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BEFORE THE ARIZONA CORPORATION COMMISSION

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AZ CORP COMMISSION
DOCKET CONTROL

COMMISSIONERS
MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE

IN THE MATTER OF THE APPLICATION OF CHAPARRAL CITY WATER COMPANY, INC., AN ARIZONA CORPORATION FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES FOR UTILITY BASED THEREON.	DOCKET NO. W-02113A-07-0551 **STAFF'S NOTICE OF FILING ADOPTED TESTIMONY**

Staff of the Arizona Corporation Commission ("Staff") hereby provides the portions of Mr. Pedro M. Chaves' Direct Testimony adopted by Mr. David C. Parcell. The portions of Mr. Chaves' Direct Testimony not adopted by Mr. Parcell have been stricken.

RESPECTFULLY SUBMITTED this 9th day of December, 2008.

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Arizona Corporation Commission
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BEFORE THE ARIZONA CORPORATION COMMISSION

MIKE GLEASON
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IN THE MATTER OF THE APPLICATION OF CHAPPARAL CITY WATER COMPANY, INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES FOR UTILITY SERVICE BASED THEREON.	)	DOCKET NO. W-02113A-07-0551

DIRECT

TESTIMONY

OF

PEDRO M. CHAVES

PUBLIC UTILITIES ANALYST III

UTILITIES DIVISION

ARIZONA CORPORATION COMMISSION

SEPTEMBER 30, 2008

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SCHEDULES

I. INTRODUCTION

Q. Please state your name, occupation, and business address.

A. My name is Pedro M. Chaves. I am a Public Utilities Analyst employed by the Arizona Corporation Commission ("Commission") in the Utilities Division ("Staff"). My business address is 1200 West Washington Street, Phoenix, Arizona 85007.

Q. Briefly describe your responsibilities as a Public Utilities Analyst.

A. In my position as a Public Utilities Analyst, I perform studies to estimate the cost of capital component of the overall revenue requirement calculation in rate filings. I also perform analyses regarding requests for financing authorization and other financial regulatory matters.

Q. Please describe your educational background and professional experience.

A. I am a graduate of Arizona State University and received a Bachelor of Science degree in Global Business with a specialization in finance. My course of studies included classes in corporate and international finance, investments, accounting, statistics, and economics. I began employment as a Staff Public Utilities Analyst in December 2005.

Q. What is the scope of your testimony in this case?

A. I provide Staff's recommended capital structure, cost of debt, return on equity ("ROE") and fair value rate of return ("FVROR") in this case. I discuss the appropriate capital structure, cost of debt, ROE and FVROR for establishing the revenue requirement for Chaparral City Water Company, Inc. ("Chaparral City" or "Applicant").

Summary of Testimony and Recommendations

Q. Briefly summarize how Staff's cost of capital testimony is organized.

A. Staff's cost of capital testimony is presented in ten sections. Section I is this introduction. Section II discusses the concept of weighted average cost of capital ("WACC"). Section III presents the concept of capital structure and presents Staff's recommended capital structure for Chaparral City in this proceeding. Section IV discusses the concepts of ROE and risk. Section V presents the methods employed by Staff to estimate Chaparral City's ROE. Section VI presents the findings of Staff's ROE analysis. Section VII presents Staff's final cost of equity estimates for Chaparral City. Section VIII presents Staff's weighted average cost of capital. Section IX presents Staff's FVROR recommendation. Section X presents Staff's comments on the direct testimony of Mr. Thomas J. Bourassa in support of the Applicant's proposed cost of capital ("Mr. Bourassa's Direct Testimony"). Lastly, Section XI presents the conclusions.

Q. Have you prepared any exhibits to accompany your testimony?

A. Yes. I prepared ten schedules (PMC-1 to PMC-10) that support Staff's cost of capital analysis.

Q. What is Staff's weighted average cost of capital for Chaparral City?

A. Staff's WACC is 8.8 percent and it is calculated in Schedule PMC-1. ~~Staff's WACC is based on cost of equity estimates for Chaparral City that range from 9.3 percent to 14.3 percent. Staff's ROE recommendation includes a 1.8 percent downward adjustment due to the lower financial risk reflected in the Applicant's capital structure in relation to that of the sample companies.~~

~~**Q. What is Staff's recommended fair value rate of return for Chaparral City?**~~

~~A. Staff recommends a 6.3 percent FVROR. Staff's recommended 6.3 percent FVROR is calculated in Schedule PMC-2.~~

Applicant's Proposed Overall Rate of Return

Q. Briefly summarize the Applicant's proposed capital structure, cost of debt, return on equity and overall rate of return for this proceeding.

A. Table 1 summarizes the Applicant's proposed hypothetical capital structure, cost of debt, return on equity and overall cost of capital and FVROR in this proceeding:

Table 1

	Weight	Cost	Weighted Cost
Long-term Debt	23.4%	5.5%	1.3%
Common Equity	76.6%	10.5%	8.0%
Cost of Capital (FVROR)			**9.3%**

Chaparral City is proposing an overall cost of capital, i.e., FVROR of 9.3 percent.

II. THE WEIGHTED AVERAGE COST OF CAPITAL

Q. Please define the cost of capital concept.

A. The cost of capital is the opportunity cost represented by anticipated returns or earnings that are foregone by choosing one investment over others with equivalent risk. In other words, the cost of capital is the return that shareholders expect for committing their resources in a determined business enterprise.

Q. What is the overall cost of capital?

A. The overall cost of capital is equal to the weighted average cost of capital.

Q. How is the WACC calculated?

A. The WACC is calculated by adding the weighted expected returns of a firm's securities. Equation 1 that follows presents the WACC as a mathematical expression.

Equation 1.

$$WACC = \sum_{i=1}^{n} W_i * r_i$$

In this equation, W_i is the weight given to the i^{th} security (the proportion of the i^{th} security relative to the portfolio) and r_i is the expected return on the i^{th} security.

Q. Can you provide an example demonstrating application of Equation 1?

A. Yes. For this example, assume that an entity has a capital structure composed of 35 percent debt and 65 percent equity. Also, assume that the embedded cost of debt is 6.0 percent and the expected return on equity, i.e. the cost of equity, is 10.0 percent. Calculation of the WACC is as follows:

WACC = (35% * 6.0%) + (65% * 10.0%)

WACC = 2.10% + 6.50%

WACC = 8.60%

The weighted average cost of capital in this example is 8.60 percent. The entity in this example would need to earn an overall rate of return of 8.60 percent to cover its cost of capital.

III. CAPITAL STRUCTURE

Background

Q. Please explain the capital structure concept.

A. The capital structure of a firm is the relative proportions of short-term debt, long-term debt (including capital leases), preferred stock and common stock that are used to finance the firm's assets.

Q. How is the capital structure expressed?

A. The capital structure of a company is expressed as the percentage of each component of the capital structure (capital leases[1], short-term debt, long-term debt, preferred stock and common stock) relative to the total capital (the total sum of all the components of the capital structure).

For instance, the capital structure for an entity that is financed by $5,000 of short-term debt, $15,000 of capital leases, $30,000 of long-term debt, $10,000 of preferred stock and $40,000 of common stock is shown in Table 2.

Table 2

Component			**%**
Short-Term Debt	$5,000	($5,000/$100,000)	5.0%
Capital Leases	$15,000	($15,000/$100,000)	15.0%
Long-Term Debt	$30,000	($30,000/$100,000)	30.0%
Preferred Stock	$10,000	($10,000/$100,000)	10.0%
Common Stock	$40,000	($40,000/$100,000)	40.0%
Total	**$100,000**		**100%**

[1] Capital leases are a specific form of long-term debt.

The capital structure in this example is composed of 5.0 percent short-tern debt, 15.0 percent capital leases, 30.0 percent long-term debt, 10.0 percent preferred stock and 40.0 percent common stock.

Applicant's Capital Structure

Q. What capital structure does the Applicant propose?

A. The Applicant proposes a hypothetical capital structure composed of 23.4 percent debt and 76.6 percent common equity.

Q. What capital structure does Staff recommend?

A. Staff recommends a capital structure of 24.4 percent debt and 75.6 percent equity, to reflect Chaparral City's most recent debt and equity positions, as displayed in Schedule PMC-10 and summarized in Table 3, below.

Table 3

Chaparral City Water Company, Inc.
Capitalization

		Amount outstanding as of 6/30/2008	Percentage of Capital Structure
Total Debt	$	8,635,000.00	24.4%
Total Common Equity	$	26,690,000	75.6%
Total Capitalization	$	35,325,000	100.0%

Q. How does Chaparral City's actual capital structure compare to capital structures of publicly traded water utilities?

A. The Applicant's actual capital structure is composed of 24.4 percent debt and 75.6 percent equity. Schedule PMC-4 shows the capital structures of six publicly traded water companies ("sample water companies") as of March 31, 2008[2]. The average capital structure for the sample water utilities is comprised of approximately 49.9 percent debt and 50.1 percent equity.

