

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

GARY PIERCE, Chairman
BOB STUMP
PAUL NEWMAN
SANDRA D. KENNEDY
BRENDA. BURNS

IN THE MATTER OF THE APPLICATION OF
ARIZONA-AMERICAN WATER COMPANY,
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 BASED THEREON
FOR UTILITY SERVICE BY ITS AGUA FRIA
WATER, HAVASU WATER AND MOHAVE
WATER DISTRICTS

DOCKET NO. W-01303A-10-0448

**REBUTTAL TESTIMONY
OF
DR. BENTE VILLADSEN
ON BEHALF OF
ARIZONA-AMERICAN WATER COMPANY
JULY 15, 2011**

**REBUTTAL TESTIMONY
OF
DR. BENTE VILLADSEN
ON BEHALF OF
ARIZONA-AMERICAN WATER COMPANY
JULY 15, 2011**

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
I. INTRODUCTION AND SUMMARY.....	1
II. COST OF CAPITAL FOR ARIZONA-AMERICAN WATER COMPANY.....	3
A. Cost of Debt	5
B. Cost of Equity and Capital Structure	9
III. COST OF CAPITAL IMPLEMENTATION.....	14
A. Sample Selection.....	15
B. Discounted Cash Flow	16
C. Capital Asset Pricing Model	21
IV. CONCLUSIONS	29
TABLES AND WORK PAPERS	33

1

2 **EXECUTIVE SUMMARY**

3 Dr. Villadsen rebuts the cost of capital testimony provided by Staff witness, Juan Manrique,
4 RUCO witness, William Rigsby, and Sun City Grand Community Association witness, Michael
5 Arndt.

6 Dr. Villadsen also testifies regarding the implication to Arizona-American of the low returns
7 recommended by these parties.

1 **I. INTRODUCTION AND SUMMARY**

2 **Q. ARE YOU THE SAME BENTE VILLADSEN WHO FILED DIRECT**
3 **TESTIMONY ON BEHALF OF ARIZONA-AMERICAN WATER COMPANY IN**
4 **NOVEMBER 2010?**

5 A. Yes.

6 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

7 A. I have been asked by Arizona-American Water Company (Arizona-American Water or
8 the Company) to review and comment on the testimonies filed by Mr. Juan C. Manrique
9 on behalf of the Utilities Division of the Arizona Corporation Commission (“Manrique
10 Testimony”), Mr. Michael L. Arndt on behalf of Sun City Grand Community Association
11 (“Arndt Testimony”) and Mr. William A. Rigsby on behalf of Residential Utility
12 Consumer Office (“Rigsby Testimony”). Specifically, I have been asked to address these
13 three testimonies cost of capital estimates including the cost of equity, the cost of debt
14 and the relationship between the cost of equity and capital structure. In addition, I have
15 been asked to comment on the implications for Arizona-American Water Company of
16 being allowed to earn a return as low as 6.19 percent on its rate base.

17 **Q. HAVE YOU CHANGED YOUR RECOMMENDED ROE?**

18 A. No. However, should a decision be made to rely on a capital structure with less equity
19 than that filed by the Company, I find that a higher return on equity is merited.
20 Specifically, should a decision be made to use a capital structure with 40% equity and
21 60% debt, I recommend a return of equity of no less than 12 percent.

22 **Q. WHAT ARE YOUR CONCLUSIONS?**

23 A. The Arndt Testimony and the Rigsby Testimony recommends an overall return on capital
24 as low as 6.2 percent recommending a low return on equity, a low equity percentage, an
25 unusually high percentage of short-term debt and an extremely low cost of short-term
26 debt. With these parameters the Company is unlikely to be able to improve its currently
27 very weak financial metrics. As short-term debt needs to be replaced, rolled over, or

1 otherwise modified within a short time horizon, the inclusion of substantial short-term
2 debt exposes the Company to interest rate risk. This risk is high because indications are
3 that interest rates will increase. Further, the combination of the low recommended equity
4 return, high debt and short-term debt percentage and the low cost of short-term debt, the
5 overall cost of capital that the Arndt, Manrique and Rigsby Testimonies recommend is
6 below the overall cost of capital that has recently been allowed comparable water utilities
7 in Arizona as well as below the overall cost of capital that has been allowed in other
8 jurisdictions for water utilities or gas distribution companies. Specifically, the Rigsby
9 Testimony recommends an overall cost of capital of only 6.2 percent while the Manrique
10 Testimony recommends 6.8 percent. At the same time a range of comparable utilities
11 have averaged an allowed return on capital of a bit over 8 percent. Therefore, the
12 recommended cost of capital is simply too low.

13 In addition, I have several issues with the methodology applied in the submitted
14 testimonies. First, the Arndt Testimony fails to perform an analysis of the current cost of
15 capital and should therefore be ignored. Second, the Manrique Testimony's reliance on
16 historical growth rates in the DCF model as well as its recommended of a large amount of
17 short-term debt with a low allowed cost lead to an underestimation of the overall cost of
18 capital. The Manrique Testimony also underestimated the degree to which the cost of
19 equity increases with leverage. Third, the Rigsby Testimony substantially underestimates
20 the cost of capital for several reasons. The Rigsby Testimony fails to adequately adjust
21 the cost of equity for the additional financial risk that Arizona-American is exposed to
22 due to the inclusion of a large amount of short and long-term debt with the short-term
23 debt adding interest rate risk. In addition, the Rigsby Testimony's implementation of the
24 Capital Asset Pricing Model (CAPM) and DCF model is non-standard. The CAPM
25 implementation relies on a market risk premium that uses a geometric market risk
26 premium (MRP), which the academic literature recommends against. Further, the MRP
27 is calculated using total returns on the government bonds, while the literature
28 recommends using the income return of these bonds. The result is a substantial downward
29 bias in the CAPM estimates. Similarly, the Rigsby Testimony relies on a non-standard

1 version of the DCF model using a mix of historical and forecasted growth rates. These
2 non-standard features substantially downward bias the cost of equity estimate.

3 If I modify the implementation of the DCF model and CAPM in the Rigsby and
4 Manrique Testimonies, I find that the recommended cost of equity estimates is downward
5 biased by 70 basis points or more. In addition, the financial leverage impact is under
6 estimated in both the Manrique and the Rigsby Testimonies by as much as 100 basis
7 points.

8 **Q. HOW IS THE REMAINDER OF YOUR REBUTTAL TESTIMONY**
9 **ORGANIZED?**

10 A. Section II summarizes the cost of capital recommendations in this proceedings and also
11 reflect on the reasonableness of the recommended cost of debt, cost of equity, and capital
12 structure. Section III addresses the lack of an independent assessment in the Arndt
13 Testimony and the implementation of the Discounted Cash Flow (“DCF”) and Capital
14 Asset Pricing Model (“CAPM”) in the Manrique and Rigsby Testimony. Finally, Section
15 IV concludes.

16 **II. COST OF CAPITAL FOR ARIZONA-AMERICAN WATER COMPANY**

17 **Q. PLEASE SUMARIZE THE COST OF CAPITAL RECOMMENDATIONS IN**
18 **THIS CASE.**

19 A. Table 1 below shows the cost of capital and capital structure recommendations of the
20 various parties that have provided cost of capital estimates in this matter including the
21 Company and myself.

	Manrique / Staff	Rigsby / RUCO	Villadsen / Company
ROE	10.30%	9.50%	11.50%
% Equity	40%	37.46%	45.34%
Cost of Debt	4.40%	-	-
Short-Term Debt	-	0.45% (17.38%)	na
Long-term Debt	-	5.66% (45.16%)	5.66%
% Debt	60%	62.54%	54.66%
Cost of Capital	6.80%	6.19%	8.30%

Table 1: Summary of Recommendations¹

1 It is evident from the table that substantial disagreement exists on not only the cost of
 2 equity but also on the cost of debt and the capital structure. I note the Manrique, Rigsby,
 3 and Arndt Testimonies rely on short-term debt and the cost of short-term debt to
 4 determine the cost of capital, while the rate base for Arizona-American Water Company
 5 consists of long-lived assets. Further, the short-term debt is assigned a cost rate of only
 6 0.45%. Such a low cost of debt has only been experienced for a very short period in the
 7 last 10 years and it is implausible that Arizona-American Water Company can replace its
 8 current short-term debt with debt at such a low cost. Further, Arizona-American Water
 9 Company has been reducing its reliance on short-term debt and I note that both the
 10 Rigsby Testimony and the Arndt Testimony rely on outdated figures for the capital
 11 structure and the cost of debt. More recent data shows a lower reliance on short-term
 12 debt.²

13 **Q. WHAT IS YOUR REACTION TO THE COST OF CAPITAL**
 14 **RECOMMENDATIONS IN THE ARNDT, MANRIQUE AND RIGSBY**
 15 **TESTIMONIES?**

¹ Sources: Manrique Testimony, Executive Summary; Rigsby Testimony pp. 7-8; Direct Testimony of Thomas M. Broderick on behalf of Arizona-American Water Company (“Broderick Direct”), Executive Summary; and Direct Testimony of Bente Villadsen on behalf of Arizona-American Water Company (“Villadsen Direct”), Executive Summary. The Arndt Testimony does not provide a cost of capital estimate but largely agrees with the cost of capital recommendation of RUCO.

