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STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DW 08-073

In the Matter of:
Pennichuck Water Works, Inc.
Petition for Permanent Rates and Step Increases

Direct Testimony

of

David C. Parcell
On Behalf of
Commission Staff

March 24, 2009

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1 **I. INTRODUCTION**

2
3 **Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.**

4 A. My name is David C. Parcell. I am President and Senior Economist of Technical
5 Associates, Inc. My business address is Suite 601, 1051 East Cary Street, Richmond,
6 Virginia 23219.
7

8 **Q. PLEASE SUMMARIZE YOUR EDUCATION BACKGROUND AND**
9 **PROFESSIONAL EXPERIENCE.**

10 A. I hold B.A. (1969) and M.A. (1970) degrees in economics from Virginia Polytechnic
11 Institute and State University (Virginia Tech) and a M.B.A. (1985) from Virginia
12 Commonwealth University. I have been a consulting economist with Technical
13 Associates since 1970. I have provided cost of capital testimony in public utility
14 ratemaking proceedings dating back to 1972. In connection with this, I have previously
15 filed testimony and/or testified in over 400 utility proceedings before more than 40
16 regulatory agencies in the United States and Canada. Appendix I provides a more
17 complete description of my education and relevant work experience.
18

19 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

20 A. I have been retained by the Commission Staff to evaluate the cost of capital aspects of the
21 current filing of Pennichuck Water Works, Inc. ("PWW" or "Company"). I have
22 performed independent studies and am making recommendations of the current cost of
23 capital for PWW. In addition, because PWW is a subsidiary of Pennichuck Corporation
24 ("PC" or "Parent"), I also have evaluated this entity in my analyses.
25

26 **Q. HAVE YOU PREPARED AN EXHIBIT IN SUPPORT OF YOUR TESTIMONY?**

27 A. Yes, I have prepared one exhibit, identified as Schedule I through Schedule 13. This
28 exhibit was prepared either by me or under my direction. The information contained in
29 this exhibit is correct to the best of my knowledge and belief.

1 **II. RECOMMENDATIONS AND SUMMARY**

2
3 **Q. WHAT ARE YOUR RECOMMENDATIONS IN THIS PROCEEDING?**

4 A. My overall cost of capital recommendations for PWW are:

5

	<u>Percent</u>	<u>Cost</u>	<u>Return</u>
6 Long-Term Debt	57.78%	5.30%	3.06%
7 Common Equity	42.22%	9.00-10.00%	3.80-4.22%
8 Total	100.00%		6.86-7.28%
			7.07% mid-point

9

10 PWW's application requests a return on common equity of 11.25 percent and
11 overall rate of return of 7.81 percent. The only difference between PWW's request and
12 my recommendation is the cost of equity capital, where PWW proposes a 11.25 percent
13 return and I recommend a 9.0 percent to 10.0 percent return.

14
15 **Q. PLEASE SUMMARIZE YOUR COST OF CAPITAL ANALYSES AND**
16 **RELATED CONCLUSIONS FOR PWW.**

17 A. This proceeding is concerned with PWW's regulated water utility operations in New
18 Hampshire. My analyses are concerned with the Company's total cost of capital. The
19 first step in performing these analyses is the development of the appropriate capital
20 structure. PWW's proposed capital structure is the proforma December 31, 2007 capital
21 structure ratios of PWW. I also use this capital structure in my cost of capital analyses.

22 The second step in a cost of capital calculation is a determination of the embedded
23 cost rate of long-term debt. I have used the 5.30 percent cost rate for long-term debt
24 contained in PWW's application.

25 The third step in the cost of capital calculation is the estimation of the cost of
26 common equity. I have employed three recognized methodologies to estimate the cost of
27 equity for PWW. Each of these methodologies is applied to two groups of proxy water
28 utilities. These three methodologies and my findings are:

	<u>Methodology</u>	<u>Range</u>
1	Discounted Cash Flow	9.0-10.0% (9.5% mid-point)
2	Capital Asset Pricing Model	8.5-9.0% (8.75% mid-point)
3	Comparable Earnings	10.00%

4

5 Based upon these findings, I conclude that the cost of common equity for PWW is within
6 a range of 9.0 percent to 10.0 percent (9.5 percent mid-point), which reflects the range for
7 each model results.

8 Combining these three steps into a weighted cost of capital results in an overall
9 rate of return range of 6.86 percent to 7.28 percent (7.07 percent mid-point, which
10 incorporates a cost of common equity of 9.5 percent). My specific cost of capital
11 recommendation for PWW is 7.07 percent.

1 **III. ECONOMIC/LEGAL PRINCIPLES AND METHODOLOGIES**

2
3 **Q. WHAT ARE THE PRIMARY ECONOMIC AND LEGAL PRINCIPLES THAT**
4 **ESTABLISH THE STANDARDS FOR DETERMINING A FAIR RATE OF**
5 **RETURN FOR A REGULATED UTILITY?**

6 A. Public utility rates are normally established in a manner designed to allow the recovery of
7 their costs, including capital costs. This is frequently referred to as “cost of service”
8 ratemaking. Rates for regulated public utilities traditionally have been primarily
9 established using the “rate base - rate of return” concept. Under this method, utilities are
10 allowed to recover a level of operating expenses, taxes, and depreciation deemed
11 reasonable for rate-setting purposes, and are granted an opportunity to earn a fair rate of
12 return on the assets utilized (i.e., rate base) in providing service to their customers.

13 The rate base is derived from the asset side of the utility’s balance sheet as a
14 dollar amount and the rate of return is developed from the liabilities/owners’ equity side
15 of the balance sheet as a percentage. The revenue impact of the cost of capital is thus
16 derived by multiplying the rate base by the rate of return (including income taxes).

17 The rate of return is developed from the cost of capital, which is estimated by
18 weighting the capital structure components (i.e., debt, preferred stock, and common
19 equity) by their percentages in the capital structure and multiplying these by their cost
20 rates. This is also known as the weighted cost of capital.

21 Technically, “fair rate of return” is a legal and accounting concept that refers to an
22 ex post (after the fact) earned return on an asset base, while the cost of capital is an
23 economic and financial concept which refers to an ex ante (before the fact) expected or
24 required return on a liability base. In regulatory proceedings, however, the two terms are
25 often used interchangeably. I have equated the two concepts in my testimony.

26 From an economic standpoint, a fair rate of return is normally interpreted to mean
27 that an efficient and economically managed utility will be able to maintain its financial
28 integrity, attract capital, and establish comparable returns for similar risk investments.
29 These concepts are derived from economic and financial theory and are generally
30 implemented using financial models and economic concepts.

1 Although I am not a lawyer and I do not offer a legal opinion, my testimony is
2 based on my understanding that two United States Supreme Court decisions are
3 universally cited as providing the standards for a fair rate of return. The first is Bluefield
4 Water Works and Improvement Co. v. Public Serv. Comm'n of West Virginia, 262 U.S.
5 679 (1923). In this decision, the Court stated:

6 What annual rate will constitute **just compensation** depends upon many
7 circumstances and must be **determined by the exercise of fair and**
8 **enlightened judgment**, having regard to all relevant facts. A **public**
9 **utility** is entitled to such rates as will permit it to **earn a return** on the
10 value of the property which it employs for the convenience of the public
11 equal to that **generally being made** at the same time and in the same
12 general part of the country on **investments in other business**
13 **undertakings** which are **attended by corresponding risks and**
14 **uncertainties**; but it has no **constitutional right to profits** such as are
15 realized or anticipated in **highly profitable enterprises or speculative**
16 **ventures**. The **return** should be reasonably sufficient to assure
17 confidence in the **financial soundness** of the utility, and should be
18 adequate, **under efficient and economical management**, to maintain and
19 **support its credit** and **enable it to raise the money** necessary for the
20 proper discharge of its public duties. A rate of return may be reasonable at
21 one time, and become too high or too low by changes affecting
22 opportunities for investment, the money market, and business conditions
23 generally. **[Emphasis added.]**

24
25 It is my understanding that the Bluefield decision established the following standards for
26 a fair rate of return: comparable earnings, financial integrity, and capital attraction. It
27 also noted the changing level of required returns over time as well as an underlying
28 assumption that the utility be operated in an efficient manner.

29 The second decision is Federal Power Comm'n v. Hope Natural Gas Co., 320
30 U.S. 591 (1942). In that decision, the Court stated:

31 The rate-making process under the [Natural Gas] Act, i.e., the fixing of
32 'just and reasonable' rates, involves a **balancing** of the **investor** and
33 **consumer interests** From the investor or company point of view it is
34 important that there be enough revenue not only for operating expenses
35 but also for the capital costs of the business. These include service on the
36 debt and dividends on the stock. By that standard the **return** to the equity
37 **owner** should be **commensurate** with **returns on investments in other**
38 **enterprises having corresponding risks**. That return, moreover, should
39 be sufficient to assure confidence in the **financial integrity** of the
40 enterprise, so as to **maintain its credit** and to **attract capital**. **[Empahsis**
41 **added.]**

1 The Hope case is also frequently credited with establishing the “end result” doctrine,
2 which maintains that the methods utilized to develop a fair return are not important as
3 long as the end result is reasonable.

4 The three economic and financial parameters in the Bluefield and Hope decisions
5 - comparable earnings, financial integrity, and capital attraction - reflect the economic
6 criteria encompassed in the “opportunity cost” principle of economics. The opportunity
7 cost principle provides that a utility and its investors should be afforded an opportunity
8 (not a guarantee) to earn a return commensurate with returns they could expect to achieve
9 on investments of similar risk. The opportunity cost principle is consistent with the
10 fundamental premise on which regulation rests, namely, that it is intended to act as a
11 surrogate for competition.

12
13 **Q. HOW CAN THESE PARAMETERS BE EMPLOYED TO ESTIMATE THE COST**
14 **OF CAPITAL FOR A UTILITY?**

15 A. Neither the courts nor economic/financial theory have developed exact and mechanical
16 procedures for precisely determining the cost of capital. This is the case because the cost
17 of capital is an opportunity cost and is prospective-looking, which dictates that it must be
18 estimated.

19 There are several useful models that can be employed to assist in estimating the
20 cost of equity capital, which is the capital structure item that is the most difficult to
21 determine. These include the discounted cash flow (“DCF”), capital asset pricing model
22 (“CAPM”), comparable earnings (“CE”) and risk premium (“RP”) methods. Each of
23 these methods (or models) differs from the others and each, if properly employed, can be
24 a useful tool in estimating the cost of common equity for a regulated utility.

25
26 **Q. WHICH METHODS HAVE YOU EMPLOYED IN YOUR ANALYSES OF THE**
27 **COST OF COMMON EQUITY IN THIS PROCEEDING?**

28 A. I have utilized three methodologies to determine PWV’s cost of common equity: the
29 DCF, CAPM, and CE methods. Each of these methodologies will be described in more
30 detail in my testimony that follows.

1 **IV. GENERAL ECONOMIC CONDITIONS**

2
3 **Q. WHY ARE ECONOMIC AND FINANCIAL CONDITIONS IMPORTANT IN**
4 **DETERMINING THE COSTS OF CAPITAL?**

5 **A.** The costs of capital, for both fixed-cost (debt and preferred stock) components and
6 common equity, are determined in part by current and prospective economic and
7 financial conditions. At any given time, each of the following factors has an influence on
8 the costs of capital: the level of economic activity (i.e., growth rate of the economy), the
9 stage of the business cycle (i.e., recession, expansion, or transition), the level of inflation,
10 and expected economic conditions. My understanding is that this position is consistent
11 with the Bluefield decision that noted "[a] rate of return may be reasonable at one time,
12 and become too high or too low by changes affecting opportunities for investment, the
13 money market, and business conditions generally."
14

15 **Q. WHAT INDICATORS OF ECONOMIC AND FINANCIAL ACTIVITY HAVE**
16 **YOU EVALUATED IN YOUR ANALYSES?**

17 **A.** I have examined several sets of economic statistics from 1975 to the present. I chose this
18 time period because it permits the evaluation of economic conditions over three full
19 business cycles plus the current cycle to date, allowing for an assessment of changes in
20 long-term trends. This period also approximates the beginning and continuation of active
21 rate case activities by public utilities.

22 A business cycle is commonly defined as a complete period of expansion
23 (recovery and growth) and contraction (recession). A full business cycle is a useful and
24 convenient period over which to measure levels and trends in long-term capital costs
25 because it incorporates the cyclical (i.e., stage of business cycle) influences, and thus,
26 permits a comparison of structural (or long-term) trends.
27

28 **Q. PLEASE DESCRIBE THE TIMEFRAME OF THE THREE PRIOR BUSINESS**
29 **CYCLES AND THE MOST RECENT CYCLE.**

30 **A.** The three prior complete cycles and most recent cycle cover the following periods:
31

<u>Business Cycle</u>	<u>Expansion Cycle</u>	<u>Contraction Period</u>
1975-1982	Mar. 1975-July 1981	Aug. 1981-Oct. 1982
1982-1991	Nov. 1982-July 1990	Aug. 1990-Mar. 1991
1991-2001	Apr. 1991-Mar. 2001	Apr. 2001-Nov. 2001
Current	Dec. 2001-Nov. 2007	Dec. 2007-Present

Source: National Bureau of Economic Research, "Business Cycle Expansions and Contractions."

Q. DO YOU HAVE ANY GENERAL OBSERVATIONS CONCERNING THE RECENT TRENDS IN ECONOMIC CONDITIONS AND THEIR IMPACT ON CAPITAL COSTS OVER THIS BROAD PERIOD?

A. Yes, I do. As I will describe below, until recently the U.S. economy enjoyed general prosperity and stability over the period since the early 1980s. This period has been characterized by longer economic expansions, relatively tame contractions, relatively low and declining inflation, and declining interest rates and other capital costs. The current business cycle began in late 2001, following a somewhat modest recession earlier in the year.

Over the past two years, on the other hand, the economy has slowed significantly, initially as a result of the 2007 collapse of the "sub-prime" mortgage market and related liquidity crises in the financial sector of the economy. Subsequently, this financial crisis intensified with a more broad-based decline initially based on an intensive increase in petroleum prices and an increasing decline in the U.S. financial sector culminating with the collapse and/or bailouts of a substantial number of long-standing institutions such as Bear Stearns, Lehman Brothers, Merrill Lynch, Freddie Mac, Fannie Mae, AIG and Wachovia. This crisis has recently been described as the worst financial crisis since the Great Depression. The U.S. government is in the process of implementing unprecedented actions to attempt to correct or minimize its scope and effects. As of this time the consequences of these governmental initiatives are unclear. There is presently a universal acceptance that the economy is in a recession. Should the economic recession become severe, the impacts on cost of capital would likely be characterized by lower utility growth and declining capital costs due to a decline in corporate profits and expected earnings growth. It is clear that a serious recession would also have negative impacts on PWW's customers, in terms of income levels, unemployment and higher

1 poverty levels. In addition, it is likely that PWW's business customers are experiencing
2 lower profits as a result of the recession. Clearly, this is not an environment in which it is
3 sensible to increase the profitability of a regulated company such as PWW.

