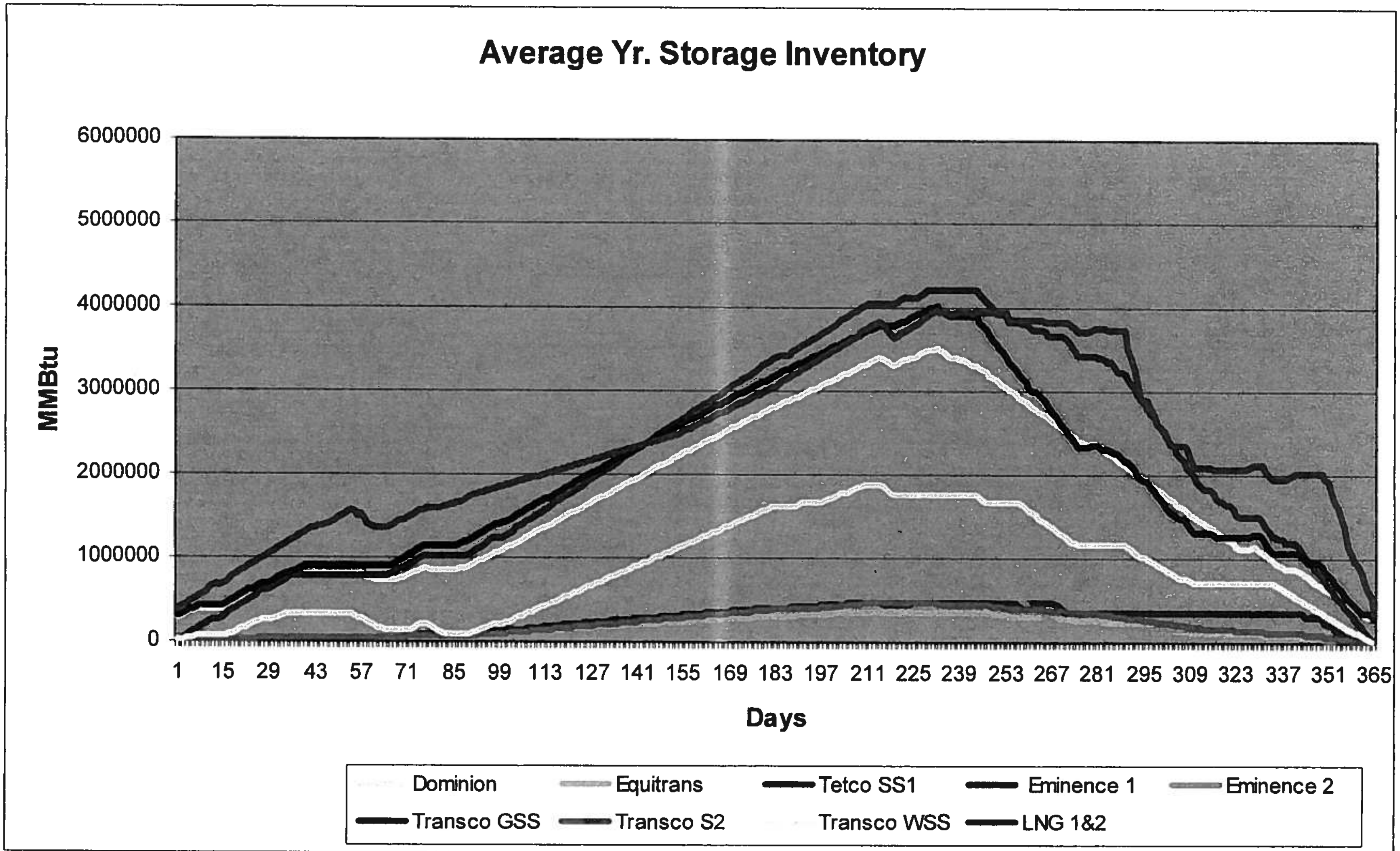
Reference Case Storage

- The graphic shows the pattern of storage injection and withdrawal and the peak quantities put into storage for each storage service.
- The large storage services (Dominion, Tetco SS1 and Transco GSS) are almost fully utilized in the design year optimization.
- LNG is also filled to near capacity.
- The smaller storage services are also filled.
- WSS appears to be on the margin, not reaching its full contracted capacity.

Average Year Storage Patterns



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Average Year Storage Utilization

