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

James L. Lenihan
Staff Utility Analyst, Gas and Water Division

March 24, 2009

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

A. My name is James L. Lenihan, and my business address is 21 South Fruit St. Concord, New Hampshire 03301. I am employed as a Utility Analyst by the New Hampshire Public Utilities Commission (Commission). I am a graduate from St. Francis College, Maine with a B.A. in Economics, and subsequently completed graduate courses at the University of Maine. In 1985 I attended the Michigan State University Regulatory Studies Program. During the period 1969-73 I was a Junior High School instructor in Biddeford, Maine. In the fall of 1973 I joined the Cost of Living Council in Washington, D.C. From 1974 to 1984 I held various positions in the Federal Energy Administration and the Department of Energy as an Analyst in the areas of fossil fuel availability, distribution, and price for the residential, industrial and utility sectors on a national as well as regional level. In July of 1984 I joined the staff of the New Hampshire Public Utilities Commission.

Q. What is the purpose of your Testimony?

A. The purpose of my testimony is to review Pennichuck Water Works Inc.'s (Pennichuck or the Petitioner) Cost of Service findings and recommendations submitted in support of this permanent rate proceeding.

Q. How many customers are provided water service by Pennichuck?

A. Pennichuck serves approximately 24,800 metered customers primarily located in the City of Nashua. In addition, Pennichuck serves the entire town of Amherst, limited areas in the towns of Merrimack, Hollis, Bedford, Derry, Plaistow, Milford, Epping, Salem and Newmarket. Anheuser-Busch and the towns of Milford and Hudson are provided service

under the terms of special contracts. Pennichuck also provides Municipal as well as private fire protection.

Q. Would you describe Pennichuck's current rates prior to the authorization of temporary rates in this proceeding?

A. Pennichuck provides a general metered service which is comprised of a monthly $15.36, or $46.08 quarterly service charge for a 5/8 in. residential meter as well as a volumetric charge of $2.40 per hundred cubic feet for all water consumed. At the time of the filing, Pennichuck was in the process of converting all customers from quarterly to monthly bills. The conversion to monthly billing was completed in November 2008 and as of December 2008 all customers were to be billed on a monthly basis. The consumption portion of the bill is a single rate for all water consumed for all meter sizes. The special contracts have minimum charges and volumetric rates which are established in accordance with the terms and conditions of the special contracts. In addition to metered water service, Pennichuck provides municipal and private fire service. The private fire service costs are recovered through means of graduated charges increasing based on the size of the service pipe entering the property. Costs of serving the municipal fire protection customers are recovered by means of a hydrant charge and an inch-foot charge.

Q. How much of an increase in annual revenue is Pennicuck seeking in this proceeding?

A. Pennichuck is requesting a permanent increase in rates to reflect an annual revenue increase over the test year ending on December 31, 2007 in the amount $3,193,638 or a 14.72 percent increase over test year revenues. In addition, the Petitioner is requesting

two step increases to reflect post test year additions. The first step increase requested is in the amount of $1,096,560 or a 5.05 percent increase over test year revenues and a second step increase originally requesting a $1,195,589 or 5.51% increase which was later modified to reflect capital additions that were deferred. The modified second step reduced the amount of the increase requested to $822,299 or 3.79 percent over the test year revenue. The total annual revenue increase sought by Pennichuck including the two steps is 23.56 percent.

Q. What are the factors resulting in the increases proposed by Pennichuck?

A. The increases result from completion of upgrades to its water treatment plant in 2008, replacing aging water mains, services, valves and hydrants in 2007 as well as the installation of radio meter readers in 2007 to achieve the Company's transition form quarterly to monthly billing. The step adjustment includes recovery of additional capital expenditures beyond the end of the test year and into 2008. Operating expense increases which have occurred or will occur within twelve months follow the test year are also included in this permanent rate increase.

Q. Does Pennichuck currently have temporary rates in effect?

A. Yes, on December 30, 2008 by Commission Order 24,926 Pennichuck was granted an 11 percent increase over its last authorized annual revenue. Pennichuck originally filed for an 11.27 percent increase, however, the parties to the stipulation agreement recommend an 11 percent temporary rate increase in revenue and was approved by the Commission for effect on service rendered on or after July 28, 2008. The temporary revenue increase translated into a 3/8 inch residential monthly customer charge of $16.55 and a volumetric

rate of $2.64 per hundred cubic feet.

Q. How did the Petitioner propose to adjust its current rates to achieve the 11.27 percent temporary rate increase?

A. Originally, Pennichuck proposed to follow the results of its June 2008 Cost of Service Study submitted in this proceeding for implementing temporary rates. The study recommended the general metered class increase by 11.07 percent, private fire class by 69.72 percent, municipal fire protection by 1.1 percent, Anheuser Busch, 12.75 percent, Milford Contract volumetric charges 11.99 percent and the Hudson volumetric charges 9.13 percent. Given the study recommended such a large increase in permanent rates for private fire protection, it was recommended in the stipulation on temporary rates that less that the full amount of the proposed increase to private fire protection be placed in effect pending further investigation into the recommendations of the study. For the purposes of establishing temporary rates, the increase in private fire protection was shared equally between municipal and private fire protection customers. The remainder of the rate increase was borne proportionally by all Pennichuck's customers in accordance with the findings in the Cost of Service Study.

Q. For the purpose implementing an increase in permanent rates and possibly additional step increases in this proceeding, will staff continue to recommend the increase to the private fire protection class be shared with the municipal customers?

A. No, for the purpose of implementing a permanent increase in this proceeding, and should the commission approve the step increases, staff would recommend that the private fire protection class rates be adjusted in accordance with the recommendations in the of the

Cost of Service Study. Further investigation into the reasons for the increases were outlined in the information submitted in response to staff data request 4-1 attached. It is recommended, that although substantial, the private fire protection increases are necessary to keep rates in line with cost. The only way not to fully implement the increases to private fire protection would require the revenue short fall to be borne by the other classes. Given the number and magnitude of rate increases Pennichuck customers' have experienced in the past ten years, I would not recommend recovering a short fall from other classes.

Q. Did you have any other issues with the results and recommendations of the Cost of Service Study?

A. No.

Q. What increase would a residential (5/8-inch meter) customer see as a result of the proposed permanent and step increases?

A. Should the permanent rate and step increases be approved as modified an annual water bill for a single family home would be approximately $557.59 based on an average usage of 9.53 hundred cubic feet of water per month. This would represent an increase of $8.23 per month over currently effective permanent rates.

Q. When is Pennichuck proposing the increases become effective?

A. The revised tariff pages submitted in this proceed governing the permanent, temporary and step increases all identify and effective date of August 1, 2006. However since the effective date of temporary rates in this proceeding is July 28, 2008, should the Commission approve a permanent rate increase above the temporary rate level, the

temporary and permanent rates would be reconciled back to the effective date of the temporary rates. If the Commission approves a step adjustment to reflect improvements in 2008, staff recommends that the effective date of the step adjustments be no earlier than the effective date of issuance of a final Commission Order in this proceeding. Staff also recommends that any reconciliation not include any expenses associated with the step adjustment.

Q. Does this conclude your testimony?

A. Yes.

DW 08-073
PENNICHUCK WATER WORKS, INC. RESPONSE TO
STAFF DATA REQUESTS FROM TECHNICAL SESSION– SET 4

Date Request Received: 2/26/09
Request No. Staff 4-1

Date of Response: 3/11/09
Witness: Bonalyn J. Hartley
John R. Palko

REQUEST:

a) Please provide the percentage rate increase for public and private fire protection for the years 2001 through 2008.

b) Please explain the cost increase to the private fire protection.

RESPONSE:

a) Please see attached schedules for public and private fire protection rates and the footnoted percentage increases in 2007 and 2008. Also included is a schedule of public fire protection revenues from the years 2000 to 2007 that reflect revenue increases due to the number of inch foot and hydrants updated annually as well as the 2007 rate increases.

b) As was noted in the response to Staff 3-16, it is difficult to pinpoint any one item as being responsible for the increase in private fire protection rates. As further noted, the increase in private fire protection rates is due to the combination of changes, both in investment and in operating expenses, which have occurred since the prior study and to the totality of all allocations in the present study.

In order to obtain additional information and insight concerning the increase to private fire protection, a number of comparisons involving present rate revenues, the results of the present (i.e., the June 2008 study based on a 12/31/07 test period) cost of service allocation study, and the results of the prior (i.e., the July 2001 study based on a 12/31/00 test period) cost of service allocation study were developed. These comparisons are attached to this response. Note that identification of the attachments is provided in the footer at the bottom of each attachment.

A number of comparisons are set forth on the attached Schedule 1. The topmost compares present rate revenue to the results of the 12/31/00 cost allocation. As is shown thereon, the revenue from private fire protection showed a percentage increase of less than half the percentage increase of net revenues from sales while municipal fire protection revenues showed a greater percentage

increase than net revenues from sales. In and of itself, this indicates that, all else being equal, private fire protection would require greater increases than the overall increase and the increase to municipal fire.

The center portion of Schedule 1 compares the results of the 12/31/00 cost allocations with the results of the 12/31/07 cost allocations. This shows that relatively more costs were allocated to private fire in the 12/31/07 study than in the 12/31/00 study.

The bottom comparison on Schedule 1 shows the 12/31/07 indicated percentage increases over present rate revenues.

The attached Schedule 2 shows the increase in the number of both private and municipal fire protection billing units from the 12/31/00 study to the 12/31/07 study. As shown thereon, the number of private fire protection billing units increased by almost 20% while the increase in municipal fire protection billing units was only about 7%. This means that, on a percentage basis, more of the total fire protection cost responsibility would be allocated to private fire in the 12/31/07 study than was allocated in the 12/31/00 study.

Additionally, comparing the data set forth on Schedule 2 with that in the top portion of Schedule 1 shows that over the seven years between studies, the revenue increase from private fire was only slightly greater than the increase in billing units, while the revenue increase from public fire was significantly greater than the increase in billing units.

The attached Schedule 3 compares the private and the municipal class allocators used in the 12/31/07 and the 12/31/00 cost allocation studies. These allocators bear out the fact, as noted and discussed above, that the relatively greater increase in private fire protection billing units means that more of the total fire protection cost responsibility would be allocated to private fire. In the 12/31/00 study, 13.42% of the revenue requirement was attributable to all fire protection with 2.81% attributable to private fire protection and 10.61% attributable to municipal fire protection. In the 12/31/07 study, the total fire protection responsibility increased to 13.80%; however, municipal fire protection cost responsibility decreased to 10.12%, while private fire protection cost responsibility increased noticeably to 3.68% of the net revenue requirement.

