Exhibit No.:	
Issue:	Cost of Capital
Witness:	Daniel J. Lawton
Type of Exhibit:	Direct
Sponsoring Party:	OPC
Case No:	GR-2009-0355
Date Prepared:	August 21, 2009

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

	§	
In the Matter of Missouri Gas Energy and	§	
Its Tariff Filing to Implement a General Rate Increase	§	**Case No. GR-2009-0355**
For Natural Gas Service	§	
	§	

Direct Testimony and Exhibits of

Daniel J. Lawton

On behalf of

Missouri Office of Public Counsel

August 21, 2009

AFFIDAVIT

STATE OF TEXAS §

COUNTY OF TRAVIS §

Daniel J. Lawton, being first duly sworn, on oath says that he is the person identified in the foregoing prepared testimony and exhibits; and that such testimony and exhibits were prepared by or under the direction of said person; that such answers and/or information appearing therein are true and correct to the best of his knowledge and belief; and if asked the questions appearing therein, his answers would, under oath be the same.

Daniel J. Lawton

Subscribed and sworn to before me on this 19th day of August 2009.

My Commission Expires: 5/21/2013

JANELLE M. EDMISTON
MY COMMISSION EXPIRES
May 21, 2013

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DIRECT TESTIMONY OF

DANIEL J. LAWTON

CASE NO. GR-2009-0355

SECTION I: INTRODUCTION/BACKGROUND/SUMMARY

Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Daniel J. Lawton. My business address is 701 Brazos, Suite 500, Austin, Texas 78701.

Q2. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A. I have been working in the utility consulting business as an economist since 1983. Consulting engagements have included electric utility load and revenue forecasting, cost of capital analyses, revenue requirements/cost of service reviews, and rate design analyses in litigated rate proceedings before federal, state and local regulatory authorities. I have worked with municipal utilities developing electric rate cost of service studies for reviewing and setting rates. In addition, I have a law practice based in Austin, Texas. My main areas of legal practice include administrative law representing municipalities in electric and gas rate proceedings and other litigation and contract matters. I have included a brief description of my relevant educational background and professional work experience in Schedule (DJL-1).

Q3. HAVE YOU PREVIOUSLY FILED TESTIMONY IN RATE PROCEEDINGS?

A. Yes. A list of cases where I have previously filed testimony is included in Schedule (DJL-1).

Q4. ON WHOSE BEHALF ARE YOU FILING TESTIMONY IN THIS PROCEEDING?

A. I have been retained to review Missouri Gas Energy's ("Company" or "MGE") cost of capital request on behalf of the Missouri Office of the Public Counsel ("OPC"). In addition, I will be reviewing the Company's rate design as it relates to risk and impacts on capital costs.

Q5. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony in this proceeding is to address the Company's requested overall cost of capital. I will address the Company's requested rate of return, capital structure, and cost rates for equity and debt, which is presented in the pre-filed direct testimony of its cost of capital witnesses, Mr. Hanley. Also, I address the issue of rate design impacts on equity costs set forth in the testimony of Mr. Russell A. Feingold.

I do not make any recommendations with regard to the appropriateness of the Company's straight fixed-variable ("SFV") request in this case. Other witnesses will be addressing this matter and as I understand their position on this matter the OPC will oppose the Company's SFV proposal. My testimony quantifies the necessary adjustment that should be made to revenue requirements in the event

this Commission approves the Company's SFV proposal.

Q6. WHAT MATERIALS DID YOU REVIEW AND RELY ON FOR THIS TESTIMONY?

A. I have reviewed the Company's testimony in this proceeding, previous Missouri Public Service Commission ("Commission") orders, Company responses to interrogatories, Value Line Investment Survey ("Value Line"), financial reports of Southern Union Company (the Parent, "SUC"), and various other financial information and other materials available in the public domain. When relying on other sources, I have referenced such sources in my testimony and on attached schedules and/or included copies or summaries in my attached schedules or workpapers.

Q7. PLEASE SUMMARIZE YOUR FINDINGS AND CONCLUSIONS IN THIS CASE.

A. My analyses of the Company's requested 8.43% overall cost of capital and 11.250% return on equity indicate that the Company's request is overstated given current costs of capital.

Table 1 below shows the Company's requested capital structure, cost rates and overall return for MGE in this case.

TABLE 1[1] Missouri Gas Energy CAPITAL STRUCTURE AND COST RATES			
DESCRIPTION	RATIO	COST	WEIGHTED COST
Long-Term Debt	41.06%	6.08%	2.496%
Short-Term Debt	10.94%	4.92%	0.538%
Total Debt	52.00%	__	
Common Equity	48.00%	11.25%	5.400%
Total	100.00%		8.434%

Now, it is important to note that the Company is proposing a hypothetical capital structure with capital ratios and cost rates for debt are in no way related to MGE's, or the parent Southern Union Company's, actual capitalization levels or costs. I will address this issue in more detail in Section VII Capital Structure as well as my rebuttal testimony that will be filed on or about September 25, 2009.

Recognizing that this Commission has declined to adopt a hypothetical estimate of capitalization and cost rates for MGE, Mr. Hanley, on behalf of the Company, does present an alternative proposal[2] based on the actual capitalization levels of the parent, Southern Union Company, which is as follows:

[1] Direct Testimony of Frank Hanley at 2:12-22.
[2] *Id.* At 3:1-20.

TABLE 2[3] CAPITAL STRUCTURE AND COST RATES BASED ON MGE PARENT CAPITALIZATION As of December 31, 2008			
DESCRIPTION	RATIO	COST	WEIGHTED COST
Long-Term Debt	56.16%	6.258%	3.514%
Short-Term Debt	3.26%	5.920%	0.193%
Preferred Equity	1.92%	7.758%	0.149%
Common Equity	38.66%	15.250%	5.896%
Total	100.00%		9.752%

While the components of the "actual" capital structure cost rates for debt are similar to the hypothetical levels – Mr. Hanley proposes an astounding 15.25% equity return rate when the actual capital structure is employed. Again, these issues are addressed in the capital structure section of my testimony and/or will be addressed in rebuttal testimony.

I have calculated a more appropriate cost of common equity of 10.0% for this case which would result in an overall cost of capital 7.722% for MGE employing the actual capital structure, to be earned on invested capital rate base investment.