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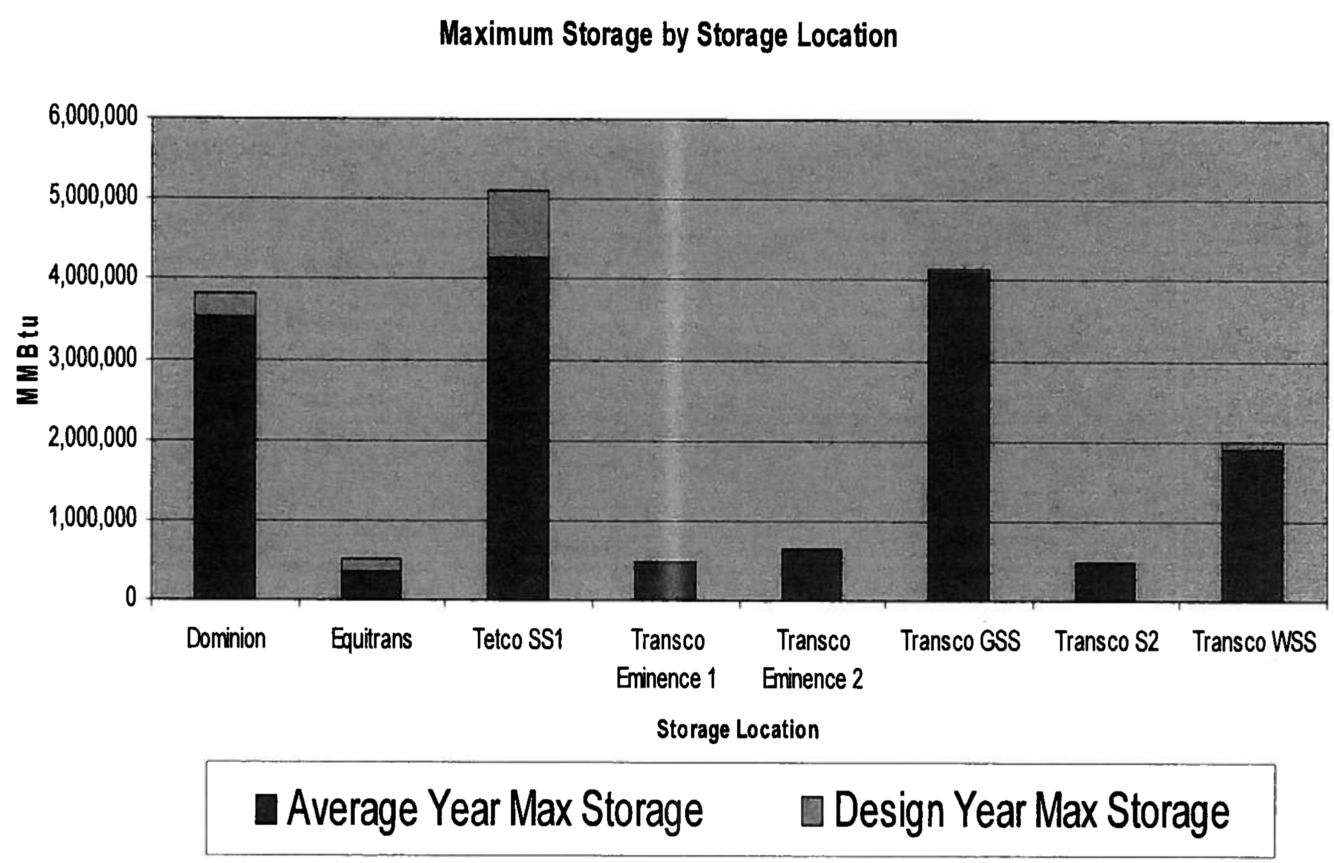
- As expected the model does not fill contracted storage services at the same level as would be expected in a design year
  - (The model has perfect foresight, however, which gas planners do not have.)
  - Gas planners must anticipate design conditions for storage injection.
- The interesting pattern is that the model still fills most of the storage services even when planning for an average winter.

Storage Capacity Utilization is Similar for Design and Average Year Sendout



Transco WSS has the Lowest Capacity Factor

	Storage Cap	Design Year	Cap Factor	Average Year	Cap Factor
Dominion	3,918,971	3,822,823	0.98	3,526,063	0.90
Equitrans	522,500	521,814	1.00	367,475	0.70
Tetco SS1	5,109,200	5,109,200	1.00	4,272,260	0.84
Eminence 1	482,792	482,792	1.00	482,792	1.00
Eminence 2	656,013	656,013	1.00	656,013	1.00
Transco GSS	4,123,733	4,123,733	1.00	4,114,258	1.00
Transco S2	466,548	466,548	1.00	466,548	1.00
Transco WSS	3,335,909	1,981,522	0.59	1,906,339	0.57

Storage Value also Depends on Price Volatility

- We tested a case where volatility and the price difference between summer and winter grew – our high volatility case.
  - We gradually increased winter gas prices to $0.75/MMBtu by Dec. 1, declining back to base levels by April 1
- Results show higher utilization of storage consistent with current levels of storage capacity
- WSS still does not reach current storage capacity levels.

	Storage Cap	Design Year	Hi Volatility
Dominion	3,918,971	3,822,823	3,902,284
Equitrans	522,500	521,814	521,814
Tetco SS1	5,109,200	5,109,200	5,109,200
Eminence 1	482,792	482,792	482,792
Eminence 2	656,013	656,013	656,013
Transco GSS	4,123,733	4,123,733	4,123,733
Transco S2	466,548	466,548	466,548
Transco WSS	3,335,909	1,981,522	2,987,263

What Happens when WSS is Reduced?

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- Because WSS uses long haul transportation, it's role appears to be maximized when there is price volatility.
- When WSS storage is eliminated, total system costs increase by about $1.5 million, mostly in purchased gas costs
- The value of WSS is related to its ability to take advantage of the volatility in gas prices.
  - When gas prices drop in the Gulf, PGW can store gas in WSS
  - When prices spike PGW does not have to buy
  - WSS value is therefore tied to its optionality
- WSS also provides supply security, as during the recent hurricane events, where it allowed PGW to bank supplies against winter shortfalls on Transco supply from the Gulf.

What Happens when Equitrans Storage is Reduced?

- ICF also tested the question of whether reducing Equitrans would affect overall costs.
- When Equitrans is reduced, savings occur in lower storage costs (eliminating Equitrans fixed costs) and lower pipeline transportation costs (Equitrans and Tetco FTS)
- The results are similar to WSS elimination
  - Fixed costs decline
  - Purchased gas costs increase
- However with Equitrans, the higher gas costs do not offset the savings in reservation and operating costs. The savings are modest – about $0.4 million
  - These results are dependent on gas price volatility and seasonal patterns.
  - When the high volatility case is considered, Equitrans becomes more valuable.