Several other comparisons were developed to provide additional data and information for this response. The attached Schedule 4 sets forth a comparison of the results of the functional cost allocations from the 12/31/07 study and the 12/31/00 study. This comparison shows that there was minimal change in the fire hydrant functional cost but significant change in the base and extra capacity functional costs. Significant portions of the extra capacity functional costs are subsequently allocated to fire protection. Given the relatively greater increase in private fire protection billing units when compared with municipal fire protection billing units, relatively more of the fire protection responsibility for extra capacity costs would be allocated to private fire.

The attached Schedule 5 starts with the 12/31/07 functional cost allocation (which was also set forth on Schedule 4) and applies both the 12/31/07 private fire class allocators and the 12/31/00 private fire class allocators. The results show that if the 12/31/07 private fire class allocators were not changed from the 12/31/00 study, the indicated 12/31/07 private fire cost responsibility would be $806,793 or a decrease of $108,872 from the actual 12/31/07 study. This would represent a 57.36% increase above present rate private fire revenues. This is still significant, being more than 4 times the overall increase.

Finally, the attached Schedule 6 applies both the 12/31/00 functional cost allocation results and the 12/31/00 private fire class allocators to the current $24,898,859 net revenue requirement. Under this scenario, private fire would only be responsible for $699,681 of the 12/31/07 net revenue requirement. While this is a decrease of $215,984 from the indications of the 12/31/07 study, it represents an $186,967 (or 36.47%) increase above the $512,714 present rate private fire protection revenue. This is still significant, being about 2.8 times the overall increase.

It is noted that in developing fire service capacity units (refer to Schedule 7, Page 2 of 2 in the 12/31/07 cost of service allocation study), no weighting factors were applied to private fire service. It is not uncommon to weight private fire more than municipal fire given the fact that fire flow demands and requirements in areas served by private fire protection facilities are usually greater than the fire flow demands and requirements in areas served solely by municipal fire protection. If such a weighting were used in the 12/31/07 study, the resulting allocations to private fire protection service would have been ever greater.

Also note (either by reference to Schedule 5 herein or by reference to Schedule 5, Page 1 of 1 in the 12/31/07 study) that no functional customer-services costs were allocated to private fire. Arguments can be made that some portion of these costs should be allocated to private fire. If this were done, the overall allocation of cost responsibility of private fire protection service would increase even further.

In closing, it is noted that the allocations and resulting cost and rate increases to private fire protection service developed in the 12/31/07 study, even though large, are reasonable based on the study itself and the discussions and information set forth herein. Of course, a gradual approach can be taken in increasing the private fire protection rates and revenues, recognizing that any revenue not received from the private fire protection class would need to be recovered from other classes.

Pennichuck Water Works, Inc. **Response to Staff 4-1(a)**

Private Fire Protection Rates :

Size	2001	2002	2003	2004	2005	2006	(1) 2007	(2) 2007	(3) 2008
4" or smaller	$ 23.75	$ 23.75	$ 23.75	$ 23.75	$ 23.75	$ 23.75	$ 28.62	$ 29.35	$ 40.05
6"	$ 39.85	$ 39.85	$ 39.85	$ 39.85	$ 39.85	$ 39.85	$ 48.02	$ 49.25	$ 67.20
8"	$ 58.67	$ 58.67	$ 58.67	$ 58.67	$ 58.67	$ 58.67	$ 70.70	$ 72.51	$ 98.94

Public Fire Protection Rates:

Size	2001	2002	2003	2004	2005	2006	(1) 2007	(2) 2007	(3) 2008
Inch Foot	$ 0.0920	$ 0.0920	$ 0.0920	$ 0.0920	$ 0.0920	$ 0.0920	$ 0.1109	$ 0.1137	$ 0.1160
Hydrant	$ 134.40	$ 134.40	$ 134.40	$ 134.40	$ 134.40	$ 134.40	$ 162.00	$ 166.08	$ 201.96

Notes:

(1) 20.50% step increase for service rendered as of 1/5/07

(2) 3.07% additional step increase for service rendered as of 6/1/07

(3) reflect temporary increase of 36.45% for private and 21.64% for public hydrant and 2.04% for public inch foot issued 12/30/08 for services rendered as of 7/28/08.

Attachment JLL-1

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Pennichuck Water Works, Inc.
Municipal Fire Protection Revenue

Response to Staff 4-1 (a)

	2001	2002	2003	2004	2005	2006	2007	2007 Recoupment	2008	2008 Recoupment
Nashua	$ 1,667,052.12	$ 1,677,648.96	$ 1,683,042.86	$ 1,694,475.46	$ 1,710,675.36	$ 1,721,564.97	$1,955,169.69	$ 131,230.09	$ 2,133,057.84	$ 44,743.44
Merrimack	$ 55,691.04	$ 56,156.64	$ 56,156.64	$ 56,156.64	$ 56,156.64	$ 56,156.64	$ 63,740.36	$ 4,261.74	$ 69,416.40	$ 1,072.20
Amherst	$ 100,986.00	$ 101,076.37	$ 101,075.28	$ 105,822.54	$ 105,822.24	$ 114,827.78	$ 133,240.03	$ 8,937.71	$ 145,073.40	$ 2,588.70
Derry	$ -	$ 21,215.16	$ 21,215.16	$ 21,215.16	$ 21,215.16	$ 21,215.16	$ 24,079.96	$ 1,478.24	$ 26,218.44	$ 572.66
Bedford	$ 43,949.16	$ 45,109.83	$ 68,236.87	$ 85,680.00	$ 94,542.00	$ 96,660.52	$ 114,297.41	$ 6,950.04	$ 139,359.00	$ 2,107.33

Municipal Fire Protection Revenues increase as the number of inch foot and the number of hydrants is updated annually.
* 20.50% step increase for service rendered as of 1/5/07 (DW 06-073)
** 3.07% additional step increase for service rendered as of 6/1/07 (DW 06-073)
2008 recoupment billed in 2009

Attachment JLL-1

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Pennichuck Water Works, Inc.
Data for Request No. Staff 4-1
Allocation and Revenue Comparisons

Item	12/31/00 Allocation	Present Rate Revenue	$ Increase	% Increase
Private Fire Protection	421,450	512,714	91,264	21.65
Municipal Fire Protection	1,589,671	2,493,950	904,279	56.88
Net Revenue/Requirement	14,979,788	22,007,885	7,028,097	46.92

The above tabulation compares the results of the cost of service allocation based on the 12/31/00 test period with the present rate revenues which were current at the time of the June 2008 cost of service allocation study. Dollar increases and percentage increases are shown.

Item	12/31/00 Allocation	12/31/07 Allocation	$ Increase	% Increase
Private Fire Protection	421,450	915,665	494,215	117.27
Municipal Fire Protection	1,589,671	2,520,828	931,157	58.58
Net Revenue/Requirement	14,979,788	24,898,859	9,919,071	66.22

The above tabulation compares the results of the cost of service allocation based on the 12/31/00 test period with the results of the cost of service allocation based on the 12/31/07 test period. Dollar increases and percentage increases are shown.

Item	Present Rate Revenue	12/31/07 Allocation	$ Increase	% Increase
Private Fire Protection	512,714	915,665	402,951	78.59
Municipal Fire Protection	2,493,950	2,520,828	26,878	1.08
Net Revenue/Requirement	22,007,885	24,896,859	2,888,974	13.13

The above tabulation compares the present rate revenues with results of the cost of service allocation based on the 12/31/07 test period. Dollar increases and percentage increases are shown.

Pennichuck Water Works, Inc.
Data for Request No. Staff 4-1
Increase in Number of Fire Protection Billing Units

Private Fire Protection

Size	Number @12/31/07	Number @12/31/00	Increase In Number	% Increase
2"	25	16	9	56.25
4"	102	86	16	18.60
6"	359	308	51	16.56
8"	274	225	49	21.78
10"	6	5	1	20.00
12"	13	12	1	8.33
16"	1		1	
	780	652	128	19.63

Municipal Fire Protection

Size	Number @12/31/07	Number @12/31/00	Increase In Number	% Increase
Hydrant	2,458	2,309	149	6.45
Inch-Feet	18,344,114	17,116,582	1,227,532	7.17

This schedule compares the number of fire protection billing units in the 12/31/00 test period with the number of fire protection billing units in the 12/31/07 test period. The increase in number and the percentage increase are shown.

Pennichuck Water Works, Inc.
Data for Request No. Staff 4-1
Comparison of Class Allocators - Test Periods Ending 12/31/07 and 12/31/00

	Test Period Ending 12/31/07		Test Period Ending 12/31/00		Change Between Test Periods	
Functional Cost	% to Priv Fire	% to Muni Fire	% to Priv Fire	% to Muni Fire	Priv Fire	Muni Fire
Base Cost	0.28	0.72	0.24	0.70	0.04	0.02
Extra Cap Max Day	7.04	17.82	6.50	18.60	0.54	(0.78)
Extra Cap Max Hour	10.25	25.96	8.15	23.29	2.10	2.67
Cust - Comm'l	5.35	0.04	5.33	0.04	0.02	0.00
Cust - Meters	0.00	0.00	0.00	0.00	0.00	0.00
Cust - Services	0.00	0.00	0.00	0.00	0.00	0.00
Fire Hydrants	0.00	100.00	0.00	100.00	0.00	0.00
Net Revenue Req'm'nt	3.68	10.12	2.81	10.61	0.87	(0.49)
Combined Fire %	13.80		13.42		0.38	

This schedule compares the private and municipal fire class allocators used in the cost of service allocation studies based on the test periods ending 12/31/07 and 12/31/00. The last two columns show the magnitude of the change in each individual allocator.

Pennichuck Water Works, Inc.
Data for Request No. Staff 4-1
Comparisons of Functional Cost Allocations - Test Periods Ending 12/31/07 and 12/31/00

Functional Cost	Test Period Ending 12/31/07		Test Period Ending 12/31/00		12/31/07 Less 12/31/00		
	$	%	$	%	$ Increase	% Increase	% of Increase
Base Cost	9,858,898	39.60	6,489,201	43.32	3,369,697	51.93	33.97
Extra Cap Max Day	6,109,640	24.54	3,067,860	20.48	3,041,780	99.15	30.67
Extra Cap Max Hour	3,406,156	13.68	2,349,692	15.68	1,056,464	44.96	10.65
Cust - Comm'l	2,033,832	8.17	273,241	1.82	1,760,591	644.34	17.75
Cust - Meters	1,695,152	6.81	1,332,626	8.90	362,526	27.20	3.65
Cust - Services	1,317,118	5.29	995,716	6.65	321,402	32.28	3.24
Fire Hydrants	478,063	1.91	471,452	3.15	6,611	1.40	0.07
Net Revenue Req'm'nt	24,898,859	100.00	14,979,788	100.00	9,919,071	66.22	100.00

This schedule compares the results of the functional cost allocations for the test periods ending 12/31/07 and 12/31/00. The last three columns respectively show the dollar increse in the allocations, the percentage increase in the allocations, and the percentage of each element increase to the total increase.

