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Cost of Capital Stephen G. Hill **Direct Testimony Trigen Kansas City** HR-2008-**January 8, 2008**

BEFORE THE PUBLIC SERVICE COMMISSION

STATE OF MISSOURI

DIRECT TESTIMONY

OF

STEPHEN G. HILL

TRIGEN-KANSAS CITY ENERGY CORP.

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Case No. HR-2008-____

TRIGEN KANSAS CITY ENERGY CORP.

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1		INTRODUCTION / SUMMARY
2		
3	Q.	PLEASE STATE YOUR NAME, OCCUPATION AND ADDRESS.
4	A.	My name is Stephen G. Hill. I am self-employed as a financial consultant, and principal
5		of Hill Associates, a consulting firm specializing in financial and economic issues in
6		regulated industries. My business address is P. O. Box 587, Hurricane, West Virginia,
7		25526 (e-mail: hillassociates@gmail.com).
8		
9	Q.	BRIEFLY, WHAT IS YOUR EDUCATIONAL BACKGROUND?
10	A.	After graduating with a Bachelor of Science degree in Chemical Engineering from Auburn
11		University in Auburn, Alabama, I was awarded a scholarship to attend Tulane Graduate
12		School of Business Administration at Tulane University in New Orleans, Louisiana.
13		There I received a Master's Degree in Business Administration. More recently, I have
14		been awarded the professional designation, "Certified Rate of Return Analyst" by the
15		Society of Utility and Regulatory Financial Analysts. This designation is based upon
16		education, experience and the successful completion of a comprehensive examination. I
17		have also been a member of the Board of Directors of that national organization for
18		several years. A more detailed account of my educational background and occupational
19		experience appears in Appendix A.
20		
21	Q.	HAVE YOU TESTIFIED BEFORE THIS OR OTHER REGULATORY
22		COMMISSIONS?
23	Α.	Yes, I have previously presented testimony in this jurisdiction and have testified on cost
24		of capital, corporate finance and capital market issues in over 225 regulatory proceedings
25		before the following regulatory bodies: the West Virginia Public Service Commission, the
26		Texas Public Utilities Commission, the Oklahoma State Corporation Commission, the
27		Public Utilities Commission of the State of California, the Public Service Commission of
28		New Hampshire, the Arizona Corporation Commission, the Public Utilities Commission
29		of the State of Minnesota, the Ohio Public Utilities Commission, the Insurance

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1		Commissioner of the State of Texas, the North Carolina Insurance Commissioner, the
2		Rhode Island Public Utilities Commission, the City Council of Austin, Texas, the State of
3		Maine Public Service Commission, the South Carolina Public Service Commission, the
4		Public Utilities Commission of the State of Hawaii, the New Mexico Corporation
5		Commission, the Wisconsin Public Service Commission, the State of Washington Utilities
6		and Transportation Commission, the Public Service Commission of Utah, the Illinois
7		Commerce Commission, the Kansas Corporation Commission, the Indiana Utility
8		Regulatory Commission, the Virginia Corporation Commission, the Public Service
9		Commission of Maryland, the Pennsylvania Public Utilities Commission, the Public
10		Service Commission of Montana, the Vermont Public Service Board, the Federal
11		Communications Commission and the Federal Energy Regulatory Commission. I have
12		also testified before the West Virginia Air Pollution Control Commission regarding
13		appropriate pollution control technology and its financial impact on the company under
14		review by that agency and have been an advisor to the Arizona Corporation Commission
15		on matters of utility finance.
16		
17	О.	ON BEHALF OF WHOM ARE YOU TESTIFYING IN THIS PROCEEDING?
18	A.	I am testifying on behalf of the applicant in this proceeding, Trigen-Kansas City Energy
19		Corporation (Trigen, the Company), a subsidiary of Thermal North America, Inc. (TNAI,
20		the parent).
21		
22	Q.	CAN YOU BRIEFLY DESCRIBE THE REGULATED OPERATIONS OF TRIGEN-
23		KANSAS CITY?
24	A.	Trigen-Kansas City provides steam to customers in the downtown loop area of Kansas
25		City, Missouri. Trigen-Missouri, a sister company to Trigen-Kansas City, supplies
26		chilled water to customers in the same area, but that service is not regulated. The primary
27		heat-generation facility, which is coal-fired, is Trigen's Grand Avenue Station, which has
28		the capacity to produce 1,260 Mlbs/hr of steam. Additional natural gas-fired capacity is
29		available to support reliable service. Trigen sells steam to customers in downtown Kansas

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1 City. It is anticipated that the 10 largest customers account for approximately 75% of 2007 revenues. 2 3 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY? 4 5 A. I have been retained by the Company to present a cost of capital analysis for its regulated 6 steam heating utility operations in Kansas City, Missouri. As part of my analysis, I will recommend and testify to the overall rate of return that I believe should be utilized in 7 8 determining regulated rates for the steam heating operations of the Company in this 9 proceeding. 10 Q. MR. HILL, PRIOR TO YOUR TESTIMONY IN THIS PROCEEDING, HAVE YOU 11 12 EVER TESTIFIED ON BEHALF OF A UTILITY IN A REGULATED RATE **PROCEEDING?** 13 A. No. My prior testimony has been on behalf of public service commissions, consumer 14 15 advocates or state attorneys general, i.e., representing regulatory/ratepayer interests. 16 Q. IS YOUR COST OF EQUITY RECOMMENDATION IN THIS PROCEEDING ANY 17 DIFFERENT FROM WHAT IT WOULD BE IF YOU WERE TESTIFYING FOR 18 **REGULATORY OR RATEPAYER INTERESTS?** 19 20 A. No. As I will explain in more detail subsequently, in my opinion, the utility operations of Trigen are reasonably proxied by studying the market-based cost of capital of gas 21 22 distribution utility operations. In determining the cost of equity appropriate for Trigen, 23 my analytical methods are no different than they would be if I were testifying on behalf of consumer interests. Upward adjustments to the cost of equity are made in my 24 recommendation in this proceeding, but those adjustments are appropriately made 25 because of the difference in financial risk between Trigen and the sample group of 26 27 companies used to estimate the market-based cost of equity capital, not because of any change in analytical methodology. 28

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1	Q.	HAVE YOU PREPARED SCHEDULES IN SUPPORT OF YOUR TESTIMONY?
2	A.	Yes. Attached to this testimony are 12 Schedules that provide the analytical support for
3		the conclusions reached regarding the forward-looking overall cost of capital for Trigen's
4		steam heating utility operations presented in the body of this testimony. Also, I have
5		attached four Appendices ("A" through "D"), which contain additional detail regarding
6		certain aspects of my narrative testimony in this proceeding. These Schedules and
7		Appendicies were prepared by me and are correct to the best of my knowledge and belief.
8		Finally, my cost of equity analysis was undertaken in April of 2007 in anticipation
9		of an earlier filing date. I have not updated that testimony because the cost of equity capital
10		has been relatively stable since the analysis for Trigen was undertaken, and the basis for the
11		equity return request in this proceeding remains reasonable.
12		
13	Q.	PLEASE SUMMARIZE YOUR TESTIMONY AND FINDINGS CONCERNING THE
14		RATE OF RETURN THAT SHOULD BE UTILIZED IN SETTING RATES FOR
15		TRIGEN's UTILITY OPERATIONS IN THIS PROCEEDING.
16	A.	My testimony is organized into three sections. First, I discuss the cost of capital standard
17		as a measure of the return to be allowed for regulated industries, and review the current
18		economic environment in which the equity return estimate is made. Second, I review the
19		Company's actual capital structure in comparison to capital structures employed by the
20		energy utility industry, generally.
21		Third, I evaluate the cost of equity capital for similar-risk operations using
22		Discounted Cash Flow (DCF), Capital Asset Pricing Model (CAPM), Modified
23		Earnings-Price Ratio (MEPR), and Market-to-Book Ratio (MTB) analyses.
24		I have estimated the equity capital cost of utility operations similar in operating
25		(business) risk to those of Trigen-Kansas City to be in the range of 9.00% to 9.50%.
26		However, Trigen's regulatory capital structure contains substantially less common equity
27		and more debt than the sample group of gas distributors used to estimate the equity
28		capital cost. Also, Trigen-Kansas City has a bond rating that is below investment grade,
29		while the sample group of gas companies analyzed have an average bond rating that is

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investment grade. Therefore, a reasonable estimate of the current cost of equity capital for 1 the Company would be above upper end of a range of equity costs appropriate for the 2 sample group. Utilizing a conservative 10,00% equity cost rate with a current embedded 3 4 cost of long- and short-term debt of 9.01% and 8.43%, respectively, and a recent-average capital structure for Trigen's parent (used as Trigen's regulatory capital structure), 5 6 produces an after-tax overall cost of capital for Trigen's utility operations of 9.34% (see 7 Schedule 12). An after-tax overall return will afford the Company an opportunity to attain a pre-tax interest coverage level of 2.0 times. 8 9 Q. WHY SHOULD THE COST OF CAPITAL SERVE AS A BASIS FOR THE PROPER 10 11 ALLOWED RATE OF RETURN FOR A REGULATED FIRM? A. The Supreme Court of the United States has established, as a guide to assessing an 12 appropriate level of profitability for regulated operations, that investors in such firms are 13 to be given an opportunity to earn returns that are sufficient to attract capital and are 14 15 comparable to returns investors would expect in the unregulated sector for assuming the 16 same degree of risk. The <u>Bluefield</u> and <u>Hope</u> cases provide the seminal decisions [Bluefield Water Works v. PSC, 262 US 679 (1923); FPC v. Hope Natural Gas 17 Company, 320 US 591 (1944)]. These criteria were restated in the Permian Basin Area 18 Rate Cases, 390 US 747 (1968). However, the Court also makes quite clear in Hope that 19 regulation does not guarantee profitability and, in <u>Permian Basin</u> that, while investor 20 21 interests (profitability) are certainly pertinent to setting adequate rates, those interests do 22 not exhaust the relevant considerations. As a starting point in the rate-setting process, then, the cost of capital of a 23 24 regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. Since financial theory holds that investors will not 25 provide capital for a particular investment unless that investment is expected to yield 26 their opportunity cost of capital, the correspondence of the cost of capital with the 27 28 Court's guidelines for appropriate earnings is clear. 29

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I. ECONOMIC ENVIRONMENT

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Q. WHY IS IT IMPORTANT TO REVIEW THE ECONOMIC ENVIRONMENT IN WHICH AN EQUITY COST ESTIMATE IS MADE?

A. The cost of equity capital is an expectational, or *ex ante*, concept. In seeking to estimate 5 the cost of equity capital of a firm, it is necessary to gauge investor expectations with 6 7 regard to the relative risk and return of that firm, as well as that for the particular risk-8 class of investments in which that firm resides. Because this exercise is, necessarily, based on understanding and accurately assessing investor expectations, a review of the larger 9 economic environment within which the investor makes his or her decision is most 10 11 important. Investor expectations regarding the strength of the U.S. economy, the direction 12 of interest rates and the level of inflation (factors that are determinative of capital costs) are key building blocks in the investment decision. Those factors should be reviewed by 13 the analyst and the regulatory body in order to assess accurately investors' required 14 return—the cost of equity capital. 15

16

Q. WHY DO YOU BELIEVE AN EQUITY RETURN IN THE RANGE OF 9.00% TO
9.50% IS REASONABLE FOR UTILITY COMPANIES WITH INVESTMENTGRADE BOND RATINGS IN TODAY'S ECONOMIC ENVIRONMENT?

A. First, the overall level of fixed-income capital costs has been relatively low for several 20 21 years, and continues to be relatively low at the current time. Although, as shown in the chart below, there has been steady upward movement in *short-term* interest rate levels 22 over the past two years as the Federal Reserve (the Fed) has raised the Federal Funds 23 rate, long-term interest rates have fluctuated in a range of 4.5% to 5.5% over the past two 24 years. This indicates that even though the Fed has raised short-term interest rates and the 25 spread between long-term and short-term treasuries is well below the historical average, 26 investors are not convinced that the overall level of economic growth will be sufficient to 27 warrant an increase in long-term interest rates and long-term capital cost rates. As a result 28 long-term capital costs have not increased to a substantial extent, even though the Federal 29

Reserve has dramatically increased short-term rates.

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Data from Federal Reserve Statistical Release H.15

Another indication of the reason investors are willing to buy and hold stocks that offer what seem to be modest returns is shown in Schedule 1, page 1, which depicts Moody's Baa-rated bond yields from 1984 through March 2007. Page 1 of Schedule 1 shows that interest rates and capital costs remain very low relative to the interest rate levels that existed in the mid-1980s, and have continued a strong downward trend begun in 2000.

Also, page 2 of Schedule 1, which presents the year-average Moody's Baa-rated bond yields for each year over the past 39 years (1968-2006), shows that Baa-rated bond yields in 2006, even with a slight increase over 2005, remained below the bond yield levels seen in the U.S. in the late 1960s. Also, the most recent average Baa-rated utility

1	bond yield, 5.96% ¹ , falls at the lower end of the range of interest rates that have existed
2	over the past 30 years (See Schedule 1, page 2). Simply put, a fundamental reason that
3	the current cost of common equity capital for investment-grade utility operations of
4	9.00% to 9.50% is reasonable is that long-term capital cost rates are as low as they have
5	been in more than thirty years.
6	The above data indicate that long-term capital costs, even with the recent credit
7	tightening by the Federal Reserve Bank (the Fed), remain at low levels and generally
8	support the reasonableness of relatively low equity capital cost rates.
9	
10	Q. WHAT IS THE CURRENT EXPECTATION WITH REGARD TO THE ECONOMY
11	AND INTEREST RATES?
12	A. As Value Line notes in its most recent Quarterly Review the current expectation is that
13	the economy will expand at a more moderate pace during 2007, and inflation and interest
14	rates will continue to be relatively moderate, allowing for "a gradual reduction in
15	borrowing costs." The following excerpts from Value Line explain how a relatively low
16	interest rate environment will be preserved:
17 18 19 20 21 22 23 24 25 26 27 28 20	Economic Growth: As noted, U.S. GDP growth slowed abruptly during the middle quarters of 2006, under pressure from rising oil prices, tightening Federal Reserve Board policies, and a weakening in housing demand. Then, the Fed voted to stop raising interest rates and the price of oil fell back sharply. This combination helped the economy pick up its gait in the fourth quarter, with GDP growth ratcheting up (subject to revision) to 3.5% [chart omitted] Looking forward, we expect the economy to grow by 2.5%- 2.0% in the current quarter and for growth to average a
29 30	respectable 2.5%-3.0% for the balance of 2007 Our
31	longer-range projection has GDP averaging 3.0%-3.5% in
32 33	2010-2012.

¹ Value Line *Selection & Opinion*, most recent six weekly editions (2/23/07-3/30/07, inclusive), 20/30-year Baa-rated utility bond yield averages.