Based on my analyses (which are fully explained in the following pages), I make the following conclusions and recommendations:

(i) The Company's proposed 8.434% and the alternative 9.752% return on investment is overstated and should not be adopted as representative of the

[3] *Id.*

Company's cost of capital requirements;

(ii) The Company's proposed 11.250% and alternative 15.25% return for equity shareholders is an overstatement of the required return on equity to hold and attract equity capital and fails to reflect the enhanced financial metrics and risk shifting that results from the risk reduction associated with rate decoupling embodied in the Company's rate design;

(iii) The Company's required return on equity is in the range of 9.5% to 10.5%, and a midpoint estimate of 10% is reasonable;

(iv) The Company's overall cost of capital to be earned on rate base investment employing the actual capital structure and a 10% equity return is 7.722% for setting just and reasonable rates for customers in this proceeding; and

(v) To compensate customers for the risk shifting associated with decoupling, I have recommended a total cost of service reduction of $1,842,034[4] in addition to my return recommendations summarized above.

Q8. PLEASE SUMMARIZE THE COMPANY'S RATE INCREASE REQUEST IN THIS CASE.

A. The Company's rate increase request is summarized in the following table:

[4] See Schedule (DJL-3)

TABLE 3
SUMMARY OF MGE MARGIN
RATE INCREASE REQUEST

Customer Class	Current Margins	Proposed Increase	Percent Change
Residential Service	$129,152,183	$27,654,329	21.40%
Small General Service	$25,964,517	$2,835,444	10.90%
Large General Service	$13,180,684	$883,396	6.70%
Large Volume Service	$13,403,240	$1,041,920	7.77%
Total	$181,700,624	$32,415,106	17.84%

Thus, the margin increase (all costs less gas commodity costs) is $32,415,106 or about 17.8% per year.

SECTION II: REVENUE DECOUPLING

Q9. WHAT ISSUE WILL YOU BE ADDRESSING IN THIS SECTION OF YOUR TESTIMONY?

A. I address the general concept of revenue decoupling, the Company's proposed revenue decoupling in this case, the impact of revenue decoupling on risk and return in general and MGE specifically and lastly, I comment on the Company's failure to adequately identify and quantify the impact of revenue decoupling on the Company in this case.

Q10. WHAT IS REVENUE DECOUPLING?

A. Revenue decoupling is a revenue collection mechanism that severs or eliminates the linkage between sales volumes and base revenues. A typical tariff for a gas distribution company customer consists of three general components:

1) A customer charge (minimum bill);
2) A charge for each unit of gas purchased (volumetric charge); and
3) A commodity or gas cost charge for the gas commodity.

The commodity or gas cost is charged based on the quantity of gas consumed. Customers pay the actual cost of the gas commodity and these charges are typically trued-up on a periodic basis. These fuel or gas cost charges are not part of the revenue decoupling proposal – as these fuel costs are fully recovered by the Company.

The non-fuel or base rate revenue is generally collected through a customer charge and a volumetric charge. For example, the total residential gas service margins requested in this case are $156,806,512.[5] Of this $156,806,512 million total margin level, it is all collected through the proposed $29.83 minimum bill or customer charge.

The customer charge of $29.83 per month is an example of revenue decoupling. The revenue stream is not dependent on gas sales volumes, but rather this $29.83 monthly charge is paid whether gas is purchased by the customer. In other words,

[5] See Table 2 above, current margin of #129,152,183 plus proposed increase of $27,654,329.

whether the customer uses 0 therms of gas or a hundred therms of gas, a minimum of $29.83 is charged to that customer. The billing of the $29.83 customer charge is unrelated to gas consumption – so long as an individual remains a gas customer, he will be billed at least $29.83 per month.

The revenue decoupling through the SFV rate design adopted in the Company's last rate proceeding is again proposed in this case and as such, the proposed residential increase of $27,654,329[6] would be collected in total under MGE's proposal.

Q11. HAS THE COMPANY PROPOSED AN EXPANSION OF RATE DECOUPLING THROUGH A SFV RATE DESIGN IN THIS CASE?

A. Yes. The Company has proposed restructuring the SGS class to develop a more homogenous grouping of SGS customers and collect essentially all SGS margin requirements through a SFV charge (monthly) of $41.20. Thus, all margins for the residential and SGS class will be guaranteed recovery through the proposed rate design.

Q12. WHAT LEVEL OF MGE MARGINS IS ASSURED RECOVERY THROUGH THE PROPOSED SFV RATE DESIGN?

A. I have calculated the margin recovery that will be recovered through SFV charges and monthly fixed charges for all classes in my Schedule (DJL-2). Based on the Company's data and rate design proposals of the $214,115,714 annual proposed total margin requirement, about $196,699,673 will be collected through "fixed" or "minimum" monthly charges. Thus, 91.87% of the Company's claimed annual

[6] Schedule RAF-4

revenue requirement is virtually assured recovery through fixed charges that are unrelated to volumes of gas sold.

Q13. WILL THE FIXED MARGINS BE SUBJECT TO VARIATIONS IN VOLUMES ASSOCIATED WITH WEATHER, DECLINING USAGE, ECONOMIC CHANGE OR CONSERVATION?

A. No. Under the Company's proposal – MGE is assured recovery of 91.87% of its requested revenue requirement. The only possible impact is if customers leave the system and MGE experiences negative growth. Other than the unlikely negative growth scenario – customers will guarantee revenues no matter the weather, economic climate, conservation/usage declines or any other factor. Moreover, to the extent there is customer growth – those new customers will be required to guarantee these same margins. Customers are essentially insuring the Company's revenue stream through the proposed rate design.

Q14. ARE YOU RECOMMENDING THAT THE COMMISSION ADOPT THE COMPANY'S DECOUPLING PROPOSALS?

A. As I stated earlier, I make no recommendations on this matter. The only purpose of this testimony is to quantify the impact of the Company's rate proposals on revenues and risk to the Company. Other witnesses will address rate design. But, to the extent the decoupling rate design proposals are adopted by this Commission, it is important to recognize that substantial risks have been shifted from shareholders to customers. This risk shifting and its impact should be recognized in the rate setting process.

Q15. WHAT IMPACT WILL THE IMPLEMENTATION OF THE SFV RATE DESIGN HAVE ON THE COMPANY'S COST OF EQUITY CAPITAL?

A. In my opinion, the risk reduction impact of this rate design is about 50 basis points. In MGE's last case, the Company itself proposed a 35 basis point reduction in equity costs.

Now with the expansion of the decoupling and associated margin assurances, a larger equity reduction is justified. As noted earlier, of the $214,115,714 proposed margin revenue requirement, the SFV rate design and minimum monthly charges for other classes assures recovery of 91.87% of the margins.