² See, for example, Manrique Testimony p. 7.

1 A. Overall, the recommended cost of capital is too low. The recommendations range from
2 an overall cost of capital of 6.19 to 6.80 percent. In comparison, the allowed cost of
3 capital for, for example, gas utilities in 2010 was approximately 8 percent.³ While I
4 know of no source for the allowed cost of capital for water utilities, the average allowed
5 overall cost of capital in 23 recent Commission decisions for water utilities was 8.1 to 8.5
6 percent⁴ and, for example, the California Public Utilities Commission allowed a cost of
7 capital of 8.0 to 8.9 percent in its generic proceeding.⁵ Given that Arizona-American
8 Water Company exhibits a weak financial metric and has in recent years earned way
9 below its allowed ROE. As a result a cost of capital as low as 6.19 percent could
10 severely impact the Company's ability to attract capital.

11 **A. COST OF DEBT**

12 **Q. PLEASE SUMMARIZE THE COST OF DEBT DURING THE PAST 10 YEARS.**

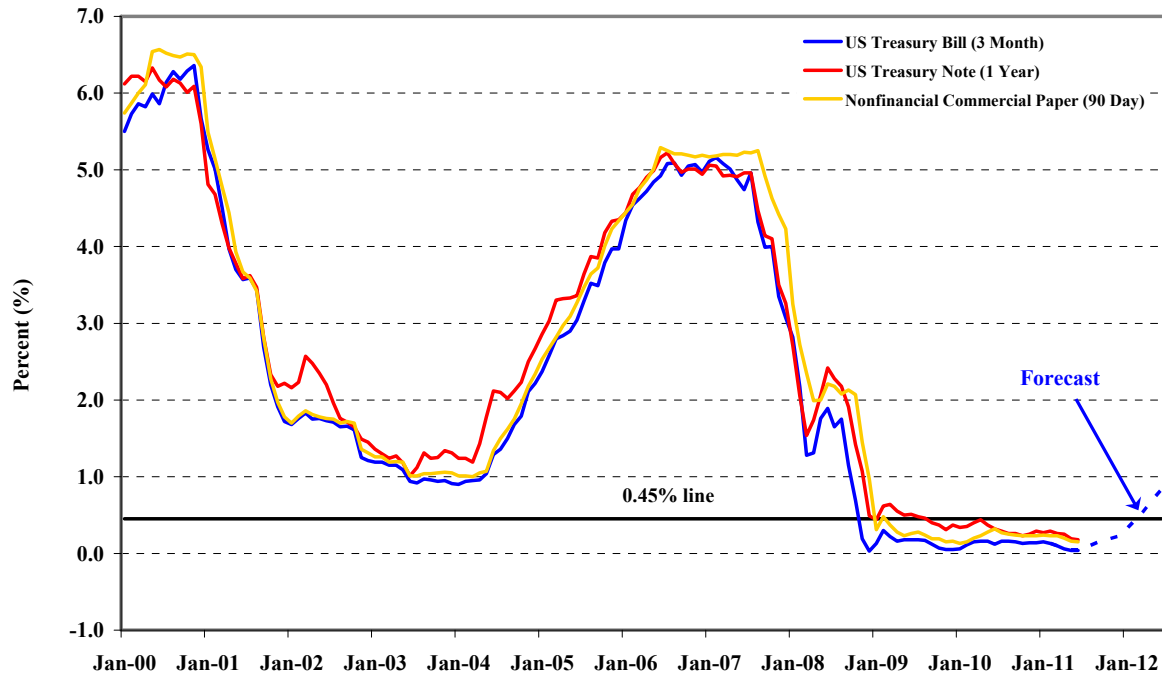
13 A. Figure 1 below shows the yield on 3-month government bills, 1-year government bonds,
14 and commercial (non-financial) paper since 2000.

³ See Section II.B below for details.

⁴ See Table 3 below.

⁵ See Table No. BV R-1 attached to this rebuttal testimony.

US Short Term Treasury and Commercial Paper Yields



Source: Bloomberg as of July 5, 2011, Survey of Professional Forecasters released May 13, 2011, and Board of Governors of the Federal Reserve System updated July 7, 2011.

Figure 1

1 As is evident from the figure above, the cost of short-term risk-free government debt and
 2 90-day commercial paper has generally been higher than the 0.45% that the Manrique,
 3 Rigsby, and Arndt Testimonies are using for Arizona-American Water Company's short-
 4 term debt. For example, the average yield on 90-day T-bills has been 1.75 and 1.96
 5 percent over the last 5 and 10 years, respectively while the yield on non-financial
 6 commercial paper averaged 2.0 and 2.1 percent over the same period.⁶ Equally
 7 important is the fact that the interest on short-term risk-free government debt is expected
 8 to exceed 0.45% in less than a year.

9 However, because the debt in question is short-term, it necessarily will need to be
 10 refinanced and because interest rates on utility debt necessarily is higher than the interest
 11 rate on risk-free government debt, Arizona-American Water Company cannot refinance

⁶ Data from Bloomberg and the Federal Reserve.

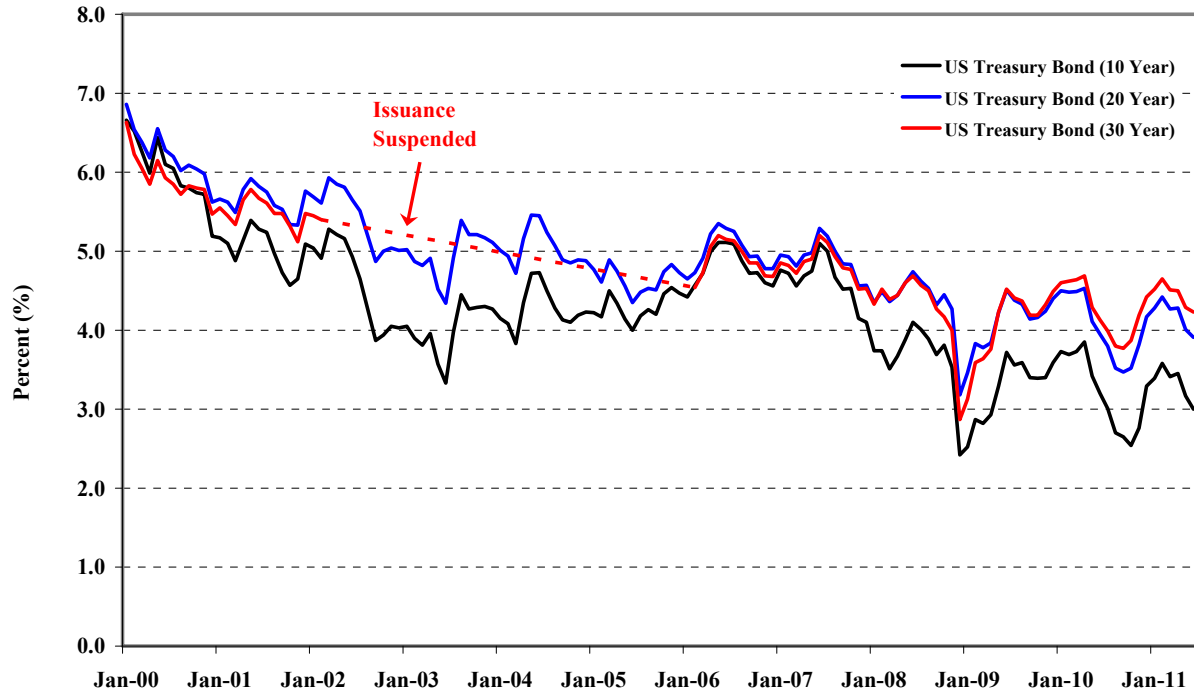
1 its current debt at the same rates as that of risk-free government debt. Further, the
2 interest on government debt (both short and long-term) is expected to increase
3 substantially over the next 1-2 years with the Federal Reserve of Philadelphia's current
4 survey indicating that the rate on 3-month T-bills will be at 1.1 to 3.0% and 10-year
5 government bonds will be at 4.2 – 5.1% during the 2012 – 2014 period.⁷ There is no way
6 Arizona-American Water Company can refinance its debt at the same rates as the
7 government, so naturally any debt that is refinanced can be expected to be somewhat
8 higher than these figures with the historical average indicating that Baa-rated utility
9 bonds require a premium of more than 200 basis points over the 10-year government
10 bond yields.⁸ The average yields on A and Baa-rated utility bonds are displayed in
11 Figure 2 below, which also includes the yield on 20-year government bonds for
12 comparison.⁹

⁷ Federal Reserve Bank of Philadelphia, "Survey of Professional Forecasters," May 13, 2011.

