



UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION

Paiute Pipeline Company ) Docket No. RP09-\_\_\_\_-000  
)  
)

Prepared Direct Testimony  
of  
THEODORE K. WOOD

## INTRODUCTION

Q. 1 Please state your name and business address.

A. 1 My name is Theodore K. Wood, and my business address is  
5241 Spring Mountain Road, Las Vegas, Nevada 89150-0002.

Q. 2 By whom are you employed and in what capacity?

A. 2 I am employed by Southwest Gas Corporation (Southwest or the Company) as Senior Manager in the Treasury Services Department.

Q. 3 Does Appendix A summarize your educational background and business experience?

A. 3 Yes, it does.

Q. 4 Have you previously testified before any regulatory commissions?

A. 4 Yes. I previously testified before the California Public Utilities Commission (CPUC), the Arizona Corporation Commission (ACC) and the Public Utilities Commission of Nevada (PUCN). I have also provided written testimony to the Federal Energy Regulatory Commission (FERC or Commission).

1  
2 Q. 5 What is the purpose of your prepared direct testimony in  
3 this proceeding?

4 A. 5 The purpose of my prepared direct testimony is to support  
5 Paiute Pipeline Company's (Paiute) overall requested rate  
6 of return in this proceeding. Specifically, my testimony  
7 details the development of the requested capital  
8 structure, an estimation of a fair and reasonable rate of  
9 return on common equity, and the embedded cost of  
10 long-term debt used for determining the appropriate  
11 weighted average cost of capital for Paiute. My testimony  
12 is comprised of three sections: (I) the development and  
13 use of an appropriate capital structure for ratemaking,  
14 (II) the estimation of the cost of common equity, and  
15 (III) the development of the embedded cost of long-term  
16 debt.

17 Q. 6 Are you sponsoring any schedules and exhibits in support  
18 of your prepared direct testimony?

19 A. 6 Yes. I am sponsoring the schedules under Statement F and  
20 the financial supporting Exhibits No.\_\_(TKW-2) through  
21 No.\_\_(TKW-8), which are attached to my testimony. These  
22 schedules were prepared by me or under my supervision.

23 Q. 7 What is the overall rate of return necessary for Paiute  
24 to have the opportunity to earn on its investment in  
25 natural gas transmission facilities?

26 A. 7 An overall rate of return of 10.89 percent is reasonable  
27 in this proceeding. This rate of return is developed as

follows:

Paiute Pipeline Company

<u>Component</u>	<u>Ratio</u>	<u>Cost</u>	<u>Weighted Cost</u>
Long-Term Debt	45.60%	7.39%	3.37%
Common Equity	<u>54.40%</u>	13.83%	<u>7.52%</u>
Total	<u>100.00%</u>		<u>10.89%</u>

Q. 8 Why is this rate of return appropriate and necessary for Paiute?

A. 8 This rate of return is necessary in order to maintain the Company's financial integrity, to allow the Company to attract new capital and to permit equity holders the opportunity to earn a fair and reasonable rate of return.

Moreover, this rate of return will meet the standard of reasonableness set forth by the United States Supreme Court in Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679 (1923) (Bluefield). The court ruled in that case that:

The return should be reasonably sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.

Furthermore, this rate of return will meet the comparability standard set by the court in the Federal Power Commission v. Hope Natural Gas Company, 320 U.S. 591 (1944) (Hope). In that case, the court ruled:

1 . . . the return to the equity owner should be  
2 commensurate with returns on investments in  
other enterprises having corresponding risks.

3 Q. 9 Please summarize your testimony.

4 A. 9 The first part of my testimony discusses the development  
5 of the capital structure requested by Paiute, which is a  
6 hypothetical capital structure comprised of 54.4 percent  
7 common equity and 45.6 percent long-term debt. Since  
8 Paiute does not issue its own equity or debt and does not  
9 have its own bond rating, the capital structure for  
10 Paiute must be imputed. The use of its parent company's  
11 capital structure, Southwest, is not appropriate since it  
12 has a significantly lower common equity ratio relative to  
13 the average of the proxy group. A hypothetical capital  
14 structure was developed based on the average capital  
15 structures of the proxy group companies used to estimate  
16 the cost of equity.

17 The second part of my testimony discusses the  
18 methodology for estimating the cost of common equity for  
19 Paiute. A proxy group of five natural gas transmission  
20 companies was used to estimate the cost of equity. The  
21 Commission-accepted Discounted Cash Flow (DCF)  
22 methodology is applied to the set of proxy group  
23 companies to estimate the cost of equity. The resulting  
24 median estimated cost of common equity was 13.33 percent.  
25 However, because of the recent change in capital market  
26 conditions and Paiute's higher level of investment risk  
27 due to the evergreen status of many of its service

1 agreements, the requested return on common equity was  
2 adjusted upward by 50 basis points, to 13.83 percent.

3 The third and last part of my testimony discusses  
4 the development of the embedded cost of long-term debt.  
5 Southwest's embedded long-term debt cost is used as a  
6 proxy for the debt cost for Paiute. Southwest's cost of  
7 long-term debt at the end of the test period  
8 (August 31, 2009) is estimated to be 7.39 percent.

9 Combining the recommended capital structure weights  
10 with the estimated cost of common equity and the embedded  
11 cost of long-term debt results in an overall requested  
12 allowed rate of return of 10.89 percent.

13 In summary, the recommended hypothetical capital  
14 structure, together with the recommended cost of equity  
15 and embedded debt cost, are essential to provide Paiute  
16 with an opportunity to earn a fair and reasonable overall  
17 rate of return. The requested rate of return in this  
18 proceeding is fair to both customers and shareholders,  
19 and it properly reflects the risks and returns  
20 appropriate for Paiute's natural gas transportation and  
21 storage properties.

22 **I. CAPITAL STRUCTURE**

23 Q. 10 What is the capital structure Paiute is proposing for  
24 developing a rate of return in this proceeding?

25 A. 10 Paiute is proposing a hypothetical capital structure of  
26 54.4 percent common equity and 45.6 percent long-term  
27 debt.

1 Q. 11 Has the Commission set any guidelines for determining a  
2 company's capital structure?

3 A. 11 Yes. The current methodology to determine the appropriate  
4 capital structure for ratemaking was set out by the  
5 Commission in Opinion No. 414-A, Order on Rehearing,  
6 Transcontinental Gas Pipe Line Corporation, 84 FERC  
7 ¶61,084 (1998). In Opinions No. 414 and 414-A, the  
8 Commission modified the capital structure methodology  
9 that was previously defined by the Commission in Opinion  
10 No. 7 (Kentucky West Virginia Gas Company, 2 FERC,  
11 ¶61,139 (1978)), which had established a three-step  
12 process for determining a capital structure for a  
13 regulated pipeline.

14 First

15 If possible, the Commission would prefer that the  
16 regulated pipeline use an actual capital structure to  
17 develop a rate of return.

18 Second

19 If the regulated pipeline is wholly-owned and  
20 financed by the parent, or has an "atypical" capital  
21 structure which would result in excessive costs to the  
22 consumer, or inadequate returns to the investors, then  
23 the actual capital structure of the parent company should  
24 be considered.

25 Third

26 If the parent company and the regulated pipeline  
27 "subsidiary" risks are not essentially the same and this

1 would also result in inappropriate costs to the consumer,  
2 the Commission would consider the use of a hypothetical  
3 capital structure.

4 In Opinion 414-A, the Commission stated that it  
5 would prefer to utilize the pipeline's own capital  
6 structure and will do so if the applicant issues its own  
7 non-guaranteed debt and has its own bond rating. The  
8 Commission will utilize an imputed capital structure  
9 (most often that of the corporate parent) if the record  
10 in a particular case reveals that the pipeline's own  
11 equity ratio is so far outside the range of other equity  
12 ratios approved by the Commission and the range of proxy  
13 company equity ratios that it is unreasonable. The  
14 Commission will no longer use the difference in business  
15 risk between the pipeline and the parent as a factor in  
16 applying a hypothetical capital structure, but rather if  
17 the use of the parent's capital structure will result in  
18 an anomalous rate of return. The standard to be applied  
19 by the Commission remains whether the capital structure  
20 will produce just and reasonable rates. In order to meet  
21 this standard, the pipeline must demonstrate that its  
22 proposed equity ratio is not excessive as compared to  
23 equity ratios approved by the Commission in other recent  
24 cases and in comparison with the equity ratios of the  
25 proxy group companies.

26 Q. 12 Considering this criteria, do the facts and circumstances  
27 surrounding Paiute necessitate the use of a hypothetical



capital structure in this proceeding?

A. 12 Yes. First, it is not possible for Paiute to use an actual capital structure because Paiute has not publicly issued any equity nor has outstanding any non-guaranteed debt issued to a third party. Paiute has relied upon its parent corporation, Southwest, for its financing needs.

Second, the use of Southwest's capital structure, containing a significantly higher level of financial leverage than the average of the proxy group, would result in an anomalous rate of return for Paiute, absent a significant increase in allowed return on common equity. Southwest's actual capital structure at November 30, 2008, was as follows:

Long-Term Debt	52.1%
Preferred Equity	4.2%
Common Equity	43.7%
Total	<u>100.0%</u>

For the proxy group, the development of which is detailed infra, the average permanent capital structure of the proxy group as of September 30, 2008 was as follows:

Long-Term Debt	45.6%
Preferred Equity	0.0%
Common Equity	54.4%
Total	<u>100.0%</u>

Based on the significant difference in Southwest's capital structure which, relative to the proxy group, contains higher financial risk for Southwest, the use of a hypothetical capital structure is warranted.

1 Q. 13 Please explain the differences between the operational  
2 profiles of Paiute and Southwest.

3 A. 13 Paiute is a small interstate pipeline that receives gas  
4 near the Nevada/Idaho border. It transports gas in a  
5 southwesterly direction for approximately 300 miles to  
6 the Reno/Carson City area. Paiute serves parts of  
7 northern California as well as parts of northern Nevada.

8 Southwest is a diversified company consisting of  
9 multi-jurisdictional natural gas distribution operations  
10 in three states (Arizona, California, and Nevada), where  
11 it serves approximately 1.8 million customers, a  
12 wholly-owned construction subsidiary, Northern Pipeline  
13 Construction Company, and a natural gas pipeline company,  
14 Paiute Pipeline Company. The operational profile and the  
15 capital structure of Southwest is a function of the  
16 operating environment and past financial performance in  
17 each of the Company's regulatory jurisdictions and of its  
18 non-regulated subsidiary.

19 Q. 14 Please discuss Southwest's operating environment.

20 A. 14 Consideration of Southwest's operating environment should  
21 be given for why it is not appropriate to employ  
22 Southwest's capital structure for Paiute in this  
23 proceeding. Southwest has been, and continues to be, one  
24 of the fastest growing local gas distribution companies  
25 in the nation, which has required significant amounts of  
26 capital expenditures. This, combined with declining  
27 average customer usage and the impact from regulatory

1 lag, has resulted in sub-standard financial results, all  
2 of which have impeded Southwest's ability in improving  
3 its financial condition. To put into perspective the  
4 rapid level of growth experienced by Southwest during the  
5 ten-year period 1998 to 2007, Southwest has made  
6 approximately \$2.5 billion in capital expenditures and  
7 has added about 662,000 new customers. During the same  
8 time period, the average realized rate of return on  
9 equity has been 8.1 percent. Currently, Southwest's long-  
10 term unsecured credit ratings are "BBB" from Fitch, Inc.  
11 (Fitch), "Baa3" from Moody's Investor Services (Moody's)  
12 and "BBB-" from Standard & Poor's (S&P). The Moody's and  
13 S&P ratings are at the lowest investment grade rating,  
14 while the Fitch rating is one level above the threshold  
15 for an investment grade rating.

16 While Southwest has made improvements in its  
17 capital structure during this time, its bond ratings by  
18 the major rating agencies remain just above non-  
19 investment grade (junk bond status). The challenges faced  
20 by Southwest are reflected in recent comments by Moody's,  
21 which stated:

22 Due to the regulatory lag and gaps in the  
23 company's rate design in Arizona and Nevada,  
24 this has placed Southwest among the lowest  
rated investment grade gas utility companies.<sup>1</sup>

25 Q. 15 Please briefly describe the modern financial theory  
26

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27 <sup>1</sup> Moody's Investor Services, Credit Opinion: Southwest Gas Corporation, June  
21, 2007.

1 concerning capital structure, the cost of equity, and the  
2 overall cost of capital.

3 A. 15 To gain an understanding of the relationship between  
4 capital structure, the cost of equity, and the overall  
5 cost of capital, it is best to start with the classic  
6 Modigliani-Miller (MM) proposition that the cost of  
7 capital of a firm is independent of its capital  
8 structure. This proposition is based on perfect market  
9 conditions where there are no taxes and no bankruptcy.

10 For example, assume a firm is financed only by  
11 equity and has a 10 percent cost of equity, therefore it  
12 would have a cost of capital equal to 10 percent. If the  
13 firm elected to employ lower cost debt and changed its  
14 capital structure to be 40 percent debt and 60 percent  
15 equity, and the cost of debt was 7 percent, what happens  
16 to the cost of equity and the overall cost of capital?  
17 Under the MM proposition, the overall cost of capital  
18 would remain the same, at 10 percent, and the cost of  
19 equity would increase to 12 percent. Now if the firm  
20 increased the ratio to 50 percent debt and 50 percent  
21 equity, assume the cost of debt increases to 7.25 percent  
22 due to the increased amount of leverage, the cost of  
23 equity would increase to 12.75 percent and the overall  
24 cost of capital would remain at 10 percent. The  
25 calculations of the weighted cost of capital for these  
26 examples are shown as follows:  
27

			Weighted
	<u>Component</u>	<u>Weight</u>	<u>Rate</u>
	Equity	100.00%	10.00%
	Debt	0.00%	0.00%
	Total	<u>100.00%</u>	<u>10.00%</u>

			Weighted
	<u>Component</u>	<u>Weight</u>	<u>Rate</u>
	Equity	60.00%	7.20%
	Debt	40.00%	2.80%
	Total	<u>100.00%</u>	<u>10.00%</u>

			Weighted
	<u>Component</u>	<u>Weight</u>	<u>Rate</u>
	Equity	50.00%	6.38%
	Debt	50.00%	3.62%
	Total	<u>100.00%</u>	<u>10.00%</u>

What can be seen from these examples is that capital structure does affect the cost of debt and equity, however the changes in those costs are exactly offset by changes in the weights of each capital structure component. The costs of both debt and equity increase with greater amounts of debt because both debt holders and shareholders are exposed to greater risk. The key insight provided by the MM theory is that the cost of capital is a function of the risk of the firm's assets and the "law of one price" should hold, as the cost of capital is based on the level of risk of the firm's assets and not how it is financed.