Background on LNG Issues

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- Current System
  - Total storage capacity is just over 4 Bcf
  - Liquefaction is a combination of the old Cascade system and the new expander system
    - Expander liquefaction is limited in summer due to low system throughput and can be expected to produce 2 Bcf
    - Expander can operate in winter, unlike the cascade system
    - Cascade system is old and requires overhaul each year but can fill the remainder of the tank
- Analysis thus far indicates that LNG storage and sendout are strategic elements of the supply portfolio because of flexibility and low cost relative to other options.
- Key question is whether to replace the cascade system?
  - Costs
  - Other LNG options

Alternative Sources of LNG -- Barging

Scale favors barging: typical barges hold 5,000 to 10,000 cubic meters of LNG (112,000 to 225,000 MMBtu)

- To top off the tank with 2.5 Bcf would take about 12 to 23 deliveries
- Most barge systems anticipate barging from import terminals, not lightering directly from ships
- Barge costs average about $45 to $50 million
- LNG terminal operators (e.g., Dominion) have looked into barging for longer term market planning but nothing is available in near term
- There currently are no plans for barging services from Cove Point or Distrigas
- It is possible that a Crown Landing project, if developed, could provide barges of LNG for PGW

Alternative Sources of LNG -- Trucking

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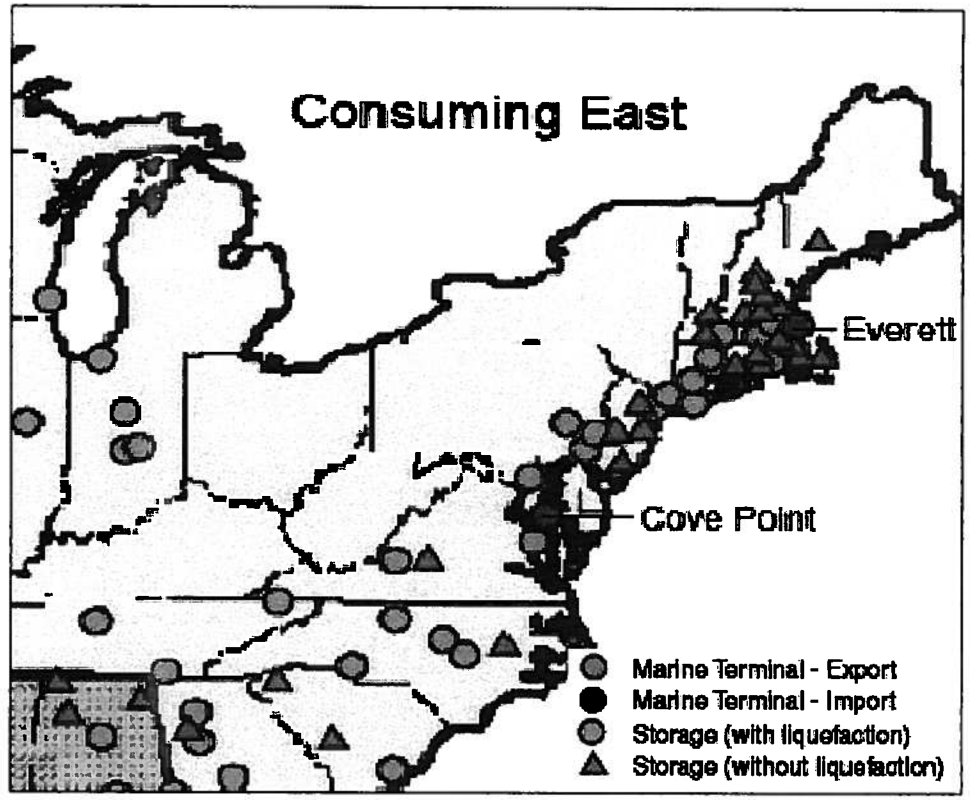
- Trucks hold typically 10,000 gallons, about 750-1,000 MMBtu
  - To top off the tank with 2.5 Bcf, would take about 3,000 truck loads when only about 1800 trucks (1.5Bcf) can be physically unloaded between March and November
  - Nearest large sources of LNG would be Distrigas (outside Boston) and Transco's facility outside New York
- Distrigas LNG costs are based on delivered gas prices in New England, plus liquefaction charges plus redelivery costs by truck.
  - 2006 average costs have been $7.54/Dt off Algonquin, plus liquefaction charges of between $1.50 and $2.50/Dt
  - Transport costs estimated by PGW in 2004 at $2.74/Dt
- Transco LNG-S service requires buyers supply the gas, pay $0.64/Dt fee and 14.6% fuel retention. Trucking costs are additional.
- Trucking presents logistical challenges in the large number of trucks that would be required

Regional LNG Liquefaction

- Regional liquefaction supports local peaking needs, where facilities have contracts for servicing satellite storage and peaking.
- Nearest large facilities are are Distrigas (Everett) and Transco Station 240 (Carlstadt, N.J.)



Expanding the LNG Liquefaction Capability

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- A new nitrogen based system would cost about $22 million
  - Capacity would be 14,000 Mcf per day between April and November
  - For our analysis, we estimated a fixed charge payment of $0.68/Dt
  - Major operating cost would be fuel – it consumes about 14.6% of gas (compared to about 0.75% for the expander system)
  - (This estimate is comparable to Transco LNG-S service, less the costs of trucking.)
- PGW is considering an option where 1 Bcf of LNG storage and sendout capability in the winter could be made available to off system customers.
  - This would help reduce the costs to PGW of the new system.
  - All of our storage sensitivities assumed this option.

