Control Number: 44809

Item Number: 60

Addendum StartPage: 0

APPLICATION OF QUADVEST L.P.	§	BEFORE THE STATE OFFICE
FOR A RATE/TARIFF CHANGE	§	
	§	OF
	§	
	§	ADMINISTRATIVE HEARINGS
	§	
	§	

TO THE HONORABLE ADMINISTRATIVE LAW JUDGE ("ALJ"):

Quadvest, L.P. ("QVLP") files this Motion for Leave to File the Direct Testimony of Greg Scheig in the above-captioned proceeding and in support thereof would respectfully show as follows:

I.

QVLP hereby requests leave to file the Direct Testimony of Greg Scheig. The testimony QVLP seeks to file is attached hereto as Exhibit "1".

II.

On February 2, 2016, the parties agreed to a procedural schedule which included a February 22, 2016, deadline for filing prefiled testimony. This procedural schedule was adopted by the ALJ on February 29, 2016. In accordance with this agreed schedule, QVLP sent the following documents to its consultant for filing, via email: (1) Direct Testimony of Charles E. Loy, (2) Jeffery Eastman, (3) Morey Villareal, and (4) Direct Testimony of Greg Scheig. Unbeknownst to QVLP's counsel, however, the document containing Scheig's direct testimony apparently failed to send because the size of the document exceeded 20 MB, the email server's limit. (Exhibit 2). As a result, Scheig's direct testimony was not filed. Notably, because the first three documents were received and filed without issue, QLVP's counsel did not become aware of the filing error until OPUC filed its Motion to Strike on March 1, 2016.

II.

In its Motion, OPUC objects to all references to Mr. Greg Scheig as a witness or his testimony; however, these objections lack merit. Notwithstanding QVLP's inadvertent failure to file Scheig's direct testimony, OPUC has been in possession of Scheig's Expert Report since June 6, 2015, as it was attached and included in the Application (See Exhibit 1, Attachment A). The Report contains a detailed and comprehensive summarization of Scheig's direct testimony. *Notably, the testimony merely summarizes the over 40 page report previously provided and does not contain any substantive changes.* As such, OPUC has had all of the information contained in Scheig's Direct Testimony, for nearly nine months. *In fact, both OPUC and Staff have conducted substantial discovery with respect to the findings in Scheig's report (Exhibit 3).* Furthermore, given the detailed and comprehensive nature of Scheig's expert report, it is questionable whether QVLP needed to prefile Scheig's direct testimony.

In view of this, good cause exists for granting this motion for leave to file Direct Testimony of Greg Scheig. QVLP's motion for leave will not delay or prejudice the parties in this proceeding. Further, QVLP agrees to extend the procedural schedule by two weeks, if necessary or requested, to the extent any party needs additional time to review Scheig's Direct Testimony.

WHEREFORE, the QVLP prays that the ALJ grant leave for the QVLP to file the Direct Testimony of Greg Scheig, and for all other relief, legal and equitable, to which it is justly entitled.

Dated: March 4, 2016

Respectfully submitted,

By: /s/ Tammy Wavle-Shea
       Tammy Wavle-Shea
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ATTORNEYS FOR DEFENDANT
Quadvest, L.P.

SOAH DOCKET NO. 473-16-1848.WS
PUC DOCKET NO. 44809

This is to certify that a true and correct copy of the foregoing has been forwarded to all

parties or counsel of record by personal delivery, facsimile, email, and/or certified mail, return

receipt requested, on this the 4th day of March 2016, as follows:

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Public counsel
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Christiaan Siano
Assistant Public Counsel
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/s/ Tammy Wavle-Shea
Tammy Wavle-Shea

26023504\1

4

4

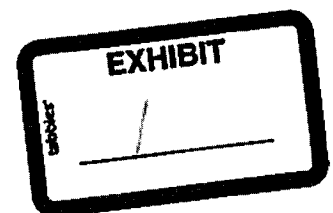APPLICATION FOR A WATER & SEWER RATE/TARRIFF CHANGE

QUADVEST, L.P.

TEST YEAR ENDING DECEMBER 31, 2014

COST OF EQUITY

DIRECT TESTIMONY
OF

GREGORY E. SCHEIG, CPA/ABV/CFF/CGMA, CFA

FEBRUARY 22, 2016

EXHIBIT
_____

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TABLE OF CONTENTS

APPENDIX A: Report Filed

APPENDIX B: Qualifications of Gregory E. Scheig

ValueScope, Inc.

1 **I. INTRODUCTION AND QUALIFICATIONS**

2 Q. Please state your name and business address.

3 A. My name is Gregory E. Scheig. I am a Principal in ValueScope, Inc., 950 E. State Highway 114, Suite 120,

4 Southlake, TX 76092.

5

6 Q. Please state your educational background and describe your professional training and experience.

7 A. I have a Bachelor of Science degree in petroleum engineering and a Master of Business Administration

8 in finance from The University of Texas in Austin, Texas. I began my career with FINANCO, Inc., where I

9 spent approximately ten years supporting Dr. Samuel C. Hadaway in preparation of cost of capital

10 testimony. I also performed financial modeling and developed valuation analyses for utility and non-

11 utility companies and assets.

12

13 After my time with FINANCO, Inc., I worked with Deloitte Consulting as a Senior Manager in their utility

14 practice. At Deloitte, I performed substantive work on numerous regulatory projects in the area of utility

15 M&A, mostly supporting Tom Flaherty, Deloitte's key utility regulatory expert at the time.

16

17 Following Deloitte, I worked with CBIZ Valuation Group as a Managing Director and with Kroll as a

18 Senior Director, focusing on valuation projects for financial reporting, tax reporting and other

19 management requirements, prior to joining ValueScope.

20

21 I earned the designation of Chartered Financial Analyst (CFA) in 1991 and the designation of Certified

22 Public Accountant (CPA) in 1997. I have done valuation analyses for over 25 years professionally and

ValueScope, Inc.

1   each project performed has required the consideration of appropriate market rates of capital. A list of my

2   publications and testimony I have given before various courts is contained in my resume, which is

3   included as Appendix B.

4

5   **II. PURPOSE AND SUMMARY OF TESTIMONY**

6   Q. By who are you retained in this proceeding?

7   A. I have been retained by Quadvest, L.P. ("Quadvest" or the "Company").

8

9   Q. What is the purpose of your testimony?

10   A. The purpose of my testimony is to measure the Company's cost of equity for its current rate case. This

11   testimony and my report previously filed present my recommendation concerning the appropriate rate of

12   return on common equity for Quadvest's revenue requirement.

13

14   Q. Have you attached documents to your testimony?

15   A. Yes, Attachment A is a copy of my report and Appendix B is a copy of my qualifications.

16

17   Q. On what do you base the opinions in your testimony?

18   A. I base the opinions expressed in this testimony on my knowledge and experience previously described,

19   my review of the Quadvest Rate Application that is the subject of this proceeding, my discussions with

20   employees of Quadvest and my review of the market information described in my report attached.

21

22

ValueScope, Inc.

1   Q. Please outline and describe the testimony you will present.

2   A. My testimony is divided into six sections, including this section and the previous one (Sections I and II).

3   In Section III, I review various methods for estimating the cost of equity and discuss the capital asset

4   pricing model (CAPM), the empirical capital asset pricing model (ECAPM), the discounted cash flow

5   (DCF) method, and the risk premium method. In Section IV, I review capital market conditions and

6   discuss recent developments in the water utility industry that may affect the cost of capital. In Section V, I

7   discuss the details of my cost of equity studies and summarize my return on equity (ROE)

8   recommendations.

9

10 Q. Please summarize your cost of equity studies and state your ROE recommendation.

11 A. My ROE recommendation is based on the analyses that I developed using (1) CAPM, (2) ECAPM (3)

12 DCF models, and (4) risk premium analyses. I developed the CAPM, ECAPM, and DCF models using a

13 comparable group of water utilities followed by *Value Line* for which complete and reliable data is

14 available. Given the small number of companies from *Value Line* for which data was available and

15 complete, I expanded my CAPM and ECAPM analysis to include companies from Standard & Poor's

16 Capital IQ database.

17

18 My risk premium analysis is based on *Moody's* utility industry interest rate data and the authorized rates

19 of return for regulated electric and gas utilities.

20

ValueScope, Inc.