⁸ According to Bloomberg, the difference between Moody's Baa-rated utility bond yields and the yield on 10-year government bonds averaged 220 basis points during the 2002-2007 period (prior to the financial crisis).

⁹ Moody's utility bond index include bonds with a maturity as close to 30 years as possible and bonds are dropped when the term to maturity falls below 20 years. As the 30-year government bond was not traded during the 2002-06 period, I choose the 20-year government bond yields for comparison. Source: Bloomberg.

US Long Term Treasury Yields



Source: Bloomberg as of July 5, 2011 and Survey of Professional Forecasters released May 13, 2011.

Figure 2

1 **Q. WHAT ARE THE IMPLICATIONS OF THE DISCUSSION ABOVE?**

2 A. There are several important points regarding the current short-term debt and its cost.
3 First, the short-term debt that is outstanding will necessarily need to be refinanced, rolled
4 over or otherwise modified in the short term - - because it is short term. Second, it is not
5 viable to permanently finance long-lived assets permanently with short-term debt, so
6 naturally some of the short-term debt will at some point in time be replaced by longer
7 term debt or equity. Third, any replacement debt will likely be at a cost much higher than
8 0.45%.¹⁰ Fourth, the substantial reliance on short-term debt exposes Arizona-American
9 Water to interest rate risk. Therefore, if Arizona-American Water Company is allowed to
10 recover only 0.45% on 14-17% of its rate base, it will be exposed interest rate risk and/or

¹⁰ The yield on 3-month treasury bills is expected to exceed 1% in 2012 and 3% in 2014 (Federal Reserve of Philadelphia, "Survey of Professional Forecasters," May 13, 2011, p. 8).

1 may experience substantial cash flow shortfall until the replacement cost of debt can be
2 recovered. Both of these features are worsened by two factors: (i) Arizona-American
3 Water Company already has weak credit metrics¹¹ and (ii) as noted above, surveys
4 indicate that interest rates are likely to increase substantially.¹² Because of the interest
5 rate risk, which is asymmetric in the sense that it is more likely interest rates will increase
6 than decrease; shareholders of Arizona-American Water are exposed to asymmetric risk.
7 As a result of the asymmetry shareholders cannot expect to earn their allowed return on
8 equity.¹³ To ensure that shareholders can expect to earn the allowed return on equity in an
9 asymmetric world, it is necessary to either (i) eliminate the asymmetry or (ii) raise the
10 return on equity.

11 **B. COST OF EQUITY AND CAPITAL STRUCTURE**

12 **Q. WHAT IS YOUR REACTION TO THE RECOMMENDATIONS FOR AN**
13 **ALLOWED ROE?**

14 A. Allowing an ROE as low as 9.5% on 37.5% equity is simply too low. In comparison, gas
15 distribution companies were on average allowed an ROE of 10.2% in 2010 and the
16 average gas distribution company has approximately 53.3% book equity.¹⁴ Thus, if we
17 use the average 2010 yield on a Baa-rated utility bond of 5.96%, the weighted average
18 cost of capital is approximately 8.2%, which is comparable to the Company's request.¹⁵
19 As I know of no source that provides a list of water utility decisions, I cannot provide a
20 similar figure for U.S. water utilities. However, looking to the recent Commission
21 decisions on water utilities, I find the average allowed cost of capital was 8.1 percent¹⁶
22 and in California's most recent generic cost of capital the average allowed cost of capital

¹¹ Direct Testimony of Paul G. Townsley on behalf of Arizona-American Water Company in Docket No. W-01303A-10-0448 ("Townsley Direct") pp. 3-6.

¹² Federal Reserve Bank of Philadelphia, "Survey of Professional Forecasters," May 13, 2011.

¹³ In a symmetric situation, shareholders will with equal likelihood expect to earn above and below the allowed return on equity and therefore expect to earn the allowed return on equity.

¹⁴ Public Utilities Fortnightly, "Utilities ROE Survey," July 7, 2011 and Value Line Investment Survey, "Natural Gas Utility," June 10, 2011.

¹⁵ Calculated as: $10.2\% \times 53.3\% + 5.96\% \times (1 - 53.3\%) = 8.2\%$.

¹⁶ See Table 3 below.

1 was 8.5 percent.¹⁷ Thus, these decisions show that the Manrique, and Rigsby overall cost
2 of capital is below that recently allowed in many jurisdictions.¹⁸ Allowing a reasonable
3 return on equity is especially important for a company such as Arizona-American Water
4 Company, which has earned far below its allowed ROE since 2001.¹⁹ This is important
5 because both debt and equity investors expect to earn a return consistent with that
6 available in competitive markets.

7 **Q. PLEASE REFLECT ON THE NUMBERS PRESENTED BY THE ARNDT,**
8 **MANRIQUE AND RIGSBY TESTIMONIES IN RELATION TO RECENTLY**
9 **ALLOWED RETURNS IN ARIZONA.**

10 A. My direct testimony presented data on the allowed return for water utilities in Arizona²⁰
11 and related these allowed returns to the capital structure proposed by the Company in this
12 proceeding. As the Manrique and Rigsby Testimonies suggest a different capital
13 structure, I re-calculated the comparable ROE using the equity percentages proposed in
14 the above mentioned testimonies. In addition, I added a recent decision for Rio Rico
15 (Liberty Water). First, in Table 2 I show the common equity and allowed return on
16 equity for a number of water utility decisions in Arizona.

¹⁷ See Table BV R-1 attached to this rebuttal testimony.

¹⁸ As the Arndt Testimony provides no estimation of the cost of capital, but recommends an cost of capital similar to that of the Rigsby Testimony, I shall not specifically reference the Arndt Testimony in my discussions going forward.

¹⁹ Townsley Direct p. 3.

²⁰ Villadsen Direct, Tables 8-9.

Company	Decision [1]	Date [2]	Common Equity [3]	Allowed Rate of Return on Equity [4]
Bella Vista Water Company	65350	11/1/2002	68.1%	9.1%
Clearwater Utilities	66782	2/13/2004	100.0%	9.1%
Arizona Water Company	66849	3/19/2004	66.2%	9.2%
AZ-American Water Co. (Citizens)	67093	6/30/2004	39.9%	9.0%
Rio Rico Utilities	67279	10/5/2004	100.0%	8.7%
Las Quintas Serenas Water Co.	67455	1/4/2005	100.0%	8.1%
Forest Highlands	67983	7/18/2005	100.0%	8.1%
Pineview Water Co.	67989	7/18/2005	51.0%	8.9%
Chaparral City Water	68176	9/30/2005	58.8%	9.3%
Arizona Water Company	68302	11/14/2005	73.4%	9.1%
AZ-American Water Co. (PV)	68858	7/28/2006	36.7%	10.4%
Black Mountain Sewer	69164	12/5/2006	100.0%	9.6%
Far West Water & Sewer Co.	69335	2/20/2007	56.0%	9.3%
Goodman Water Co.	69404	4/16/2007	100.0%	9.3%
AZ-American Water Co. (Mohave)	69440	5/1/2007	40.0%	10.7%
Gold Canyon Sewer Company	69664	6/28/2007	100.0%	9.2%
Utility Source	70140	1/23/2008	100.0%	8.9%
Cordes Lakes Water Company	70710	2/27/2008	100.0%	10.0%
AZ -American (Sun City Wastewater)	70209	3/20/2008	38.5%	10.6%
AZ-American (Anthem)	70372	6/13/2008	39.2%	8.8%
Arizona Water Company	71845	8/24/2010	45.9%	9.5%
Global Water	71878	9/14/2010	55.5%	9.0%
Rio Rico Utilities	72059	1/6/2011	80.0%	9.5%
Average			71.7%	9.3%
Average *			61.7%	9.2%

* Excluding Arizona-American Water and companies with 100% equity.