Modeling LNG

- ICF's approach was to model the existing expander system and a proposed new system.
  - Current expander system has limitations on liquefaction due to low summer system send out. At most the expander system can deliver about 2.5 Bcf, before boil-off of 2,000 Mcf per day.
  - The current cascade system can fill the balance of the tank, but due to age and high operating costs is scheduled for retirement.
  - New system is estimated to cost $22 million, and would be able to work in tandem with the expander system to fill the tank.
- We modeled the expander (LNG1) and the new system (LNG2)
  - Capital costs of the expander were considered sunk; the capital costs of the new system were included in the cost of operations.
  - Operating costs were included for both.

Modeling LNG (contd.)

- LNG expansion was looked at in three ways
  - Full availability of the new unit (LNG 1&2 -- Reference Case)
  - No LNG liquefaction expansion (No LNG 2 Case)
  - Reserving 1 Bcf of storage for off system sales (LNG 1Bcf Case)
- All cases assumed no cascade system

Findings – LNG Liquefaction

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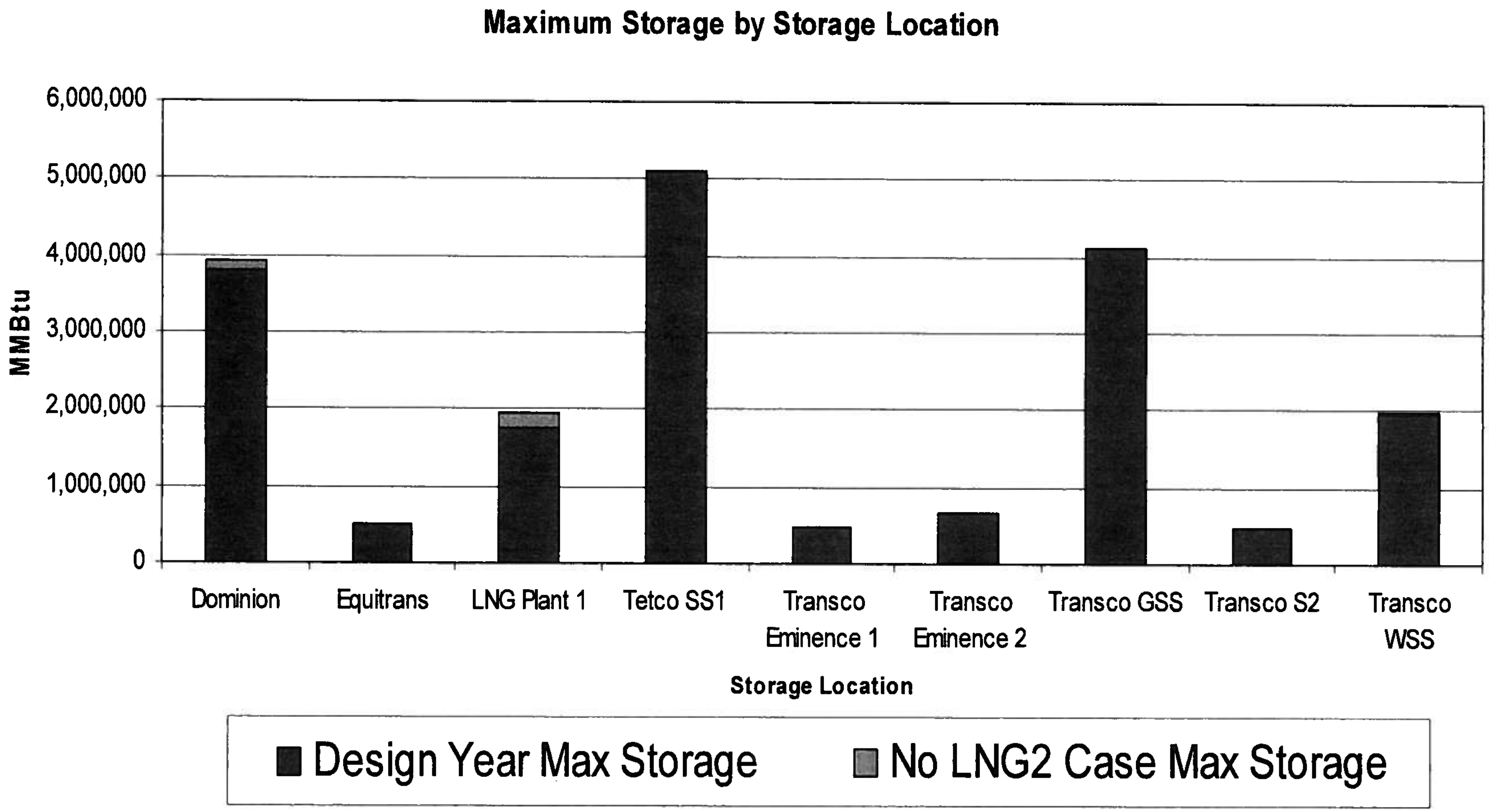
- Under all conditions, the least cost solution will maximize LNG storage and use
  - LNG reduces overall system costs
- PGW must have additional liquefaction capacity beyond the expander system to meet native load
  - Cases without expansion led to extensive winter-long interruption of smaller interruptible customers, pushing them into fuel oil markets.
  - The decision to complete the replacement of the Cascade with a newer lower operating and maintenance cost system is essentially an engineering benefit/cost analysis
- A deal where 1 Bcf of LNG storage is dedicated to a third party does not harm your ability to meet domestic load even in a design year.
  - Such a deal should be very advantageous to a third party gas marketer and hence valuable to PGW.