Other cases where a revenue tracker is employed to capture essentially the entirety of the non-fuel revenue requirement – regulators have employed a 50 basis point adjustment (reduction) to equity return.[7] There is no longer a risk of revenue recovery, that risk is shifted entirely to customers. As I noted earlier, regulatory authorities have employed a 50 basis point reduction to equity return for similar decoupling proposals.

Q16. WHAT IS THE IMPACT OF A 50 BASIS POINT REDUCTION TO EQUITY RETURN ON THE COMPANY'S ANNUAL EARNINGS?

A. Employing the Company's rate base and return request, the following table

[7] In the Matter of the Application of Delmarva Power and Light Company for Authority to Revise its Rates and Charges for Electric Service and For Certain Rate Design Charges, Before the Public Service Commission of Maryland, Case No. 9093 Commission Final Order at 41-43. July 19, 2007.

demonstrates the impact of a 50 basis point reduction on the Company's equity earnings.

TABLE 4
QUANTIFICATION OF DECOUPLING IMPACT
ON ROE AND REVENUE REQUIREMENTS

Line No.		MGE
1	Rate Base	$604,954,779
2	Rate of Return	8.434%
3	Required Return	$51,021,886
4	Return & Taxes Gross-up	1.62308
5	Return & Taxes RoR	11.798%
6	Return & Taxes	$71,372,565
7	RoR less 50 Bps.	8.194%
8	RoR w/ Gross-up	11.409%
9	Return & Taxes w/ 50 Bps. Reduction	$69,019,852
10	Revenue Requirement Reduction	<$2,352,713>

Sources:
Lines:
1-5 Company Schedule A
6 Line 5 x Line 1
7 Direct Testimony F. H anley at 2:14-22 adjusted equity for 50 basis points
8 Line 7 grossed-up for Taxes 1.62308 factor
9 Line 8 x Line 1
10 Line 9 Less Line 6

Thus, the impact of a 50 basis point reduction to equity return is about a $2,352,713 reduction in annual revenue requirements. In return, customers are assuring all margin revenue subject to the SFV rate design will be recovered by the Company. The revenues involved exceed well over $196 million per annum. Thus, the risk of recovery of these revenues has now been shifted 100% to customers. A 50 basis point equity return adjustment is reasonable in that such adjustment represents less than 1.1% percent of the $196 million revenue stream

being guaranteed by customers. This is a low cost insurance premium to guarantee against any risk of revenue interruption.

Q17. IS THERE A SPECIFIC WAY ONE CAN MEASURE THE IMPACT OF THE REDUCED RISK ASSOCIATED WITH DECOUPLING?

A. Yes. I have included in my Schedule (DJL-3) an alternative estimate of revenue savings associated with decoupling. Rating agencies such as Standard & Poor's assign numeric risk profiles to companies ranging from 1-10, with 1 being the least risky and 10 being most risky. Gas distribution companies typically range between 1 and 4 on the S&P business risk measure scale.

What is important to note is that a Company such as MGE, if it were a standalone firm, can have a better risk score with decoupling. In such a situation, the Company could maintain the same bond rating with a higher debt/leverage ratio. Typically, a movement of one unit on the S&P risk profile indicates a 2%-3% debt ratio differential for the same bond rating.

Schedule (DJL-3) calculates the impact on return assuming a shift of 2.5% to more debt/less equity in the capital structure. The result of this analysis indicates an annual risk reduction impact of $1,842,034. This is consistent with a 50 basis point reduction to equity.

Q18. WHAT IS YOUR RECOMMENDATION TO THE COMMISSION IN TERMS OF A DECOUPLING RISK ADJUSTMENT?

A. I recommend that the Commission reduce cost of service by $1,842,034 for decoupling. In my opinion, this adjustment is conservative, ties to risk changes expected from decoupling, is consistent with risk measures and considerations of

rating agencies, and is consistent with a 50 basis point reduction discussed earlier.

Q19. HAVE REGULATORY AUTHORITIES CONCLUDED MARGIN GUARANTEES REQUIRE LARGER THAN 50 BASIS POINT RISK ADJUSTMENTS?

A. Yes. Recently, the Connecticut Department of Public Utility Control concluded:

> The Company's decoupling proposal thrusts customers into the role of insurer without proffering compensation. …the Department concluded that the requisite reduction in ROE needed as compensation would prove too draconian and actually impede the Company's ability to attract capital….It will require a 100 basis point reduction in ROE…to provide customers with weather-only compensation…[8]

Q20. WHAT FACTORS WILL BE CONSIDERED REGARDING CREDIT QUALITY IF THE EXPANDED SFV RATE DESIGN IS APPROVIED?

A. The key factor that will be considered as it relates to credit quality is that authorized margins will be recovered by the Company. Further, margins associated with increased customers above and beyond the test year level will also be collected if the proposed rate design is approved.

Thus, risk associated with variations in weather has been shifted from shareholders to customers. Risks associated with declining usage per customer have been shifted from shareholders to customers. Risks associated with customer growth have been shifted from shareholders to customers. These

[8] Docket No. 08-12-06, Application of Connecticut Natural Gas Corporation for a Rate Increase, Department of Public Utility Control, Decision June 30, 2009 at 76.

business risks will be shifted from shareholders to customers.

Q21. WILL THE IMPLEMENTATION OF THE PROPOSED RATE DESIGN GUARANTEE THAT THE AUTHORIZED EQUITY RETURN WILL BE EARNED?

A. No. The implementation of the proposed rate design assures that the authorized margin revenues, which includes the Company's authorized return on investment, will be collected. The Company must be efficient and prudent in controlling its costs. While the rate design assures revenues – it is not cost plus ratemaking. The Company's annual earnings will vary up and down with cost changes and Company management cost control measures and efforts.

SECTION III: REGULATORY ISSUES AND COST OF CAPITAL

Q22. PLEASE EXPLAN THE COST OF CAPITAL CONCEPT AS IT RELATES TO THE REGULATORY PROCESS.