Attachment JLL-1

Pennichuck Water Works, Inc.
Data for Request No. Staff 4-1
Effect of Using 12/31/00 Class Allocators for Private Fire

Functional Cost	12/31/07 Allocation Results	12/31/07 Allocation To Private Fire %	12/31/07 Allocation To Private Fire $	Private Fire Allocation Using 12/31/00 Factors %	Private Fire Allocation Using 12/31/00 Factors $	$ Difference
Base Cost	9,858,898	0.28	27,605	0.24	23,661	3,944
Extra Cap Max Day	6,109,640	7.04	430,119	6.50	397,127	32,992
Extra Cap Max Hour	3,406,156	10.25	349,131	8.15	277,602	71,529
Cust - Comm'l	2,033,832	5.35	108,810	5.33	108,403	407
Cust - Meters	1,695,152	0.00	0	0.00	0	0
Cust - Services	1,317,118	0.00	0	0.00	0	0
Fire Hydrants	478,063	0.00	0	0.00	0	0
Net Revenue Req'm'nt	24,898,859		915,665		806,793	108,872

This schedule allocates the functional cost components developed in the cost of service allocation study based on the 12/31/07 test period to Private Fire using the class allocators from the 12/31/07 study and the class allocators from the 12/31/00 study. The last column shows the resulting differences between the two sets of class allocators.

Pennichuck Water Works, Inc.
Data for Request No. Staff 4-1
Current Private Fire Allocation Based on 12/31/00 Allocators

Functional Cost	12/31/00 %	Allocated $	% to Priv Fire	Allocated to Priv Fire
Base Cost	43.32	10,786,187	0.24	25,887
Extra Cap Max Day	20.48	5,099,286	6.50	331,454
Extra Cap Max Hour	15.68	3,904,141	8.15	318,187
Cust - Comm'l	1.82	453,159	5.33	24,153
Cust - Meters	8.90	2,215,998	0.00	0
Cust - Services	6.65	1,655,774	0.00	0
Fire Hydrants	3.15	784,314	0.00	0
Net Revenue Req'm'nt	100.00	24,898,859	2.81	699,681

This schedule uses the results of the 12/31/00 test period functional cost allocation and the 12/31/00 private fire class allocators to allocate the current $ 24,898,859 net revenue requirement to the private fire class. Based on the 12/31/000 test period parameters, private fire would be responsible for $ 699,681 of the current net revenue requirement. This represents a $ 186,967 (or 36.47%) increase above the $ 512,714 present rate revenue.

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

Jayson P. Laflamme
Staff Utility Analyst, Gas and Water Division

March 24, 2009

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New Hampshire Public Utilities Commission

Pennichuck Water Works, Inc.

DW 08-073

Petition for Permanent Rates and Step Increases

Direct Testimony of Jayson P. Laflamme

I. INTRODUCTION

Q. Please state your full name.

A. My name is Jayson P. Laflamme.

Q. By whom are you employed and what is your business address?

A. I am employed by the New Hampshire Public Utilities Commission (NHPUC) and my business address is 21 South Fruit Street, Suite 10, Concord, New Hampshire.

Q. What is your position at the NHPUC?

A. I am a Utility Analyst in the Gas and Water Division.

Q. Please describe your duties at the NHPUC.

A. I am responsible for the evaluation of rate and financing filings, including the recommendation of changes in revenue levels that conform to regulatory methodologies. I represent Staff in meetings with company officials, outside attorneys and accountants relative to rate case and financing matters as well as the Commission's rules, policies and procedures.

Q. Would you please describe your educational background?

A. I received a Bachelor of Science Degree in Accounting from Lyndon State College in 1989. In 1998, I attended the NARUC Annual Regulatory Studies Program at Michigan

State University. In 2002, I attended the 22nd Annual Western Utility Rate School in San Diego, California.

Q. Would you please describe your work experience?

A. In 1989, I was hired as a Staff Accountant by Driscoll & Company, a CPA firm located in Littleton, New Hampshire. I performed audits, reviews and compilations as well as prepared tax returns for a variety of entities. I was eventually promoted to the position of Manager. In 1997, I was hired as a Utility Examiner in the Audit Division of the NHPUC. In that position, I participated in field audits of the books and records of regulated utilities in the electric, telecommunications, water, sewer and gas industries. I examined reports and filings submitted to the Commission by regulated utilities and performed rate of return analyses. In 2001, I was promoted to my current position as a Utility Analyst in the Commission's Gas and Water Division.

Q. What is the purpose of your testimony?

A. My testimony will provide Staff's recommendation with regard to a permanent rate revenue requirement for Pennichuck Water Works, Inc. (PWW or the Company). My testimony will also provide Staff's recommendations regarding the Company's request for two step increases relative to this rate proceeding.

II. STAFF RECOMMENDATION FOR PERMANENT RATES

Q. Please provide a brief summary of PWW's request for permanent rates in this proceeding.

A. On June 23, 2008, PWW filed a petition, including testimony and supporting schedules, requesting approval of a permanent rate increase in order to generate additional revenue

of $3,193,791, which represents a 14.72% increase in annual operating water revenue. The Company utilized a 2007 test year in making its determinations.

Q. Are temporary rates currently in effect in this docket?

A. Yes. On December 30, 2008, the Commission issued Order No. 24,926 authorizing a temporary revenue increase of 11.00% to be implemented on a service rendered basis, effective July 28, 2008.

Q. Before discussing the specifics of Staff's recommended revenue requirement, are there any general comments that you would like to make?

A. Yes. I would like to commend the Commission's Audit Staff for their excellent work in this case. The Audit Staff was quite thorough in its examination of the Company's test year and discovered many items which were included in its Final Audit Report dated February 10, 2009 (Final Audit Report). Many of these items have been incorporated into Staff's recommendations.

Q. Please summarize Staff's recommendation regarding a permanent rate revenue requirement for PWW in this case.

A. As indicated on Schedule 1 of Attachment JPL-1, Staff is recommending a revenue requirement totaling $23,718,630. This represents an increase of $2,015,562, or 9.29%, over the Company's pro-formed test year operating water revenue of $21,703,068. Staff's recommended revenue requirement is calculated utilizing a total rate base of $77,843,943 which is computed on Schedule 2 of Attachment JPL-1 and provides for an overall rate of return of 7.07% which is based upon the direct testimony of David C. Parcell, Staff's cost of capital consultant in this proceeding. The revenue deficiency before tax effect is $1,217,198. When the federal and state tax effect of $798,364 is

added to this revenue deficiency, the overall increase in the Company's revenue requirement becomes $2,015,562.

Q. What was used for a Federal and State tax rate?

A. As indicated on Schedule 1A of Attachment JPL-1, an overall effective tax rate of 39.61% was computed. This is the same effective tax rate presented by the Company in its filing.

III. RATE BASE

Q. Please discuss the rate base amount calculated by Staff on Schedule 2 of Attachment JPL-1.

A. Column (1) shows the thirteen-month averages for the various components of PWW's rate base which together total $72,945,003. Column (2) provides a summary of the Company's adjustments to these components as proposed in its original filing. The cumulative effect of the Company's adjustments results in an increase in rate base of $3,974,060 to an amount of $76,919,063 which is presented in Column (3). Columns (4) and (5) provide a summary of Staff's adjustments to rate base. Staff's adjustments are further detailed on Schedule 2A of Attachment JPL-1 and provide for a net increase of $924,880 to an amount of $77,843,943 which is presented in Column (6).

Q. Please explain Staff Adjustment # 1 to reduce Plant in Service by an amount of $10,000.

A. This adjustment stems from Staff Audit Issue # 1 contained in the Final Audit Report. On March 23, 2007, a previous NHPUC Audit Report was issued relative to the step adjustment recognized by the Company in its prior rate case; docket DW 06-073. In that

report, the Audit Staff discovered and the Company agreed that plant in service was overstated by an amount of $10,000. However, during its most recent examination, the Audit Staff discovered that the credit adjustment that was required to correct this overstatement had not been recorded by the Company until June 2008. Thus, for the test year, plant in service was still overstated by $10,000. Staff Adjustment # 1 has been recorded to correct this overstatement.

Q. Please explain Staff Adjustment # 2 to reduce Plant in Service by an amount of $565.

A. This adjustment pertains to Staff Audit Issue # 2 which concerns a shareholder related advertising expense that was erroneously recorded as plant in service. The Audit Staff and the Company agreed that this expense in the amount of $565 should be reclassified from plant in service to a miscellaneous non-utility expense line item. Therefore, Staff Adjustment # 2 reduces plant in service by the amount of this advertising expense.

Q. Please explain Staff Adjustment # 3 to Plant in Service and Staff Adjustment # 5 to Accumulated Depreciation which increases these respective accounts by $1,875.

A. These adjustments relate to Staff Audit Issue # 4 concerning a pump which was erroneously recorded as retired by the Company in its general ledger. The combination of Staff Adjustment # 3 to increase plant in service and Staff Adjustment # 5 to increase accumulated depreciation, both by an amount of $1,875, reverses the retirement of this pump recorded on the Company's books. The net result of these adjustments is a $0 impact on rate base.

Q. Please explain Staff Adjustment # 4 reducing Accumulated Depreciation by an amount of $1,456,400.

A. In its filing, PWW included a pro-forma adjustment reducing its test year average plant in service balance by an amount of $1,456,400. This amount represents the difference between the total cost and the calculated test year average cost of certain "non-revenue producing plant" which was retired during the test year. However, the Company did not make a similar pro-forma adjustment to its accumulated depreciation test year average balance. Such an adjustment would be necessary in order for the Company's filing to be in conformity with NHPUC regulatory accounting rules for plant retirements. Thus, Staff has included its Adjustment # 4 to reduce accumulated depreciation, as well, by the amount of $1,456,400.

Q. Please explain Staff Adjustment # 6 which reduces Cash Working Capital by $501,590.

A. There are actually two factors which combine to form the basis for this adjustment. First, Staff has made a number of pro-forma adjustments to PWW's operation and maintenance (O&M) expenses. These adjustments, which result in a net increase of $98,590 in total O&M expenses to an amount of $10,343,969, will be further discussed later in my testimony regarding Schedules 3 and 3A of Attachment JPL-1. The second and more significant factor contributing to this adjustment is the use of a 12.33% working capital percentage. In its filing, PWW proposed using the same working capital percentage of 17.40% that had been employed in its prior rate cases going back to docket DR 97-058. This percentage was based upon a calculated 63.5 day lag between incurred expenses and billed revenue. However, in its filing, the Company explained its intention of moving from a quarterly billing cycle for its customers to a monthly billing cycle during 2008. In its response to Staff Data Request 2-20, PWW stated that this transition had been

completed as of November 2008. It is Staff's position that a cash working capital percentage should be utilized which is reflective of the Company's current billing cycle. Therefore, Staff is proposing a cash working capital percentage of 12.33% which is based upon a monthly billing cycle. Staff Adjustment # 6 combines the factors of an increase in pro-forma O&M expenses and an accelerated billing cycle with the result being a $501,590 decrease in cash working capital.