No LNG 2 Case (no Liquefaction Expansion): Small Effect on Traditional Storage

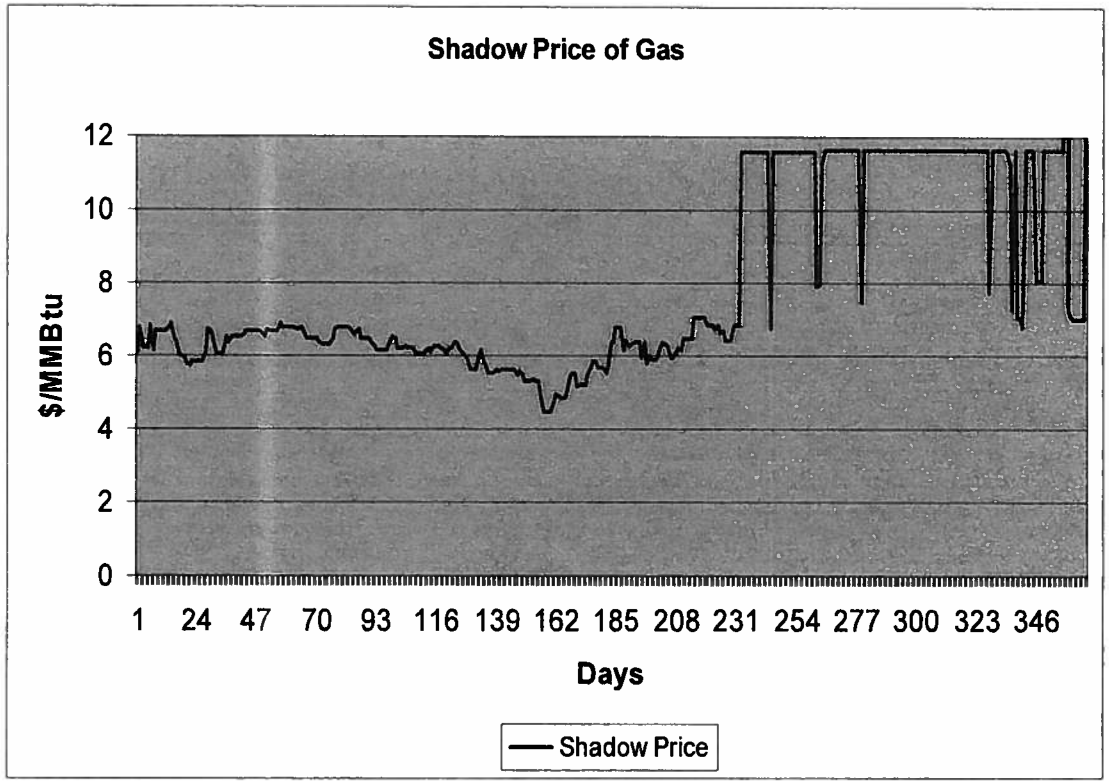


No LNG 2 Case: Modest Effect on Pipeline Utilization

- Drives Tetco CDS to 60% load factor (relative to Reference case LF of 56%)
  - CDS will fill up in December and climb to 75% of capacity in March
- Tetco FT also increases overall load factor to 58% with increases in December (98%) and March (76%)
- Transco summer utilization declines as less gas is needed to meet liquefaction requirements.

No LNG 2 Case: Large Effect on Interruption and Shadow Price of Gas

- No LNG 2, leaves winter deliverability unable to meet interruptible load.
- Interruptible (LBS, BPS) customers switch to distillate fuel oil, driving the shadow price of gas to fuel oil prices.
- The system is left with little cushion.
- The case where there is no expansion of liquefaction costs $19.6 million more than the reference case.