A. The overall rate of return to be earned on rate base investment is an essential element in the regulatory and rate setting process. The overall return earned on rate base investment is typically a major portion of overall revenue requirements. For example, in this case the Company's requested overall return for the Company is 8.434%.[9] The Company's requested rate base investment level is

[9] Company Schedule A

$604,954,779.[10] The Company's requested return on investment is $51,021,886.[11] The $51,021,886 return on rate base investment represents about 24% of base rate revenue requirements (all costs excluding gas cost). This means that 24 cents of every dollar paid by customers in base rates goes to satisfy return requirements of investors. These calculations are after tax. When income tax is considered the return requirement as a percentage of revenue requirements is higher as federal income tax obligations are to satisfy equity return requirements. For example, if the federal income tax is combined with the $51,021,886 return requirement, then the return and associated tax obligation represents 33.3% of base rates.

A small change in return requirements can have a large impact on revenue requirements.

Q23. PLEASE EXPLAIN HOW THE VARIOUS COMPONENTS OF COST OF CAPITAL ARE DETERMINED.

A. The overall rate of return in the regulatory process is best explained in two parts. The first part is the return to senior securities, such as debt and preferred stock, which is contractually set at issuance. The reasonableness of the cost of these contractual obligations between the utility and its investors is examined by regulatory agencies as part of the utility's overall cost of service.

The second part of a Company's overall return requirement is the appropriate cost rate to assign the equity portion of capital costs. The return to equity should be established at a level that will permit the firm an opportunity to earn a fair rate of return. By fair rate of return, I mean a return to equity holders, which is sufficient

[10] *Id.*
[11] *Id.*

to hold and attract capital, sufficient to maintain financial integrity, and a return to equity comparable to other investments of similar risks.

Two U.S. Supreme Court decisions are often cited as the legal standards for rate of return determination. The first is *Bluefield Water Works and Improvement Company v. Public Service Commission of West Virginia*, 262. U.S. 679 (1923). The *Bluefield* case established the following general standards for a rate of return: The return should be sufficient for maintaining financial integrity and capital attraction and a public utility is entitled to a return equal to that of investments of comparable risks.

The second U.S. Supreme Court decision is the *Federal Power Commission v. Hope Natural Gas Company*, 320 U.S. 591 (1942). In the *Hope* decision, the Court affirmed its earlier *Bluefield* standards and found that methods for determining return are not the test of reasonableness rather the result and impact of the end result are controlling.

The cost of capital is defined as the annual percentage that a utility must receive to maintain its financial integrity, to pay a return to security owners and to insure the continued attraction of capital at a reasonable cost and in an amount adequate to meet future needs. Mathematically, the cost of capital is the composite of the cost of several classes of capital used by the utility – debt, preferred stock, and common stock, weighted on the basis of an appropriate capital structure.

The ratemaking process requires the regulator to determine the utility's cost of capital for debt, preferred stock and equity costs. These calculations of cost rates, when combined with the proportions of each type of capital in the capital structure, result in a percentage figure that is then multiplied by the value of assets

(investment) used and useful in the production of the utility service to ultimately arrive at a rate charged to customers. Rates should not be excessive (exceed actual costs) or burdensome to the customer and at the same time should be just and reasonable to the utility.

In summary, the objective of overall rate of return determination in the regulatory process is to compute the return such that the embedded (contractually required) cost of senior securities is recovered. In addition, a regulated utility should be provided an opportunity to generate additional earnings that are sufficient to compensate equity investors at a level that will hold existing investors, attract new investors, and maintain the financial integrity of the utility.

Q24. PLEASE EXPLAIN THE COST OF EQUITY CONCEPT.

A. The cost of equity, or return on equity capital, is the return expected by investors over some prospective time period. The cost of equity one seeks to estimate in this proceeding is the return investors expect prospectively when the rates from this case will be in effect.

The cost of common equity is not set by contract, and there are no hard and fast mathematical formulae with which to measure investor expectations with regard to equity requirements and perceptions of risk. As a result, any valid cost of equity recommendation must reflect investors' expectations of the risks facing a utility.

Q25. WHAT PRINCIPAL METHODOLOGY DO YOU EMPLOY IN YOUR COST OF EQUITY CAPITAL ANALYSES?

A. I employ the Discounted Cash Flow ("DCF") methodology for estimating the cost

of equity, keeping in mind the general premise that any utility's cost of equity capital is the risk free return plus the premium required by investors for accepting the risk of investing in an equity instrument of the utility. It is my opinion that the best analytical technique for measuring a utility's cost of common equity is the DCF methodology. Other return on equity modeling techniques such as the Capital Asset Pricing Model ("CAPM") and risk premium are often used to check the reasonableness of the DCF results.

Q26. PLEASE DESCRIBE THE RISKS YOU REFER TO ABOVE.

A. As I stated earlier in this testimony, equity investors require compensation above and beyond the risk free return because of the increased risk factors investors face in the equity markets. Thus, investors require the risk free return plus some risk premium above the risk free return. The basic risks faced by investors that make up the equity risk premium include business risks, financial risks, regulatory risks, and liquidity risks.

Q27. PLEASE DESCRIBE THE COMPANY.

A. MGE is an operating division within Southern Union Company. Southern Union Company, together with subsidiary operations, operates in three general segments of the gas industry, transportation and storage, gathering and processing, and distribution of gas. The gas distribution segment operates two local gas distribution operations – one in Massachusetts and MGE in Missouri. For the year ended in December 31, 2008, Southern Union Company had operating revenues in excess of $3.0 billion, operating income of over $300 million and total assets of $7.8 billion. Thus, MGE is a small part of SUC's total operations.

MGE as a division of SUC has no separate corporate existence from SUC. MGE

operates like most local distribution company operations ("LDC") in that it purchases gas for sale to its customers. Like any LDC the MGE gas purchase cost including transport costs are passed through to the customer through a purchase gas adjustment tariff. The Company does not earn a profit on commodity costs, but is allowed full recovery of these costs.

The costs subject of this proceeding are MGE's costs of distribution associated with operations and investment in delivering gas to customer meters for consumption.

SECTION IV: CURRENT CAPITAL MARKET CONDITIONS

Q28. ARE CURRENT ECONOMIC CONDITIONS CONTINUING TO DECLINE IN 2009?

A. The impacts of the global recession continue through 2009. The U.S. and global financial markets continue to struggle with liquidity issues following the collapse of the subprime mortgage markets. The Federal Reserve and central banks around the world have been ramping up lending in an all out effort to keep the financial markets functioning.

The Federal Reserve Chairman, Ben Bernanke, predicts that the global financial markets crisis will restrain U. S. economic growth well into 2009. Thus, while inflation issues have recently receded, economic conditions have worsened prospects of economic growth.