Table 2: Allowed Return on Equity and Equity Percentage in Recent AZ Water Decisions

1 Second, I calculate the corresponding overall cost of capital and the return on equity
 2 Arizona-American Water's at the capital structure requested by Arizona-American Water
 3 Company as well as at the capital structure proposed by the Manrique and Rigsby
 4 Testimony. Because the Manrique Testimony and the Rigsby Testimony propose less
 5 equity than the Company requested, the financial risk of the Company is higher and

1 consequently its cost of equity capital is higher. As Arizona-American Water has less
2 equity, a smaller fraction of its rate base gets an equity return while a larger fraction of
3 the rate base gets a debt return. Henceforth, the weighted average cost of capital or
4 overall return is not higher than that of other entities.

5 As can be seen from Table 3 below, on an apples-to-apples comparison, the average
6 allowed overall cost of capital (WACC) ranged from 7.8 to 8.4 percent depending on the
7 companies included in the average. At the same time, the return on equity allowed by the
8 Commission at Arizona-American Water's targeted capital structure was 11.6 percent
9 when companies with 100% equity and Arizona-American Water companies are
10 removed. However, if the regulatory capital structure includes only 40 percent equity,
11 then the past decisions, on an apples-to-apples comparison, corresponds to a return on
12 equity of almost 14 percent. Therefore, a return on equity of only 9.5 percent on less than
13 40 percent equity substantially below what the Commission has allowed in the past.

Company	Implied RoR	Implied ROE at AZ-Am Equity %		
		Villadsen / Company [12]	Manrique / Staff [13]	Rigsby / RUCO [14]
Bella Vista Water Company	8.1%	12.0%	14.3%	15.3%
Clearwater Utilities	9.1%	15.9%	18.7%	20.0%
Arizona Water Company	9.0%	13.5%	16.0%	17.0%
AZ-American Water Co. (Citizens)	6.5%	7.6%	9.4%	10.0%
Rio Rico Utilities	8.7%	15.0%	17.7%	18.9%
Las Quintas Serenas Water Co.	8.1%	13.7%	16.2%	17.3%
Forest Highlands	8.1%	13.7%	16.2%	17.3%
Pineview Water Co.	7.2%	9.4%	11.4%	12.2%
Chaparral City Water	7.6%	10.7%	12.8%	13.7%
Arizona Water Company	8.9%	13.6%	16.1%	17.2%
AZ-American Water Co. (PV)	7.2%	8.9%	10.7%	11.5%
Black Mountain Sewer	9.6%	17.0%	19.9%	21.3%
Far West Water & Sewer Co.	7.8%	10.8%	12.9%	13.8%
Goodman Water Co.	9.3%	16.3%	19.2%	20.5%
AZ-American Water Co. (Mohave)	7.7%	9.9%	11.9%	12.7%
Gold Canyon Sewer Company	9.2%	16.1%	18.9%	20.2%
Utility Source	8.9%	15.4%	18.2%	19.4%
Cordes Lakes Water Company	10.0%	17.9%	20.9%	22.4%
AZ -American (Sun City Wastewater)	7.5%	9.4%	11.3%	12.1%
AZ-American (Anthem)	6.7%	7.9%	9.6%	10.3%
Arizona Water Company	7.7%	10.0%	12.0%	12.8%
Global Water	7.9%	10.7%	12.8%	13.7%
Rio Rico Utilities	8.7%	14.1%	16.7%	17.8%
Average #	8.2%	12.6%	15.0%	16.0%
Average without AZ-Am #	8.5%	13.7%	16.2%	17.3%
Average without AZ-Am and Companies with 100% Equity #	8.1%	11.6%	13.9%	14.8%

Table 3: Comparing Recent WACC and Cost of Equity from Arizona Decisions

1 **III. COST OF CAPITAL IMPLEMENTATION**

2 **Q. DO YOU HAVE ANY PRELIMINARY COMMENTS ON THE METHODS**
3 **RELIED UPON BY THE WITNESSES TO OBTAIN THEIR RECOMMENDED**
4 **ROE?**

5 A. Yes. First, the Arndt Testimony did not provide an independent analysis of the cost of
6 capital, but relied exclusively on the Commission's most recently allowed ROE for two
7 of the Company's districts. The exclusive reliance on previously allowed ROE numbers
8 is circular in that it uses the Company's return, which affects its value to estimate its
9 return. Further, the Arndt Testimony fails to consider whether the recommended ROE is
10 comparable to the return available to equity investments in other enterprises of
11 comparable risk. In contrast both the Manrique Testimony and the Rigsby Testimony
12 supported their recommended ROE by analyses of the current cost of equity capital for
13 water utilities and (in the Rigsby Testimony) gas distribution utilities.

14 **Q. ARE THERE OTHER PRELIMINARY ISSUES?**

15 A. Yes. Logically, cost of equity is higher than the cost of debt, so estimates of the cost of
16 equity that are below the current yield on investment grade utility bonds do not make
17 economic sense. Looking at the Rigsby Testimony, the estimated cost of common equity
18 using the CAPM methodology range from 4.91 to 6.71 percent and average 5.77
19 percent.²¹ In comparison, the Rigsby Testimony reports that the current yield on Baa-
20 rated utility bonds is 5.69 percent,²² so the estimated cost of common equity is only eight,
21 0.08%, higher than the cost of utility debt of the same rating as that of American Water.
22 It is not plausible that an investor will accept a premium of only 0.08% to invest in equity
23 rather than Baa-rated utility bonds.

24 Further, the amount of financial risk that shareholders are facing depends on leverage and
25 investors' expected return, the cost of equity, increases with leverage. Table BV R-3
26 attached to this rebuttal testimony illustrates the degree to which the cost of equity

²¹ Rigsby Testimony Schedule WAR-1, p. 3.

²² Rigsby Testimony Schedule WAR-8.

1 increases with leverage. In Table BV R-3, the first line in each scenario calculates the
2 after-tax weighted-average cost of capital is calculated for a sample, while the second line
3 calculate the equivalent cost of equity for a company that is similar except it has a
4 different capital structure. The example demonstrates that if the cost of equity for sample
5 companies having 50% equity is 10%, then the cost of equity for a company with only
6 40% equity is 11.5%. Scenarios II and III relies on the recommended ROE and capital
7 structure in the Manrique and the Rigsby Testimony, respectively and shows that
8 Arizona-American Water's higher leverage merits an increase in the cost of equity of
9 more than 100 basis points even if the sample companies' book value capital structure is
10 relied upon.²³

11 **A. SAMPLE SELECTION**

12 **Q. PLEASE COMPARE THE SAMPLES RELIED UPON IN THE MANRIQUE**
13 **TESTIMONY, THE RIGSBY TESTIMONY AND YOUR DIRECT TESTIMONY.**

14 **A.** All three testimonies rely on a water utility sample selected from companies that Value
15 Line follow. In addition, Mr. Rigsby and I both use a sample of local gas distribution
16 companies. The four water utilities included in the Rigsby Testimony (California Water,
17 Aqua America, SJW Corp., and American States Water) are also included in the
18 Manrique Testimony and the Villadsen Direct. In addition to these four companies, the
19 Manrique Testimony and my direct testimony also include Connecticut Water and
20 Middlesex Water. In addition, I considered four additional companies: American Water
21 Works (the parent of Arizona-American Water Company), Pennichuck, Southwest Water,
22 and York.²⁴ As Pennichuck has agreed to be acquired by the City of Nashua, NH and
23 Southwest Water no longer is a publicly traded company, I agree that these two
24 companies no longer should be included in a water utility sample. Further, I did not
25 include York Water in the more reliable subsample and excluded American Water Works
26 from the subsample when analyzing the CAPM and ECAPM results. While I believe that

²³ I agree with the academic literature that the market value capital structure is the relevant benchmark, but use the average book value equity percentage calculated in the Manrique Testimony, Schedule JCM-4 for illustrative purposes.

²⁴ Manrique Testimony p. 13, Rigsby Testimony p. 22 and Villadsen Direct Table BV-2.