1   The following table contains my summary results:

Method	Assumptions	Cost of Equity	Cost of Equity - Range	
			Minimum	Maximum
CAPM				
ValueLine	Value Line Betas	11.6%		
Bloomberg	Bloomberg Betas	12.0%	11.6%	12.0%
ECAPM				
ValueLine	Value Line Betas	11.8%		
Bloomberg	Bloomberg Betas	12.1%	11.8%	12.1%
DCF Analyses				
Constant Growth	Average	12.7%		
Constant Growth	Median	12.7%	12.7%	12.7%
Nonconstant Growth	5 Years to Attain Terminal Value, Average	9.5%		
Nonconstant Growth	5 Years to Attain Terminal Value, Median	9.4%	9.4%	9.5%
Nonconstant Growth	4 Years to Attain Terminal Value, Average	10.5%		
Nonconstant Growth	4 Years to Attain Terminal Value, Median	10.3%	10.3%	10.5%
Nonconstant Growth	3 Years to Attain Terminal Value, Average	12.2%		
Nonconstant Growth	3 Years to Attain Terminal Value, Median	12.1%	12.1%	12.2%
Risk Premium				
1990-2014	Moody's Baa Electric Utility Debt Cost	12.7%		
	Company's Debt Cost	12.7%	12.7%	12.7%
1990-2009	Moody's Baa Gas Utility Debt Cost	12.5%		
	Company's Debt Cost	12.6%	12.5%	12.6%
Median - Indicated Range			12.0%	12.2%
Total Rate of Return - Range			12.0%	12.2%
Requested Rate of Return			12.1%	

2

3   Under current market and utility industry conditions, a combination approach, based on all methods

4   considered, provides the most accurate and reliable estimation of the Company's cost of equity. The data

5   sources and the details of my rate of return analyses are contained in Schedules A through F. Based on my

6   analyses and my review of current financial market and utility industry conditions, it is my opinion that

7   12.10% is Quadvest's fair cost of equity capital.

8

ValueScope, Inc.

1   III. ESTIMATING THE COST OF EQUITY

2   Q. What is the purpose of this section of your testimony?

3   A. This section presents a definition of the cost of equity and discusses the methods for estimating the cost

4   of equity.

5

6   Q. Please define the term "cost of capital" and how it relates to equity specifically.

7   A. The cost of equity capital is the rate of return that common stockholders require on their investment.

8   Equity investors expect a return on their capital commensurate with the risks they assume and consistent

9   with returns that might be available from other similar investments. Differences in risk profiles among

10   investments are accounted for in the market through price changes and the ultimate rates of return

11   implied by that pricing.

12

13

1   The following graph shows historical rates of return calculated by Morningstar in their 2013 Ibbotson SBBI

2   Valuation Yearbook[1].

Capital Market Line
SBBI Rates of Return 1926 - 2012
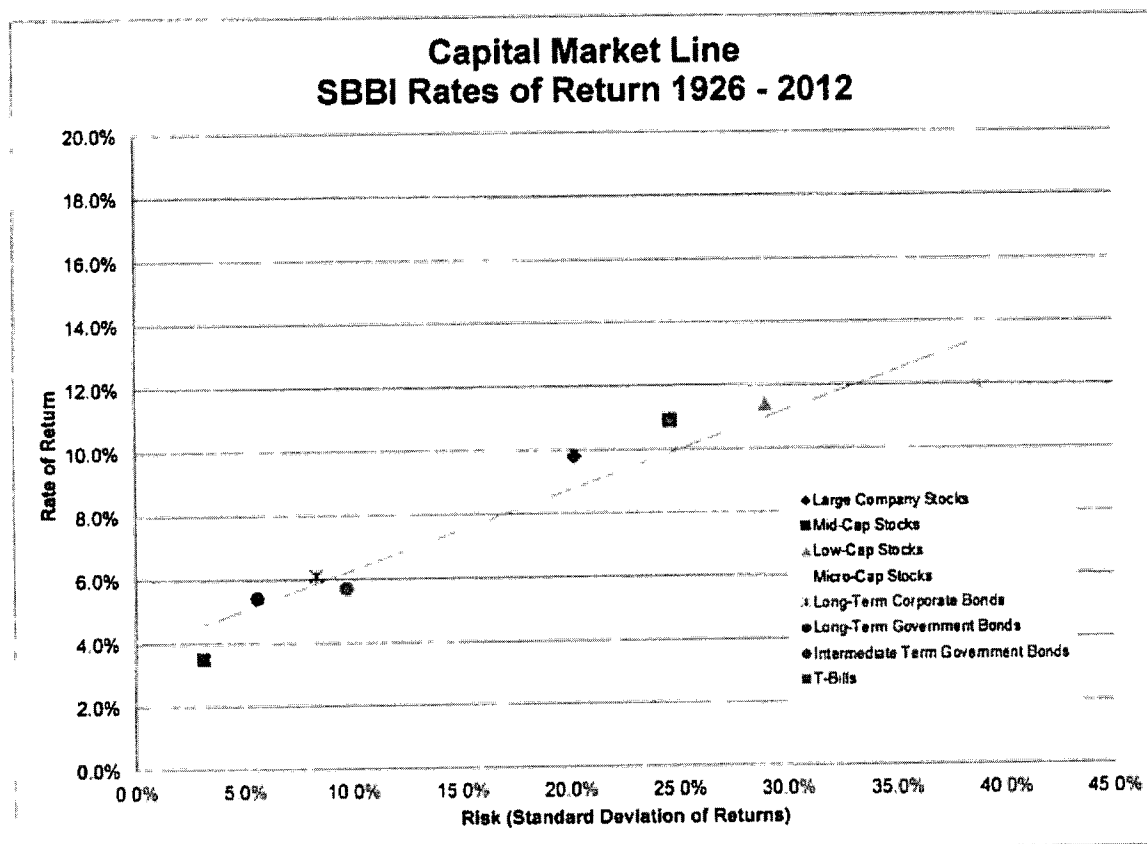
3

4   This graph plots the realized rates of return from different investments versus their risk, as measured by

5   the standard deviation of their returns. The line is called the Capital Market Line (CML) and it shows the

6   relationship between risk and rates of return.

7

---

[1]   Stocks, Bonds, Bills and Inflation Valuation Yearbook, Ibbotson Associates, 2013, Table 2.1: "Total Returns,
      Income Returns, and Capital Appreciation of the Basic Asset Classes: Summary Statistics of Annual Returns", pg.
      23.

ValueScope, Inc.

1   Q. How is the fair rate of return in the regulatory process related to the estimated cost of equity?

2   A. The regulatory process is guided by principles established in the U.S. Supreme Court cases, *Bluefield*

3   *Waterworks* and *Hope Natural Gas*:

4

5   A public utility is entitled to such rates as will permit it to earn a return on the value of the

6   property which it employs for the convenience of the public equal to that generally being

7   made at the same time and in the same general part of the country on investments in other

8   business undertakings which are attended by corresponding risks and uncertainties; but it

9   has no constitutional right to profits such as are realized or anticipated in highly profitable

10   enterprises or speculative ventures. *Bluefield Waterworks & Improvement Company v. Public*

11   *Service Commission of West Virginia*, 262 U.S. 679, 692-693 (1923).

12

13   From the investor or company point of view, it is important that there be enough revenue

14   not only for operating expenses, but also for the capital costs of the business. These include

15   service on the debt and dividends on the stock. By that standard the return to the equity

16   owner should be commensurate with returns on investments in other enterprises having

17   corresponding risks. That return, moreover, should be sufficient to assure confidence in the

18   financial integrity of the enterprise, so as to maintain its credit and to attract capital. *Federal*

19   *Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).

20

21   In another case, the Supreme Court of Texas stated "the rate of return must be high enough to attract

22   ample capital but need not be beyond that [amount]." *Railroad Commission v. Houston Natural Gas*

23   *Corporation*, 289 S.W.2d 559 (Tex. 1956), *Southwestern Bell Telephone Company v. Public Utility Commission*,

24   571 S.W.2d 503 (Tex. 1978).[2]

---

[2] Natural Gas Rate Review Handbook, Railroad Commission of Texas, June 2007, p. 24.

ValueScope, Inc.

1   In my analysis of the test year ending December 31, 2014, I applied observations taken from the current

2   state of the capital markets, which is reflective of investors' current set of investment expectations and risk

3   preferences.