The modern theory of capital structure, which includes taxes and bankruptcy, says the cost of capital is not constant, but becomes a U-shaped curve. Under what is known as the "static trade-off theory," the cost of

capital begins to decline as debt is first used in the capital structure due to the tax-deductibility of interest, and reaches a minimum value at the point the increased risk and costs of financial distress begin to exceed the tax deductibility of interest benefit and increase the overall cost of capital. With the static trade-off theory there exists an optimal capital structure which results in the minimum cost of capital and the maximum firm value. The important point of both theories is that there is a dynamic relationship between capital structure, the costs of the individual types of capital, and the resulting overall cost of capital. It is universally accepted that the cost of equity increases as the amount of leverage is increased on the balance sheet.

Q. 16 Can you explain why it is not valid, based on modern finance theory, to employ Southwest's actual capital structure with the estimated required return on common equity based on the proxy group companies used to estimate the cost of common equity for Paiute?

A. 16 Given the relationship between capital structure and the cost of equity previously discussed, the difference in Southwest's actual capital structure relative to the proxy group's average, results in a significantly higher level of financial risk used for Paiute. Absent any adjustment for the difference in financial risk, applying the estimated required return on equity derived from the proxy group with Southwest's actual capital structure is

1 inappropriate, as the required return on common equity is  
2 positively related to the debt-to-equity ratio of the  
3 firm. A prominent finance scholar, Stewart Myers, who has  
4 published a number of studies on capital structure  
5 theory, states the following:

6 The cost of equity does depend on capital  
7 structure. Comparisons of cost of equity  
8 estimates or allowed or actual returns make  
9 sense only if differences in financial leverage  
10 are accounted for. When a given utility's debt  
11 ratio increases, the cost of equity also  
increases and the allowed return must be  
adjusted upwards. This adjustment is required  
to preserve a fair return to equity investors.<sup>2</sup>

12 Similarly, Bradford Cornell states:

13 ...the cost of equity capital depends on the  
14 investment risk of the equity, which depends,  
15 in turn, on the company's capital structure.  
16 More highly levered companies will have  
riskier equity and higher cost of equity  
17 capital. If the dividend discount model is to  
be applied to a "comparable" company, the  
18 appraiser must verify that the comparable  
company has a similar capital structure. If it  
19 does not, the cost of capital estimated for  
the comparable cannot be applied to the  
20 appraisal target without an adjustment to  
reflect the impact of leverage on risk.<sup>3</sup>

21 In addition, the standards cited in the Bluefield  
22 and Hope cases support this test of comparability in the  
23 level of risk and rate of return.

24 Q. 17 For utility ratemaking, what kinds of risk-adjustments  
25

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26 2 Stewart C. Myers, "Capital Structure and the Cost of Capital for Regulated  
Companies," prepared for The New York Energy Collaborative, December 4, 1992.

27 3 Bradford Cornell, Corporate Valuation, 1993, McGraw Hill, NY, p.199.

1 can be made to account for the differences in financial  
2 risk as compared to the proxy group?

3 A. 17 For ratemaking purposes, to adjust for the differences in  
4 the financial risk of Southwest compared to that of the  
5 proxy group, there are three possible adjustments. They  
6 are:

- 7 1. Employ a risk-adjusted hypothetical capital  
8 structure;
- 9 2. Employ a risk-adjusted allowed rate of return  
10 on common equity; or
- 11 3. Employ a partial risk adjustment to both the  
12 capital structure and the allowed ROE.

13 Paiute is recommending alternative number 1, to  
14 employ a risk-adjusted capital structure. The recommended  
15 capital structure employed is the average capital  
16 structure of the proxy group. The use of a hypothetical  
17 capital structure allows for the proper setting of rates  
18 solely for the natural gas transmission and storage  
19 assets of Paiute. Further, this treatment is consistent  
20 with the Hope and Bluefield standards.

21 Q. 18 Has the Commission previously accepted the use of a  
22 hypothetical capital structure based on the average of  
23 the proxy group?

24 A. 18 Yes. In the decision for High Island Offshore System,  
25 L.L.C., 110 FERC ¶ 61,043 (2005), the Commission accepted  
26 the use of a hypothetical capital structure rather than  
27 employ the capital structure of the parent company,



1 GulfTerra. The Commission accepted the use of a  
2 hypothetical capital structure, which was proposed by  
3 FERC Staff, that was based on the average capital  
4 structure of the proxy group companies used in the DCF  
5 model analysis to estimate the cost of common equity.  
6 The hypothetical capital structure used was 50.8 percent  
7 debt and 49.2 percent common equity. In the decision the  
8 Commission stated:

9 The Commission also affirms the ALJ's decision  
10 to adopt a hypothetical capital structure  
11 based on the average equity ratio of the same  
12 proxy group Staff uses for its DCF analysis.  
13 As the ALJ found, this assures a match between  
14 the financial risk inherent in the DCF  
15 analysis used to develop the return on equity  
16 and the hypothetical capital structure.<sup>4</sup>

17 There exists Commission precedent to employ the  
18 average proxy group capital structure of similar natural  
19 gas pipelines when employing a hypothetical capital  
20 structure.

21 Q. 19 Please describe the hypothetical capital structure used  
22 for developing a rate of return for this proceeding.

23 A. 19 The capital structure used in this proceeding (as  
24 reflected in Statement F-2, Sheet 1 of 1) is 45.6 percent  
25 long-term debt and 54.4 percent common equity. This  
26 capital structure is appropriate for a comparable company  
27 engaged in the transportation and storage of customer-  
owned interstate natural gas, were it an independent

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4 High Island Offshore System, L.L.C., 110 FERC ¶ 61,043 at P 147 (2005).

1 company.

2 Q. 20 How was the hypothetical capital structure determined for  
3 this proceeding?

4 A. 20 In addition to the precedent of prior Commission  
5 decisions, important factors were considered when  
6 developing the hypothetical capital structure for this  
7 proceeding including comparisons to other gas  
8 transmission companies.

9 A review of the proxy group companies utilized to  
10 estimate the cost of common equity shows common equity  
11 ratios ranging from 37 percent to 74 percent as of  
12 September 30, 2008, with the average common equity ratio  
13 for the proxy group being 54.4 percent (see Exhibit  
14 No.\_\_\_\_(TKW-2)).

15 Q. 21 Please summarize your testimony concerning the  
16 appropriate capital structure to be used in developing an  
17 appropriate rate of return for Paiute in this proceeding.

18 A. 21 Paiute, in this ratemaking proceeding, is proposing a  
19 hypothetical capital structure for the development of the  
20 overall rate of return. While acknowledging the  
21 Commission's general preference for using the actual  
22 capital structures of interstate pipelines in general  
23 rate proceedings, Paiute supports the need to use a  
24 hypothetical capital structure for the following reasons:  
25 (1) Paiute is wholly-owned and financed by its parent  
26 company and does not maintain a capital structure of its  
27 own; and (2) there is a significant difference in the

parent's actual capital structure compared to that of the proxy group used to estimate the cost of common equity for Paiute. Paiute developed a comparable and reasonable capital structure in this filing using the average equity ratios of publicly-traded interstate natural gas pipelines. The use of a hypothetical capital structure that is based on the proxy group average capital structure provides for a more comparable level of financial risk in conjunction with the DCF model used to estimate the cost of common equity.

## **II. ESTIMATED COST OF COMMON EQUITY**

Q. 22 Please describe what the cost of common equity represents and how it is estimated.

A. 22 The cost of common equity capital represents the rate of return equity investors require in order to invest in a particular asset. The cost of equity has the following key attributes: (1) it is an opportunity cost; (2) it is an expected return which is forward-looking; (3) it is determined in the capital markets; (4) it is generally measured as a nominal rate; and (5) it should be based on both the risk of the asset and the amount of debt used to finance the asset. Since the cost of equity capital is not directly observable, it must be estimated. In order to estimate the cost of common equity for Paiute, a proxy group of natural gas transmission companies, which are comparable in investment risk, is utilized to estimate a reasonable range of estimates for Paiute's required

1 return on common equity.

2 **A. Proxy Group**

3 Q. 23 What is the Commission's current policy regarding the  
4 development of a proxy group used to estimate the cost of  
5 common equity for a natural gas pipeline?

6 A. 23 The Commission has recently established new proxy group  
7 policies for determining gas and oil pipeline return on  
8 common equity. On April 17, 2008, the Commission issued  
9 a policy statement<sup>5</sup> which allowed, for the first time,  
10 pipelines that were organized as Master Limited  
11 Partnerships (MLPs) to be included in the proxy group for  
12 natural gas pipelines. This change in policy is in  
13 response to the structural changes in the industry that  
14 have occurred over time, which have resulted in fewer  
15 natural gas companies that met the prior Commission  
16 criteria used for establishing an acceptable proxy group.  
17 Also, during the course of the proceeding (Docket No.  
18 PL07-2-000) that established the new proxy group policy,  
19 the U.S. Court of Appeals for the D.C. Circuit Court  
20 issued its opinion in Petal Gas Storage, L.L.C. v. FERC<sup>6</sup>.  
21 This decision vacated and remanded the Commission's  
22 determination of the selected proxy group companies used  
23 to estimate the cost of common equity in the prior  
24 ratemaking order for HIOS and Petal Gas Storage. In

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25  
26 <sup>5</sup> Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on  
Equity, 123 FERC ¶ 61,048.

27 <sup>6</sup> Petal Gas Storage, L.L.C. v. FERC, 496 F.3d 695 (D.C. Cir. 2007) (*Petal v.*  
*FERC*).

1 doing so, the U.S Court of Appeals stated the importance  
2 to rely on companies of similar risk to the target  
3 company, stating:

4 That proxy group arrangements must be risk-  
5 appropriate is the common theme in each  
6 argument. The principle is well-established.  
7 See *Hope Natural Gas Co.*, 320 U.S. at 603  
8 ("[T]he return to the equity owner should be  
9 commensurate with returns on investments in  
10 other enterprises having corresponding  
11 risks."); *CAPP I*, 254 F.3d at 293 ("[A]  
12 utility must offer a risk-adjusted expected  
13 rate of return sufficient to attract  
14 investors."). The principle captures what  
15 proxy groups do, namely, provide market-  
16 determined stock and dividend figures from  
17 public companies comparable to a target  
18 company for which those figures are available.  
19 *CAPP I*, 254 F.3d at 293-94. Market-determined  
20 stock figures reflect a company's risk level  
21 and, when combined with dividend values,  
22 permit calculation of the "risk-adjusted  
23 expected rate of return sufficient to attract  
24 investors."<sup>7</sup>

17 In addition, the U.S. Court of Appeals stated:

18 What matters is that the overall proxy group  
19 arrangement makes sense in terms of relative  
20 risk and, even more importantly, terms of the  
21 statutory command to set "just and reasonable"  
22 rates, 15 U.S.C. §717c, that are "commensurate  
23 with returns on investment in other  
24 enterprises having corresponding risks" and  
25 "sufficient to assure confidence in the  
26 financial integrity of the enterprise . . .  
27 [and] maintain its credit and . . . attract  
capital," *Hope Natural Gas Co.*, 320 U.S. at  
603.<sup>8</sup>

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26 <sup>7</sup> Ibid, p. 5.

27 <sup>8</sup> Ibid, p. 7.

1 The new Commission proxy group policy statement is  
2 consistent with the decision in *Petal*, with the  
3 Commission asserting:

4 It is crucial that firms in the proxy group be  
5 comparable to the regulated firm whose rate is  
6 being determined. In other words, as the court  
7 emphasized in *Petal*, the proxy group must be  
"risk-appropriate".<sup>9</sup>

8 Q. 24 Has the Commission applied the new proxy group policy in  
9 establishing an authorized ROE for a natural gas  
10 pipeline?

11 A. 24 Yes. On January 15, 2009, the Commission issued Opinion  
12 No. 486-B, Order on Rehearing, Proposed Settlement and  
13 Paper Hearing, Kern River Gas Transmission Company, 126  
14 FERC ¶61,034 (2009) which established an authorized  
15 return on equity applying the new proxy group policy for  
16 Kern River Gas Transmission Company. In the decision,  
17 the Commission established a proxy group consisting of  
18 three MLPs and two corporations. In developing the proxy  
19 group for this case, the Commission stated it would  
20 prefer to include MLPs or corporations which have at  
21 least 50 percent of the firm's assets or operating income  
22 from natural gas pipeline operations over the most recent  
23 three-year period. The other requirement for developing a  
24 proxy group identified by the Commission is that it  
25 should consist of at least four and preferably a minimum

26  
27 <sup>9</sup> Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on  
Equity, 123 FERC ¶ 61,048, p. 20.

1 of five members. The Commission recognized that having a  
2 larger proxy group increases the statistical accuracy in  
3 estimating the cost of common equity, but only if the  
4 additional companies are representative of the natural  
5 gas pipeline business.

6 Q. 25 Please discuss how the proxy group for Paiute was  
7 determined.

8 A. 25 A proxy group of five natural gas pipelines was used in  
9 estimating the cost of common equity. The following  
10 criteria were used to select the companies for the proxy  
11 group:

12 (1) natural gas pipelines (MLPs or corporations) that  
13 are publicly traded and have not cut nor omitted  
14 cash dividends or distribution payments in the past  
15 year (2008); and

16 (2) natural gas pipelines, which have ownership  
17 interest in natural gas pipelines regulated by the  
18 Commission and had 2007 operating revenues  
19 generated from the transportation and storage of  
20 natural gas equal to or greater than 50 percent.

21 The five natural gas pipelines are:

22 Natural Gas Pipelines:

- 23 • Boardwalk Pipeline Partners, L.P.
- 24 • El Paso Pipeline Partners, L.P.
- 25 • Kinder Morgan Energy Partner, L.P.
- 26 • Spectra Energy Partners, L.P.
- 27 • TC Pipelines, L.P.