1	Inflation: The news on inflation has been rather benign.
2	Specifically, oil prices have trended lower for he most part
3	during the past six months; productivity (or labor cost
4	efficiency) picked up nicely in the final quarter of 2006;
5	labor cost increases have slowed; and commodity prices
6	have flattened out. We think that core inflation (i.e.,
7	inflation with the always volatile food and energy
8	components backed out) will moderate further this year,
9	perhaps averaging less than 2% by the end of 2007. Our
10	forecast also assumes inflation will be contained in 2008 (as
11	GDP growth is likely to stray little from 3%). Finally, we
12	expect no sustained acceleration in inflation through 2010-
13	2012. [Chart omitted].
14	
15	Interest Rates: The prospects for a prolonged period of
16	relatively benign growth and inflation (at least by historical
17	standards) should help to mollify an inflation-sensitive
18	Federal Reserve and allow the nation's lead bank to hold
19	short-term interest rates stable through at least the first half
20	of 2007 and then perhaps relax the monetary reins a little
21	by late this year or the first part of 2008 Long-term
22	interest rates, which are not controlled by the Fed and
23	which have a major impact on the housing market (via
24	morigage rates), have held relatively steady after deciming
25	earner in 2000, we think such rates will stay within a
20	comparativery narrow range in 2007 and 2008. [Chart
21	Opinion Exprisery 23, 2007, pp. 4852, 4854.)
20	<i>Opinion</i> , Politiki 25, 2007, pp. 4852-4854.)
29	
30	In that most recent Quarterly Economic Review, cited above, Value Line projects
31	long-term Treasury bond rates will average 5.0% through 2007 and 5.2% through 2008.
32	The recent six-week average 30-year T-bond yield is 4.73% (data from Value Line,
33	Selection & Opinion, six weekly editions, February 23, through March 30, 2007).
34	Therefore, the indicated expectation with regard to interest rates is that they are likely to
35	move somewhat higher, but remain within a range that Value Line terms "comparatively
36	narrow."

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1	Q.	IS IT REASONABLE TO CONLUDE THAT UTILITY INVESTORS ARE AWARE
2		OF THE EXPECTATIONS FOR SOMEWHAT HIGHER INTEREST RATES IN THE
3		FUTURE, AND HAVE REACTED TO THAT NEWS?
4	A,	Yes. A widely accepted tenet of modern finance is that U.S. capital markets are efficient
5		in quickly assimilating into stock prices news that impacts stock valuation. Higher
6		interest rates have been forecast for some time and, it is reasonable to believe, utility
7		investors have incorporated that expectation into the stock prices they are willing to
8		provide for utility stocks. Therefore, when estimating the cost of equity capital it is
9		necessary to consider current interest rate levels, not projected levels, because current
10		interest rates best represent investors' current expectations for the future.
11		
12		II. CAPITAL STRUCTURE
13		
14	Q.	ACCORDING TO ITS BOOKS OF ACCOUNT, HOW IS TRIGEN-KANSAS CITY
15		CAPITALIZED?
16	A.	As shown on page 1 of Schedule 2 attached to my testimony, Trigen-Kansas City does
1 7		not have any outstanding long-term debt and, therefore, has an effective capital structure
18		which is 100% equity. The long-term debt is issued by the parent company, TNAI.
19		Page 2 of Schedule 2 shows TNAI's (Trigen Kansas City's parent company)
20		consolidated capital structure over the five quarters ending in December 2006. That
21		capital structure consists of 34.22%% common equity and 65.78% total debt (long-and
22		short-term). The parent company consolidated capital structures provides a reasonable
23		representation of how the regulated assets of Trigen-Kansas City are effectively
24		capitalized.
25		
26	Q.	HOW DOES TRIGEN'S EFFECTIVE COMMON EQUITY RATIO COMPARE
27		WITH THE CAPITALIZATION OF ENERGY UTILITIES TODAY?
28	A.	Trigen's regulatory capital structure contains considerably less common equity capital
29		and more debt than that used by the gas distribution industry and the electric utility

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1 industry, on average. Page 3 of Schedule 2 shows that the recent average common equity 2 ratio of the gas industry (distribution and integrated companies) is 47% of total 3 capital—well above the equity ratio of Trigen. Page 4 of Schedule 2 shows that the current average common equity ratio of the 4 electric utility and combination gas and electric utility industry is 44% of total capital. 5 Again, Trigen's capital structure contains far less common equity and more debt that the 6 7 average energy utility. 8 It is clear from these comparisons that Trigen is more levered that the average energy utility, i.e., is capitalized with a relatively low equity ratio and high debt ratio 9 10 compared to the industry. Because of that fact, Trigen has higher financial risk than other energy utilities. 11 12 Q. WHAT ARE THE REGULATORY OPTIONS WITH REGARD TO DETERMINING 13 OVERALL CAPITAL COSTS WHEN THE APPLICANT UTILITY IS HIGHLY 14 15 LEVERAGED? 16 A. There are two options. First, the actual capital structure can be used to calculate the overall cost of capital. However, the amount of additional financial risk, which exists 17 because of the high debt load, must be recognized in the equity return allowed. That is 18 because the amount of debt used to finance the subject utility is greater than other 19 utilities, on average, and that additional financial risk causes the cost of equity capital to 20 be higher than it would be if the firm were capitalized in a manner similar to industry 21 averages. For a firm that is only somewhat more leveraged than average, it is possible 22 through econometric analysis to estimate the impact of the additional leverage on the cost 23 of equity capital. 24 The second regulatory treatment for a firm that is highly levered is to use a 25 hypothetical or ratemaking capital structure, which mitigates the financial risk but 26 27 balances the interests of the Company and its ratepayers by recognizing the manner in which the Company is actually capitalized. However, in this instance, Trigen's 28 ratemaking capital structure is somewhat more leveraged than that of the utilities that will 29

1 be used to estimate the cost of equity, but the difference is not so great as to require the 2 use of a hypothetical capital structure. The increase in the cost of common equity can be 3 estimated through econometric analysis. 4 Q. WHAT IS YOUR RECOMMENDATION THEN, WITH REGARD TO THE 5 CAPITAL STRUCTURE THAT SHOULD BE USED IN DETERMINING THE 6 7 OVERALL CAPITAL COSTS TO BE USED IN SETTING RATES IN THIS 8 **PROCEEDING?** A. I believe a ratemaking capital structure based on the parent company average capital 9 10 structure, consisting of 34.22% common equity and 65.78% debt—the actual proportions of capital used to finance the Trigen assets owned by Thermal North America, Inc., 11 would be reasonable for setting rates for Trigen's utility operations in Kansas City. That 12 13 capital structure contains less equity capital and more financial risk than average for an energy utility, but an increase in the cost of equity capital due to the additional financial 14 15 risk can be estimated from econometric analyses. 16 Q. WHAT VALUE DID YOU USE FOR THE COST OF DEBT? 17 A. The long-term debt used to finance Thermal North America, Inc.'s purchase of Trigen 18 DHCS Companies, according to Company sources, is a term loan obtained from a 19 consortium of banks, with a floating interest based on LIBOR (the London Interbank 20 Offering Rate). Page 5 of Schedule 2 shows the calculation of the current cost rates of 21 22 long- and short-term debt, the data for which were supplied by the Company. The ratemaking capital structure that I recommend be used to set rates for Trigen-Kansas City 23 in this proceeding is also shown on page 5 of Schedule 2. 24 25 Q. DOES THIS CONCLUDE YOUR DISCUSSION OF CAPITAL STRUCTURE 26 **ISSUES?** 27 A. Yes, it does. 28 29

1		III. METHODS OF EQUITY COST EVALUATION
2		
3		A. DISCOUNTED CASH FLOW MODEL
4		
5	Q.	PLEASE DESCRIBE THE DISCOUNTED CASH FLOW (DCF) MODEL YOU USED
6		TO ARRIVE AT AN ESTIMATE OF THE COST RATE OF COMMON EQUITY
7		CAPITAL FOR THE COMPANY IN THIS PROCEEDING.
8	A.	The DCF model relies on the equivalence of the market price of the stock (P) with the
9		present value of the cash flows investors expect from the stock, and assumes that the
10		percentage rate which discounts the future cash flows (dividends) to the present value
11		(the stock price) equals the cost of capital. The total return to the investor, which equals
12		the required return according to this theory, is the sum of the dividend yield and the
13		expected growth rate in the dividend.
14		The theory is represented by the equation,
15		
16		$k = D/P + g, \tag{1}$
17		
18		where "k" is the equity capitalization rate (cost of equity, required return), "D/P" is the
19		dividend yield (dividend divided by the stock price) and "g" is the expected sustainable
20		growth rate.
21		
22	Q.	WHAT GROWTH RATE (g) DID YOU ADOPT IN DEVELOPING YOUR DCF
23		COST OF COMMON EQUITY FOR THE GAS UTILITIES?
24	A.	The growth rate variable in the traditional DCF model is quantified theoretically as the
25		dividend growth rate investors expect to continue into the indefinite future. The DCF
26		model is actually derived by 1) considering the dividend a growing perpetuity, that is, a
27		payment to the stockholder which grows at a constant rate indefinitely, and 2) calculating
28		the present value (the current stock price) of that perpetuity. The model also assumes
29		that the company whose equity cost is to be measured exists in a steady state

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1		environment, i.e., the payout ratio and the expected return are constant and the earnings,
2		dividends, book value and stock price all grow at the same rate, forever. As with all
3		mathematical models of real-world phenomena, the DCF theory does not exactly "track"
4		reality. Payout ratios and expected equity returns do change over time. Therefore, in order
5		to properly apply the DCF model to any real-world situation and, in this case, to find the
6		long-term sustainable growth rate called for in the DCF theory, it is essential to
7		understand the determinants of long-run expected dividend growth.
8		
9	Q.	CAN YOU PROVIDE AN EXAMPLE TO ILLUSTRATE THE DETERMINANTS
10		OF LONG-RUN EXPECTED DIVIDEND GROWTH?
11	A.	Yes, in Appendix B, I provide an example of the determinants of a sustainable growth rate
12		on which to base a reliable DCF estimate. In addition, in Appendix B, I show how
13		reliance on earnings or dividend growth rates alone, absent an examination of the
14		underlying determinants of long-run dividend growth, can produce inaccurate DCF
15		results.
16		
17	Q.	DID YOU USE A SUSTAINABLE GROWTH RATE APPROACH TO DEVELOP AN
18		ESTIMATE OF THE EXPECTED GROWTH RATE FOR THE DCF MODEL?
19	A.	Yes. The objective of my testimony in this proceeding is to estimate the overall return
20		appropriate for determining the cost of service for Trigen's steam heating utility service in
21		the Kansas City metro area. One important part of that determination is an estimate of
22		the cost of equity capital to the company. Direct market data regarding Trigen's equity
23		capital is not available because there is simply no market data for publicly-traded steam
24		heating utilities. Therefore, I have calculated both the historical and projected sustainable
25		growth rate for a sample of publicly-traded utility firms that I believe have similar risk
26		characteristics. While the Company's utility operations have some similarity to water
27		(delivery of utility service is through pipes), electric (fossil fuel is burned to generate
28		steam) and gas utility operations, because the ultimate product it provides to its
		customers is heat. I believe the best prove for Trigen's operations is as distribution

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utility operations. I have therefore analyzed the sustainable growth of a sample of gas
 distribution utilities in order to assess the cost of equity for Trigen. To supplement the
 sustainable growth rate analysis, I have also analyzed published data regarding both
 historical and projected growth rates in earnings, dividends, and book value for all the
 companies under study.

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7 8

Q. WHY HAVE YOU USED THE TECHNIQUE OF ANALYZING THE MARKET DATA OF SEVERAL COMPANIES?

A. I have used the "similar sample group" approach to cost of capital analysis because it 9 yields a more accurate determination of the cost of equity capital than does the analysis 10 11 of the data of one individual company. Any form of analysis, in which the result is an estimate, such as growth in the DCF model, is subject to measurement error, i.e., error 12 induced by the measurement of a particular parameter or by variations in the estimate of 13 the technique chosen. When the technique is applied to only one observation (e.g., 14 estimating the DCF growth rate for a single company) the estimate is referred to, 15 16 statistically, as having "zero degrees of freedom." This means, simply, that there is no way of knowing if any observed change in the growth rate estimate is due to measurement 17 error or to an actual change in the cost of capital. The degrees of freedom can be increased 18 and exposure to measurement error reduced by applying any given estimation technique 19 to a sample of companies rather than one single company. Therefore, by analyzing a 20 group of firms with similar characteristics, the estimated value (the growth rate and the 21 22 resultant cost of capital) is more likely to equal the "true" value for that type of 23 operation.

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25 Q. HOW WERE THE SAMPLE COMPANIES SELECTED?

A. In selecting a sample of gas distribution firms to analyze, I screened all the gas
 distribution firms followed by Value Line. I selected companies from that group that had
 a continuous financial history and had approximately 60% or more of revenues generated

1	by gas distribution operations. ² In addition, I eliminated companies that were in the
2	process of merging or being acquired, or companies that had recently omitted dividends.
3	The data for the gas sample group were obtained from A. G. Edwards Gas Utilities
4	Quarterly Review, October 4, 2006, the Value Line Investment Survey, Ratings and
5	Reports, March 16, 2007, and A.U.S. Utility Reports, April 2007.
6	The companies included in the similar-risk sample group in this proceeding are
7	AGL Resources (ATG), Atmos Energy Corporation (ATO), Laclede Group (LG), Nicor,
8	Inc. (GAS), Northwest Natural Gas (NWNG), Piedmont Natural Gas Company (PNY),
9	South Jersey Industries (SJI), Southwest Gas (SWX) and WGL Holdings (WGL). [Note:
10	In the Schedules accompanying this testimony, the sample group companies are referred
11	to by their stock ticker symbols.]
12	
13	Q. HOW HAVE YOU CALCULATED THE DCF GROWTH RATES FOR THE SAMPLE
14	OF COMPARABLE COMPANIES?
15	A. Schedule 3 pages 1 through 3, shows the retention ratios, equity returns, sustainable
16	growth rates, book values per share and number of shares outstanding for the comparable
17	companies for the past five years. Also included in the information presented in Schedule
18	3, are Value Line's projected 2007, 2008 and 2010-2012 values for equity return,
19	retention ratio, book value growth rates and number of shares outstanding.
20	In evaluating these data, I first calculate the five-year average sustainable growth
21	rate, which is the product of the earned return on equity (r) and the ratio of earnings
22	retained within the firm (b). For example, Schedule 3, page 2, shows that the five-year
23	average sustainable growth rate for Piedmont Natural Gas (PNY) is 2.94%. The simple
24	five-year average sustainable growth value is used as a benchmark against which I measure
25	the company's most recent growth rate trends. Recent growth rate trends are more
26	investor-influencing than are simple historical averages. Continuing to focus on PNY, we

² Many of the gas distributors have recently added energy merchant functions to their operations, lowering the percentage of revenues provided by regulated utility operations and increasing overall investment risk. Because almost 40% of revenues for this sample group is derived from unregulated operations the cost of equity for this group will tend to overstate that appropriate for a pure gas distribution utility operation.