Q. Please discuss Staff Adjustment # 7 which increases Unamortized Deferred Debits by an amount of $5,968.

A. This adjustment stems from the Company's response to Staff Data Request 2-13. In that request, PWW was asked about two unamortized deferred debits which were to be fully amortized during 2008. In its response, the Company indicated that the pro-forma test year amortization expense relative to these two items should be reduced to amounts that are equal to the respective test year ending balances of these items. As will be discussed later in my testimony, Staff Adjustment # 26 was recorded in order to reduce pro-forma test year amortization expense by a combined amount of $5,968 relative to the two deferred debits. The purpose of Staff Adjustment # 7 is to record a corresponding rate base adjustment in order that the unamortized deferred debit items are also properly recorded for rate making purposes.

Q. Please explain Staff Adjustment # 8 which reduces Unamortized Deferred Debits by an amount of $25,333.

A. In its filing, PWW submitted a pro-forma adjustment to increase its rate base by the net amortized cost of a compensation study for non-union employees and executives that it conducted during 2008. For reasons that will be further elaborated upon later in my

testimony, Staff is proposing that recovery on this deferred asset should be made a part of the step adjustments proposed in this case. Therefore, Staff Adjustment # 8 removes the net amortized cost of the 2008 Compensation Study in the amount of $25,333 from PWW's rate base for purposes of determining a permanent rate.

IV. NET OPERATING INCOME

Q. Please discuss the Operating Income Statement for PWW presented on Schedule 3 of Attachment JPL-1.

A. Column (1) presents the actual test year operating activity for the Company which results in the recognition of $4,680,242 in Net Operating Income. Column (2) summarizes the adjustments presented by the Company in its filing relative to test year operating income and expenses. The Company's adjustments reduce test year net operating income by $600,475 to an amount of $4,079,767 which is shown in Column (3). Columns (4) and (5) summarize Staff's adjustments to operating income and expenses from Schedule 3A of Attachment JPL-1. Staff's adjustments result in a net tax effected increase in the Company's pro-forma net operating income of $206,602. Column (6) presents Staff's proposed pro-forma net operating income amount of $4,286,369 which is the amount used by Staff to calculate the increase in the Company's revenue requirement on Schedule 1 of Attachment JPL-1. Columns (7) and (8) present the effect of Staff's calculated revenue requirement from Schedule 1 of Attachment JPL-1 resulting in a net operating income requirement of $5,503,567.

Q. With regard to the adjustments that Staff is proposing to PWW's Operating Revenue, please first discuss Staff Adjustment # 9 which increases Other Water Revenue by an amount of $232,293.

A. In its response to Staff Data Request 1-12, the Company stated that net jobbing revenue in the amount of $232,293 had not been included in net operating income for rate making purposes as had been the case in its prior rate filings. Therefore, Staff Adjustment # 9 has been recorded in order that the Company's pro-forma test year includes this net jobbing revenue.

Q. Please discuss Staff Adjustment # 10 to increase Other Water Revenue by the amount of $5,308.

A. In PWW's response to Staff Data Request 2-16, the Company indicated that its pro-forma revenue should be increased by the amount of $5,308 in order to properly match an increase in jobbing revenue relative to pro-forma increases in jobbing salaries as presented in its filing.

Q. Please discuss Staff Adjustment # 11 which increases Other Water Revenue by $77,435.

A. It its response to Staff Data Request 3-17, PWW stated that as part of its request for increased rates that it was also requesting increases in its miscellaneous utility service fees. This includes increases in its Service Connection and Disconnection of Water Service and Collection charges from $28 to $46 during regular hours and from $40 to $63 during non-regular hours. Also included is an increase in its Service Pipe Connection fee from $85 to $160. During the technical session held between the parties in this case on February 26, 2009, PWW presented a revenue analysis showing the pro-forma effect on

test year revenue that would result from instituting these proposed increases in service fees. A copy of this analysis is attached to my testimony and is identified as Attachment JPL-2. The combined increase in test year revenue resulting from PWW's proposed adjustments in its service fees is $77,435 which has been included in Staff's determination of permanent rates via Staff Adjustment # 11.

Q. Turning our attention now to Staff's adjustments to the Company's operating expenses; please explain Staff Adjustment # 12 to increase Production Expenses by $303,322.

A. In its original filing, PWW proposed a pro-forma increase in its chemical expenses of $20,515. However, in its response to Staff Data Request 2-2, the Company indicated that it was experiencing a more significant increase in chemical costs during 2008 as compared to its test year to the extent that it proposed that its chemical expense pro-forma should be modified to an amount of $323,837. Further, the Company stated that it was anticipating that this level of chemical expense would continue into the future. Therefore, Staff Adjustment # 12 in the amount of $303,322 increases PWW's original pro-forma adjustment for chemical expenses to the Company's modified request.

Q. Please discuss Staff Adjustment # 13 to increase Production Expenses by $55,512.

A. This pro-forma adjustment stems from Staff Audit Issue # 10 which includes an agreed upon adjustment between the Audit Staff and the Company to reduce purchased power expense relative to the treatment plant by an amount of $55,512. The purpose of this adjustment is to correct various accrual postings to this account made during the test year.

Q. Please explain Staff Adjustment # 14 which reduces Production Expenses by $5,847.

A. This adjustment is based upon Staff Audit Issue # 11 regarding a 2006 expense item in the amount of $5,847 that was included in the 2007 test year. Staff Adjustment # 14 removes this expense from the Company's pro-forma test year.

Q. Please discuss Staff Adjustment # 15 which reduces Transmission and Distribution Expense by an amount of $49,350.

A. PWW included a pro-forma adjustment relative to the significant increases in gas and diesel prices that it was experiencing at the time that it made its rate filing with the Commission in June of last year. Since that time, however, gas and diesel prices have decreased significantly. Therefore, Staff is proposing that the Company's pro-forma adjustment relative to fuel prices should be removed from the test year so that the Company's actual test year expense is considered for rate making purposes.

Q. Please explain Staff Adjustment # 16 to decrease Administrative and General Expenses by an amount of $71,947.

A. In its filing, PWW included pro-forma increases in wages in the amounts of $34,008 and $37,939 relative to customer service positions that it was intending to fill in June and October of 2008. However, in its responses to Staff Data Requests 2-15 and 4-4, the Company indicated that it had subsequently determined that these positions were no longer required. Therefore, Staff Adjustment # 16 removes the pro-forma salary expense relative to these positions from the Company's test year.

Q. Is Staff proposing any other pro-forma adjustments relative to the elimination of the Customer Service positions discussed above?

A. Yes. Staff Adjustment # 17 is recorded to further reduce administrative & general expenses by $27,772 for the benefit costs associated with these eliminated positions that

had been pro-formed into the test year by the Company in its filing. Staff Adjustment # 24 is recorded in order to eliminate the pro-forma allocation to affiliates of the salaries and benefits for these positions in the amount of $28,021. The net reduction in test year expense resulting from Staff Adjustments # 16, # 17 and # 24 is $71,698 [$71,947 + $27,772 - $28,021].

Q. Please discuss Staff Adjustment # 18 which increases Administrative and General Expenses by an amount of $2,698.

A. This Staff adjustment stems from the Company's response to Office of Consumer Advocate (OCA) Data Request 1-8. In that response, PWW requested an increase relative to its regulatory commission expense pro-forma from $6,080, as was originally proposed, to a revised amount of $8,778. Staff believes that the Company's explanation for this revision is reasonable and therefore is proposing this adjustment to increase the Company's test year expense by $2,698.

Q. Please explain Staff Adjustment # 19 to increase General and Administrative Expenses by $1,749.

A. In its response to OCA Data Request # 1-9, PWW requested an increase in its computer maintenance expense pro-forma, net of affiliate allocation, by an amount of $1,749. Staff believes that the Company's explanation for this revision is reasonable and therefore is proposing Staff Adjustment # 19 to increase PWW's test year expense by this amount.

Q. Please explain Staff Adjustment # 20 to increase Administrative and General Expenses by an amount of $5,882.

A. In its response to Staff Data Request 3-3, PWW indicated that there was an error in the calculation of its miscellaneous general expense pro-forma in the amount of $5,882.

Staff concurs that an error exists in the Company's filing and therefore is proposing this adjustment in order to correct that error.

Q. Please discuss Staff Adjustment # 21 which reduces Administrative and General Expenses by an amount of $9,916.

A. This adjustment is based on Staff Audit Issue # 14 where it was found that the Company's outside service expense contained two charges that should be eliminated from the test year. The first, in the amount of $3,640 (net of affiliate allocation), was for investment advisory expenses incurred during 2006. The second charge, in the amount of $6,276 (net of affiliate allocation), relates to a cost that has been previously disallowed by the Commission. Therefore, Staff Adjustment # 21 for the combined amount of $9,916 has been recorded in order to remove these expenses from PWW's pro-forma test year.

Q. Turning our attention to the Inter-division Management Fee, please explain Staff Adjustment # 22 which reduces the Company's operating expenses by $21,901.

A. The Company is affected by a management fee allocation relative to various costs that are incurred by PWW's parent, Pennichuck Corporation (PCP), which are allocated to five subsidiaries: PWW, Pennichuck East Utility (PEU), Pittsfield Aqueduct Company (PAC), Pennichuck Water Service Company (PWSC), and The Southwood Corporation (TSC). Staff Audit Issue # 12 revealed that charges relative to four legal invoices to PCP had been over-accrued during the test year by an amount of $28,817. PWW's share of this over-accrued expense is $21,901 (76.0%). Therefore, Staff Adjustment # 22 has been recorded in order to reduce PWW's test year expenses by its share of the over-accrued amount.

Q. Please discuss Staff Adjustment # 23 which results in an $838 reduction in the Inter-division Management Fee.

A. This adjustment relates to Staff Audit Issue # 13 which pertains to a charge to the parent corporation in the amount of $1,103 that was originally recorded as a test year expense but, in fact, should be reclassified as a debt issuance cost deferred asset. PWW was allocated $838, or 76.0%, of this charge. Therefore, Staff Adjustment # 23 removes this expense from the Company's pro-forma test year.

Q. Concerning the Company's Depreciation Expense, please discuss Staff Adjustment # 25 which reduces test year expense by $4,143.

A. In its filing, PWW included a pro-forma adjustment relative to an increase in the depreciation life that it was using for filter media from five years to seven years. On an annual basis, this would result in a decrease in depreciation expense of $8,286. However, in its filing, the Company only proposed recognition of half this amount, or $4,143. In its response to Staff Data Request 2-12, PWW acknowledged that on a going-forward basis the full decrease in depreciation expense should be recognized. Therefore, Staff Adjustment # 25 further reduces the Company's test year depreciation expense by an additional $4,143.