1 Connecticut Water and Middlesex Water provides information about the water utilities
2 industry, an elimination of these two companies and Pennichuck from the samples in my
3 direct testimony would increase the sample's cost of equity estimates slightly.²⁵

4 Among the gas LDC's the Rigsby Testimony and the Villadsen Direct both included
5 AGL, Atmos, Laclede, New Jersey Resources, Northwest, Piedmont, South Jersey
6 Industries, Southwest Gas, and WGL. In addition, the Villadsen Direct included Nicor
7 and NiSource.²⁶ For a sample selection as of today, I agree with Mr. Rigsby in excluding
8 Nicor, which is being acquired by AGL. However, I would also exclude AGL, whose
9 stock price is also affected by the merger. If I were to exclude Nicor and NiSource from
10 my gas LDC sample, the estimated cost of equity would not change in a measurable
11 fashion.²⁷ Thus, the differences in samples do not cause any substantive difference in
12 results.

13 **B. DISCOUNTED CASH FLOW**

14 **Q. DO YOU HAVE ANY COMMENTS ON THE MANRIQUE OR THE RIGSBY**
15 **TESTIMONIES' IMPLEMENTATION OF THE DCF METHOD?**

16 A. Yes. A key concern with both testimonies is their use of historical growth rates, which
17 are not necessarily reflective of investors' *expectations*. This is particularly true for
18 industries such as the water utility industry, which is undergoing significant changes from
19 infrastructure investments, consolidation, etc., so the historical performance may not be
20 reflective of future performance. The standard DCF model is based on expected growth
21 rates.²⁸

²⁵ To see this, note that the average of the after-tax weighted-average cost of capital for Connecticut Water, Middlesex Water, and Pennichuck is below both the full sample and subsample' averages in Table No. BV-11, Panel A.

²⁶ Rigsby Testimony p. 35 and Villadsen Direct Table BV-14.

²⁷ To see this, note that the after-tax weighted average cost of capital for Nicor and NiSource in Table No. BV-19, Panels A and B is below the average for the full sample as well as the subsample. Further, in Table BV-22, Panel A, the average for the two companies is within 0.05% of the sub sample and consistently below the average for the full sample.

²⁸ See, for example, Morningstar, "*Ibbotson SBBi 2011 Valuation Edition*," p. 62 or M.J. Gordon, "Optimal Investment and Financing Policy," *Journal of Finance* 18, 1962, pp. 264-272.

1 I note that while the Manrique Testimony specifies the numerical use of the growth rates
2 reported, it is not clear to me exactly how the Rigsby Testimony used its reported growth
3 rates in the analysis.

4 **Q. THE MANRIQUE TESTIMONY ARGUES THAT ANALYSTS' GROWTH**
5 **FORECASTS ARE BIASED. HOW DO YOU RESPOND?**

6 A. The Manrique Testimony cites several papers in support of the view that "exclusive
7 reliance on analysts' forecasts of earnings growth in the DCF model would result in
8 inflated cost of equity estimates."²⁹ However, I note that all the publications cited in
9 footnotes 13-16 of the Manrique Testimony dates from 2003 or earlier. It is important to
10 recognize that the New York Stock Exchange ("NYSE") and the NASD during the 2002-
11 05 period implemented a series of rules intended to improve objectivity and transparency
12 in equity research; including in equity analysts' earnings forecasts.³⁰ To the extent that
13 these rules resulted in the intended improvement in the objectivity and transparency of
14 analysts' forecasts, research conducted prior to the implementation of the rules could
15 differ substantially and it does.

16 While academic researchers during the 1990s as well as in early 2000s found evidence of
17 analysts' optimism bias, it appears that (1) regulatory reforms have largely if not
18 completely eliminated the issue and (2) utilities likely were not subject to the level of
19 optimism bias as other industries.³¹ To elaborate, a recent paper by Hovakimina and
20 Saenyasiri (2010) found that recent efforts to curb analysts' incentive to provide
21 optimistic forecasts have worked, so that "the median forecast bias essentially
22 disappeared."³² Thus, some recent research indicates that the analyst bias may be a
23 problem of the past.

²⁹ Manrique Testimony p. 37.

³⁰ See, for example, "Joint Report by the NASD and the NYSE On the Operation and Effectiveness of the Research Analyst Conflict of Interest Rules," December 2005, p. 1.

³¹ See, for example, the discussion of the Chan, Karecki and Lakonishok 2003 article on pp. D-7 and D-8 of the Villadsen Direct.

³² A. Hovakimian and E. Saenyasiri, "Conflicts of Interest and Analyst Behavior: Evidence from Recent Changes in Regulation," *Financial Analysts Journal*, vol. 66, 2010.

Q. HOW WOULD THE DCF RESULTS REPORTED IN THE MANRIQUE TESTIMONY CHANGE IF FORECASTED GROWTH RATES WERE USED?

A. To understand the impact of the use of historic growth rate, I re-calculated the DCF cost of equity using the same model as in the Manrique Testimony, but replaced the growth rates with Manrique’s forecasted growth rates. The results are reported in Table 4.

	Manrique as Filed	Manrique Using Forecasted Growth
Constant Growth DCF Estimate	8.50%	9.20%
Multi-Stage DCF Estimate	9.90%	9.90%
Average DCF Estimate	9.20%	9.55%
Higher of DCF Estimate	9.90%	9.90%

Table 4: Comparing Manrique Estimates as Filed and Using Forecasted Growth

It is clear from the table above that reliance on forecasted growth rates, which is consistent with the academic literature and, for example, Ibbotson Associates implementation result in cost of equity estimates that are up to 70 basis points higher for the constant growth DCF model.³³

Q. IN ADDITION TO RELYING ON HISTORICAL GROWTH RATES ARE THERE OTHER PROBLEMS WITH THE DCF IMPLEMENTATION PRESENTED IN THE RIGSBY TESTIMONY?

A. Yes. The Rigsby Testimony relies on a constant growth DCF model with a sustainable growth rate where the standard sustainable growth model states that

$$g = b \times r + s \times v \tag{1}$$

where b is the earnings retention ratio

r is the return on common equity

s is the growth in shares

$$v = [(\text{Market Value per Share}) / (\text{Book Value per Share}) - 1] \tag{2-a}$$

³³ Morningstar, *Ibbotson 2011 Cost of Capital Yearbook*, pp. 12-13.

1 Rigsby calculates the five-year historical and forecasted retention ratio, book return on
2 equity, book value per share, and growth in shares. Based on five-year historical
3 averages and forecasted growth rates, Rigsby decides on an internal growth rate.³⁴ He
4 also estimates the share growth. However, the Rigsby Testimony relies on a model
5 where v is replaced by³⁵

$$6 \quad v^* = \{[(\text{Market Value per Share}) / (\text{Book Value per Share}) + 1] / 2 - 1\} \quad (2-b)$$

7 As v^* is less than v whenever the stock price per share is higher than the book value per
8 share, the formula in (2-b) results in a lower growth rate than the standard formula for
9 companies with a market-to-book (or price to book value per share) above one. The
10 simplest way to see the difference between (2-a) and (2-b) is to slightly rewrite the
11 formula. Let M denote the market value per share and B denote the book value per share.
12 Simple algebraic manipulations show that

$$13 \quad v = s \times (M - B) / B \quad (3-a)$$

14 while (2-b) becomes

$$15 \quad v^* = s \times (M - B) / 2B \quad (3-b)$$

16 Equation (3-a) is the standard version of the sustainable growth model that textbooks
17 present.³⁶ It simply calculates growth in equity that shareholders contribute in excess of
18 book value from external financing. In contrast, the version presented in the Rigsby
19 Testimony (versions (2-a) and (2-b)) do not have a straightforward interpretation.
20 Instead, it arbitrarily reduces the growth contribution by equity holders as it assumes that
21 the market value will drop to approach the book value and do so in a manner that cuts the
22 long-term external growth in half. There is no theory that justifies this formula and the

³⁴ I found no specific formula relied upon in Schedule WAR-5 and therefore did not calculate the impact of using historical growth rates.

³⁵ Rigsby Testimony p. 19.

³⁶ For example, David C. Parcell, *"The Cost Capital – A Practitioner's Guide,"* 2010 Edition p. 144-145 relies on the standard sustainable growth model in (1) and (2-a) as do Leonardo R. Giacchino and Jonathan Lesser, *"Principles of Utility Corporate Finance,"* Public Utilities Report, 2011 ("Giacchino and Lesser 2011"), p. 254-255.

1 Rigsby Testimony did not cite a textbook or scholarly article that demonstrates the
2 empirical validity of the assumption. Instead Mr. Rigsby cited testimony by another
3 ROE witness.³⁷ I know of no textbook for published, peer-reviewed article that rely on
4 the formulation used in the Rigsby Testimony. Because Mr. Rigsby's adjustment to the
5 standard sustainable growth has no theoretical support and Mr. Rigsby has not provided
6 empirical evidence that it is an accurate description of real world phenomena, I find the
7 adjustment unsupported and modified the Rigsby Testimony's results using the textbook
8 formula for the sustainable growth. The impact of simply changing the sustainable
9 growth relied upon in the Rigsby Testimony to the standard sustainable growth is shown
10 in Table 5 below.