1	see that sustainable growth in 2006 was about 2.77%—below the average growth for the
2	five-year period. That recent historical data, then, indicate a moderating growth rate trend.
3	By the 2010-2012 period, Value Line projects PNY's sustainable growth will reach a level
4	very near the recent five-year average—about 3%. These forward-looking data indicate
5	that investors expect PNY to grow at a rate in the future similar to the growth rate that
6	has existed, on average, over the past five years.
7	At this point I should note that, while the five-year projections are given
8	consideration in estimating a proper growth rate because they are available to and are used
9	by investors, they are not given sole consideration. Without reviewing all the data
10	available to investors, both projected and historic, sole reliance on projected information
11	may be misleading. Value Line readily acknowledges to its subscribers the subjectivity
12	necessarily present in estimates of the future:
13 14 15 16 17 18	"We have greater confidence in our year-ahead ranking system, which is based on proven price and earnings momentum, than in 3- to 5-year projections." (<u>Value Line</u> <u>Investment Survey, Selection and Opinion</u> , June 7, 1991, p.854).
19	
20	Another factor to consider is that PNY's book value growth is expected to
21	increase at a 2.5% level over the next five years, after increasing at a 6.5% rate
22	historically. While that signals a substantially lower expectation for future growth, that
23	decline in book value growth is due to a slowdown in acquisition activity for PNY, and
24	would, therefore, probably understate long-term growth. Also, as shown on Schedule 4,
25	page 2, that company's dividend growth rate, which was 5% historically, is expected to
26	decline to a 4% rate of growth in the future—higher than the sustainable growth rate
27	projections, but below historical levels. That information would tend to moderate investor
28	expectations regarding growth in the future. Earnings growth rate data available from
29	Value Line indicate that investors can expect a higher lower rate in the future (3%) than
30	has existed over the past five years (5%). However, Reuters and Zack's (investor
31	advisory services that poll institutional analysts for growth earnings rate projections)

.

project higher earnings growth rate for PNY-4.64% and 5.5%, respectively-over the
 next five years.

PNY's projected sustainable growth, as well as Value Line's projected earnings
growth indicates that investors can expect growth in the future similar to that which has
occurred, on average, in the past. Those projections are moderated upward by an
expectation of higher dividend and earnings growth projections. A long-term sustainable
growth rate of 5.0% is a reasonable expectation for PNY.

8

9 Q. IS THE INTERNAL (b x r) GROWTH RATE THE FINAL GROWTH RATE YOU 10 USE IN YOUR DCF ANALYSIS?

A. No. An investor's sustainable growth rate analysis does not end upon the determination 11 of an internal growth rate from earnings retention. Investor expectations regarding growth 12 from external sources (sales of stock) must also be considered and examined. For PNY, 13 page 2 of Schedule 3 shows that the number of outstanding shares increased at about a 3% 14 rate over the most recent five-year period. Value Line expects the number of shares 15 outstanding to decline through the 2010-2012 period, bringing the share growth rate down 16 17 to -0.76% rate by that time. Therefore, an expectation of share growth of 0.5% is reasonable for this company. 18

As shown on page 1 of Schedule 4, because PNY is currently trading at a market
price that is greater than its book value, a long-term expectation of increasing the number
of shares outstanding will also increase investors' growth expectations for that company.
Multiplying the expected growth rate in shares outstanding by (1-(Book Value/Market
Value)) increases the long-term DCF growth rate for PNY by 26 basis points.³
I have included the details of my growth rate analyses for PNY as an example of

the methodology I use in determining the DCF growth rate for each company in the gas
 utility sample group. A description of the growth rate analyses of each of the companies

³ As explained in Appendix B attached to this testimony, according to Gordon's original DCF formula the factor that accounts for additional growth due to sales of stock is "s" the rate of increase in shares outstanding, times "v" the equity accretion rate, defined as (1-M/B). For the gas utilities under study, the "sv" term adds an additional 75 basis points to the DCF cost of equity capital.

included in my sample group is set out in Appendix C. Schedule 4, page 1, attached to
 this testimony shows the internal, external and resultant overall growth rates for all the
 utility companies analyzed.

4

Q. HAVE YOU CHECKED THE REASONABLENESS OF YOUR GROWTH RATE ESTIMATES AGAINST OTHER, PUBLICLY AVAILABLE, GROWTH RATE DATA?

A. Yes. Page 2 of Schedule 4 shows the results of my DCF sustainable growth rate analysis
as well as 5-year historic and projected earnings, dividends and book value growth rates
from Value Line, earnings growth rate projections from Reuters, the average of Value Line
and Reuters growth rates and the 5-year historical compound growth rates for earnings,
dividends and book value for each company under study.

- For the gas distribution sample group, Schedule 4 page 2 shows that my DCF 13 growth rate estimate for those companies is 5.49%. That long-term growth rate estimate 14 is higher than Value Line's projected average earnings, dividend and book value growth 15 rate, 3.85% and higher than the historical average of those same parameters, 4.54%. In 16 17 addition, my DCF growth rate estimate for the gas distributors is also higher than Reuters carnings growth rate projections (4.46%) and also above earnings growth projections by 18 19 Zack's (4.7%). My DCF growth rates for the gas distribution companies are conservative 20 (on the high side) when compared to available published information.
- 21

22 Q. DOES THIS CONCLUDE THE GROWTH RATE PORTION OF YOUR DCF

23 ANALYSIS?

A. Yes, it does.

25

26 Q. HOW HAVE YOU CALCULATED THE DIVIDEND YIELDS?

A. I have estimated the next quarterly dividend payment of each firm analyzed and

annualized them for use in determining the dividend yield. If the quarterly dividend of any

29 company was expected to be increased in the next quarter (2nd or 3rd quarter 2007), I

increased the current quarterly dividend by (1+g). For the utility companies in the sample
groups, a dividend adjustment was unnecessary for many of the companies under study
because they either recently raised their dividend or were not projected to raise the
dividend in 2007. A dividend adjustment was required only for Laclede Gas, NICOR, and
Piedmont Natural Gas.

6 The next quarter annualized dividends were divided by a recent daily closing 7 average stock price to obtain the DCF dividend yields. I use the most recent six-week 8 period to determine an average stock price in a DCF cost of equity determination because 9 I believe that period of time is long enough to avoid daily fluctuations and recent enough 10 so that the stock price captured during the study period is representative of current 11 investor expectations.

Schedule 5 contains the market prices, annualized dividends and dividend yields of the utility companies under study. Schedule 5, page 1, indicates that the average dividend yield for the sample group of gas companies is 3.72%. The year-ahead dividend yield projection for the gas utility sample group published by Value Line is 3.63% (Value Line, *Summary & Index*, March 30, 2007). By that measure, my dividend yield calculation is similar to investor expectations.

18

Q. WHAT IS YOUR COST OF EQUITY CAPITAL ESTIMATE FOR THE UTILITYCOMPANIES, UTILIZING THE DCF MODEL?

A. Schedule 6 shows that the average DCF cost of equity capital for the gas distribution
companies is 9.21%.

23

Q. DOES THIS CONCLUDE YOUR DCF ANALYSIS OF THE COST OF EQUITY
 CAPITAL FOR TRIGEN?

A. Yes, it does.

27

28

B. CORROBORATIVE EQUITY COST ESTIMATION METHODS 1 2 Q. IN ADDITION TO THE DCF, WHAT OTHER METHODS HAVE YOU USED TO 3 ESTIMATE THE COST OF EQUITY CAPITAL FOR TRIGEN IN THIS 4 **PROCEEDING?** 5 6 A. To support and temper the results of my DCF analysis, I have used three additional econometric methods to estimate the cost of equity capital for the group of firms similar 7 in investment risk to Trigen-gas distributors. The three additional equity cost estimation 8 9 methodologies are: 1) the Capital Asset Pricing Model (CAPM), 2) the Modified Earnings-Price Ratio (MEPR) analysis, and 3) the Market-to-Book Ratio (MTB) 10 analysis. The similar risk sample group of firms analyzed with these three methods is the 11 12 same as that selected for the DCF analysis, discussed previously. The theoretical details 13 of each of those analyses are contained in Appendix D, attached to this testimony. The actual calculations and data supporting the results of each of these models are shown in 14 15 the attached Schedules. Schedule 7 attached to this testimony shows the detail regarding the CAPM 16 17 analysis. Schedule 7 shows a CAPM cost of equity range for the gas distributors of 18 9.00% to 10.39%. As I discuss in Appendix D, recent research in financial economics indicates that the market risk premium expectations for the future are lower than that 19 20 contained in the historical data on which my CAPM is based. Therefore, in my opinion, the lower end of the CAPM results are more relevant with regard to the determination of 21 22 the current cost of equity capital. Schedules 8 and 9 shows the theoretical basis and the data and calculations 23 24 regarding the Modified Earnings Price Ratio (MEPR) analysis, respectively. That analysis indicates a current cost of equity capital for companies like Trigen ranging from 8.66% to 25 8.88%. Finally, Schedule 10 attached to this testimony contains the supporting detail for 26 the Market-to-Book Ratio (MTB) analysis, which indicates a current cost of equity 27 capital for the gas utility sample group ranging from 9.20% to 9.26%. 28 29

C. SUMMARY

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY CAPITAL COST
ANALYSES FOR THE SAMPLE GROUP OF SIMILAR-RISK COMPANIES.
A. My analysis of the cost of common equity capital for the sample group of gas
distribution companies is summarized in the table below.

1

2

7

<u>METHOD</u>	COST OF EQUITY
DCF	9.21%
САРМ	9.00%/10.39%
MEPR	8.66%/8.88%
MTB	9.20%/9.26%

The DCF result noted above, which is my primary indication of the cost of equity 8 9 capital, is 9.21%. Averaging the highest and lowest results of all of the corroborative 10 methodologies indicates a cost of equity range for the gas distributors of 8.95%-9.51%. My DCF result is roughly in the middle of that range. Therefore, weighing all the evidence 11 presented herein, my best estimate of the cost of equity capital for a company facing 12 13 similar risks as that group of investment-grade gas distribution utility companies ranges from 9.00% to 9.50%. As I discuss below, due to the facts that 1) Trigen is capitalized 14 with less equity and more debt and 2) Trigen has a below-investment-grade bond rating, 15 its cost of equity is higher than the average for the sample group of gas distributors 16 studied here. 17 18 O. ARE THERE FACTORS WHICH SHOULD BE CONSIDERED IN DETERMINING 19

A POINT-ESTIMATE FOR TRIGEN'S EQUITY RETURN RELATIVE TO THE
RANGE OF 9.00% TO 9.50%?

A. Yes. I have analyzed the market data of gas distribution utilities as reasonable proxies for
 Trigen's operations. The current cost of equity of those companies falls in a range of

9.00% to 9.50%, and the mid-point of that range is 9.25%. It is also important to note 1 that the average common equity ratio of the group of gas distributors analyzed in my 2 3 testimony is approximately 47% of total capital-the ratemaking common equity ratio for Trigen is about 34% of total capital. Also the average bond rating of the sample 4 companies fall between "A-" and "A", which is above investment-grade and Trigen's 5 bond rating is "BB-", substantially lower and below investment-grade. Therefore, the 6 equity return allowed Trigen should be higher than the mid-point of the 9.00% to 9.50% 7 8 range.

As an example of the capital cost rate differential between an A-rated credit and a BB-rated credit can be found in the difference in current bond yields for those two credit rating categories. The current yield differential between A-rated and BB-rated utility longterm debt, according to Reuters⁴ is approximately 200 basis points. While not necessarily appropriate for the determination of equity cost differentials, these data show that the capital cost for a B+/BB- company like Trigen are higher than the capital costs for an Arated utility.

16

Q. IS THERE A RECOGNIZED METHOD WITH WHICH DIFFERENCES INFINANCIAL RISK CAN BE QUANTIFIED?

A. Yes. The cost of equity capital is affected by the capital structure a company employs.
When a company increases the proportion of debt in its capital structure, it increases the
riskiness of its equity. Financial risk (created by the use of debt in the capital structure)
causes investors to demand a higher rate of return; that is, financial risk increases the cost
of equity capital.

The impact of debt leverage on the cost of equity capital can be approximated through an examination of the changes in beta, which occur when leverage is increased or decreased. The Value Line betas for the sample companies used in my cost of capital analysis in this proceeding reflect the market's (investors') perception of both the business risks and the financial risks of a firm. That is, one portion of the beta of a firm is

⁴ <u>http://bondchannel.bridge.com/publicspreads.cgi?utilities</u>

(2)

related to the business risk of the firm (the risk inherent in its operations) and one portion
of the beta is related to the financial risk of that firm (the risk associated with the use of
debt). Therefore, if a firm elects to finance its operations with debt as well as equity, the
beta coefficient of that firm will reflect both the business and financial risk. When a firm
uses debt to finance its operations, the beta can also be referred to as a "levered" beta (i.e.,
a beta coefficient that includes the impact of debt leverage).

The average beta coefficient of the sample group of utilities can be "unlevered."
That is, the beta-risk related to the level of debt capital used by the firm can be removed.
"Unlevering the betas" amounts to estimating what the average beta would be if the
companies were financed entirely with equity capital. Equation (1) is used to estimate the
unlevered beta for a firm or a group of similar-risk firms.⁵

12

13

 $\beta_{\rm U} = \frac{b_{\rm Measured}}{(1+(1-t){\rm D/E})}$ (1)

14

Equation (1) indicates that an estimate of the unlevered beta ($\beta_{\rm U}$) of a firm can be 15 16 calculated by dividing the measured beta ($\beta_{Measured}$, e.g. the beta coefficient reported by investor services such as Value Line) by one plus the average debt-to-equity ratio, 17 adjusted to account for taxes. The debt-to-equity ratio is measured using the average 18 market value of the sample group's common equity capital. Once the unlevered beta for 19 the firm (or, in this case, for the sample group of market-traded utility companies) is 20 calculated, the beta coefficient is "re-levered" and adjusted to conform to the more 21 leveraged capital structure of Trigen, which contains approximately 34% common equity. 22 The formula used to "re-lever" the utility betas is shown below. 23

24

25 26

27

Equation (2) states that the relevered beta equals the unlevered beta (β_{II}) multiplied times

 $\beta_{\text{Relevered}} = \beta_{\text{U}}(1+(1-t)D/E)$

⁵Equation (1) is a version of the Hamada equation which combines the Miller-Modigliani theories regarding capital structure and the logic of the CAPM: Hamada, R.S., "Portfolio Analysis, Market equilibrium and Corporation Finance," *Journal of Finance*, March 1969, pp. 13-31.

12

one plus the target debt-to-equity ratio (in this case Trigen's ratemaking capital structure—34% equity/66% debt), again adjusted for taxes.

Schedule 11 shows that the average capital structure of the sample group of gas companies used to estimate the cost of equity capital in my direct testimony consists of 47.44% common equity and 52.56% fixed-income capital. That capital structure, adjusted to market levels by an average 1.84 market-to-book ratio and accounting for a 35% tax rate, produces an average value for (1-t)D/E in Equation (1) of 0.41.

8 Schedule 11 shows further that the measured (average Value Line) beta coefficient 9 of the sample group of gas utility firms is 0.87 and the <u>unlevered</u> beta coefficient of those 10 firms (i.e., what the average beta would be if those firms were financed entirely with 11 common equity) is 0.62. When that beta is "relevered" using the methodology described 12 above to conform to Trigen's ratemaking capital structure, the resulting average beta 13 coefficient is 1.04, an increase in beta of 0.167 due to the sample group's higher average 14 equity capitalization ["measured" beta of 0.87 vs. "relevered" beta of 1.04].

Finally, with the increase in beta determined, the CAPM can be used to estimate the impact of that adjustment on the cost of capital. A review of the CAPM equation (Equation (i) in Appendix D) indicates that the beta coefficient is multiplied by the market risk premium $(r_m - r_f)$ as a step in the determination of the cost of capital. Therefore, it is possible to measure the impact of an adjustment to beta by multiplying

the difference in the measured and relevered betas of the gas companies by the market risk
premium.