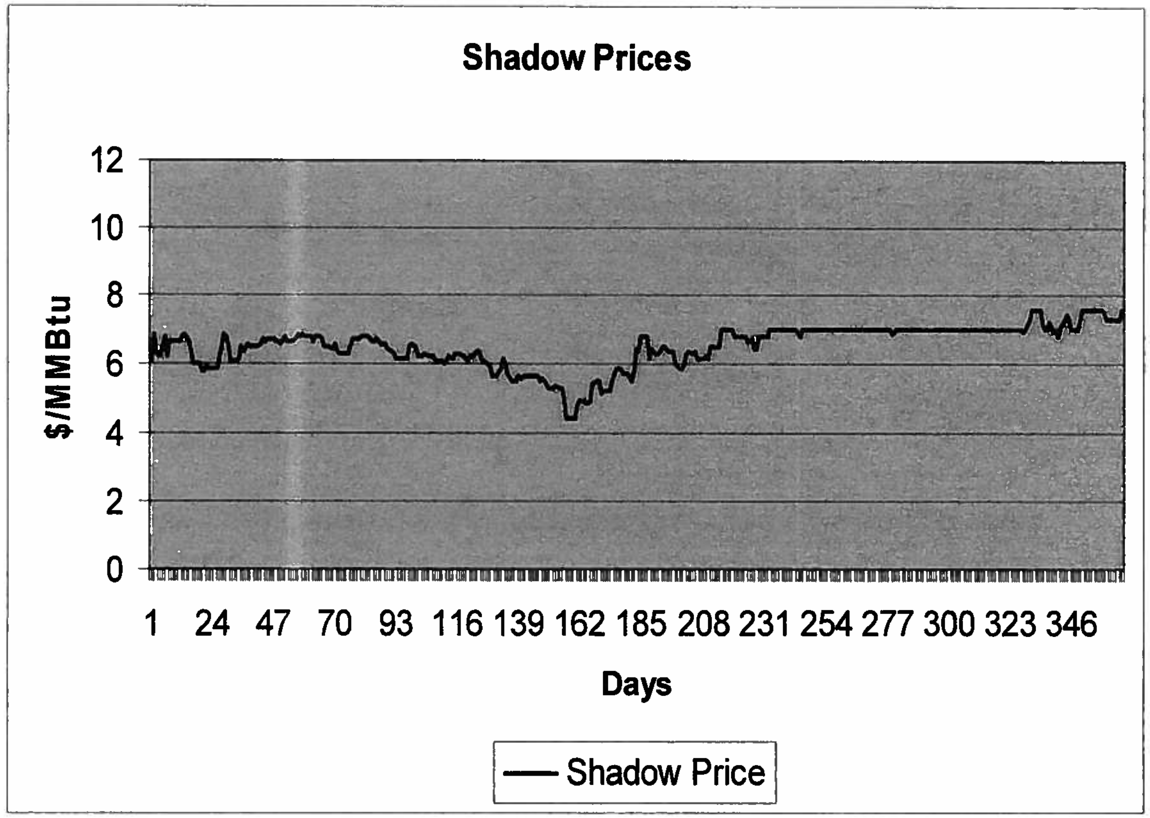


LNG 1 Bcf Case Tests

- ICF ran several sensitivities to test whether the allocation to a third party of 1 Bcf of LNG storage inventory combined with a reduction of LNG sendout capability by 25% affects your ability to meet sendout requirements.
- Cases tested were
  - Reference Case (Design Winter)
  - Elimination alternatively of Eminence, Equitrans, Transco S2, Transco WSS
- In all cases there is adequate supply capability to meet sendout requirements, without interruptions.

LNG 1 Bcf Case does not Affect Sendout

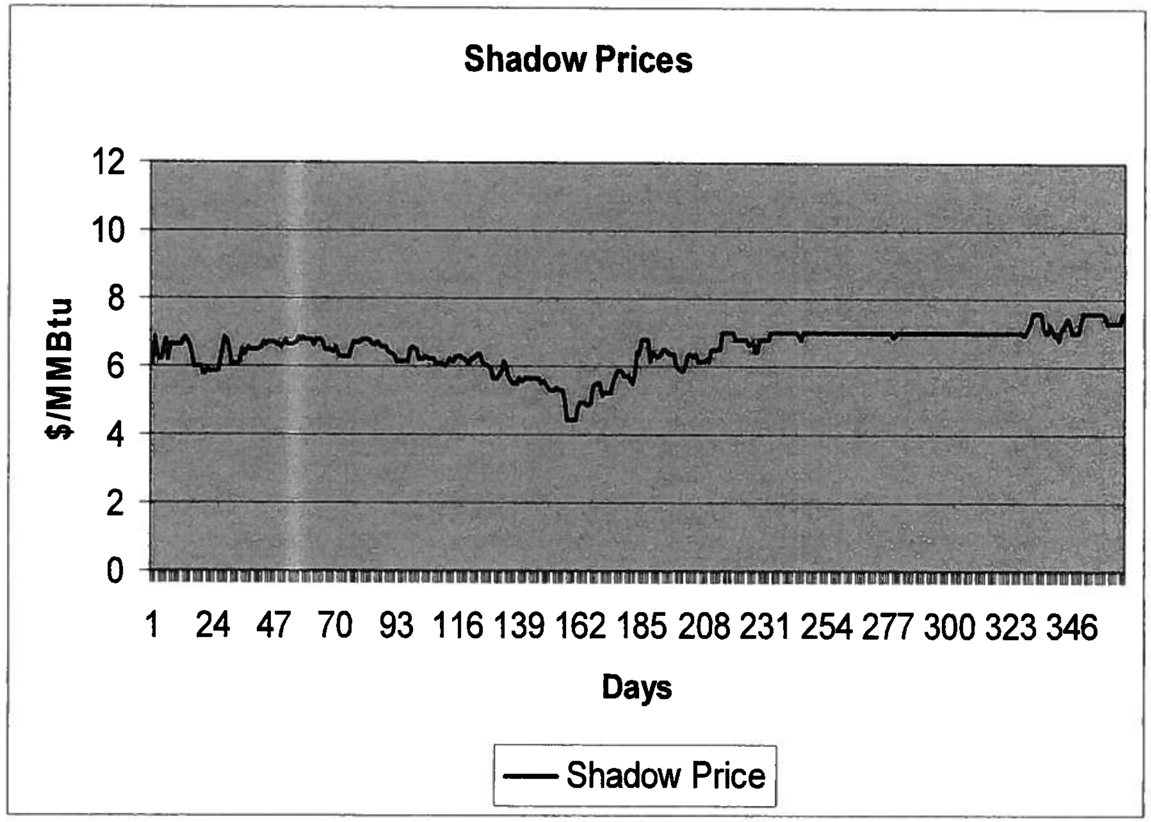
- Reducing LNG storage by 1 Bcf does not lead to interruption
- This assumes that PAID capacity is available.
- When PAID capacity *is not* available, increased interruption occurs in March as inventory is depleted and sendout LNG sendout is compromised.
- The LNG 1 Bcf case creates savings through the off-system sales.



Passion. **Expertise. Results.**

LNG 1 Bcf Case and No Equitrans Suggests a Closer Look at Equitrans

- Reducing LNG storage by 1 Bcf combined with reducing Equitrans does not lead to interruption.
- Our estimate that the savings from avoided Equitrans (and associated transportation) fixed costs is partially offset by higher purchased gas costs.
- On net, eliminating Equitrans creates a $0.4 million savings
- Higher volatility in gas prices will reduce this advantage.