4
5 **Q. PLEASE DESCRIBE RECENT AND CURRENT ECONOMIC AND FINANCIAL**
6 **CONDITIONS AND THEIR IMPACT ON THE COSTS OF CAPITAL.**

7 **A.** Schedule 2 shows several sets of economic data. Pages 1 and 2 contain general
8 macroeconomic statistics while Pages 4 through 6 contain financial market statistics.
9 Pages 1 and 2 show that the U.S. economy ended 2007 as the sixth year of an economic
10 expansion although, as indicated previously, the economy was then entering a decline.
11 This is indicated by the growth in real (i.e., adjusted for inflation) Gross Domestic
12 Product ("GDP"), industrial production, and the increase in the unemployment rate. This
13 most recent expansion was characterized by slower growth, in comparison to prior
14 expansions which resulted in lower inflationary pressures and interest rates.

15 The rate of inflation is also shown on Pages 1 and 2. As is reflected in the
16 Consumer Price Index ("CPI"), for example, inflation rose significantly during the 1975-
17 1982 business cycle and reached double-digit levels in 1979-1980. The rate of inflation
18 declined substantially in 1981 and remained at or below 6.1 percent during the 1983-1991
19 business cycle. Since 1991, the CPI has been 4.1 percent or lower. The 0.1 percent rate
20 of inflation in 2008 was the lowest level of the past thirty years. This is indicative of
21 virtually no inflation, which should also be reflective of lower capital costs.

22
23 **Q. WHAT HAVE BEEN THE TRENDS IN INTEREST RATES?**

24 **A.** Pages 3 and 4 show several series of interest rates. Rates rose sharply to record levels in
25 1975-1981 when the inflation rate was high and generally rising. Interest rates declined
26 substantially in conjunction with inflation rates throughout the remainder of the 1980s
27 and throughout the 1990s. Interest rates declined even further from 2000-2005 and
28 generally recorded their lowest levels since the 1960s.

29 During the past several years, long-term interest rates have remained low by
30 historic standards. During the 2001 recession and early in the succeeding expansion, the
31 Federal Reserve lowered interest rates (i.e., Federal Funds rate) 11 times in 2001 and

twice in 2003 in an effort to stimulate the economy. Following this, the Federal Reserve increased short-term interest rates on 17 occasions between 2004 and 2006,¹ although each time by only 0.25 percent, in an attempt to ensure that any perceived inflationary expectations will not stifle continued economic growth. Nevertheless, the Federal Reserve actions did not result in a pronounced increase in long-term rates. Most recently, however, the Federal Reserve has lowered the Federal Funds rate (i.e., short-term rate) on several occasions and as February 20, 2009 it is 0.25 percent, an all-time low. Over the past several years, long-term interest rates have remained relatively stable, by historic standards. The year 2008 experienced a pronounced decline in short-term rates, a slight decline in long-term U.S. Treasury Securities yields, and an increase in utility bond yields. The initial months of 2009 has seen a reduction in the levels of corporate yields.

Q. WHAT HAVE BEEN THE TRENDS IN COMMON SHARE PRICES?

A. Pages 5 and 6 show several series of common stock prices and ratios. These ratios indicate that share prices were essentially stagnant during the high inflation/interest rate environment of the late 1970s and early 1980s. On the other hand, the 1983-1991 business cycle and the most recent cycles witnessed a significant upward trend in stock prices. Since the beginning of the current financial crisis, on the other hand, stock prices have declined precipitously and have been very volatile. Stock prices in 2008 and early 2009 are down significantly from 2007 levels, reflecting the financial/economic crises.

Q. WHAT CONCLUSIONS DO YOU DRAW FROM YOUR DISCUSSION OF ECONOMIC AND FINANCIAL CONDITIONS?

A. It is apparent that recent and current economic/financial circumstances are radically different from any that have prevailed since at least the 1930s. The recent deterioration in stock prices and the decline in U.S. Treasury bond yields and increase in corporate bond yields reflect the “flight to quality” that describes the extreme reluctance of investors to purchase common stocks and corporate bonds while moving investments into the very safe government bonds.

¹ See Federal Reserve Bank of New York, “Historical Changes of the Target Federal Funds and Discount Rates,” www.newyorkfed.org/markets/statistics/dlyrates/fedrate.html.

1 This "flight to safety" should not be interpreted to reflect an increase in the cost of
2 capital, however. Rather, it more properly reflects an "availability of capital" since
3 investors have been recently been unwilling to invest in any assets other than U.S.
4 Treasury bonds. As I noted previously, the opportunity cost of capital, as measured by
5 the recent and current returns of unregulated firms, has been the lowest in recent memory.
6 Clearly, this cannot be claimed to reflect an increase in the cost of capital for a regulated
7 firm such as PWW.

1 **V. PENNICHUCK’S OPERATIONS AND RISKS**

2
3 **Q. PLEASE SUMMARIZE PWW AND ITS OPERATIONS.**

4 A. PWW is a public utility that provides water services to some 110,000 people in New
5 Hampshire. The Company dates to 1852 and is presently the largest investor-owned
6 water utility in New Hampshire. PWW is a subsidiary of PC.

7
8 **Q. PLEASE DESCRIBE PC.**

9 A. PC is a holding company, whose principal subsidiaries are water utilities that provide
10 water in New Hampshire and a small portion of Massachusetts. According to PC’s 2008
11 Form 10-K, it owns five operating subsidiaries:

- 12 • **Pennichuck Water Works, Inc.** (“PWW”) our principal subsidiary, was
13 established in 1985 and services the City of Nashua, New Hampshire and 10
14 surrounding New Hampshire municipalities located in southern New Hampshire
15 with an estimated population of 110,000, almost 10% of the population of the
16 State of New Hampshire.
- 17 • **Pennichuck Water Service Corporation** (“PWSC”) is in the contract operations
18 field. Currently, PWSC has operations and management agreements with the
19 towns of Hudson, NH and Salisbury and Hyannis, MA. PWSC is the certified
20 operator for many non-community water systems, providing laboratory testing,
21 monitoring and consulting services.
- 22 • **Pennichuck East Utility, Inc.** (“PEU”) was organized in 1998 and serves 15
23 communities most of which are located in southern and central New Hampshire.
- 24 • **Pittsfield Aqueduct Company** which was acquired in 1998 serves customers in
25 Pittsfield, New Hampshire, as well as three other communities in central and
26 northern New Hampshire.
- 27 • **The Southwood Corporation** is engaged in real estate management and
28 commercialization activities. Southwood’s holdings include approximately 450
29 acres of developable land located in Nashua and Merrimack New Hampshire.
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31 commercialization activities. Southwood’s holdings include approximately 450
32 acres of developable land located in Nashua and Merrimack New Hampshire.
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34 commercialization activities. Southwood’s holdings include approximately 450
35 acres of developable land located in Nashua and Merrimack New Hampshire.

36 **Q. WHAT ARE THE SEGMENT RATIOS OF PC?**

37 A. These are shown on Schedule 3. Page 1 indicates the ratios of operating revenues, net
income, capital additions and assets for the three major business segments of PC - water

1 utility, water management and real estate. This indicates that the water utility operations
2 form the vast majority (i.e., 90 percent or greater) of PC's combined operations.

3 Page 2 of Schedule 3, in turn, shows the relative amounts of utility operating
4 revenues attributable to the three utility subsidiaries of PC. This indicates that PWW is
5 the primary utility subsidiary, as it accounts for about 80 percent of the combined
6 operating revenues.

7
8 **Q. WHAT ARE THE CURRENT BOND RATINGS OF PC?**

9 A. The debt of PWW is rated Baa3 by Moody's. This rating has been in effect since 2005.
10

11 **Q. HOW DO THESE RATINGS COMPARE TO OTHER PUBLICLY-TRADED**
12 **WATER UTILITIES?**

13 A. According to AUS Utility Reports, only 4 of the 10 covered water utilities have S&P
14 bond ratings. Of the 4, two are rated single-A and one is rated double-A. The other has
15 triple-A ratings apparently reflecting the existence of insured debt. Only one of the 10
16 companies has Moody's ratings; this is single-A rated. The lack of ratings by most of the
17 water utilities implies that PWW is less risky than water utilities generally. This follows
18 since a rated company is perceived to have a recognized risk profile assigned by an
19 independent rating agency, whereas an unrated company does not.
20

21 **Q. DOES THE ONGOING EMINENT DOMAIN PROCEEDING IMPACT THE**
22 **COST OF CAPITAL FOR PWW?**

23 A. Since 2002, the City of Nashua has been involved in an ongoing effort to acquire a
24 significant portion of PWW's assets through an eminent domain proceeding. At the
25 present time, PWW is involved in the appeal of the NHPUC decision dated July 25, 2008
26 that the City should be permitted to acquire the Company's assets. According to PC's
27 2008 Form 10-K, the Company has engaged an investment banking firm to "advise it
28 regarding a possible settlement with the City."

29 I do not believe that this eminent domain proceeding, as well as any speculation
30 as to its ultimate outcome, should impact the cost of capital for PWW in this proceeding.

1 I also note that PWW does not appear to be claiming that its cost of equity should be
2 directly impacted by this factor.

1 **VI. CAPITAL STRUCTURE AND COST OF DEBT**

2
3 **Q. WHAT IS THE IMPORTANCE OF DETERMINING A PROPER CAPITAL**
4 **STRUCTURE IN A REGULATORY FRAMEWORK?**

5 A. A utility's capital structure is important because the concept of rate base – rate of return
6 regulation requires that a utility's capital structure be determined and utilized in
7 estimating the total cost of capital. Within this framework, it is proper to ascertain
8 whether the utility's capital structure is appropriate relative to its level of business risk
9 and relative to other utilities.

10 As discussed in Section III of my testimony, the purpose of determining the
11 proper capital structure for a utility is to help ascertain its capital costs. The rate base –
12 rate of return concept recognizes the assets employed in providing utility services and
13 provides for a return on these assets by identifying the liabilities and common equity (and
14 their cost rates) used to finance the assets. In this process, the rate base is derived from
15 the asset side of the balance sheet and the cost of capital is derived from the
16 liabilities/owners' equity side of the balance sheet. The inherent assumption in this
17 procedure is that the dollar values of the capital structure and the rate base are
18 approximately equal and the former is utilized to finance the latter.

19 The common equity ratio (i.e., the percentage of common equity in the capital
20 structure) is the capital structure item which normally receives the most attention. This is
21 the case because common equity: (1) usually commands the highest cost rate; (2)
22 generates associated income tax liabilities; and, (3) causes the most controversy since its
23 cost cannot be precisely determined.

24
25 **Q. HOW HAVE YOU EVALUATED THE CAPITAL STRUCTURE OF PWW AND**
26 **PC?**

27 A. I have first examined the five year historic (2003-2007) and recent (Nov. 30, 2008)
28 capital structure ratios of PWW and PC.

29
30 **Q. WHAT ARE THE CAPITAL STRUCTURE RATIOS OF PWW AND PC?**

1 A. These are shown on Schedule 4. These common equity ratios of PWW and PC, on a
2 consolidated basis, are summarized below:

	<u>Pennichuck Water Works</u>	<u>Pennichuck Corporation</u>
3 2003	47.9%	52.5%
4 2004	49.9%	52.9%
5 2005	51.0%	52.4%
6 2006	49.0%	48.0%
7 2007	40.9%	41.3%
8 Nov. 30, 2008	42.3%	42.5%

9 These ratios indicate a decline in common equity percentage for both PWW and PC in
10 2007 and 2008. The Company maintains (e.g., Mr. Walker's testimony on page 12) that
11 this decline is due to PC's inability to sell additional equity due to the eminent domain
12 proceeding.

13
14 **Q. HOW DO THESE CAPITAL STRUCTURES COMPARE TO THOSE OF**
15 **INVESTOR-OWNED WATER UTILITIES?**

16 A. Schedule 5 shows the common equity ratios (including short-term debt in capitalization)
17 for the two groups of proxy water utilities identified in a following section of my
18 testimony. These are:

	<u>Value Line</u>	<u>AUS Utility</u>
19 Year	<u>Water Group</u>	<u>Reports</u>
20 2003	46%	46%
21 2004	52%	50%
22 2005	49%	48%
23 2006	50%	50%
24 2007	51%	50%

25 These common equity ratios are seen to be generally higher than those of PWW since
26 2007.

27
28 **Q. WHAT CAPITAL STRUCTURE RATIOS HAS PWW REQUESTED IN THIS**
29 **PROCEEDING?**

30 A. The Company requests use of the following (proforma December 31, 2007) capital
31 structure:

Capital Item	Percent
Long-Term Debt	57.78%
Common Equity	42.22%

According to PWW witness William Patterson, the pro forma adjustment to the Company's actual December 31, 2007 capital structure reflects an equity infusion from PC in early 2008 from funds derived from the sale of real estate.

Q. WHAT CAPITAL STRUCTURE DO YOU PROPOSE TO USE IN THIS PROCEEDING?

A. I have utilized the proposed capital structure that is contained in the Company's filing. This capital structure reflects the proforma per books ratios of PWW and is similar to the recent actual capital structure ratios. I note that the capital structure proposed by PWW does not include short-term debt. I generally favor the inclusion of short-term debt in a utility's capital structure for ratemaking purposes, especially when it can be shown to be consistently financing a portion of rate base. It does not appear that PWW has consistently utilized short-term debt in recent years.

Q. WHAT IS THE COST RATE OF LONG-TERM DEBT IN THE COMPANY'S APPLICATION?

A. The Company's filing cites a cost of long-term debt of 5.30 percent. I use this rate in my cost of capital analyses.

Q. ARE YOU AWARE THAT PWW HAS PROVIDED THE STAFF WITH A "REVISED" COST OF LONG-TERM DEBT CALCULATION?

A. Yes, I am. It is my understanding that PWW has provided Staff with a "revised" set of long-term debt embedded cost rates that primarily differ from those in the Company's filing by including a rate of return or carrying cost on the unamortized amount of issuance costs. I note that PWW apparently has not requested that its cost of debt be modified from that contained in the original filing. However, the Staff requested me to address this proposal in my testimony.

1 **Q. DO YOU AGREE WITH PWV'S REVISED COST OF DEBT METHODOLOGY?**

2 A. No, I do not. I believe that PWV's proposal has the impact of over-recovering the cost
3 of debt. This is the case since, even though the Company does not receive the gross
4 proceeds from each debt issue (and recovers the differential between the gross and net
5 proceeds through the cost of debt), the capital structure used by the Company for
6 establishing its total cost of capital does include the gross amount of long-term debt.
7 Thus, the Company is earning a return on the full, or gross, amount of its long-term debt
8 throughout the life of each long-term debt issue and is thus fully compensated for its debt
9 costs.

10
11 **Q. CAN YOU PROVIDE AN EXAMPLE OF WHY THIS IS THE CASE?**

12 A. Yes, I can. Schedule 5 of PWV's filing shows the "Effective Rate" of each of its debt
13 issues. Consider, for example, the "BFA of NH" issue, which has an outstanding balance
14 of \$4 million and an "Effective Rate" of 6.52 percent. This cost rate contains an "All In
15 Annual Cost" of \$260,819, which includes \$8,819 of "Annual Amortization" of the debt
16 discount.

17 The Company's alternative methodology, as provided to the Staff, indicates a cost
18 of 6.73 percent for this debt issue. This rate is derived by dividing the \$260,819 "All In
19 Annual Cost" by the "Outstanding Debt Funded" (which is the \$4 million "Outstanding
20 Balance" less the \$126,404 "unamortized issuance costs"), which results in the 6.73
21 percent cost rate in PWV's revised cost rate for this issue.