IV. RETURN ON EQUITY

Background

Q. Please define the term "cost of equity capital."

A. The cost of equity capital is determined by the market. It is the rate of return that investors expect to earn on their equity investment in an entity given its risk. In other words, the cost of equity to an entity is the investors' expected rate of return on other investments of similar risk.

Q. Is there any relationship between interest rates and the cost of equity capital?

A. Yes. The cost of equity tends to move in the same direction as interest rates. This relationship is integral to the capital asset pricing model ("CAPM") formula. The CAPM is a market based model used for estimating the cost of equity capital that is discussed in Section V of this testimony. Therefore, a comparison of current interest rates to historical interest rates provides insight for how the current cost of equity capital might be compared to the cost of equity capital historically.

Q. What has been the general trend of interest rates in recent years?

A. A chronological chart of interest rates is a good tool to show interest rate history and identify trends. Chart 1 graphs intermediate U.S. treasury rates from July 2002 to July 2008.

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[2] Value Line Summary & Index. 7-25-08

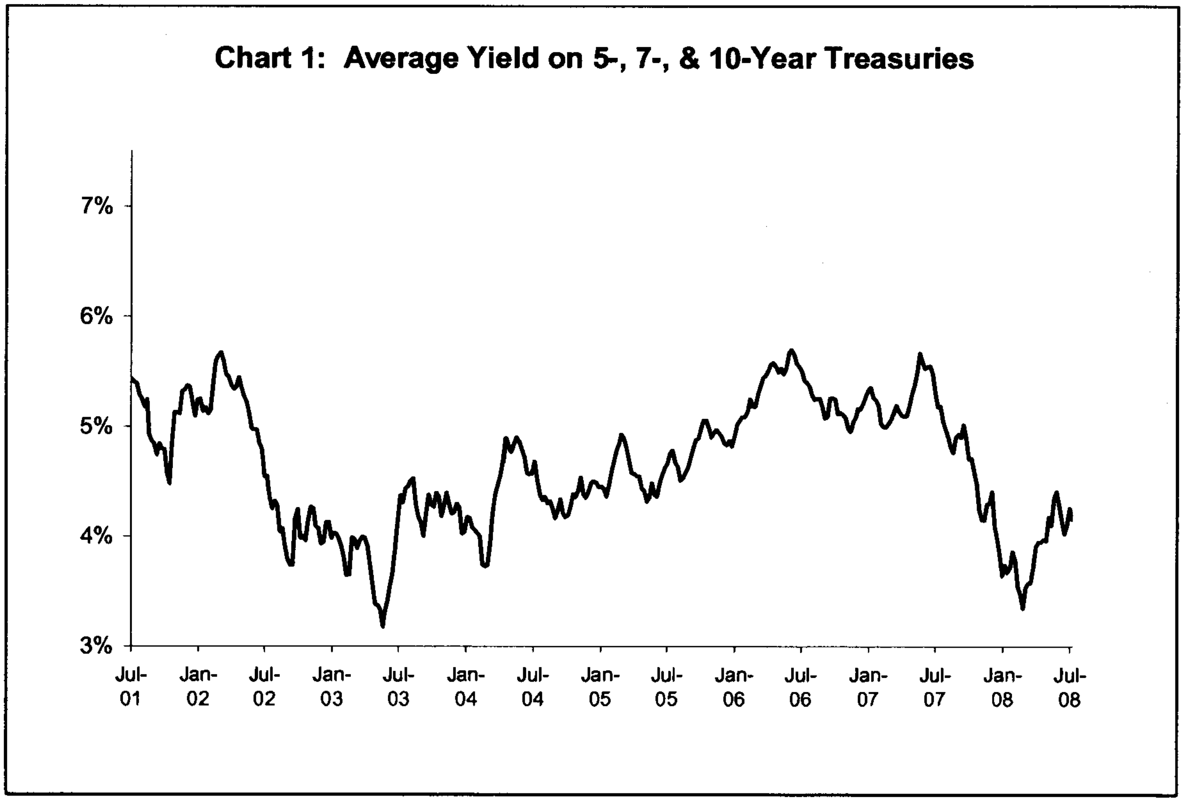

Chart 1 shows that intermediate interest rates trended downward from 2001 to mid-2003; then, trended upward to mid-2006; subsequently, remained relatively steady at about 5 percent to mid-2007; and have declined since then to about 4 percent.

Q. How do current interest rates compare to a longer term history of interest rates, and what does it suggest for capital costs?

A. Chart 2 shows that interest rates have trended downward in the immediate past period of approximately 25 years. It also shows that interest rates over the past 40 years have been higher than currently. The inference from the relationship between interest rates and the cost of equity capital is that current capital costs are low in comparison to historical capital costs.

Source: Federal Reserve

Q. Do actual returns represent the cost of equity?

A. No. The cost of equity represents investors' *expected* returns not realized accounting returns.

Q. Is there any information available that leads to an understanding of the relationship between the equity returns required for a regulated water utility versus the market?

A. Yes. A comparison of betas, a component of the CAPM discussed in Section V, for the water utility industry and the market provides insight into this relationship. The average beta (1.01)[3] for a water utility is about the same than the theoretical average beta for all stocks (1.0). According to the CAPM formula, the cost of equity capital moves in the same direction as beta. Since the beta for the water utility industry is about the same than

[3] See Schedule PMC-7

the beta for the market, the implication is that the required return on equity for a regulated water utility is approximately the average required return on the market.

Risk

Q. Please define risk.

A. Risk, as it relates to an investment, is generally recognized as the variability or uncertainty of the returns on the investment. Risk is often separated into two components. Those components are market risk (systematic risk) and non-market risk (unique risk).

Q. What is market risk?

A. Market risk or systematic risk is the risk that changes in the stock market as a whole will cause changes in the stock price of a particular entity. Market risk is related to the economy-wide perils that affect all business such as inflation, interest rates, and general business cycles. Market risk affects all stocks and it cannot be eliminated by diversification, i.e., it is non-diversifiable. However, the impact on each entity is not necessarily the same. Accordingly, market risk is the only risk that affects the cost of equity.

Q. Is there a measure for market risk?

A. Yes. Market risk is measured by the beta. Beta reflects both the business risk and financial risk of an entity.

Q. How are business and financial risks defined?

A. Business risk is that risk which is associated with the fluctuation in earnings due to the basic nature of an entity's business. Financial risk is that risk which affects shareholders due to a firm's use of fixed obligation (i.e., debt) financing.

Q. Is the cost of equity affected by both business and financial risk?

A. Yes.

Q. What is the relationship between the capital structure of a firm and its financial risk?

A. As previously discussed, the relative proportions of short-term debt, long-term debt (including capital leases), preferred stock and common stock used to finance an entity's assets represent its capital structure. Financial risk increases as an entity includes a greater proportion of fixed obligation financing in its capital structure (i.e., as it becomes more leveraged). An increase in financial risk is reflected in the market risk measured by beta resulting in an increase in an entity's cost of equity.

Q. How does Chaparral City's financial risk compare to the sample water companies' financial risk from the perspective of an investor?

A. From an investor's perspective Chaparral City's capital structure is composed of approximately 24.4 percent debt and 75.6 percent equity. Schedule PMC-4 shows the capital structures of six publicly traded water companies ("sample water companies") as of March 31, 2008, as well as Chaparral City's actual capital structure. As of March 31, 2008, the sample water utilities were capitalized with approximately 49.9 percent debt and 50.1 percent equity, while Chaparral City's actual capital structure consists of approximately 24.4 percent debt and 75.6 percent equity. Consequently, Chaparral City's shareholders bear less financial risk than the shareholders of the sample water companies.

Q. What is non-market risk?

A. Non-market (unique risk) is risk related to an individual entity. There is no correlation among entities for unique risk; accordingly, it can be eliminated through diversification.

Specifically, investors can eliminate unique risk by holding a diversified investment portfolio.

Q. Is unique risk measured by beta?

A. No. Unique risk is not measured by beta.

Q. Is the cost of equity affected by unique risk?

A. No. Since unique or firm-specific risk can be eliminated through diversification, it does not affect the cost of equity capital.

Q. What additional return can investors expect to account for unique risk?

A. None. Investors who hold diversified portfolios can eliminate unique risk, and consequently do not require any related additional return. Since investors who choose to be less than fully diversified must compete in the market with fully diversified investors, the former cannot expect to be compensated for unique risk.

V. ESTIMATING THE COST OF EQUITY

Introduction

Q. Did Staff directly estimate the cost of equity for the Applicant?

A. No. Staff did not directly estimate Chaparral City's cost of equity for two reasons. First, Chaparral City's stock is not publicly traded; therefore, its cost of equity cannot be estimated because the required information is not available to perform the analysis. Second, using an average of a representative sample group reduces the potential for random fluctuations resulting in a more reliable estimate, vis-à-vis relying on a single entity.