Exhibit No. \_\_\_\_ (TKW-2) through Exhibit No. \_\_\_\_ (TKW-4) display the capital structures, the natural gas pipeline operation statistics, and bond ratings for each of the five proxy group companies. The average permanent capital structure of the proxy group as of September 30, 2008 was 54.4 percent common equity, 0.0 percent preferred equity and 45.6 percent long-term debt.

**B. Discounted Cash Flow (DCF) Model**

Q. 26 Please describe the finance theory behind the DCF model.

A. 26 Using the DCF model for estimating the return on equity is similar to finding the internal rate of return (IRR) or yield-to-maturity (YTM) for a bond, in which the IRR is the discount rate that equates the current price of the bond with the discounted coupon payments plus the discounted face value of the bond upon maturity. In the case of common stock, it is the discount rate that equates the current price of the stock to the discounted future dividend payments plus the discounted expected value of the stock. The sources of return to the stockholder are the dividends and appreciation of the stock price.

The single-stage DCF model is derived from the Gordon Growth Model or Constant Growth Model for the valuation of common stock shown as follows:

$$P_0 = D_1 / (k_e - g)$$

where:

$P_0$  = the current market price of the stock



1            $D_1$  = expected dividends per share for the next year

2            $k_e$  = the annual required rate of return on equity

3            $g$  = expected annual constant growth rate in dividends

4           The equation can be solved for the required return  
5 on equity as shown below:

6            $k_e = D_1/P_0 + g$

7           The resulting formula states that the cost of  
8 equity is equal to the sum of the expected dividend yield  
9 and the expected growth rate in dividends. The key  
10 variable for the model is the growth rate investors  
11 expect.

12 Q. 27 Please describe the methodology for the DCF model used to  
13 estimate the cost of common equity for Paiute.

14 A. 27 The methodology for the DCF model used was the  
15 methodology originally set out by the Commission in  
16 Opinion No. 414-A, Order on Rehearing, Transcontinental  
17 Gas Pipe Line Corporation, 84 FERC ¶61,084 (1998) and as  
18 modified for the inclusion of MLPs in the new proxy group  
19 policy statement, Composition of Proxy Groups for  
20 Determining Gas and Oil Pipeline Return on Equity, 123  
21 FERC ¶ 61,048 (2008). The DCF methodology relied on by  
22 FERC for estimating the cost of equity capital for  
23 natural gas pipelines is a two-step growth DCF model,  
24 where the growth rate employed is a weighted average rate  
25 derived from both a short-term and a long-term growth  
26 rate estimate. The short-term growth rate is based on  
27 investment analysts' projections of the five-year growth

1 rate in earnings per share (EPS) and the long-term growth  
2 rate is the long-term growth rate of the economy  
3 represented by the Gross Domestic Product (GDP) growth  
4 rate. For MLPs, the long-term growth rate is 50 percent  
5 of the long-term GDP growth rate.<sup>10</sup> The five-year EPS  
6 growth rate is given a two-thirds weight and the long-  
7 term GDP growth rate is given a one-third weight to  
8 derive a single growth rate to be employed in the DCF  
9 model.

10 Q. 28 Please describe how the DCF model was applied to derive  
11 the cost of common equity for Paiute.

12 A. 28 To apply the two-step DCF model, we need to determine the  
13 expected dividend yield and the expected growth rate in  
14 dividends for each firm in the proxy group. The  
15 Commission preferred form of the DCF model used is:

$$k_e = D_0(1+0.5g)/P_0 + g$$

17 The expected dividend yield, represented by  
18  $D_0(1+0.5g)/P_0$ , which is the average of the continuous and  
19 discrete dividend yield, was obtained by taking the  
20 current dividend yield,  $D_0/P_0$ , and multiplying it by  
21 1 plus one-half of the expected growth rate,  $0.5 \times g$ . For  
22 the current dividend,  $D_0$  was determined using the  
23 annualized dividends paid during the six-month period  
24 August 1, 2008 - January 31, 2009. The average daily high  
25 and low stock prices for the six-month period of August  
26

---

27 <sup>10</sup> Ibid, p. 45.

1, 2008 - January 31, 2009 were used for the stock price,  $P_0$ .

The expected growth rate in dividends,  $g$ , was calculated using the weighted average of short-term earnings per share growth rates and the long-term GDP growth rate estimate, where the short-term growth estimate was given a two-thirds weight and the long-term growth estimate was given a one-third weight. The earnings growth rates utilized are the five-year earnings growth rates for each company provided by the Bloomberg earnings estimates platform (BEst)<sup>11</sup>. For the long-term growth rate, the long-term GDP growth forecast was obtained by averaging macroeconomic forecast data provided from the Energy Information Administration's Annual Energy Outlook 2009 and the Social Security Administration's 2008 OASDI Trustees Report. The average annual long-term growth rate in nominal GDP was calculated to be 4.39 percent. Since the proxy group consists solely of MLPs, the long-term growth rate used was 50 percent of the long-term GDP growth rate, which is 2.20 percent (4.39 percent x 50 percent = 2.20 percent).

Q. 29 What were the results of the DCF model?

---

<sup>11</sup> The Commission's stated preference for the source of the 5-year earnings growth rate is the forecast published by the Institutional Broker's Estimate System (IBES). A subscription to Bloomberg no longer includes the IBES earnings estimates. As represented by Bloomberg, the Bloomberg BEst earnings estimates are generated using a very similar methodology of aggregating earnings forecasts from over 530 brokers and independent research houses. As a result, the Bloomberg BEst and IBES earnings estimates should result in very similar earnings forecasts.

1 A. 29 The DCF model produced a high estimate of 14.67 percent  
2 and a low of 12.8 percent, with a mean of 13.66 percent  
3 and a median of 13.33 percent for the proxy group's  
4 estimated cost of common equity capital. The results are  
5 displayed in Exhibit No.\_\_(TKW-5), Sheet 1 of 2.

6 Q. 30 Are there any additional factors to consider in  
7 determining where Paiute's return should be placed within  
8 the range of the DCF model results?

9 A. 30 Yes. The two additional factors to be considered are: (1)  
10 the substantial changes in capital market conditions  
11 during the past-six months; and (2) Paiute's  
12 significantly high contract risk.

13 Q. 31 How have capital market conditions changed during the  
14 six-month period used for the inputs into the DCF model?

15 A. 31 During the six-month period August 1, 2008 to January 31,  
16 2009, global capital market conditions have and continue  
17 to experience a serious crisis, which includes a  
18 dislocation in the financial sector, accompanied by a  
19 severe credit contraction, significant declines in global  
20 equity prices, and an unprecedented level of volatility.  
21 The table below highlights the changes in some key  
22 capital market measures during this six-month period.

23 //

24 //

25 //

26 //

27 //

**Change in Capital Market Conditions**  
**August 2008 - January 2009**

	<u>7/31/2008</u>	<u>1/30/2009</u>	<u>Change</u>	<u>% Change</u>
S&P 500 Index	1,267.38	825.88	(441.50)	-34.8%
Dow Jones Utility Average	484.88	369.70	(115.18)	-23.8%
30-Year Gas Trans. BBB Bond Yields	7.14%	8.26%	1.12%	15.71%
10-Year US Treasury Note	3.95%	2.84%	-1.11%	-28.0%
Credit Spread	3.19%	5.42%	2.23%	69.8%
CBOE S&P 500 Volatility Index	22.99%	44.84%	21.85%	95.0%

*Source: Bloomberg*

As can be seen from the table, the S&P 500 Index has declined 34.8 percent and the Dow Jones Utility Average has declined 23.8 percent. During the same time period, the equity prices of the proxy group on average have declined approximately 15.7 percent. In addition, the credit spread for gas transmission bonds has widened significantly. All of this reflects a substantial increase in the cost of capital. As a result, the DCF model results based on the past six months of prices do not accurately reflect current capital market conditions. Using the last three months of data, the DCF model mean and median cost of common equity estimates for the proxy group are 14.29 and 13.67, respectively. See Exhibit No. \_\_\_\_ (TKW-5), Sheet 2 of 2.

Q. 32 Please explain Paiute's higher investment risk due to the

1 evergreen status of many of its service agreements.

2 A. 32 The explanation of Paiute's high degree of contract risk  
3 is contained in the direct testimony of Paiute witness  
4 Edward C. McMurtrie, pages 12-14.

5 Q. 33 What is your recommended cost of common equity for  
6 Paiute?

7 A. 33 The Commission has established the use of the median  
8 estimate to be used in setting the rate of return for the  
9 average risk pipeline company. In determining where to  
10 set the allowed return on common equity, the Commission  
11 examines a pipeline's relative risk, focusing on risks  
12 faced by the pipeline attributable to circumstances  
13 outside the control of the pipeline's management.<sup>12</sup> While  
14 some consideration should be given for the unprecedented  
15 change in capital market conditions during the six-month  
16 period used for the DCF model, which signifies a  
17 substantial increase in the cost of capital, substantial  
18 consideration should also be given for Paiute's  
19 significantly high contract risk. Based on DCF model  
20 results and consideration of additional risk factors, I  
21 conclude that 13.83 percent is an appropriate figure for  
22 the cost of common equity.

23 **III. EMBEDDED COST OF LONG-TERM DEBT**

24 Q. 34 Please describe the development of the cost of debt for  
25 Paiute.

26 \_\_\_\_\_  
27 <sup>12</sup> Opinion No. 414-A, Order on Rehearing, Transcontinental Gas Pipe Line Corporation, 84 FERC ¶61,084 (1998) p. 33-34.

1 A. 34 The embedded cost of long-term debt of Southwest was used  
2 as a proxy for the hypothetical cost of debt for Paiute,  
3 which it might have incurred over time to fund its  
4 investment in pipeline and storage assets. Using a  
5 hypothetical embedded cost is consistent with the  
6 original cost principle of ratemaking, which applies the  
7 overall cost of capital to an original cost rate base.

8 Q. 35 Is the use of Southwest's cost of utility debt a  
9 reasonable proxy for Paiute's cost of debt?

10 A. 35 Yes, it is. In fact, it is a conservative measure for the  
11 hypothetical embedded cost of debt for Paiute. Paiute  
12 began transporting gas in August 1988. Since rate base is  
13 typically financed by market rates applicable at the time  
14 the rate base is acquired, an examination of the monthly  
15 yields on Baa Public Utility Bonds from August 1988  
16 through November 2008 was completed to determine the  
17 average annual yield. The average annual yield was  
18 determined to be 7.96 percent. See Exhibit No. \_\_\_\_\_  
19 (TKW-6), Sheet 1 of 1 for the average annual Baa yield  
20 calculation. By assuming that Paiute would have issued  
21 debt corresponding to rate base acquisitions made evenly  
22 during the period 1988 through 2008, its embedded cost of  
23 debt, at a minimum, would have approximated 7.96 percent.  
24 Therefore, the use of Southwest's embedded cost of debt,  
25 at 7.39 percent, is a conservative proxy for the  
26 hypothetical embedded cost of debt for Paiute.

27 Q. 36 Have you determined the appropriate cost rate for

1 long-term debt capital?

2 A. 36 Yes. The appropriate rate for long-term debt in this  
3 proceeding is 7.39 percent. This rate is summarized on  
4 line 1, column (c), of Statement F-3. Statement F-3,  
5 Sheets 1 through 7, display the development of the long-  
6 term debt cost rate. The cost of long-term debt is  
7 comprised of the cost of fixed-rate debentures, fixed-  
8 rate medium-term notes, and a variable-rate term  
9 facility. In addition, the cost of long-term debt  
10 includes the effect of the amortization of reacquired  
11 debt expense associated with past refinancing programs.

12 Q. 37 Please describe the development of the cost rates of  
13 debentures and notes.

14 A. 37 Southwest has three outstanding debenture and note issues  
15 totaling \$475 million of gross principal. The debentures  
16 and notes have a weighted average cost of 8.19 percent,  
17 as shown on line 4, column (e), of Statement F-3, Sheet 4  
18 of 7.

19 Q. 38 Please describe the cost rate of the medium-term notes.

20 A. 38 Southwest established a \$150 million medium-term note  
21 program in November 1997. The name is somewhat of a  
22 misnomer as medium-term notes can be issued with  
23 maturities of nine months to 30 years. Southwest has  
24 issued all of its medium-term note program and has four  
25 outstanding medium-term note issues totaling \$82.5  
26 million of gross principal. The medium-term notes have a  
27 weighted average cost of 7.76 percent, as shown on



1 line 9, column (e), of Statement F-3, Sheet 4 of 7.

2 Q. 39 How are the effective cost rates of debentures, notes,  
3 and medium-term notes calculated?

4 A. 39 The effective cost rates of debentures, notes, and  
5 medium-term notes are calculated through the use of the  
6 YTM or effective interest rate method.

7 Q. 40 Please describe the YTM method.

8 A. 40 The YTM method is based on an internal rate of return  
9 calculation which takes into account the actual cash  
10 flows of each debt security. Specifically, Southwest  
11 receives a cash inflow at the debt's issuance consisting  
12 of the face value less any associated issuance expenses  
13 and debt discount. The cash outflows consist of interest  
14 payments and principal repayments. The effective rate is  
15 the percentage rate that discounts those cash outflows to  
16 the net cash inflow the Company receives at issuance.  
17 Once the effective rate is calculated, it is then  
18 multiplied by the net proceeds (i.e., the principal  
19 amount outstanding less any unamortized discounts) to  
20 determine the total expense per payment period for each  
21 issue. The weighted average cost is then determined by  
22 weighting the effective cost of each issue by the current  
23 net proceeds amount. When used for ratemaking, the yield  
24 to maturity cost rate results in a cost of an issue which  
25 remains constant over its life. The calculations for the  
26 effective cost of debentures, notes, and medium-term  
27 notes are shown in Exhibit No.\_\_\_\_(TKW-7), Sheet 1 through

Sheet 12.

Q. 41 Please describe and discuss the development of the cost rate for the variable rate term facility debt.

A. 41 Southwest has a five-year (May 2007-May 2012) \$300 million revolving credit facility. In addition, Southwest has a \$50 million uncommitted F-2 commercial paper program, which is supported by the revolving credit facility. Southwest views \$150 million of the facility as a permanent intermediate-term component of its debt portfolio and, accordingly, has classified it as long-term debt. The remaining \$150 million of the facility is used to fund recurring, seasonal working capital needs. At the end of the base period, Southwest had outstanding \$132.6 million as part of the long-term debt portion of the facility. Of this amount, \$131 million was outstanding as London Interbank Offered Rate (LIBOR) loans and \$1.6 million was outstanding as commercial paper. At the end of the test period (August 31, 2009), Southwest expects to have \$150 million outstanding of its term facility.