As I noted in my discussion of the CAPM analysis in Appendix D, the long-term historical market risk premium provided by Ibbotson Associates' historical database is 4.9% to 6.5%. I also discuss the fact that the most recent research indicates that the Ibbotson historical risk premium data overstate investor expectations. Therefore, for purposes of this analysis, I will use a range of market risk premium from 3% to 6%. As shown in Schedule 11, an increase in the average beta coefficient of 0.167, multiplied by a market risk premium ranging from 3% to 6%, indicates an increase in the

29 cost of equity capital due to additional leverage at Trigen of from 50 to 100 basis points

1		$(0.167 \times 3\%-6\% = 0.50\%-1.00\%)$. The mid-point of that range is 0.75%.
2		The mid-point of the cost of common equity for the gas distribution sample
3		group, presented previously is 9.25%. Recognizing the increase in financial risk due to
4		additional leverage at Trigen, a cost of equity of 10.0% is reasonable for ratemaking
5		purposes. That represents an increase in the cost of equity for Trigen (with a 34%
6		common equity ratio) of 75 basis points over the mid-point of a reasonable range for gas
7		distribution operations, which are capitalized on average with about 47% common equity.
8		
9	Q.	WHAT IS THE OVERALL COST OF CAPITAL FOR TRIGEN'S UTILITY
10		OPERATIONS IN KANSAS CITY, BASED ON AN ALLOWED EQUITY RETURN
11		OF 10.00%, AND YOUR RECOMMENDED CAPITAL STRUCTURE?
12	A.	Schedule 12 attached to my testimony shows that, with an allowed return on equity
13		capital of 10.00%, using a ratemaking capital structure based on Trigen's parent company
14		capitalization and debt cost rates, Trigen's overall cost of capital would be 9.34%. As
15		also shown on Schedule 12, if Trigen were capitalized in a manner similar to that of its
16		parent company, the equity return I recommend would afford the company a pre-tax
17		interest coverage of approximately 2.0 times.
18		
19	Q.	DOES THIS CONCLUDE YOUR ANALYSIS OF THE COMPANY'S OVERALL
20		COST OF CAPITAL?
21	A.	Yes, it does.
22		
23	Q.	DOES THIS CONCLUDE YOUR DIRECT TESTIMONY IN THIS PROCEEDING?
24	Α.	Yes, it does.

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BEFORE THE PUBLIC SERVICE COMMISSION **OF THE STATE OF MISSOURI**

In The Matter Of The Tariff Filing Of Trigen-Kansas City Energy Corporation to Implement) A General Rate Increase For Regulated Steam) Heating Service Provided To Customers In The) Company's Missouri Service Area.

Case No. HR-2008-

AFFIDAVIT OF STEPHEN G. HILL

SS.

STATE OF WEST VIRGINIA) COUNTY OF PUTNAM

Stephen G. Hill, being of lawful age, on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form to be presented in the above case; that the answers in said Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

Stephen G. Hill

Subscribed and sworn to before me this _____ day of February, 2008.

OFFICIAL SEAL NOTARY PUBLIC STATE OF WEST VIRGINIA TAMMY N. BARTHELMESS THE MAILFOOM 3959 TEAYS VALLEY ROAD HURRICANE, WV 25526 series and contaxe not select

Jammy M. Barthebouess Notary

APPENDIX A

EDUCATION AND EMPLOYMENT HISTORY OF STEPHEN G. HILL

EDUCATION

<u>Auburn University</u> - Auburn, Alabama - Bachelor of Science in Chemical Engineering (1971); Honors - member Tau Beta Pi national engineering honorary society, Dean's list, candidate for outstanding engineering graduate; Organizations - Engineering Council, American Institute of Chemical Engineers

<u>Tulane University</u> - New Orleans, Louisiana - Masters in Business Administration (1973); concentration: Finance; awarded scholarship; Organizations - member MBA curriculum committee, Vice-President of student body, academic affairs

<u>Continuing Education</u> - NARUC Regulatory Studies Program at Michigan State University

EMPLOYMENT

West Virginia Air Pollution Control Commission (1975)

Position: Engineer ; Responsibility: Overseeing the compliance of all chemical companies in the State with the pollution guidelines set forth in the Clean Air Act.

West Virginia Public Service Commission-Consumer Advocate (1982)

Position: Rate of Return Analyst; Responsibility: All rate of return research and testimony promulgated by the Consumer Advocate; also, testimony on engineering issues, when necessary.

Hill Associates (1989)

Position: Principal; Responsibility: Expert testimony regarding financial and economic issue in regulated industries.

PUBLICATIONS

"The Market Risk Premium and the Proper Interpretation of Historical Data," <u>Proceedings of the Fourth NARUC Biennial Regulatory Information Conference,</u> <u>Volume I, pp. 245-255.</u>

"Use of the Discounted Cash Flow Has Not Been Invalidated," <u>Public Utilities</u> <u>Fortnightly</u>, March 31, 1988, pp. 35-38.

MEMBERSHIPS

American Institute of Chemical Engineers; Society of Utility and Regulatory Financial Analysts (Certified Rate of Return Analyst, Member of the Board of Directors)

APPENDIX B

Q. PLEASE PROVIDE AN EXAMPLE WHICH DESCRIBES THE DETERMINANTS OF LONG-TERM SUSTAINABLE GROWTH.

A. Assume that a hypothetical regulated firm had a first period common equity or book value per share of \$10, the investor-expected return on that equity was 10% and the stated company policy was to pay out 60% of earnings in dividends. The first period earnings per share are expected to be \$1.00 (\$10/share book equity x 10% equity return) and the expected dividend is \$0.60. The amount of earnings not paid out to shareholders (\$0.40), the retained earnings, raises the book value of the equity to \$10.40 in the second period. The table below continues the hypothetical for a five year period and illustrates the underlying determinants of growth.

TABLE A.

	<u>YEAR 1</u>	<u>YEAR 2</u>	<u>YEAR 3</u>	<u>YEAR 4</u>	YEAR 5	<u>GROWTH</u>
BOOK VALUE	\$10.00	\$10.40	\$10.82	\$11.25	\$11.70	4.00%
EQUITY RETURN	10%	10%	10%	10%	10%	-
EARNINGS/SH.	\$1.00	\$1.040	\$1.082	\$1.125	\$1.170	4.00%
PAYOUT RATIO	0.60	0.60	0.60	0.60	0.60	-
DIVIDENDS/SH.	\$0.60	\$0.624	\$0.649	\$0.675	\$0.702	4.00%

We see that under steady-state conditions, the earnings, dividends and book value all grow at the same rate. Moreover, the key to this growth is the amount of earnings retained or reinvested in the firm and the return on that new portion of equity. If we let "b" equal the retention ratio of the firm (1 – the payout ratio) and let "r" equal the firm's expected return on equity, the DCF growth rate "g" (also referred to as the internal or sustainable growth rate) is equal to their product, or

$$g = br.$$
 (i)

Professor Myron Gordon, who developed the Discounted Cash Flow technique and first

i

introduced it into the regulatory arena, has determined that Equation (i) embodies the underlying fundamentals of growth and, therefore, is a primary measure of growth to be used in the DCF model. Professor Gordon's research also indicates that analysts' growth rate projections are useful in estimating investors' expected sustainable growth.

I should note here that the above hypothetical does not allow for the existence of external sources of equity financing, i.e., sales of common stock. Stock financing will cause investors to expect additional growth if the company is expected to issue new shares at a market price that exceeds book value. The excess of market over book would inure to current shareholders, increasing their per share equity value. Therefore, if the company is expected to continue to issue stock at a price that exceeds book value, the shareholders would continue to expect their book value to increase and would add that growth expectation to that stemming from earnings retention or internal growth. Conversely, if a company were expected to issue new equity at a price below book value, that would have a negative effect on shareholder's current growth rate expectations. In such a situation, shareholders would perceive an overall growth rate less than that produced by internal sources (retained earnings). Finally, with little or no expected equity financing or a market-to-book ratio near unity, investors would expect the sustainable growth rate for the company to equal that derived from Equation (i), "g = br." Dr. Gordon¹ identifies the growth rate which includes both expected internal and external financing as:

$$g = br + vs, (ii)$$

where,

((

((

g = DCF expected growth rate,
r = return on equity,
b = retention ratio,
v = fraction of new common stock sold that accrues to the current shareholder,
s = funds raised from the sale of stock

¹Gordon, M.J., <u>The Cost of Capital to a Public Utility</u>, MSU Public Utilities Studies, East Lansing, Michigan, 1974, pp., 30–33.

as a fraction of existing equity.

Additionally,

$$\mathbf{v} = 1 - \mathbf{BV}/\mathbf{MP},\tag{iii}$$

where,

((

MP = market price,BV = book value.

I have used Equation (iii) as the basis for my examination of the investor expected long-term growth rate (g) in this proceeding.

Q. IN YOUR PREVIOUS EXAMPLE, EARNINGS AND DIVIDENDS GREW AT THE SAME RATE (br) AS DID BOOK VALUE. WOULD THE GROWTH RATE IN EARNINGS OR DIVIDENDS, THEREFORE, BE SUITABLE FOR DETERMINING THE DCF GROWTH RATE ?

A. No, not necessarily. Rates of growth derived from earnings or dividends alone can be unreliable due to extraneous influences on those parameters such as changes in the expected rate of return on common equity or changes in the payout ratio. That is why it is necessary to examine the underlying determinants of growth through the use of a sustainable growth rate analysis.

If we take the hypothetical example previously stated and assume that, in year three, the expected return on equity rises to 15%, the resultant growth rate for earnings and dividends far exceeds that which the company could sustain indefinitely. The potential error in using those growth rates to estimate "g" is illustrated in the following table.

iii

APPENDIX B

TABLE B.

	<u>YEAR 1</u>	<u>YEAR 2</u>	<u>YEAR 3</u>	YEAR 4	YEAR 5	<u>GROWTH</u>
BOOK VALUE	\$10.00	\$10.40	\$10.82	\$11.47	\$12.157	5.00%
EQUITY RETURN	10%	10%	15%	15%	15%	10.67%
EARNINGS/SH.	\$1.00	\$1.040	\$1.623	\$1.720	\$1.824	16.20%
PAYOUT RATIO	0.60	0.60	0.60	0.60	0.60	-
DIVIDENDS/SH.	\$0.60	\$0.624	\$0.974	\$1.032	\$1.094	16.20%

What has happened is a shift in steady-state growth paths. For years one and two, the sustainable rate of growth (g=br) is 4.00%, just as in the previous hypothetical. Then, in the last three years, the sustainable growth rate increases to 6.00% (g=br = 0.4x15%). If the regulated firm were expected to continue to earn a 15% return on equity and retain 40% of its earnings, then a growth rate of 6.0% would be a reasonable estimate of the long-term sustainable growth rate. However, the compound annual growth rate for dividends and earnings exceeds 16% which is the result only of an increased equity return rather than the intrinsic ability of the firm to grow continuously at a 16% annual rate. Clearly, this type of estimate of future growth cannot be used with any reliability at all. In the case of the hypothetical, to utilize a 16% growth rate in a DCF model would be to expect the company's return on common equity to increase by 50% every five years into the indefinite future. This would be a ridiculous forecast for any regulated firm and underscores the importance of utilizing the underlying fundamentals of growth in the DCF model.

It can also be demonstrated that a change in our hypothetical regulated firm's payout ratio makes the past rate of growth in dividends an unreliable basis for predicting "g". If we assume our regulated firm consistently earns its expected equity return (10%) but in the third year, changes its payout ratio from 60% to 80% of earnings, the results are shown in the table below.

iv

APPENDIX B

TABLE C.

	YEAR 1	<u>YEAR 2</u>	YEAR 3	<u>YEAR 4</u>	<u>YEAR 5</u>	<u>GROWTH</u>
BOOK VALUE	\$10.00	\$10.40	\$10.82	\$11.036	\$11.26	3.01%
EQUITY RETURN	10%	10%	10%	10%	10%	-
EARNINGS/SH.	\$1.00	\$1.040	\$1.082	\$1.104	\$1.126	3.01%
PAYOUT RATIO	0.60	0.60	0.80	0.80	0.80	7.46%
DIVIDENDS/SH.	\$0.60	\$0.624	\$0.866	\$0.833	\$0.900	10.67%

What we see here is that, although the company has registered a high dividend growth rate (10.67%), it is, again, not at all representative of the growth that could be sustained indefinitely, as called for in the DCF model. In actuality, the sustainable growth rate has declined from 4.0% the first two years to only 2.0% (g=br = 0.2x10%) during the last three years due to the increased payout ratio. To utilize a 10% growth rate in a DCF analysis of this hypothetical regulated firm would 1) assume the payout ratio of the firm would continue to increase 33% every five years into the indefinite future, 2) lead to the highly implausible result that the firm intends to consistently pay out more in dividends than it earns and 3) grossly overstate the cost of equity capital.

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APPENDIX C

APPENDIX C SAMPLE COMPANY GROWTH RATE ANALYSES

GAS DISTRIBUTORS

ATG - AGL Resources - ATG's sustainable growth rate has averaged 5.99% over the most recent five year period (2002-2006). VL expects ATG's sustainable growth to continue near that historical growth rate level and to reach 5.87% by the 2010-2012 period. ATG's book value growth rate is expected to be 2.50% over the next five years, a decrease from the 8.5% rate of growth experienced over the past five years (due to a decline in acquisition activity). Also, ATG's earnings per share are projected to increase at a 4.66% (Reuters), 5% (Zack's) to 3.5% (VL) rate— below historical growth and the projected sustainable growth rate—and its dividends are expected to show 5.5% annual growth over the next five years. Over the past five years, ATG's earnings showed 13.50% growth (as the company acquired other large distribution operations and expanded its energy trading business), while its dividends increased at only a 2% rate. Investors can reasonably expect a sustainable growth rate in the future of **5.25%** for ATG.

Regarding share growth, ATG's shares outstanding increased at approximately a 8% rate over the past five years, due to merger activity. The number of shares is projected by VL to increase at about a 0.6% rate between 2005 and the 2010-12 period. An expectation of share growth of 1% for this company is reasonable.

ATO – **Atmos Energy Corp** - ATO's sustainable growth rate averaged only about 2,5% for the five-year historical period. Value Line projects increasing growth in 2007, and then a rise by the 2010-12 period to a level near 4.6%, through an increasing ROE and earnings retention. However, ATO's book value growth during the most recent five years (8.5%) is expected to moderate to a 4% rate in the future, again through a declining rate of acquisitions. ATO's earnings per share are projected to increase at a 5% (VL) to 5.2% (Reuters) to 5.3% (Zack's) rate, but its dividends are expected to grow at only a 1.5% rate, moderating long-term growth expectations. Historically ATO's earnings have shown 10% growth, while its dividends increased at a 2.0% rate. Investors can reasonably expect a sustainable growth rate higher than that established historically, but not as high as the earnings growth projected by Value Line; **4.25%** is a reasonable expectation for this company.

Regarding share growth, ATO's shares outstanding grew at approximately an 18% rate over the past five years due to merger activity. The number of shares is expected to grow at approximately a 5.5% rate through 2010-12. An expectation of share growth of 6% for this company is reasonable.

LG – Laclede Group - LG's sustainable growth rate has averaged 2.5% over the most recent five year period, with much higher growth in the most recent

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year—indicating an upward trend. VL expects LG's sustainable growth moderate while rising above that historical growth rate level to reach 3.2% by the 2010-2012 period. LG's book value growth rate is expected to be 5% over the next five years, up from the 3.5% rate of growth experienced over the past five years. Also, LG's earnings per share are projected to increase at 2% rate, according to Value Line—below the indicated sustainable growth rate. Analysts polled by Reuters expect 3% earnings growth. Also, LG's dividends are expected to grow at 2.5%. Over the past five years, LG's earnings growth was 6.5% while its dividends increased at a 0.5% rate. Investors can reasonably expect a sustainable growth rate in the future of **4.5%** for LG.