Q. Please explain Staff Adjustment # 26 to reduce Amortization Expense by an amount of $5,968.

A. As was discussed previously with regard to Staff Adjustment # 7, this adjustment also stems from the Company's response to Staff Data Request 2-13, in which PWW was asked about two deferred debits which were to be fully amortized during 2008. As a result of the Company's response, it was determined that the test year amortization

expense relative to these two items should be reduced to amounts that are equal to the respective ending balances of the two unamortized deferred debit items. Therefore, Staff Adjustment # 26 was recorded in order to reduce pro-forma test year amortization expense by a combined amount of $5,968 relative to these items.

Q. Please explain Staff Adjustment # 27 which reduces PWW's Amortization Expense by an amount of $12,667.

A. This adjustment corresponds with Staff Adjustment # 8 and also pertains to PWW's pro-forma adjustment to increase its test year expenses relative to the annual amortization of the cost of a compensation study for non-union employees and executives that it conducted during 2008. For reasons that will be further elaborated upon later in my testimony, Staff is proposing that this pro-forma adjustment should be made a part of the step adjustments proposed in this case. Therefore, Staff Adjustment # 27 removes the amortization expense in the amount of $12,667 relative to the 2008 Compensation Study from PWW's test year expense for the purpose of determining permanent rates.

Q. Please explain Staff Adjustment # 28 which reduces the Company's Real Estate Tax expense by an amount of $101,577.

A. During the test year, the Company recognized $1,512,803 for state and municipal real estate tax expense. The Company's rate filing also proposed pro-forma adjustments to increase the test year real estate tax expense by an additional $599,805. The combined amount of real estate tax expense for rate making purposes reflected in the Company's rate filing is $2,112,608. The Company's response to Staff Data Request 2-10 included PWW's real estate tax bills for the year 2008. In Attachment JPL-3, Staff used this information to create an analysis of pro-forma real estate tax expense based on the

Company's 2008 real estate taxes. Columns (1) through (3) show the municipal and state property taxes that were assessed during 2008 totaling $2,013,395. Columns (4) through (7) of Attachment JPL-4 detail an adjustment based on the fact that, with regard to a number of parcels, the Company was not only being assessed the State Utility Property Tax by the State of New Hampshire but was also being assessed this tax by certain municipalities as well, thus resulting in an overpayment of property taxes. Columns (4) through (7) of Attachment JPL-4 calculates this overpayment in the amount of $2,364 which is deducted from the total municipal real estate taxes shown in Column (3) resulting in an adjusted real estate tax assessment for 2008 of $2,011,031 shown in Column (8). This amount, which is $101,577 less than the pro-forma real estate tax expense proposed by the Company, is the basis for Staff Adjustment # 28.

V. TAX EFFECT OF OPERATING INCOME AND EXPENSE ADJUSTMENTS

Q. Please briefly explain Schedule 3B of Attachment JPL-1.

A. This schedule calculates the income tax effect of the above described revenue and expense adjustments. The combined impact of Staff Adjustments # 9 through # 28 is a net increase in the Company's pro-forma net operating income in the amount of $340,801. This increase in net operating income results in a marginal increase in PWW's New Hampshire Business Profits Tax (NHBPT) of $28,968 calculated at a rate of 8.50%. In order to calculate the marginal federal income tax effect, Staff offset the calculated NHBPT by a decrease in state income taxes stemming from Staff Audit Issue # 9 where it was found that $1,200 for State of Massachusetts excise tax had been erroneously recorded on PWW's books. Therefore, the net state income tax adjustment is $27,768

[$28,968 - $1,200]. The marginal net income resulting from Staff's adjustments subject to federal income tax is $313,033 which results in a marginal increase in federal income taxes of $106,431 calculated at a rate of 34.00%. After tax effect, the net increase in operating income resulting from Staff's pro-forma adjustments is $206,602.

VI. STAFF RECOMMENDATION FOR STEP ADJUSTMENTS

Q. Please provide a brief summary of PWW's request for step increases in this proceeding.

A. In addition to a request for an increase in permanent rates, the Company's original filing also contained a request for two step increases in its operating revenue. The first step increase (Step One) encompasses net water treatment plant upgrades of $7,179,944 which were installed as of May 2008. As a result, PWW requested an initial incremental step increase in its revenue of $1,095,263, or 5.05%. For its second step increase (Step Two), the Company was originally anticipating that additional net water treatment plant upgrades of $8,151,558 would be installed as of November 2008. This would have resulted in an additional incremental step increase in revenue of $1,196,149, or 5.51%. However, subsequent to its original filing, PWW submitted revised testimony and schedules pertaining specifically to its second step increase request which it was scaling back so as to include $5,445,539 in subsequent net water treatment plant upgrades. The revised second step increase proposed by the Company would result in an increase in revenue of $823,836, or 3.80%.

Q. Has the Company completed all of the upgrades associated with Step One and revised Step Two?

A. It would appear that all of the upgrades have been completed. The Company's filing indicated that the upgrades associated with Step One were completed as of May 2008. In its response to Staff Data Request 2-22, the Company expressed its anticipation that the upgrades associated with revised Step Two would be completed by the end of January 2009.

Q. Has Staff reviewed the actual costs associated with these major upgrades to PWW's treatment plant?

A. No. However, it is anticipated that the NHPUC Audit Staff will be reviewing the actual costs of construction pertaining to the two sets of treatment plant upgrades relatively soon. Upon completion of that review, a report containing the Audit Staff's findings concerning these upgrades will be issued. In the mean time, and for purposes of my testimony, I will be utilizing the amounts provided by the Company in its filing and discovery responses relative to the upgrades associated with Step One and Step Two. It should be noted, however, that many of the amounts provided are estimates and that the final costs associated with the proposed step adjustments are yet to be determined by the Company and verified by the Commission Staff.

Q. What is Staff's recommendation at this time with regard to PWW's request for step increases in rates relative to the treatment plant upgrades?

A. The upgrades to PWW's treatment plant were considered in docket DW 05-094 which involved a request for financing approval. Staff Counsel has advised me that in Commission Order # 24,510, issued on September 2, 2005, the Commission found that the proposed upgrades to the Company's treatment plant were reasonably necessary and consistent with the public good. Therefore, subject to the findings of the NHPUC Audit

Staff relative to the actual costs incurred for these upgrades, Staff supports the step increases proposed by the Company in its rates to recover the cost of its treatment plant additions. Staff anticipates that once the audit of the plant upgrades is completed, a recommendation from the parties will be presented to the Commission regarding the actual proposed step increases in rates. Staff recommends that the effective date of the proposed step increases be on or after the date of the Commission's final order in this proceeding.

Q. Did PWW request an increase in its Pension Expense for rate making purposes?

A. Yes. The Company is requesting that a $298,308 increase in pension expense be recognized as part of the proposed step increases. The Company explained in its response to Staff Data Request 3-8 that it is facing a substantial increase in its pension expense for two reasons. First, for purposes of determining its 2008 pension expense, IRS regulations required the use of updated mortality tables. As a result of using these new mortality tables, the pension expense recognized by PWW and its affiliates increased from $624,978 for 2007 to $782,273 for 2008; an increase of $157,295. PWW's share of this increase is $113,095, or 71.90%. Second, as a result of the recent fall in the stock market, the Company's pension plan assets have lost an approximate $1.5 million, or 24%, in value. The resulting shortfall in the return on these assets will need to be recovered through additional pension plan expense spread over future years starting in 2009. Thus, the Company indicated that the pension plan expense that it and its affiliates will recognize in 2009 will be $1,039,871, which is $414,893 more than what was recognized during the test year. PWW's share of this increase in pension expense is

$298,308, or 71.90%, which is the amount that the Company is requesting be recognized for an increase in its pension plan expense.

Q. What is Staff's position concerning PWW's request?

A. Staff has a concern that such a request constitutes an improper "stretching of the test year." The Company is requesting consideration of a 2009 level of pension expense in a case with a 2007 test year. Staff believes that the concept of step adjustments was developed in order to recognize for rate purposes significant plant investments that immediately followed the test year so as to avoid the situation where a utility experiences a revenue deficiency immediately after the completion of a rate case. The underlying intent is to obviate the immediate need for filing a subsequent case so soon after one has been already completed. However, in the case of PWW, that has not been happening. Staff recognizes that this is in large part due to the significant additions that have been occurring relative to the Company's water treatment plant. Thus, recently, new rate cases have been filed by PWW approximately within a year from the close of its previous rate proceeding. In these cases, PWW has made requests to "update" the test year for "known and measurable" changes in its operating income and expenses that have occurred within the twelve months following the close of the test year. However, the Company's request in this instance is to use its anticipated 2009 pension expense level. Staff believes that such a request constitutes a departure from balancing the interests of the stockholders of the utility and its customers. In addition, the pension expense incurred by the Company is in large part a function of the current economic conditions as those conditions impact the plan investments. These conditions can and will likely change. However, the timing of such change is uncertain. Therefore, it is Staff's conclusion that using the 2009

pension expense in this case does not result in a proper balancing of the interests, and further, does not meet the "known and measurable" standard for pro-forma adjustments. Staff does, however, agree to an adjustment of the Company's share of pension expense to the calculated 2008 level which is by-and-large the result of the change in mortality tables. As indicated previously, this represents an increase in PWW's pension expense of $113,095. Staff further recommends that this adjustment should be included in the Company's proposed Step Two.

Q. Does Staff have a concern regarding the allocation of certain Unamortized Deferred Debits?

A. Yes. During discovery, it came to Staff's attention that PWW was carrying certain deferred debits on its books which are actually a benefit to the Company's affiliates as well. However, it does not appear that the affiliates were carrying any portion of these deferred costs on their respective books. These items include deferred pension costs, deferred post employment and retirement health costs, a deferred SERP, deferred VEBA Trusts, employee recruiter fees, the cost of union negotiations, a 2004 compensation study and Synergen computer training. The total test year average cost of these items is $3,956,658. In addition, the Company proposed in its request for permanent rates that the deferred cost of a 2008 compensation study in the amount of $38,000 should also be included in its pro-forma test year for rate making purposes. Staff is concerned that while it is apparent that these items provide a common benefit to PWW and its affiliates, it is only PWW's customers who are bearing the cost relative to the rate of return on these assets through rates. Staff is also concerned that the amortization expense associated with certain of these items is not being allocated amongst the affiliates.