For the test period, the Global Insight Interest Rate Forecast - January 2009 was used to forecast the effective cost of the term facility. For the \$150 million of LIBOR-based loans, the three-month LIBOR rate forecast for the 36 months from September 2009 through August 2012 of 3.7 percent was used as the reference rate plus Southwest's spread of 60 basis points to determine the

1 interest cost of LIBOR loans. Due to current market  
2 conditions, Southwest does not anticipate issuing any  
3 commercial paper in the foreseeable future.

4 The estimated all-in effective rate of the  
5 long-term debt portion of the variable rate term facility  
6 at the end of the test year is 4.46 percent, as shown on  
7 line 10, column (e) of Statement F-3, Sheet 4 of 7. This  
8 all-in rate includes the interest on the loans, an annual  
9 fee, and amortization of debt expenses incurred to  
10 establish the facility. Exhibit No.\_\_\_\_(TKW-8) displays  
11 the calculation of the effective cost of the LIBOR loans  
12 and commercial paper under the term facility for both the  
13 base period and the test period.

14 Q. 42 Please discuss the reacquired debt amortization expense  
15 included to determine the effective cost of long-term debt.

16 A. 42 Southwest conducted a refinancing program in 1996. The  
17 reacquired debt expenses associated with the refinancing  
18 program are amortized on a straight-line basis over the  
19 remaining life of the refunded debt issue. This is  
20 consistent with the methodology approved in the 1970  
21 Commission order in Manufacturers Heat & Light Company,  
22 44 FPC 314 (1970). Statement F-3, Sheets 6 through 7,  
23 display the reacquired debt amounts by issue and the  
24 corresponding annual amortization expense.

25 Q. 43 Why are the Clark County and Big Bear Industrial Revenue  
26 Bonds (IDRBs) excluded in calculating the cost of  
27 long-term debt?

1 A. 43 Southwest has issued IDRBs in two of its rate  
2 jurisdictions. The IDRB issues and applicable rate  
3 jurisdictions are as follows: (1) the Clark County,  
4 Nevada IDRBs (1999 Series A, C & D, 2003 Series A,C,D &  
5 E, 2004 Series A & B, 2005 Series A, 2006 Series A and  
6 2008 Series A) for its Southern Nevada rate jurisdiction,  
7 and (2) the City of Big Bear, California IDRBs (1993  
8 Series A) for its Southern California rate jurisdiction.  
9 As reflected in the IDRB indentures and financing  
10 agreements, the proceeds from the issuance of this type  
11 of debt are restricted to funding qualified construction  
12 expenditures for additions and improvements in the  
13 specific distribution systems to which the IDRBs relate.  
14 In addition, there are strict Internal Revenue Service  
15 (IRS) rules which stipulate that the benefits of the tax-  
16 exempt, lower cost IDRBs must accrue to customers in the  
17 specific jurisdiction to which the IDRBs apply. Deviation  
18 from the requirements of this IRS ruling could result in  
19 the loss of the IDRB tax-exempt status. This would in  
20 turn cause Southwest to refinance its debt at a much  
21 higher cost.

22 Q. 44 How have Southwest's regulatory bodies treated the cost  
23 of IDRBs in past regulatory proceedings?

24 A. 44 Southwest has historically excluded the IDRBs from the  
25 cost of debt calculation in all regulatory jurisdictions,  
26 except for the specific jurisdictions (Southern Nevada  
27 for Clark County IDRBs and Southern California for City

1 of Big Bear IDRBs) to which the relevant IDRBs apply. The  
2 PUCN, the CPUC, and the ACC have accepted this treatment  
3 for IDRBs in past regulatory proceedings.

4 Q. 45 Does this conclude your prepared direct testimony?

5 A. 45 Yes, it does.

**APPENDIX A**  
**SUMMARY OF QUALIFICATIONS**  
**THEODORE K. WOOD**

I graduated from the University of Nevada, Reno (UNR) in 1985 with a Bachelor of Science degree with a major in agricultural economics. In 1989, I earned a Masters of Science degree from UNR in agricultural economics with a minor in finance. I have attained the professional designations of Chartered Financial Analyst (CFA), Certified Rate of Return Analyst (CRRA), Certified Management Accountant (CMA), Certified in Financial Management (CFM), and Certified Treasury Professional (CTP). I am a member of the Institute of Management Accountants, the CFA Institute, Association for Financial Professionals, Financial Management Association, and the Society of Regulatory and Utility Financial Analysts.

From 1985 to 1988, I was employed as a research associate in the Department of Agricultural Economics at UNR in Reno, Nevada. My primary role was to assist with ongoing research projects in the Department including secondary data collection, statistical analysis, FORTRAN programming, and the development of microcomputer spreadsheets for farm management decision analysis.

In 1989, I was employed by First Interstate Bank of Nevada in Reno, Nevada, as a financial analyst in the Finance Department. My duties entailed maintenance of the general ledger system, creation of monthly management and

1 financial reports, and special projects.

2 From 1990 to 1992, I was employed as a planning  
3 analyst with Valley Bank of Nevada, in Las Vegas, Nevada,  
4 in the Planning Department. My primary responsibilities  
5 included preparation of the annual budget, quarterly  
6 budget variance analysis, supporting the Asset/Liability  
7 Committee of the bank, and other financial analyses.

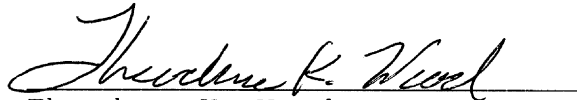
8 From 1992 to 1994, I was employed by PriMerit Bank,  
9 FSB, then a wholly-owned subsidiary of Southwest, as a  
10 Senior Financial Analyst in the Budget and Forecasting  
11 Department. My primary responsibilities included  
12 creation and maintenance of a microcomputer-based  
13 budgeting system, preparation of the annual budget,  
14 monthly budget variance analysis, product profitability  
15 analysis, and other special projects.

16 In 1994, I accepted a Senior Financial Analyst  
17 position in the Treasury Services Department of  
18 Southwest. My responsibilities included daily cash  
19 management, preparation of financial forecasts and  
20 analyses, and assisting in the preparation of rate of  
21 return testimony for the Company's various ratemaking  
22 jurisdictions. I was promoted to Supervisor of the  
23 Treasury Services Department in May 1997, to Manager in  
24 June 2000 and to Senior Manager in May 2005. I supervise  
25 three other financial analysts in the Treasury Services  
26 Department.

AFFIDAVIT OF THEODORE K. WOOD

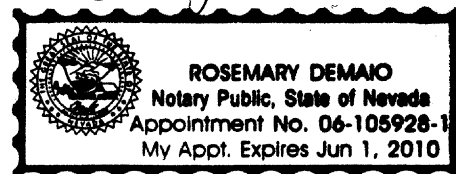
LAS VEGAS, NV            )

Theodore K. Wood, being duly sworn, deposes and says:  
that he has read and is familiar with the contents of the  
foregoing "Prepared Direct Testimony of Theodore K. Wood";  
that if asked the questions contained in said prepared  
direct testimony, the answers and responses thereto would  
be as shown in said testimony; that the facts contained in  
said answers are true to the best of his knowledge,  
information and belief; and that he adopts these matters as  
his own.

  
Theodore K. Wood

SUBSCRIBED AND SWORN TO BEFORE ME on this 23<sup>d</sup> day  
of February 2009.

  
Notary Public





**PAIUTE PIPELINE COMPANY**  
**PROXY GROUP OF NATURAL GAS TRANSMISSION COMPANIES**  
**CAPITAL STRUCTURE RATIOS[1]**  
**AS OF SEPTEMBER 30, 2008**

Capital Component (a)	Proxy Group Company					Proxy Group Average (g)
	Boardwalk Pipeline Partners (b)	Kinder Morgan Energy Partners (c)	Spectra Energy Partners (d)	TC Pipelines (e)	El Paso Pipeline Partners (f)	
Based on Total Permanent Capital						
Long-Term Debt	45.80%	63.17%	25.76%	37.62%	55.42%	45.56%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	54.20%	36.83%	74.24%	62.38%	44.58%	54.44%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Based on Total Capital						
Total Debt, Including Short Term	45.80%	64.15%	28.13%	37.82%	55.42%	46.26%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	54.20%	35.85%	71.87%	62.18%	44.58%	53.74%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

[1] Source: Bloomberg

**PAIUTE PIPELINE COMPANY**  
**PROXY GROUP OF NATURAL GAS TRANSMISSION COMPANIES**  
**NATURAL GAS PIPELINE OPERATIONS**

Company (a)	2007 % Revenue from Natural Gas Pipeline Operations <sup>1</sup> (b)	FERC Regulated Natural Gas Pipelines <sup>2</sup> (c)	Percent Ownership <sup>2</sup> (d)	Pipelines (Miles) <sup>2</sup> (e)	Design Capacity (MMcf/d) <sup>2</sup> (f)
<b>Boardwalk Pipeline Partners</b>	82.3%	Gulf South Pipeline Company, LP	100.0%	7,700	4,500
		Texas Gas Transmission, LLC	100.0%	5,850	3,800
		Texas Intrastate Natural Gas Pipeline Group	100.0%	6,000	5,200
		Kinder Morgan Interstate Gas Transmission Pipeline LLC	100.0%	5,100	830
<b>Kinder Morgan Energy Partners</b>	69.7%	Trailblazer Pipeline Company	100.0%	436	846
		TransColorado Gas Transmission Company LLC	100.0%	300	
		Rockies Express Pipeline	51.0%	1,679	1,800
		Kinder Morgan Louisiana Pipeline	100.0%	133	3,200
		Midcontinent Express Pipeline LLC	50.0%	500	1,400
<b>Spectra Energy Partners</b>	98.1%	East Tennessee Natural Gas	100.0%	1,400	1,300
		Gulfstream Natural Gas	24.5%	700	1,100
		Great Lakes	46.5%	2,115	2,300
<b>TC Pipelines</b>	100%	Northern Border	50.0%	1,249	2,374
		Tuscarora	100.0%	240	190
<b>El Paso Pipeline Partners</b>	100%	Wyoming Interstate Company	100.0%	800	2,721
		Colorado Interstate Gas Company	40.0%	4,000	3,048
		Southern Natural Gas Company	25.0%	7,600	3,665

<sup>1</sup> Source: Bloomberg

<sup>2</sup> Source: SEC 10-K and 10-Q Reports

**PAIUTE PIPELINE COMPANY  
 PROXY GROUP OF NATURAL GAS TRANSMISSION COMPANIES  
 BOND RATINGS**

Company (a)	Moody's Bond Rating		S&P's Bond Rating	
	Bond Rating (b)	Weight[1] (c)	Bond Rating (d)	Weight[1] (e)
Natural Gas Pipelines MLPs				
Boardwalk Pipeline Partners LP[2]	Baa2	9.00	BBB	9.00
Kinder Morgan Energy Partners, LP	Baa2	9.00	BBB	9.00
Spectra Energy Partners LP[3]	N/A		BBB+	9.00
TC Pipelines LP[4]	Baa1	8.00	A-	7.00
El Paso Pipeline Partners, LP[5]	Ba3	13.00	BB	13.00
Average	Baa3	9.75	BBB	9.40

[1] From Sheet 2 of this Exhibit

[2] Bond ratings are those of Boardwalk Pipeline LP

[3] Bond ratings are those of Spectra Energy Corp.

[4] Bond ratings are those of TransCanada Corp.

[5] Bond ratings are those of El Paso Corp. In its February 10, 2009 credit report for El Paso Corp., S&P stated that on a stand-alone basis the pipeline segment would likely be assigned a bond rating of BBB+.

**PAIUTE PIPELINE COMPANY  
BOND RATING WEIGHTS  
MOODY'S AND STANDARD & POOR'S BOND RATINGS**

<u>Moody's Bond Rating</u>	<u>Weight</u>	<u>S&amp;P Bond Rating</u>
Aaa	1	AAA
Aa1	2	AA+
Aa2	3	AA
Aa3	4	AA-
A1	5	A+
A2	6	A
A3	7	A-
Baa1	8	BBB+
Baa2	9	BBB
Baa3	10	BBB-
Ba1	11	BB+
Ba2	12	BB
Ba3	13	BB

**PAIUTE PIPELINE COMPANY**  
**PROXY GROUP OF NATURAL GAS TRANSMISSION COMPANIES**  
**FERC TWO-STEP DCF MODEL COST OF EQUITY ESTIMATES**

Line No.	Company (a)	Symbol (b)	Po 6-Month Average Stock Price[1] (c)	Do Dividend[2] (d)	Do/Po 6-Month Average Dividend Yield (e)	5-Year Growth Rate Earnings[3] (f)	Long-Term Growth Rate[4] (g)	g Weighted Avg. Growth Rate[5] (h)	Do/Po(1+.5g) Adj. Dividend Yield[6] (i)	Do/Po(1+.5g) + g Estimated Cost of Equity[7] (j)	Line No.
1	Natural Gas Pipelines MLPs										1
2	Boardwalk Pipeline Partners LP	BWP	\$ 20.99	\$ 1.89	9.00%	6.58%	2.20%	5.12%	9.23%	14.35%	2
3	Kinder Morgan Energy Partners, LP	KMP	50.99	4.02	7.88%	6.00%	2.20%	4.73%	8.07%	12.80%	3
4	Spectra Energy Partners LP	SEP	20.04	1.38	6.89%	8.25%	2.20%	6.23%	7.10%	13.33%	4
5	TC Pipelines LP	TCLP	27.13	2.82	10.39%	5.00%	2.20%	4.07%	10.60%	14.67%	5
6	El Paso Pipeline Partners, LP	EPB	16.76	1.19	7.10%	7.63%	2.20%	5.82%	7.30%	13.12%	6
7									Maximum =	14.67%	7
8									Minimum =	12.80%	8
9									Mean =	13.66%	9
									Median =	13.33%	

[1] Source: Bloomberg Financial Services - Average high and low daily price for the period August 1, 2008 - January 31, 2009

[2] Source: Bloomberg Financial Services - Annualized dividend/distribution paid for the period August 1, 2008 - January 31, 2009

[3] Source: Bloomberg Financial Services - The estimated annual earnings per share growth rate projected over the next five years as provided by Bloomberg earnings estimate platform (BEst)

[4] For Natural Gas Pipeline LPs the long-term growth rate = 1/2 the projected long-term nominal Gross Domestic Product (GDP) growth rate.