4

5   Q. What financial models and market data did you use to determine the cost of equity?

6   A. Four different financial models were considered and used in my study:

7   1. the Capital Asset Pricing Model (CAPM);

8   2. the Empirical Capital Asset Pricing Model (ECAPM);

9   3. the Discounted Cash Flow (DCF) model; and

10   4. a Risk Premium analysis.

11   Q. Please explain the CAPM.

12   A. The capital asset pricing model was originally developed in an article by Nobel-prize winning

13   economist William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of

14   Risk" (Journal of Finance, 1964). Subsequent academic works further developed the concept. The

15   components of the capital asset pricing model (CAPM) used to determine the cost of equity K_e are as

16   follows:

17   •   The risk-free rate of return, R_f

18   •   An equity market risk premium, designated as MRP in the CAPM equation

19   •   A beta coefficient, β, used as an index of the security's systematic risk.

20   Combining these factors results in the required rate of return on equity shown in the formula below:

21                           $$K_e = R_f + \beta (MRP)$$

ValueScope, Inc.

1

2   Q. Please explain the Empirical Capital Asset Pricing Model (ECAPM).

3   A. The empirical capital asset pricing model represents a pragmatic solution to the limitations of the

4   standard CAPM model and was originally applied to public utilities in a paper by Litzenberger,

5   Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of a Public Utility's Cost of Equity

6   Capital" (Journal of Finance, 1980).

7

8   A CAPM-based estimate of cost of capital underestimates the return required from low-beta securities and

9   overstates the return required from high-beta securities, based on the empirical evidence. This is one of

1   the   most   well-known   results   in   finance,   and   it   is   displayed   graphically   below.

CAPM: Predicted vs Observed Returns
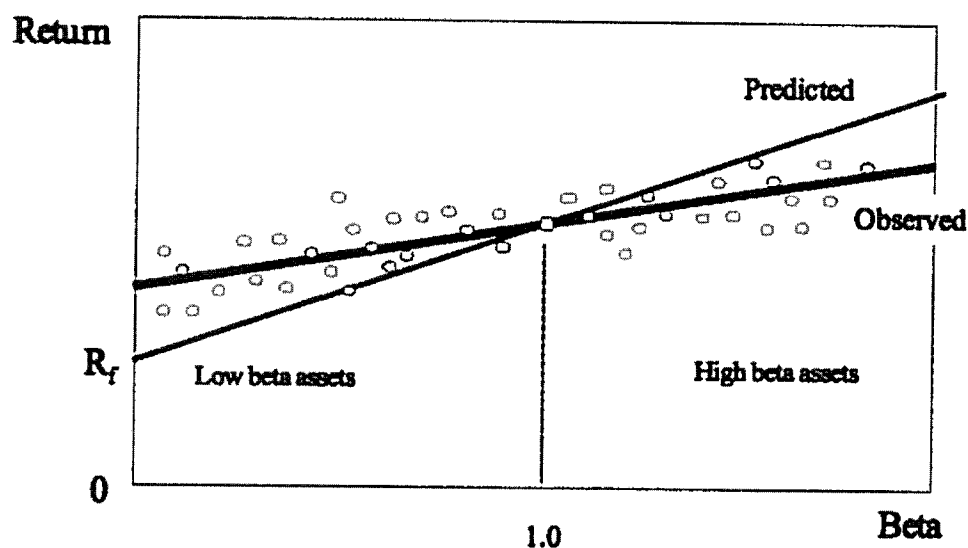
2

3   A number of variations on the original CAPM theory have been proposed to explain this finding. The

4   ECAPM makes use of these empirical findings. The components of the empirical capital asset pricing

5   model (ECAPM) used to determine the cost of equity K_e are as follows:

6   •   The risk-free rate of return, R_f

7   •   An equity market risk premium, designated as MRP in the CAPM equation

8   •   A beta coefficient, β, used as an index of the security's systematic risk.

9   •   A factor to be determined empirically, α

10

ValueScope, Inc.

1   Combining these factors results in the required rate of return on equity shown in the formula below:

2

$$K_e \quad = \quad R_f + x\,(MRP) + (1-\alpha)\,\beta\,(MRP)$$

3   Inserting the long-term risk-free rate as a proxy for the risk-free rate, an alpha in the range of 1% to 2%,

4   and reasonable values of beta and the MRP in the above equation produces results that are

5   indistinguishable from the following more tractable ECAPM expression:

6

$$K = R_f + 0.25\,(MRP) + 0.75\,\beta\,(MRP)[3]$$

7

8

---

[3]   See Chapter 6 of *The New Regulatory Finance* by Roger A. Morin, Ph.D.

ValueScope, Inc.

1   Q. Please explain the DCF model.

2   A. There are two general forms of the DCF model – the constant growth[4] and the non-constant growth

3   versions. Both versions of the DCF model are based on the concept that a stock's price represents the

4   present value of the cash flows. In the most general form, the DCF model is expressed in the following

5   formula:

6    $$P_0 = D_1/(1+k)^1 + D_2/(1+k)^2 + ... + D_\infty/(1+k)^\infty$$

7   where P_0 is today's stock price, D_1, D_2, ..., D_∞ are all expected future dividends, and k is the discount rate

8   or the risk adjusted required rate of return on equity. Under the assumption that dividends are expected

9   to grow at a constant rate g, the equation above can be solved for k and rearranged into the simple form:

10    $$k = D_1/P_0 + g$$

11   In this equation, D_1/P_0 is the expected dividend yield and g is the long-term expected growth rate,

12   assumed to be a constant in this form of the model.

13   When growth rates are not expected to be constant, other forms of this model[5] are applied that reflect an

14   initial investment in the stock, a holding period, and then a future sale of the stock.

15   The DCF equation above can then be written in a different form reflecting the purchase of a stock,

16   collecting a dividend for t years, and then selling at the end of year t:

17    $$P_0 = D_1/(1+k) + D_2/(1+k)^2 + ... + D_t/(1+k)^t$$

18   or

---

4   Eugene F. Brigham and Joel F. Houston, *Fundamentals of Financial Management* (11th Edition, South-Western, OH, 2007), p. 299.
5 Ibid., p. 300.

ValueScope, Inc.

1    $$P_0 = D_1/(1+k) + D_2/(1+k)^2 + \ldots + P_t$$

2   Both constant and non-constant growth forms of the DCF model are presented in my schedules.

3   In my analysis, I applied several estimates of growth published by analysts, and a calculated sustainable

4   growth rate (SGR).

5

6   Q. Please explain the discuss the sustainable growth rate.

7   A. The sustainable growth rate is described by the formula:

8    $$SGR = br + sv$$

9   where:

10   • b is the earnings retention ratio, equal to *1-(Dividends/Earnings)*

11   • r is the return on equity

12   • s is the percentage of common equity issued annually to fund growth

13   • v is the equity accretion rate.

14   According to financial theory, growth in book equity comes from the reinvestment of company earnings

15   and from sources of external financing. Put another way, the growth in book equity will arise from, and be

16   equal to, the portion of earnings kept by the firm and the rate of return the firm will generate on that

17   equity. If the company's earnings retention ratio and earned rate of return remain stable over time, then

18   the growth in earnings and dividends should be equal to the growth in equity book value.

19

20   Although perfect earnings stability may be unlikely in current markets, the theoretical value of the

21   approach provides an estimate of growth by the firm, and it is often cited in regulatory proceedings for

22   that purpose.

ValueScope, Inc.

1

2

1   The **br** component of the formula above describes the retention ratio and earnings of the firm, and

2   represents the firm's growth created by the reinvestment of earnings. This represents the maximum

3   growth limit for firms that lack access to external capital and must therefore fund all growth internally. An

4   increase in either the earnings retention ratio (the portion of earnings not distributed as dividends) or the

5   return on equity will increase the firm's sustainable growth rate. All else equal, firms with higher retention

6   ratios will have higher sustainable growth rates due to a greater reinvestment of their earnings.

7

8   In my analysis, I calculate return on equity as the dividends per share divided by the price of equity per

9   share, and make an adjustment for the annual growth in common equity as it will affect existing

10   shareholders. In general, as a firm grows, it will require ever-increasing amounts of capital. It will raise

11   equity capital (i.e., sell shares) when it cannot meet those capital needs with earnings generated and

12   retained from operations. When the firm seeks to raise equity capital from external sources, it will sell

13   shares at the price the market will bear, which may lead to premium pricing. The **sv** term of this

14   expression accounts for the gain to existing shareholders when common stock is issued at a premium to its

15   book value per share. The pricing of new common equity by the market has an impact on the existing

16   common equity shareholders, as they see their respective percentage equity ownership rise in value.