22 Recalling that the full \$4 million of the outstanding balance of the BFA of NH
23 issue is in the capital structure (which can be verified by comparing the \$58,164,687
24 outstanding balance of long-term debt shown on Schedule 5 with Schedule 1), it is
25 apparent that the 6.73 percent over-compensates the Company for its debt cost. This is
26 the case since the \$4 million amount outstanding is in the capital structure used to
27 develop the total cost of capital, not the "Outstanding Debt Funded" which PWV used to
28 develop its 6.73 percent cost in its "revised" cost of debt.

1 **Q. CAN THE COST OF COMMON EQUITY BE DETERMINED WITH THE SAME**
2 **DEGREE OF PRECISION AS THE COSTS OF DEBT AND PREFERRED**
3 **EQUITY?**

4 **A.** No. The cost rates of debt and preferred stock are largely determined by interest
5 payments, issue prices, and related expenses. The cost of common equity, on the other
6 hand, cannot be precisely quantified, primarily because this cost is an opportunity cost.
7 There are, however, several models which can be employed to estimate the cost of
8 common equity. Three of the primary methods - DCF, CAPM, and CE - are developed in
9 the following sections of my testimony.

1 **VII. SELECTION OF PROXY GROUPS**

2
3 **Q. HOW HAVE YOU ESTIMATED THE COST OF COMMON EQUITY FOR**
4 **PWW?**

5 A. PWW is not a publicly-traded company. Consequently, it is not possible to directly apply
6 cost of equity models to this entity. Its parent company, PC, however, is publicly-traded.
7 As a result, it is possible to conduct direct analyses of its cost of common equity.
8 However, it is customary to analyze groups of comparison or “proxy” companies as a
9 substitute for PWW and PC to determine their cost of common equity.

10 I have examined two such groups for comparison to PWW and PC. The first
11 proxy group is the group of four water utilities that are included in Value Line Investment
12 Survey. The second group is the complete set of water utilities reported in AUS Utility
13 Reports. This is similar to the group of six water utilities identified by PWW witness
14 Walker in his cost of capital analyses and identified as “Water Group Followed by
15 Analysts,” although it includes two companies not contained in Mr. Walker’s group (i.e.,
16 Connecticut Water and Middlesex Water).

1 **VIII. DISCOUNTED CASH FLOW ANALYSIS**

2
3 **Q. WHAT IS THE THEORY AND METHODOLOGICAL BASIS OF THE**
4 **DISCOUNTED CASH FLOW MODEL?**

5 A. The discounted cash flow (DCF) model is one of the oldest, as well as the most
6 commonly-used, models for estimating the cost of common equity for public utilities.
7 The DCF model is based on the "dividend discount model" of financial theory, which
8 maintains that the value (price) of any security or commodity is the discounted present
9 value of all future cash flows.

10 The most common variant of the DCF model assumes that dividends are expected
11 to grow at a constant rate. This variant of the dividend discount model is known as the
12 constant growth or Gordon DCF model. In this framework cost of capital is derived by
13 the following formula:

14
$$K = \frac{D}{P} + g$$

15
16 where: K = discount rate (cost of capital)
17 P = current price
18 D = current dividend rate
19 G = constant rate of expected growth
20

21 This formula essentially recognizes that the return expected or required by investors is
22 comprised of two factors: the dividend yield (current income) and expected growth in
23 dividends (future income).
24

25 **Q. PLEASE EXPLAIN HOW YOU HAVE EMPLOYED THE DCF MODEL.**

26 A. I have utilized the constant growth DCF model. In doing so, I have combined the current
27 dividend yield for each group of proxy utility stocks described in the previous section
28 with several indicators of expected dividend growth.
29

1 **Q. HOW DID YOU DERIVE THE DIVIDEND YIELD COMPONENT OF THE DCF**
2 **EQUATION.**

3 A. There are several methods that can be used for calculating the dividend yield component.
4 These methods generally differ in the manner in which the dividend rate is employed;
5 i.e., current versus future dividends or annual versus quarterly compounding of
6 dividends. I believe the most appropriate dividend yield component is a quarterly
7 compounding variant, which is expressed as follows:

$$Yield = \frac{D_0(1 + 0.5g)}{P_0}$$

9 This dividend yield component recognizes the timing of dividend payments and dividend
10 increases.

11 The P_0 in my yield calculation is the average (of high and low) stock price for
12 each proxy company for the most recent three month period (December 2008 to February
13 2009). The D_0 is the current annualized dividend rate for each proxy company.
14

15 **Q. HOW HAVE YOU ESTIMATED THE DIVIDEND GROWTH COMPONENT OF**
16 **THE DCF EQUATION?**

17 A. The dividend growth rate component of the DCF model is usually the most crucial and
18 controversial element involved in using this methodology. The objective of estimating
19 the dividend growth component is to reflect the growth expected by investors that is
20 embodied in the price (and yield) of a company's stock. As such, it is important to
21 recognize that individual investors have different expectations and consider alternative
22 indicators in deriving their expectations. This is evidenced by the fact that every
23 investment decision resulting in the purchase of a particular stock is matched by another
24 investment decision to sell that stock.

25 A wide array of indicators exist for estimating the growth expectations of
26 investors. As a result, it is evident that no single indicator of growth is always used by all
27 investors. It therefore is necessary to consider alternative indicators of dividend growth
28 in deriving the growth component of the DCF model.

29 I have considered five indicators of growth in my DCF analyses. These are:

30 1. 2003-2007 (5-year average) earnings retention, or fundamental growth;

2. 5-year average of historic growth in earnings per share (EPS), dividends per share (DPS), and book value per share (BVPS);
3. 2008, and 2011-2013 projections of earnings retention growth; (per Value Line);
4. 2005-2007 to 2011-2013 projections of EPS, DPS, and BVPS (per Value Line); and,
5. 5-year projections of EPS growth as reported in First Call (per Yahoo! Finance).

I believe this combination of growth indicators is a representative and appropriate set with which to begin the process of estimating investor expectations of dividend growth for the groups of proxy companies. I also believe that these growth indicators reflect the types of information that investors consider in making their investment decisions. As I indicated previously, investors have an array of information available to them, all of which should be expected to have some impact on their decision-making process.

Q. PLEASE DESCRIBE YOUR INITIAL DCF CALCULATIONS.

- A. Schedule 6 presents my DCF analysis. Page 1 shows the calculation of the “raw” (i.e., prior to adjustment for growth) dividend yield for each proxy company. Pages 2 and 3 show the growth rate for the groups of proxy companies. Page 4 shows the “raw” DCF calculations, which are presented on several bases: mean, median, and range of low/high values. These results can be summarized as follows:

	Mean	Median	Mean High ²	Median High ²
Value Line Group	7.5%	7.3%	9.1%	9.3%
AUS Group	8.7%	8.9%	11.4%	11.1%

I note that the individual DCF calculations shown on Schedule 6 should not be interpreted to reflect the expected cost of capital for the proxy groups; rather, the

² Using only the highest growth rate.

1 individual values shown should be interpreted as alternative information considered by
2 investors.

3 The DCF results in Schedule 6 indicate average (mean and median) DCF cost
4 rates of about 7½ percent to 9 percent. The highest DCF rates (i.e., using the highest
5 growth rates only) are about 9 percent to 11 percent.

6
7 **Q. WHAT DO YOU CONCLUDE FROM YOUR DCF ANALYSES?**

8 A. Based upon my analyses, I believe a broad range of 7½ percent to 11 percent represents
9 the current DCF cost of equity for the proxy groups. This is approximated by the
10 average/mean values, as well as the top DCF calculations for the groups examined in the
11 previous analysis. I recommend a 9 percent to 10 percent (9.5 percent mid-point) for
12 PWW, which focuses on the middle portion of the DCF range.

13 I note that my recommendation does not incorporate either the lowest DCF costs
14 (i.e., 7 percent to 8½ percent) of the upper end (which reflects only a single growth rate
15 estimate).

1 **IX. CAPITAL ASSET PRICING MODEL ANALYSIS**

2
3 **Q. PLEASE DESCRIBE THE THEORY AND METHODOLOGICAL BASIS OF**
4 **THE CAPITAL ASSET PRICING MODEL.**

5 A. The Capital Asset Pricing Model (CAPM) is a version of the risk premium method. The
6 CAPM describes and measures the relationship between a security's investment risk and
7 its market rate of return. The CAPM was developed in the 1960s and 1970s as an
8 extension of modern portfolio theory (MPT), which studies the relationships among risk,
9 diversification, and expected returns.

10
11 **Q. HOW IS THE CAPM DERIVED?**

12 A. The general form of the CAPM is:

13
$$K = R_f + \beta(R_m - R_f)$$

14 where: K = cost of equity

15 R_f = risk free rate

16 R_m = return on market

17 β = beta

18 $R_m - R_f$ = market risk premium

19
20 As noted previously, the CAPM is a variant of the risk premium method. I believe the
21 CAPM is generally superior to the simple risk premium method because the CAPM
22 specifically recognizes the risk of a particular company or industry (i.e., beta), whereas
23 the simple risk premium method does not, but rather the simple risk premium method
24 assumes the same cost of equity for all companies exhibiting similar bond ratings.

25
26 **Q. WHAT GROUPS OF COMPANIES HAVE YOU UTILIZED TO PERFORM**
27 **YOUR CAPM ANALYSES?**

28 A. I have performed CAPM analyses for the same groups of proxy utilities evaluated in my
29 DCF analyses.

1 **Q. WHAT RATE DID YOU USE FOR THE RISK-FREE RATE?**

2 A. The first term of the CAPM is the risk-free rate (R_f). The risk-free rate reflects the level
3 of return that can be achieved without accepting any risk.

4 In CAPM applications, the risk-free rate is generally recognized by use of U.S.
5 Treasury securities. Two general types of U.S. Treasury securities are often utilized as
6 the R_f component - short-term U.S. Treasury bills and long-term U.S. Treasury bonds.

7 I have performed CAPM calculations using the three month average yield
8 (December 2008-February 2009) for 20-year U.S. Treasury bonds. Over this three month
9 period, these bonds had an average yield of 3.49 percent.

11 **Q. WHAT IS BETA AND WHAT BETAS DID YOU EMPLOY IN YOUR CAPM?**

12 A. Beta is a measure of the relative volatility (and thus risk) of a particular stock in relation
13 to the overall market. Betas of less than 1 are considered less risky than the market,
14 whereas betas greater than 1 are more risky. Utility stocks traditionally have had betas
15 below 1. I utilized the most recent Value Line betas for each company in the groups of
16 proxy utilities.

18 **Q. HOW DID YOU ESTIMATE THE MARKET RISK PREMIUM COMPONENT?**

19 A. The market risk premium component ($R_m - R_f$) represents the investor-expected premium
20 of common stocks over the risk-free rate, or government bonds. For the purpose of
21 estimating the market risk premium, I considered alternative measures of returns of the
22 S&P 500 (a broad-based group of large U.S. companies) and 20-year U.S. Treasury
23 bonds.

24 First, I have compared the actual annual returns on equity of the S&P 500 with the
25 actual annual yields of U.S. Treasury bonds. Schedule 7 shows the return on equity for
26 the S&P 500 group for the period 1978-2007 (all available years reported by S&P). This
27 Schedule also indicates the annual yields on 20-Year U.S. Treasury bonds, as well as the
28 annual differentials (i.e., risk premiums) between the S&P 500 and U.S. Treasury 20-
29 Year bonds. Based upon these returns, I conclude that this version of the risk premium is
30 about 6.5 percent.

I have also considered the total returns (i.e., dividends/interest plus capital gains/losses) for the S&P 500 group as well as for the long-term government bonds, as tabulated by Ibbotson Associates, using both arithmetic and geometric means. I have considered the total returns for the entire 1926-2008 period, which are as follows:

	<u>S&P 500</u>	<u>L-T Gov't Bonds</u>	<u>Risk Premium</u>
Arithmetic	11.7%	6.1%	5.6%
Geometric	9.6%	5.7%	3.9%

I conclude from this that the expected risk premium is about 5.3 percent (i.e., average of all three risk premiums). I believe that a combination of arithmetic and geometric means is appropriate since investors have access to both types of means and, presumably, both types are reflected in investment decisions and thus stock prices and cost of capital.

Schedule 8 shows my CAPM calculations using the risk premium. The results are:

	<u>Mean</u>	<u>Median</u>
Value Line	8.8%	8.8%
AUS Group	8.3%	8.4%

Q. WHAT IS YOUR CONCLUSION CONCERNING THE CAPM COST OF EQUITY?

A. The CAPM results collectively indicate a cost of about 8½ percent to 9 percent for the two groups of comparison utilities. I conclude that the CAPM cost of equity for PWV is also 8½ percent to 9 percent.

1 **X. COMPARABLE EARNINGS ANALYSIS**

2
3 **Q. PLEASE DESCRIBE THE BASIS OF THE CE METHODOLOGY.**

4 A. The CE method is derived from the "corresponding risk" standard of the Bluefield and
5 Hope cases. This method is thus based upon the economic concept of opportunity cost.
6 As previously noted, the cost of capital is an opportunity cost: the prospective return
7 available to investors from alternative investments of similar risk.

8 The CE method is designed to measure the returns expected to be earned on the
9 original cost book value of similar risk enterprises. Thus, this method provides a direct
10 measure of the fair return, because the CE method translates into practice the competitive
11 principle upon which regulation is based.

12 The CE method normally examines the experienced and/or projected returns on
13 book common equity. The logic for returns on book equity follows from the use of
14 original cost rate base regulation for public utilities, which uses a utility's book common
15 equity to determine the cost of capital. This cost of capital is, in turn, used as the fair rate
16 of return which is then applied (multiplied) to the book value of rate base to establish the
17 dollar level of capital costs to be recovered by the utility. This technique is thus
18 consistent with the rate base methodology used to set utility rates.

19
20 **Q. HOW HAVE YOU EMPLOYED THE CE METHODOLOGY IN YOUR**
21 **ANALYSIS OF PWW'S COMMON EQUITY COST?**

22 A. I conducted the CE methodology by examining realized returns on equity for several
23 groups of companies and evaluating the investor acceptance of these returns by reference
24 to the resulting market-to-book ratios. In this manner it is possible to assess the degree to
25 which a given level of return equates to the cost of capital. It is generally recognized for
26 utilities that market-to-book ratios of greater than one (i.e., 100%) reflect a situation
27 where a company is able to attract new equity capital without dilution (i.e., above book
28 value). As a result, one objective of a fair cost of equity is the maintenance of stock
29 prices above book value.

30 I would further note that the CE analysis, as I have employed it, is based upon
31 market data (through the use of market-to-book ratios) and is thus essentially a market

1 test. As a result, my comparable earnings analysis is not subject to the criticisms
2 occasionally made by some who maintain that past earned returns do not represent the
3 cost of capital. In addition, my comparable earnings analysis uses prospective returns
4 and thus is not backward looking.

5
6 **Q. WHAT TIME PERIODS HAVE YOU EXAMINED IN YOUR CE ANALYSIS?**

7 A. My CE analysis considers the experienced equity returns of the proxy groups of utilities
8 for the period 1992-2007 (i.e., last sixteen years). The CE analysis requires that I
9 examine a relatively long period of time in order to determine trends in earnings over at
10 least a full business cycle. Further, in estimating a fair level of return for a future period,
11 it is important to examine earnings over a diverse period of time in order to avoid any
12 undue influence from unusual or abnormal conditions that may occur in a single year or
13 shorter period. Therefore, in forming my judgment of the current cost of equity I have
14 focused on two periods: 2002-2007 (the last business cycle) and 1992-2001 (the most
15 recent complete business cycle).