For Natural Gas Pipeline Companies the long-term growth rate = the projected long-term nominal Gross Domestic Product (GDP) growth rate.

Source:	Projected Nominal GDP (in billions)		Nominal GDP Growth Rate
	2014	2030	
EIA Annual Energy Outlook 2009'	\$ 18,143.05	\$ 34,931.13	N/A
2008 OASDI Trustees Report <sup>c</sup>	19,313.00	191,872.00	4.60%
		Average =	4.39%

[5] Weighted Average Growth Rate = (2/3) X 5-year Bloomberg BEst EPS Growth Rate + (1/3) X Average Long-Term Growth Rate

[6] Adjusted Dividend Yield = (Do(1+.5g)/Po)

[7] Estimated Cost of Equity = Adjusted Dividend Yield + Weighted Average Growth Rate = (Do(1+.5g)/Po) + g

<sup>1</sup> [http://www.eia.doe.gov/oiaf/aero/aeroref\\_tab.html](http://www.eia.doe.gov/oiaf/aero/aeroref_tab.html) (Table 20. Macroeconomic Indicators - aeotab\_20.xls)

<sup>2</sup> [http://www.socialsecurity.gov/OACT/TR/TR08/V1\\_OASDHI\\_GDP.html](http://www.socialsecurity.gov/OACT/TR/TR08/V1_OASDHI_GDP.html)

**PAIUTE PIPELINE COMPANY**  
**PROXY GROUP OF NATURAL GAS TRANSMISSION COMPANIES**  
**FERC TWO-STEP DCF MODEL COST OF EQUITY ESTIMATES**

Line No.	Company (a)	Symbol (b)	Po 3-Month Average Stock Price[1] (c)	Do Dividend[2] (d)	Do/Po 6-Month Average Dividend Yield (e)	5-Year Earnings[3] Growth Rate (f)	Long-Term Growth Rate[4] (g)	g Weighted Avg. Growth Rate[5] (h)	Do/Po(1+.5g) Adj. Dividend Yield[6] (i)	Do/Po(1+.5g) Estimated Cost of Equity[7] (j)	Line No.
1	Natural Gas Pipelines MLPs										
2	Boardwalk Pipeline Partners LP	BWP	\$ 20.40	\$ 1.90	9.31%	6.58%	2.20%	5.12%	9.55%	14.67%	1
3	Kinder Morgan Energy Partners, LP	KMP	48.32	4.08	8.44%	6.00%	2.20%	4.73%	8.64%	13.38%	2
4	Spectra Energy Partners LP	SEP	19.40	1.40	7.22%	8.25%	2.20%	6.23%	7.44%	13.67%	3
5	TC Pipelines LP	TCLP	23.51	2.82	12.00%	5.00%	2.20%	4.07%	12.24%	16.30%	4
6	EI Paso Pipeline Partners, LP	EPB	16.26	1.20	7.38%	7.63%	2.20%	5.82%	7.60%	13.41%	5
7									Maximum =	16.30%	6
8									Minimum =	13.38%	7
9									Mean =	14.29%	8
									Median =	13.67%	9

[1] Source: Bloomberg Financial Services - Average high and low daily price for the period November 1, 2008 - January 31, 2009  
[2] Source: Bloomberg Financial Services - Annualized dividend/distribution paid for the period November 1, 2008 - January 31, 2009  
[3] Source: Bloomberg Financial Services - The estimated annual earnings per share growth rate projected over the next five years as provided by Bloomberg earnings estimate platform (BEst)  
[4] For Natural Gas Pipeline LPs the long-term growth rate = 1/2 the projected long-term nominal Gross Domestic Product (GDP) growth rate.  
For Natural Gas Pipeline Companies the long-term growth rate = the projected long-term nominal Gross Domestic Product (GDP) growth rate.

Source:	Projected Nominal GDP (in billions)		Nominal GDP Growth Rate	
	2014	2030	2065	
EIA Annual Energy Outlook 2009 <sup>1</sup>	\$ 18,143.05	\$ 34,931.13	N/A	4.18%
2008 OASDI Trustees Report <sup>2</sup>	19,313.00		191,872.00	4.60%
			Average =	4.39%

[5] Weighted Average Growth Rate = (2/3) X 5-year Bloomberg BEst EPS Growth Rate + (1/3) X Average Long-Term Growth Rate  
[6] Adjusted Dividend Yield = (Do(1+.5g)/Po)  
[7] Estimated Cost of Equity = Adjusted Dividend Yield + Weighted Average Growth Rate = (Do(1+.5g)/Po) + g

<sup>1</sup> [http://www.eia.doe.gov/oiaf/aeo/aeoref\\_tab.html](http://www.eia.doe.gov/oiaf/aeo/aeoref_tab.html) (Table 20. Macroeconomic Indicators - aeotab\_20.xls)  
<sup>2</sup> [http://www.socialsecurity.gov/OACT/TR/TR08/VI\\_OASDHI\\_GDP.html](http://www.socialsecurity.gov/OACT/TR/TR08/VI_OASDHI_GDP.html)

**PAIUTE PIPELINE COMPANY**  
**MOODY'S MONTHLY AVERAGE Baa UTILITY BOND YIELDS**  
**AUGUST 1988 - NOVEMBER 2008**

Date	Yield	Date	Yield	Date	Yield	Date	Yield	Date	Yield
Aug-88	11.40	Sep-92	8.54	Oct-96	8.15	Nov-00	8.25	Dec-04	6.10
Sep-88	10.92	Oct-92	8.76	Nov-96	7.87	Dec-00	8.02	Jan-05	5.95
Oct-88	10.31	Nov-92	8.86	Dec-96	7.98	Jan-01	7.99	Feb-05	5.76
Nov-88	10.35	Dec-92	8.69	Jan-97	8.18	Feb-01	7.94	Mar-05	6.01
Dec-88	10.44	Jan-93	8.57	Feb-97	8.02	Mar-01	7.85	Apr-05	5.95
Jan-89	10.38	Feb-93	8.31	Mar-97	8.26	Apr-01	8.06	May-05	5.88
Feb-89	10.38	Mar-93	8.10	Apr-97	8.42	May-01	8.11	Jun-05	5.70
Mar-89	10.50	Apr-93	8.11	May-97	8.28	Jun-01	8.02	Jul-05	5.81
Apr-89	10.49	May-93	8.18	Jun-97	8.12	Jul-01	8.05	Aug-05	5.80
May-89	10.29	Jun-93	8.05	Jul-97	7.87	Aug-01	7.96	Sep-05	5.83
Jun-89	9.80	Jul-93	7.93	Aug-97	7.93	Sep-01	8.12	Oct-05	6.08
Jul-89	9.64	Aug-93	7.59	Sep-97	7.84	Oct-01	8.01	Nov-05	6.19
Aug-89	9.64	Sep-93	7.35	Oct-97	7.67	Nov-01	7.95	Dec-05	6.14
Sep-89	9.70	Oct-93	7.27	Nov-97	7.49	Dec-01	8.27	Jan-06	6.06
Oct-89	9.64	Nov-93	7.69	Dec-97	7.41	Jan-02	8.13	Feb-06	6.11
Nov-89	9.64	Dec-93	7.73	Jan-98	7.28	Feb-02	8.18	Mar-06	6.26
Dec-89	9.60	Jan-94	7.66	Feb-98	7.36	Mar-02	8.32	Apr-06	6.54
Jan-90	9.74	Feb-94	7.76	Mar-98	7.37	Apr-02	8.25	May-06	6.59
Feb-90	9.96	Mar-94	8.11	Apr-98	7.37	May-02	8.33	Jun-06	6.61
Mar-90	10.06	Apr-94	8.47	May-98	7.34	Jun-02	8.25	Jul-06	6.61
Apr-90	10.13	May-94	8.61	Jun-98	7.21	Jul-02	8.08	Aug-06	6.43
May-90	10.16	Jun-94	8.64	Jul-98	7.24	Aug-02	7.74	Sep-06	6.26
Jun-90	9.96	Jul-94	8.80	Aug-98	7.20	Sep-02	7.62	Oct-06	6.24
Jul-90	9.92	Aug-94	8.74	Sep-98	7.13	Oct-02	7.99	Nov-06	6.04
Aug-90	10.12	Sep-94	8.98	Oct-98	7.13	Nov-02	7.69	Dec-06	6.05
Sep-90	10.32	Oct-94	9.24	Nov-98	7.31	Dec-02	7.61	Jan-07	6.16
Oct-90	10.28	Nov-94	9.35	Dec-98	7.24	Jan-03	7.46	Feb-07	6.10
Nov-90	10.12	Dec-94	9.16	Jan-99	7.30	Feb-03	7.17	Mar-07	6.10
Dec-90	9.96	Jan-95	9.15	Feb-99	7.41	Mar-03	7.05	Apr-07	6.24
Jan-91	9.96	Feb-95	8.93	Mar-99	7.55	Apr-03	6.94	May-07	6.23
Feb-91	9.68	Mar-95	8.78	Apr-99	7.51	May-03	6.45	Jun-07	6.54
Mar-91	9.74	Apr-95	8.67	May-99	7.74	Jun-03	6.30	Jul-07	6.49
Apr-91	9.64	May-95	8.30	Jun-99	8.03	Jul-03	6.67	Aug-07	6.51
May-91	9.64	Jun-95	8.01	Jul-99	7.96	Aug-03	7.09	Sep-07	6.45
Jun-91	9.79	Jul-95	8.11	Aug-99	8.16	Sep-03	6.87	Oct-07	6.36
Jul-91	9.69	Aug-95	8.24	Sep-99	8.19	Oct-03	6.79	Nov-07	6.27
Aug-91	9.47	Sep-95	7.98	Oct-99	8.32	Nov-03	6.69	Dec-07	6.51
Sep-91	9.35	Oct-95	7.82	Nov-99	8.12	Dec-03	6.61	Jan-08	6.35
Oct-91	9.32	Nov-95	7.81	Dec-99	8.28	Jan-04	6.47	Feb-08	6.60
Nov-91	9.28	Dec-95	7.63	Jan-00	8.40	Feb-04	6.28	Mar-08	6.68
Dec-91	9.07	Jan-96	7.64	Feb-00	8.33	Mar-04	6.12	Apr-08	6.81
Jan-92	8.98	Feb-96	7.78	Mar-00	8.40	Apr-04	6.46	May-08	6.79
Feb-92	9.09	Mar-96	8.15	Apr-00	8.40	May-04	6.75	Jun-08	6.93
Mar-92	9.16	Apr-96	8.32	May-00	8.86	Jun-04	6.84	Jul-08	6.97
Apr-92	9.11	May-96	8.45	Jun-00	8.47	Jul-04	6.67	Aug-08	6.98
May-92	9.01	Jun-96	8.51	Jul-00	8.33	Aug-04	6.45	Sep-08	7.15
Jun-92	8.90	Jul-96	8.44	Aug-00	8.25	Sep-04	6.27	Oct-08	8.58
Jul-92	8.69	Aug-96	8.25	Sep-00	8.32	Oct-04	6.17	Nov-08	8.98
Aug-92	8.58	Sep-96	8.41	Oct-00	8.29	Nov-04	6.16		
Average Rate									7.96

Source: Bloomberg

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**8.0% Debenture, Due 8/1/2026**