Q. What companies did Staff select as proxies or comparables for Chaparral City?

A. Staff selected six publicly traded water utilities shown in Schedule PMC-4. Staff chose these six entities because they derive most of their earnings from regulated operations, and they are currently analyzed by *The Value Line Investment Survey Small and Mid Cap Edition* ("*Value Line Small Cap*") and *The Value Line Investment Survey* ("*Value Line*") making available the necessary information to perform a cost of capital estimation for Chaparral City.

Q. What models did Staff implement to estimate Chaparral City's cost of equity?

A. The cost of equity is determined by the market; therefore, Staff used two market-based models to estimate the cost of equity for Chaparral City: the discounted cash flow model ("DCF") and the CAPM.

Q. Explain why Staff chose the DCF and CAPM?

A. Staff chose to use the DCF and CAPM because they are widely recognized as appropriate market-based models and have been used extensively to estimate the cost of equity. A description of the DCF and then the CAPM begins immediately below.

Discounted Cash Flow Model Analysis

Q. Please provide a brief summary of the theory underlying use of the DCF to estimate the cost of equity.

A. The theory underlying use of the DCF to estimate the cost of capital is that the cost of equity is that discount rate which equates the current market price to all future cash flows expected by investors. That is, the cost of equity is the rate that future expected cash flows (primarily dividends) must be discounted to equal a given market price.

In the 1960s, Professor Myron Gordon pioneered the use of the DCF method to estimate the cost of capital for a public utility. The DCF model has become widely used due to its theoretical merit and its simplicity.

Q. How is the DCF model applied?

A. The DCF model is applied via a mathematical formula where the current market price, the expected dividend, and projected dividend growth rate are inputs, while the discount rate (cost of equity) is the result. The formula can be applied to a sample of companies that exhibit similar risk to the entity whose cost of equity is being estimated and the results averaged to arrive at an estimate of the cost of equity for the subject entity.

Q. Did Staff apply more than one version of the DCF?

A. Yes. Staff applied two versions of the DCF: the constant-growth DCF and the multi-stage or non-constant growth DCF. The constant-growth DCF assumes that an entity will grow indefinitely at the same rate. Alternately, the non-constant growth DCF does not assume one constant, indefinite dividend growth rate.

The Constant-Growth DCF

Q. What is the mathematical formula used in Staff's constant-growth DCF analysis?

A. The constant-growth DCF formula used in Staff's analysis is:

Equation 2:

$$K = \frac{D_1}{P_0} + g$$

where:

	K	=	the cost of equity
	D_1	=	the expected annual dividend
	P_0	=	the current stock price
	g	=	the expected infinite annual growth rate of dividends

Equation 2 assumes that the entity has a constant earnings retention rate and that its earnings are expected to grow at a constant rate. According to Equation 2, a stock with a current market price of $10 per share, an expected annual dividend of $0.39 per share and an expected dividend growth rate of 5.0 percent per year has a cost of equity to the entity of 8.9 percent reflected by the sum of the dividend yield ($0.39/ $10 = 3.9 percent) and the 5.0 percent annual dividend growth rate.

Q. How did Staff calculate the dividend yield component (D_1/P_0) of the constant-growth DCF formula?

A. Staff calculated the yield component of the DCF formula by dividing the expected annual dividend[4] (D_1) by the spot stock price (P_0) after the close of the market August 6, 2008, as reported by *MSN money*.

[4] Value Line Summary & Index. 7-25-08

Q. Why did Staff use the spot stock price rather than a historical average stock price to calculate the dividend yield component of the DCF formula?

A. Use of the current market stock price (spot stock price) is consistent with finance theory, i.e., the efficient market hypothesis. This hypothesis asserts that the current stock price reflects information investors use to form expectations of future returns. Use of a historical average of stock prices illogically discounts the most recent information in favor of less recent information. The latter is stale and is representative of underlying conditions that may have changed.

Q. How did Staff estimate the dividend growth (g) component of the constant-growth DCF model represented by Equation 2?

A. The dividend growth component for Staff's constant-growth DCF model is the average of six different estimation methods as shown in Schedule PMC-8. Staff computed both historical and projected growth estimates on dividend-per-share ("DPS")[5], earnings-per-share ("EPS")[6] and sustainable growth bases.

Q. Why did Staff examine EPS growth to estimate the dividend growth component of the constant-growth DCF model?

A. Staff examined EPS growth (both historical and projected) because dividends are dependent on earnings. Dividend distribution in excess of earnings results in capital contraction. Continued capital contraction is not sustainable in the long run, and it is inconsistent with the constant-growth DCF model. Therefore, EPS growth is an appropriate consideration for estimating expected dividend growth.

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[5] Derived from information provided by *Value Line*
[6] Derived from information provided by *Value Line*

Q. How did Staff estimate historical DPS growth?

A. Staff estimated historical DPS growth by calculating the average rate of growth in DPS of the sample water companies from 1997 to 2007. The results of that calculation are shown in Schedule PMC-5. Staff calculated an average historical DPS growth rate of 2.9 percent for the sample water utilities for the period 1997 to 2007.

Q. How did Staff estimate the projected DPS growth?

A. Staff calculated an average of the projected DPS growth rates for the sample water utilities from *Value Line*. The average projected DPS growth rate is 4.2 percent as shown in Schedule PMC-5.

Q. How did Staff calculate the historical EPS growth rate?

A. Staff estimated historical EPS growth by calculating the average rate of growth in EPS of the sample water companies from 1997 to 2007. The results of that calculation are shown in Schedule PMC-5. Staff calculated an average historical EPS growth rate of 3.6 percent for the sample water utilities for the period 1997 to 2007.[7]

Q. How did Staff estimate the projected EPS growth?

A. Staff calculated an average of the projected EPS growth rates for the sample water utilities from *Value Line*. The average projected EPS growth rate is 8.4 percent as shown in Schedule PMC-5.

[7] Staff has excluded one data input from the calculation. EPS from the period of 1997 to 2007 for California Water resulted in a negative 2.0 percent EPS growth rate. Staff excluded the negative result of the calculation of average growth in EPS for the sample companies in that period, because negative growth is inconsistent with the DCF model.

Q. How did Staff calculate its historical and projected sustainable growth rates?

A. Staff's historical and projected sustainable growth rates were calculated by adding their respective retention growth rate terms (br) to their respective stock financing growth rate terms (vs) as shown in Schedule PMC-6.

Q. What is retention growth?

A. Retention growth is the growth in dividends due to the retention of earnings. Viewed differently, an entity cannot expect to grow dividends if it does not retain any earnings. Retention growth is dependent on the percentage of earnings retained (retention ratio) and the value of earnings. Mathematically, the retention growth rate is the product of the retention ratio and the book/accounting return on equity.

Q. What is the formula for the retention growth rate?

A. The retention growth rate formula is:

Equation 3:

$$\text{Retention Growth Rate} = br$$

where: b = the retention ratio (1 – dividend payout ratio)
r = the accounting/book return on common equity

Q. How did Staff calculate the average historical retention growth rate (br) for the sample water utilities?

A. First, Staff calculated the retention rate for each of the sample water companies from 1998 to 2007. Then Staff calculated the mean of those results. The historical average retention (br) growth for the sample water utilities is 2.9 percent as shown in Schedule PMC-6.

Q. How did Staff determine projected retention growth rate (br) for the sample water utilities?

A. Staff used the retention growth projections for the sample water utilities for the period 2011 to 2013 from *Value Line.* The projected average retention growth rate for the sample water utilities is 5.5 percent as shown in Schedule PMC-5.

Q. When can retention growth provide a reasonable estimate of future dividend growth?

A. The retention growth rate is a reasonable estimate of future dividend growth when the retention ratio is reasonably constant and the entity's market price to book value ("market-to-book ratio") is expected to be 1.0. The average retention ratio has been reasonably constant in recent years. However, the market-to-book ratio for the sample water utilities is 2.0, notably higher than 1.0, as shown in Schedule PMC-7.

Q. Is there any financial implication of a market-to-book ratio greater than 1.0?

A. Yes. A market-to-book ratio greater than 1.0 implies that investors expect an entity to earn an accounting/book return on its equity that exceeds its cost of equity. The relationship between required returns and expected cash flows is readily observed in the fixed securities market. For example, assume an entity contemplating issuance of bonds with a face value of $10 million at either 5 percent or 7 percent, and thus, paying annual interest of $500,000 or $700,000, respectively. Regardless of investors' required return on similar bonds, investors will be willing to pay more for the bonds if issued at 7 percent than if the bonds are issued at 5 percent. For example, if the current interest rate required by investors is 5 percent, then they would bid $10 million for the 5 percent bonds and more than $10 million for the 7 percent bonds. Similarly, if equity investors require a 7 percent return and expect an entity to earn accounting/book returns of 11 percent, the market will bid up the price of the entity's stock to provide the required return of 7 percent.