Regarding share growth, LG's shares outstanding increased at approximately a 3% rate over the past five years, with equity issuances recently. The number of shares outstanding in 2010-2012 is expected to have increased at a rate of 3.2% from 2006 levels. An expectation of share growth of 3% for this company is reasonable.

GAS – Nicor, Inc. - GAS's sustainable growth rate averaged 3.5% over the fiveyear historical period with a decreasing trend. VL projects sustainable growth through 2010-12 near historical averages, 3.7%. GAS's book value, which increased at a 1.5% rate during the most recent five years, is expected to increase to a 4.5% rate in the future, above both historic rates and the sustainable growth projection. GAS's earnings per share are projected to increase at 4% (VL) 3.3% (Reuters) rate and 2.0% (Zack's). Its dividends are expected to grow at a 1.0% rate, moderating long-term growth expectations. Historically GAS's earnings grew at a -3.5% rate, according to Value Line and its dividends showed 3.5% growth. The projected sustainable growth, earnings and book value growth rate data indicate that investors can expect the growth from GAS to be lower in the future than has existed in the past. Investors can reasonably expect a sustainable growth rate of **4.0%** for GAS.

Regarding share growth, GAS's shares outstanding showed a 0.4% increase over the past five years. Further, GAS's growth rate in shares outstanding is expected to rise at about a 0.1% rate of increase through 2010-12. An expectation of share growth of 0.25% for this company is reasonable.

NWN - Northwest Natural Gas - NWN's sustainable growth rate averaged 2.99% for the five-year period, with the results in the most recent year exceeding the average. VL expects sustainable growth to rise to about a 4.7% level through the 2010-12 period. NWN's book value growth is expected to continue to increase at a 3.5%, equal to the historical level of 3.5%. NWN's earnings per share growth is projected to increase at 7% (VL) to 5.3% (Reuters & Zack's). VL projects its dividends are expected to grow at a 4.0% rate. Historically NWN's earnings and dividends increased at 5% and 1% rates, respectively, according to Value Line. Investors can reasonably expect sustainable growth from NWN to exceed past

averages, a sustainable internal growth rate of **4.5%** is reasonable for this company.

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Regarding share growth, NWN's shares outstanding grew at a 1.6% rate over the past five years. The growth in the number of shares is expected by VL to be 1.2% through 2010-12. An expectation of share growth of 1.0% for this company is reasonable.

PNY - Piedmont Natural Gas - PNY's sustainable internal growth rate averaged 2.94% over the five-year historical period. VL projects PNY's sustainable growth to rise to a level of approximately 3% through 2010-12. Also, PNY's book value growth rate is expected to continue in the future at 2.5%, below the historical level of 6.5%, pointing to moderating growth for this company. PNY's earnings per share are projected to increase at 3% (VL) to 5.5% (Zack's), to 4.6% (Reuters), while its dividends are expected to grow at a 4% rate, slightly below the historical rate, indicating moderating growth. Sustainable growth has been relatively consistent for this company and is expected to be consistent at about 3%. However, dividend and earnings growth are expected to be higher than that level, therefore, investors can reasonably expect a sustainable growth rate of **5%**, from PNY.

Regarding share growth, PNY's shares outstanding grew at about a 3% rate over the past five years, due to a large equity issuance in 2004. Prior to that time share growth was about 1.7% annually. The level of share growth is expected by VL to decline at a 0.75% rate through 2010-12. An expectation of share growth of 0.5% for this company is reasonable.

SJI – South Jersey Industries - SJI's internal sustainable growth rate has averaged 6.4% over the most recent five-year period (2002-2006), with results in 2006 well above the historical growth rate level, indicating an increasing trend. That higher level of growth is expected to be maintained and to reach 11% by the 2010-2012 period, through a dramatically increased ROE. SJI's book value growth rate is expected to be 5% over the next five years—down from the 13% rate of growth experienced over the past five years (the product of acquisitions). SJI's earnings per share are projected to increase at 9.5% (VL) to 6.5% (Zack's) and 6.3% (Reuters), while its dividends are expected to grow at 5.5%. Over the past five years, SJI's earnings grew at an 11.5% rate while its dividends showed a 2.5% increase. Investors can reasonably expect a sustainable growth rate in the future to be higher than past averages, **6%** is reasonable for SJI.

Regarding share growth, SJI's shares outstanding grew at a 4.7% rate over the past five years. The number of shares outstanding is projected by VL to rise at approximately a 1.1% rate through 2010-12. An expectation of share growth of **1.5%** for this company is reasonable.

SWX – Southwest Gas - SWX's sustainable growth rate averaged 3.05% over the five-year historical period with an increasing trend. VL projects that the retention ratio and ROE will rise through 2010-12, bringing sustainable growth near 6.5%.

SWX's book value, which increased at a 3% rate during the most recent five years, is expected to increase slightly to a 4% rate in the future, below the sustainable growth projection. SWX's earnings per share are projected to increase at a 8% (VL) 4.33% (Reuters) and 5% (Zack's). Its dividends are expected to grow at a 1.5% rate, moderating long-term growth expectations. Historically SWX's earnings grew at a -0.5% rate, according to Value Line and its dividends showed 0% growth. The projected sustainable growth and earnings growth rate data indicate that investors can expect the growth from SWX to be higher in the future than has existed in the past, however those expectations are moderated by the book value growth and the stagnant dividend. Investors can reasonably expect a sustainable growth rate of **5.55%** for SWX.

Regarding share growth, SWX's shares outstanding showed a 5.8% increase over the past five years. Further, SWX's growth rate in shares outstanding is expected to rise at about a 2.6% rate of increase through 2010-12. An expectation of share growth of 3% for this company is reasonable.

WGL – WGL Holdings - WGL's sustainable growth rate has averaged 3.41% over the most recent five year period, with an increasing trend. VL expects WGL's sustainable growth to continue at that historical growth rate level to reach 3.58% by the 2010-2012 period. WGL's book value growth rate is expected to be 3.0% over the next five years, equal to the 3% rate of growth experienced over the past five years. WGL's earnings per share are projected to increase at a 1.0% (VL) 3.3% (Reuters) to 3.0% (Zack's). However, its dividends are expected to grow at only 1.5%. Over the past five years, WGL's earnings growth was 6% while its dividends increased at a 1.5% rate. Investors can reasonably expect a sustainable growth rate in the future of 3.75% for WGL.

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Regarding share growth, WGL's shares outstanding increased at approximately a 0.2% rate over the past five years. That rate of increase is expected to moderate in the future with number of shares outstanding in 2010-2012 is expected to grow at a 0.04% rate. An expectation of share growth of **0.1%** for this company is reasonable.

CORROBORATIVE EQUITY CAPITAL COST ESTIMATION METHODS

CAPITAL ASSET PRICING MODEL

Q. PLEASE DESCRIBE THE CAPITAL ASSET PRICING MODEL (CAPM) YOU USED TO ARRIVE AT AN ESTIMATE FOR THE COST RATE OF THE COMPANY'S EQUITY CAPITAL.

A. The CAPM states that the expected rate of return on a security is determined by a riskfree rate of return plus a risk premium that is proportional to the non-diversifiable (systematic) risk of a security. Systematic risk refers to the risk associated with movements in the macro-economy (the economic "system") and, thus, cannot be eliminated through diversification by holding a portfolio of securities. The beta coefficient (b) is a statistical measure that attempts to quantify the non-diversifiable risk of the return on a particular security against the returns inherent in general stock market fluctuations. The formula is expressed as follows:

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$$\mathbf{k} = \mathbf{r}_{\mathbf{f}} + \mathbf{b}(\mathbf{r}_{\mathbf{m}} - \mathbf{r}_{\mathbf{f}}),\tag{i}$$

where "k" is the cost of equity capital of an individual security, " r_f " is the risk-free rate of return, "b" is the beta coefficient, " r_m " is the average market return and " $r_m - r_f$ " is the market risk premium. The CAPM is used in my analysis, not as a primary cost of equity analysis, but as a check of the DCF cost of equity estimate. Although I believe the CAPM can be useful in testing the reasonableness of a cost of capital estimate, certain theoretical shortcomings of this model (when applied in cost of capital analysis) reduce its usefulness.

Q. CAN YOU EXPLAIN WHY YOU APPLY THE CAPM ANALYSIS WITH CAUTION?

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A. Yes. The reasons why the CAPM should be used in cost of capital analysis with caution are set out below. It is important to understand that my caution with regard to the use of the CAPM in a cost of equity capital analysis does not indicate that the model is not a useful description of the capital markets. Rather, it recognizes that in the practical application of the CAPM to cost of capital analysis there are problems that can cause the results of that type of analysis to be less reliable than other, more widely accepted models such as the DCF.

The CAPM was originally designed as a point-in-time tool for selecting stock portfolios that matched a particular investor's risk/return preference. Its use in rate of return analysis to estimate multi-period return expectations for one stock or one type of stock, rather than a diversified portfolio of stocks, takes the model out of the context for which it was intended. Also, questions regarding the fundamental applicability of the CAPM theory and the accuracy of beta have arisen recently in the financial literature.

Over the past few years there has been much comment in the financial literature over the strength of the assumptions that underlie the CAPM and the inability to substantiate those assumptions through empirical analysis. Also, there are problems with the key CAPM risk measure that indicate that the CAPM analysis is not a reliable primary indicator of equity capital costs.

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Cost of capital analysis is a decidedly forward-looking, or *ex-ante*, concept. Beta is not. The measurement of beta is derived with historical, or *ex-post*, information. Therefore, the beta of a particular company, because it is usually derived with five years of historical data, is slow to change to current (i.e., forward-looking) conditions, and some price abnormality that may have happened four years ago could substantially affect beta while, currently, being of little actual concern to investors. Moreover, this same shortcoming which assumes that past results mirror investor expectations for the future plagues the market risk premium in an ex-post, or historically-oriented CAPM.

Also, an important study performed for the Center for Research in Security Prices at the University of Chicago Graduate School of Business shows that the assumed linear relationship between beta, risk and return (i.e., beta varies directly with risk and return)

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simply does not appear to exist in the marketplace. As Value Line reported in its <u>Industry</u> Review published in March of 1992:

> Two of the most prestigious researchers in the financial community, Professors Eugene F. Fama and Kenneth R. French from the University of Chicago have challenged the traditional relationship between Beta and return in a recent paper published by the Center for Research in Security Prices. In this study, the duo traced the performance of thousands of stocks over 50 years, but found no statistical support for the hypothesis that the relationship between volatility and return is significantly different from random. (Value Line Industry Review, March 13, 1992, p. 1-8.)

Fama and French have continued their investigation of the CAPM since their 1992 article and have postulated that a more accurate CAPM would use two additional risk measures in addition to beta. However, it is important to note that while those authors tout the superiority of their three-factor CAPM to the single-beta CAPM on theoretical grounds, they recognize that there are significant problems with any type of asset pricing model when it comes to using the model to estimate the cost of equity capital. Just last year, Fama and French noted regarding the CAPM:

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"The attraction of the CAPM is that is offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor-poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model....In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid." (Fama, E., French, K., "The Capital Asset Pricing Model: Theory and Evidence," Journal of Economic Perspectives, Vol. 18, No. 3, Summer 2004, pp. 25-46)

While the recently published conclusions as to the imprecision of equity cost estimates produced by CAPM-type models does not necessarily negate the risk/return basis of asset pricing, it does call for more accurate measures with which asset returns can be more reliably indexed. However, unless and until such indices are published and widely accepted in the marketplace, CAPM cost of equity capital estimates should be relegated to a supporting role or informational status. Therefore, I use the CAPM for informational purposes and do not rely on that methodology as a primary equity capital cost estimation technique.

Q. WHAT VALUE HAVE YOU CHOSEN FOR A RISK-FREE RATE OF RETURN IN YOUR CAPM ANALYSIS?

A. As the CAPM is designed, the risk-free rate is that short-term rate of return investors can realize with certainty. The nearest analog in the investment spectrum is the 13-week U. S. Treasury Bill. Although longer-term Treasury bonds have equivalent default risk to T-Bills, those longer-term government securities carry maturity risk that the T-Bills do not have. When investors tie up their money for longer periods of time, as they do when purchasing a long-term Treasury, they must be compensated for future investment opportunities forgone as well as the potential for future changes in inflation. Investors are compensated for this increased investment risk by receiving a higher yield on T-Bonds.

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As I noted in my discussion of the macro-economy in the main body of my testimony, the Fed has acted vigorously during 2005 and 2006 to raise short-term interest rates. Over the most recent six-week period, T-Bills have produced an average yield of 5.10% and Treasury Bonds have yielded 4.73% (data from Value Line *Selection & Opinion*, six most recent weekly editions¹).

Q. DO YOU BELIEVE THE USE OF A LONG-TERM TREASURY BOND RATE IS APPROPRIATE IN THE CAPM?

A. Although the selection of a long- or short-term Treasury security as the risk free rate of

¹ Current T-Bill yield, six-week average yield from Value Line Selection & Opinion (2/23/07-3/30/07).

return to be used in the CAPM is often one of the areas of contention in applying the model in cost of capital analysis, the use of a normalized short-term T-Bill rate is the more theoretically correct parameter. However, the T-Bill yield can be influenced by Federal Reserve policy, and, could can inaccurate indications of the cost of equity, especially if the yield differential between T-Bonds and T-Bills is different from long-term averages. Recently, with the increase in short-term T-Bill yields resulting from Federal Reserve credit tightening, combined with stable long-term yields, the yield differential between T-Bonds and T-Bills is of a normalized short-term averages of about 1.5% to 2%. Therefore, for purposes of analysis in this proceeding I will rely on the long-term Treasury bond yields for the risk-free rate in the CAPM.

Q. WHAT HAVE YOU CHOSEN AS THE MARKET RISK PREMIUM FOR THE CAPM ANALYSIS?

A. In their 2006 edition of <u>Stocks, Bonds, Bills and Inflation</u>, R.G. Ibbotson Associates indicates that the average market risk premium between stocks and T-Bonds over the 1926–2005 time period is 6.5% (based on an arithmetic average), and 4.9% (based on a geometric average). I have used these values to estimate the market risk premium in the CAPM analysis. The geometric mean is based on compound returns over time and the arithmetic mean is based on the average of single-period returns.

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It is also important to note that recent research in the field of financial economics has shown that the market risk premium data published by Ibbotson Associates—the earned return differentials that existed in the U.S. between 1926 and 2005—overstates investor-expected market risk premiums. The most recent research indicates that the return investors require over the risk-free rate ranges from 2.5% to 4.5% as opposed to the 4.9% to 6.5% estimate published by Ibbotson. Also Ibbotson, himself, has published a recent paper that indicates the forward-looking risk premium expectation ranges between 3.97% and 5.90%.² Therefore, the upper end of the CAPM cost of equity estimates, based on the historical Ibbotson data, should be considered to be higher than the current cost of

² Ibbotson, R, Chen, P., "Long-Run Stock Returns: Participating in the Real Economy," *Financial Analysts Journal*, January/February 2003, pp. 88-89.

common equity capital.