Semi-Annual Payment	Outstanding Principal	Unamortized Balance					Net Proceeds	Redemption	Interest Expense	Internal Rate of Return = 8.12%			
		Debt Expense		Discount		Total Expense				Annual Cost	Cash Flows		
		(c)	(d)	(e)	(f)							(g)	(h)
8/1/1996	\$ 75,000,000	\$ 150,000	\$ 894,750	\$ 73,955,250	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	8.12%	\$ 73,955,250
2/1/1997	75,000,000	149,385	891,080	73,959,535	-	-	3,000,000	615	3,670	3,004,285	3,004,285	8.12%	(3,000,000)
8/1/1997	75,000,000	148,745	887,261	73,963,994	-	-	3,000,000	640	3,819	3,004,459	3,004,459	8.12%	(3,000,000)
2/1/1998	75,000,000	148,078	883,287	73,968,634	-	-	3,000,000	666	3,974	3,004,640	3,004,640	8.12%	(3,000,000)
8/1/1998	75,000,000	147,385	879,152	73,973,463	-	-	3,000,000	693	4,135	3,004,829	3,004,829	8.12%	(3,000,000)
2/1/1999	75,000,000	146,664	874,848	73,978,488	-	-	3,000,000	721	4,303	3,005,025	3,005,025	8.12%	(3,000,000)
8/1/1999	75,000,000	145,913	870,370	73,983,717	-	-	3,000,000	751	4,478	3,005,229	3,005,229	8.12%	(3,000,000)
2/1/2000	75,000,000	145,132	865,710	73,989,158	-	-	3,000,000	781	4,660	3,005,441	3,005,441	8.12%	(3,000,000)
8/1/2000	75,000,000	144,319	860,861	73,994,821	-	-	3,000,000	813	4,849	3,005,662	3,005,662	8.12%	(3,000,000)
2/1/2001	75,000,000	143,473	855,814	74,000,713	-	-	3,000,000	846	5,046	3,005,893	3,005,893	8.12%	(3,000,000)
8/1/2001	75,000,000	142,592	850,563	74,006,845	-	-	3,000,000	880	5,251	3,006,132	3,006,132	8.12%	(3,000,000)
2/1/2002	75,000,000	141,676	845,098	74,013,226	-	-	3,000,000	916	5,465	3,006,381	3,006,381	8.12%	(3,000,000)
8/1/2002	75,000,000	140,723	839,411	74,019,866	-	-	3,000,000	953	5,687	3,006,640	3,006,640	8.12%	(3,000,000)
2/1/2003	75,000,000	139,731	833,493	74,026,776	-	-	3,000,000	992	5,918	3,006,910	3,006,910	8.12%	(3,000,000)
8/1/2003	75,000,000	138,698	827,335	74,033,967	-	-	3,000,000	1,032	6,158	3,007,191	3,007,191	8.12%	(3,000,000)
2/1/2004	75,000,000	137,624	820,926	74,041,450	-	-	3,000,000	1,074	6,408	3,007,483	3,007,483	8.12%	(3,000,000)
8/1/2004	75,000,000	136,506	814,258	74,049,236	-	-	3,000,000	1,118	6,669	3,007,787	3,007,787	8.12%	(3,000,000)
2/1/2005	75,000,000	135,343	807,318	74,057,339	-	-	3,000,000	1,163	6,940	3,008,103	3,008,103	8.12%	(3,000,000)
8/1/2005	75,000,000	134,132	800,097	74,065,772	-	-	3,000,000	1,211	7,222	3,008,432	3,008,432	8.12%	(3,000,000)
2/1/2006	75,000,000	132,872	792,582	74,074,546	-	-	3,000,000	1,260	7,515	3,008,775	3,008,775	8.12%	(3,000,000)
8/1/2006	75,000,000	131,561	784,762	74,083,677	-	-	3,000,000	1,311	7,820	3,009,131	3,009,131	8.12%	(3,000,000)
2/1/2007	75,000,000	130,197	776,624	74,093,180	-	-	3,000,000	1,364	8,138	3,009,502	3,009,502	8.12%	(3,000,000)
8/1/2007	75,000,000	128,777	768,155	74,103,068	-	-	3,000,000	1,420	8,468	3,009,888	3,009,888	8.12%	(3,000,000)
2/1/2008	75,000,000	127,300	759,343	74,113,358	-	-	3,000,000	1,477	8,812	3,010,290	3,010,290	8.12%	(3,000,000)
8/1/2008	75,000,000	125,762	750,172	74,124,065	-	-	3,000,000	1,537	9,170	3,010,708	3,010,708	8.12%	(3,000,000)
2/1/2009	75,000,000	124,163	740,629	74,135,208	-	-	3,000,000	1,600	9,543	3,011,143	3,011,143	8.12%	(3,000,000)
8/1/2009	75,000,000	122,498	730,699	74,146,804	-	-	3,000,000	1,665	9,931	3,011,595	3,011,595	8.12%	(3,000,000)
2/1/2010	75,000,000	120,765	720,365	74,158,870	-	-	3,000,000	1,732	10,334	3,012,067	3,012,067	8.12%	(3,000,000)
8/1/2010	75,000,000	118,962	709,611	74,171,427	-	-	3,000,000	1,803	10,754	3,012,557	3,012,557	8.12%	(3,000,000)
2/1/2011	75,000,000	117,086	698,420	74,184,494	-	-	3,000,000	1,876	11,191	3,013,067	3,013,067	8.12%	(3,000,000)
8/1/2011	75,000,000	115,134	686,775	74,198,091	-	-	3,000,000	1,952	11,645	3,013,598	3,013,598	8.12%	(3,000,000)
2/1/2012	75,000,000	113,103	674,656	74,212,241	-	-	3,000,000	2,032	12,118	3,014,150	3,014,150	8.12%	(3,000,000)
8/1/2012	75,000,000	110,988	662,046	74,226,966	-	-	3,000,000	2,114	12,611	3,014,725	3,014,725	8.12%	(3,000,000)
2/1/2013	75,000,000	108,788	648,923	74,242,289	-	-	3,000,000	2,200	13,123	3,015,323	3,015,323	8.12%	(3,000,000)
8/1/2013	75,000,000	106,499	635,267	74,258,234	-	-	3,000,000	2,289	13,656	3,015,945	3,015,945	8.12%	(3,000,000)
2/1/2014	75,000,000	104,117	621,056	74,274,827	-	-	3,000,000	2,382	14,211	3,016,593	3,016,593	8.12%	(3,000,000)
8/1/2014	75,000,000	101,638	606,268	74,292,094	-	-	3,000,000	2,479	14,788	3,017,267	3,017,267	8.12%	(3,000,000)
2/1/2015	75,000,000	99,058	590,879	74,310,063	-	-	3,000,000	2,580	15,389	3,017,969	3,017,969	8.12%	(3,000,000)

Internal Rate of Return = 8.12% Effective Rate



**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**8.0% Debenture, Due 8/1/2026**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance			Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Debt Expense (h)	Discount (i)	Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Debt Expense (c)	Discount (d)									
8/1/2015	75,000,000	96,373	574,865		74,328,762	-	3,000,000	2,685	16,014	3,018,699	8.12%	(3,000,000)
2/1/2016	75,000,000	93,579	558,201		74,348,220	-	3,000,000	2,794	16,664	3,019,458	8.12%	(3,000,000)
8/1/2016	75,000,000	90,672	540,859		74,368,469	-	3,000,000	2,907	17,341	3,020,249	8.12%	(3,000,000)
2/1/2017	75,000,000	87,647	522,813		74,389,540	-	3,000,000	3,025	18,046	3,021,071	8.12%	(3,000,000)
8/1/2017	75,000,000	84,499	504,034		74,411,467	-	3,000,000	3,148	18,779	3,021,927	8.12%	(3,000,000)
2/1/2018	75,000,000	81,223	484,493		74,434,285	-	3,000,000	3,276	19,542	3,022,818	8.12%	(3,000,000)
8/1/2018	75,000,000	77,813	464,157		74,458,030	-	3,000,000	3,409	20,336	3,023,745	8.12%	(3,000,000)
2/1/2019	75,000,000	74,266	442,995		74,482,739	-	3,000,000	3,548	21,162	3,024,709	8.12%	(3,000,000)
8/1/2019	75,000,000	70,574	420,974		74,508,452	-	3,000,000	3,692	22,021	3,025,713	8.12%	(3,000,000)
2/1/2020	75,000,000	66,732	398,058		74,535,210	-	3,000,000	3,842	22,916	3,026,758	8.12%	(3,000,000)
8/1/2020	75,000,000	62,734	374,211		74,563,055	-	3,000,000	3,998	23,847	3,027,845	8.12%	(3,000,000)
2/1/2021	75,000,000	58,574	349,395		74,592,031	-	3,000,000	4,160	24,816	3,028,976	8.12%	(3,000,000)
8/1/2021	75,000,000	54,245	323,571		74,622,184	-	3,000,000	4,329	25,824	3,030,153	8.12%	(3,000,000)
2/1/2022	75,000,000	49,740	296,699		74,653,561	-	3,000,000	4,505	26,873	3,031,378	8.12%	(3,000,000)
8/1/2022	75,000,000	45,052	268,734		74,686,214	-	3,000,000	4,688	27,964	3,032,653	8.12%	(3,000,000)
2/1/2023	75,000,000	40,173	239,634		74,720,193	-	3,000,000	4,879	29,100	3,033,979	8.12%	(3,000,000)
8/1/2023	75,000,000	35,097	209,351		74,755,552	-	3,000,000	5,077	30,283	3,035,359	8.12%	(3,000,000)
2/1/2024	75,000,000	29,814	177,838		74,792,348	-	3,000,000	5,283	31,513	3,036,796	8.12%	(3,000,000)
8/1/2024	75,000,000	24,316	145,045		74,830,638	-	3,000,000	5,498	32,793	3,038,290	8.12%	(3,000,000)
2/1/2025	75,000,000	18,595	110,920		74,870,484	-	3,000,000	5,721	34,125	3,039,846	8.12%	(3,000,000)
8/1/2025	75,000,000	12,642	75,409		74,911,949	-	3,000,000	5,953	35,511	3,041,465	8.12%	(3,000,000)
2/1/2026	75,000,000	6,447	38,455		74,955,098	-	3,000,000	6,195	36,954	3,043,149	8.12%	(3,000,000)
8/1/2026	75,000,000	-	-		75,000,000	75,000,000	3,000,000	6,447	38,455	3,044,902	8.12%	(78,000,000)
					<u>\$ 75,000,000</u>	<u>\$ 75,000,000</u>	<u>\$ 180,000,000</u>	<u>\$ 150,000</u>	<u>\$ 894,750</u>	<u>\$ 181,044,750</u>		

Internal Rate of Return = 8.12% Effective Rate

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**8.375 % Notes, Due 2/15/2011**

Internal Rate of Return = Effective Rate  
8.6098%

Semi-Annual Payment	Outstanding Principal	Unamortized Balance		Net Proceeds	Redemption	Interest Expense	Amortization of		Total Expense	Annual Cost	Cash Flows
		Discount	Debt Expense				Discount	Debt Expense			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
2/13/2001	\$ 200,000,000	\$ 2,818,000	\$ 288,784	\$ 196,893,216	\$ -	0	0	0	0	0	\$ 196,893,216
8/15/2001	200,000,000	2,726,322	279,389	196,994,289	-	8,375,000	91,678	9,395	8,476,073	4.30%	(8,375,000)
2/15/2002	200,000,000	2,630,697	269,589	197,099,713	-	8,375,000	95,625	9,799	8,480,424	4.30%	(8,375,000)
8/15/2002	200,000,000	2,530,956	259,368	197,209,676	-	8,375,000	99,741	10,221	8,484,962	4.30%	(8,375,000)
2/15/2003	200,000,000	2,426,921	248,707	197,324,372	-	8,375,000	104,035	10,661	8,489,696	4.30%	(8,375,000)
8/15/2003	200,000,000	2,318,408	237,586	197,444,006	-	8,375,000	108,514	11,120	8,494,634	4.30%	(8,375,000)
2/15/2004	200,000,000	2,205,223	225,987	197,568,790	-	8,375,000	113,185	11,599	8,499,784	4.30%	(8,375,000)
8/15/2004	200,000,000	2,087,166	213,889	197,698,945	-	8,375,000	118,057	12,098	8,505,156	4.30%	(8,375,000)
2/15/2005	200,000,000	1,964,026	201,270	197,834,704	-	8,375,000	123,140	12,619	8,510,759	4.30%	(8,375,000)
8/15/2005	200,000,000	1,835,585	188,108	197,976,307	-	8,375,000	128,441	13,162	8,516,603	4.30%	(8,375,000)
2/15/2006	200,000,000	1,701,615	174,379	198,124,006	-	8,375,000	133,970	13,729	8,522,699	4.30%	(8,375,000)
8/15/2006	200,000,000	1,561,878	160,058	198,278,064	-	8,375,000	139,737	14,320	8,529,057	4.30%	(8,375,000)
2/15/2007	200,000,000	1,416,125	145,122	198,438,753	-	8,375,000	145,753	14,936	8,535,689	4.30%	(8,375,000)
8/15/2007	200,000,000	1,264,098	129,543	198,606,360	-	8,375,000	152,027	15,579	8,542,607	4.30%	(8,375,000)
2/15/2008	200,000,000	1,105,526	113,292	198,781,182	-	8,375,000	158,572	16,250	8,549,822	4.30%	(8,375,000)
8/15/2008	200,000,000	940,127	96,343	198,963,530	-	8,375,000	165,398	16,950	8,557,348	4.30%	(8,375,000)
2/15/2009	200,000,000	767,609	78,663	199,153,728	-	8,375,000	172,519	17,679	8,565,198	4.30%	(8,375,000)
8/15/2009	200,000,000	587,663	60,223	199,352,114	-	8,375,000	179,945	18,440	8,573,386	4.30%	(8,375,000)
2/15/2010	200,000,000	399,971	40,988	199,559,040	-	8,375,000	187,692	19,234	8,581,926	4.30%	(8,375,000)
8/15/2010	200,000,000	204,200	20,926	199,774,874	-	8,375,000	195,772	20,062	8,590,834	4.30%	(8,375,000)
2/15/2011	200,000,000	-	-	200,000,000	200,000,000	8,375,000	204,200	20,926	8,600,126	4.30%	(208,375,000)
				\$ 200,000,000	\$ 200,000,000	\$ 167,500,000	\$ 2,818,000	\$ 288,784	\$ 170,606,784		

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.625% Notes, Due 5/15/2012**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance		Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Discount (c)	Debt Expense (d)				Discount (h)	Debt Expense (i)			
5/15/2002	\$ 200,000,000	\$ 2,052,000	\$ 270,042	\$ 197,677,958	\$ -	\$ -	\$ 0	\$ 0	\$ 0	3.90%	\$ 197,677,958
11/15/2002	200,000,000	1,982,352	260,876	197,756,772	-	7,625,000	69,648	9,166	7,703,814	3.90%	(7,625,000)
6/15/2003	200,000,000	1,909,989	251,354	197,838,657	-	7,625,000	72,363	9,523	7,706,885	3.90%	(7,625,000)
11/15/2003	200,000,000	1,834,806	241,460	197,923,734	-	7,625,000	75,183	9,894	7,710,077	3.90%	(7,625,000)
5/15/2004	200,000,000	1,756,694	231,180	198,012,126	-	7,625,000	78,113	10,280	7,713,392	3.90%	(7,625,000)
11/15/2004	200,000,000	1,675,537	220,500	198,103,963	-	7,625,000	81,157	10,680	7,716,837	3.90%	(7,625,000)
5/15/2005	200,000,000	1,591,217	209,403	198,199,379	-	7,625,000	84,320	11,096	7,720,416	3.90%	(7,625,000)
11/15/2005	200,000,000	1,503,612	197,874	198,298,514	-	7,625,000	87,606	11,529	7,724,135	3.90%	(7,625,000)
5/15/2006	200,000,000	1,412,592	185,896	198,401,512	-	7,625,000	91,020	11,978	7,727,998	3.90%	(7,625,000)
11/15/2006	200,000,000	1,318,025	173,451	198,508,524	-	7,625,000	94,567	12,445	7,732,012	3.90%	(7,625,000)
5/15/2007	200,000,000	1,219,772	160,521	198,619,706	-	7,625,000	98,252	12,930	7,736,182	3.90%	(7,625,000)
11/15/2007	200,000,000	1,117,691	147,087	198,735,222	-	7,625,000	102,082	13,434	7,740,515	3.90%	(7,625,000)
5/15/2008	200,000,000	1,011,631	133,130	198,855,239	-	7,625,000	106,060	13,957	7,745,017	3.90%	(7,625,000)
11/15/2008	200,000,000	901,438	118,629	198,979,933	-	7,625,000	110,193	14,501	7,749,694	3.90%	(7,625,000)
5/15/2009	200,000,000	786,950	103,562	199,109,487	-	7,625,000	114,487	15,066	7,754,554	3.90%	(7,625,000)
11/15/2009	200,000,000	668,001	87,909	199,244,090	-	7,625,000	118,949	15,654	7,759,603	3.90%	(7,625,000)
5/15/2010	200,000,000	544,416	71,645	199,383,939	-	7,625,000	123,585	16,264	7,764,849	3.90%	(7,625,000)
11/15/2010	200,000,000	416,015	54,747	199,529,238	-	7,625,000	128,401	16,898	7,770,299	3.90%	(7,625,000)
5/15/2011	200,000,000	282,610	37,191	199,680,199	-	7,625,000	133,405	17,556	7,775,961	3.90%	(7,625,000)
11/15/2011	200,000,000	144,006	18,951	199,837,043	-	7,625,000	138,604	18,240	7,781,844	3.90%	(7,625,000)
5/15/2012	200,000,000	-	-	200,000,000	200,000,000	7,625,000	144,006	18,951	7,787,957	3.90%	(207,625,000)
				<u>\$ 200,000,000</u>	<u>\$ 200,000,000</u>	<u>\$ 152,500,000</u>	<u>\$ 2,052,000</u>	<u>\$ 270,042</u>	<u>\$ 154,822,042</u>		