16
17 **Q. PLEASE DESCRIBE YOUR CE ANALYSIS.**

18 A. Schedules 9 and 10 contain summaries of experienced returns on equity for several
19 groups of companies, while Schedule 11 presents a risk comparison of utilities versus
20 unregulated firms.

21 Schedule 9 shows the earned returns on average common equity and market-to-
22 book ratios for the two groups of proxy utilities. These can be summarized as follows:

23

Group	Historic		Prospective
	ROE	M/B	ROE
Value Line Group	8.6-11.0%	160-235%	9.3-12.5%
AUS Group	9.5-11.1%	172-233%	9.3-12.5%

24
25
26

27 These results indicate that historic returns of 8.6-11.1 percent have been adequate to
28 produce market-to-book ratios of 160-235 percent for the groups of proxy utilities.
29 Furthermore, projected returns on equity for 2008 and 2011-2013 are within a range of
30 9.3 percent to 12.5 percent for the utility groups. These relate to 2007 market-to-book
31 ratios of 200 percent or higher.

1 **Q. HAVE YOU ALSO REVIEWED EARNINGS OF UNREGULATED FIRMS?**

2 A. Yes. As an alternative, I also examined a group of largely unregulated firms. I have
3 examined the Standard & Poor's 500 Composite group, since this is a well recognized
4 group of firms that is widely utilized in the investment community and is indicative of the
5 competitive sector of the economy. Schedule 10 presents the earned returns on equity
6 and market-to-book ratios for the S&P 500 group over the past sixteen years. As this
7 Schedule indicates, over the two periods this group's average earned returns ranged from
8 13.9 percent to 14.7 percent with market-to-book ratios ranging between 284 percent and
9 341 percent.

10
11 **Q. HOW CAN THE ABOVE INFORMATION BE USED TO ESTIMATE THE COST**
12 **OF EQUITY FOR PWV?**

13 A. The recent earnings of the proxy utility and S&P 500 groups can be utilized an indication
14 of the level of return realized and expected in the regulated and competitive sectors of the
15 economy. In order to apply these returns to the cost of equity for proxy utilities,
16 however, it is necessary to compare the risk levels of the water utility industries with
17 those of the competitive sector. I have done this in Schedule 11, which compares several
18 risk indicators for the S&P 500 group and the utility groups. The information in this
19 schedule indicates that the S&P 500 group is slightly more risky than the utility proxy
20 groups.

21
22 **Q. WHAT RETURN ON EQUITY IS INDICATED BY THE CE ANALYSIS?**

23 A. Based on the recent earnings and market-to-book ratios, I believe the CE analysis
24 indicates that the cost of equity for the proxy utilities is no more than 10 percent. Recent
25 return of 8.6-11.1 percent have resulting in market-to-book ratios of 160 and greater.
26 Prospective returns of 9.3-12.5 percent have been accompanied by market-to-book ratios
27 of over 200 percent. As a result, it is apparent that returns below this level would result
28 in market-to-book ratios of well above 100 percent. An earned return of 10 percent or
29 less should thus result in a market-to-book ratio of at least 100 percent. As I indicated
30 earlier, the fact that market-to-book ratios substantially exceed 100 percent indicates that

- 1 historic and prospective returns of 10 percent reflect earnings levels that exceed the cost
- 2 of equity for those regulated companies.

1 **XI. RETURN ON EQUITY RECOMMENDATION**

2
3 **Q. PLEASE SUMMARIZE THE RESULTS OF YOUR THREE COST OF EQUITY**
4 **ANALYSES.**

5 **A.** My three methodologies produce the following:

6 Discounted Cash Flow	9.0-10.0% (9.5 mid-point)
7 Capital Asset Pricing Model	8.5-9.0% (8.75 mid-point)
8 Comparable Earnings	10.00%

9
10 My overall conclusion from these results is an overall range of 9.0 percent to 10.0
11 percent, which focuses on the respective ranges of my individual model findings.
12 Focusing on the respective mid-points, the range is 8.75 percent to 10.0 percent. I
13 recommend a cost of equity rate of 9.0 percent to 10.0 percent for PWV.

1 **XII. TOTAL COST OF CAPITAL**

2
3 **Q. WHAT IS THE TOTAL COST OF CAPITAL FOR PWW?**

4 A. Schedule 1 reflects the total cost of capital for the Company using the proforma
5 December 31, 2007 capital structure and cost of long-term debt, and my common equity
6 cost recommendations. The resulting total cost of capital is a range of 6.86 percent to
7 7.28 percent, with a mid-point of 7.07 percent. I recommend that this 7.07 total cost of
8 capital be established for PWW.

9
10 **Q. DOES YOUR COST OF CAPITAL RECOMMENDATION PROVIDE THE**
11 **COMPANY WITH A SUFFICIENT LEVEL OF EARNINGS TO MAINTAIN ITS**
12 **FINANCIAL INTEGRITY?**

13 A. Yes, it does. Schedule 12 shows the pre-tax coverage that would result if PWW earned
14 the mid-point of my cost of capital recommendation. As the results indicate, the mid-
15 point of my recommended range would produce a coverage level within the benchmark
16 range for an A rated utility. In addition, the debt ratio (which reflects the capital structure
17 as proposed by the Company) is within that benchmark for a BBB rated utility.

XIII. COMMENTS ON COMPANY TESTIMONY

Q. HAVE YOU REVIEWED THE COST OF CAPITAL TESTIMONY PWW WITNESS HAROLD WALKER?

A. Yes, I have.

Q. WHAT IS YOUR UNDERSTANDING OF HIS COST OF EQUITY RECOMMENDATION FOR PWW?

A. Mr. Walker is recommending a cost of equity for PWW of 11.25 percent.

Q. HOW DOES HE DERIVE HIS COST OF EQUITY RECOMMENDATION?

A. Mr. Walker performs the following cost of equity analyses and derives the indicated results:

	Water Group Followed By Analysts		
	DCF	CAPM	RP
Common Equity Cost Rate Range	11.6%	14.4%	11.2%
Investment Risk Adjustment	0.05	0.05	0.05
Adjusted Common Equity Cost Rate Range Applicable to Pennichuck Water Works, Inc.	11.65	14.45	11.25
Recommended Common Equity Cost Rate for Pennichuck Water Works, Inc.		11.25%	

I have prepared Schedule 13 in order to summarize Mr. Walker's cost of equity models, data employed, and conclusions. As this indicates, Mr. Walker included a "leverage adjustment" of 0.60 percent to his DCF and risk premium results. In addition, he added a size premium to his CAPM results.

Q. DO YOU HAVE ANY DISAGREEMENTS WITH ANY OR ALL OF MR. WALKER'S METHODOLOGIES AND RECOMMENDATIONS?

1 A. Yes, I have disagreements with each of his cost of equity methodologies and conclusions.
2 I also disagree with his leverage adjustment and size premium.
3

4 **Q. PLEASE BEGIN WITH HIS DCF MODEL AND CONCLUSIONS.**

5 A. Mr. Walker's DCF model yield uses the average of the yield as of April 2008 and twelve-
6 month average yield for the period ending April 2008, with the resulting yield increased
7 by one-half of the growth rate. His adjusted yield of 2.8 percent is similar to my adjusted
8 yields of 2.7 percent and 3.4 percent, respectively, which are based on a three-month
9 average for the period ending February 2009.

10 Mr. Walker considers several growth rates in his DCF analyses, including
11 projected EPS, DPS, and cash flow. However, his DCF growth rate of 8.2 percent only
12 considers projections of EPS.

13 Finally, Mr. Walker increases his DCF results by use of his leverage adjustment.
14

15 **Q. DO YOU BELIEVE IT IS APPROPRIATE TO GIVE EXCLUSIVE WEIGHT TO**
16 **FORECASTS OF EPS IN A DCF CONTEXT?**

17 A. No, I do not.
18

19 **Q. WHY IS IT IMPROPER TO RELY HEAVILY ON EPS PROJECTIONS IN A**
20 **DCF CONTEXT?**

21 A. There have been several events in recent years that would given investors reason to
22 question the accuracy of EPS projections, and therefore the relative weight of such
23 forecasts in establishing stock prices.

24 First, recent academic scholarship has challenged the accuracy of analysts' EPS
25 forecasts. A prominent example is a 1998 article (in the Financial Analysts Journal, Vol.
26 54, No. 6, Nov./Dec, 1998, 35-42) titled "Why So Much Error In Analysts' Earnings
27 Forecasts?" by Vijay Kumer Chopra. In this article, the author concluded, "Analysts'
28 forecasts of EPS and growth in EPS tend to be overly optimistic." He concluded that
29 analysts' forecasts of EPS over the past 13 years have been more than twice the actual
30 growth rate.

1 Another source is less academic and more directly in the financial mainstream.
2 On March 26, 2002, Federal Reserve Chairman Alan Greenspan spoke to an audience at
3 the Stern School of Business of New York University. In that speech, (available at the
4 FRB's website: <http://www.federalreserve.gov>), the Chairman addressed the historical
5 relationships and roles of corporations, financial institutions and brokerage-based
6 investment analysts:

7 For the most part, despite providing limited incentives for board members
8 to safeguard shareholder interest, this paradigm has worked well. We are
9 fortunate for financial markets have had no realistic alternative other than
10 to depend on the chief executive Division to ensure an objective
11 evaluation of the prospects of the corporation. Apart from a relatively few
12 large institutional investors, not many existing or potential shareholders
13 have the research capability to analyze corporate reports and thus judge
14 the investment value of a corporation. This vitally important service has
15 become dominated by firms in the business of underwriting or selling
16 securities.

17
18 **But, as we can see from recent history, long-term earnings forecasts of**
19 **brokerage-based securities analysts, on average, had been persistently**
20 **overly optimistic. Three-to five-years earnings forecasts for each of**
21 **the S&P 500 corporations, compiled from projections of securities**
22 **analysts by I/B/E/S, averaged almost 12 percent per year between**
23 **1985 and 2001. Actual earnings growth over the period averaged**
24 **about 9 percent.**

25
26 Perhaps the last sixteen years for which systematic data have been
27 available are a historic aberration. But the persistence of the bias year
28 after year suggests that it more likely results, at least in part, from the
29 proclivity of firms that sell securities to retain and promote analysts with
30 an optimistic inclination. Moreover, the bias apparently has been
31 especially large when the brokerage firm issuing the forecast also serves
32 as an underwriter for the company's securities.

33 (Emphasis added).

34
35 Still another source of new insight and perspective is, unfortunately, the well-publicized
36 financial debacles of Enron and WorldCom. These sagas demonstrate dramatically how
37 analysts are often either unwilling to discern or incapable of discerning potentially
38 disastrous impacts on a company's projected EPS, and how even current earnings can be
39 distorted by the complex financial machinations of large, aggressive corporations.

1 Further, during 2003, ten of the nation's largest securities firms agreed to pay a
2 record \$1.4 billion in penalties to settle U.S. government charges involving investor
3 abuses, many of which resulted from analysts' forecasts and recommendations that the
4 government charged were biased and subject to conflicts of interests. This settlement
5 largely grew out of a New York State investigation and reflects the national, and even
6 international, scope of the negative perceptions of analysts' forecasts and
7 recommendations. These and other similar investigations and complaints have
8 underscored a growing awareness that analysts' estimates cannot be considered an
9 unbiased source of growth expectations by investors, and this has important implications
10 for a DCF analysis that exclusively incorporates any such estimates.

11 Finally, the depth and severity of the current recession creates additional
12 uncertainty to the process of projecting corporate growth rates. Investors should be
13 aware that recent projections of EPS growth have not been realized.

14 In summary, investors are now very much aware of recent scandals involving
15 security analysts, including the Enron and WorldCom debacles, conflicts of interest that
16 have resulted in settlements, fines, and public admonishments, as well as other negative
17 connotations related to the reliability of analysts' forecasts. This clearly calls into
18 question the reliance on analysts' forecasts as the primary source of growth in a DCF
19 context.

20
21 **Q. IS IT POSSIBLE THAT RECENT STEPS BY THE SECURITIES AND**
22 **EXCHANGE COMMISSION HAVE THE EFFECT OF REMOVING ANY PAST**
23 **PROBLEMS WITH ANALYSTS' FORECASTS?**

24 **A.** No, I do not believe so. The SEC measures may have the impact of correcting some past
25 abuses by analysts and forecasters, but this does not mean that all investors will be
26 convinced that the problem is solved. The extremely negative publicity associated with
27 the Enron, WorldCom, and New York State investigations will have a lingering effect on
28 investors, whose losses due to incorrect and/or improper forecasts have a much larger
29 impact on their decision-making than some promise by the SEC that abuses have been
30 eliminated. In any event, it remains a far-fetched proposition to maintain that all

1 investors rely exclusively on analysts' forecasts of EPS in making all investment
2 decisions.

3
4 **Q. PLEASE DESCRIBE YOUR DISAGREEMENTS WITH MR. WALKER'S CAPM**
5 **ANALYSIS.**

6 A. Mr. Walker employs a CAPM analysis where he uses a 4.7 percent risk free rate, a 1.01
7 beta, and a 7.2 percent historic risk premium and 8.8 percent projected risk premium.
8 Mr. Walker's CAPM analysis is also increased by a small cap adjustment.

9 Mr. Walker's 4.7 percent risk free rate was based on data as of the preparation of
10 his testimony (i.e., prior to June 2008), but is substantially above the more current yield
11 that I use – 3.49 percent.

12 Another concern with Mr. Walker's CAPM analysis is his 7.2 percent historic risk
13 premium component. Mr. Walker's risk premium is based on two studies – the 1926-
14 2007 Ibbotson Associates study showing a 7.2 percent differential between common
15 stocks (i.e., S&P 500) and long-term government bonds, and an 8.8 percent "projected"
16 risk premium between the projected market return (i.e., estimated growth in stock prices
17 plus dividend yield) for the Value Line composite index. I disagree with both of these
18 studies.

19 The Ibbotson Associates study gives equal weight to annual return differentials
20 throughout the 1926-2007 period. This assumes that investors place equal weights to
21 events occurring in the 1930's (i.e., Great Depression), 1940's (i.e., World War II) and
22 1970's-early 1980's (i.e., high inflation and interest rates) to those of more recent times.
23 These conditions have not existed in the past 20+ years and there are few, if any,
24 projections that they will be repeated in the near term. I do not believe it is rational to
25 maintain that investors base their decisions on such a belief. The mere proposition that
26 investors rely on this long period of data simply because it is available is not sufficient
27 reason to set utility rates on this basis. In addition, it is apparent that an update of the
28 Ibbotson data to include 2008 results in much lower risk premiums.

29 The second study primarily relies on forecasts of stock prices by Value Line. I
30 believe it is fair to say that no one can predict the level of future stock prices, yet, this is
31 what Mr. Walker relies on in this part of his risk premium analysis.

1 Finally, I disagree with Mr. Walker's 1.9 percent size premium. The betas used in
2 his comparable groups reflect the relative movement in these companies stock prices (i.e.,
3 beta) and thus already reflect any perceived risk associated with size. There is thus no
4 reason to add a size adjustment.