17

18   To determine the **sv** term, I calculated the annual growth rates in book value of equity from *Value Line*.

19   The common equity expected to be issued, **s**, is the product of the projected market-to-book ratio and the

20   average growth in common shares outstanding from the recent period to the projected period, which is

21   five years in my model. The accretion rate, **v**, represents the equity premium received by equity holders on

ValueScope, Inc.

1 issuance of new shares, which is the percentage difference between the market value of equity and the

2 book value of equity. It is calculated as 1 minus the inverse of the projected market to book ratio.

3 Shareholders will receive this premium in the form of dividends as a percentage of return on the now

4 increased value of equity[6].

5

6 The addition of the **br** and **sv** factors results in the SGR for the firm, one of the growth rates considered in

7 my DCF analyses.

8

9 Q. Please explain the risk premium methodology.

10 A. As shown in the capital market line graph, risk premium methods are based on the assumption that

11 equity securities are riskier than debt and, therefore, that equity investors require a higher rate of return.

12 Therefore, an investor can observe the rates of return for debt in the marketplace and then add an

13 additional expected risk premium to calculate a required rate of return on equity.

14

15 Q. Please summarize your discussion of cost of equity estimation techniques.

16 A. The CAPM is the most widely used tool for estimating the cost of equity. Other models such as the

17 ECAPM, DCF and alternate risk premium models provide additional support for determining an

18 appropriate cost of equity. As I will discuss later, a small stock risk premium must also be considered for

19 Quadvest. A combination of the models provides a range of indicated costs of equity and also serves as a

---

[6] When incremental shares are issued at book value: $1 - \left(\frac{1}{\left(\frac{market\ value}{book\ value}\right)}\right) = 1 - \left(\frac{1}{1}\right) = 1 - 1 = 0$; There is no premium to book equity, resulting in no change to the book, and sv will equal zero.

ValueScope, Inc.

22

1   check of reasonableness.

2

3   **IV. FACTORS THAT AFFECT THE COST OF EQUITY**

4   Q. What is the purpose of this section of your testimony?

5   A. The purpose of this section is to review recent capital market costs and conditions as well as industry-

6   and company-specific factors that affect the cost of equity.

7

8   Q. What has been the recent experience in the U.S. capital markets?

9   A. The domestic bond market has seen the continued trend of low short term interest rates and declining

10   long-term rates. The interest rate on the three-month Treasury bill changed from 0.07% as of January 2,

11   2014 to 0.04% as of December 31, 2014.[7] The interest rate on the ten-year Treasury note decreased from

12   3.00% as of January 2, 2014 to 2.17% as of December 31, 2014.[8]

---

[7]   Federal Reserve Bank of St. Louis, Federal Reserve Economic Data, *Series: DTB3, 3-Month Treasury Bill: Secondary Market Rate*, last accessed February 26, 2015

[8]   Federal Reserve Bank of St. Louis, Federal Reserve Economic Data, *Series: DGS10, 10-Year Treasury Constant Maturity Rate*, last accessed February 26, 2015
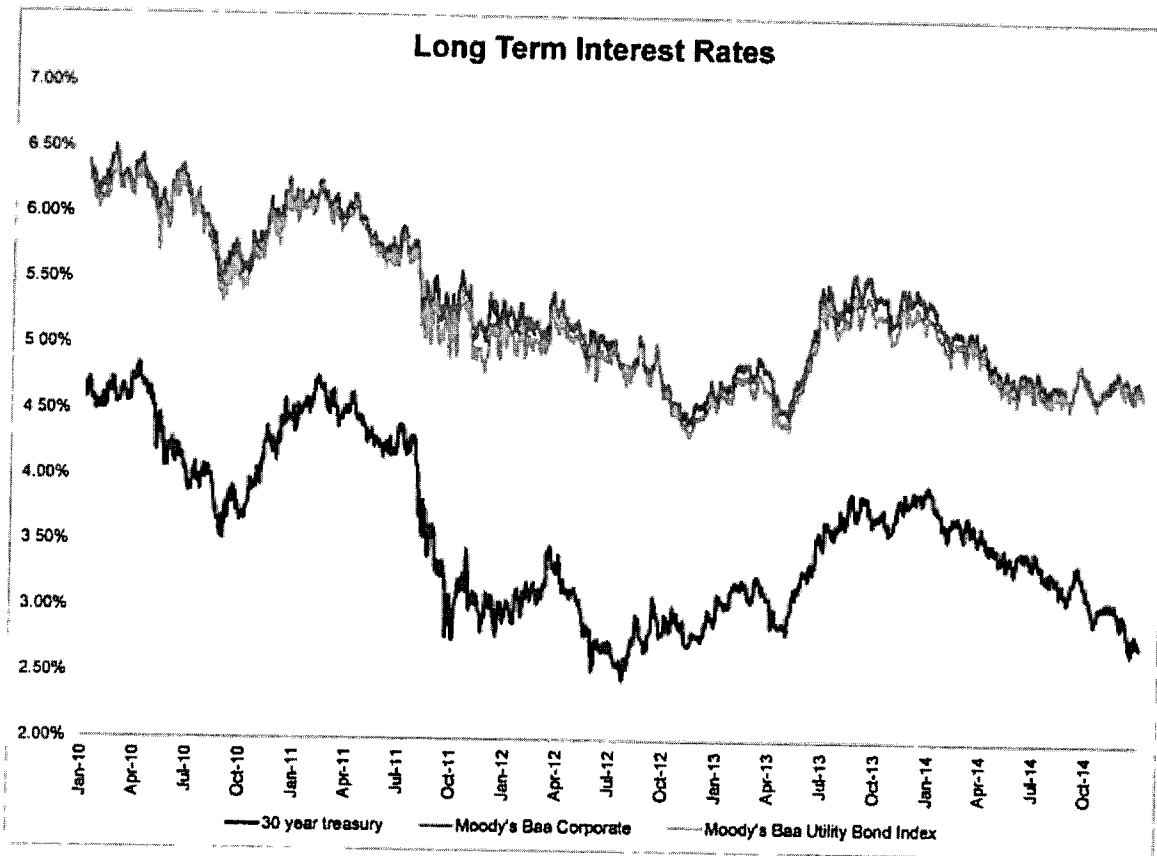
ValueScope, Inc.
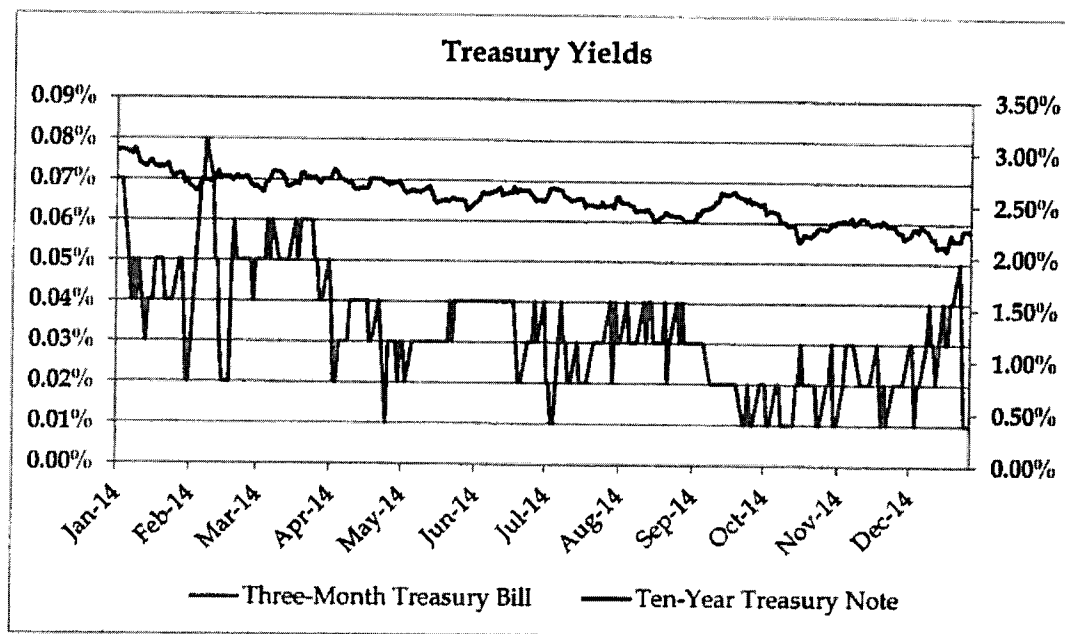
1

2　For the three-month Treasury bill, forecasters surveyed by the Federal Reserve Bank of Philadelphia

3　expected an interest rate of 0.25% by June 2015.[9] For the ten-year Treasury note, the same survey found a

4　10 year interest rate forecast of 2.72% by June 2015.