The Federal Reserve has taken numerous steps to address financial market liquidity issues including the recent cut in the federal funds rate to a target range of 0% to 0.25% as of December 16, 2008. These rates were recently reaffirmed by the Federal Reserve. I have included in my Schedule (DJL-4) monthly bond yields for various securities showing changes by month since January 2006 through July 2009.

Q29. DO YOU HAVE ANY GENERAL OBSERVATIONS CONCERNING THE RECENT TRENDS IN ECONOMIC CONDITIONS AND THE IMPACT ON CAPITAL COSTS?

A. Yes. As a general matter the U.S. economy has enjoyed growth, prosperity and stability since the early 1990's. Over this time period there has been a general level of economic expansions accompanied by historical low levels of inflation and interest rates.

Now, the economy has slowed significantly at least initially as a result of the "sub-prime" mortgage problems and more recently as a result of the liquidity crisis in the financial markets. Moreover, the economic slow down is having global impacts as can be seen in declining energy prices (natural gas, oil) as well as general commodity prices.

The financial sector crisis intensified through the last quarter or 2008, following the collapse and/or bailout of such institutions as Bear Stearns, Lehman Brothers, Merrill Lynch, Freddie Mac, Fannie Mae, AIG and Citigroup, Inc. The U.S. Government and governments around the world have been and continue to employ unprecedented monetary actions to minimize the impacts of the financial crisis on economic growth. While the impacts of these government rescue efforts

and other monetary policy actions have not yet resolved all the tight credit market problems – that does not mean there has been no impact or continued impact.

The one sure thing is that an economic slowdown has occurred and is expected to continue. For this reason economic growth will be lower than past forecast estimates have suggested. This is true across all economic sectors including the utility industry. Thus, while utility stock prices may be lower and dividend yields higher – the other side of the coin shows lower economic growth expectations by investors.

Q30. PLEASE DISCUSS THE FINANCIAL MARKETS, THE ECONOMY AND THE GENERAL RESPONSE OF THE U.S. GOVERNMENT.

A. There is no question that the mortgage market collapse, subprime mortgage crisis, credit/liquidity crisis, economic recession and the subsequent bailout and restructuring of financial institutions has not only had tremendous impacts on the U.S. national economy, but global economic implications as well. After initial problems developed in the mortgage market, these problems associated with the subprime developed into a crisis which led to the collapse and need for bailout of certain financial institutions. The turmoil in the U.S. markets peaked in the third-quarter of 2008. During the summer of 2008 commodity prices increase sharply with a barrel of oil increasing to over $150 and natural gas exceeding $12 mmbtu.

The U.S. economy entered the current recession in late 2007 and unemployment figures have been increasing. As of July 2009, the unemployment rate is at about 9.5% and 10% or more unemployment rate is forecast by many analysts. Commodity prices have declined, but have rebounded from first quarter 2009 lows. The stock market for 2009 hit a low in March, but has since rebounded

from March 2009 levels. The change in course regarding commodity prices and the market downturn from early 2009 levels is some evidence that the downward economic slide is over. While unemployment figures lag other economic indicators.

In response to the economic crisis, the Federal Reserve has taken extraordinary and substantial measures to stabilize financial markets and address the significant resulting liquidity crisis. Among the numerous Federal Reserve measures is the opening of lending facilities to numerous banking and investment firms to free up tight credit markets. The development of the Troubled Asset Relief Program ("TARP") is designed to provide over $700 billion in government funds into the banking system through capital infusions. In addition, the federal government has added billions of additional dollars to bail out and stabilize such prominent financial institutions as AIG, Citigroup and Bank of America. The federal government has expended substantial sums to bailout other industries such as the auto industry with cash for General Motors and Chrysler.

As part of the overall budget process, we have seen the federal government provide almost $800 billion of economic stimulus – including tax cuts and additional government spending aimed at creating jobs and addressing the overall economic slowdown.

Q31. HOW HAVE THE FINANCIAL MARKETS RESPONDED TO THE ACTIONS OF THE FEDERAL RESERVE AND OTHER STIMULUS ACTIONS?

A. The long-term credit market response has been significant over the first two quarters of 2009. The credit/liquidity crisis is associated with concerns and

reluctance by credit providers to provide needed capital due to concerns over the weak economy. As shown in Schedule (DJL-4), interest rates on BBB rated bonds increased substantially, about 7.0% in June 2008 to over 9.0% in November 2008. Since the November 2008 peak in the midst of the liquidity crisis, BBB rated bonds have steadily declined. Now, for July 2009, BBB rated bonds have averaged about 7.10%[12] or are at levels seen just prior to the liquidity crisis. Current BBB bond yields in late July are at 6.6% as of July 31, 2009, and have continued at or around this 6.6% level into August.

Further, yields on Treasury Bonds, for 30 year, 20 year and 10 year are at levels in July 2009 that the market experienced in May and June 2008 – just prior to the economic credit squeeze. Also, like BBB bonds, the AAA corporate bond yields are back to the pre-credit/liquidity crisis levels. These historical bond yields are shown in Schedule (DJL-4).

In summary, the market evidence appears to demonstrate that the massive government response have had the desired effect on credit markets. Actions by the Federal Reserve and the current administration show a continued commitment to restoring the economic health quickly. But, while the worst of the credit crisis may be over, the U.S. economy has continued to contract, albeit at a slower rate of decline. Economic recovery is expected to gain momentum slowly with some economic segments growing more slowly than others.

Thus, while the economy is slowly changing course in terms of economic growth, the upheaval in financial markets is an event of the past as we see interest rates and capital costs back to pre-financial crisis levels.

[12] www.federalreserve.gov/releaseh15date/weekly

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Q32. WHAT CONCLUSIONS DO YOU DRAW FROM CURRENT ECONOMIC CONDITIONS IN PROVIDING GUIDANCE IN SETTING EQUITY CAPITAL COSTS IN THIS PROCEEDING?

A. As a general matter capital costs remain low in comparison to historical levels. While the bottom tier of corporate bond rates (BBB) increased since September 2008 – such increases do not appear to be a trend, but rather the direct impact of an atypical event in the capital markets. The economic slowdown or recession will cause general investor expectations of growth to decline. The bottom line is that the general economic data does not support increasing capital costs. Further, it is not sound ratemaking to establish revenue requirements and rates on atypical or abnormal events – especially when such events (continuation of the financial liquidity crisis) are not likely to continue to be repeated.

SECTION V: COST OF EQUITY CAPTIAL DCF ANALYSIS

Q33. YOU STATED ABOVE THAT YOU RELIED ON A DCF ANALYSIS. PLEASE DESCRIBE HOW YOU CONDUCTED YOUR DCF ANALYSIS.