5
6 **Q. PLEASE DESCRIBE MR. WALKER'S RISK PREMIUM METHODOLOGY**
7 **AND CONCLUSIONS.**

8 A. Mr. Walker's risk premium methodology combines his estimate of the prospective yield
9 on A rated public utility bonds (6.1 percent) with an "equity risk premium" of 4.5 percent
10 to arrive at a risk premium cost of equity of 10.6 percent. He then "adjusted" this value
11 to "account for the differences in leverage between market value capitalization rates.

12
13 **Q. PLEASE DESCRIBE YOUR DISAGREEMENTS WITH MR. WALKER'S RISK**
14 **PREMIUM ANALYSIS.**

15 A. Mr. Walker utilizes a 4.5 percent risk premium, which he derives by comparing the stock
16 returns of public utilities over several periods with corresponding bond returns. This
17 process suffers from the same deficiencies as did his risk premium calculations in his
18 CAPM methodology. It is further apparent, from his Schedule 20, page 3, that the
19 respective risk premiums have been declining over time, as is evidenced by the fact that
20 the premiums over the most recent period are the smallest of all the periods examined.

21
22 **Q. YOU PREVIOUSLY MENTIONED THAT MR. WALKER ADDED A**
23 **LEVERAGE ADJUSTMENT TO CERTAIN OF HIS COST OF EQUITY MODEL**
24 **RESULTS. PLEASE DESCRIBE THIS ADJUSTMENT AND PROVIDE YOUR**
25 **COMMENTS ON THE APPROPRIATENESS OF SUCH IN ADJUSTMENT.**

26 A. Mr. Walker is proposing a "leverage adjustment" which is essentially an adjustment to
27 the DCF cost rate to offset Mr. Walker's concern that "the DCF only provides a
28 reasonable estimate of the comparable groups common equity when their market price
29 and book value are similar." As a result, Mr. Walker utilizes a "leverage adjustment" to
30 his DCF and risk premium cost of equity model results to reflect differences in book
31 value and market value.

1 I strongly disagree with Mr. Walker's proposed adjustment. Investors are well
2 aware that water utilities have their rates established based upon the book value of their
3 assets (rate base) and capitalization. As a result, investors are not expecting a regulatory
4 award on any other basis, nor should they be compensated for any difference between the
5 book value and market value of their common equity.

6 I further note that, during the depressed stock price period of the 1970s and early
7 1980s, utility witnesses did not propose any negative leverage adjustments to lower the
8 DCF cost of equity for the fact that utility market-to-book ratios were below 100 percent.
9

10 **Q. DOES THIS CONCLUDE YOUR PRE-FILED TESTIMONY?**

11 **A.** Yes, it does.

**PENNICHUCK WATER COMPANY
TOTAL COST OF CAPITAL**

Item	Amount 1/	Percent	Cost	Weighted Cost
Long-Term Debt	\$58,164,687	57.78%	5.30% 1/	3.06%
Common Equity	\$42,508,454	42.22%	9.00% 10.00%	3.80% 4.22%
Total	\$100,673,141	100.00%		6.86% 7.28%
				Mid-Point 7.07%

1/ Pro forma amounts as of December 31, 2007, as contained in Schedule 1 of Company Filing.

ECONOMIC INDICATORS

Year	Real GDP Growth*	Industrial Production Growth	Unemploy- ment Rate	Consumer Price Index	Producer Price Index
1975 - 1982 Cycle					
1975	-1.1%	-8.9%	8.5%	7.0%	6.6%
1976	5.4%	10.8%	7.7%	4.8%	3.7%
1977	5.5%	5.9%	7.0%	6.8%	6.9%
1978	5.0%	5.7%	6.0%	9.0%	9.2%
1979	2.8%	4.4%	5.8%	13.3%	12.8%
1980	-0.2%	-1.9%	7.0%	12.4%	11.8%
1981	1.8%	1.9%	7.5%	8.9%	7.1%
1982	-2.1%	-4.4%	9.5%	3.8%	3.6%
1983 - 1991 Cycle					
1983	4.0%	3.7%	9.5%	3.8%	0.6%
1984	6.8%	9.3%	7.5%	3.9%	1.7%
1985	3.7%	1.7%	7.2%	3.8%	1.8%
1986	3.1%	0.9%	7.0%	1.1%	-2.3%
1987	2.9%	4.9%	6.2%	4.4%	2.2%
1988	3.8%	4.5%	5.5%	4.4%	4.0%
1989	3.5%	1.8%	5.3%	4.6%	4.9%
1990	1.8%	-0.2%	5.6%	6.1%	5.7%
1991	-0.5%	-2.0%	6.8%	3.1%	-0.1%
1992 - 2001 Cycle					
1992	3.0%	3.1%	7.5%	2.9%	1.6%
1993	2.7%	3.3%	6.9%	2.7%	0.2%
1994	4.0%	5.4%	6.1%	2.7%	1.7%
1995	2.5%	4.8%	5.6%	2.5%	2.3%
1996	3.7%	4.3%	5.4%	3.3%	2.8%
1997	4.5%	7.2%	4.9%	1.7%	-1.2%
1998	4.2%	5.9%	4.5%	1.6%	0.0%
1999	4.5%	4.3%	4.2%	2.7%	2.9%
2000	3.7%	4.2%	4.0%	3.4%	3.6%
2001	0.8%	-3.4%	4.7%	1.6%	-1.6%
Current Cycle					
2002	1.6%	-0.1%	5.8%	2.4%	1.2%
2003	2.5%	1.2%	6.0%	1.9%	4.0%
2004	3.6%	2.5%	5.5%	3.3%	4.2%
2005	2.9%	3.3%	5.1%	3.4%	5.4%
2006	2.8%	2.2%	4.6%	2.5%	1.1%
2007	2.0%	1.7%	4.6%	4.1%	6.2%
2008	1.3%	-1.8%	5.8%	0.1%	-0.9%

*GDP=Gross Domestic Product

Source: Council of Economic Advisors, Economic Indicators, various issues.

ECONOMIC INDICATORS

Year	Real GDP Growth*	Industrial Production Growth	Unemploy- ment Rate	Consumer Price Index	Producer Price Index
2002					
1st Qtr.	2.7%	-3.8%	5.6%	2.8%	4.4%
2nd Qtr.	2.2%	-1.2%	5.9%	0.9%	-2.0%
3rd Qtr.	2.4%	0.8%	5.8%	2.4%	1.2%
4th Qtr.	0.2%	1.4%	5.9%	1.6%	0.4%
2003					
1st Qtr.	1.2%	1.1%	5.8%	4.8%	5.6%
2nd Qtr.	3.5%	-0.9%	6.2%	0.0%	-0.5%
3rd Qtr.	7.5%	-0.9%	6.1%	3.2%	3.2%
4th Qtr.	2.7%	1.5%	5.9%	-0.3%	2.8%
2004					
1st Qtr.	3.0%	2.8%	5.6%	5.2%	5.2%
2nd Qtr.	3.5%	4.9%	5.6%	4.4%	4.4%
3rd Qtr.	3.6%	4.6%	5.4%	0.8%	0.8%
4th Qtr.	2.5%	4.3%	5.4%	3.6%	7.2%
2005					
1st Qtr.	3.0%	3.8%	5.3%	4.4%	5.6%
2nd Qtr.	2.6%	3.0%	5.1%	1.6%	-0.4%
3rd Qtr.	3.8%	2.7%	5.0%	8.8%	14.0%
4th Qtr.	1.3%	2.9%	4.9%	-2.0%	4.0%
2006					
1st Qtr.	4.8%	3.4%	4.7%	4.8%	-0.2%
2nd Qtr.	2.7%	4.5%	4.6%	4.8%	5.6%
3rd Qtr.	0.8%	5.2%	4.7%	0.4%	-4.4%
4th Qtr.	1.5%	3.5%	4.5%	0.0%	3.6%
2007					
1st Qtr.	0.1%	2.5%	4.5%	4.8%	6.4%
2nd Qtr.	4.8%	1.6%	4.5%	5.2%	6.8%
3rd Qtr.	4.8%	1.8%	4.6%	1.2%	1.2%
4th Qtr.	-0.2%	2.2%	4.8%	6.4%	10.8%
2008					
1st Qtr.	0.9%	1.8%	4.9%	2.8%	9.6%
2nd Qtr.	2.8%	0.3%	5.3%	7.6%	14.0%
3rd Qtr.	-0.5%	-3.0%	6.0%	2.8%	-0.4%
4th Qtr.	-3.8%	-6.0%	6.9%	-13.6%	-27.6%

Source: Council of Economic Advisors, Economic Indicators, various issues.

INTEREST RATES

Year	Prime Rate	US Treas T Bills 3 Month	US Treas T Bonds 10 Year	Utility Bonds Aaa	Utility Bonds Aa	Utility Bonds A	Utility Bonds Baa
1975 - 1982 Cycle							
1975	7.86%	5.84%	7.99%	9.03%	9.44%	10.09%	10.96%
1976	6.84%	4.99%	7.61%	8.63%	8.92%	9.29%	9.82%
1977	6.83%	5.27%	7.42%	8.19%	8.43%	8.61%	9.06%
1978	9.06%	7.22%	8.41%	8.87%	9.10%	9.29%	9.62%
1979	12.67%	10.04%	9.44%	9.86%	10.22%	10.49%	10.96%
1980	15.27%	11.51%	11.46%	12.30%	13.00%	13.34%	13.95%
1981	18.89%	14.03%	13.93%	14.64%	15.30%	15.95%	16.60%
1982	14.86%	10.69%	13.00%	14.22%	14.79%	15.86%	16.45%
1983 - 1991 Cycle							
1983	10.79%	8.63%	11.10%	12.52%	12.83%	13.66%	14.20%
1984	12.04%	9.58%	12.44%	12.72%	13.66%	14.03%	14.53%
1985	9.93%	7.48%	10.62%	11.68%	12.06%	12.47%	12.96%
1986	8.33%	5.98%	7.68%	8.92%	9.30%	9.58%	10.00%
1987	8.21%	5.82%	8.39%	9.52%	9.77%	10.10%	10.53%
1988	9.32%	6.69%	8.85%	10.05%	10.26%	10.49%	11.00%
1989	10.87%	8.12%	8.49%	9.32%	9.56%	9.77%	9.97%
1990	10.01%	7.51%	8.55%	9.45%	9.65%	9.86%	10.06%
1991	8.46%	5.42%	7.86%	8.85%	9.09%	9.36%	9.55%
1992 - 2001 Cycle							
1992	6.25%	3.45%	7.01%	8.19%	8.55%	8.69%	8.86%
1993	6.00%	3.02%	5.87%	7.29%	7.44%	7.59%	7.91%
1994	7.15%	4.29%	7.09%	8.07%	8.21%	8.31%	8.63%
1995	8.83%	5.51%	6.57%	7.68%	7.77%	7.89%	8.29%
1996	8.27%	5.02%	6.44%	7.48%	7.57%	7.75%	8.16%
1997	8.44%	5.07%	6.35%	7.43%	7.54%	7.60%	7.95%
1998	8.35%	4.81%	5.26%	6.77%	6.91%	7.04%	7.26%
1999	8.00%	4.66%	5.65%	7.21%	7.51%	7.62%	7.88%
2000	9.23%	5.85%	6.03%	7.88%	8.06%	8.24%	8.36%
2001	6.91%	3.45%	5.02%	7.47%	7.59%	7.78%	8.02%
Current Cycle							
2002	4.67%	1.62%	4.61%	[1]	7.19%	7.37%	8.02%
2003	4.12%	1.02%	4.01%		6.40%	6.58%	6.84%
2004	4.34%	1.38%	4.27%		6.04%	6.16%	6.40%
2005	6.19%	3.16%	4.29%		5.44%	5.65%	5.93%
2006	7.96%	4.73%	4.80%		5.84%	6.07%	6.32%
2007	8.05%	4.41%	4.63%		5.94%	6.07%	6.33%
2008	5.09%	1.48%	3.66%		6.18%	6.53%	7.25%

[1] Note: Moody's has not published Aaa utility bond yields since 2001.

Sources: Council of Economic Advisors, Economic Indicators; Moody's Bond Record; Federal Reserve Bulletin; various issues.

INTEREST RATES

Year	Prime Rate	US Treas T Bills 3 Month	US Treas T Bonds 10 Year	Utility Bonds Aaa [1]	Utility Bonds Aa	Utility Bonds A	Utility Bonds Baa
2005							
Jan	5.25%	2.32%	4.22%		5.68%	5.78%	5.95%
Feb	5.50%	2.53%	4.17%		5.55%	5.61%	5.76%
Mar	5.75%	2.75%	4.50%		5.76%	5.83%	6.01%
Apr	5.75%	2.79%	4.34%		5.56%	5.64%	5.95%
May	6.00%	2.86%	4.14%		5.39%	5.53%	5.88%
June	6.25%	2.99%	4.00%		5.05%	5.40%	5.70%
July	6.25%	3.22%	4.18%		5.18%	5.51%	5.81%
Aug	6.50%	3.45%	4.26%		5.23%	5.50%	5.80%
Sept	6.75%	3.47%	4.20%		5.27%	5.52%	5.83%
Oct	6.75%	3.70%	4.46%		5.50%	5.79%	6.08%
Nov	7.00%	3.90%	4.54%		5.59%	5.88%	6.19%
Dec	7.25%	3.89%	4.47%		5.55%	5.80%	6.14%
2006							
Jan	7.50%	4.20%	4.42%		5.50%	5.75%	6.06%
Feb	7.50%	4.41%	4.57%		5.55%	5.82%	6.11%
Mar	7.75%	4.51%	4.72%		5.71%	5.98%	6.26%
Apr	7.75%	4.59%	4.99%		6.02%	6.29%	6.54%
May	8.00%	4.72%	5.11%		6.16%	6.42%	6.59%
June	8.25%	4.79%	5.11%		6.16%	6.40%	6.61%
July	8.25%	4.96%	5.09%		6.13%	6.37%	6.61%
Aug	8.25%	4.98%	4.88%		5.97%	6.20%	6.43%
Sept	8.25%	4.82%	4.72%		5.81%	6.00%	6.26%
Oct	8.25%	4.89%	4.73%		5.80%	5.98%	6.24%
Nov	8.25%	4.95%	4.60%		5.61%	5.80%	6.04%
Dec	8.25%	4.85%	4.56%		5.62%	5.81%	6.05%
2007							
Jan	8.25%	4.96%	4.76%		5.78%	5.96%	6.16%
Feb	8.25%	5.02%	4.72%		5.73%	5.90%	6.10%
Mar	8.25%	4.97%	4.56%		5.66%	5.85%	6.10%
Apr	8.25%	4.88%	4.69%		5.83%	5.97%	6.24%
May	8.25%	4.77%	4.75%		5.86%	5.99%	6.23%
June	8.25%	4.63%	5.10%		6.18%	6.30%	6.54%
July	8.25%	4.84%	5.00%		6.11%	6.25%	6.49%
Aug	8.25%	4.34%	4.67%		6.11%	6.24%	6.51%
Sept	7.75%	4.01%	4.52%		6.10%	6.18%	6.45%
Oct	7.50%	3.97%	4.53%		6.04%	6.11%	6.36%
Nov	7.50%	3.49%	4.15%		5.87%	5.97%	6.27%
Dec	7.25%	3.08%	4.10%		6.03%	6.16%	6.51%
2008							
Jan	6.00%	2.86%	3.74%		5.87%	6.02%	6.35%
Feb	6.00%	2.21%	3.74%		6.04%	6.21%	6.60%
Mar	5.25%	1.38%	3.51%		5.99%	6.21%	6.68%
Apr	5.00%	1.32%	3.68%		5.99%	6.29%	6.82%
May	5.00%	1.71%	3.88%		6.07%	6.27%	6.79%
June	5.00%	1.90%	4.10%		6.19%	6.38%	6.93%
July	5.00%	1.72%	4.01%		6.13%	6.40%	6.97%
Aug	5.00%	1.79%	3.89%		6.09%	6.37%	6.98%
Sept	5.00%	1.46%	3.69%		6.13%	6.49%	7.15%
Oct	4.00%	0.84%	3.81%		6.95%	7.56%	8.58%
Nov	4.00%	0.30%	3.53%		6.83%	7.60%	8.98%
Dec	3.25%	0.04%	2.42%		5.93%	6.54%	8.13%
2009							
Jan	3.25%	0.12%	2.52%		6.01%	6.39%	7.90%
Feb					6.11%	6.30%	7.74%

Sources: Council of Economic Advisors, Economic Indicators; Moody's Bond Record; Federal Reserve Bulletin; various issues.