Q. Did Staff express its concerns to the Company during discovery?

A. Yes. In Staff Data Request 2-1, the Company was asked why it did not appear that any portion of the pension and benefit deferred assets was being allocated to its affiliates. In response, PWW indicated its concern that if such an allocation was to be included in this rate proceeding, a portion of the costs associated with those items would be stranded until rate filings were submitted for its regulated affiliates; PEU and PAC. The Company stated that it felt that any such allocations should be deferred until such time as the allocated costs could be reflected in the rate cases of these other regulated affiliates.

Q. What is Staff's reaction to PWW's response?

A. Staff believes that this rate proceeding is the most opportune time to address this issue and thus proposes that the allocation of the unamortized deferred debits as well as any corresponding expense allocations should be reflected in the Company's proposed Step 2. The benefits of this approach would include a somewhat immediate adjustment in PWW's customer rates. Also, for the Company, that reduction would be cushioned by virtue of the fact that it would coincide with a step increase in rates relative to its treatment plant upgrades. As far as the deferred recognition of the stranded costs by PWW's regulated affiliates, PAC currently has a rate proceeding pending before the Commission in DW 08-052 which is scheduled to conclude in the late summer of this year. Staff would not be opposed to considering the inclusion of PAC's share of these allocated costs in that rate proceeding. Staff also believes that PEU should be in a position to make another rate filing with the Commission within approximately one year's time which could also include a request for recovery of its share of these allocated costs.

Q. Has Staff prepared schedules which show the effect of its previously explained recommendations relative to Step One and Step Two?

A. Yes. With regard to Step One, I have included Attachment JPL-4 with my testimony which shows a $1,293,314, or 5.96%, step increase in revenue. For Step Two, I have included Attachment JPL-5 which shows the calculation of an additional $1,004,711, or 4.63%, step increase in revenue. Each attachment is based upon the amounts provided by the Company in its filing as well as its subsequent discovery responses. As I indicated previously, these amounts have neither been finalized by the Company nor audited by the Commission Staff.

VII. ILLUSTRATION OF STEP ONE

Q. Please provide a brief narrative which explains Staff's computations for Step One in Attachment JPL-4.

A. As illustrated on Schedule 1 of Attachment JPL-4, Staff is utilizing the same amount of $7,179,944 proposed by the Company in its filing for net additions to rate base relative to Step One. The 7.07% rate of return utilized by Staff is based upon the direct testimony of David C. Parcell, Staff's cost of capital consultant in this proceeding. An operating income requirement for Step One of $507,622 results when this rate of return percentage is applied to the Company's proposed net additions to rate base. From Schedule 3 of Attachment JPL-4, Staff determined that $273,410 in net additional operating expenses will be recognized by the Company from the installation of its new plant associated with Step One. These additional expenses added to the operating income requirement results in a revenue deficiency before taxes of $781,032. When the federal and state tax income

effect relative to Step One of $512,282 is added to this revenue deficiency, the overall increase in PWW's revenue requirement becomes $1,293,314 which is a 5.96% increase over the Company's test year water revenue of $21,703,068.

Q. It appears from Schedules 3 and 3A of Attachment JPL-4, that Staff made four adjustments to the Company's proposed net operating expenses for Step One. Could you please briefly explain these adjustments?

A. Staff Adjustments # 29 and # 30 stem from the Company's response to Staff Data Request 2-24 in which the Company indicated that in its filing only a half-year of depreciation expense adjustments were reflected relative to the plant additions and retirements resulting from Step One. Therefore, Staff Adjustment # 29 increases depreciation expense by $154,764 for plant additions and Staff Adjustment # 30 decreases depreciation expense by $10,324 for plant retirements, for a net increase in depreciation expense of $144,440. Staff Adjustments # 31 and # 32 are based upon the Company's response to Staff Data Request 2-23 where it was indicated that there was no provision for real estate taxes made in the original filing for the net additions to plant for Step One. Staff Adjustment # 31 provides Staff's calculation of additional property taxes relative to plant additions in the amount of $149,256. Staff Adjustment # 32 shows Staff's calculation of reduced property tax expense associated with plant retirements in the amount of $7,491. Combined, these adjustments result in a net increase in the Company's property tax expense of $141,765.

VIII. ILLUSTRATION OF STEP TWO

Q. Please provide a brief narrative which explains Staff's computations for Step Two as contained in Attachment JPL-5.

A. As illustrated on Schedule 1 of Attachment JPL-5, Staff is utilizing an adjusted amount for net additions to rate base of $4,711,329 relative to Step Two. The 7.07% rate of return utilized by Staff is based upon the direct testimony of David C. Parcell, Staff's cost of capital consultant in this proceeding. An operating income requirement for Step Two of $333,091 results when this rate of return percentage is applied to the adjusted proposed net additions to rate base. From Schedule 3 of Attachment JPL-5, Staff determined that $273,654 in net additional operating expenses will be recognized by the Company relative to Step Two. These additional expenses added to the operating income requirement results in a revenue deficiency before taxes of $606,745. When the federal and state income tax effect relative to Step Two of $397,966 is added to this revenue deficiency, the overall increase in PWW's revenue requirement becomes $1,004,711 which is a 4.63% increase over the Company's test year water revenue of $21,703,068.

Q. Please provide a brief explanation of Staff's adjustments to Rate Base relative to Step Two.

A. The purpose of Staff Adjustment # 33 which reduces plant in service by $25,489 is in order to properly reflect the cost of removal for replaced mains. This adjustment is based upon the Company's response to Staff Data Request 2-24 as is also the case for Staff Adjustment # 34 which reduces accumulated depreciation by $191 relative to the same replaced mains. Staff Adjustment # 35 is based upon the Company's response to Staff Data Request 2-28 and corrects the cost of removal associated with the Merrimack Village Dam by decreasing accumulated depreciation by $157,500. Staff Adjustment #

36 increases the Company's cash working capital by $13,943 relative to an increase in the Company's pension expense of $113,095 which was previously explained in my testimony. Staff Adjustment # 37 represents an allocation of a portion of unamortized deferred debits to the Company's affiliates in the amount of $1,111,821. Staff Adjustment # 38 records the Company's allocated portion of a 2008 Compensation Study in the amount of $18,215 which it had requested approval for in its permanent rates. The basis for Staff Adjustments # 37 and # 38 has been explained previously in my testimony. In an attempt to be equitable to the Company relative to Staff Adjustment # 37, Staff is also proposing Staff Adjustment # 39 in order to also reflect an allocation of a portion of the Company's unfunded FAS 106 and 158 costs to its affiliates in the amount of $213,251.

Q. Would it also be possible for you to provide a brief explanation of Staff's proposed adjustments to the Company's net operating expenses relative to Step Two?

A. As discussed previously, Staff Adjustment # 40 increases PWW's test year pension expense by an amount of $113,095 in order to reflect the 2008 expense level for this cost. Staff Adjustments # 41 and # 42 stem from the Company's response to Staff Data Request 2-24 in which the Company indicated that in its filing only a half-year of depreciation expense adjustments were reflected for the plant additions and retirements resulting from Step Two. Therefore, Staff Adjustment # 41 increases depreciation expense by $116,904 for the Step Two plant additions and Staff Adjustment # 42 decreases depreciation expense by $8,497 for corresponding plant retirements. Staff Adjustment # 43 reduces depreciation expense by $382 resulting from the cost of removal adjustment for replaced mains indicated in the Company's response to Staff Data

Request 2-24. The net increase in depreciation expense that is proposed by Staff is $108,025. Staff Adjustments # 44 and # 45 are related to Staff Adjustments # 37 and # 38, respectively, which have been previously discussed. Staff Adjustment # 44, which reduces annual operating expenses by $7,106, relates to certain unamortized deferred debits for which Staff determined that the corresponding amortization expense for these items was not being appropriately allocated to its affiliates. The purpose of Staff Adjustment # 45 is to recognize PWW's share of the annual amortization expense of the 2008 Compensation Study previously recorded in Staff Adjustment # 38. The net increase in amortization expense being proposed by Staff is $2,001. Staff Adjustments # 46 and # 47 are based upon the Company's response to Staff Data Request 2-23 where it was indicated that there was no provision for real estate taxes made in the original filing for the net additions to plant for Step Two. Staff Adjustment # 46 provides Staff's calculation of the additional property taxes arising from the Step Two plant additions in an amount of $114,961. Staff Adjustment # 47 shows Staff's calculation of the property tax reduction associated with Step Two plant retirements in an amount of $4,393. Combined, these adjustments result in a net increase in the Company's property tax expense of $110,568.

Q. Does this conclude your direct testimony?

A. Yes.

Attachment JPL-1
Schedule 1

DW 08-073
PENNICHUCK WATER WORKS, INC.
REVENUE REQUIREMENT

Rate Base (Sch 2)	$ 77,843,943
Rate of Return	7.07%
Operating Income Requirement	5,503,567
Operating Income (Sch 3)	4,286,369
Revenue Deficiency Before Taxes	1,217,198
Divided by Tax Factor (Sch 1A)	60.39%
Revenue Deficiency	2,015,562
Test Year Water Revenue (Sch 3)	21,703,068
Revenue Requirement	$ 23,718,630
Percent Increase	9.29%

Attachment JPL-1
Schedule 1A

DW 08-073
PENNICHUCK WATER WORKS, INC.
EFFECTIVE TAX FACTOR

Taxable Income	100.00%
Less: NH Business Profits Tax	8.50%
Federal Taxable Income	91.50%
Federal Income Tax Rate	34.00%
Effective Federal Income Tax Rate	31.11%
Add: NH Business Profits Tax	8.50%
Effective Tax Rate	39.61%
Percent of Income Available if No Tax	100.00%
Effective Tax Rate	39.61%
Percent Used as a Divisor in Determining the Revenue Requirement	60.39%
Tax Multiplier	0.65590

Attachment JPL-1
Schedule 2

DW 08-073
PENNICHUCK WATER WORKS, INC.
RATE BASE

	(1) Test Year Average (Co Filing - Tab 13; Sch 3)	(2) Pro-forma Adj's Per Company (Co Filing - Tab 13; Sch 3; Att's A - E)	(3) Pro-forma Test Year (Co Filing - Tab13; Sch 3)	(4) Pro-forma Adj's Per Staff	(5) Sch 2A	(6) Adjusted Rate Base Per Staff
Plant in Service	$ 128,961,502	$ 5,102,806	$ 134,064,308	$ (8,690)	**1-3**	$ 134,055,618
Accumulated Depreciation	(30,924,929)	(360,382)	(31,285,311)	1,454,525	**4-5**	(29,830,786)
Deferred Rental Credit - Hecop III	(132,433)		(132,433)			(132,433)
Acquisition Adjustment - Net	(605,253)		(605,253)			(605,253)
Contributions in Aid of Construction - Net	(22,115,526)		(22,115,526)			(22,115,526)
Net Plant in Service	75,183,361	4,742,424	79,925,785	1,445,835		81,371,620
Cash Working Capital	1,692,044	84,830	1,776,874	(501,590)	**6**	1,275,284
Materials and Supplies	795,357		795,357			795,357
Prepayments	377,515		377,515			377,515
Unamortized Deferred Debits	6,146,122	(94,292)	6,051,830	(19,365)	**7-8**	6,032,465
Customer Advances	(85,544)		(85,544)			(85,544)
Customer Deposits	(173,160)		(173,160)			(173,160)
Deferred Income Taxes	(9,216,029)		(9,216,029)			(9,216,029)
Regulatory Liability	(924,151)		(924,151)			(924,151)
Unamortized Investment Credit	(850,512)		(850,512)			(850,512)
Unfunded FAS 106 and 158 Costs	-	(758,902)	(758,902)			(758,902)
TOTAL RATE BASE	$ 72,945,003	$ 3,974,060	$ 76,919,063	$ 924,880		$ 77,843,943