A. For my cost of capital analyses I have employed a twelve company comparable group as a proxy for MGE. MGE as a division of Southern Union Company has no publically traded stock or other published financial measures for which a study can be performed. The goal is to establish an equity return for MGE, a natural gas entity operating as a local distribution company ("LDC"). Therefore, I have

developed a twelve company group of natural gas utility companies that are followed by Value Line.

The group I employ includes all the companies employed in Company witness Hanley's analysis as well as a few additional gas companies followed by Value Line for this industry sector.

Q34. DID YOU ESTIMATE A COST OF EQUITY FOR MGE'S PARENT COMPANY, SOUTHERN UNION COMPANY?

A. No. The goal is to estimate equity and costs for an LDC operation and Southern Union's operations encompass much more than gas distribution. For these reasons I have not estimated a cost of equity for Southern Union.

Q35. WHY HAVE YOU EXAMINED COMPARABLE GAS COMPANIES?

A. There are several reasons why it is appropriate to examine a group of companies rather than rely solely on one company.

1) A comparable risk group analysis is consistent with the requirements of a fair and reasonable return addressed in the *Hope* and *Bluefield* cases. The return on investment should be commensurate with returns earned by firms with comparable risk. Thus, there is a need to examine firms of comparable risk to identify the fair and reasonable comparable returns being earned. In addition, the equity returns of comparable firms are viewed as opportunity costs of forgone investments in the market which, like other investment opportunities, will directly impact the cost of equity of the Company.

2) The reliability of the cost of equity estimate is enhanced when the calculation is based on equity capital estimates from a variety of risk equivalent companies. A group of comparable companies can be employed as a check on a single company analysis. Further, the comparable group analysis, whether employed as a check or the primary analysis, mitigates any distortions resulting from measurement errors in dividend yield and expected growth measures and estimates. For example, the average growth rate estimate based on forecasts of several comparable firms is less likely to deviate from investor expectations of growth than an estimate for a single firm. Moreover, the general assumptions underlying the DCF model are more likely to be met for a group of companies than for a single firm.

3) An analysis of a comparable group also avoids circularity problems. In the analysis of investor-owned utilities, the stock price (that is, the cost of capital) is a direct function of an investor's growth rate expectations, which is also a function of an investor's perception of the regulatory environment. The bottom line is that the cost of equity depends in part on the anticipated regulatory environment and actions. Thus, both the components of the DCF model – dividend yield and growth expectations – are influenced by the regulatory process.

4) Extending the sample size of comparable companies beyond a single regulatory influence will mitigate the regulatory circulatory problem. Specific conditions concerning a subject utility often requires that a comparable company analysis be employed. As is

the case here, one of the most common conditions is the lack of market data necessary to perform a DCF analysis. In times of utility consolidation and merger, many utilities are owned and controlled by a single parent holding company, which is the case with MGE.

Q36. HAVE YOU PROVIDED A LISTING OF THE COMPANIES IN THE COMPARABLE GROUP?

A. Yes. Contained in my Schedule (DJL-5) is a list of the twelve companies in the comparable group, along with additional data of Company equity ratio projected for 2009, 2010 and 2012-2014.

Q37. PLEASE EXPLAIN THE DCF METHODOLOGY YOU HAVE EMPLOYED IN YOUR ANALYSIS.

A. The foundation of the DCF model is in the theory of security valuation. The price that an investor is willing to pay for a share of common stock today is determined by what income stream the investor expects to receive from the investment. The return the investor expects to receive over the investment time horizon is composed of: (i) dividend payments, and (ii) the appreciated sale value of the investment. A proper analysis adds dividends to the gain on the final sale value, and discounts these expected future earnings to a present value.

To determine or estimate investor requirements using the DCF model, one computes a cost of capital requirement, or discount rate from the current market data and the expected dividend stream. The DCF model stated as a formula is as follows:

K= D/P + G

where:

K = required return on equity,

D = dividend rate,

P = stock price,

D/P = dividend yield, and

G = growth in dividends.

Q38. PLEASE EXPLAIN HOW YOU CALCULATED THE DIVIDEND YIELD FOR THE COMPARABLE COMPANIES.

A. The dividend yield is the ratio of the annual expected dividend to the stock price. When calculating the dividend yield, one must be cautious and not rely on spot stock prices. One must be equally cautious not to rely on long periods of time as the data becomes unrepresentative of market conditions. The objective is to use a period of time such that the resulting dividend yield is representative of the prospective period when rates will be in effect.

While there is no fixed period for selecting the denominator of the dividend yield (i.e., stock price), the key guideline is that the yield not be distorted due to fluctuations in stock market prices. On the other hand, dividends, the numerator of the yield calculation, are relatively stable, as opposed to the stock prices, which are subject to daily and cyclical market fluctuations. The selection of a representative time period will dampen the effect of stock market changes.

The price and dividend data used for each of the companies in the comparable group is contained in my Schedule (DJL-6).

As I discussed in Section III of this testimony there has been substantial volatility in the market due to impacts associated with the current financial market crisis. For these reasons I have reviewed an average 52-week high and low price for a recent twelve month period ending in July 2009. In addition, I have examined shorter time periods to evaluate the dividend yield. For this case, I am employing a dividend yield based on a recent six week period through July 31, 2009 of stock data.

To calculate dividends, I annualized the current dividend and increased the resulting annual dividend by one half the growth rate. The resulting dividend yield is shown on my Schedule (DJL-6) for the comparable group.

Q39. HOW DOES YOUR DIVIDEND YIELD CALCULATION COMPARE TO MR. HANLEY'S ESTIMATES OF DIVIDEND YIELD?

A. As shown on my Schedule (DJL-6), the comparable group average dividend yield is about 4.66%. Mr. Hanley's analysis shown in his Exhibit (FJH-11), shows a dividend yield range for the comparable group of 3.72% to 4.06%, which is below my 4.66% estimate for the comparable group.

Q40. PLEASE EXPLAIN HOW YOU HAVE CALCULATED THE EXPECTED GROWTH RATE IN YOUR DCF ANALYSIS FOR THE COMPANIES IN THE COMPARABLE GROUP.

A. Like dividend yields, there exists no single or simple method to calculate growth rates. The calculation of investor growth expectations is the most difficult part of the DCF analysis. To estimate investor expectations of growth, I have examined forecasted growth rates, and other financial data for each of the companies in the comparable group.