5　I also reviewed long-term debt securities over an approximate 5-year period, beginning in 2010, as shown

6　in the following chart:

---

[9]　Federal Reserve Bank of Philadelphia, *Fourth Quarter 2014 Survey of Professional Forecasters*, December 12, 2014

ValueScope, Inc.

Long Term Interest Rates

Legend: 30 year treasury — Moody's Baa Corporate — Moody's Baa Utility Bond Index

| Descriptive | Long Term Interest Rates | | |
Statistics	30 yr. Treasury	Moody's Baa Corporate	Moody's Baa Utility Bond
Min	2.46%	4.42%	4.33%
Median	3.47%	5.22%	5.09%
Max	4.85%	6.51%	6.43%
Mean	3.57%	5.32%	5.23%

3   As shown, Moody's Utility Bond Index yields have ranged from 4.33% to 6.43% between January 2010 and

4   December 2014, with an average of 5.23%. The chart also shows clearly how spreads between long-term

5   treasury securities and corporate bond yields change over time.

6

7   Q. What is the current position of the water utility industry?

ValueScope, Inc.

1   A. According to IBISWorld's industry report, growth in industry revenue is expected to outstrip per capita

2   increases in water consumption over 2015 to 2020, reflecting the focus on water conservation. Growth in

3   water rates is expected to represent part of this policy. As a result, industry revenue is expected to expand

4   by about 2.1% per year.[10]

5

6   IBISWorld notes that the household sector is the major user of water in the United States, accounting for

7   almost 56% of domestic consumption. Water utilities, therefore, are vital to assure the safe delivery of the

8   liquid to millions of Americans daily. With no substitution, demand is likely to continue growing at a

9   healthy pace, driven by population growth.

10

11   Water utilities face a stiff headwind due to infrastructure maintenance, as most of the water systems in use

12   are outdated and require significant investment. Also, none of the companies in this industry have the

13   cash coffers to meet the upcoming maintenance costs associated with decaying water systems and

14   pipelines. *Value Line* noted that "chronic underinvestment in the infrastructure of water utilities in the past

15   has resulted in most domestic owned and municipal systems being antiquated and in need of great

16   repair." With costs apparently on the rise, nearly all the cash-strapped companies in this space will need

17   to find the means to fund the repairs, close up shop or be acquired by an investor owned water utility.[11]

18

19   Q. Did you develop a review of Quadvest's capital structure?

---

10 IBISWorld Industry Report 22131, *Water Supply & Irrigation Systems in the U.S.,* January 2015.
11 *Value Line,* Water Utility Industry Commentary, January 16, 2015.

ValueScope, Inc.

1 A. As shown in Schedule B, Quadvest's long-term capital structure is comprised of a combination of debt

2 and equity. They have $12,143,067 of long-term debt from various sources at interest rates ranging from

3 0.00% to 7.48%, with a weighted average cost of debt of 4.78%. The debt does not include Developer and

4 Customer CIAC debt. Quadvest is showing an equity balance in its capital structure of $9,092,663.

5

6 Q. What other company-specific factors need to be considered in estimating the cost of equity for

7 Quadvest?

8 A. The Company's size must be considered and I have accounted for this through the inclusion of a small

9 stock risk premium.

10
11

ValueScope, Inc.

1   Q. Please describe the small stock risk premium (SSRP).
2

3   A. A premium required for small stock equity returns is well documented in Morningstar's annual

4   publication, Stocks, Bonds, Bills and Inflation.   As explained by Morningstar: "One of the most

5   remarkable discoveries of modern finance is that of a relationship between firm size and return. The

6   relationship cuts across the entire size spectrum but is most evident among smaller companies, which

7   have higher returns on average than larger ones."

8   The need for the SSRP arises because differences in investors' required rates of return that are related to

9   firm size are not fully captured by in the models of my study. To account for this, Morningstar has

10 developed size premiums that need to be added to the indicated cost of equity estimates to account for the

11 level of a firm's market capitalization.

12

13 In the last year, Morningstar's report and book has been acquired and published by the investment

14 banking firm, Duff and Phelps. This report extends and updates the analyses created in the Morningstar

15 series. Given its timeliness to this rate proceeding, I relied on the Duff & Phelps study for the estimates of

16 the Small Size Stock Premium for Quadvest.

17

18 As shown in the Capital Market Line earlier, smaller company stocks have higher risk and expected

19 returns in the market. The SSRP takes into account that smaller companies are usually less liquid, with

20 private companies like Quadvest being even less liquid. Stocks that are more liquid have higher

21 valuations for the same cash flows, which equate to lower costs of capitals and commensurately lower

ValueScope, Inc.

1   returns, on average. Stocks that are less liquid have higher observed costs of capital and higher returns,

2   on average.

3   Q. Could you summarize the Duff and Phelps's studies?

4   A. The *Size Premia Study* by Duff & Phelps[12] examines the Stock Size Premiums of the entire universe of

5   NYSE/AMEX/NASDAQ – listed securities from 1926 to the present. The survey is well regarded and the

6   commonly cited study in utility rate case studies. Specifically, the risk premium required due to each

7   firm's size is estimated by dividing the universe of securities into portfolios[13] by capitalization and

8   measuring the premium required beyond the risk-free rate and the security's equity risk premium

9   estimate, beta. The study concludes that the required Small Size Stock Premium increases inversely to firm

10 size and is in addition to the required systematic (i.e. market) risk. The summary results are in the

11 following table:

---

[12] 2014 Valuation Handbook, Duff & Phelps, 2014.
[13] Portfolio data provided by the Center for Research in Security Prices (CSRP).

ValueScope, Inc.

Equity Risk Premium

	2014 Value
Long-horizon expected equity risk premium (historical): large company stock total returns minums long-term government bond income returns	6.96%

Size Premium

Decile	Market Capitalization of Smallest Company (In Millions)	Market Capitalization of Largest Company (In Millions)	Size Premium (Return in Excess of CAPM)
Mid-cap, 3-5	2,432.9	9,196.5	1.11%
Low-cap, 6-8	636.7	2,431.2	1.98%
Micro-cap, 9-10	2.4	632.8	3.87%
Breakdown of Deciles 1 - 10			
1-Largest	21,753.4	428,699.8	-0.37%
2	9,196.7	21,739.0	0.75%
3	5,572.6	9,196.5	0.86%
4	3,581.5	5,569.8	1.16%
5	2,432.9	3,573.1	1.75%
6	1,626.4	2,431.2	1.86%
7	1,056.2	1,621.8	1.94%
8	636.7	1,055.3	2.36%
9	340.0	632.8	2.81%
10-Smallest	2.4	338.8	5.99%
Breakdown of the 10th Decile			
10a			
10w	184.9	338.8	4.40%
10x	250.7	338.8	3.52%
10b	184.9	250.5	5.67%
10y	2.4	184.9	8.99%
10z	100.9	184.9	7.55%
	2.4	100.8	12.12%

Source: Duff & Phelps 2014 Valuation Handbook

1

2   Q. What SSRP did you conclude from your review of the Duff and Phelps' studies?

3   A. Based on the Duff & Phelps data for small stock risk premia, Quadvest would require the highest level,

4   Decile 10, of 5.99%. Although Quadvest's current size would qualify it potentially for the 10z category

5   above, I believe it would be inappropriate, however, to apply this _full_ risk premium to Quadvest's equity

6   capital. Some of the risk factors reflected in the study above are offset by the regulated nature of their

7   business. In other words, regulated returns reduce the volatility of the company's earnings and therefore

8   they reduce its risk.

9

10   However, it would be incorrect to not include any small stock risk adjustment. It is more difficult for

11   small firms to raise capital, both debt and equity, at reasonable rates which affects their ability to grow and

ValueScope, Inc.