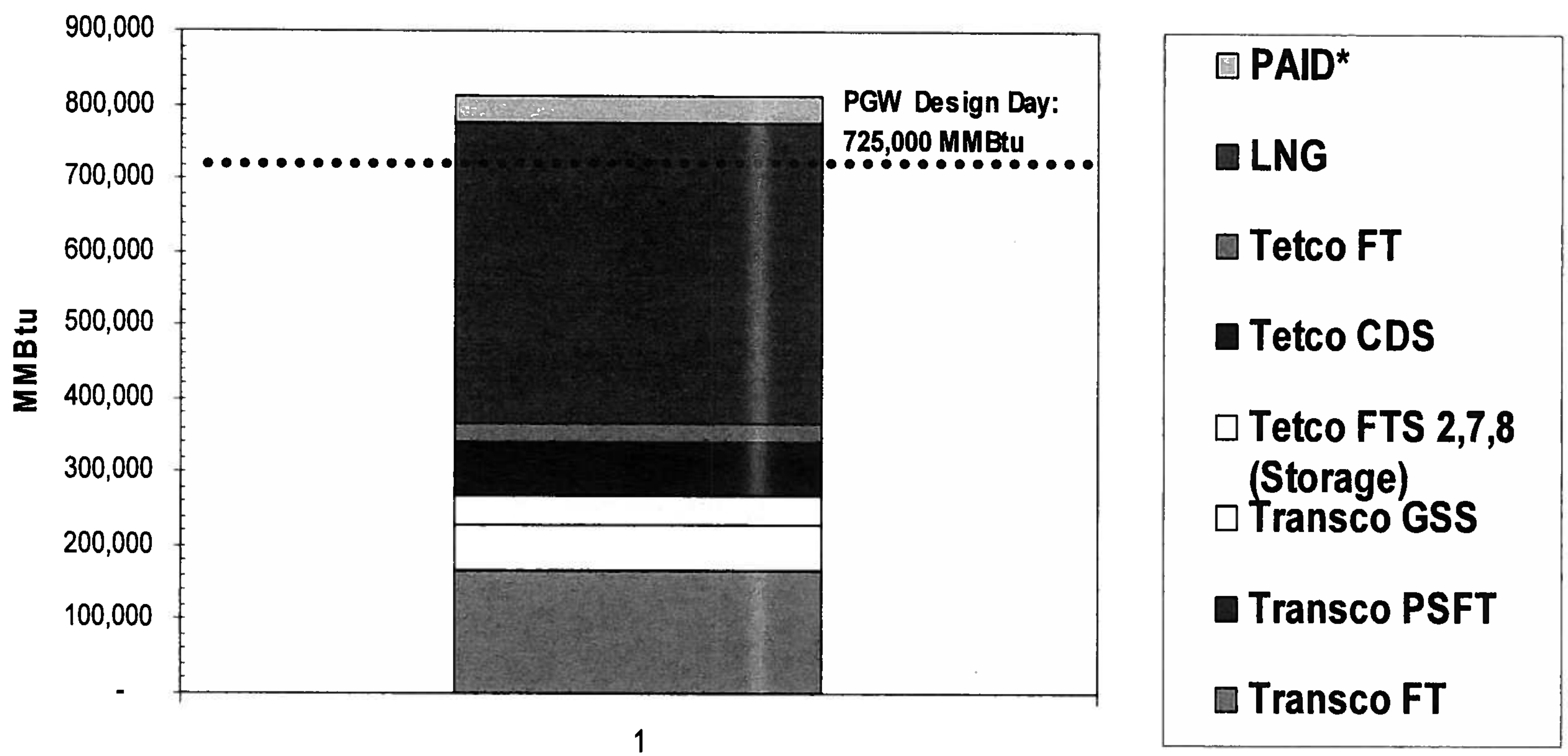
Passion. **Expertise. Results.**

Outline

ICF INTERNATIONAL

- Introduction
- Market Context
- Design Winter and Day Analysis
- Supply Analysis and Issues
- Conclusions and Recommendations

Observation: Design Day Deliverability is an Incomplete Measure of Asset Value



PAID released capacity has no annual demand charge.

Observation: Design Day Deliverability is an Incomplete Measure of Asset Value

ICF INTERNATIONAL

- Comparing Design Day requirements with available options is not a complete analysis.
- PGW operates with a 12 percent reserve margin over Design Day sendout requirements. This does not appear unreasonable.
  - Deliverability options on Design Day include
    - Transco long haul pipeline capacity
    - Transco GSS storage
    - Tetco/Dominion/Equitrans Storage delivered through Tetco FTS services
    - LNG
    - PAID – released capacity which has no long term fixed costs
- Design Day does not account for "Design Hour" requirements to maintain system pressures
- Design Day does not account for storage optionality in volatile gas markets.

Conclusions and Recommendations

- PGW's approach to estimating design winter and day conditions is reasonable and yields results that are prudent for capacity planning purposes.
- PGW uses its full pipeline capacity during winter seasons. Overall capacity utilization is higher for Transco, which is the lower cost pipeline, than it is for Tetco.
  - PGW has some opportunities to release capacity on these pipes, or engage in off-system sales when capacity is not needed for native load.
  - PGW should not permanently release capacity without call-back rights for winter seasons.
- PGW storage services appear adequate to meet peak requirements.

Conclusions and Recommendations contd.

ICF INTERNATIONAL

- WSS is seldom used to full capacity due largely to the fact it must use mainline pipeline capacity to redeliver gas.
  - Nevertheless, WSS is strategic for optimizing gas purchases and hedging prices to the system. Eliminating WSS would cost the system more than the savings from avoided reservation charges.
- Equitrans storage is a close call and should be looked at carefully
- Trading opportunities exist around the WSS, Equitrans, and other storage services in conjunction with pipeline capacity – however, this was not analyzed.
  - Any off system sales employing LNG would require coordination among all PGW's supply assets.
- LNG optimization must focus on improving liquefaction capabilities.
  - Without expanding the liquefaction above the expander system, substantial interruptions could occur.
  - A strategy to use an expanded system to undertake third party sales would create benefits for PGW and its customers.