Q. SOME ANALYSTS ARGUE THAT THE USE OF GEOMETRIC MEANS IN COST OF CAPITAL ANALYSIS IS IMPROPER. WHY DO YOU BELIEVE IT IS REASONABLE TO USE THAT INFORMATION?

A. It is necessary to utilize a range of market risk premiums when applying a CAPM analysis because, as I note in Section I of my Direct Testimony, there is substantial new research that indicates the published Ibbotson historical data significantly overstate investors' expectations with regard to the market risk premium. Also, Ibbotson Associates, while stating a preference for the arithmetic market risk premium, also publish the geometric market risk premium and investors have equal access to those data. Therefore, it is reasonable to believe, under the assumption of informationally-efficient markets, that such data is impounded in stock prices.

Also the "decision tree" rationale often used to support sole reliance on arithmetic means assumes that year-to-year returns are strictly independent results—each having no effect on the other. However, there is research that indicates such is not the case and that period-to-period returns are inter-dependent to some degree.³ Therefore, the typical "decision tree" logic often used to support strict allegiance to an arithmetic market risk premium does not strictly apply.

In addition, there are data anomalies associated with arithmetic risk premiums. In order to calculate arithmetic risk premiums based on a market index like the S&P 500 or the NYSE, it is commonly assumed that those indexes are bought and sold each year without transaction costs or tax consequences. That is unrealistic. Also, the arithmetic market risk premium is period-specific. That is, the longer the assumed holding period the lower the arithmetic risk premium.

It is commonly assumed that the holding periods (the amount of time between buying and selling the market portfolio) is one year, however, there is no magic to that particular time-span, it is simply a common assumption in the calculation. If, for

³ E. Fama and K. French, "Dividend Yields and Expected Stock Returns," *Journal of Financial Economics* (October 1988), pp. 3-26.

example, we assume that the holding period is two years instead of one, the arithmetic market risk premium declines. If that holding period increases to three years, the market risk premium based on the Ibbotson data declines again.⁴

In sum, the Ibbotson arithmetic mean is at the upper end of the current range of market risk premium estimates according to recent research, and even that measure declines as the holding period increases. Therefore consideration of a lower bound for the determination of a CAPM cost of equity (Ibbotson's geometric mean) is reasonable for the purposes of determining the cost of common equity capital for AmerenUE.

Q. IF THE IBBOTSON HISTORICAL DATA OVERSTATE THE EXPECTED MARKET RISK PREMIUM, WHY DO YOU USE THOSE DATA IN YOUR CAPM ESTIMATE OF THE COST OF COMMON EQUITY CAPITAL?

A. I continue to utilize the historical Ibbotson data in my CAPM analysis in order to be consistent with the manner in which I have traditionally used those data. I have been testifying on the subject of the cost of equity capital for more than twenty years and have consistently used the Ibbotson historical data in my CAPM analyses, and choose not to deviate from that practice at this time. However, the new research on the market risk premium (including a paper from Ibbotson, himself) indicates that the expected market risk premium is considerably lower than the risk premium contained in the historical data. While that information does not cause me to change my long-standing CAPM methodology of relying on the Ibbotson historical risk premium data, the current research on the topic of the market risk premium is important, deserves consideration and causes me to put considerably less weight on the higher end of the CAPM estimates.

Q. WHAT VALUES HAVE YOU CHOSEN FOR THE BETA COEFFICIENTS IN THE CAPM ANALYSIS?

A. Value Line reports beta coefficients for all the stocks it follows. Value Line's beta is derived from a regression analysis between weekly percentage changes in the market

⁴ Copeland, Koller, and Murrin, <u>Valuation: Measuring and Managing the Value of Companies</u>, 3rd Ed., McKinsey & Co., New York, 2006, pp. 218-221.

price of a stock and weekly percentage changes in the New York Stock Exchange Composite Index over a period of five years. The average beta coefficient of the sample group of gas distributors is 0.87.

Q. WHAT IS YOUR RECOMMENDED COST OF EQUITY CAPITAL FOR THE SAMPLE OF UTILITY COMPANIES USING THE CAPITAL ASSET PRICING MODEL ANALYSIS?

A. Schedule 7 shows that the average Value Line beta coefficient for the group of gas companies under study is 0.87. The overall arithmetic average market risk premium of 6.5% would, upon the adoption of a 0.87 beta, become a sample group premium of 5.67% (0.87 x 6.5%). That non-specific risk premium added to the risk-free T-Bond rate of 4.73%, previously derived, yields a common equity cost rate estimate of 10.39%. Using the geometric average market risk premium, the CAPM equity cost estimate is 9.00%. As noted above, that upper-end estimate of the CAPM is likely to exceed the current cost of equity capital.

It is also important to note that those results are predicated on Ibbotson's longterm historical market risk premiums, which current research indicates overstate actual investor expectations. However, those CAPM results bracket the DCF results derived previously, supporting the reasonableness of those results.

MODIFIED EARNINGS-PRICE RATIO ANALYSIS

Q. PLEASE DESCRIBE THE MODIFIED EARNINGS-PRICE RATIO (MEPR) ANALYSIS OF THE COST OF COMMON EQUITY CAPITAL.

A. The earnings-price ratio is calculated simply as the expected earnings per share divided by the current market price. In cost of capital analysis, the earnings-price ratio (which is one portion of this analysis) can be useful in a corroborative sense, since it can be a good indicator of the proper range of equity costs when the market price of a stock is near its book value. When the market price of a stock is *above* its book value, the earnings-price

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ratio *understates* the cost of equity capital. Schedule 8 contains mathematical proof for this concept. The opposite is also true, i.e.; the earnings-price ratio *overstates* the cost of equity capital when the market price of a stock is *below* book value.

Under current market conditions, the utilities under study have an average marketto-book ratio of 1.84 and, therefore, the average earnings-price ratio alone would understate the cost of equity for the sample groups. However, I do not use the earningsprice ratio alone as an indicator of equity capital cost rates. Because of the relationship among the earnings-price ratio, the market-to-book ratio and the investor-expected return on equity described mathematically in Schedule 8, I have modified the standard earningsprice ratio analysis by including expected returns on equity for the companies under study. It is that modified analysis that I will use to assist in estimating an appropriate range of equity capital costs in this proceeding.

Q. PLEASE EXPLAIN THE RELATIONSHIP AMONG THE EARNINGS-PRICE RATIO, THE EXPECTED RETURN ON EQUITY, AND THE MARKET-TO-BOOK RATIO.

A. When the expected return (ROE) approximates the cost of equity, the market price of the utility approximates its book value and the earnings-price ratio provides an accurate estimate of the cost of equity. As the investor-expected return on equity for a utility (ROE) begins to exceed the investor-required return (the cost of equity capital), the market price of the firm will tend to exceed its book value. As shown in Schedule 9, when the market price exceeds book value, the earnings-price ratio understates the cost of equity capital.

If the cost of equity capital doesn't change and expected returns (ROE) move higher, the market price continues to move higher than book value and the earnings-price ratio continues to decline below the cost of capital. In other words, the earnings-price ratio and the expected ROE tend to "orbit" around the cost of equity capital. When market prices are near book value, both parameters approximate the cost of equity. If the market-to-book ratio increases due to differences between the cost of capital and

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expected returns, the expected ROE moves higher than the cost of capital and the earnings-price ratio moves lower than the cost of equity capital. The reverse happens when market-to-book ratios decline below 1.0. In that instance, expected ROEs are lower than the cost of equity capital and earnings-price ratios are higher. The key to this analysis is that the "locus" of the expected ROE and the earnings-price ratio is the cost of common equity capital.

These relationships represent general tendencies but are useful in corroborating other cost of capital methodologies. The Federal Energy Regulatory Commission, in its generic rate of return hearings, found this technique useful and indicated that under the circumstances of market-to-book ratios exceeding unity, the cost of equity is bounded above by the expected equity return and below by the earnings-price ratio (e.g., 50 Fed Reg, 1985, p. 21822; 51 Fed Reg, 1986, pp. 361, 362; 37 FERC ¶ 61,287). The mid-point of these two parameters, therefore, produces an estimate of the cost of equity capital which, when market-to-book ratios are different from unity, provides a corroborative estimate of the cost of common equity.

Q. WHAT ARE THE RESULTS OF YOUR EARNINGS-PRICE RATIO ANALYSIS OF THE COST OF EQUITY FOR THE SAMPLE GROUP?

A. Schedule 9 shows the Reuters projected 2007 per share earnings for each of the firms in the sample groups. Recent average market prices (the same market prices used in my DCF analysis), Value Line's projected return on equity for 2007 and 2010-2012 for each of the companies are also shown.

The average earnings-price ratio for the gas sample group, 5.81%, is below the cost of equity for those companies due to the fact that their average market-to-book ratio is currently substantially above unity (average gas utility M/B = 1.84). The sample gas companies' 2007 expected book equity return averages 11.50%. For the sample group, then, the mid-point of the earnings-price ratio and the current equity return is 8.66%.

Schedule 9 also shows that the average expected book equity return for the gas utilities over the next three- to five-year period is 11.94%, indicating relatively steady

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return expectations. The midpoint of these two boundaries of equity capital cost for the whole group, i.e., the long-term projected return on book equity (11.94%) and the current earnings-price ratio (5.81%) is 8.88%, and provides another forward-looking estimate of the equity capital cost rate of gas utility firm. Due to the very high market to book ratios of the gas companies, it is reasonable to assume these results understate the cost of equity for those companies.

MARKET-TO-BOOK RATIO ANALYSIS

Q. PLEASE DESCRIBE YOUR MARKET-TO-BOOK (MTB) ANALYSIS OF THE COST OF COMMON EQUITY CAPITAL FOR THE SAMPLE GROUP.

A. This technique of analysis is a derivative of the DCF model that attempts to adjust the capital cost derived with regard to inequalities that might exist in the market-to-book ratio. This method is derived algebraically from the DCF model and, therefore, cannot be considered a strictly independent check of that method. However, the MTB analysis is useful in a corroborative sense. The MTB seeks to determine the cost of equity using market-determined parameters in a format different from that employed in the DCF analysis. In the DCF analysis, the available data is "smoothed" to identify investors' long-term sustainable expectations. The MTB analysis, while based on the DCF theory, relies instead on point-in-time data projected one year and five years into the future and, thus, offers a practical corroborative check on the traditional DCF. The MTB formula is derived as follows:

Solving for "P" from Equation (1), the standard DCF model, we have

$$P = D/(k-g).$$
(ii)

But the dividend (D) is equal to the earnings (E) times the earnings payout ratio, or one minus the retention ratio (b), or

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$$D = E(1-b).$$
(iii)

Substituting Equation (iii) into Equation (ii), we have

$$P = \frac{E(1-b)}{k-g} . \qquad (iv)$$

The earnings (E) are equal to the return on equity (r) times the book value of that equity (B). Making that substitution into Equation (iv), we have

$$P = \frac{rB(1-b)}{k-g} .$$
 (v)

Dividing both sides of Equation (v) by the book value (B) and noting from Equation (iii) in Appendix B that g = br+sv,

$$\frac{P}{B} = \frac{r(1-b)}{k-br-sv} .$$
 (vi)

Finally, solving Equation (vi) for the cost of equity capital (k) yields the MTB formula:

$$k = \frac{r(1-b)}{P/B} + br + sv.$$
 (vii)

Equation (vii) indicates that the cost of equity capital equals the expected return on equity multiplied by the payout ratio, divided by the market-to-book ratio plus growth. Schedule 10 shows the results of applying Equation (vii) to the defined parameters for the gas utility firms in the comparable sample. For the gas utility sample group, page 1 of Schedule 10 utilizes current year (2007) data for the MTB analysis while page 2 utilizes Value Line's 2010-2012 projections.

The MTB cost of equity for the sample of gas utility firms, recognizing a current average market-to-book ratio of 1.84 is 9.26% using the current year data and 9.20%

using projected three- to five-year data. Those MTB results indicate that my DCF equity cost estimate are reasonable.

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TRIGEN-KANSAS CITY MOODY'S BAA BOND YIELDS 1984-2007



Data from Federal Reserve Release H.15.

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Schedule 1 Page 1 of 2



TRIGEN-KANSAS CITY MOODY'S BAA BOND YIELDS 1968-2006

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TRIGEN-KANSAS CITY QUARTERLY BALANCE SHEET

ASSETS:	Dec.05	Mar-06	Iun 06	Sen 06	Dec 06
Current Assets	000-000	Iviai-00	Juli-00	0	1/60-00
Cash	0 776	11 170	2 102	12 166	207
Restricted Cash Current	5,110	11,170	2,102	12,100	207
Marketable Securities	-	-	-	-	-
A ccounte Bacajushla	1 204 402	1 475 002	1 459 044	-	-
Notes Receivable Current	1,594,405	1,423,002	1,458,044	2,015,289	2,272,023
Investory	917 701	776 750	9,62,802	-	-
Brengidg & Other Current Accests	817,791	//0,/30	863,892	790,354	309,011
Total Current A gosta	2 277 211	124,182	100,309	2,918,466	3,789,833
Dron Dignt & Equin (not of A course Down)	2,277,211	2,337,983	2,490,407	5,734,275	6,431,074
Production Diant	2 201 102	1 100 710	2 2 12 0 (0	2 50 5 2 10	1100000
Floquetion Plant	3,291,193	3,198,719	3,343,869	3,586,343	4,168,056
Concerning Plant	21,541,410	21,419,540	22,659,359	22,529,197	31,111,791
General Plant	93,439	87,733	87,230	86,585	96,433
Construction work in Progress	139,153	1,589,809	8,031,153	6,716,594	3,496,566
Total Property, Plant, & Equipment	25,065,194	26,295,802	34,121,612	32,918,719	38,872,845
Long Term investments	-	-	-	-	-
Intangibles	-	-		-	-
Intercompany Receivable/(Payable)	(2,436,661)	(4,810,663)	(13,274,372)	(14,605,029)	(19,105,047)
Restricted Cash - Long Term	-	-	-	-	-
Notes Receivable - Long Term	-	-	-	-	-
Other Assets	681,178	681,178	681,178	681,178	1,145,583
TOTAL ASSETS	25,586,923	24,504,301	24,018,825	24,729,143	27,344,455
I LA BIT ITTES.			1		
Current Liphilities					
Trada Accounta Davable					
Fuel & Consumplies Payable	167 176			-	
Other A consultables Fayable	407,470	212,142	241,244	494,448	003,031
A convert Income Texas	391,882	(12,450)	1/6,539	880,858	2,981,065
Accrued income taxes	1,550	(13,450)	(15,000)	(15,000)	(38,256)
Notes Devel-	-	-	-	-	59,671
Constal Lance Obligation Constant	- (-	-	-	-
Capital Lease Obligation - Current	-	-	-	-	-
Current Portion of L1 Debi	-	-		-	
Constal Liabilities	1,060,908	316,671	402,783	1,360,306	3,666,112
Capital Lease Obligation - Long Term	-	-	-	-	-
Long Term Debt	-	-	-	-	-
Minority Interest in Subsidiaries	- (-	- 1	-	-
Other Liabilities	2,081,733	2,136,176	2,229,129	2,271,646	3,363,841
TUTAL LIABILITIES	3,142,641	2,452,848	2,631,912	3,631,952	7,029,953
TOTAL STOCKHOLDERS' EQUITY	22,444,282	22,051,453	21,386,913	21,097,191	20,314,502
TOTAL LIABILITIES & EOUTTY	25.586.923	24,504,301	24,018,825	24,729 143	27 344 455
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Data provided by Company.