Internal Rate of Return = Effective Rate  
7.79%

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.59% Medium Term Note Series A, Due 1/17/2017**

Semi-Annual Payment	Outstanding Principal	Unamortized Balance		Net Proceeds	Redemption	Interest Expense	Amortization of		Total Expense	Annual Cost	Cash Flows
		Discount	Debt Expense				Discount	Debt Expense			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1/17/1997	\$ 25,000,000	\$ 187,500	\$ 33,400	\$ 24,779,100	\$ -	\$ -	\$ -	\$ -	0		\$ 24,779,100
4/1/1997	25,000,000	186,657	33,250	24,780,093	-	390,042	843	150.09	391,034	7.68%	(390,042)
10/1/1997	25,000,000	184,576	32,879	24,782,545	-	948,750	2,082	371	951,203	7.68%	(948,750)
4/1/1998	25,000,000	182,414	32,494	24,785,092	-	948,750	2,162	385	951,297	7.68%	(948,750)
10/1/1998	25,000,000	180,169	32,094	24,787,737	-	948,750	2,245	400	951,395	7.68%	(948,750)
4/1/1999	25,000,000	177,838	31,679	24,790,483	-	948,750	2,331	415	951,496	7.68%	(948,750)
10/1/1999	25,000,000	175,418	31,248	24,793,334	-	948,750	2,420	431	951,601	7.68%	(948,750)
4/1/2000	25,000,000	172,905	30,800	24,796,295	-	948,750	2,513	448	951,711	7.68%	(948,750)
10/1/2000	25,000,000	170,295	30,335	24,799,370	-	948,750	2,610	465	951,825	7.68%	(948,750)
4/1/2001	25,000,000	167,585	29,852	24,802,562	-	948,750	2,710	483	951,943	7.68%	(948,750)
10/1/2001	25,000,000	164,771	29,351	24,805,878	-	948,750	2,814	501	952,065	7.68%	(948,750)
4/1/2002	25,000,000	161,849	28,831	24,809,320	-	948,750	2,922	521	952,192	7.68%	(948,750)
10/1/2002	25,000,000	158,815	28,290	24,812,895	-	948,750	3,034	540	952,325	7.68%	(948,750)
4/1/2003	25,000,000	155,665	27,729	24,816,606	-	948,750	3,151	561	952,462	7.68%	(948,750)
10/1/2003	25,000,000	152,393	27,146	24,820,461	-	948,750	3,272	583	952,604	7.68%	(948,750)
4/1/2004	25,000,000	148,996	26,541	24,824,463	-	948,750	3,397	605	952,752	7.68%	(948,750)
10/1/2004	25,000,000	145,468	25,913	24,828,619	-	948,750	3,527	628	952,906	7.68%	(948,750)
4/1/2005	25,000,000	141,806	25,260	24,832,934	-	948,750	3,663	652	953,065	7.68%	(948,750)
10/1/2005	25,000,000	138,002	24,583	24,837,415	-	948,750	3,803	678	953,231	7.68%	(948,750)
4/1/2006	25,000,000	134,053	23,879	24,842,068	-	948,750	3,949	704	953,403	7.68%	(948,750)
10/1/2006	25,000,000	129,951	23,149	24,846,900	-	948,750	4,101	731	953,582	7.68%	(948,750)
4/1/2007	25,000,000	125,693	22,390	24,851,917	-	948,750	4,259	759	953,767	7.68%	(948,750)
10/1/2007	25,000,000	121,271	21,602	24,857,127	-	948,750	4,422	788	953,960	7.68%	(948,750)
4/1/2008	25,000,000	116,679	20,784	24,862,536	-	948,750	4,592	818	954,160	7.68%	(948,750)
10/1/2008	25,000,000	111,911	19,935	24,868,154	-	948,750	4,768	849	954,367	7.68%	(948,750)
4/1/2009	25,000,000	106,960	19,053	24,873,987	-	948,750	4,951	882	954,583	7.68%	(948,750)
10/1/2009	25,000,000	101,819	18,137	24,880,043	-	948,750	5,141	916	954,807	7.68%	(948,750)
4/1/2010	25,000,000	96,481	17,186	24,886,333	-	948,750	5,338	951	955,039	7.68%	(948,750)
10/1/2010	25,000,000	90,937	16,199	24,892,645	-	948,750	5,543	987	955,281	7.68%	(948,750)
4/1/2011	25,000,000	85,181	15,174	24,899,645	-	948,750	5,756	1,025	955,531	7.68%	(948,750)
10/1/2011	25,000,000	79,204	14,109	24,906,687	-	948,750	5,977	1,065	955,792	7.68%	(948,750)
4/1/2012	25,000,000	72,998	13,003	24,913,999	-	948,750	6,206	1,106	956,062	7.68%	(948,750)
10/1/2012	25,000,000	66,553	11,855	24,921,592	-	948,750	6,445	1,148	956,343	7.68%	(948,750)
4/1/2013	25,000,000	59,861	10,663	24,929,476	-	948,750	6,692	1,192	956,634	7.68%	(948,750)
10/1/2013	25,000,000	52,912	9,425	24,937,663	-	948,750	6,949	1,238	956,937	7.68%	(948,750)
4/1/2014	25,000,000	45,696	8,140	24,946,164	-	948,750	7,216	1,285	957,251	7.68%	(948,750)

Internal Rate of Return = 7.68% Effective Rate

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.59% Medium Term Note Series A, Due 1/17/2017**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance		Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Discount (c)	Debt Expense (d)				Discount (h)	Debt Expense (i)			
10/1/2014	25,000,000	38,204	6,805	24,954,991	-	948,750	7,493	1,335	957,577	7.68%	(948,750)
4/1/2015	25,000,000	30,423	5,419	24,964,157	-	948,750	7,780	1,386	957,916	7.68%	(948,750)
10/1/2015	25,000,000	22,344	3,980	24,973,676	-	948,750	8,079	1,439	958,268	7.68%	(948,750)
4/1/2016	25,000,000	13,955	2,486	24,983,559	-	948,750	8,389	1,494	958,633	7.68%	(948,750)
10/1/2016	25,000,000	5,244	934	24,993,822	-	948,750	8,711	1,552	959,013	7.68%	(948,750)
1/17/2017	25,000,000	-	-	25,000,000	25,000,000	558,708	5,244	934	564,886	7.68%	(25,558,708)
				<u>\$ 25,000,000</u>	<u>\$ 25,000,000</u>	<u>\$ 37,950,000</u>	<u>\$ 187,500</u>	<u>\$ 33,400</u>	<u>\$ 38,170,900</u>		

Internal Rate of Return = Effective Rate  
7.68%

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.78% Medium Term Note Series A, Due 2/3/2022**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance			Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Discount		Debt Expense (i)								
		(c)	(d)					(h)				
2/3/1997	\$ 25,000,000	\$ 187,500	\$ 33,400	\$ 24,779,100	\$ -	\$ -	-	\$ -	-	\$ -		\$ 24,779,100
4/1/1997	25,000,000	187,096	33,328	24,779,576	-	313,361	404	72	313,837	7.86%		(313,361)
10/1/1997	25,000,000	185,825	33,102	24,781,073	-	972,500	1,271	226	973,997	7.86%		(972,500)
4/1/1998	25,000,000	184,504	32,866	24,782,629	-	972,500	1,321	235	974,056	7.86%		(972,500)
10/1/1998	25,000,000	183,132	32,622	24,784,246	-	972,500	1,373	244	974,117	7.86%		(972,500)
4/1/1999	25,000,000	181,705	32,368	24,785,927	-	972,500	1,426	254	974,181	7.86%		(972,500)
10/1/1999	25,000,000	180,223	32,104	24,787,673	-	972,500	1,483	264	974,247	7.86%		(972,500)
4/1/2000	25,000,000	178,682	31,829	24,789,489	-	972,500	1,541	274	974,315	7.86%		(972,500)
10/1/2000	25,000,000	177,081	31,544	24,791,375	-	972,500	1,601	285	974,387	7.86%		(972,500)
4/1/2001	25,000,000	175,416	31,248	24,793,336	-	972,500	1,664	296	974,461	7.86%		(972,500)
10/1/2001	25,000,000	173,687	30,939	24,795,374	-	972,500	1,730	308	974,538	7.86%		(972,500)
4/1/2002	25,000,000	171,889	30,619	24,797,492	-	972,500	1,798	320	974,618	7.86%		(972,500)
10/1/2002	25,000,000	170,021	30,286	24,799,693	-	972,500	1,868	333	974,701	7.86%		(972,500)
4/1/2003	25,000,000	168,079	29,940	24,801,981	-	972,500	1,942	346	974,788	7.86%		(972,500)
10/1/2003	25,000,000	166,061	29,581	24,804,359	-	972,500	2,018	360	974,878	7.86%		(972,500)
4/1/2004	25,000,000	163,963	29,207	24,806,830	-	972,500	2,097	374	974,971	7.86%		(972,500)
10/1/2004	25,000,000	161,783	28,819	24,809,398	-	972,500	2,180	388	975,068	7.86%		(972,500)
4/1/2005	25,000,000	159,518	28,415	24,812,067	-	972,500	2,266	404	975,169	7.86%		(972,500)
10/1/2005	25,000,000	157,163	27,996	24,814,841	-	972,500	2,355	419	975,274	7.86%		(972,500)
4/1/2006	25,000,000	154,716	27,560	24,817,724	-	972,500	2,447	436	975,383	7.86%		(972,500)
10/1/2006	25,000,000	152,172	27,107	24,820,721	-	972,500	2,543	453	975,496	7.86%		(972,500)
4/1/2007	25,000,000	149,529	26,636	24,823,835	-	972,500	2,643	471	975,614	7.86%		(972,500)
10/1/2007	25,000,000	146,782	26,147	24,827,072	-	972,500	2,747	489	975,737	7.86%		(972,500)
4/1/2008	25,000,000	143,926	25,638	24,830,436	-	972,500	2,855	509	975,864	7.86%		(972,500)
10/1/2008	25,000,000	140,959	25,109	24,833,932	-	972,500	2,968	529	975,996	7.86%		(972,500)
4/1/2009	25,000,000	137,875	24,560	24,837,565	-	972,500	3,084	549	976,134	7.86%		(972,500)
10/1/2009	25,000,000	134,669	23,989	24,841,342	-	972,500	3,205	571	976,276	7.86%		(972,500)
4/1/2010	25,000,000	131,338	23,396	24,845,266	-	972,500	3,331	593	976,425	7.86%		(972,500)
10/1/2010	25,000,000	127,876	22,779	24,849,345	-	972,500	3,462	617	976,579	7.86%		(972,500)
4/1/2011	25,000,000	124,277	22,138	24,853,585	-	972,500	3,598	641	976,739	7.86%		(972,500)
10/1/2011	25,000,000	120,537	21,472	24,857,991	-	972,500	3,740	666	976,906	7.86%		(972,500)
4/1/2012	25,000,000	116,651	20,779	24,862,570	-	972,500	3,887	692	977,079	7.86%		(972,500)
10/1/2012	25,000,000	112,611	20,060	24,867,329	-	972,500	4,040	720	977,259	7.86%		(972,500)
4/1/2013	25,000,000	108,413	19,312	24,872,275	-	972,500	4,198	748	977,446	7.86%		(972,500)
10/1/2013	25,000,000	104,049	18,535	24,877,416	-	972,500	4,363	777	977,641	7.86%		(972,500)
4/1/2014	25,000,000	99,514	17,727	24,882,759	-	972,500	4,535	808	977,843	7.86%		(972,500)

Internal Rate of Return = 7.86% Effective Rate

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.78% Medium Term Note Series A, Due 2/3/2022**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance		Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Discount (c)	Debt Expense (d)				Discount (h)	Debt Expense (i)			
10/1/2014	25,000,000	94,801	16,887	24,888,312	-	972,500	4,713	840	978,053	7.86%	(972,500)
4/1/2015	25,000,000	89,903	16,015	24,894,083	-	972,500	4,898	873	978,271	7.86%	(972,500)
10/1/2015	25,000,000	84,812	15,108	24,900,080	-	972,500	5,091	907	978,498	7.86%	(972,500)
4/1/2016	25,000,000	79,521	14,165	24,906,314	-	972,500	5,291	943	978,734	7.86%	(972,500)
10/1/2016	25,000,000	74,022	13,186	24,912,793	-	972,500	5,499	980	978,979	7.86%	(972,500)
4/1/2017	25,000,000	68,306	12,168	24,919,526	-	972,500	5,715	1,018	979,233	7.86%	(972,500)
10/1/2017	25,000,000	62,367	11,110	24,926,524	-	972,500	5,940	1,058	979,498	7.86%	(972,500)
4/1/2018	25,000,000	56,193	10,010	24,933,797	-	972,500	6,173	1,100	979,773	7.86%	(972,500)
10/1/2018	25,000,000	49,777	8,867	24,941,356	-	972,500	6,416	1,143	980,059	7.86%	(972,500)
4/1/2019	25,000,000	43,109	7,679	24,949,212	-	972,500	6,668	1,188	980,356	7.86%	(972,500)
10/1/2019	25,000,000	36,179	6,445	24,957,377	-	972,500	6,930	1,235	980,665	7.86%	(972,500)
4/1/2020	25,000,000	28,976	5,162	24,965,862	-	972,500	7,203	1,283	980,986	7.86%	(972,500)
10/1/2020	25,000,000	21,490	3,828	24,974,681	-	972,500	7,486	1,333	981,319	7.86%	(972,500)
4/1/2021	25,000,000	13,710	2,442	24,983,847	-	972,500	7,780	1,386	981,666	7.86%	(972,500)
10/1/2021	25,000,000	5,624	1,002	24,993,374	-	972,500	8,086	1,440	982,026	7.86%	(972,500)
2/3/2022	25,000,000	-	-	25,000,000	25,000,000	659,139	5,624	1,002	665,765	7.86%	(25,659,139)
				<u>\$ 25,000,000</u>	<u>\$ 25,000,000</u>	<u>\$ 48,625,000</u>	<u>\$ 187,500</u>	<u>\$ 33,400</u>	<u>\$ 48,845,900</u>		