1   maintain service levels. In my study, I have considered disfferent approaches to conclude a SSRP for

2   Quadvest.

3

4   Q. Please describe your approaches.

5   A. My first two approaches are based on the Duff and Phelps data.

6   <u>Duff and Phelps's Micro-cap Group</u>

7   In the table above, the small stock premia are reported in different deciles and sub-decile groups. Duff

8   and Phelps also aggregates the deciles into three separate groups, Mid-cap, Low-cap, and Micro-cap. The

9   Micro-cap comprises groups 9 and 10 of their analyses, based on companies with market capitalizations

10   from $2.4 million to $338.8 million. The indicated range of SSRP based on the Micro-Cap group is 3.87%.

11   Although not as high as the 10th decile rate in which Quadvest falls, in my opinion this SSRP properly

12   reflects the additional risk of a small water utility, without unduly penalizing rate payers.

13   <u>Duff and Phelps's Differential Analysis</u>

14   I also considered what I will describe as a Differential Analysis to determine an appropriate SSRP for

15   Quadvest. This analysis compares the indicated SSRP for Quadvest from the 10th decile with the indicated

16   SSRP for each of the companies in my selected peer group of water utilities. Since all of these companies

17   operate within the same industry, I believe this differential would capture the additional SSRP required

18   for Quadvest, as compared to that indicated for the companies which serve as the basis for my cost of

19   equity analyses that follow. The results of this analysis are shown in the following table.

ValueScope, Inc.

Company Name	Ticker Symbol	Market Cap	Duff & Phelps Small Stock Premium	Market Cap Weighting
American Water Works Company, Inc.	AWK	$9,557,170	0.75%	50.5%
Aqua America Inc.	WTR	$4,716,128	1.16%	24.9%
American States Water Company	AWR	$1,446,144	1.94%	7.6%
California Water Service Group	CWT	$1,176,506	1.94%	6.2%
SJW Corp.	SJW	$650,045	2.36%	3.4%
Middlesex Water Co.	MSEX	$371,520	1.16%	2.0%
Connecticut Water Service Inc.	CTWS	$403,291	2.81%	2.1%
Artesian Resources Corp.	ARTN.A	$201,087	5.99%	1.1%
The York Water Company	YORW	$297,297	5.99%	1.6%
Pure Cycle Corporation	PCYO	$96,152	5.99%	0.5%

	Duff & Phelps Small Stock Premium	Additional Small Stock Premium Required
Quadvest - 10th Decile Small Stock Risk Premium	5.99%	
less Peer Group Small Stock Risk Premia:		
Mean	3.01%	2.98%
Median	2.15%	3.84%
Market Cap Weighted Average	1.29%	4.70%
Concluded Additional Small Stock Risk Premia Required for Quadvest		3.85%

1

2 As shown above, this analysis compares Quadvest's indicated SSRP with the Mean, Median and Market-

3 Cap weighted average SSRPs for the group. Based on these three indications, I selected 3.85% as being

4 representative of the required SSRP for Quadvest.

5

6 Q. What other sources of information did you consider in your small stock risk premium analyses?

7 A. another way to quantify a required small stock risk premium for Quadvest is based on academic

8 studies of private equity rates of return. The first source that I considered was titled "What Do Private

ValueScope, Inc.

1   Equity Firms (Say They) Do?"[14] This paper surveyed 79 private equity (buyout) investors with a total of

2   over $750 billion of assets under management about their practices in firm valuation, capital structure,

3   governance and value creation. This paper points out that investors rely on internal rates of return and

4   multiples of invested capital for investment decisions. Private equity investors typically target a 22%

5   internal rate of return on their investments on average with most firms clustered tightly between 20% and

6   25%, a rate of return well above that indicated by the Capital Asset Pricing Model.

7

8   This paper cites research which indicates that Private Equity funds on average outperform the S&P500

9   index returns by about 8% before their fees and about 4% after their fees. Therefore, this is one indication

10   of the additional rate of return, or SSRP, required by investors in smaller, more risk private equity

11   investments in private companies.

12

13   A second study considered is entitled "Private Equity Performance and Liquidity Risk."[15] This paper

14   discusses the liquid risk of an investment in private equity and their subsequent investments in private

15   companies, as well as the additional compensation required for taking on that risk. This study concludes

16   that the total risk premium for private equity was around 18% per annum, of which there was a

17   "significant" liquidity risk premium for private equity of 3% per annum. This liquidity risk premium is

18   another indication of the SSRP required for smaller companies like Quadvest.

---

[14] Paul A. Gompers (Harvard Business School and NBER), Steven N. Kaplan (University of Chicago Booth School of Business and NBER) and Vladimir Mukharlyamov (Harvard University), This Draft February 2014.

[15] Ludovic Phalippou (University of Oxford, Said Business School), co-authors: Francesco Franzoni and Eric Nowak, both at Swiss Finance Institute – University of Lugano

ValueScope, Inc.

1   A third study considered was "Private Equity Performance: What Do We Know?" This study considered

2   the excess returns indicated by various other academic studies, as well as the authors' research. Their

3   conclusions regarding the excess returns earned by and expected from private equity investments in

4   smaller, private companies are summarized below:

5   • The average private equity fund had a return 6.6% greater than the S&P 500, with a median excess

6   return of 3.4%.

7   • Private equity funds earned a capital-weighted average excess return is 3.7%, with a median of

8   3.0%, and they conclude that

9   • The average private equity fund's IRR exceeds that of the S&P 500 by 4% to 5%.[16]

10   Q. What is your concluded small stock risk premium for Quadvest?

11   A. Based on the three approaches considered above, a reasonable range of SSRP required for Quadvest is

12   in the range of 3.0% to 4.0% which must be considered in the following analyses. Per my discussions with

13   Quadvest's management and Counsel, I am selecting the lower end of this range for conservatism,

14   although the higher rates could certainly be justified. Therefore, the following analyses include a small

15   stock risk premium of 3.0%. A summary of this analysis is presented in Schedule C.1.

16

17   Q. Did you consider an additional risk premium for company-specific risk?

18   A. In addition to market risk and size risk, investors also consider unsystematic or company-specific risk

19   in determining a required rate of return for an equity investment. Per my discussions with management, I

20   have determined that for Quadvest, no additional unsystematic risk premium is required at this time.

---

[16] Robert Harris, Tim Jenkinson and Steve Kaplan, The University of Chicago Booth School of Business,

ValueScope, Inc.

1

2 V. COST OF EQUITY FOR QUADVEST

3 Q. What is the purpose of this section of your testimony?

4 A. This section presents the results of my analysis of the cost of equity for the Company followed by a

5 discussion of the methods and details of my analysis.

6

7 In the first part of my cost of equity analysis, I develop the CAPM analyses for a group of guideline water

8 utility companies covered by *Value Line* and *CapitalIQ*, considering different sources for beta and market

9 risk premia. In the second part, I develop the ECAPM analyses for a group of guideline water utility

10 companies covered by *Value Line* and *CapitalIQ*, considering different sources for beta and market risk

11 premia. In the third part of my analysis, I apply DCF models to the same group of *Value Line* comparable

12 water utility companies. Lastly, I discuss and develop a cost of equity estimate based on a risk premium

13 approach.

14

ValueScope, Inc.

1   Included in my report are the following schedules described below:

2   •   **Schedule A** presents a summary of the results of each methodology, along with my conclusion
3   for the required rate of return
4   •   **Schedule B** contains my financial statement analysis
5   •   **Schedule C** contains my capital asset pricing model (CAPM) analysis
6   •   **Schedule D** contains my ECAPM analysis
7   •   **Schedule E** contains my discounted cash flow analyses
8   •   **Schedule F** presents my risk premium analysis
9

10   Q. Please summarize the results of your CAPM analyses.

11   A. The results of my CAPM analyses, as shown on schedules C.2 to C.3, indicate required rates of return

12   on equity in the range of 11.6% to 12.0%, including a small stock risk premium, discussed previously.

13   I utilized the standard historical market risk premium from Duff & Phelps 2014 Valuation Handbook of

14   6.0%, which reflects large company stock total returns minus long-term government bond income returns

15   for the period 1926 – 2013, as indicated in Schedules C.2 and C.3. The CAPM is a forward-looking model

16   design to estimate the market's expected (future) rate of return on an equity investment. Studies like the

17   Duff & Phelps study calculate historical returns, which can then be used in the CAPM, based on the

18   assumption that the future return characteristics will match the past.