TAB 14

Docket No. R-10XXX

Item 53.64(i)(1)

Philadelphia Gas Works
Pennsylvania Public Utility Commission
52 PA Code 53.61, et seg.

Item 53.64(i) Utilities shall comply with the following:

(1) Thirty days prior to the filing of a tariff reflecting increases or decreases in purchased gas expenses, gas utilities under 66 Pa.C.S. § 1307 (f) recovering expenses under that section shall file a statement for the 12-month period ending 2 months prior to the filing date under 66 Pa.C.S.§ 1307(f) as published in accordance with subsection (b) which shall specify:

(i) The total revenues received under 66 Pa.C.S. § 1307(a), (b) or (f), including fuel revenues received, whether shown on the bill as 66 Pa.C.S.§ 1307(f) as published in accordance with subsection (b) which shall specify:

(ii) The total gas expenses incurred.

(iii) The difference between the amounts in sub paragraphs (I) and (ii).

(iv) Evidence explaining how actual costs incurred differ from the costs allowed under subparagraph (ii).

(v) How these costs are consistent with a least cost fuel procurement policy, as required by 66 Pa.C.S. § 1318 (relating to determination of just and reasonable natural gas rates).

Response: Please see attached schedule. Additionally, please refer to Item 53.64(c)(6) for a detailed discussion regarding the company's least cost fuel procurement policy.

GCR
STATEMENT OF RECONCILIATION
January through December 2009

		NET COST OF FUEL 1	FIRM SALES 2	IRC FACTOR APPLIED 3	INTERRUPT. REVENUE CREDIT 4= (2 *3)	APPLICABLE EXPENSES 5 = (1 - 4)	GCR FACTOR APPLIED 6	GCR REVENUE BILLED 7	SSPC & MIGRATION REVENUE 8	MONTHLY OVER/(UNDER) RECOVERY 9 = (7 + 8 - 5)	NATURAL GAS REFUNDS 10	CUMULATIVE OVER/(UNDER) RECOVERY 11
		$	MCF	$	$	$	$	$	$	$	$	$
PRIOR YEAR'S CARRYOVER:												11,248,928
JANUARY 2009	Actual	122,281,446	9,221,074	0.2113	1,947,952	120,333,494	11.6767	106,465,137	(11,417)	(13,879,774)	0	(2,630,846)
FEBRUARY	Actual	78,414,407	8,874,697	0.2059	1,827,300	76,587,107	10.7007	94,948,381	22,064	18,383,339	0	15,752,493
MARCH	Actual	70,226,784	6,690,089	0.2091	1,398,563	68,828,221	9.5600	63,294,692	44,372	(5,489,157)	0	10,263,336
APRIL	Actual	24,894,113	4,373,233	0.2122	928,000	23,966,113	8.4192	36,909,123	(37,181)	12,905,830	0	23,169,165
MAY	Actual	13,981,288	2,186,285	0.2122	463,930	13,517,358	8.4192	18,441,508	(15,429)	4,908,721	0	28,077,886
JUNE	Actual	10,301,953	1,380,535	0.2141	295,504	10,006,449	7.8004	10,761,684	9,612	764,846	0	28,842,732
JULY	Actual	10,075,761	1,162,540	0.2159	250,992	9,824,769	7.1815	8,449,439	(19,548)	(1,394,878)	6,275	27,454,129
AUGUST	Actual	10,575,549	1,017,205	0.2159	219,615	10,355,934	7.1815	7,388,777	14,398	(2,952,760)	136,343	24,637,712
SUBTOTAL JAN.TO AUG. 08		340,751,301	34,905,657		7,331,855	333,419,446		346,658,742	6,870	13,246,166	142,618	24,637,712
2008-2009 FINALIZED OVERCOLLECTION												24,637,712
2008-2009 INTEREST CREDIT ON COMMODITY												973,740
TOTAL "E" FACTOR												25,611,453
SEPTEMBER 2009	Actual	10,815,702	1,074,087	0.1650	177,171	10,638,531	7.1358	7,715,994	13,920	(2,908,617)	0	22,702,835
OCTOBER	Actual	18,114,638	1,670,689	0.1140	190,459	17,924,179	7.0900	11,879,385	12,844	(6,031,951)	0	16,670,885
NOVEMBER	Actual	26,440,822	3,081,608	0.1140	351,303	26,089,519	7.0900	22,136,103	36,034	(3,917,382)	0	12,753,503
DECEMBER	Actual	54,256,451	5,671,027	0.1140	646,497	53,609,954	7.1699	41,026,407	42,880	(12,540,667)	0	212,836
SUBTOTAL SEPT. TO DEC. 08		109,627,613	11,497,411		1,365,430	108,262,183		82,757,889	105,677	(25,398,617)	0	212,836
TOTAL 2009		450,378,914	46,403,068		8,697,285	441,681,629		429,416,631	112,548	(12,152,451)	142,618	212,836

TAB 15

<u>Philadelphia Gas Works</u>

Pennsylvania Public Utility Commission
52 Pa. Code §53.61, et seq.

Item 53.65 (1)

The costs of the affiliated gas, transportation or storage as compared to the average market price of other gas, transportation or storage and the price of other sources of gas, transportation and storage.

Response:

PGW has no affiliates, see response to 53.64(c)(1) for price of gas, transportation and storage.