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO RATE BASE

Adj #			
	PLANT IN SERVICE		
1	To reduce Plant in Service for plant adjustment stemming from prior Staff Audit. (Per Staff Audit Issue # 1)		$ (10,000)
2	To reduce Plant in Service by amount of non-utility advertising expense erroneously recorded as a fixed asset. (Per Staff Audit Issue # 2)		(565)
3	To reinstate asset that was erroneously recorded as retired in the Co's Gen'l Ledger. (Per Staff Audit Issue # 4) (See Staff Adj # 5)		1,875
	Total Adjustments - Plant in Service		$ (8,690)
	ACCUMULATED DEPRECIATION		
4	To record the corresponding pro-forma adjustment to Accumulated Depreciation relative to the Co's calculation on Tab 13; Sch 3; Att A; Ex 4 of their filing regarding retired non-revenue producing plant. (See Tab 13; Sch 3; Att A; Adj IB of Co filing)		$1,456,400
5	To reinstate asset that was erroneously recorded as retired in the Co's Gen'l Ledger. (Per Staff Audit Issue # 4) (See Staff Adj # 3)		(1,875)
	Total Adjustments - Accumulated Depreciation		$1,454,525
	CASH WORKING CAPITAL		
6	To adjust Cash Working Capital in order to reflect Staff's O&M pro-forma adj's as well as the Co's switch from quarterly customer billing to monthly customer billing:		
	Total O & M Expenses (Att JPL-1; Sch 3; Column (6))	$10,343,969	
	X 45 days / 365 days (Reflective of Monthly Customer Billing)	12.33%	
	Cash Working Capital allowance	1,275,284	
	Less: Amount per Company filing (Tab 13; Sch 3 of Co filing)	(1,776,874)	$ (501,590)
	UNAMORTIZED DEFERRED DEBITS		
7	To adjust Co's proforma adj to Unamortized Deferred Debits - Other. (Per Co response to Staff DR 2-13) (See Staff Adj # 26):		
	Adjustment for Berkely/Swart Terrace Study	$ 4,984	
	Adjustment for WTP Sludge Tank Cleaning - 2005	984	$ 5,968
8	To reclassify Co's pro-forma adj for 2008 Compensation Study as a step adjustment item. (See Tab 13; Sch 3; Att B; Adj II C of Co Filing) (See Att JPL-5; Sch 2A; Adj # 38)		(25,333)
	Total Adjustments - Amortization Expense-Other		$ (19,365)
	Net Staff Pro-forma Adjustments to Rate Base		**$ 924,880**

DW 08-073
PENNICHUCK WATER WORKS, INC.
OPERATING INCOME STATEMENT

	(1) 12 Months Ended 12/31/07	(2) Pro-forma Adj's Per Company (Co Filing - Tab 13; Sch 1; Att's A - G)	(3) Pro-forma Per Company (Co Filing - Tab 13; Sch 1)	(4) Staff Pro-forma Adjustments	(5) Sch 3A	(6) Pro-forma Test Year	(7) Revenue Deficiency (Sch 1)	(8) Test Year Pro-forma (Sch 1)
OPERATING REVENUES								
Water Sales	$ 21,312,996	$ 390,072	$ 21,703,068			$ 21,703,068	$ 2,015,562	$ 23,718,630
Water Sales for Resale	933		933			933		933
Other	233,983		233,983	315,036	**9-11**	549,019		549,019
Gain on Disposal of Utility Property	-		-			-		-
Total Operating Revenues	21,547,912	390,072	21,937,984	315,036		22,253,020	2,015,562	24,268,582
OPERATING EXPENSES								
O & M Expenses:								
Production	3,449,914	152,770	3,602,684	241,963	**12-14**	3,844,647		3,844,647
Transmission and Distribution	1,221,403	91,086	1,312,489	(49,350)	**15**	1,263,139		1,263,139
Engineering	540,788	11,023	551,811			551,811		551,811
Customer Accounting	339,031		339,031			339,031		339,031
Administrative and General	5,609,087	543,573	6,152,660	(99,305)	**16-21**	6,053,355		6,053,355
Inter-Division Management Fee	(1,402,374)	(310,922)	(1,713,296)	5,282	**22-24**	(1,708,014)		(1,708,014)
Total O & M Expenses	9,757,849	487,530	10,245,379	98,590		10,343,969	-	10,343,969
Depreciation Exp / Acquisition Adj	3,329,392	290,681	3,620,073	(4,143)	**25**	3,615,930		3,615,930
Amortization Expense - CIAC	(446,433)		(446,433)			(446,433)		(446,433)
Amortization Expense - Other	32,456	6,385	38,841	(18,635)	**26-27**	20,206		20,206
Rent Expense Fit-up Allowance	-		-			-		-
Payroll Taxes	482,351		482,351			482,351		482,351
Real Estate Taxes	1,512,803	599,805	2,112,608	(101,577)	**28**	2,011,031		2,011,031
Taxes - Other	1,200		1,200			1,200		1,200
Total Operating Expenses	14,669,618	1,384,401	16,054,019	(25,765)		16,028,254	-	16,028,254
Net Operating Income Before Income Tax	6,878,294	(994,329)	5,883,965	340,801		6,224,766	2,015,562	8,240,328
Income Taxes:								
NH Business Profits Tax *	565,653	(84,518)	481,135	27,768	**Sch 3B**	508,903	171,323	680,226
Federal Income Taxes *	1,665,435	(309,336)	1,356,099	106,431	**Sch 3B**	1,462,530	627,041	2,089,572
Provision for ITC	(33,036)		(33,036)			(33,036)		(33,036)
Total Income Taxes	2,198,052	(393,854)	1,804,198	134,199		1,938,397	798,364	2,736,761
NET OPERATING INCOME	$ 4,680,242	$ (600,475)	$ 4,079,767	$ 206,602		$ 4,286,369	$ 1,217,198	$ 5,503,567

* Includes deferred taxes

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO REVENUE AND EXPENSES

Adj #								
	PRO-FORMA ADJUSTMENTS TO REVENUES:							
	OTHER WATER REVENUE							
9	To record Net Revenues from Merchandising, Jobbing and Contracts. (Per Co response to Staff DR 1-12)							$ 232,293
10	To record additional pro-forma jobbing revenues. (Per Co response to Staff DR 2-16)							5,308
11	To reflect change in revenue resulting from Co's proposed increase in customer fees (See Att JPL-2):							
		Pro-forma		Actual				
	Meter On/Off Collections	$ 90,763	-	$ 55,328	=	$ 35,435		
	Service Connection Fees	89,600	-	47,600	=	42,000		77,435
	Total Adjustments - Other Water Revenue							$ 315,036
	PRO-FORMA ADJUSTMENTS TO EXPENSES:							
	PRODUCTION							
12	To adjust Co pro-forma for anticipated increase in chemical costs. (Per Co response to Staff DR 2-2):							
	Increase in Chemical Costs per Co's response to Staff DR 2-2					$ 323,837		
	Less: Co pro-forma adj per Tab 13; Sch 1; Att B; Adj III A of Co filing					(20,515)		$ 303,322
13	To adjust purchased power expense relative to the Co's Treatment Plant. (Per Staff Audit Issue # 10)							(55,512)
14	To reduce Maintenance Structures: Source/Supply expense by Ecosystem Project 2006 invoice. (Per Staff Audit Issue # 11)							(5,847)
	Total Adjustments - Production							$ 241,963
	TRANSMISSION and DISTRIBUTION							
15	To reverse Co pro-forma adj for increases in gas and diesel prices. (See Co proforma adj per Tab 13; Sch 1; Att B; Pg 2; Adj II C of Co filing)							$ (49,350)
	ADMINISTRATIVE and GENERAL							
16	To eliminate the salaries of two customer service positions which the Co indicates were not hired. (Per Co responses to Staff DR's 2-15 and 4-4):							
	06/01/08 Customer Service Hiring					$ (34,008)		
	10/01/08 Customer Service Hiring					(37,939)		$ (71,947)

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO REVENUE AND EXPENSES

Adj #			
17	To reduce benefit cost relative to the elimination of two customer service salaries. (See Staff Pro-forma Adj 16):		
	Staff Pro-forma Adj 16:	$ (71,947)	
	Benefits Pro-forma Percentage	38.60%	(27,772)
18	To revise Co's pro-forma adj relative to Regulatory Commission Expense. (Per Co response to OCA DR 1-8):		
	Revised Co Pro-forma (Per response to OCA DR 1-8)	$ 8,778	
	Less: Original Co Pro-forma (Per Tab 13; Sch 1; Att C; Pg 2; Adj IV A of Co filing)	(6,080)	2,698
19	To record additional pro-forma computer maintenance expenses (Per Co response to OCA 1-9):		
	Total additional computer maintenance expenses (Per OCA DR 1-9)	$ 2,403	
	% Allocated to PWW	72.80%	1,749
20	To correct Co's proforma adj to Miscellaneous General Expense. (Per Co response to Staff DR 3-3).		
	Corrected pro-forma adj per Co response to Staff DR 3-3	$ 16,211	
	Less: Co proforma adj per Tab 13; Sch 1; Att C; Pg 2; Adj X A of Co filing	(10,329)	5,882
21	To reduce test year expense by outside service charges. (Per Staff Audit Issue # 14):		
	Investment advisory services	$ (3,640)	
	Costs previously disallowed by NHPUC	(6,276)	(9,916)
	Total Adjustments - Administrative and General Expense		$ (99,305)
	INTER-DIVISION MANAGEMENT FEE		
22	To reduce PCP to PWW Management Fee for Nutter invoices. (Per Staff Audit Issue # 12)		$ (21,901)
23	To reduce PCP to PWW Management Fee relative to remarkenting expense. (Per Staff Audit Issue # 13)		(838)
24	To reduce payroll pro-forma adjustment to reflect elimination of two customer service positions. (See Staff Pro-forma Adj's 16 & 17):		
	Staff Pro-forma Adj 16:	$ (71,947)	
	Staff Pro-forma Adj 17:	(27,772)	
	Total	(99,719)	
	Affiliate Allocation Percentage	28.10%	28,021
	Total Adjustments - Inter-Division Management Fee		$ 5,282