19

20   Q. Please summarize the results of your ECAPM analyses.

21   A. The results of my ECAPM analyses, as shown on schedules D.1 to D.2, indicate required rates of return

22   on equity in the range of 11.8% to 12.1%, including a small stock risk premium. I utilize the standard

23   historical market risk premium from Duff & Phelps 2014 Valuation Handbook of 6.0%, which reflects large

ValueScope, Inc.

1   company stock total returns minus long-term government bond income returns for the period 1926 – 2013,

2   as indicated in Schedules D.1 and D.2.

3   Q. Please summarize the results of your guideline company DCF analyses.

4   A. The results of my guideline company DCF analyses are presented in Schedules E.1 through E.4.

5   The constant growth DCF model indicates an ROE of 12.7%, including a small stock risk premium. My

6   non-constant growth models on schedules E.2 through E.4, indicate a range of 9.4% to 12.2%, depending

7   on the terminal period selected.

8

9   This study includes a combination of growth rates to estimate investor's expectations of return on equity. I

10   have relied upon analyst estimates of growth rates from *Value Line*, and the sustainable growth rate

11   derived from the *Value Line* published estimates, as developed in my schedule E.1.

12   Throughout my analyses, I have used average stock prices for the month ending December 31, 2014 for

13   each company. The cost of equity is a long-term concept and relying upon average prices prevents a

14   single day's market volatility from adversely affecting the analysis.

15

16   Q. What are the results of your risk premium studies?

17   A. The results of my risk premium study are shown in Schedule F. My analysis compares average ROEs

18   allowed each year for electric and gas utilities by the various state regulatory commissions to average

19   utility debt costs as reflected in Moody's Average Utility Bond Yields. The risk premium study indicates

20   that an ROE in the range of 12.70% to 12.74% is appropriate including a small stock risk premium.

21

ValueScope, Inc.

1   Q. Please describe your risk premium studies?

2   A. The studies compare electric and gas utility authorized ROEs to long-term utility debt rates. Although

3   Quadvest is a water utility, all regulated utilities must compete for capital and are subject to similar risk

4   factors. The differences between average authorized ROEs and debt costs are used to measure each year's

5   equity risk premium. As part of the study, I implemented a nine-month regulatory lag.

6

7   My first analysis considered the time period 1990 through the third quarter of 2014, as shown in the *Rate*

8   *Case Summary Q3 2014 Financial Update*, published by the Edison Electric Institute, which is based on data

9   compiled by SNL Financial (formerly Regulatory Research Associates). I performed a regression analysis

10 of the allowed annual equity risk premiums relative to Moody's Average Utility Index interest rate levels,

11 as shown on schedule E.1.

12

13 This regression analysis was then used with the current cost of Moody's Baa Utility debt of 4.70% and the

14 Company's embedded cost of debt of 4.78% to arrive at an indicated cost of equity range of 12.70% to

15 12.74%. This implies that an equity risk premium of 4.96% to 5.00%, as shown in Schedule E.1, is

16 appropriate at the current level of interest rates.

17

18 My second analysis considered the time period 1990 through the 2009, as shown in the Major *Rate Case*

19 *Decisions – Calendar 2010*, published by Regulatory Research Associates. I performed a regression analysis

20 of the allowed annual equity risk premiums relative to Moody's Average Utility Index interest rate levels,

21 as shown on schedule E.2.

ValueScope, Inc.

1

2 This regression analysis was then used with the current cost of Moody's Baa Utility debt of 4.70% and the

3 Company's embedded cost of debt of 4.78% to arrive at an indicated cost of equity range of 12.53% to

4 12.58%. This implies that an equity risk premium of 4.80% to 4.83%, as shown in Schedule E.2, is

5 appropriate at the current level of interest rates.

6

7 The most widely followed risk premium studies, which are now published annually by Duff & Phelps[17]

8 (formerly by Morningstar (SBBI)) for the period 1926-2013, indicate a long horizon expected equity risk

9 premium of 6.96% for large company common stocks versus long-term corporate bonds. My risk

10 premium studies indicate a lower risk premium than those found in the Duff & Phelps study.

11

12 **VI. CONCLUSION**
13

14 Q. Please summarize the results of your cost of equity analysis.

15 A. As summarized in Schedule A in my report, I developed multiple analyses for estimating the cost of

16 equity for Quadvest. I then reviewed the results and selected the points considered most relevant to

17 determining a fair rate of equity return for Quadvest.

---

[17] 2014 Valuation Handbook, Duff & Phelps, 2014.

ValueScope, Inc.

Method	Assumptions	Cost of Equity	Cost of Equity - Range	
			Minimum	Maximum
CAPM				
ValueLine	Value Line Betas	11.6%		
Bloomberg	Bloomberg Betas	12.0%	11.6%	12.0%
ECAPM				
ValueLine	Value Line Betas	11.8%		
Bloomberg	Bloomberg Betas	12.1%	11.8%	12.1%
DCF Analyses				
Constant Growth	Average	12.7%		
Constant Growth	Median	12.7%	12.7%	12.7%
Nonconstant Growth	5 Years to Attain Terminal Value, Average	9.5%		
Nonconstant Growth	5 Years to Attain Terminal Value, Median	9.4%	9.4%	9.5%
Nonconstant Growth	4 Years to Attain Terminal Value, Average	10.5%		
Nonconstant Growth	4 Years to Attain Terminal Value, Median	10.3%	10.3%	10.5%
Nonconstant Growth	3 Years to Attain Terminal Value, Average	12.2%		
Nonconstant Growth	3 Years to Attain Terminal Value, Median	12.1%	12.1%	12.2%
Risk Premium				
1990-2014	Moody's Baa Electric Utility Debt Cost	12.7%		
	Company's Debt Cost	12.7%	12.7%	12.7%
1990-2009	Moody's Baa Gas Utility Debt Cost	12.5%		
	Company's Debt Cost	12.6%	12.5%	12.6%
Median - Indicated Range			12.0%	12.2%
Total Rate of Return - Range			12.0%	12.2%
Requested Rate of Return			12.1%	

1

2

3   In considering the CAPM and ECAPM, I elected to apply the complete range of estimates from the two

4   approaches considered in each analysis. For the constant growth DCF model, using a selection of different

5   indicated growth rates, the average and median values provided a useful range for consideration. Of the

6   three non-constant growth DCF models considered, the entire range was relied upon. For the risk

7   premium analysis, the two results utilizing the current Moody's Baa Utility cost of debt as well as the

8   Company's embedded cost of debt provided a reasonable range of estimates.

ValueScope, Inc.

1 .

2 All of the methods considered are for larger public water utility companies and lack any adjustments for

3 size, capital structures or other company-specific factors. As a result I incorporated a small stock risk

4 premium in each one of the aforementioned analyses. For the small stock premium, I relied upon a mall

5 stock risk premium of approximately 3%, as discussed previously.

6 As a result my concluded cost of equity is 12.10% (rounded).

7

8 Q. How should these results be interpreted to determine the fair cost of equity for Quadvest?

9 A. Based on my review of the CAPM, DCF models and risk premium analyses, and my review of current

10 market and utility industry conditions, it is my opinion that the requested cost of equity of 12.1% is a

11 conservative and reasonable estimate of Quadvest's fair cost of equity.

12

13 Q. Does this conclude your testimony?

14 A. Yes, it does.

ValueScope, Inc.

SCHEDULES
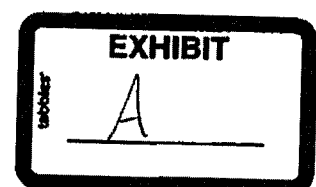
ValueScope, Inc.

APPENDIX A

ValueScope, Inc.

APPLICATION FOR A WATER & SEWER RATE/TARRIFF CHANGE

QUADVEST, L.P.

TEST YEAR ENDING DECEMBER 31, 2014

COST OF EQUITY

GREGORY E. SCHEIG, CPA/ABV/CFF/CGMA, CFA

TABLE OF CONTENTS

45

I. INTRODUCTION

Quadvest, L.P. ("Quadvest" or the "Company") engaged Gregory E. Scheig, CPA/ABV/CFF, CFA of ValueScope, Inc. to measure the Company's cost of equity for its current rate case. This report presents my recommendation concerning the appropriate rate of return on common equity that the Texas Commission on Environmental Quality ("TCEQ") should recognize in Quadvest's revenue requirement. My qualifications are provided in Appendix A.