Q. How has Staff generally recognized a market-to-book ratio exceeding 1.0 in its cost of equity analyses in recent years?

A. First, Staff has assumed that investors expect the market-to-book ratio to remain greater than 1.0. Given that assumption, Staff has added a stock financing growth rate (vs) term to the retention ratio (br) term to calculate its historical and projected sustainable growth rates.

Q. Do the historical and projected sustainable growth rates Staff uses to develop its DCF cost of equity in this case continue to include a stock financing growth rate term?

A. Yes.

Q. What is stock financing growth?

A. Stock financing growth is the growth in an entity's dividends due to the sale of stock by that entity. Stock financing growth is a concept derived by Myron Gordon and discussed in his book *The Cost of Capital to a Public Utility.*[8] Stock financing growth is the product of the fraction of the funds raised from the sale of stock that accrues to existing shareholders (v) and the fraction resulting from dividing the funds raised from the sale of stock by the existing common equity (s).

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[8] Gordon, Myron J. *The Cost of Capital to a Public Utility*. MSU Public Utilities Studies, Michigan, 1974. pp 31-35.

Q. What is the mathematical formula for the stock financing growth rate?

A. The mathematical formula for stock financing growth is:

Equation 4:

$$\text{Stock Financing Growth} = vs$$

where: v = Fraction of the funds raised from the sale of stock that accrues to existing shareholders

s = Funds raised from the sale of stock as a fraction of the existing common equity

Q. How is the variable *v* presented above calculated?

A. Variable v is calculated as follows:

Equation 5:

$$v = 1 - \left(\frac{book\ value}{market\ value}\right)$$

For example, assume that a share of stock has a \$40 book value and is selling for \$50. Then, to find the value of v, the formula is applied:

$$v = 1 - \left(\frac{40}{50}\right)$$

In this example, v is equal to 0.20.

Q. How is the variable *s* presented above calculated?

A. Variable s is calculated as follows:

Equation 6:

$$s = \frac{\text{Funds raised from the issuance of stock}}{\text{Total existing common equity before the issuance}}$$

For example, assume that an entity has $100 in existing equity, and it sells $10 of stock. Then, to find the value of s, the formula is applied:

$$s = \left(\frac{10}{100}\right)$$

In this example, s is equal to 10.0 percent.

Q. What is the *vs* term when the market-to-book ratio is equal to 1.0?

A. A market-to-book ratio equal to 1.0 reflects that investors expect an entity to earn a book/accounting return on their equity investment equal to the cost of equity. When the market-to-book ratio is equal to 1.0, none of the funds raised from the sale of stock by the entity accrues to the benefit of existing shareholders, i.e., the term v is equal to zero (0.0). Consequently, the vs term is also equal to zero (0.0). When stock financing growth is zero, dividend growth depends solely on the br term.

Q. What is the effect of the *vs* term when the market-to-book ratio is greater than 1.0?

A. A market-to-book ratio greater than 1.0 reflects that investors expect an entity to earn a book/accounting return on their equity investment greater than the cost of equity.

Equation 5 shows that when the market-to-book ratio is greater than 1.0 the v term is also greater than zero. The excess by which new shares are issued and sold over book value per share of outstanding stock is a contribution that accrues to existing stockholders in the form of a higher book value. The resulting higher book value leads to higher expected earnings and dividends. Continued growth from the vs term is dependent upon the continued issuance and sale of additional shares at a price that exceeds book value per share.

Q. What *vs* estimate did Staff calculate from its analysis of the sample water utilities?

A. Staff estimated an average stock financing growth of 2.5 percent for the sample water utilities as shown in Schedule PMC-6.

Q. What would occur if an entity had a market-to-book ratio greater than 1.0 due to investors expecting earnings to exceed the cost of equity capital and the entity subsequently experienced newly authorized rates equal to its cost of equity capital?

A. There would be downward pressure on the entity's stock price to reflect the change in future expected cash flows because, in theory, the market-to-book ratio should decline to 1.0.

Q. What is implied by Staff's continued use of the *vs* term in the historical and projected sustainable growth rates Staff uses to develop its DCF cost of equity is this case?

A. The implication is that there are expectations regarding the market-to-book ratio continuing to exceed 1.0, and that the water utilities will continue to issue and sell stock at prices exceeding book value to provide benefits to existing shareholders. If the authorized ROEs for water utilities are established at the cost of equity capital, the market-to-book ratio should decline to 1.0. If that occurs, the stock financing term would no longer be necessary. If investors expect the average market-to-book ratio of the sample water utilities to fall to 1.0 due to authorized ROEs equaling the cost of equity capital, then Staff's inclusion of the *vs* term in its constant-growth DCF analysis might result in an over estimate of its sustainable dividend growth rate and the resulting DCF ROE estimate.

Q. What are Staff's historical and projected sustainable growth rates?

A. Staff's estimated historical sustainable growth rate is 5.4 percent based on an analysis of earnings retention for the sample water companies. Staff's projected sustainable growth rate is 9.0 percent based on retention growth projected by *Value Line.* Schedule PMC-6 presents Staff's estimates of the sustainable growth rate.

Q. What is Staff's expected infinite annual growth rate in dividends?

A. Staff averaged historical and projected DPS, EPS, and sustainable growth estimates to calculate the expected infinite annual growth rate in dividends. Schedule PMC-8 presents the calculation of the expected infinite annual growth rate in dividends. Staff's estimate is 5.6 percent.

Q. What is Staff's constant-growth DCF estimate?

A. Staff's constant-growth DCF estimate is 8.8 percent, which is shown in Schedule PMC-3.

The Multi-Stage DCF

Q. Why did Staff implement the multi-stage DCF to estimate Chaparral City's cost of equity?

A. As previously stated, Staff used the multi-stage DCF to consider the assumption that dividends may not grow at a constant rate. Staff's multi-stage DCF incorporates two growth rates: a near-term growth rate and a long-term growth rate.

Q. What is the mathematical formula for the multi-stage DCF?

A. The multi-stage DCF formula is shown in the following equation:

Equation 7:

$$P_0 = \sum_{t=1}^{n} \frac{D_t}{(1+K)^t} + \frac{D_n(1+g_n)}{K-g_n}\left[\frac{1}{(1+K)}\right]^n$$

Where:
P_0 = current stock price
D_t = dividends expected during stage 1
K = cost of equity
n = years of non – constant growth
D_n = dividend expected in year n
g_n = constant rate of growth expected after year n

As mentioned above, Staff incorporated two growth rates. This assumes that investors expect dividends to grow at a one rate in the near-term ("Stage-1 growth") and another rate in the long-term ("Stage-2 growth").

Q. What steps did Staff take to implement its multi-stage DCF cost of equity model?

A. First, Staff projected a stream of dividends for each of the sample water utilities using near-term and long-term growth rates. Second, Staff calculated the rate (cost of equity) which equates the present value of the forecasted stream of dividends to the current stock price for each of the sample water utilities. Then, Staff calculated an average of the individual sample company cost of equity estimates.

Q. How did Staff calculate near-term (stage-1) growth?

A. Staff projected four years of dividends for each of the sample water utilities. Projections for the first twelve months, to the extent available, were from *Value Line*. The dividend projections for the remainder of stage 1 reflect the average dividend growth rate calculated in Staff's constant growth DCF analysis, or 5.6 percent, as shown in Schedule PMC-8.

Q. How did Staff estimate long-term (stage-2) growth?

A. Staff used the arithmetic average rate of growth in gross domestic product ("GDP") from 1929 to 2007[9]. Using the GDP growth rate assumes that the water utility industry is expected to grow at the same rate as the overall economy.

Q. What is the historical GDP growth rate that Staff used to estimate stage-2 growth?

A. Staff used 6.7 percent to estimate the stage-2 growth rate.

Q. What is Staff's multi-stage DCF estimate?

A. Staff's multi-stage DCF estimate is 9.8 percent as shown in Schedule PMC-9.

Q. What is Staff's overall DCF estimate?

A. Staff's overall DCF estimate is 9.3 percent. Staff calculated the overall DCF estimate by averaging the constant growth DCF (8.8 percent) and multi-stage DCF (9.8 percent) estimates as shown in Schedule PMC-3.

Capital Asset Pricing Model

Q. Please describe the Capital Asset Pricing Model.

A. The CAPM is concerned with the determination of the prices of capital assets in a competitive market. The CAPM model describes the relationship between a security's investment risk and its market rate of return. This relationship identifies the expected rate of return which investors expect a security to earn so that its market return is comparable

[9] www.bea.doc.gov

with the market returns earned by other securities of similar risk.[10] The CAPM model assumes that investors require a return that is commensurate with the level of risk associated with a particular security. The model also assumes that investors will sufficiently diversify their investments to eliminate any non-systematic or unique risk.[11] In 1990, Professors Harry Markowitz, William Sharpe, and Merton Miller earned the Nobel Prize in Economic Sciences for their contribution to the development of the CAPM.