STOCK PRICE INDICATORS

Year	S&P Composite [1]	NASDAQ Composite [1]	DJIA	S&P D/P	S&P E/P
1975 - 1982 Cycle					
1975			802.49	4.31%	9.15%
1976			974.92	3.77%	8.90%
1977			894.63	4.62%	10.79%
1978			820.23	5.28%	12.03%
1979			844.40	5.47%	13.46%
1980			891.41	5.26%	12.66%
1981			932.92	5.20%	11.96%
1982			884.36	5.81%	11.60%
1983 - 1991 Cycle					
1983			1,190.34	4.40%	8.03%
1984			1,178.48	4.64%	10.02%
1985			1,328.23	4.25%	8.12%
1986			1,792.76	3.49%	6.09%
1987			2,275.99	3.08%	5.48%
1988	[1]	[1]	2,060.82	3.64%	8.01%
1989	322.84		2,508.91	3.45%	7.41%
1990	334.59		2,678.94	3.61%	6.47%
1991	376.18	491.69	2,929.33	3.24%	4.79%
1992 - 2001 Cycle					
1992	415.74	599.26	3,284.29	2.99%	4.22%
1993	451.21	715.16	3,522.06	2.78%	4.46%
1994	460.42	751.65	3,793.77	2.82%	5.83%
1995	541.72	925.19	4,493.76	2.56%	6.09%
1996	670.50	1,164.96	5,742.89	2.19%	5.24%
1997	873.43	1,469.49	7,441.15	1.77%	4.57%
1998	1,085.50	1,794.91	8,625.52	1.49%	3.46%
1999	1,327.33	2,728.15	10,464.88	1.25%	3.17%
2000	1,427.22	3,783.67	10,734.90	1.15%	3.63%
2001	1,194.18	2,035.00	10,189.13	1.32%	2.95%
Current Cycle					
2002	993.94	1,539.73	9,226.43	1.61%	2.92%
2003	965.23	1,647.17	8,993.59	1.77%	3.84%
2004	1,130.65	1,986.53	10,317.39	1.72%	4.89%
2005	1,207.23	2,099.32	10,547.67	1.83%	5.36%
2006	1,310.46	2,263.41	11,408.67	1.87%	5.78%
2007	1,477.19	2,578.47	13,169.98	1.86%	5.29%
2008	1,220.04	2,161.65	11,252.62	2.37%	

[1] Note: this source did not publish the S&P Composite prior to 1988 and the NASDAQ Composite prior to 1991.

Source: Council of Economic Advisors, Economic Indicators, various issues.

STOCK PRICE INDICATORS

YEAR	S&P Composite	NASDAQ Composite	DJIA	S&P D/P	S&P E/P
2002					
1st Qtr.	1,131.56	1,879.85	10,105.27	1.39%	2.15%
2nd Qtr.	1,068.45	1,641.53	9,912.70	1.49%	2.70%
3rd Qtr.	894.65	1,308.17	8,487.59	1.76%	3.68%
4th Qtr.	887.91	1,346.07	8,400.17	1.79%	3.14%
2003					
1st Qtr.	860.03	1,350.44	8,122.83	1.89%	3.57%
2nd Qtr.	938.00	1,521.92	8,684.52	1.75%	3.55%
3rd Qtr.	1,000.50	1,765.96	9,310.57	1.74%	3.87%
4th Qtr.	1,056.42	1,934.71	9,856.44	1.69%	4.38%
2004					
1st Qtr.	1,133.29	2,041.95	10,488.43	1.64%	4.62%
2nd Qtr.	1,122.87	1,984.13	10,289.04	1.71%	4.92%
3rd Qtr.	1,104.15	1,872.90	10,129.85	1.79%	5.18%
4th Qtr.	1,162.07	2,050.22	10,362.25	1.75%	4.83%
2005					
1st Qtr.	1,191.98	2,056.01	10,648.48	1.77%	5.11%
2nd Qtr.	1,181.65	2,012.24	10,382.35	1.85%	5.32%
3rd Qtr.	1,225.91	2,144.61	10,532.24	1.83%	5.42%
4th Qtr.	1,262.07	2,246.09	10,827.79	1.86%	5.60%
2006					
1st Qtr.	1,283.04	2,287.97	10,996.04	1.85%	5.61%
2nd Qtr.	1,281.77	2,240.46	11,188.84	1.90%	5.86%
3rd Qtr.	1,288.40	2,141.97	11,274.49	1.91%	5.88%
4th Qtr.	1,389.48	2,390.26	12,175.30	1.81%	5.75%
2007					
1st Qtr.	1,425.30	2,444.85	12,470.97	1.84%	5.85%
2nd Qtr.	1,496.43	2,552.37	13,214.26	1.82%	5.65%
3rd Qtr.	1,490.81	2,609.68	13,488.43	1.86%	5.15%
4th Qtr.	1,494.09	2,701.59	13,502.95	1.91%	4.51%
2008					
1st Qtr.	1,350.19	2,332.91	12,383.86	2.11%	4.55%
2nd Qtr.	1,371.65	2,426.26	12,508.59	2.10%	4.01%
3rd Qtr.	1,251.94	2,290.87	11,322.40	2.29%	3.94%
4th Qtr.	909.80	1,599.64	8,795.61	2.98%	

[1] Note: this source did not publish the S&P Composite prior to 1988 and the NASDAQ Composite prior to 1991.

Source: Council of Economic Advisors, Economic Indicators, various issues.

PENNICHUCK CORPORATION
SEGMENT INFORMATION
2006 - 2008

Segment	Operating Revenues	Net Income	Capital Additions	Assets
2006				
Water Utility Operations	\$21,974 89.7%	\$1,699 298.1%	\$21,383 99.9%	
Water Management Services	\$2,334 9.5%	\$152 26.7%	\$12 0.1%	
Real Estate Operations	\$106 0.4%	\$179 31.4%		
Pennichuck Corp. Consolidated	\$24,484	\$570	\$21,395	
2007				
Water Utility Operations	\$27,217 92.2%	\$4,192 117.1%	\$17,608 99.6%	\$157,704 93.5%
Water Management Services	\$2,287 7.7%	\$118 3.3%	\$78 0.4%	\$144 0.1%
Real Estate Operations	\$23 0.1%	-\$92 -2.6%		\$2,454 1.5%
Pennichuck Corp. Consolidated	\$29,535	\$3,581	\$17,686	\$168,588
2008				
Water Utility Operations	\$28,303 91.4%	\$2,521 53.4%	\$14,420 100.0%	\$165,280 94.5%
Water Management Services	\$2,647 8.5%	\$224 4.7%	\$5 0.0%	\$159 0.1%
Real Estate Operations	\$20 0.1%	\$2,219 47.0%		\$2,394 1.4%
Pennichuck Corp. Consolidated	\$30,979	\$4,721	\$14,425	\$174,954

Source: Pennichuck Corporation, 2008 Form 10-K.

PENNICHUCK CORPORATION
UTILITY OPERATING REVENUES
(\$000)

Utility	2007	2008
Pennichuck Water	\$21,780 80.0%	\$22,097 78.1%
Pennichuck East	\$4,654 17.1%	\$5,088 18.0%
Pittsfield	\$783 2.9%	\$1,118 4.0%
Total	\$27,217	\$28,303

Source: Pennichuck Corporation, 2008 Form 10-K.

PENNICHUCK WATER WORKS, INC
CAPITAL STRUCTURE RATIOS
2003 - 2008

YEAR	COMMON EQUITY	LONG-TERM DEBT	SHORT-TERM DEBT
2003	\$19,135,011 47.9% 47.9%	\$20,848,718 52.1% 52.1%	\$0 0.0%
2004	\$20,370,404 49.9% 49.9%	\$20,490,163 50.1% 50.1%	\$0 0.0%
2005	\$36,927,977 51.0% 51.0%	\$35,458,105 49.0% 49.0%	\$10,000 0.0%
2006	\$39,919,799 49.0% 49.0%	\$41,624,883 51.0% 51.0%	\$0 0.0%
2007	\$40,258,454 40.9% 40.9%	\$58,164,687 59.1% 59.1%	\$0 0.0%
Nov. 30, 2008	\$41,462,366 42.3% 42.3%	\$56,542,054 57.7% 57.7%	\$0 0.0%

Source: Response to Staff 2-35.

PENNICHUCK CORPORATION
CAPITAL STRUCTURE RATIOS
2003 - 2008
(000)

YEAR	COMMON EQUITY	LONG-TERM DEBT	SHORT-TERM DEBT
2003	\$30,172 50.8% 52.5%	\$27,247 45.9% 47.5%	\$2,000 3.4%
2004	\$30,151 49.6% 52.9%	\$26,835 44.1% 47.1%	\$3,800 6.3%
2005	\$45,636 52.4% 52.4%	\$41,456 47.6% 47.6%	\$0 0.0%
2006	\$44,550 48.0% 48.0%	\$48,170 52.0% 52.0%	\$0 0.0%
2007	\$45,565 41.3% 41.3%	\$64,672 58.7% 58.7%	\$0 0.0%
Nov. 31, 2008	\$47,004 42.5% 42.5%	\$63,719 57.5% 57.5%	\$0 0.0%

Source: Response to Staff 2-35.

PROXY WATER UTILITIES COMMON EQUITY RATIOS

COMPANY	2003	2004	2005	2006	2007
Value Line Water Group					
American States Water Co.	43%	48%	47%	50%	50%
Aqua America, Inc.	44%	45%	44%	38%	43%
California Water Service Group	46%	51%	51%	55%	57%
Southwest Water Co.	51%	63%	53%	56%	52%
Average	46%	52%	49%	50%	51%
AUS Utility Reports Group					
American States Water Co.	43%	48%	47%	50%	50%
Aqua America, Inc.	44%	45%	44%	38%	43%
Artesian Resources Corp.	37%	36%	38%	38%	48%
California Water Service Group	46%	51%	51%	55%	57%
Connecticut Water Service, Inc.	52%	53%	55%	54%	50%
Middlesex Water Company	41%	46%	42%	49%	48%
SJW Corporation	54%	56%	57%	56%	52%
Southwest Water Co.	51%	63%	53%	56%	52%
York Water Company	50%	48%	46%	51%	48%
Average	46%	50%	48%	50%	50%

Source: AUS Utility Reports.

**PROXY WATER UTILITIES
DIVIDEND YIELD**

COMPANY	DPS	December 2008 - February 2009			YIELD
		HIGH	LOW	AVERAGE	
Value Line Water Group					
American States Water Co.	\$1.00	\$37.79	\$27.56	\$32.68	3.1%
Aqua America, Inc.	\$0.54	\$21.65	\$17.83	\$19.74	2.7%
California Water Service Group	\$1.18	\$48.28	\$36.91	\$42.60	2.8%
Southwest Water Co.	\$0.10	\$5.74	\$2.67	\$4.21	2.4%
Average					2.7%
AUS Utility Reports Group					
American States Water Co.	\$1.00	\$37.79	\$27.56	\$32.68	3.1%
Aqua America, Inc.	\$0.54	\$21.65	\$17.83	\$19.74	2.7%
Artesian Resources Corp.	\$0.71	\$16.50	\$13.82	\$15.16	4.7%
California Water Service Group	\$1.18	\$48.28	\$36.91	\$42.60	2.8%
Connecticut Water Service, Inc.	\$0.89	\$24.98	\$20.07	\$22.53	4.0%
Middlesex Water Company	\$0.71	\$17.93	\$13.51	\$15.72	4.5%
SJW Corporation	\$0.66	\$30.44	\$22.58	\$26.51	2.5%
Southwest Water Co.	\$0.10	\$5.74	\$2.67	\$4.21	2.4%
York Water Company	\$0.50	\$13.50	\$10.65	\$12.08	4.2%
Average					3.4%

Source: Yahoo! Finance.

**PROXY WATER UTILITIES
RETENTION GROWTH RATES**

COMPANY	2003	2004	2005	2006	2007	Average	2008	2009	'11-'13	Average
Value Line Water Group										
American States Water Co.	-0.7%	1.2%	3.3%	2.6%	3.8%	2.0%	2.5%	3.5%	6.5%	4.2%
Aqua America, Inc.	4.8%	4.8%	5.0%	4.1%	3.2%	4.4%	3.5%	3.5%	3.0%	3.3%
California Water Service Group	0.7%	2.2%	2.1%	1.1%	1.1%	1.4%	4.0%	5.0%	6.0%	5.0%
Southwest Water Co.	6.5%	1.5%	2.2%	2.7%	-1.3%	2.3%				
Average						2.5%				4.2%
AUS Utility Reports Group										
American States Water Co.	-0.7%	1.2%	3.3%	2.6%	3.8%	1.6%	2.5%	3.5%	6.5%	4.2%
Aqua America, Inc.	4.8%	4.8%	5.0%	4.1%	3.2%	4.7%	3.5%	3.5%	3.0%	3.3%
Artesian Resources Corp.	1.5%	2.0%	2.8%	4.0%	2.4%	2.5%				
California Water Service Group	0.7%	2.2%	2.1%	1.1%	1.1%	1.5%	4.0%	5.0%	6.0%	5.0%
Connecticut Water Service, Inc.	3.0%	3.1%	0.6%	-0.4%	1.6%	1.6%				
Middlesex Water Company	-0.5%	0.8%	0.5%	1.5%	1.8%	0.8%				
SJW Corporation	4.5%	4.7%	6.1%	9.5%	3.4%	5.6%				
Southwest Water Co.	6.5%	1.5%	2.2%	2.7%	-1.3%	3.2%				
York Water Company	2.5%	2.5%	3.0%	2.4%	1.5%	2.4%				
Average						2.7%				4.2%

Source: AUS Utility Reports and Value Line Investment Survey.