Quadvest owns a regulated water and wastewater utility located in Tomball, Texas. Quadvest serves approximately 8,000 water and sewer customers within the state of Texas.

II. SUMMARY

This report is divided into five sections. Sections I and II are introductory in nature. In Section III, I review various methods for estimating the cost of equity and discuss the capital asset pricing model (CAPM), the empirical capital asset pricing model (ECAPM), the discounted cash flow (DCF) method, and the risk premium method. In Section IV, I review capital market conditions and discuss recent developments in the water utility industry that may affect the cost of capital. In Section V, I discuss the details of my cost of equity studies and summarize my return on equity (ROE) recommendations.

My ROE recommendation is based on the analyses that I developed using (1) CAPM, (2) ECAPM (3) DCF models, and (4) risk premium analyses. I developed the CAPM, ECAPM, and DCF models using a comparable group of water utilities followed by *Value Line* for which complete and reliable data is available. Given the small number of companies from *Value Line* for which data was available and complete, I expanded my CAPM and ECAPM analysis to

1

include companies from Standard & Poor's Capital IQ database. My risk premium analysis is based on *Moody's* utility industry interest rate data and the authorized rates of return for regulated electric and gas utilities.

The following table contains my summary results:

Method	Assumptions	Cost of Equity	Cost of Equity - Range	
			Minimum	Maximum
CAPM				
ValueLine	Value Line Betas	11.6%		
Bloomberg	Bloomberg Betas	12.0%	11.6%	12.0%
ECAPM				
ValueLine	Value Line Betas	11.8%		
Bloomberg	Bloomberg Betas	12.1%	11.8%	12.1%
DCF Analyses				
Constant Growth	Average	12.7%		
Constant Growth	Median	12.7%	12.7%	12.7%
Nonconstant Growth	5 Years to Attain Terminal Value, Average	9.5%		
Nonconstant Growth	5 Years to Attain Terminal Value, Median	9.4%	9.4%	9.5%
Nonconstant Growth	4 Years to Attain Terminal Value, Average	10.5%		
Nonconstant Growth	4 Years to Attain Terminal Value, Median	10.3%	10.3%	10.5%
Nonconstant Growth	3 Years to Attain Terminal Value, Average	12.2%		
Nonconstant Growth	3 Years to Attain Terminal Value, Median	12.1%	12.1%	12.2%
Risk Premium				
1990-2014	Moody's Baa Electric Utility Debt Cost	12.7%		
	Company's Debt Cost	12.7%	12.7%	12.7%
1990-2009	Moody's Baa Gas Utility Debt Cost	12.5%		
	Company's Debt Cost	12.6%	12.5%	12.6%
Median - Indicated Range			12.0%	12.2%
Total Rate of Return - Range			12.0%	12.2%
Requested Rate of Return			12.1%	

Under current market and utility industry conditions, a combination approach, based on all methods considered, provides the most accurate and reliable estimation of the Company's cost of equity. The data sources and the details of my rate of return analyses are contained in Schedules A through F. Based on my analyses and my review of current financial market and utility industry conditions, it is my opinion that 12.10% is Quadvest's fair cost of equity capital.

2

# III. ESTIMATING THE COST OF EQUITY

This section presents a definition of the cost of equity and discusses the methods for estimating the cost of equity. The cost of capital is the expected rate of return that market participants require in order to attract funds to a particular investment. In economic terms, the cost of capital for a particular investment is an opportunity cost (i.e., the cost of forgoing the next best alternative investment). In this sense, it is related to the economic principle of substitution – that is, an investor will not invest in a particular asset if there is a more attractive substitute.[1] When applied to debt instruments, the cost of capital is observable in the stated interest rate and the resulting yield to maturity.

The cost of equity capital is the rate of return that common stockholders require on their investment. Equity investors expect a return on their capital commensurate with the risks they assume and consistent with returns that might be available from other similar investments. Differences in risk profiles among investments are accounted for in the market through price changes and the ultimate rates of return implied by that pricing.

---

[1]   Shannon P. Pratt and Roger J. Grabowski, *Cost of Capital Applications and Examples*, 3rd ed. (Hoboken, New Jersey: John Wiley & Sons, Inc., 2008), p. 3.

3

The following graph shows historical rates of return calculated by Morningstar in their 2013 Ibbotson SBBI Valuation Yearbook[2].
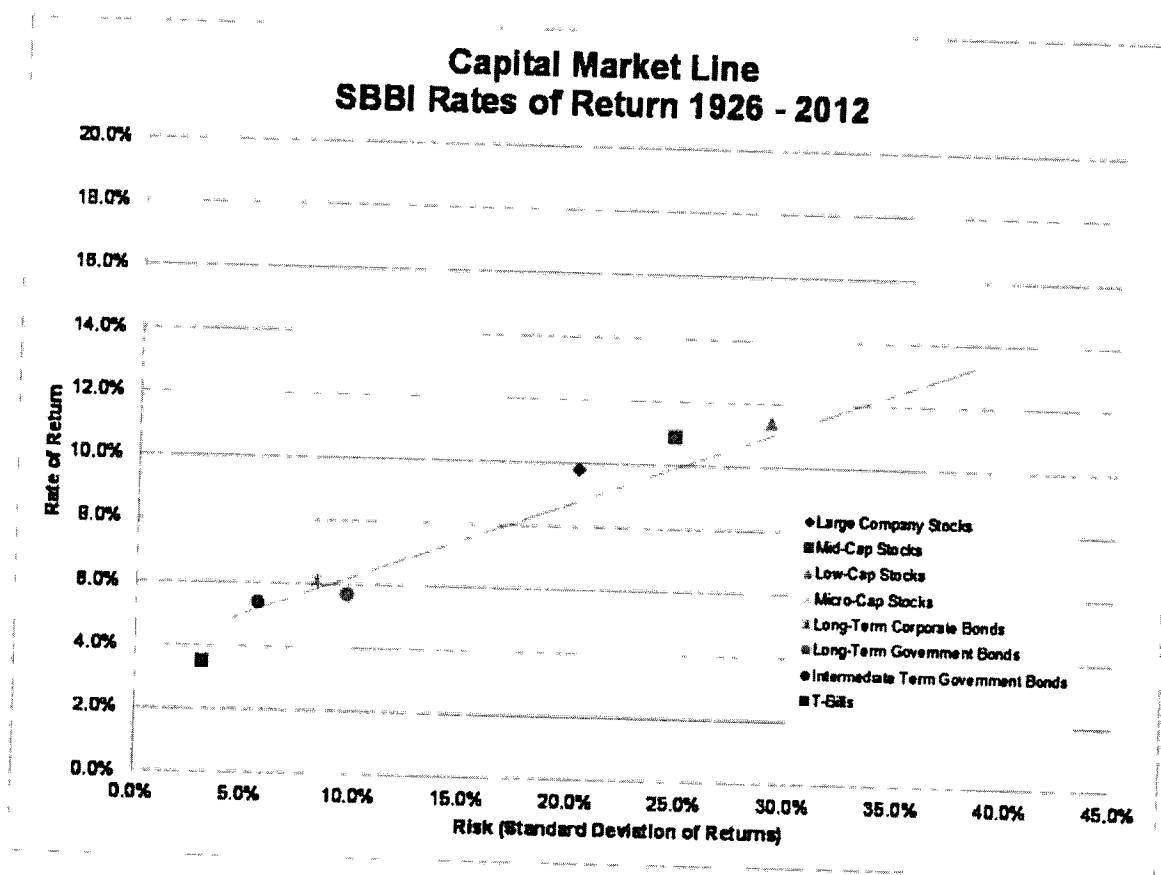
Capital Market Line
SBBI Rates of Return 1926 - 2012

This graph plots the realized rates of return from different investments versus their risk, as measured by the standard deviation of their returns. The line is called the Capital Market Line (CML) and it shows the relationship between risk and rates of return.

---

2 Stocks, Bonds, Bills and Inflation Valuation Yearbook, Ibbotson Associates, 2013, Table 2.1: "Total Returns, Income Returns, and Capital Appreciation of the Basic Asset Classes: Summary Statistics of Annual Returns", pg. 23.

4