Q. What sample did Staff use to compute the CAPM to estimate Chaparral City's cost of equity?

A. Staff used the same sample water utilities for its CAPM computation that it used for its DCF analysis.

Q. What is the mathematical formula for the CAPM?

A. The mathematical formula for the CAPM is:

Equation 8:

$$K = R_f + \beta (R_m - R_f)$$

where:

R_f = risk free rate
R_m = return on market
β = beta
$R_m - R_f$ = market risk premium
K = expected return

[10] David C. Purcell; Cost of Capital – A Practitioner's Guide Pg. 6-1.
[11] The CAPM makes the following assumptions: 1. single holding period 2. perfect and competitive securities market 3. no transaction costs 4. no restrictions on short selling or borrowing 5. the existence of a risk-free rate 6. homogeneous expectations.

The equation shows that the expected return (K) on a risky asset is equal to the risk-free interest rate ("R_f") plus the product of the market risk premium ("Rp") $(R_m - R_f)$ multiplied by beta (β) where beta represents the riskiness of the investment relative to the market.

Q. What did Staff use as an estimate for the risk-free rate of interest in its historical market risk premium CAPM method?

A. Staff calculated an estimate of the risk-free rate of interest by averaging three (five-, seven- and ten-year) intermediate-term U.S. Treasury securities' spot rates on August 6, 2008, to correspond with the date Staff selected the sample companies' stock spot market prices. Staff's estimated risk-free rate for use in its historical market risk premium CAPM method is 3.7 percent[12] as shown in Schedule PMC-3.

Q. What did Staff use as an estimate for the risk-free rate of interest in its current market risk premium CAPM method?

A. Staff used the August 6, 2008, spot rate on 30-year U.S. Treasury notes as presented in the U.S. Treasury Department website.

Q. Why do U.S. Treasury security spot rates provide an appropriate representation of the risk-free rate?

A. U.S. Treasury spot rates represent a good estimate of a risk free rate because they have virtually no chance of default and are backed by the U.S. Government. Besides, they are verifiable, objective and readily available.

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[12] Average yield on 5-, 7-, and 10-year Treasury notes according to the U.S. Treasury Department website at www.ustreas.gov: 3.30%, 3.62% and 4.06%, respectively.

Q. What does beta measure?

A. Beta measures the systematic risk of a particular entity's stock relative to the market's beta which is 1.0. Systematic risk is the only risk that cannot be diversified away; therefore, it is the only risk that is relevant when estimating an entity's required return. Since the market's beta is 1.0, a security with a beta higher than 1.0 is riskier than the market and a security with a beta lower than 1.0 is less risky than the market.

Q. How did Staff estimate a proxy for Chaparral City's beta?

A. Staff averaged the *Value Line* betas of the sample water utilities and used this average as a proxy for Chaparral City's beta. Schedule PMC-7 shows the *Value Line* betas for each of the sample water utilities. Staff's estimated beta for Chaparral City is 1.01.

Q. What is a descriptive explanation for the expected market risk premium ($R_m - R_f$)?

A. Descriptively, the expected market risk premium is the expected return on all common stocks minus the risk free rate. It is the additional amount of return over the risk-free rate that investors expect to receive from investing in the market (or an average-risk security). Staff used two approaches to calculate the market risk premium: the historical market risk premium approach and the current market risk premium approach.

Q. What is the historical market risk premium estimate approach used by Staff?

A. The historical market risk premium estimate approach assumes that if the long-run average market risk premium is used consistently to estimate the expected market risk premium, it should, on average, yield the correct premium. In this approach, Staff assumed that the average historical market risk premium estimate is a reasonable estimate of the expected market risk premium.

Q. How did Staff calculate the historical market risk premium?

A. Staff calculated the historical market risk premium by averaging the historical arithmetic differences between the S&P 500 and the intermediate-term government bond income returns published in Morningstar's[13] *Ibbotson Stocks, Bonds, Bills, and Inflation 2008 Classic Yearbook* for the period 1926-2007. Morningstar calculated the historical risk premium by averaging the historical arithmetic differences between the S&P 500 and the intermediate-term government bond income returns. Staff's historical market risk premium estimate is 7.5 percent as shown in Schedule PMC-3.

~~**Q. How did Staff calculate the current market risk premium estimate?**~~

~~A. Staff first derived a DCF ROE of 17.3 (2.3 + 15.02[14]) percent using the expected dividend yield (2.3 percent over the next twelve months) and the annual per share growth rate (15.02 percent) that *Value Line* projects for all dividend-paying stocks under its review (August 15, 2008) as inputs. Then, Staff used the DCF-derived ROE (17.3 percent), the current long-term risk-free rate (4.7 percent 30-year Treasury note) and the market's average beta of 1.0 as inputs into equation 8 to solve for the implied current market risk premium of 12.6 percent.[15]~~

~~**Q. What is the range of Staff's expected market risk premium estimates?**~~

~~A. Staff's market risk premium estimates range from 7.5 percent to 12.6 percent.~~

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[13] Formerly published by Ibbotson Associates.
[14] The three to five year price appreciation is 75%. $1.75^{0.25} - 1 = 15.02\%$
[15] $17.32\% = 4.68 + (1)(12.64)$

~~**Q. What is Staff's overall CAPM estimate?**~~

~~A. Staff's overall CAPM estimate is 14.3 percent. Staff's overall CAPM estimate is the average of the historical market risk premium CAPM (11.2 percent) and the current market risk premium CAPM (17.4 percent) estimates as shown in Schedule PMC-3.~~

VI. SUMMARY OF STAFF'S COST OF EQUITY ANALYSIS

Q. What is the result of Staff's constant-growth DCF analysis to estimate of the cost of equity to the sample water utilities?

A. Schedule PMC-3 shows the result of Staff's constant-growth DCF analysis. The result of Staff's constant-growth DCF analysis is as follows:

k = Dividend yield + Expected dividend growth

k = 3.2% + 5.6%

k = **8.8%**

Staff's constant-growth DCF estimate of the cost of equity to the sample water utilities is 8.8 percent.

Q. What is the result of Staff's multi-stage DCF analysis to estimate the cost of equity for the sample utilities?

A. Schedule PMC-9 shows the result of Staff's multi-stage DCF analysis. The result of Staff's multi-stage DCF analysis is:

Company	**Equity Cost Estimate (k)**
American States Water	9.4%
California Water	9.8%
Aqua America	9.8%
Connecticut Water	10.2%
Middlesex Water	10.7%
SJW Corp	9.2%
Average	**9.8%**

Staff's multi-stage DCF estimate of the cost of equity for the sample water utilities is 9.8 percent.

Q. What is Staff's overall DCF estimate of the cost of equity for the sample utilities?

A. Staff's overall DCF estimate of the cost of equity for the sample utilities is 9.3 percent. Staff's overall DCF estimate was calculated by averaging Staff's constant growth DCF (8.8 percent) and Staff's multi-stage DCF (9.8 percent) estimates as shown in Schedule PMC-3.

Q. What is the result of Staff's historical market risk premium CAPM analysis to estimate of the cost of equity for the sample utilities?

A. Schedule PMC-3 shows the result of Staff's CAPM analysis using the historical risk premium estimate. The result is as follows:

$$K = R_f + \beta (R_m - R_f)$$

$$K = 3.7\% + 1.01 * 7.5\%$$

$$K = 11.2\%$$

Staff's CAPM estimate (using the historical market risk premium) of the cost of equity to the sample water utilities is 11.2 percent.