	Rigsby	Rigsby using Standard Sustainable Growth
DCF - Water	9.07%	10.62%
DCF - Gas LDC	9.10%	9.64%
Average	9.09%	10.13%

Table 5: Impact of Using Standard Sustainable Growth Model

11 By using the non-standard version of the sustainable growth model, the Rigsby
12 Testimony downward biases the cost of equity estimated by more than 100 basis points.
13 As can be seen from Table 5 above, simply changing the Rigsby Testimony's DCF to
14 rely on a standard DCF methodology implies that the Rigsby Testimony's recommended
15 return of equity is below the DCF estimate of the cost of equity.

16 **Q. WHAT DO YOU CONCLUDE REGARDING THE DCF ESTIMATES ON COST**
17 **OF EQUITY PRESENTED IN THE MANRIQUE AND RIGSBY TESTIMONIES?**

18 A. Based on the calculations shown above, the constant growth DCF cost of equity estimate
19 presented in the Manrique Testimony is 70 basis points too low and the average DCF

³⁷ Rigsby Testimony p. 19-20.

1 estimate is 35 basis points too low, while the estimates in the Rigsby Testimony is
2 approximately 100 basis points too low.

3 **C. CAPITAL ASSET PRICING MODEL**

4 **Q. DO YOU HAVE ANY COMMENTS ON THE CAPM IMPLEMENTATIONS IN**
5 **THE MANRIQUE TESTIMONY?**

6 A. Yes. The Manrique Testimony implements two versions of the CAPM model. First, he
7 implements a CAPM that rely a medium-term risk-free rate *and* a historical market risk
8 premium (“MRP”). Second, he implements a long-term version of the model that relies
9 on relies on a 30-year risk-free rate *and* a current MRP.³⁸ The historical model results in
10 a cost of equity estimate of only 8 percent, while the current model results in a cost of
11 equity of 10.6 percent. Noteworthy, the current MRP is estimated at 8.2 percent, which
12 indicate that the expected premium over the risk-free rate currently is higher than it
13 historically has been. I.e., equity investors may require a higher risk premium than they
14 historically have.

15 As shown in Figure 3 below, the spread between shorter-term government bonds and A-
16 rated utility bond yields is currently unusually high. This indicates that the yield on
17 medium term government bonds is suppressed relative to longer term debt instruments.
18 Therefore, a reliance on a medium term risk-free rate is likely to underestimate the cost of
19 equity.

20 To see the numerical impact of the reliance on the medium term version of the CAPM, I
21 implemented the CAPM using the data in the Manrique Testimony with two exceptions.
22 First, I modified the risk-free rate to be the long-term rate used by the Manrique
23 Testimony in its current version of the model. Second, to ensure consistency between the
24 horizon of the risk-free rate and the MRP, I substituted the medium term MRP with the

³⁸ Manrique Testimony JCM-3.

1 long-term MRP (reducing it from 7.2% to 6.7%).³⁹ The modification to the model results
2 in the CAPM estimates presented in Table 6 below.

	Manrique	Manrique Modified
CAPM Method		
Historical Market Risk Premium	8.00%	9.40%
Current Market Risk Premium	10.60%	10.60%
Average CAPM Estimate	9.30%	10.00%
Higher of CAPM Estimates	10.60%	10.60%

Table 6: Manrique CAPM Results Using Long-Term Version of Model

3 Thus, the reliance on the long-term version of the CAPM results in an increase in the
4 average CAPM cost of equity estimate of 70 basis points.

5 **Q. DO YOU HAVE ANY REACTIONS TO THE CAPM IMPLEMENTATION IN**
6 **THE RIGSBY TESTIMONY?**

7 A. Yes. I have several. First, a cost of equity estimate below the cost of debt is simply not
8 meaningful. Therefore, the several of the cost of equity estimates in the Rigsby
9 Testimony should be ignored. Second, the Rigsby Testimony determines the market risk
10 premium using geometric averages, whereas standard financial texts recommend using
11 the arithmetic average. Third, the Rigsby Testimony uses the total return of government
12 bonds rather than the income return recommended in standard financial texts. Fourth, the
13 Rigsby Testimony relies on the 5-year government bond as a measure of the risk-free
14 rate. The yield on the 5-year government bond (and bonds of shorter maturity) is
15 currently unusually low, so that the use of this risk-free rate downward biases the cost of
16 equity estimate. Each of these aspects of the CAPM implementation results in a
17 downward bias in the cost of equity estimate.

³⁹ Ibbotson SBBi 2011 Valuation Edition, Appendix A (the source cited in the Manrique Testimony).

1 **Q. PLEASE ELABORATE ON YOUR POINT THAT THE COST OF EQUITY**
2 **MUST BE HIGHER THAN THE COST OF DEBT.**

3 A. A cost of equity estimate that is below the cost of debt plus an amount is unreasonable.
4 As equity investors are the residual claimants and only receive a return on their
5 investment after debt investors have received their interest and principal payments, equity
6 is inherently more risky than debt. As explained in the Villadsen Direct, Section II, the
7 definition of the cost of capital recognizes a tradeoff between risk and return, so that the
8 higher the risk, the higher the cost of capital. Therefore, an investment that carries more
9 systematic risk requires a higher expected return. As equity is riskier than bonds, equity
10 investors expect a higher return than bondholders.⁴⁰ If the Rigsby Testimony were to
11 exclude all CAPM cost of equity figures below the cost of debt plus 100 basis points,
12 which is the cut-off that FERC uses, the resulting cost of equity estimate would be 6.71
13 percent.⁴¹ This is 96 basis points higher than the average cost of equity reported in the
14 Rigsby Testimony.⁴²

15 **Q. WHY DO YOU SAY THAT THE GEOMETRIC MRP SHOULD BE IGNORED?**

16 A. The Rigsby Testimony presents two versions of the CAPM of which one relies on
17 geometric measures of the market risk premium. While the magnitude of the market risk
18 premium currently is the subject of scrutiny in the academic literature,⁴³ there is little
19 doubt among academics that the geometric market risk premium does not apply to cost-
20 of-capital estimation. For example, Ibbotson Associates state

21 The equity risk premium data presented in this book are arithmetic
22 average risk premia as opposed to geometric average risk premia. The
23 arithmetic average equity risk premium can be demonstrated to be most
24 appropriate when discounting future cash flows. For use as the expected
25 equity risk premium in either the CAPM or the building block approach,

⁴⁰ The Federal Energy Regulatory Commission (“FERC”) recognizes this and usually ignores cost of equity estimates that are less than the cost of debt plus 100 basis points. See, for example, FERC Order 445, 92 FERC ¶61,007.

⁴¹ See Table BV R-2 for details.

⁴² Rigsby Testimony, Schedule WAR-1.

⁴³ See Villadsen Direct, Appendix C for a detailed discussion

1 the arithmetic mean or the simple difference of the arithmetic means of
2 stock market returns and riskless rates is the relevant number. This is
3 because both the CAPM and the building block approach are additive
4 models, in which the cost of capital is the sum of its parts. The geometric
5 average is more appropriate for the reporting past performance, since it
6 represents the compound average return.⁴⁴

7 Similarly, the *New Regulatory Finance* text by Roger A. Morin (2006) argues that

8 Only arithmetic means are correct for forecasting purposes and for
9 estimating the cost of capital. There is no theoretical or empirical
10 justification for the use of geometric mean rates of returns as a measure of
11 the appropriate discount rate in computing the cost of capital or in
12 computing present values. There is no dispute in academic circles as to
13 whether the arithmetic or geometric average should be used for purposes
14 of computing the cost of capital.⁴⁵

15 Finally, the corporate finance text by Berg & DeMarzo (2009) states:

16 The compound annual return is a better description of the long-run
17 *historical* performance of an investment. . . . Conversely, we should use the
18 arithmetic average return when we are trying to estimate an investment's
19 *expected* return over a *future* horizon based on its past performance.
20 [emphasis in original]⁴⁶

21 Thus, standard financial textbooks recommend using the arithmetic average.

22 If I modify Rigsby's CAPM implementation, so that it relies solely on the arithmetic
23 MRP, then the CAPM cost of equity estimate is almost 70 basis points higher than that
24 reported by the Rigsby Testimony. These results are reported in Table 7 below.
25 Importantly, the arithmetic MRP estimates are higher than the cost of debt as
26 approximated by the yield on utility bonds.