Implementation of the DCF model requires the exercise of considerable judgment with regard to estimating investor expectations of growth and it is a difficult task, but such difficulties are not insurmountable. Many factors affect capital markets in general and individual stocks specifically. Investors are aware and informed of current economic conditions and expectations. Such economic variables entail the current state of the economy, the trade deficit, federal budget uncertainty, fiscal policy, inflation and Federal Reserve Board policies on interest rates.

Investors generally have good information on the economic and financial variables outlined above. All of this information is available quickly, especially in recent decades with easy access to the worldwide web. This information influences return expectations and, as a result, the maximum price an investor will pay for various securities.

Like the information available on the general economy, investors also have access to a wealth of information about particular types of securities, industries and specific company investments. This information is also factored into investor expectations and therefore the stock price individuals are willing to pay.

Common earnings growth rate forecasts and historical growth rate data may be found in the Value Line Investment survey ("Value Line") publication. These Value Line earnings estimates are five year projections in annual earnings. Again, Value Line is widely available to the public, and is a good source of earnings projections. Other earnings estimates are forecasted by Zacks as well as First Call projections, widely available on the internet at Zacks.com and Yahoo Finance respectively. Those earnings projections along with other stock specific financial data provide a range of estimates of earnings and are readily available at no cost.

Another growth estimate is referred to as the sustainable growth or retention ratio growth estimate. To project future growth in earnings under the sustainable growth method, one multiplies the fraction of a firm's earnings expected to be retained (not paid out as dividends) by the expected return on book equity. As a formula:

(growth = b x r)
Where:
b =1-(dividends per share/earnings per share)
r =earnings per share / net book value share

All the data necessary to calculate the elements of the sustainable growth method are available on a forecasted basis in Value Line.

Q41. PLEASE EXPLAIN YOUR GROWTH RATE ANALYSIS.

A. I have included in my Schedule (DJL-7) the growth rates I have reviewed in my analysis. Along with historical growth rates, the first set of growth rates is the Value Line forecasted growth rates in earnings per share ("EPS") for each company in the comparable group. The second set of growth rates examined is the Zacks forecasted growth rates in earnings. The third growth estimate considered is the first Call growth rates which are readily available to investors at Yahoo Finance. In addition, I have examined the growth rates based on the forecasted retention ratio growth estimate discussed above. These calculations are included in my Schedule (DJL-7).

The growth rates described above provide a range of estimates for each of the comparable companies. The resulting range of average and median forecasted growth rates for the Company and the group is from 4.3% to 6.3% when looking

at average and median internal growth forecasts and earnings per share ("EPS") forecast estimates for the comparable group. Relying on the combined forecasted earnings per share estimates and internal growth rate estimates, the growth rate average range can be narrowed to 4.9% to 5.4% as shown in Schedule (DJL-7).

Q42. HOW DO THESE GROWTH RATES COMPARE TO GROWTH ESTIMATES EMPLOYED BY MR. HANLEY?

A. Reviewing Mr. Hanley's Exhibit (FJH-11), it appears Mr. Hanley has relied upon a growth rate range of 5.4% - 5.9% for the MGE comparable group. This estimate is limited to Value Line, Reuters and estimates that are both outdated and overstated. The end result is Mr. Hanley's estimates should not be relied on in this case.

Q43. PLEASE SUMMARIZE YOUR CONSTANT GROWTH DCF ANALYSIS.

A. I have summarized these results in my Schedule (DJL-8). For the comparable group the range of results is 9.8% to 10.0%.

Q44. HAVE YOU CALCULATED ADDITIONAL DCF ANALYSES FOR THE COMPARABLE GROUP COMPANIES?

A. Yes. I have calculated in Schedule (DJL-9) a two stage non-constant growth DCF analysis for the comparable group companies.

Q45. PLEASE DESCRIBE YOUR TWO-STAGE NON-CONSTANT GROWTH DCF.

A. This analysis calculates equity cost using a non-constant growth Two Stage DCF Model. The constant growth DCF model is often adjusted to reflect multiple

growth assumptions because the constant growth rate assumption is often not consistent with investor expectations. As an example, it is often the case where short-term growth estimates are not consistent with long-term sustainable growth projections. In those instances, where more than one growth rate estimate is appropriate, a multi-stage non-constant growth model can be employed to derive a cost of capital estimate. In other words, the constant growth model is adjusted to incorporate multiple growth rate periods, assuring a constant growth (long-term) rate is estimated for a longer period.

For the first growth stage (years 1-4) of the model, the Value Line growth in dividends is employed and an annual dividend is calculated. The second stage (years 5 and beyond)[13] an earnings growth estimate based on the comparable group average of 5.2% is employed. This long-run earnings estimate is based on the average for Value Line, Zacks, and First Call earnings forecasts along with the internal growth estimate.

In the two-stage model the dividend cash flows are discounted equal to the price[14] paid for the stock. The calculated discount rate or internal rate of return is the cost of equity capital estimate.

Q46. WHAT ARE THE RESULTS OF THE TWO-STAGE NON-CONSTANT GROWTH DCF ANALYSIS?

A. The results of the two-stage non-constant growth DCF analysis are shown in Schedule (DJL-9). The comparable group average indicates a cost of equity of 9.5%.

[13] The model is ended at year 150.
[14] Price is based on the 6 week average of closing prices ending July 31, 2009.

Q47. PLEASE SUMMARIZE YOUR DCF ESTIMATES.

A. The table below is a summary of the DCF results:

TABLE 5
COST OF EQUITY CAPITAL SUMMARY

DESCRIPTION	COMPARABLE GROUP
Constant Growth DCF	9.82% - 10.04%
Non-Constant Growth Two Stage DCF	9.51% - 9.53%

This range of estimates for the Comparable Group range from 9.51%-10.04%, with a DCF midpoint of 9.8%.

SECTION VI: RISK PREMIUM/CAPM COST OF EQUITY ESTIMATE

Q48. PLEASE DESCRIBE THE RISK PREMIUM ANALYSIS.

A. Debt instruments such as bonds (long-term debt) are less risky than common equity when both classes of capital are issued by the same entity. Bondholders have a prior contractual claim to the earnings of the corporation and returns on bonds are less variable and more predictable than stocks. The bottom line is that debt is less risky than equity. There are numerous return studies of capital market investments, all of which show lower returns with lower risks and higher returns

with higher risk investments. These financial truisms provide a sound theoretical basis and foundation for the risk premium method for estimating equity costs. The risk premium approach is useful in that the analysis is based on current market interest rates, that is, the current observable cost of debt capital. But, the risk premium approach is not without its problems and drawbacks. In practice, there is considerable debate as to the time period to analyze in the determination of the bond/equity return risk spread. Historical debt/equity risk spreads measured over many decades may not be relevant to current capital market requirements. Others argue that a long-term analysis is necessary, since the goal is to measure investors' long-term expectations.