**PROXY WATER UTILITIES
PER SHARE GROWTH RATES**

COMPANY	5-Year Historic Growth Rates				Est'd '05-'07 to '11-'13 Growth Rates			
	EPS	DPS	BVPS	Average	EPS	DPS	BVPS	Average
Value Line Water Group								
American States Water Co.	3.9%	2.0%	4.5%	3.5%	11.0%	5.0%	2.5%	6.2%
Aqua America, Inc.	5.6%	8.5%	10.9%	8.3%	6.0%	5.5%	5.0%	5.5%
California Water Service Group	3.7%	0.7%	7.1%	3.8%	11.0%	2.0%	3.0%	5.3%
Southwest Water Co.	-4.5%	8.9%	7.0%	3.8%	9.5%	6.0%	1.0%	5.5%
Average				4.9%				5.6%
AUS Utility Reports Group								
American States Water Co.	3.9%	2.0%	4.5%	3.5%	11.0%	5.0%	2.5%	6.2%
Aqua America, Inc.	5.6%	8.5%	10.9%	8.3%	6.0%	5.5%	5.0%	5.5%
Artesian Resources Corp.	3.4%	5.3%	7.0%	5.2%				
California Water Service Group	3.7%	0.7%	7.1%	3.8%	11.0%	2.0%	3.0%	5.3%
Connecticut Water Service, Inc.	-0.4%	1.2%	3.6%	1.5%				
Middlesex Water Company	3.6%	1.8%	6.3%	3.9%				
SJW Corporation	5.9%	5.8%	9.0%	6.9%				
Southwest Water Co.	-4.5%	8.9%	7.0%	3.8%	9.5%	6.0%	1.0%	5.5%
York Water Company	7.3%	6.5%	8.9%	7.6%				
Average				4.9%				5.6%

Source: AUS Utility Reports and Value Line Investment Survey.

**PROXY WATER UTILITIES
DCF COST RATES**

COMPANY	ADJUSTED YIELD	HISTORIC RETENTION GROWTH	PROSPECTIVE RETENTION GROWTH	HISTORIC PER SHARE GROWTH	PROSPECTIVE PER SHARE GROWTH	FIRST CALL EPS GROWTH	AVERAGE GROWTH	DCF RATES
Value Line Water Group								
American States Water Co.	3.1%	2.0%	4.2%	3.5%	6.2%	4.0%	4.0%	7.1%
Aqua America, Inc.	2.8%	4.4%	3.3%	8.3%	5.5%	8.0%	5.9%	8.7%
California Water Service Group	2.8%	1.4%	5.0%	3.8%	5.3%	8.0%	4.7%	7.6%
Southwest Water Co.	2.4%	2.3%		3.8%	5.5%	5.0%	4.2%	6.6%
Mean	2.8%	2.5%	4.2%	4.9%	5.6%	6.3%	4.7%	7.5%
Median	2.8%	2.2%	4.2%	3.8%	5.5%	6.5%	4.4%	7.3%
Composite - Mean		5.3%	7.0%	7.7%	8.4%	9.1%	7.5%	
Composite - Median		5.0%	7.0%	6.6%	8.3%	9.3%	7.3%	
AUS Utility Reports Group								
American States Water Co.	3.1%	1.6%	4.2%	3.5%	6.2%	4.0%	3.9%	7.0%
Aqua America, Inc.	2.8%	4.7%	3.3%	8.3%	5.5%	8.0%	6.0%	8.8%
Artesian Resources Corp.	4.8%	2.5%		5.2%		5.0%	4.2%	9.0%
California Water Service Group	2.8%	1.5%	5.0%	3.8%	5.3%	8.0%	4.7%	7.6%
Connecticut Water Service, Inc.	4.1%	1.6%		1.5%		15.0%	6.0%	10.1%
Middlesex Water Company	4.6%	0.8%		3.9%		8.0%	4.2%	8.9%
SJW Corporation	2.6%	5.6%		6.9%		10.0%	7.5%	10.1%
Southwest Water Co.	2.4%	3.2%		3.8%	5.5%	5.0%	4.4%	6.8%
York Water Company	4.3%	2.4%		7.6%		8.0%	6.0%	10.3%
Mean	3.5%	2.7%	4.2%	4.9%	5.6%	7.9%	5.2%	8.7%
Median	3.1%	2.4%	4.2%	3.9%	5.5%	8.0%	4.7%	8.9%
Composite - Mean		6.2%	7.7%	8.5%	9.1%	11.4%	8.7%	
Composite - Median		5.5%	7.3%	7.0%	8.6%	11.1%	7.9%	

Note: negative average growth rates excluded from above DCF analyses.

**STANDARD & POOR'S 500 COMPOSITE
20-YEAR U.S. TREASURY BOND YIELDS
RISK PREMIUMS**

Year	EPS	BVPS	ROE	20-YEAR T-BOND	RISK PREMIUM
1977		\$79.07			
1978	\$12.33	\$85.35	15.00%	7.90%	7.10%
1979	\$14.86	\$94.27	16.55%	8.86%	7.69%
1980	\$14.82	\$102.48	15.06%	9.97%	5.09%
1981	\$15.36	\$109.43	14.50%	11.55%	2.95%
1982	\$12.64	\$112.46	11.39%	13.50%	-2.11%
1983	\$14.03	\$116.93	12.23%	10.38%	1.85%
1984	\$16.64	\$122.47	13.90%	11.74%	2.16%
1985	\$14.61	\$125.20	11.80%	11.25%	0.55%
1986	\$14.48	\$126.82	11.49%	8.98%	2.51%
1987	\$17.50	\$134.04	13.42%	7.92%	5.50%
1988	\$23.75	\$141.32	17.25%	8.97%	8.28%
1989	\$22.87	\$147.26	15.85%	8.81%	7.04%
1990	\$21.73	\$153.01	14.47%	8.19%	6.28%
1991	\$16.29	\$158.85	10.45%	8.22%	2.23%
1992	\$19.09	\$149.74	12.37%	7.26%	5.11%
1993	\$21.89	\$180.88	13.24%	7.17%	6.07%
1994	\$30.60	\$193.06	16.37%	6.59%	9.78%
1995	\$33.96	\$215.51	16.62%	7.60%	9.02%
1996	\$38.73	\$237.08	17.11%	6.18%	10.93%
1997	\$39.72	\$249.52	16.33%	6.64%	9.69%
1998	\$37.71	\$266.40	14.62%	5.83%	8.79%
1999	\$48.17	\$290.68	17.29%	5.57%	11.72%
2000	\$50.00	\$325.80	16.22%	6.50%	9.72%
2001	\$24.70	\$338.37	7.44%	5.53%	1.91%
2002	\$27.59	\$321.72	8.36%	5.59%	2.77%
2003	\$48.73	\$367.17	14.15%	4.80%	9.35%
2004	\$58.55	\$414.75	14.98%	5.02%	9.96%
2005	\$69.93	\$453.06	16.12%	4.69%	11.43%
2006	\$81.51	\$504.39	17.03%	4.68%	12.35%
2007	\$66.17	\$529.59	12.80%	4.86%	7.94%
Average			14.09%	7.69%	6.46%

Sources: Standard & Poor's Analysts' Handbook and Ibbotson Associates 2008 Yearbook.

**PROXY WATER UTILITIES
CAPM COST RATES**

COMPANY	RISK-FREE RATE	BETA	RISK PREMIUM	CAPM RATES
Value Line Water Group				
American States Water Co.	3.49%	0.95	5.3%	8.5%
Aqua America, Inc.	3.49%	0.90	5.3%	8.3%
California Water Service Group	3.49%	1.05	5.3%	9.1%
Southwest Water Co.	3.49%	1.10	5.3%	9.3%
Mean				8.8%
Median				8.8%
AUS Utility Reports Group				
American States Water Co.	3.49%	0.95	5.3%	8.5%
Aqua America, Inc.	3.49%	0.90	5.3%	8.3%
Artesian Resources Corp.	3.49%		5.3%	
California Water Service Group	3.49%	1.05	5.3%	9.1%
Connecticut Water Service, Inc.	3.49%	0.80	5.3%	7.7%
Middlesex Water Company	3.49%	0.80	5.3%	7.7%
SJW Corporation	3.49%	1.05	5.3%	9.1%
Southwest Water Co.	3.49%	1.10	5.3%	9.3%
York Water Company	3.49%	0.65	5.3%	6.9%
Mean				8.3%
Median				8.4%

Sources: Value Line Investment Survey, Standard & Poor's Analysts' Handbook, Ibbotson Associates 2006 Yearbook.

PROXY WATER UTILITIES
RATES OF RETURN ON AVERAGE COMMON EQUITY

COMPANY	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1992-2001 Average	2002-2007 Average	2008	2009	2011-2013
Value Line Water Group																					
American States Water Co.	14.0%	11.7%	9.5%	10.0%	10.0%	9.4%	9.5%	10.2%	9.6%	10.5%	9.6%	5.6%	8.0%	10.4%	8.2%	9.3%	10.4%	8.5%	8.0%	9.0%	12.5%
Aqua America, Inc.	11.0%	11.4%	11.2%	12.0%	11.8%	12.5%	14.2%	13.8%	13.0%	14.0%	13.9%	12.3%	11.4%	11.5%	11.0%	10.0%	12.5%	11.7%	10.0%	11.0%	11.0%
California Water Service Group	10.4%	12.6%	10.6%	10.0%	12.6%	14.5%	11.0%	11.4%	10.3%	7.5%	9.6%	8.7%	9.8%	9.3%	7.8%	4.9%	11.1%	8.3%	10.0%	11.0%	12.5%
Southwest Water Co.	8.0%	0.4%	3.7%	5.0%	6.5%	8.3%	10.0%	15.5%	12.2%	12.0%	12.1%	10.2%	6.8%	5.4%	5.6%	-5.0%	8.2%	5.9%			
Average	10.6%	9.0%	8.8%	9.3%	10.2%	11.2%	11.2%	12.7%	11.3%	11.0%	11.3%	9.2%	9.0%	9.2%	8.1%	4.8%	10.5%	8.6%	9.3%	10.3%	12.0%
Median	10.7%	11.6%	10.1%	10.0%	10.9%	11.0%	10.5%	12.6%	11.3%	11.3%	10.9%	9.5%	8.9%	9.9%	7.9%	7.1%	11.0%	9.0%	10.0%	11.0%	12.5%
AUS Utility Reports Group																					
American States Water Co.	14.0%	11.7%	9.5%	10.0%	10.0%	9.4%	9.5%	10.2%	9.6%	10.5%	9.6%	5.6%	8.0%	10.4%	8.2%	9.3%	10.4%	8.5%	8.0%	9.0%	12.5%
Aqua America, Inc.	11.0%	11.4%	11.2%	12.0%	11.8%	12.5%	14.2%	13.8%	13.0%	14.0%	13.9%	12.3%	11.4%	11.5%	11.0%	10.0%	12.5%	11.7%	10.0%	11.0%	11.0%
Artisan Resources Corp.							9.8%	9.7%	8.1%	9.4%	9.6%	7.4%	7.6%	8.9%	10.2%	8.5%		8.7%			
California Water Service Group	10.4%	12.6%	10.6%	10.0%	12.6%	14.5%	11.0%	11.4%	10.3%	7.5%	9.6%	8.7%	9.8%	9.3%	7.6%	4.9%	11.1%	8.3%	10.0%	11.0%	12.5%
Connecticut Water Service, Inc.	12.1%	12.5%	12.6%	12.7%	12.4%	12.3%	12.2%	12.4%	11.8%	13.3%	11.6%	11.2%	11.4%	12.0%	7.5%	8.9%	12.4%	10.4%			
Middlesex Water Company	11.7%	12.6%	12.1%	12.0%	10.3%	11.2%	10.7%	10.2%	6.5%	9.0%	9.8%	8.2%	8.3%	8.4%	8.6%	8.6%	10.6%	8.7%			
SJW Corporation	11.8%	11.8%	9.8%	10.8%	16.2%	12.0%	11.6%	11.1%	9.6%	9.5%	9.4%	9.8%	11.3%	11.5%	18.2%	8.3%	11.4%	11.4%			
Southwest Water Co.	8.0%	0.4%	3.7%	5.0%	6.5%	8.3%	10.0%	15.5%	12.2%	12.0%	12.1%	10.2%	6.8%	5.4%	5.6%	-5.0%	8.2%	5.9%			
York Water Company	11.9%	12.6%	11.7%	10.7%	11.1%	10.9%	10.3%	10.3%	11.9%	11.5%	16.7%	11.7%	12.2%	11.8%	10.5%	9.7%	11.3%	12.1%			
Mean	11.4%	10.7%	10.1%	10.4%	11.4%	11.4%	11.0%	11.6%	10.3%	10.7%	11.4%	9.5%	9.6%	9.9%	9.7%	7.0%	11.0%	9.5%	9.3%	10.3%	12.0%
Median	11.8%	12.2%	10.9%	10.8%	11.5%	11.6%	10.7%	11.1%	10.3%	10.5%	9.8%	9.8%	9.8%	10.4%	8.6%	8.8%	11.1%	9.5%	10.0%	11.0%	12.5%

Source: AUS Utility Reports and Value Line Investment Survey.

PROXY WATER UTILITIES
MARKET TO BOOK RATIOS

COMPANY	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1992-2001 Average	2002-2007 Average
Value Line Water Group																		
American States Water Co.	142%	156%	124%	120%	134%	137%	148%	177%	168%	182%	176%	176%	181%	230%	205%	209%	149%	196%
Aqua America, Inc.	140%	158%	151%	124%	189%	237%	313%	287%	302%	365%	304%	280%	307%	436%	332%	259%		320%
California Water Service Group	147%	172%	157%	140%	160%	191%	207%	202%	186%	201%	199%	189%	218%	264%	223%	219%	176%	219%
Southwest Water Co.	118%	112%	85%	75%	109%	153%	174%	223%	266%	240%	202%	250%	156%	241%	201%	172%	156%	204%
Average	137%	150%	129%	115%	148%	180%	211%	222%	231%	247%	220%	224%	216%	293%	240%	215%	160%	235%
Median	141%	157%	138%	122%	147%	172%	191%	213%	226%	221%	201%	220%	200%	253%	214%	214%	173%	217%
AUS Utility Reports Group																		
American States Water Co.	142%	156%	124%	120%	134%	137%	148%	177%	168%	182%	176%	176%	181%	230%	205%	209%	149%	196%
Aqua America, Inc.			151%	124%	189%	237%	313%	287%	302%	365%	304%	280%	307%	436%	332%	259%		320%
Artesian Resources Corp.							156%	168%	149%	183%	159%	207%	198%	215%	198%	150%		188%
California Water Service Group	147%	172%	157%	140%	160%	191%	207%	202%	186%	201%	199%	189%	218%	264%	223%	219%	176%	219%
Connecticut Water Service, Inc.	162%	180%	154%	149%	156%	168%	193%	218%	226%	304%	275%	266%	233%	216%	211%	199%	207%	233%
Middlesex Water Company	111%	184%	169%	150%	150%	164%	176%	218%	222%	248%	225%	265%	214%	214%	178%	184%	179%	213%
SJW Corporation	113%	124%	117%	106%	113%	133%	137%	193%	195%	162%	155%	193%	175%	240%	307%	236%	169%	218%
Southwest Water Co.	118%	112%	85%	75%	109%	153%	174%	223%	266%	240%	202%	250%	156%	241%	201%	172%	156%	204%
York Water Company	169%	174%	87%	197%	195%	226%	198%	174%	154%	284%	277%	335%	275%	367%	309%	266%	186%	305%
Mean	137%	157%	131%	133%	151%	176%	189%	207%	208%	241%	219%	240%	217%	269%	240%	210%	174%	233%
Median	142%	172%	138%	132%	153%	166%	176%	202%	195%	240%	202%	250%	214%	240%	211%	209%	172%	221%

Source: AUS Utility Reports and Value Line Investment Survey.