⁴⁴ Morningstar, *Ibbotson SBBI 2011 Valuation Yearbook*, p. 56.

⁴⁵ Roger A. Morin (2006), *New Regulatory Finance*, Public Utilities Reports, Inc., pp. 116-117.

⁴⁶ Jonathan Berk and Peter DeMarzo, "Corporate Finance: The Core," Prentice-Hall 2009, p. 296.

	Rigsby	Rigsby excl. Geometric MRP
CAPM - Water Geometric	5.29%	nmf
CAPM - Gas LDC Geometric	4.91%	nmf
CAPM - Water Arithmetic	6.71%	6.71%
CAPM - Gas Arithmetic	6.18%	6.18%
<i>Average CAPM</i>	5.77%	6.45%

Table 7: The Impact of Rigsby Using the Geometric MRP

1 **Q. WHAT SUPPORT DO YOU HAVE FOR USING THE INCOME RETURNS**
 2 **RATHER THAN THE TOTAL RETURNS TO CALCULATE THE MRP?**

3 A. Finally, I note that it is the income return and not the total return that is the relevant
 4 benchmark against which the market risk premium should be measured. As noted by
 5 Ibbotson

6 Another point to keep in mind when calculating the equity risk premium is
 7 that the income return on the appropriate horizon treasury security, rather
 8 than the total return, is used in the calculation. The total return is
 9 comprised of three return components: the income return, the capital
 10 appreciation return and the reinvestment return... *The income return is*
 11 *thus used in the estimation of the equity risk premium because it*
 12 *represents the truly riskless portion of the return.* [emphasis added]⁴⁷

13 Table 8 below shows the impact of using income returns rather than total returns in the
 14 estimation of the cost of equity using the Rigsby Testimony's data.

⁴⁷ Morningstar, Ibbotson *SBBI 2011 Valuation Yearbook*, p. 55. See also, Giacchino and Lesser 2011, p. 234.

	Rigsby as Filed	Rigsby Using Income Returns
CAPM - Water Geometric	5.29%	5.89%
CAPM - Gas LDC Geometric	4.91%	5.44%
CAPM - Water Arithmetic	6.71%	7.39%
CAPM - Gas Arithmetic	6.18%	6.78%
<i>Average CAPM</i>	5.77%	6.37%

Table 8: The Impact of Rigsby Using Total Returns in the MRP Calculation

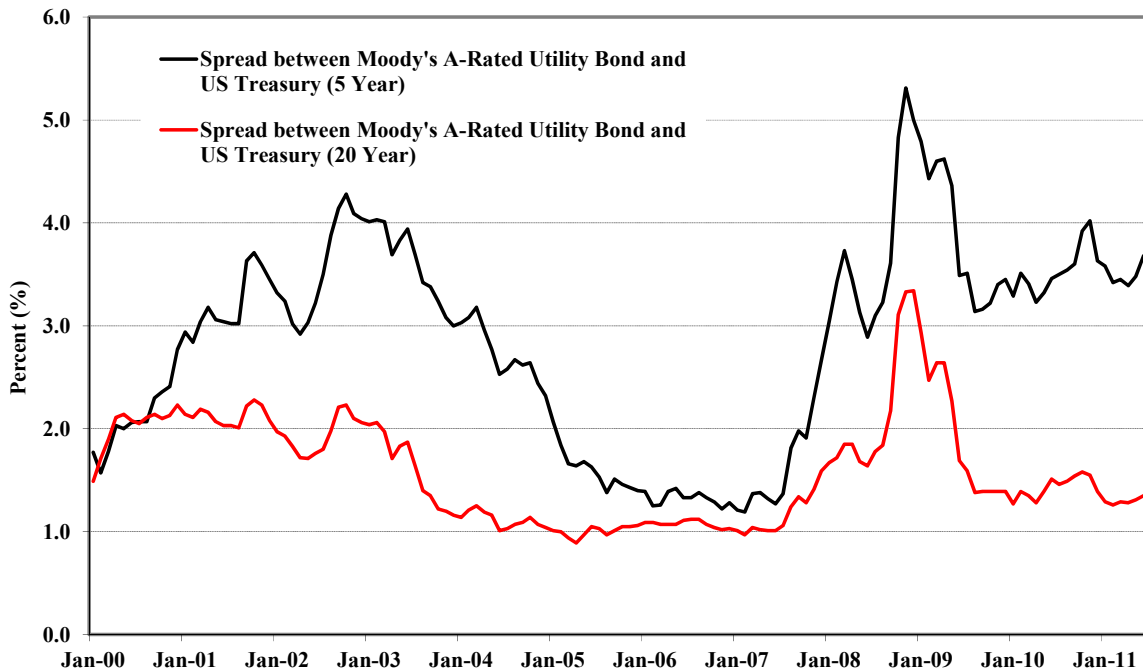
The use of total returns rather than income returns downward biases the CAPM cost of equity by approximately 60 basis points.

Q. PLEASE EXPLAIN YOUR COMMENT THAT THE USE OF THE YIELD ON A 5-YEAR GOVERNMENT BOND AS THE RISK-FREE RATE BIASES THE COST OF EQUITY DOWNWARDS.

A. While the theoretical CAPM was developed using short-term risk-free rates, most practitioners rely on long-term risk-free rates because long-term risk-free rates are less influenced by current monetary policy. At the moment, all shorter and medium term government instruments have a very low yield compared to longer term government bonds and, more importantly, utility bonds.

A comparison of the yield on A-rated utility bonds and the yield on government bonds of varying maturities reveal that there currently is a very large spread between the yield on A-rated utility bonds and government bonds of, for example, 5-year maturity compared to both the historical spread between these instruments and to the spread between the yield on, for example, A-rated utility bonds and 20-year government bonds. This fact is illustrated in Figure 3 below. It is evident from the figure that both (i) the absolute spread between the yield on A-rated utility bonds and 5-year government bonds currently is

1 highs and (ii) the spread is high relative to the spread between A-rated utility bond yield
2 and the yield on 20-year government bond yields.⁴⁸



Source: Bloomberg as of July 5, 2011.

Figure 3: Spread between the yield on A-rated utility bonds and on 5 and 20-year Treasury bonds.

3 Because of the unusual relationship between the yield on medium-term government
4 bonds and the yield on utility bonds, which are indicative of the cost of debt capital for
5 utilities, the use, for example, the 5-year government bond yield as a risk-free rate
6 downward biases the CAPM cost of equity estimate. Had the Rigsby Testimony instead
7 relied on the long-term government bond yields and an MRP calculated as did Mr.
8 Rigsby except that it is based on long-term total returns rather than 5-year total returns,

⁴⁸ I use the 20-year government bond yield for comparison because the 30-year government bond was not issued from 2002 to 2006.

1 his CAPM estimates would increase by more than 200 basis points.⁴⁹ The specific data
 2 are shown in Table 9 below.

	Rigsby as Filed	Rigsby Using Long-term Rates
CAPM - Water Geometric	5.29%	7.53%
CAPM - Gas LDC Geometric	4.91%	7.16%
CAPM - Water Arithmetic	6.71%	8.73%
CAPM - Gas Arithmetic	6.18%	8.23%
<i>Average CAPM</i>	5.77%	7.91%

Table 9: The Impact of Rigsby using the 5-year Risk-Free Rate

3 **Q. IF YOU CORRECT ALL THE CAPM IMPLEMENTATION PROBLEMS**
 4 **DISCUSSED ABOVE, HOW WOULD THE RESULTS CHANGE?**

5 A. In Table 10 below I modified the Rigsby Testimony’s calculation of the CAPM estimates
 6 as follows. First, the risk-free rate relied upon is the 30-year government bond yield
 7 rather than the 5-year government bond yield. Consistency then requires I also use a 30-
 8 year (long-term) MRP. Second, consistent with Ibbotson, I use income returns rather
 9 than total returns in the calculation of the MRP. Third, I eliminate the geometric MRP
 10 for reasons discussed above. The results from these modifications show that the Rigsby
 11 Testimony’s estimate of the CAPM ROE is downward biased by about 300 basis points.

⁴⁹ The calculation in Table 9 relies on the 30-year government bond yield in June 2011 as its risk-free rate and uses for consistency Ibbotson’s long-term total return on government bonds in the MRP calculations. The risk-free rate was obtained from Bloomberg and the Ibbotson data are from Table 2-1 p. 23 of Ibbotson SBBi 2011 Valuation Yearbook.