Q. ~~**What is the result of Staff's current market risk premium CAPM analysis to estimate the cost of equity for the sample utilities?**~~

~~A. Schedule PMC-3 shows the result of Staff's CAPM Analysis using the current market risk premium estimate. The result is:~~

$$\cancel{K = R_f + \beta (R_m - R_f)}$$

$$\cancel{K = 4.7\% + 1.01 * 12.6\%}$$

$$\cancel{K = 17.4\%}$$

~~Staff's CAPM estimate (using the current market risk premium) of the cost of equity to the sample water utilities is 17.4 percent.~~

~~**Q. What is Staff's overall CAPM estimate of the cost of equity for the sample utilities?**~~

~~A. Staff's overall CAPM estimate for the sample utilities is 14.3 percent. Staff's overall CAPM estimate is the average of the historical market risk premium CAPM (11.2 percent) and the current market risk premium CAPM (17.4 percent) estimates as shown in Schedule PMC-3.~~

~~**Q. Please summarize the results of Staff's cost of equity analysis for the sample utilities.**~~

~~A. The following table shows the results of Staff's cost of equity analysis:~~

~~**Table 4**~~

~~**Method**~~	~~**Estimate**~~
~~Average DCF Estimate~~	~~9.3%~~
~~Average CAPM Estimate~~	~~14.3%~~
~~**Overall Average**~~	~~**11.8%**~~

~~Staff's average estimate of the cost of equity to the sample water utilities is 11.8 percent.~~

~~VII. FINAL COST OF EQUITY ESTIMATES~~

~~**Q. Has Staff quantified the effect of the difference in financial risk between Chaparral City and the sample water utilities on its cost of equity?**~~

~~A. Yes. Staff used the methodology developed by Professor Robert Hamada of the University of Chicago, which incorporates capital structure theory with the CAPM, to estimate the effect of Chaparral City's capital structure on its cost of equity. Staff calculated a financial risk adjustment for Chaparral City of negative 180 basis points. Staff estimated a 10.0 percent cost of equity for Chaparral City by addition of the financial risk adjustment to Staff's average estimate of the cost of equity to the sample water utilities.~~

~~The calculation is as follows:~~

~~Equation 9:~~

~~Adjusted ROE = Overall average estimated ROE + Financial risk adjustment~~

~~Adjusted ROE for Chaparral City = 11.8% + (- 1.8%)~~

~~Adjusted ROE for Chaparral City = 10.0%~~

~~**Q. What is Staff's ROE estimate for Chaparral City?**~~

~~A. Staff determined a ROE estimate of 10.0 percent for the Applicant based on cost of equity estimates for the sample companies ranging from 9.3 percent for the DCF to 14.3 percent for the CAPM and a 180 basis point downward adjustment for the relatively smaller financial risk in Chaparral City's capital structure compared to the sample companies.~~

VIII. FINAL WEIGHTED AVERAGE COST OF CAPITAL

Q. What weighted average cost of capital did Staff determine for Chaparral City?

A. Staff determined a 8.8 percent WACC for the Applicant as shown in Schedule PMC-1 and Table 5 below:

Table 5

	Weight	Cost	Weighted Cost
Long-term Debt	24.4%	5.0%	1.2%
Common Equity	75.6%	10.0%	7.6%
Weighted Average Cost of Capital			**8.8%**

IX. FAIR VALUE RATE OF RETURN RECOMMENDATION

Q. Are the WACC and FVROR equivalent constructs?

A. No. As discussed in Section II, the WACC is a financial construct that represents the opportunity cost of foregone earnings or returns resulting from a choice of one investment over others with equivalent risk. In contrast, FVROR is a legal construct that represents the rate applied to a fair value rate base that results in a fair return. The WACC and FVROR do have one commonality – each should facilitate determination of a fair return. The underlying objectives of a fair return, and therefore the revenue requirement, are materially unaltered regardless of whether the WACC or FVROR is applied.

The Commission appropriately recognized the distinction between the WACC and FVROR in Decision No. 70441, dated July 28, 2008, stating that: "Because the weighted average cost of capital includes inflation, if the Commission were to apply that cost of capital as the FVROR to the FVRB (which includes inflation in the RCND portion), then the impact of inflation would be overstated, and the resulting revenues would compensate the utility for more than the fair value of its property, resulting in rates and charges that were not just and reasonable."

As the Commission recognized, the market determines the return required by investors. Investors in water utilities cannot expect to earn a return in excess of the market determined rate. Therefore, investors do not expect to earn their total return through current rates when they can simultaneously anticipate a return from the appreciation of utility plant that is subsequently included in rate base. An alternate way to see this is that investors earn their total return (in this case, 8.8 percent WACC) through appreciation (2.5 percent accretion return) and current rates (6.3 percent FVROR).

Q. What fair value rate of return does Staff recommend for Chaparral City?

A. Staff recommends a 6.3 percent FVROR for the Applicant as shown in Schedule PMC-2.

Q. How did Staff calculate the FVROR?

A. Staff first calculated the difference between the treasury yields for 20-year securities, and the treasury real yields for 20-year securities, to estimate the additional return required by investors due to inflation for a long-term (20-year) horizon. Then, Staff calculated the FVROR by subtracted the additional return required by investors due to inflation from the WACC.

Q. Are the cost of debt and the cost of equity both affected by inflation?

A. Yes. Inflation is widely recognized as a fundamental factor that affects both the cost of debt and the cost of equity.[16] Hence, it is appropriate to apply the inflation adjustment to both the cost of debt and the cost of equity (i.e., the inflation adjustment should be applied to the WACC).

X. STAFF RESPONSE TO THE APPLICANT'S COST OF CAPITAL WITNESS

Q. Please summarize Bourassa's analyses and recommendations.

A. Mr. Bourassa proposes a 9.32 percent WACC/FVROR based on a capital structure consisting of 23.44 percent debt (at 5.5 percent) and 76.56 percent common equity (at 10.5 percent.

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[16] See further, Eugene F. Brigham, Michael C. Ehrhardt ; _Financial Management – Theory and Practice._ 2005. Thomson South -Western. Pages. 24 – 29. William F. Shape, Gordon J. Alexander, Jeffery V. Bailey; _Investments._ 2004. Prentice-Hall. Pages 325-328. Lawrence J. Gitman, Michael D. Joehnk; _Fundamentals of Investing._ 2005. Pearson Addison-Westley.

Mr. Bourassa's proposed 10.5 percent ROE is based on analyses for single and multi-stage DCF models, as well as historical and current market risk premium CAPM for the same sample of water companies selected by Staff.

Mr. Bourassa's ROE results are summarized below:

	Range	Midpoint
DCF Constant Growth	8.1% - 13.6%	10.9%
Multi-Stage Growth Model	9.3% - 12.4%	10.9%
CAPM	11.4% - 11.5%	11.5%

Q. Does Staff have any comments on Mr. Bourassa's proposed capital structure?

A. Yes. Mr. Bourassa's capital structure is out of date. Staff used in its analysis Chaparral's capital structure as of June 31, 2008. Using an updated capital structure provides a more accurate measurement of the Company's capitalization and cost of debt.

Q. Does Staff have any comments on Mr. Bourassa's constant growth DCF estimates?

A. Yes. Mr. Bourassa relies solely on analysts' forecasts to estimate growth in his constant growth DCF estimates. Analysts' forecasts are known to be overly optimistic. Sole use of analysts' forecasts to calculate the growth in dividends ("g") causes inflated growth, and consequently, inflated cost of equity estimates. Furthermore, sole reliance on analysts' forecasts of earnings growth to forecast DPS is inappropriate because it assumes that investors do not look at other relevant information such as past dividend and earnings growth. In addition, the Commission has previously recognized that analysts' forecasts are overstated.[17]

Q. How does Staff respond to Mr. Bourassa's statement, "To the extent that past results provide useful indications of future growth prospects, analysts' forecasts would already incorporate that information."?[18]

A. The appropriate growth rate to use in the DCF formula is the dividend growth rate expected by investors, not analysts. Therefore, while analysts may have considered historical measures of growth, it is reasonable to assume that investors also rely on past growth. This calls for consideration of both analysts' forecasts as well as past growth.

Q. Does Staff have any comments on the study cited by Mr. Bourassa, conducted by David A. Gordon, Myron J. Gordon and Lawrence I. Gould[19] that Mr. Bourassa asserts support exclusive use of analysts' forecasts in the DCF model?

A. Yes. The article cited by Mr. Bourassa does not conclude that investors ignore past growth when pricing stocks; therefore, it does not support the sole use of analysts' forecast in the DCF model.

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[17] Decision No. 66849, page 22.
[18] Bourassa's Direct Testimony, Page 30, lines 6 – 8.
[19] Gordon, David A., Myron J. Gordon, Lawrence I. Gould. "Choice Among Methods 1of Estimating Share Yield." *The Journal of Portfolio Management*. Spring 1989. pp. 50-55. (Mr. Bourassa's Direct Testimony, page 30.)

Q. Does Professor Gordon recommend relying exclusively on analysts' forecasts as the measure of growth in the DCF model?

A. No. Subsequent to the study cited by Mr. Bourassa, Professor Gordon provided the keynote address at the 30th Financial Forum of the Society of Utility and Regulatory Financial Analysts, in which he stated:

> "I understand that companies coming before regulatory agencies liked and advocated the high growth rates in security analyst forecasts for arriving at their cost of equity capital. Instead of rejecting these forecasts, I understand that FERC and other regulatory agencies have decided to compromise with them. In particular, in arriving at the cost of equity for company X, the FERC has decided to arrive at the growth rate in my dividend growth model by using an average of two growth rates. One is security analysts forecast of the short-term growth rate in earnings provided by IBES or Value Line and the other a more long run and typically lower figure such as the past growth in GNP.
>
> Such an average can be questioned on various grounds. However, my judgment is that between the short-term forecast alone and its average with the past growth rate in GNP, *the latter may be a more reasonable figure*."[20] (*Emphasis added*)

Simply stated, Professor Gordon would temper the typically higher analysts' forecasts with the typically lower GNP growth rate by averaging the two.