Another version of the risk premium method is the capital asset pricing model ("CAPM"). Generally, the CAPM begins with a theoretically risk-free interest rate such as a three-month Treasury bill rate. The risk premium, or equity spread above and beyond the risk free rate is adjusted by the stock beta.[15] The risk free return measure is combined with the equity risk premium adjusted for the measure of beta to arrive at a CAPM result.

Like the risk premium discussed above, the CAPM is subject to measurement uncertainties. First, the general problem of how to measure the equity risk premium and the time period for which the premium is analyzed is subject to considerable debate. This problem and associated criticisms is generic to all variants of the risk premium model. Second, measures of beta are often unstable from period to period and may not reflect the equity risk spread measure.

[15] Beta is a measure of the volatility of the specific stock movement relative to that of a market measure such as the S&P 500. A beta below 1.0 means that a specific stock is less volatile than the market measure, while a beta above 1.0 indicates a specific stock is more volatile than the market measure.

For all of the above reasons, risk premium methods should be viewed with considerable caution.

Q49. HOW ARE YOUR RISK PREMIUM STUDIES ORGANIZED?

A. I evaluate and present two risk premium analyses. The first analysis is based on the most widely followed risk premium data provided in studies published annually, by Morningstar.[16] This data source was also relied on in Mr. Hanley's analyses. The most current published data by Morningstar indicates the following risk premium of shareholder returns above long-term corporate bonds based on arithmetic and geometric mean calculations:

TABLE 6

2009 Risk Premium Calculation

	Geometric Average	Arithmetic Average
Stocks	9.6%	11.7%
Bonds	5.9%	6.2%
Risk Premium	3.7%	5.5%
Average	4.6%	

Employing the 3.7% risk premium and a current BBB bond rate estimate of about 6.80% results in an equity return estimate of 10.50%. The arithmetic mean results in a 12.3% equity estimate.

[16] Stocks, Bonds, Bills and Inflation, Morningstar, SBBI 2009 Yearbook.

Q50. HOW DID YOU DEVELOP A BBB BOND YIELD FOR YOUR ANALYSIS?

A. I started with the BBB corporate bond yields for July 2009 as reported by the Federal Reserve.[17] These BBB yields for July 2009, like all interest rates for long-term securities, continue the steady decline from the peak November 2008 levels. The average yield for July 2009 is in the range of 7.0%. Second, I compared the BBB corporate yields to BBB public utility bond yields for the period January 2006 – May 2009 and calculated a 19 basis point differential in the yields for this period.[18] It should be noted that the yield spread is closer to 30 basis points since October 2008, but that yield differential is declining and to be conservative I have employed the 19 basis point longer term view yield differential.

Combining the 7.0% current BBB corporate yield with the 19 basis point BBB public utility bond differential, I estimated a current BBB rate of 6.80%. Thus, for my risk premium analyses, I have employed a 6.80% BBB bond rate for this case.

Q51. PLEASE DESCRIBE YOUR SECOND RISK PREMIUM ANALYSIS

A. The second risk premium analysis is based on the differences between the average authorized equity returns and the average corporate bond yields for each year to estimate the indicated risk premium. Once the equity risk premium was estimated I added the current estimated BBB bond yield to arrive at an equity estimate based on a risk premium measure.

[17] See www.federalreserve.gov
[18] Schedule (DJL-5)

Employing this second approach the risk premium is 3.19% (See Schedule (DJL-10). Combining the estimated BBB bond yield of 6.80% with the 3.19% risk premium results in an equity return estimate of 9.99%.

Q52. YOUR RISK PREMIUM RESULTS ARE BASED ON A GEOMETRIC MEAN AND NOT ARITHMETIC MEAN CALCULATIONS – PLEASE EXPLAIN THE DIFFERENCE.

A. An arithmetic mean is what most people think about regarding the "average" of a set of numbers. For example, the average of the numbers 2 and 8 is 5 or ((8+2)/2). The geometric mean is similar to the arithmetic mean, but instead of adding the set of numbers and dividing by count of numbers in the set, the numbers in the set are multiplied and the resulting product is taken to the Nth root. So, employing the set of numbers above of 2 and 8, the geometric mean is calculated as follows:

$$(2x8)^{1/2} = 4$$

The geometric mean is always less than or equal to the arithmetic mean. The two averages will be equal only in the case of all numbers in the set are equal. For example, (5,5,5) the arithmetic mean (15/3=5) and the geometric mean ($(5x5x5)^{1/3}$ = 5) are equal.

Q53. WHEN ARE GEOMETRIC MEANS EMPLOYED TO EVALUATE A SET OF NUMBERS?

A. Geometric means are commonly used when evaluating financial data and investment returns. A long-term analysis of returns, such as those reported by Morningstar, is a perfect example of the importance and relevance of the

geometric mean calculation. These investment returns from 1926-2008 reflecting annual percent changes over 82 years are analogous to a fluctuating interest or return rate. Thus, the geometric average (not the arithmetic average) calculates the average rate of return over the entire investment period to achieve the end result.

The following example makes clear why the geometric average and not the arithmetic average is a more accurate representation of financial returns.

Year 1: investor buys a stock for $100;
Year 2: stock investment doubles to $200 or a 100% increase;
Year 3: stock declines by 50% to $100.

Clearly, the investor in year 3 is back to $100, his starting amount in year 1, but calculating the arithmetic average return is 100% increase plus a 50% decrease or a 25% average ((100%-50%)/2) = 25%. Alternatively, the geometric mean is $((2x.5)^{1/2}-1) = 0$.[19]

The average return over the 2 year life of the investment is zero. The investor started with $100.00 and ended up with $100.00. This is the return "o" that the geometric average provides. It is the geometric average that better measures change in wealth over more than one period – which is the type of analysis when measuring a risk premium. For the above reasons, a geometric average is the most appropriate measure for estimating historical risk premiums.

[19] For the geometric mean the percentage increase are converted to multipliers. Thus, 2 represents the $100.00 starting amount plus the 100% or $100 increase in year 2, and .50 represents a 50% decrease.