Internal Rate of Return = 7.86% Effective Rate

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.92% Medium Term Note Series A, Due 6/4/2027**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance		Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Discount (c)	Debt Expense (d)				Discount (h)	Debt Expense (i)			
6/4/1997	\$ 25,000,000	\$ 187,500	\$ 45,761	\$ 24,766,739	\$ -	\$ -	\$ -	\$ -	-	8.00%	\$ 24,766,739
10/1/1997	25,000,000	186,988	45,636	24,767,375	-	643,500	512	125	644,137	8.00%	(643,500)
4/1/1998	25,000,000	186,180	45,439	24,768,381	-	990,000	808	197	991,005	8.00%	(990,000)
10/1/1998	25,000,000	185,340	45,234	24,769,426	-	990,000	840	205	991,045	8.00%	(990,000)
4/1/1999	25,000,000	184,466	45,021	24,770,513	-	990,000	874	213	991,087	8.00%	(990,000)
10/1/1999	25,000,000	183,557	44,799	24,771,644	-	990,000	909	222	991,131	8.00%	(990,000)
4/1/2000	25,000,000	182,612	44,568	24,772,820	-	990,000	945	231	991,176	8.00%	(990,000)
10/1/2000	25,000,000	181,629	44,329	24,774,043	-	990,000	983	240	991,223	8.00%	(990,000)
4/1/2001	25,000,000	180,607	44,079	24,775,315	-	990,000	1,022	250	991,272	8.00%	(990,000)
10/1/2001	25,000,000	179,543	43,819	24,776,637	-	990,000	1,063	260	991,323	8.00%	(990,000)
4/1/2002	25,000,000	178,437	43,550	24,778,013	-	990,000	1,106	270	991,376	8.00%	(990,000)
10/1/2002	25,000,000	177,287	43,269	24,779,444	-	990,000	1,150	281	991,431	8.00%	(990,000)
4/1/2003	25,000,000	176,091	42,977	24,780,932	-	990,000	1,196	292	991,488	8.00%	(990,000)
10/1/2003	25,000,000	174,847	42,673	24,782,479	-	990,000	1,244	304	991,548	8.00%	(990,000)
4/1/2004	25,000,000	173,554	42,358	24,784,089	-	990,000	1,294	316	991,609	8.00%	(990,000)
10/1/2004	25,000,000	172,208	42,029	24,785,763	-	990,000	1,346	328	991,674	8.00%	(990,000)
4/1/2005	25,000,000	170,809	41,688	24,787,504	-	990,000	1,399	342	991,741	8.00%	(990,000)
10/1/2005	25,000,000	169,353	41,333	24,789,314	-	990,000	1,455	355	991,811	8.00%	(990,000)
4/1/2006	25,000,000	167,840	40,963	24,791,197	-	990,000	1,514	369	991,883	8.00%	(990,000)
10/1/2006	25,000,000	166,266	40,579	24,793,155	-	990,000	1,574	384	991,958	8.00%	(990,000)
4/1/2007	25,000,000	164,629	40,179	24,795,192	-	990,000	1,637	400	992,037	8.00%	(990,000)
10/1/2007	25,000,000	162,926	39,764	24,797,310	-	990,000	1,703	416	992,118	8.00%	(990,000)
4/1/2008	25,000,000	161,155	39,332	24,799,513	-	990,000	1,771	432	992,203	8.00%	(990,000)
10/1/2008	25,000,000	159,314	38,882	24,801,804	-	990,000	1,842	449	992,291	8.00%	(990,000)
4/1/2009	25,000,000	157,398	38,415	24,804,187	-	990,000	1,915	467	992,383	8.00%	(990,000)
10/1/2009	25,000,000	155,407	37,929	24,806,665	-	990,000	1,992	486	992,478	8.00%	(990,000)
4/1/2010	25,000,000	153,335	37,423	24,809,242	-	990,000	2,072	506	992,577	8.00%	(990,000)
10/1/2010	25,000,000	151,180	36,897	24,811,922	-	990,000	2,154	526	992,680	8.00%	(990,000)
4/1/2011	25,000,000	148,940	36,350	24,814,710	-	990,000	2,241	547	992,788	8.00%	(990,000)
10/1/2011	25,000,000	146,609	35,782	24,817,609	-	990,000	2,330	569	992,899	8.00%	(990,000)
4/1/2012	25,000,000	144,186	35,190	24,820,624	-	990,000	2,424	592	993,015	8.00%	(990,000)
10/1/2012	25,000,000	141,665	34,575	24,823,760	-	990,000	2,521	615	993,136	8.00%	(990,000)
4/1/2013	25,000,000	139,044	33,935	24,827,021	-	990,000	2,621	640	993,261	8.00%	(990,000)
10/1/2013	25,000,000	136,317	33,270	24,830,413	-	990,000	2,726	665	993,392	8.00%	(990,000)
4/1/2014	25,000,000	133,482	32,578	24,833,940	-	990,000	2,835	692	993,527	8.00%	(990,000)
10/1/2014	25,000,000	130,533	31,858	24,837,609	-	990,000	2,949	720	993,669	8.00%	(990,000)
4/1/2015	25,000,000	127,466	31,110	24,841,424	-	990,000	3,067	748	993,815	8.00%	(990,000)
10/1/2015	25,000,000	124,277	30,331	24,845,392	-	990,000	3,190	778	993,968	8.00%	(990,000)

Internal Rate of Return = 8.00% Effective Rate



**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**7.92% Medium Term Note Series A, Due 6/4/2027**

Semi-Annual Payment	Outstanding Principal	Internal Rate of Return = 8.00%				Annual Cost	Cash Flows				
		Unamortized Balance		Amortization of							
		Discount	Debt Expense	Discount	Debt Expense						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
4/1/2016	25,000,000	120,960	29,521	24,849,519	-	990,000	3,317	810	994,127	8.00%	(990,000)
10/1/2016	25,000,000	117,510	28,679	24,853,811	-	990,000	3,450	842	994,292	8.00%	(990,000)
4/1/2017	25,000,000	113,922	27,804	24,858,275	-	990,000	3,588	876	994,464	8.00%	(990,000)
10/1/2017	25,000,000	110,190	26,893	24,862,917	-	990,000	3,732	911	994,642	8.00%	(990,000)
4/1/2018	25,000,000	106,309	25,946	24,867,745	-	990,000	3,881	947	994,828	8.00%	(990,000)
10/1/2018	25,000,000	102,273	24,961	24,872,766	-	990,000	4,036	985	995,021	8.00%	(990,000)
4/1/2019	25,000,000	98,076	23,936	24,877,988	-	990,000	4,198	1,024	995,222	8.00%	(990,000)
10/1/2019	25,000,000	93,710	22,871	24,883,419	-	990,000	4,366	1,065	995,431	8.00%	(990,000)
4/1/2020	25,000,000	89,170	21,763	24,889,067	-	990,000	4,540	1,108	995,648	8.00%	(990,000)
10/1/2020	25,000,000	84,448	20,610	24,894,942	-	990,000	4,722	1,152	995,874	8.00%	(990,000)
4/1/2021	25,000,000	79,537	19,412	24,901,051	-	990,000	4,911	1,199	996,109	8.00%	(990,000)
10/1/2021	25,000,000	74,430	18,165	24,907,405	-	990,000	5,107	1,246	996,354	8.00%	(990,000)
4/1/2022	25,000,000	69,118	16,869	24,914,013	-	990,000	5,312	1,296	996,608	8.00%	(990,000)
10/1/2022	25,000,000	63,594	15,521	24,920,885	-	990,000	5,524	1,348	996,872	8.00%	(990,000)
4/1/2023	25,000,000	57,849	14,119	24,928,033	-	990,000	5,745	1,402	997,147	8.00%	(990,000)
10/1/2023	25,000,000	51,873	12,660	24,935,466	-	990,000	5,975	1,458	997,433	8.00%	(990,000)
4/1/2024	25,000,000	45,659	11,144	24,943,197	-	990,000	6,214	1,517	997,731	8.00%	(990,000)
10/1/2024	25,000,000	39,196	9,566	24,951,237	-	990,000	6,463	1,577	998,040	8.00%	(990,000)
4/1/2025	25,000,000	32,475	7,926	24,959,599	-	990,000	6,721	1,640	998,362	8.00%	(990,000)
10/1/2025	25,000,000	25,485	6,220	24,968,296	-	990,000	6,990	1,706	998,696	8.00%	(990,000)
4/1/2026	25,000,000	18,214	4,445	24,977,340	-	990,000	7,270	1,774	999,044	8.00%	(990,000)
10/1/2026	25,000,000	10,653	2,600	24,986,747	-	990,000	7,561	1,845	999,406	8.00%	(990,000)
4/1/2027	25,000,000	2,790	681	24,996,529	-	990,000	7,864	1,919	999,783	8.00%	(990,000)
6/4/2027	25,000,000	-	-	25,000,000	25,000,000	346,500	2,790	681	349,971	8.00%	(25,346,500)
				\$ 25,000,000	\$ 25,000,000	\$ 59,400,000	\$ 187,500	\$ 45,761	\$ 59,633,261		

Internal Rate of Return = 8.00%  
 Effective Rate

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**6.76% Medium Term Note Series A, Due 9/24/27**  
**Put Date 9/24/2007**

Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance		Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Total Expense (j)	Annual Cost (k)	Cash Flows (l)
		Discount (c)	Debt Expense (d)				Discount (h)	Debt Expense (i)			
9/24/2007	\$ 7,500,000	\$ -	\$ -	\$ 7,500,000	\$ -	\$ -	\$ -	\$ -	\$ -	-	\$ 7,500,000
4/1/2008	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2008	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2009	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2009	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2010	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2010	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2011	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2011	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2012	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2012	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2013	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2013	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2014	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2014	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2015	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2015	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2016	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2016	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2017	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
10/1/2017	7,500,000	-	-	7,500,000	-	253,500	-	-	253,500	6.76%	(253,500)
4/1/2018	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2018	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2019	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2019	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2020	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2020	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2021	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2021	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2022	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2022	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2023	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2023	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2024	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2024	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
4/1/2025	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)
10/1/2025	7,500,000	-	-	7,500,000	-	243,642	-	-	243,642	6.76%	(243,642)

Internal Rate of Return = 6.76% Effective Rate

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation of**  
**6.76% Medium Term Note Series A, Due 9/24/27**  
**Put Date 9/24/2007**

Internal Rate of Return = <span style="float: right;">Effective Rate 6.76%</span>									
Semi-Annual Payment (a)	Outstanding Principal (b)	Unamortized Balance		Net Proceeds (e)	Redemption (f)	Interest Expense (g)	Amortization of		Cash Flows (l)
		Discount (c)	Debt Expense (d)				Discount (h)	Debt Expense (i)	
4/1/2026	7,500,000	-	-	7,500,000	-	243,642	-	-	(243,642)
10/1/2026	7,500,000	-	-	7,500,000	-	243,642	-	-	(243,642)
4/1/2027	7,500,000	-	-	7,500,000	-	243,642	-	-	(243,642)
9/24/2027	7,500,000	-	-	7,500,000	7,500,000	247,867	-	-	(7,747,867)
					<u>\$ 7,500,000</u>				

Debt expense and discount were completely amortized over the 10-year period prior to the put date of 9/24/2007

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation - \$150 Million Term Facility/CP Facility**  
**As of November 30, 2008**

Line No.	Principal (a)	(b)	(c)	(d)	Annualized Interest (e)	Line No.
		LIBOR	Spread	Rate[1]		
1	\$ 131,000,000	1.14%	0.600%	1.74%	\$ 2,310,741	1
		CP Notes	Discount Rate			
2	\$ 1,613,000	3.10%			\$ 50,016	2
		Credit Facility Fees				
3	Amortization Expense				\$ 118,066	3
4	Annual Fee				12,500	4
5	Unused Commitment Fees-CP				2,050	5
6	Total Annualized Fees				\$ 132,616	6
7	Total Annualized Fees and Interest (366 day basis)				\$ 2,493,373	7
8	Unamortized Debt Expense - 11/30/2008				\$ 419,480	8
9	CP Discount				12,436	9
10	Total Unamortized Debt Expense and CP Discount				\$ 431,915	10
11	Net Proceeds - 11/30/2008				\$ 132,181,085	11
12	All-In Effective Rate				1.89%	12

Notes:

[1] Money Market Rate - 360 day basis

**SOUTHWEST GAS CORPORATION**  
**Effective Cost Calculation - \$150 Million Term Facility/CP Facility**  
**As Adjusted At August 31, 2009**

Line No.	Principal (a)	(b)	(c)	(d)	Annualized Interest (e)	Line No.
	<b><u>Libor Loans</u></b>	<b>LIBOR[1]</b>	<b>Spread</b>	<b>Rate[2]</b>		
1	\$ 150,000,000	3.70%	0.600%	4.300%	\$ 6,539,583	1
	<b><u>CP Notes</u></b>	<b>Discount Rate</b>				
2	\$ -	NA			\$ -	2
	<b><u>Credit Facility Fees</u></b>					
3	Amortization Expense				\$ 118,066	3
4	Annual Fees				12,500	4
5	Unused Commitment Fees-CP				-	5
6	Total Annualized Fees				<u>\$ 130,566</u>	6
7	Total Annualized Fees and Interest (365 day basis)				<u>\$ 6,670,149</u>	7
8	Unamortized Debt Expense - 8/31/2009				\$ 334,055	8
9	CP Discount				-	9
10	Total Unamortized Debt Expense and CP Discount				<u>\$ 334,055</u>	10
11	Net Proceeds - 8/31/2009				<u>\$ 149,665,945</u>	11
12	All-In Effective Rate				<u>4.46%</u>	12

## Notes:

[1] Projected 36-month average 3-month LIBOR August 2009-August 2012

Source: Global Insight Interest Rate Forecast (January 2009)

[2] Money Market Rate - 360 day basis