[20] Gordon, M. J. Keynote Address at the 30th Financial Forum of the Society of Utility and Regulatory Financial Analysts. May 8, 1998. Transparency 3.

Q. Can Staff provide further evidence to support its assertion that exclusive reliance on analysts' forecasts of earnings growth in the DCF model would result in inflated cost of equity estimates?

A. Yes. Experts in the financial community have commented on the optimism in analysts' forecasts of future earnings.[21] A study cited by David Dreman in his book *Contrarian Investment Strategies: The Next Generation* found that *Value Line* analysts were optimistic in their forecasts by 9 percent annually, on average for the 1987 – 1989 period. Another study conducted by David Dreman found that between 1982 and 1997, analysts overestimated the growth of earnings of companies in the S&P 500 by 188 percent.

In addition, Burton Malkiel of Princeton University studied the one-year and five-year earnings forecasts made by some of the most respected names in the investment business. His results showed that the five-year estimates of professional analysts, when compared with actual earnings growth rates, were much worse than the predictions from several naïve forecasting models, such as the long-run rate of growth of national income. In the following excerpt from Professor Malkiel's book A Random Walk Down Wall Street, he discusses the results of his study:

> When confronted with the poor record of their five-year growth estimates, *the security analysts honestly, if sheepishly, admitted that five years ahead is really too far in advance to make reliable projections*. They protested that although long-term projections are admittedly important, they really ought to be judged on their ability to project earnings changes one year ahead. Believe it or not, it turned out that their one-year forecasts were even worse than their five-year projections.
>
> The analysts fought back gamely. They complained that it was unfair to judge their performance on a wide cross section of industries, because earnings for high-tech firms and various

[21] See Siegel, Jeremy J. Stocks for the Long Run. 2002. McGraw-Hill. New York. p. 100. Dreman, David. *Contrarian Investment Strategies: The Next Generation*. 1998. Simon & Schuster. New York. pp. 97-98. Malkiel, Burton G. *A Random Walk Down Wall Street*. 2003. W.W. Norton & Co. New York. p. 175.

> "cyclical" companies are notoriously hard to forecast. *"Try us on utilities," one analyst confidently asserted. At the time they were considered among the most stable group of companies because of government regulation. So we tried it and they didn't like it. Even the forecasts for the stable utilities were far off the mark.*[22] (Emphasis added)

Q. Does Staff have any concerns regarding Mr. Bourassa's omission of historical and forecasted DPS in his DCF constant growth estimates?

A. Yes. The omission of DPS growth in a DCF analysis implies that investors do not take into account dividend growth when pricing stocks. As previously mentioned on Section V of this testimony, the current market price of a stock is equal to the present value of all expected future dividends, not future earnings. Professor Jeremy Siegel from the Wharton School of Finance stated:

> Note that the price of the stock is always equal to the present value of all future *dividends* and not the present value of future earnings. Earnings not paid to investors can have value only if they are paid as dividends or other cash disbursements at a later date. Valuing stock as the present discounted value of future earnings is manifestly wrong and greatly overstates the value of the firm.[23]

In other words, investors pay attention to earnings as long as they are paid as dividends. Earnings can easily be overstated, but if investors do not receive dividends or other cash disbursement at a later date, then such earnings are meaningless.

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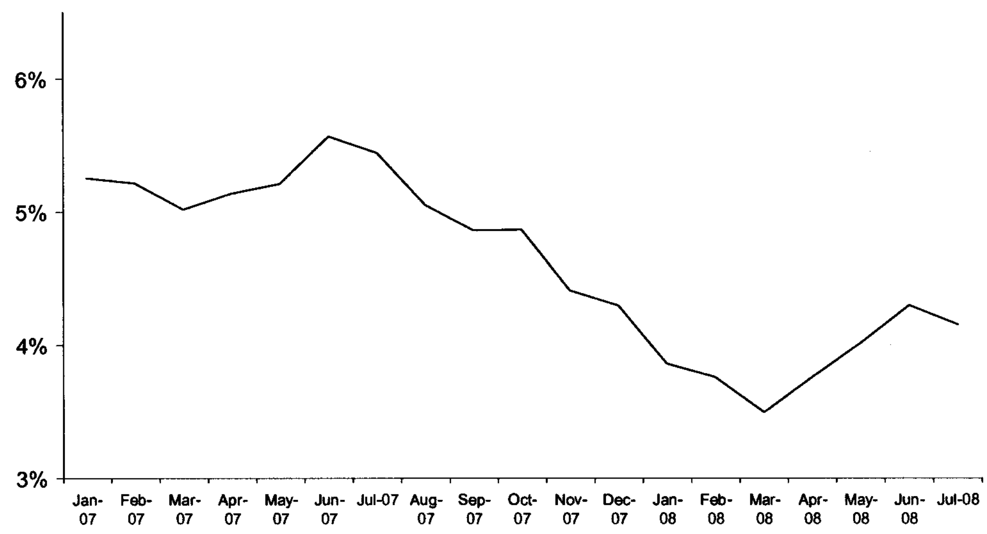
[22] Malkiel, Burton G. A Random Walk Down Wall Street. 2003. W.W. Norton & Co. New York. p. 175
[23] Siegel, Jeremy J. Stocks for the Long Run. 2002. McGraw-Hill. New York. P. 93.

Q. Does Staff have any comments on Mr. Bourassa's statement: "More recent data suggest the 10-year Treasury Bond and 30 year Treasury bond yields are on the rise. On June 13, 2007, for example, the 10-year Treasury bond and 30 year Treasury bond yields were 5.20 percent and 5.28 percent, respectively."[24]

A. Yes. Mr. Bourassa's correctly points out that there *was* an upward trend in bond yields until mid-2007. However, Mr. Bourassa erroneously assumes that such upward trend will continue. As evident in Chart 3 (below) the average yield on 10-year and 30-year treasuries has decreased since then.

Chart 3: Average Yield on 10 & 30-Year Treasuries



It is important to consider that analysts who forecast future rates do not have any more information about the future than what is already reflected in the current rate.

[24] Mr. Bourassa's Direct Testimony, page 9, lines 14 - 17.

According to Nancy L. Jacob of the University of Washington and R. Richardson Pettit of the University of Houston:

> While we know something about many of the factors that determine interest rates (money supply, the demand for loanable funds, etc.) little evidence exists to suggest these factors can be predicted with enough accuracy to successfully predict the rates.[25]

As previously stated, the best forecast of tomorrow's yield is simply today's yield. "Professional forecasts of financial variables are notoriously unreliable and appear to be getting worse, not better, over time." "The direction of interest rates [bond yields] cannot be predicted any better than by the flip of a coin."[26]

Q. What comment does Staff have in response to the Company's assertion that Staff's current market risk premium is extremely volatile?

A. Changes in Staffs current market risk premium results over time are a reflection of changes in the market's current risk premium rather than instability in Staff's method.

Q. Should DPS growth be considered in a DCF analysis?

A. Yes. The omission of historical DPS growth in a DCF analysis implies that investors do not take into account dividend growth when pricing stocks. The current market price of a stock is equal to the present value of all expected future dividends, not future earnings.

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[25] Jacob, Nancy L., R. Richardson Pettit. *Investments*. Irwin. Homewood, Ill. 1988. p. 499.
[26] Kihm, Steven G. "The Superiority of Spot Yields in Estimating Cost of Capital." *Public Utilities Fortnightly*. February 1, 1996. pp. 42-45.

XI. CONCLUSION

Q. Please summarize Staff's recommendations.

A. Staff recommends that the Commission adopt an 8.8 percent WACC for Chaparral City in this proceeding based on capital structure composed of 24.4 percent debt (at 5.0 percent) and 75.6 percent equity (at 10.0 percent).

Staff further recommends that the Commission adopt a 6.3 percent FVROR for the Applicant, reflecting a 2.5 percent inflation deduction from the WACC as shown in Schedule PMC-2.

Q. Does this conclude your direct testimony?

A. Yes, it does.

Chaparral City Water Company, Inc.
Capital Structure
And Weighted Average Cost of Capital
Staff Recommended and Company Proposed

[A]	[B]	[C]	[D]
Description	Weight (%)	Cost	Weighted Cost
Staff Recommended Structure			
Debt	24.4%	5.0%	1.2%
Common Equity	75.6%	10.0%	7.6%
Weighted Average Cost of Capital			**8.8%**
Company Proposed Structure			
Debt	23.4%	5.5%	1.3%
Common Equity	76.6%	10.5%	8.0%
Weighted Average Cost of Capital			**9.3%**

[D] : [B] x [C]

Supporting Schedules: PMC-3 and PMC-4.