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TRIGEN KANSAS CITY TNAI CONSOLIDATED CAPITAL STRUCTURE

AMOUNT

Type of Capital	<u>Dec-05</u>	<u>Mar-06</u> [2]	Jun-06 [3]	<u>Sep-06</u> [4]	<u>Dec-06</u> [5]	<u>Average</u> [6]
1) Common Equity	\$126,801,153	\$130,487,141	\$146,238,179	\$192,931,198	\$188,253,740	\$156,942,282
2) Long-term Debt	\$287,880,000	\$287,880,000	\$287,880,000	\$270,030,000	\$346,855,000	\$296,105,000
3) Short-term Debt	<u>\$10,382,424</u>	<u>\$0</u>	<u>\$1,468,583</u>	<u>\$16,048,068</u>	<u>\$209,635</u>	<u>\$5,621,742</u>
4) TOTAL	\$425,063,577	\$418,367,141	\$435,586,762	\$479,009,266	\$535,318,375	\$458,669,024

PERCENTAGE

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Type of Capital	Dec-05	<u>Mar-06</u>	<u>Jun-06</u>	<u>Sep-06</u>	<u>Dec-06</u>	5 Quarter <u>Average</u>
5) Common Equity	29.83%	31.19%	33.57%	40.28%	35.17%	34.22%
6) Long-term Debt	67.73%	68.81%	66.09%	56.37%	64.79%	64.56%
7) Short-term Debt	<u>2.44%</u>	<u>0.00%</u>	<u>0.34%</u>	<u>3.35%</u>	<u>0.04%</u>	<u>1.23%</u>
8) TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data provided by Company.

Schedule 2 Page 2 of 5

TRIGEN-KANSAS CITY GAS INDUSTRY COMMON EQUITY RATIOS

COMPANY

COMMON EQUITY RATIO

	AUS Utilities Reports
1 AGL Resources*	42%
2 Atmos Energy*	45%
3 Cascade Natural Gas	43%
4 Chesapeake Utilities	44%
5 Delta Natural Gas	41%
6 El Paso Corporation	22%
7 Energen Corporation	64%
8 Energy West Incorporated	46%
9 EnergySourth, Inc.	56%
10 Equitable Resources	51%
11 KeySpan Corp.	45%
12 Kinder Morgan, Inc.	21%
13 Laclede Group, Inc.*	58%
14 National Fuel Gas	55%
15 New Jersey Resources	51%
16 NICOR, Inc.*	51%
17 Northwest Natural Gas*	48%
18 ONEOK, Inc.	73%
19 Piedmont Natural Gas*	47%
20 Questar Corporation	67%
21 RGC Resources, Inc.	50%
22 SEMCO Energy, Inc.	28%
23 South Jersey Industries*	44%
24 Southern Union Company	37%
25 Southwest Gas Corporation*	41%
26 Southwestern Energy	78%
27 UGI Corporation	32%
28 WGL Holdings*	51%
29 Williams Companies	<u>40%</u>
INDUSTRY AVERAGE	47%
GAS DISTRIB. AVG.	47%

*Companies selected in Mr. Hill's gas distribution sample group. AUS Utility Reports, April 2007, pp. 15, 16.

TRIGEN-KANSAS CITY ELECTRIC UTILITY INDUSTRY COMMON EQUITY RATIOS

	EQUITY	COMBINATION GAS &	EQUITY
ELECTRIC COMPANIES	RATIO	ELECTRIC COMPANIES	<u>RATIO</u>
	2 (0 (100/
Allegheny Energy	36%	AES COTP.	1270 810/
ALLEIE	03%0	Amaron Com	50%
American Electric Power	43%0	Ameren Corp.	18%
Class Comparation	5/70	Aquina Aviete Corn	45%
DBI In-	20% 20%	Avisia Colp. Disale Hills Cornoration	50%
DPL, Inc.	2070	Center Point Energy	14%
Edian International	3370	CH Energy Group	56%
Edison International	4270	CMS Energy Corn	23%
El Paso Electric Co.	470	Consolidated Edison	47%
Flistenergy Corp.	45%	Constellation Energy	46%
Great Dising Energy	50%	Dominion Resources	39%
Green Mountain Bower	54%	DTE Fnergy Company	39%
Voyagian Electric Industries	27%	Duke Energy	55%
The wallah Electric Industries	49%	Empire District Electric	48%
Maine & Maritimes Com	47%	Energy East Corp.	41%
OGE Energy	54%	Entergy Corn.	47%
Otter Tail Power	61%	Excelon Corp.	43%
Pinnacle West Canital Corn	51%	Florida Pub. Utilities	47%
Progerss Energy	47%	Integrys Energy Group	42%
Southern Co	43%	MDU Resources	63%
TXU Corn	15%	MGE Resources	55%
LIII. Holdings	49%	NiSource Inc.	44%
Westar Energy	50%	Northeast Utilities	40%
(obul LiterE)	<u></u>	Northwestern Corp.	50%
Electric Company Average	46%	NSTAR	34%
		Pepco Holdings	42%
		PG&E Corp.	43%
		PNM Resources	40%
		PPL Corp.	38%
		Public Service Ent. Group	37%
		Puget Energy	38%
		SCANA Corp.	43%
OVERALL AVERAGE	44%	SEMPRA Energy	87%
		Sierra Pacific Resources	39%
		TECO Energy	31%
		UniSource Energy	35%
		Unitil Corp.	37%
		Vectren Corp.	41%
		Wisconsin Energy Corp.	40%
		Xcel Energy Inc.	<u>44%</u>
		Combination Company Average	44%

Data from AUS Utility Reports, April 2007, pp. 5-14

TRIGEN-KANSAS CITY RATEMAKNG CAPITAL STRUCTURE

Type of Capital	PERCENT	COST RATE†	WT. AVG. <u>COST RATE</u>
Common Equity	34.22%	-	-
Long-term Debt	64.56%	9.01%	5.817%
Short-term Debt	<u>1.23%</u>	<u>8.43%</u>	<u>0.103%</u>
TOTAL CAPITAL	100.00%		-

† Embedded debt cost rates provided by Company:

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	Long-term Debt (\$3	05 MM Term L	oan)		
TNAI - Sen	ior Term Debt	<u>Amount</u> \$122,000 \$122,000	Percent 40.00% 40.00%	LIBOR Swap Rate 5.03% 5.02%	<u>Wt. Cost Rate</u> 2.01% 2.01%
	Total	<u>\$61,000</u> \$305,000	<u>20.00%</u>	<u>5.14%</u> Spread Cost Rate	<u>1.03%</u> 5.05% <u>2.75%</u> 7.80%
Term 2 Years	Principal \$305,000	Fees \$6,475	Net Proceeds \$298,525	Annual Interest \$23,784	Embedded Cost 9.01%

Short-term Debt (Line o	of Credit, \$35	5,000 Available)		
	<u>Amount</u>	<u>Feb. 07 LIBOR</u>	<u>Spread</u>	Cost Rate
Amount Outstanding (Drawn)	\$10,000	5.32%	2.75%	8.07%
Amount Not Drawn	\$25,000			
Commitment Fees	0.50%			
Undrawn % of Total	<u>71.43%</u>			
Additonal Cost	0.36%			<u>0.36%</u>
Embedded Cost of Short-	-term Debt			8.43%

TRIGEN-KANSAS CITY DCF GROWTH RATE PARAMETERS GAS DISTRIBUTORS

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COMPANY		INTERNAL	GROWTH		EXTERNAL (ROWTH
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE
ATG	RATIO	<u>RETURN</u>	"g"	(\$/SHARE)	(MILLIONS)	GROW TH
2002	0.4066	14.5%	5.90%	12.52	56.70	- //
2003	0.4663	14.0%	6.53%	14.66	64.50	
2004	0.4956	11.0%	5.45%	18.06	76.70	
2005	0.4758	12.9%	6.14%	19.29	77.70	
2006	0.4559	13.0%	<u>5.93%</u>	<u>20.69</u>	<u>77.75</u>	
AVERAGE GF	OWTH		5.99%	8.50%		8.21%
2007	0.4143	13.5%	5.59%		78.00	0.32%
2008	0,4345	14.0%	6.08%		79.00	-0.50%
2010-2012	0.4194	14.0%	5.87%	2.50%	80.00	0.57%

COMPANY		INTERNAL	GROWTH		EXTERNAL (<u> BROWTH</u>
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE
ATO	RATIO	<u>RETU</u> RN	"g"	(\$/SHARE)	_ (MILLIONS)	GROWTH
2002	0.1862	10.4%	1.94%	13.75	41.68	
2003	0.2982	09.3%	2.77%	16.66	51.48	
2004	0.2278	07.6%	1.73%	18.05	62.80	
2005	0.2791	08.5%	2.37%	19.90	80.54	
2006	0.3700	09.9%	<u>3.66%</u>	<u>20.16</u>	<u>81.74</u>	
AVERAGE GI	ROWTH		2.50%	8.50%		18.34%
2007	0.3600	09.0%	3.24%		88.50	8.27%
2008	0.3810	09.5%	3.62%		92.50	6,38%
2010-2012	0.4600	10.0%	4.60%	4.00%	107.00	5.53%

COMPANY		INTERNAL	GROWTH		EXTERNAL (BROWTH
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE
LG	RATIO	<u>RETURN</u>	"g"	(\$/SHARE)	(MILLIONS)	GROWTH
2002	-0.1356	07.8%	-1.06%	15.07	18.96	
2003	0.2637	11.6%	3.06%	15.65	19.11	
2004	0.2582	10.1%	2.61%	16.96	20.98	
2005	0.2789	10.9%	3.04%	17.31	21.17	
2006	0.4093	12.5%	<u>5.12%</u>	<u>18.85</u>	<u>21.36</u>	
AVERAGE GI	ROWTH		2.55%	3,50%		3.02%
2007	0.2368	09.0%	2,13%		21.50	0.66%
2008	0.2550	09.5%	2.42%		22,00	1.49%
2010-2012	0.3191	10.0%	3.19%	5.00%	25.00	3.20%

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TRIGEN-KANSAS CITY DCF GROWTH RATE PARAMETERS GAS DISTRIBUTORS

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COMPANY	<u></u>	INTERNAL	GROWTH		EXTERNAL (GROWTH
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE
GAS .	RATIO	RETURN	"g"	(\$/SHARE)	(MILLIONS)	GROWTH
2002	0.3611	17.5%	6.32%	16.55	44.01	
2003	0.1185	12.3%	1.46%	17.13	44,04	
2004	0.1622	13.1%	2.12%	16.99	44.10	
2005	0.1806	12.5%	2.26%	18.36	44.18	
2006	0.3861	14.0%	<u>5.41%</u>	<u>19.35</u>	<u>44.70</u>	
AVERAGE GI	ROWTH		3.51%	1.50%		0.39%
2007	0.2963	13.0%	3.85%		44.60	-0.22%
2008	0.3091	13.0%	4.02%		44.70	0.00%
2010-2012	0.3103	12.0%	3.72%	4.50%	45.00	0.13%

COMPANY	INTERNAL		GROWTH		EXTERNAL (JROWTH
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE
NWN	RATIO	RETURN	"g"	(\$/SHARE)	(MILLIONS)	GROWTH
2002	0.2222	08.5%	1,89%	18.88	25,59	
2003	0.2784	09.0%	2.51%	19.52	25.94	
2004	0.3011	08.9%	2.68%	20.64	27.55	
2005	0.3744	09.9%	3.71%	21.28	27.58	
2006	0.3930	10.6%	<u>4.17%</u>	<u>21.96</u>	<u>27.28</u>	
AVERAGE GI	ROWTH		2,99%	3.50%		1.61%
2007	0.4000	10.5%	4.20%		27.50	0.81%
2008	0.4118	11.0%	4.53%		27.50	0.40%
2010-2012	0.3898	12.0%	4.68%	3,50%	29.00	1.23%

COMPANY		INTERNAL	GROWTH		EXTERNAL GROWTH		
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE	
PNY	RATIO	RETURN	"g"	(\$/SHARE)	(MILLIONS)	GROWTH	
2002	0.1579	10.6%	1.67%	8.91	66.18		
2003	0.2613	11.8%	3.08%	9.36	67.31		
2004	0.3228	11.1%	3.58%	11.15	76.67		
2005	0.3106	11.5%	3.57%	11.53	76,70		
2006	0.2520	11.0%	<u>2.77%</u>	<u>11.83</u>	<u>74.61</u>		
AVERAGE GI	ROWTH		2.94%	6.50%		3.04%	
2007	0.2929	11.5%	3.37%		73.80	-1.09%	
2008	0.2897	11.5%	3.33%		73.00	-1.08%	
2010-2012	0.2581	11.5%	2,97%	2.50%	71.80	-0.76%	

TRIGEN-KANSAS CITY DCF GROWTH RATE PARAMETERS GAS DISTRIBUTORS

COMPANY	INTERNAL		GROWTH		EXTERNAL GROWTH		
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE	
SЛ	RATIO	RETURN	"g"	(\$/SHARE)	(MILLIONS)	GROWTH	
2002	0.3852	12.5%	4.82%	9.67	24.41		
2003	0.4307	11.6%	5.00%	11.26	26.46		
2004	0.4810	12.5%	6.01%	12.41	27.76		
2005	0.4971	12.4%	6.16%	13.50	28.98		
2006	0,6260	16.3%	<u>10.20%</u>	<u>15.12</u>	<u>29.30</u>		
AVERAGE GI	ROWTH		6.44%	13.00%		4.67%	
2007	0.6370	17.0%	10.83%		29.60	1.02%	
2008	0.6379	17.0%	10.84%		30.00	1.19%	
2010-2012	0.6364	17.5%	11.14%	5.00%	31.00	1,13%	

COMPANY	INTERNAL GROWTH				EXTERNAL GROWTH		
	DETENTION	FOLUTY			SHADDS OUTST	CUADE	
	KETERTOR	EQUIT		DOOK VALUE	SHAKES UUTST	SILARD	
SWX	<u>RATIO</u>	RETURN	<u>"g"</u>	(\$/SHARE)	_(MILLIONS)	GROWTH	
2002	0.2931	06.5%	1.91%	17.91	33.29		
2003	0.2743	06.1%	1.67%	18.42	34.23		
2004	0.5060	08.3%	4.20%	19.18	36.79		
2005	0.3440	06.4%	2.20%	19.10	39.33		
2006	0.5859	09.0%	<u>5.27%</u>	<u>21.58</u>	<u>41.77</u>		
AVERAGE GI	ROWTH		3.05%	3.00%		5.84%	
2007	0.5943	09.5%	5.65%		43.00	2.94%	
2008	0.6178	10.0%	6.18%		44.00	2.63%	
2010-2012	0.6538	10,0%	6.54%	4.00%	47.50	2.60%	

COMPANY		INTERNAL	GROWTH		EXTERNAL GROWTH		
	RETENTION	EQUITY		BOOK VALUE	SHARES OUTST	SHARE	
WGL	RATIO	RETURN	" <u>g</u> "	(\$/SHARE)	(MILLIONS)	GROWTH	
2002	-0.1140	07.2%	-0.82%	15,78	48.56		
2003	0.4435	14.0%	6.21%	16,25	48.83		
2004	0.3434	11.7%	4.02%	16.95	48.67		
2005	0.3744	12.0%	4.49%	17.8	48.65		
2006	0.3093	10.2%	<u>3.15%</u>	<u>18.28</u>	<u>48.89</u>		
AVERAGE GF	ROWTH		3.41%	3.00%		0.17%	
2007	0.2959	10.5%	3.11%		48,91	0.04%	
2008	0.3073	10.7%	3.29%		48.92	0.03%	
2010-2012	0.3409	10.5%	3.58%	3.00%	49.00	0.04%	
×	*		1 1 6 200-				

Data from Value Line Ratings & Reports, March 16, 2007.