	Rigsby as Filed	Rigsby Corrected
CAPM - Water Geometric	5.29%	<i>nmf</i>
CAPM - Gas LDC Geometric	4.91%	<i>nmf</i>
CAPM - Water Arithmetic	6.71%	9.26%
CAPM - Gas Arithmetic	6.18%	8.70%
<i>Average CAPM</i>	5.77%	8.98%

Table 10: Rigsby as Filed and Corrected

1 **IV. CONCLUSIONS**

2 **Q. HAVING DISCUSSED THE IMPLEMENTATION ISSUES IN THE MANRIQUE**
 3 **AND RIGSBY TESTIMONIES, PLEASE SUMMARIZE THE CORRECTIONS**
 4 **YOU MADE TO THE MODELS.**

5 A. The Manrique Testimony’s reliance on historical growth rates downward biases its
 6 constant growth DCF estimate by approximately 70 basis points to and the average DCF
 7 estimate by 35 basis points (see Table 4 above). Further, as illustrated in above, if the
 8 Manrique Testimony had relied exclusively on the long-term CAPM, the average CAPM
 9 estimate on cost of equity would increase by approximately 70 basis points (see Table 6
 10 above). The results obtained when modifying the Manrique Testimony is summarized
 11 below.

	Manrique	Manrique Modified
Constant Growth DCF Estimate	8.50%	9.20%
Multi-Stage DCF Estimate	9.90%	9.90%
Average DCF Estimate	9.20%	9.55%
Higher of DCF Estimates	9.90%	9.90%
<u>CAPM Method</u>		
Historical Market Risk Premium	8.00%	9.40%
Current Market Risk Premium	10.60%	10.60%
Average CAPM Estimate	9.30%	10.00%
Higher of CAPM Estimates	10.60%	10.60%
Average of DCF and CAPM	9.3%	9.8%
Average of Higher DCF and CAPM	10.3%	10.3%

Table 11: Summary of Manrique Results and Modified Results

1 From the table above, the Manrique Testimony's comment that

2 Using the mean of the higher of the DCF and the CAPM methods versus
 3 the average of the DCF and CAPM methods increases the ROE
 4 recommendation by 100 basis points, from 9.3 percent to 10.3 percent.⁵⁰

5 relies on the fact that he implemented the constant growth DCF using historical growth
 6 rates rather and relied on a medium term version of the CAPM. If 100 basis points were
 7 added to the average using the more appropriate implementation in the modified column,
 8 the ROE would increase to 10.8 percent.

9 Combining the modifications I made to the Rigsby Testimony's implementation of the
 10 DCF and CAPM, I obtain the results summarized in Table 12 below.

⁵⁰ Manrique Testimony p. 34-35.

		Rigsby	Rigsby Modified
DCF - Water	[j]	9.07%	10.62%
DCF - Gas LDC	[k]	9.10%	9.64%
<i>Average DCF</i>	[l]	9.09%	10.13%
CAPM - Water Geometric	[m]	5.29%	<i>nmf</i>
CAPM - Gas LDC Geometric	[n]	4.91%	<i>nmf</i>
CAPM - Water Arithmetic	[o]	6.71%	9.26%
CAPM - Gas Arithmetic	[p]	6.18%	8.70%
<i>Average CAPM</i>	[q]	5.77%	8.98%
<i>Average DCF and CAPM</i>	[r]	7.43%	9.55%

Table 12: Rigsby Modified

1 Simply correcting the implementation issues to adhere to standard textbook definitions
 2 raises the average of the estimated cost of equity by more than 200 basis points. The
 3 Rigsby Testimony points out that its cost of equity estimate “exceeds, by 40 basis points,
 4 the high end of the range of the range of results that I have obtained in my cost of equity
 5 analysis.”⁵¹ Certainly, if non-standard implementations are corrected and a currently
 6 more appropriate long-term risk-free model is used, then the recommendation in the
 7 Rigsby Testimony is below not only the high end of the estimates but below the average
 8 estimate. Thus, the Rigsby Testimony’s cost of equity recommendation is downward
 9 biased and if corrected consistent with a figure north of 10%.

10 Further, if I take Arizona-American Water Company’s higher than average leverage into
 11 account, then both the Manrique and the Rigsby Testimonies’ recommendation is
 12 consistent with my recommendation, as Arizona-American Water Company’s more
 13 levered capital structure requires a higher ROE. From Table No. BV R-3, the additional
 14 equity return is of the magnitude of at least 100 basis points.

⁵¹ Rigsby Testimony p. 7.

1 **Q. DOES THE FACT THAT YOU DO NOT COMMENT ON SOME ASPECTS OF**
2 **THE SUBMITTED TESTIMONIES MEAN THAT YOU AGREE?**

3 A. No, it does not.

4 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

5 A. Yes.

TABLES AND WORK PAPERS

Table No. BV R-1: Overall Cost of Capital Resulting from California Water Decision

	Equity Percent [1]	Allowed RoE [2]	Debt Percentage [3]	Cost of Debt [4]	Overall CoC [5]
California Water	53%	10.20%	47%	6.72%	8.56%
California American	42%	10.20%	58%	6.48%	8.04%
Golden State	51%	10.20%	49%	7.49%	8.87%
Average					8.49%

Sources and Notes:

[1], [2]: California Decision p. 37.

[3]: 1 - [1]

[4]: Californian PUC Decision D 09-05-19 p. 12.

[5]: [1] x [2] + [3] x [4]

Table No. BV R-2: Overall Cost of Capital Resulting from California Water Decision

	rfr	Beta	Market	rfr	RoE	Bond Rating	Bond Yield	Spread to bond yield	Revised RoE	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
AWR	1.91%	0.75	11.90%	5.50%	6.71%	A	5.26%	1.45%	6.71%	
CWT	1.91%	0.7	11.90%	5.50%	6.39%	A	5.26%	1.13%	6.39%	
SJW	1.91%	0.9	11.90%	5.50%	7.67%	A	5.26%	2.41%	7.67%	
WTR	1.91%	0.65	11.90%	5.50%	6.07%	A	5.26%	0.81%	n/a	
Average									6.92%	
AGL	1.91%	0.75	11.90%	5.50%	6.71%	A	5.26%	1.45%	6.71%	
ATO	1.91%	0.7	11.90%	5.50%	6.39%	BBB	5.67%	0.72%	n/a	
LG	1.91%	0.6	11.90%	5.50%	5.75%	A	5.26%	0.49%	n/a	
NJR	1.91%	0.65	11.90%	5.50%	6.07%	A	5.67%	0.40%	n/a	
NWN	1.91%	0.6	11.90%	5.50%	5.75%	A	5.26%	0.49%	n/a	
PNY	1.91%	0.65	11.90%	5.50%	6.07%	A	5.67%	0.40%	n/a	
SJI	1.91%	0.65	11.90%	5.50%	6.07%	BBB	5.67%	0.40%	n/a	
SWX	1.91%	0.75	11.90%	5.50%	6.71%	BBB	5.67%	1.04%	6.71%	
WGL	1.91%	0.65	11.90%	5.50%	6.07%	AA	5.06%	1.02%	6.07%	
Average									6.50%	
Average of water and gas LDC									6.71%	

Sources and Notes:

[1] - [6]: Rigsby Testimony, WAR-7.

[7]: Bloomberg S&P Rating for company.

[8]: Yield on Moody's comparable bond index as of June 2011.

For WGL the yield was calculated as the yield on an A-rated utility bond minus 1/2 times the spread between the yield on a Baa and an A-rated utility bond.

[9]: [6] - [8].

[10]: If [9] > 0.999% then [6]. Otherwise n/a.

Table No. BV R-3: The Impact of Leverage on the Cost of Equity

<i>Scenario I</i>	Equity %	ROE	Debt %	Cost of Debt	Tax Rate	ATWACC
Sample	50%	10.0%	50%	5.67%	38%	6.76%
Company	40%	11.6%	60%	5.67%	38%	6.76%
<i>Scenario II</i>	Equity %	ROE	Debt %	Cost of Debt	Tax Rate	ATWACC
Sample	46.8%	10.3%	53.2%	5.67%	38%	6.69%
Company	40%	11.5%	60%	5.67%	38%	6.69%
<i>Scenario III</i>	Equity %	ROE	Debt %	Cost of Debt	Tax Rate	ATWACC
Sample	46.8%	9.5%	53.2%	5.67%	38%	6.32%
Company	37.5%	11.0%	62.5%	5.67%	38%	6.32%