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**STANDARD & POOR'S 500 COMPOSITE
RETURNS AND MARKET-TO-BOOK RATIOS
1992 - 2007**

YEAR	RETURN ON AVERAGE EQUITY	MARKET-TO BOOK RATIO
1992	12.2%	271%
1993	13.2%	272%
1994	16.4%	246%
1995	16.6%	264%
1996	17.1%	299%
1997	16.3%	354%
1998	14.6%	421%
1999	17.3%	481%
2000	16.2%	453%
2001	7.5%	353%
2002	8.4%	296%
2003	14.2%	278%
2004	15.0%	291%
2005	16.1%	278%
2006	17.0%	277%
2007	12.8%	284%
Averages:		
1992-2001	14.7%	341%
2002-2007	13.9%	284%

Source: Standard & Poor's Analyst's Handbook, 2008 edition, page 1.

RISK INDICATORS

GROUP	VALUE LINE SAFETY	VALUE LINE BETA	VALUE LINE FIN STR	S & P STK RANK
S & P's 500 Composite	2.7	1.05	B++	B+
Value Line Water Group	2.8	1.00	B+	B+/A-
AUS Utility Reports Group	2.5	0.91	B+	B+/A-

Sources: Value Line Investment Survey, Standard & Poor's Stock Guide.

Definitions:

Safety rankings are in a range of 1 to 5, with 1 representing the highest safety or lowest risk.

Beta reflects the variability of a particular stock, relative to the market as a whole. A stock with a beta of 1.0 moves in concert with the market, a stock with a beta below 1.0 is less variable than the market, and a stock with a beta above 1.0 is more variable than the market.

Financial strengths range from C to A++, with the latter representing the highest level.

Common stock rankings range from D to A+, with the later representing the highest level.

RISK INDICATORS

COMPANY	VALUE LINE SAFETY	VALUE LINE BETA	VALUE LINE FINANCIAL STRENGTH	S& P STOCK RANKING		
Value Line Water Group						
American States Water Co.	3	0.95	B++	3.67	B+	3.33
Aqua America, Inc.	3	0.90	B+	3.33	A	4.00
California Water Service Group	2	1.05	B++	3.67	B+	3.33
Southwest Water Co.	3	1.10	B	3.00	B+	3.33
Average	2.8	1.00	B+	3.42	B+/A-	3.50
AUS Utility Reports Group						
American States Water Co.	3	0.95	B++	3.67	B+	3.33
Aqua America, Inc.	3	0.90	B+	3.33	A	4.00
Artesian Resources Corp.						
California Water Service Group	2	1.05	B++	3.67	B+	3.33
Connecticut Water Service, Inc.	2	0.80	B+	3.33	A-	3.67
Middlesex Water Company	2	0.80	B+	3.33	B+	3.33
SJW Corporation	3	1.05	B+	3.33	A-	3.67
Southwest Water Co.	3	1.10	B	3.00	B+	3.33
York Water Company	2	0.65	B++	3.67		
Average	2.5	0.91	B+	3.42	B+/A-	3.52

Sources: Standard & Poor's Stock Guide and Value Line Investment Survey.

TOTAL COST OF CAPITAL RATING AGENCY RATIOS

ITEM	PERCENT	COST RATE	WEIGHTED COST	PRE-TAX COST
Long-Term Debt	57.78%	5.30%	3.06%	3.06%
Common Equity	<u>42.22%</u>	9.50%	<u>4.01%</u>	<u>6.69%</u> (1)
TOTAL CAPITAL	100.00%		7.07%	9.75%

(1) Post-tax weighted cost divided by .60 (composite tax factor)

Pre-tax coverage = $9.75\% / 3.06\%$
3.18 X

Standard & Poor's Utility Benchmark Ratios:

	A	BBB
Pre-tax coverage (X)		
Business Position:		
3	2.8x - 3.4x	1.8x - 2.8x
Total Debt to Total Capital (%)		
Business Position		
3	50% - 55%	55% - 65%

Note: Standard & Poor's no longer employs the pre-tax coverage ratios as one of its qualitative ratings criteria. The above-cited S&P benchmark ratios reflect the 1999 criteria reported by S&P.

**SUMMARY OF COST OF EQUITY MODELS USED BY
PENNICHUCK WITNESS WALKER**

Cost of Equity Model	Analysts Group	
Discounted Cash Flow		
Adj Div Yield	2.8%	
Growth	8.2%	
DCF Cost	11.0%	
Leverage Adj	0.60%	
DCF Result	11.6%	
Capital Asset Pricing Model		
	Historic	Projected
Risk Free Rate	4.7%	4.7%
Beta	1.01	1.01
Risk Premium	7.2%	8.8%
CAPM Cost	12.0%	13.6%
Size Premium	1.9%	1.9%
CAPM Result	13.8%	15.4%
Risk Premium		
A Bond Yield	6.1%	
Risk Premium	4.5%	
RP Cost	10.6%	
Leverage Adj	0.60%	
Risk Premium Result	11.2%	

BACKGROUND AND EXPERIENCE PROFILE
DAVID C. PARCELL, MBA, CRRA
PRESIDENT/SENIOR ECONOMIST

EDUCATION

1985	M.B.A., Virginia Commonwealth University
1970	M.A., Economics, Virginia Polytechnic Institute and State University, (Virginia Tech)
1969	B.A., Economics, Virginia Polytechnic Institute and State University, (Virginia Tech)

POSITIONS

2007-Present	President, Technical Associates, Inc.
1995-2007	Executive Vice President and Senior Economist, Technical Associates, Inc.
1993-1995	Vice President and Senior Economist, C. W. Amos of Virginia
1972-1993	Vice President and Senior Economist, Technical Associates, Inc.
1969-1972	Research Economist, Technical Associates, Inc.
1968-1969	Research Associate, Department of Economics, Virginia Polytechnic Institute and State University

ACADEMIC HONORS

Omicron Delta Epsilon - Honor Society in Economics
Beta Gamma Sigma - National Scholastic Honor Society of Business Administration
Alpha Iota Delta - National Decision Sciences Honorary Society
Phi Kappa Phi - Scholastic Honor Society

PROFESSIONAL DESIGNATIONS

Certified Rate of Return Analyst - Founding Member
Member of Association for Investment Management and Research (AIMR)

RELEVANT EXPERIENCE

Financial Economics -- Advised and assisted many Virginia banks and savings and loan associations on organizational and regulatory matters. Testified approximately 25 times before the Virginia State Corporation Commission and the Regional Administrator of National Banks on matters related to branching and organization for banks, savings and loan associations, and consumer finance companies. Advised financial institutions on interest rate structure and loan maturity. Testified before Virginia State Corporation Commission on maximum rates for consumer finance companies.

Testified before several committees and subcommittees of Virginia General Assembly on numerous banking matters.

Clients have included First National Bank of Rocky Mount, Patrick Henry National Bank, Peoples Bank of Danville, Blue Ridge Bank, Bank of Essex, and Signet Bank.

Published articles in law reviews and other periodicals on structure and regulation of banking/financial services industry.

Utility Economics -- Performed numerous financial studies of regulated public utilities. Testified in over 300 cases before some thirty state and federal regulatory agencies.

Prepared numerous rate of return studies incorporating cost of equity determination based on DCF, CAPM, comparable earnings and other models. Developed procedures for identifying differential risk characteristics by nuclear construction and other factors.

Conducted studies with respect to cost of service and indexing for determining utility rates, the development of annual review procedures for regulatory control of utilities, fuel and power plant cost recovery adjustment clauses, power supply agreements among affiliates, utility franchise fees, and use of short-term debt in capital structure.

Presented expert testimony before federal regulatory agencies Federal Energy Regulatory Commission, Federal Power Commission, and National Energy Board (Canada), state regulatory agencies in Alabama, Alaska, Arizona, Arkansas, California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, Ohio, Oklahoma, Ontario (Canada), Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, West Virginia, Washington, Wisconsin, and Yukon Territory (Canada).

Published articles in law reviews and other periodicals on the theory and purpose of regulation and other regulatory subjects.

Clients served include state regulatory agencies in Alaska, Arizona, Delaware, Missouri, North Carolina, Ontario (Canada), and Virginia; consumer advocates and attorneys general in Alabama, Arizona, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maryland, Nevada, New Mexico, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, and West Virginia; federal agencies including Defense Communications Agency, the Department of Energy, Department of the Navy, and General Services Administration; and various organizations such as Bath Iron Works, Illinois Citizens' Utility Board, Illinois Governor's Office of Consumer Services, Illinois Small Business Utility Advocate, Wisconsin's Environmental Decade, Wisconsin's Citizens Utility Board, and Old Dominion Electric Cooperative.

Insurance Economics -- Conducted analyses of the relationship between the investment income earned by insurance companies on their portfolios and the premiums charged for insurance. Analyzed impact of diversification on financial strength of Blue Cross/Blue Shield Plans in Virginia.

Conducted studies of profitability and cost of capital for property/casualty insurance industry. Evaluated risk of and required return on surplus for various lines of insurance business.

Presented expert testimony before Virginia State Corporation Commission concerning cost of capital and expected gains from investment portfolio. Testified before insurance bureaus of Maine, New Jersey, North Carolina, Rhode Island, South Carolina and Vermont concerning cost of equity for insurance companies.

Prepared cost of capital and investment income return analyses for numerous insurance companies concerning several lines of insurance business. Analyses used by Virginia Bureau of Insurance for purposes of setting rates.

Special Studies -- Conducted analyses which evaluated the financial and economic implications of legislative and administrative changes. Subject matter of analyses include returnable bottles, retail beer sales, wine sales regulations, taxi-cab taxation, and bank regulation. Testified before several Virginia General Assembly subcommittees.

Testified before Virginia ABC Commission concerning economic impact of mixed beverage license.

Clients include Virginia Beer Wholesalers, Wine Institute, Virginia Retail Merchants Association, and Virginia Taxicab Association.

Franchise, Merger & Anti-Trust Economics -- Conducted studies on competitive impact on market structures due to joint ventures, mergers, franchising and other business restructuring. Analyzed the costs and benefits to parties involved in mergers. Testified in federal courts and before banking and other regulatory bodies concerning the structure and performance of markets, as well as on the impact of restrictive practices.

Clients served include Dominion Bankshares, asphalt contractors, and law firms.

Transportation Economics -- Conducted cost of capital studies to assess profitability of oil pipelines, trucks, taxicabs and railroads. Analyses have been presented before the Federal Energy Regulatory Commission and Alaska Pipeline Commission in rate proceedings. Served as a consultant to the Rail Services Planning Office on the reorganization of rail services in the U.S.

Economic Loss Analyses -- Testified in federal courts, state courts, and other adjudicative forums regarding the economic loss sustained through personal and business injury whether due to bodily harm, discrimination, non-performance, or anticompetitive practices. Testified on economic loss to a

commercial bank resulting from publication of adverse information concerning solvency. Testimony has been presented on behalf of private individuals and business firms.

MEMBERSHIPS

American Economic Association
Virginia Association of Economists
Richmond Society of Financial Analysts
Financial Analysts Federation
Society of Utility and Regulatory Financial Analysts
Board of Directors 1992-2000
Secretary/Treasurer 1994-1998
President 1998-2000

RESEARCH ACTIVITY

Books and Major Research Reports

"Stock Price As An Indicator of Performance," Master of Arts Thesis, Virginia Tech, 1970

"Revision of the Property and Casualty Insurance Ratemaking Process Under Prior Approval in the Commonwealth of Virginia," prepared for the Bureau of Insurance of the Virginia State Corporation Commission, with Charles Schotta and Michael J. Ileo, 1971

"An analysis of the Virginia Consumer Finance Industry to Determine the Need for Restructuring the Rate and Size Ceilings on Small Loans in Virginia and the Process by which They are Governed," prepared for the Virginia Consumer Finance Association, with Michael J. Ileo, 1973

State Banks and the State Corporation Commission: A Historical Review, Technical Associates, Inc., 1974

"A Study of the Implications of the Sale of Wine by the Virginia Department of Alcoholic Beverage Control", prepared for the Virginia Wine Wholesalers Association, Virginia Retail Merchants Association, Virginia Food Dealers Association, Virginia Association of Chain Drugstores, Southland Corporation, and the Wine Institute, 1983.

"Performance and Diversification of the Blue Cross/Blue Shield Plans in Virginia: An Operational Review", prepared for the Bureau of Insurance of the Virginia State Corporation Commission, with Michael J. Ileo and Alexander F. Skirpan, 1988.

The Cost of Capital - A Practitioners' Guide, Society of Utility and Regulatory Financial

Analysts, 1997 (previous editions in 1991, 1992, 1993, 1994, and 1995).

Papers Presented and Articles Published

"The Differential Effect of Bank Structure on the Transmission of Open Market Operations," Western Economic Association Meeting, with Charles Schotta, 1971

"The Economic Objectives of Regulation: The Trend in Virginia," (with Michael J. Ileo), William and Mary Law Review, Vol. 14, No. 2, 1973

"Evolution of the Virginia Banking Structure, 1962-1974: The Effects of the Buck-Holland Bill", (with Michael J. Ileo), William and Mary Law Review, Vol. 16, No. 3, 1975

"Banking Structure and Statewide Branching: The Potential for Virginia", William and Mary Law Review, Vol. 18, No. 1, 1976

"Bank Expansion and Electronic Banking: Virginia Banking Structure Changes Past, Present, and Future," William and Mary Business Review, Vol. 1, No. 2, 1976

"Electronic Banking - Wave of the Future?" (with James R. Marchand), Journal of Management and Business Consulting, Vol. 1, No. 1, 1976

"The Pricing of Electricity" (with James R. Marchand), Journal of Management and Business Consulting, Vol. 1, No. 2, 1976

"The Public Interest - Bank and Savings and Loan Expansion in Virginia" (with Richard D. Rogers), University of Richmond Law Review, Vol. 11, No. 3, 1977

"When Is It In the 'Public Interest' to Authorize a New Bank?", University of Richmond Law Review, Vol. 13, No. 3, 1979

"Banking Deregulation and Its Implications on the Virginia Banking Structure," William and Mary Business Review, Vol. 5, No. 1, 1983

"The Impact of Reciprocal Interstate Banking Statutes on The Performance of Virginia Bank Stocks", with William B. Harrison, Virginia Social Science Journal, Vol. 23, 1988

"The Financial Performance of New Banks in Virginia", Virginia Social Science Journal, Vol. 24, 1989

"Identifying and Managing Community Bank Performance After Deregulation", with William B. Harrison, Journal of Managerial Issues, Vol. II, No. 2, Summer 1990

"The Flotation Cost Adjustment To Utility Cost of Common Equity - Theory, Measurement and Implementation," presented at Twenty-Fifth Financial Forum, National Society of Rate of Return Analysts, Philadelphia, Pennsylvania, April 28, 1993.

Biography of Myon Edison Bristow, Dictionary of Virginia Biography, Volume 2, 2001.

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