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Schedule 3 Page 3 of 3

TRIGEN-KANSAS CITY DCF GROWTH RATES GAS DISTRIBUTORS

<u>COMPANY</u>	<u>br</u>	+	<u>51</u>	<u>v=g*(1-(1/(M/B)</u>))	=	g
ATG	5.25%	+	1.00%	(1 - (1/1.96))	=	5.74%
АТО	4.25%	+	6.00%	(1 - (1/ 1.45))	=	6.11%
LG	4.50%	+	3.00%	(1 - (1/ 1.47))	=	5,46%
GAS	4.00%	+	1.00%	(1 - (1/ 2,23))	=	4.55%
NWN	4.50%	+	1.00%	(1 - (1/ 1.90))	=	4,97%
PNY	5.00%	+	0.50%	(1 - (1/ 2.11))	=	5.26%
SЛ	6.00%	+	1.50%	(1 - (1/ 2.17))	=	6.81%
SWX	5.50%	+	3.00%	(1 - (1/ 1.67))	=	6.70%
WGL	3.75%	+	0.10%	(1 - (1/ 1.62))	=	3.79%

Average Market-to-Book Ratio = 1.84

ATG	=	AGL Resources
ATO	==	Atmos Energy Corporation
LG	=	Laclede Group
GAS	=	NICOR
NWN	=	Northwest Natural Gas Co.
PNY	=	Piedmont Natual Gas Company
SЛ	=	South Jersey Industries, Inc.
SWX	=	Southwest Gas
WGL		WGL Holdlings

g*= expected growth in number of shares outstanding

TRIGEN-KANSAS CITY GROWTH RATE COMPARISON GAS DISTRIBUTORS

									Reuters			
	DCF	Value	Line Proj	ected	Reuters	Value	e Line His	storic	&VL	5-yr (Compound	Hist.
COMPANY	<u>Growth</u>	EPS	DPS	BVPS	<u>EPS</u>	EPS	DPS	BVPS	AVGS.	<u>EPS</u>	DPS	<u>BVPS</u>
ATG	5.74%	3.50%	5.50%	2.50%	4.66%	13.50%	2.00%	8.50%	5.74%	9.00%	8.71%	10.84%
ATO	6.11%	5.00%	1.50%	4.00%	5.19%	10.00%	2.00%	8.50%	5.17%	6.64%	1.64%	10.30%
LG	5.46%	2.00%	2.50%	5.00%	3.00%	6.50%	0.50%	3.50%	3.29%	10.00%	1.59%	6.55%
GAS	4.55%	4.00%	1.00%	4.50%	3.30%	-3.50%	3.50%	1.50%	2.04%	-1.28%	0.64%	4.37%
NWN	4.97%	7.00%	4.00%	3.50%	5.33%	5.00%	1.00%	3.50%	4.19%	8.18%	2.71%	3.75%
PNY	5.26%	3.00%	4.00%	2.50%	4.64%	5.00%	5.00%	6.50%	4.38%	8.06%	4.35%	6.14%
sл	6,81%	9.50%	5.50%	5.00%	6.33%	11.50%	2.50%	13.00%	7.62%	17.22%	5.50%	10.66%
swx	6.70%	8.00%	1.50%	4,00%	4.33%	-0.50%	0.00%	3.00%	2.90%	12.82%	0.96%	4.29%
WGL	<u>3.79%</u>	<u>1.00%</u>	1.50%	<u>3.00%</u>	<u>3.33%</u>	<u>6.00%</u>	<u>1.50%</u>	<u>3.00%</u>	<u>2.76%</u>	<u>11.45%</u>	<u>1.68%</u>	<u>3.67%</u>
		4.78%	3.00%	3,78%		5.94%	2.00%	5.67%		9.12%	3.09%	6.73%
AVERAGES	5.49%		3.85%		4.46%		4.54%		4.23%	,	6.31%	

Zack's Earnings Growth Projections: ATG-5%, ATO-5.3%, LG-1/a, GAS-2.0%, NWN-5.3%, PNY-5.5%, SJI-6.5%, SWX-5.0%, WGL-3.0%; Average = 4.7%.

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TRIGEN-KANSAS CITY STOCK PRICE, DIVIDENDS, YIELDS GAS DISTRIBUTORS

<u>COMPANY</u>	AVG. STOCK PRICE 2/26/07-4/9/07 (PER SHARE)		ANNUALIZED <u>DIVIDEND</u> (PER SHARE)	DIVIDEND <u>YIELD</u>
ATG	\$41.19		\$1.64	3.98%
ΑΤΟ	\$31.51		\$1.28	4.06%
LG	\$30.74	*	\$1.54	5.01%
GAS	\$47.73	*	\$1.94	4.07%
NWN	\$44.87		\$1.42	3.16%
PNY	\$26.16	*	\$1.01	3.86%
SЛ	\$36.17		\$0.98	2.71%
SWX	\$38.00		\$0.86	2.26%
WGL	\$31.68		\$1.37	<u>4.33%</u>
			AVERAGE	3.72%

* Dividend increased by (1+g), derived on Schedule 4.

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TRIGEN-KANSAS CITY DCF COST OF EQUITY CAPITAL GAS DISTRIBUTORS

<u>COMPANY</u>	DIVIDEND YIELD (Schedule 5)	GROWTH RATE (Schedule 4)	DCF COST OF <u>EQUITY CAPITAL</u>	
ATG	3.98%	5.74%	9.72%	
ATO	4.06%	6.11%	10.17%	
LG	5.01%	5.46%	10.47%	
GAS	4.07%	4.55%	8.62%	
NWN	3.16%	4.97%	8.14%	
PNY	3.86%	5.26%	9.13%	
SJI	2.71%	6.81%	9.52%	
SWX	2.26%	6.70%	8.97%	
WGL	4.33%	3.79%	8.12%	
		AVERAGE	9.21%	
		STANDARD DEVIATION	0.84%	

TRIGEN-KANSAS CITY CAPM COST OF EQUITY CAPITAL GAS DISTRIBUTORS

 $\mathbf{k} = \mathbf{rf} + \mathbf{B} (\mathbf{rm} - \mathbf{rf})$

 $[rf]^* = 4.73\%$ $[rm - rf]^{\dagger} = 4.90\%$ (geometric mean) $[rm - rf]^{\dagger} = 6.50\%$ (arithmetic mean) average beta = 0.87

> k = 4.73% + 0.87 (4.90%/6.50%)k = 4.73% + 4.27%/5.67%k = 9.00% / 10.39%

*Current T-Bill & T-Bond yields, six-week average yield from Value Line Selection & Opinion (2/23/07-3/30/07) †Geometric and arithmetric market risk premiums from Ibbotson Associates 2006 SBBI Yearbook, p. 28. I

TRIGEN-KANSAS CITY PROOF

If market price exceeds book value, the market-to-book ratio is greater than 1.0, and the earnings-price ratio understates the cost of capital.

> MP = market price BV = book valuei = cost of equity capitalr = earned returnE = earnings

- At MP = BV, $i = r = \frac{E}{MP}$. 1.
- 2,
- E = rBV.Then, $\frac{E}{MP} = \frac{rBV}{MP}$. 3.

4. When
$$BV < MP$$
, i.e., $\frac{BV}{MP} < 1$, then,
a. $\frac{E}{MP} < r$, since $\frac{E}{MP} = \frac{rBV}{MP} < r$, because $\frac{BV}{MP} < 1$;
b. $i < r$, since at $\frac{BV}{MP} = 1$, $i = \frac{E}{MP} = \frac{rBV}{MP}$, but if $\frac{BV}{MP} < 1$, then $i < r$; and
c. $\frac{E}{MP} < i$, since at $\frac{BV}{MP} = 1$, $i = \frac{E}{MP} = \frac{rBV}{MP}$, but if $\frac{BV}{MP} < 1$, then $\frac{E}{MP} < i$, because,
1) $\frac{BV}{MP} < 1$, through MP increasing, and, if so, $\frac{E}{MP}$ decreases, therefore, $\frac{E}{MP} < i$, or
2) $\frac{BV}{MP} < 1$, through BV decreasing, and, if so, given $E = rBV$, $\frac{E}{MP}$ decreases, therefore, $\frac{E}{MP} < i$.
5. Ergo, $\frac{E}{MP} < i < i < r$, the earnings-price ratio is lower than the cost of capital, which is lower than the earned return.

5.

TRIGEN-KANSAS CITY MODIFIED EARNINGS-PRICE RATIO ANALYSIS GAS DISTRIBUTORS

<u>COMPANY</u>	Reuters <u>2007 EARNINGS</u> (Per Share)	I MARKET <u>PRICE</u> (Per share)	EARNINGS- PRICE <u>RATIO</u>		CURRENT <u>R.O.E.</u> 2007	PROJECTED <u>R.O.E.</u> 2010-2012
ATG	\$2.81	\$41.19	6.82%		13,50%	14.00%
ATO	\$1.92	\$31.51	6.09%		9.00%	10.00%
LG	\$1.88	\$30.74	6.12%		9.00%	10.00%
GAS	\$2.76	\$47.73	5.78%		13.00%	12.00%
NWN	\$2,39	\$44.87	5.33%		10.50%	12.00%
PNY	\$1.41	\$26.16	5.39%		11.50%	11.50%
SЛ	\$1.97	\$36.17	5.45%		17.00%	17.50%
SWX	\$2.17	\$38.00	5.71%		9.50%	10.00%
WGL	\$1,79	\$31.68	<u>5,65%</u>		<u>10.50%</u>	<u>10.50%</u>
		AVERAGE	5.81%		11.50%	
	CUR	RENT M.E.P.R.		8.66%		
		AVERAGE	5.81%			11.94%
	PROJE	ECTED M.E.P.R.			8.88%	

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TRIGEN-KANSAS CITY MARKET-TO-BOOK RATIO ANALYSIS GAS DISTRIBUTORS

k = R.O.E.(1-b)/(M/B) + g[2007]

<u>COMPANY</u>

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ATG	k= 14.0% (1-	0.4345)/	1.96	÷	5.74%	=	9.78%
ATO	k= 09.5% (1-	0.3810)/	1.45	+	6.11%	=	10.17%
LG	k= 09.5% (1-	0.2550)/	1.47	+	5.46%	=	10.27%
GAS	k= 13.0% (1-	0.3091)/	2.23	+	4.55%		8.59%
NWN	k= 11.0% (1-	0.4118)/	1.90	+	4.97%	=	8.38%
PNY	k= 11.5% (1-	0.2897)/	2.11	+	5.26%		9.14%
SJI	k= 17.0% (1-	0.6379)/	2.17	÷	6.81%	=	9.64%
SWX	k= 10.0% (1-	0.6178)/	1.67	+	6.70%	=	8.99%
WGL	k= 10.7% (1-	0.3073)/	1.62	+	3.79%	=	<u>8.37%</u>
						AVERAGE	9.26%

STANDARD DEVIATION 0.74%

MARKET-TO-BOOK

COST OF EQUITY

Note: Equity returns and retention ratios based on Value Line current year projections.

TRIGEN-KANSAS CITY MARKET-TO-BOOK RATIO ANALYSIS GAS DISTRIBUTORS

k = R.O.E.(1-b)/(M/B) + g [2010-2012]

<u>COMPANY</u>

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MARKET-TO-BOOK COST OF EQUITY

ATG	k= 14.0%	(1- 0.4194)/	1.96 +	5.74%	=	9.88%
ATO	k= 10.0%	(1- 0.4600)/	1.45 +	6.11%	=	9.84%
LG	k= 10.0%	(1- 0.3191)/	1.47 +	5.46%	=	10.09%
GAS	k= 12.0%	(1- 0.3103)/	2.23 +	4.55%	=	8.27%
NWN	k= 12.0%	(1- 0.3898)/	1.90 +	4.97%	=	8.83%
PNY	k= 11.5%	(1- 0.2581)/	2.11 +	5.26%		9.31%
SЛ	k= 17.5%	(1- 0.6364)/	2.17 +	6.81%	=	9.74%
SWX	k= 10.0%	(1- 0.6538)/	1.67 +	6.70%	=	8.78%
WGL	k= 10.5%	(1- 0.3409)/	1.62 +	3.79%	=	<u>8.07%</u>
					AVERAGE	9.20%

STANDARD DEVIATION 0.74%

Note: Equity returns and retention ratios based on Value Line three- to five-year projections.

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TRIGEN-KANSAS CITY LEVERAGE/BETA ADJUSTMENT TO COMPANY'S COST OF EQUITY CAPITAL

		FIXED		
	COMMON	INCOME	M/B	MKT. VALUE
<u>COMPANY</u>	<u>EQUITY</u>	<u>CAPITAL</u>	<u>RATIO</u>	DEBT(1-t)/EQ.
AGL Resources	42.00%	58.00%	1.96	0.46
Atmos Energy Corporation	45.00%	55.00%	1.45	0.55
Laclede Group	58.00%	42.00%	1,47	0.32
NICOR	51.00%	49.00%	2.23	0.28
Northwest Natural Gas Co.	48.00%	52.00%	1.90	0.37
Piedmont Natual Gas Company	47.00%	53.00%	2,11	0.35
South Jersey Industries, Inc.	44.00%	56.00%	2,17	0.38
Southwest Gas	41.00%	59.00%	1.67	0.56
WGL Holdlings	<u>51.00%</u>	<u>49.00%</u>	<u>1.62</u>	<u>0.39</u>
AVERAGES	47.44%	52.56%	1.84	0.41
TARGET (TRIGEN CAP. STRUC.)	34.22%	65.78%	1.84	0.68

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AVERAGE (LEVERED) GAS UTILITY BETA = 0.87

Beta (Unlevered) = Beta (Levered)/ $(1+D(1-t)/E)$

Beta (Unlevered)= 0.87/(1+.41)= 0.62

Beta (Relevered)= Beta (Unlevered)*(1+D(1-t)/E)

Beta (Relevered)= 0.62(1.68)= 1.04

IMPACT ON COST OF EQUITY CAPITAL

	Measured Beta Relevered Beta	0.870 <u>1.037</u>
[1]	Diff. in Beta	0.167
[2]	Market Risk Premium (rm-rf) =	3.0% to 6%
Averag	ge Cost of equity impact = [1] x [2] =	0.50% to 1.00%
TRIGEN-KANSAS CITY OVERALL COST OF CAPITAL

Type of Capital	PERCENT	COST RATE	WT. AVG. <u>COST RATE</u>
Common Equity	34.22%	10.00%	3.42%
Long-term Debt	64.56%	9.01%	5.82%
Short-term Debt	<u>1.23%</u>	8.43%	<u>0.10%</u>
TOTAL CAPITAL	100.00%		9.34%

PRE-TAX INTEREST COVERAGE* = 2.0x

*Assuming the Company experiences, prospectively, a combined income tax rate of 40%, the pre-tax overall return would be 11.62% [9.34%-5.92% = 3.42%/(1-40%) = 5.70%+5.92%]. That pre-tax overall return (11.62%), divided by the weighted cost of debt (5.92%), indicates a pre-tax interest coverage level of 2.0 times.