Chaparral City Water Company, Inc.
Inflation Adjustment (Accretion Return) and
Resulting Fair Value Rate of Return

Description		
Weighted Average Cost of Capital	8.8%	1
Minus: Modified Inflation Adjustment/Accretion Return	**-1.2%**	2
Fair Value Rate of Return	**7.6%**	

1: Schedule PMC-1

2: Calculation of Modified Inflation Adjustment/Accretion Return:

20-year Treasury Yield [3]	4.7%	
20-year Treasury Real Yield [3]	2.3%	
Return Required by Investors due to Inflation (Accretion Return)	2.5%	
Times a 50% Factor	0.5	4
Modified Inflation Adjustment/Accretion Return	1.2%	

3: http://www.ustreas.gov as of 8/6/08.

4: Direct Testimony of Mr. Gordon L. Fox.

Chaparral City Water Company, Inc.
Final Cost of Equity Estimates
Sample Water Utilities

[A]	[B]		[C]		[D]		[E]
DCF Method			D_1/P_0 [1]	+	g [2]	=	k
Constant Growth DCF Estimate			3.2%	+	5.6%	=	8.8%
Multi-Stage DCF Estimate						=	9.8%
Average of DCF Estimates							**9.3%**
CAPM Method	Rf	+	β [5]	x	(Rp)	=	k
Historical Market Risk Premium [3]	3.7%	+	1.01	x	7.5% [6]	=	11.2%
Current Market Risk Premium [4]	4.7%	+	1.01	x	12.6% [7]	=	17.4%
Average of CAPM Estimates							**14.3%**
					Average		**11.8%**
					Financial risk adjustment		-1.8%
					Total		**10.0%**

1 MSN Money and Value Line

2 Schedule PMC-8

3 Risk-free rate (Rf) for 5, 7, and 10 year Treasury rates from the U.S. Treasury Department at www.ustreas.gov

4 Risk-free rate (Rf) for 30 Year Treasury bond rate from the U.S. Treasury Department at www.ustreas.gov

5 Value Line

6 Historical Market Risk Premium (Rp) from Ibbotson Associates SBBI 2008 Yearbook

7 Testimony

Chaparral City Water Company, Inc.
Average Capital Structure of Sample Water Utilities

[A]	[B]	[C]	[D]
Company	Debt	Common Equity	Total
American States Water	50.9%	49.1%	100.0%
California Water	43.8%	56.2%	100.0%
Aqua America	55.0%	45.0%	100.0%
Connecticut Water	50.5%	49.5%	100.0%
Middlesex Water	51.5%	48.5%	100.0%
SJW Corp	47.6%	52.4%	100.0%
Average Sample Water Utilities	**49.9%**	**50.1%**	**100.0%**
Chaparral City Water Company, Inc.	**24.4%**	**75.6%**	**100.0%**

Source:
Sample Water Companies from Value Line

Chaparral City Water Company, Inc.
Growth in Earnings and Dividends
Sample Water Utilities

[A] Company	[B] Dividends Per Share 1997 to 2007 DPS[1]	[C] Dividends Per Share Projected DPS[1]	[D] Earnings Per Share 1997 to 2007 EPS[1]	[E] Earnings Per Share Projected EPS[1]
American States Water	1.5%	4.6%	4.5%	4.8%
California Water	0.9%	0.8%	-2.0%	9.4%
Aqua America	7.2%	7.2%	7.6%	11.1%
Connecticut Water	1.2%	No Projection	0.5%	No Projection
Middlesex Water	1.9%	No Projection	2.6%	No Projection
SJW Corp	4.8%	No Projection	2.7%	No Projection
Average Sample Water Utilities	**2.9%**	**4.2%**	**3.6%** [2]	**8.4%**

1 Value Line

2 Note that the figure -2.0% has been excluded from the calculation. This has been done as negative growth is inconsistent with the DCF model.

Chaparral City Water Company, Inc.
Sustainable Growth
Sample Water Utilities

[A]	[B]	[C]	[D]	[E]	[F]
Company	Retention Growth **1998 to 2007** br	Retention Growth Projected br	Stock Financing Growth vs	Sustainable Growth **1998 to 2007** br + vs	Sustainable Growth Projected br + vs
American States Water	2.8%	5.7%	1.6%	4.5%	7.4%
California Water	1.8%	5.5%	4.5%	6.4%	10.0%
Aqua America	4.5%	5.3%	4.3%	8.8%	9.6%
Connecticut Water	2.6%	No Projection	1.2%	3.8%	No Projection
Middlesex Water	1.3%	No Projection	3.5%	4.7%	No Projection
SJW Corp	4.4%	No Projection	0.1%	4.5%	No Projection
Average Sample Water Utilities	**2.9%**	**5.5%**	**2.5%**	**5.4%**	**9.0%**

[B]: Value Line
[C]: Value Line
[D]: Value Line and MSN Money
[E]: [B]+[D]
[F]: [C]+[D]

Chaparral City Water Company, Inc.
Selected Financial Data of Sample Water Utilities

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Company	Symbol	Spot Price 8/6/2008	Book Value	Mkt To Book	*Value Line* Beta β	Raw Beta βraw
American States Water	AWR	**37.70**	17.62	2.1	**1.05**	1.04
California Water	CWT	**38.16**	18.94	2.0	**1.15**	1.19
Aqua America	WTR	**16.48**	7.66	2.2	**0.95**	0.90
Connecticut Water	CTWS	**25.50**	12.40	2.1	**0.85**	0.75
Middlesex Water	MSEX	**17.88**	10.31	1.7	**0.90**	0.82
SJW Corp	SJW	**26.23**	13.35	2.0	**1.15**	1.19
Average				**2.0**	**1.01**	**0.98**

[C]: Msn Money
[D]: Value Line
[E]: [C] / [D]
[F]: Value Line
[G]: (-0.35 + [F]) / 0.67

Chaparral City Water Company, Inc.
Calculation of Expected Infinite Annual Growth in Dividends
Sample Water Utilities

[A]	[B]
Description	g
DPS Growth - Historical[1]	2.9%
DPS Growth - Projected[1]	4.2%
EPS Growth - Historical[1]	3.6%
EPS Growth - Projected[1]	8.4%
Sustainable Growth - Historical[2]	5.4%
Sustainable Growth - Projected[2]	9.0%
Average	**5.6%**

1 Schedule PMC-5

2 Schedule PMC-6

Chaparral City Water Company, Inc.
Multi-Stage DCF Estimates
Sample Water Utilities

[A]	[B]	[C]	[D]	[E]	[F]	[H]	[I]
Company	Current Mkt. Price (P_o)[1]	Projected Dividends[2] (Stage 1 growth) (D_t)				Stage 2 growth[3] (g_n)	Equity Cost Estimate (K)[4]
	8/6/2008	d_1	d_2	d_3	d_4		
American States Water	37.7	1.04	1.10	1.16	1.23	6.7%	9.4%
California Water	38.2	1.20	1.27	1.34	1.42	6.7%	9.8%
Aqua America	16.5	0.53	0.56	0.59	0.62	6.7%	9.8%
Connecticut Water	25.5	0.92	0.97	1.03	1.08	6.7%	10.2%
Middlesex Water	17.9	0.73	0.77	0.81	0.86	6.7%	10.7%
SJW Corp	26.2	0.66	0.70	0.74	0.78	6.7%	9.2%

Average **9.8%**

$$P_0 = \sum_{t=1}^{n} \frac{D_t}{(1+K)^t} + \frac{D_n(1+g_n)}{K-g_n}\left[\frac{1}{(1+K)}\right]^n$$

Where: P_0 = current stock price
D_t = dividends expected during stage 1
K = cost of equity
n = years of non – constant growth
D_n = dividend expected in year n
g_n = constant rate of growth expected after year n

1 [B] see Schedule PMC-7
2 Derived from Value Line Information
3 Average annual growth in GDP 1929 - 2005 in current dollars.
4 Internal Rate of Return of Projected Dividends

Chaparral City Water Company, Inc.
Capitalization

	Interest Rate	Annual Interest	Amount outstanding as of 6/30/2008	Percentage of Capital Structure
Long-Term Debt				
Bonds due 2011	5.2%	$ 52,000	$ 1,000,000	
Bonds due 2022	5.4%	$ 248,940	4,610,000	
Bonds due 2022	5.3%	$ 51,675	975,000	
Long-Term Debt	5.4%	352,615	$ 6,585,000	18.6%
Short-Term Debt	3.8%	78,857	2,050,000	
Short-Term Debt	3.8%	78,857	$ 2,050,000	5.8%
Total Debt	5.0%	$ 431,472	$ 8,635,000.00	24.4%
Common Equity				
Common Shares Outstanding			4,603,000	
Paid in Capital			14,950,000	
Retained Earnings			7,137,000	
Total Common Equity			$ 26,690,000	75.6%
Total Capitalization			$ 35,325,000	100.0%