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO REVENUE AND EXPENSES

Adj #			
	DEPRECIATION EXPENSE / ACQUISTION ADJUSTMENT		
25	To correct Co's pro-forma adj to Depreciation Expense. (Per Co response to Staff DR 2-12):		
	Corrected pro-forma adj per Co response to Staff DR 2-12	$ (8,286)	
	Less: Co pro-forma adj per Tab 13; Sch 1; Att E; Adj I D	4,143	$ (4,143)
	AMORTIZATION EXPENSE - OTHER		
26	To adjust Co's pro-forma adj to Amortization Expense - Other. (Per Co response to Staff DR 2-13) (See Staff Adj # 7):		
	Adjustment for Berkely/Swart Terrace Study	$ (4,984)	
	Adjustment for WTP Sludge Tank Cleaning - 2005	(984)	$ (5,968)
27	To reclassify Co's pro-forma adj for 2008 Compensation Study as a step adjustment item. (See Tab 13; Sch 1; Att F; Adj I C of Co filing) (See Att JPL-5; Sch 3A; Adj # 45)		(12,667)
	Total Adjustments - Amortization Expense-Other		$ (18,635)
	REAL ESTATE TAXES		
28	To adjust Co's Real Estate Tax Pro-formas (Att JPL-3)		$ (101,577)
	Net Staff Pro-forma Adjustments to Operating Income before Income Tax Effect		**$ 340,801**

Attachment JPL-1
Schedule 3B

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO INCOME TAXES

INCOME TAXES
To reflect the income tax effect of pro-forma adjustments to revenue and expense:

Pro-forma Adjustments per Staff:	
Water Sales	$ -
Water Sales for Resale	-
Other Revenue	315,036
Gain on Disposal of Utility Property	-
Production Expense	(241,963)
Transmission and Distribution Expense	49,350
Engineering Expense	-
Customer Accounting Expense	-
Administrative & General Expense	99,305
Inter-Division Management Fee	(5,282)
Depreciation Expense / Acquisition Adj	4,143
Amortization Expense - CIAC	-
Amortization Expense - Other	18,635
Rent Expense Fit-up Allowance	-
Payroll Tax Expense	-
Real Estate Tax Expense	101,577
Net Income/(Expense) before Income Tax Resulting from Staff Pro-forma Adjustments	340,801
Add: MA Excise Tax erroneously recorded on Company's Books. (Per Staff Audit Issue # 9)	1,200
Less: New Hampshire Business Profits Tax @ 8.5%	(28,968)
Total State Income Tax Adjustment	(27,768)
Net Income/(Expense) from Staff Pro-forma Adjustments Subject to Federal Income Tax	313,033
Less: Federal income Tax @ 34%	(106,431)
Net Pro-forma Adjustments per Staff	$206,602

Revenue Analysis/Increase in Fees

	PWW No. Meter on/off Collections 2007	Current Fee	Total Revenue 2007	Proposed Fee	Total Revenue
Reg Hours	1906	$ 28.00	$ 53,368.00	$ 46.00	$ 87,676.00
After Hours	49	$ 40.00	$ 1,960.00	$ 63.00	$ 3,087.00
			$ 55,328.00		**$ 90,763.00**
	No. PWW Service Inspection Fee*				
	560	**$ 85.00**	**$ 47,600.00**	**$ 160.00**	**$ 89,600.00**

* Inspection Fees are charged through PWW Jobbing for regulated utilities.

	PEU No. Meter on/off Collections 2007	Current Fee	Total Revenue 2007	Proposed Fee	Total Revenue
Reg Hours	727	$ 28.00	$ 20,356.00	$ 46.00	$ 33,442.00
After Hours	19	$ 40.00	$ 760.00	$ 63.00	$ 1,197.00
			$ 21,116.00		**$ 34,639.00**

	PAC No. Meter on/off Collections 2007	Current Fee	Total Revenue 2007	Proposed Fee	Total Revenue
Reg Hours	154	$ 28.00	$ 4,312.00	$ 46.00	$ 7,084.00
After Hours	0	$ 40.00	$ -	$ 63.00	$ -
			$ 4,312.00		**$ 7,084.00**

	NC No. Meter on/off Collections 2007	Current Fee	Total Revenue 2007	Proposed Fee	Total Revenue
Reg Hours	130	$ 28.00	$ 3,640.00	$ 46.00	$ 5,980.00
After Hours	2	$ 40.00	$ 80.00	$ 63.00	$ 126.00
			$ 3,720.00		**$ 6,106.00**

DW 08-073
PENNICHUCK WATER WORKS, INC.
ANALYSIS OF MUNICIPAL AND STATE REAL ESTATE TAX PRO-FORMA ADJUSTMENT
(Staff Adjustment # 28)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		2008 Municipal Property Taxes Assessed			State School Tax Assessed by Municipalities				
Taxing Entity	Identification #	1'st Issue Billing	2'nd Issue Billing	Total Taxes	Valuation	State School Tax Rate per $1,000		Assessment	Adjusted Property Tax - 2008
Amherst	002-139-000	$ 8,312	$ 20,371	$ 28,683					$ 28,683
	002-026-000	13,109	38,924	52,033					52,033
	012-001-000	460	493	953					953
	016-001-000	534	573	1,107					1,107
	005-007-000	1,792	1,922	3,714					3,714
	005-007-001	205	219	424					424
	016-021-001	1,804	1,935	3,739					3,739
Bedford	8-16-66	12,072	41,236	53,308					53,308
	39-98-85-1	666	675	1,341					1,341
	1-18-A	766	777	1,543					1,543
	26-7-A	1,511	1,531	3,042					3,042
	1-24-1-1	1,043	1,057	2,100					2,100
	3-5-55-1	33	34	67					67
	2-23-3-1	249	252	500					500
	34-28	469	484	953					953
	34-36	97	123	220					220
	34-36-A	1,842	2,215	4,057					4,057
Derry	10-062-020	2,037	2,739	4,775					4,775
	07-047-007	1,628	2,189	3,816					3,816
	07-047-005	1,420	1,909	3,329					3,329
	09-057	1,160	1,526	2,686					2,686
	10-010-A	5,373	7,225	12,599					12,599
	06-105	1,882	2,530	4,412					4,412
	10-098-103	2,309	3,105	5,414					5,414
	13-015-001-054	1,971	2,650	4,621					4,621
	Redfield Estates	-	747	747					747
Epping	040-500-001	1,668	2,294	3,962					3,962
Hollis	033-017	3,092	4,015	7,107					7,107

DW 08-073
PENNICHUCK WATER WORKS, INC.
ANALYSIS OF MUNICIPAL AND STATE REAL ESTATE TAX PRO-FORMA ADJUSTMENT
(Staff Adjustment # 28)

		(1)	(2)	(3)		(4)		(5)		(6)		(7)	(8)
		2008 Municipal Property Taxes Assessed				State School Tax Assessed by Municipalities							
Taxing Entity	Identification #	1'st Issue Billing	2'nd Issue Billing	Total Taxes		Valuation		State School Tax Rate per $1,000				Assessment	Adjusted Property Tax - 2008
Merrimack	2D/000	18,777	22,049	40,826									40,826
	2A/008	212	243	455	^	24,000	*	2.20	/	1,000	=	53	402
	1A/001	4	5	9	^	450	*	2.20	/	1,000	=	1	8
	2C/075	150	172	322	^	17,000	*	2.20	/	1,000	=	37	285
	2C/074	52	59	111	^	5,885	*	2.20	/	1,000	=	13	98
	2C/005	153	177	330	^	17,400	*	2.20	/	1,000	=	38	292
	2C/004	159	182	341	^	18,000	*	2.20	/	1,000	=	40	301
	2B/007	4	5	9	^	449	*	2.20	/	1,000	=	1	8
	2E/032-1	1,487	2,413	3,900									3,900
	1D/001-1	33	39	72	^	3,770	*	2.20	/	1,000	=	8	64
	2D/004-1	63	73	136	^	7,085	*	2.20	/	1,000	=	16	120
Milford	041-000-000-000	6,879	14,246	21,125									21,125
Nashua	26,670	54	55	109	^	6,200	*	2.25	/	1,000	=	14	95
	33,078	39	40	79	^	4,500	*	2.25	/	1,000	=	10	69
	39,921	3,764	3,829	7,594	^	432,700	*	2.25	/	1,000	=	974	6,620
	39,924	67	69	136									136
	39,943	40	41	81	^	4,600	*	2.25	/	1,000	=	10	70
	39,950	37	37	74	^	4,200	*	2.25	/	1,000	=	9	64
	39,958	44	44	88	^	5,000	*	2.25	/	1,000	=	11	77
	39,972	37	37	74	^	4,200	*	2.25	/	1,000	=	9	64
	39,976	43	43	86	^	4,900	*	2.25	/	1,000	=	11	75
	39,977	49	50	98	^	5,600	*	2.25	/	1,000	=	13	86
	39,990	47	48	95	^	5,400	*	2.25	/	1,000	=	12	83
	39,993	124	127	251	^	14,300	*	2.25	/	1,000	=	32	219
	40,037	3,510	3,589	7,099									7,099
	40,101	2,422	2,477	4,899									4,899
	40,110	38	39	77									77
	43,043	868	887	1,755									1,755
	43,138	1,946	1,980	3,926	^	223,700	*	2.25	/	1,000	=	503	3,423
	46,629	314	321	635									635
	46,686	18,264	18,675	36,939									36,939
	46,687	461,678	701,553	1,163,231									1,163,231

DW 08-073
PENNICHUCK WATER WORKS, INC.
ANALYSIS OF MUNICIPAL AND STATE REAL ESTATE TAX PRO-FORMA ADJUSTMENT
(Staff Adjustment # 28)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		2008 Municipal Property Taxes Assessed			State School Tax Assessed by Municipalities				
Taxing Entity	Identification #	1'st Issue Billing	2'nd Issue Billing	Total Taxes	Valuation	State School Tax Rate per $1,000		Assessment	Adjusted Property Tax - 2008
Nashua(cont)	47,421	521	530	1,051 ^	59,900 *	2.25 /	1,000 =	135	916
	47,521	7,804	7,979	15,783					15,783
	47,522	2,462	2,518	4,980					4,980
	47,630	3,476	3,554	7,030					7,030
	47,631	763	776	1,539 ^	87,700 *	2.25 /	1,000 =	197	1,342
	47,632	3,146	3,216	6,362					6,362
	47,835	383	391	774					774
	47,855	24,280	24,825	49,105					49,105
	49,868	833	848	1,681 ^	95,800 *	2.25 /	1,000 =	216	1,466
	50,439	9,774	9,994	19,768					19,768
Newmarket	R7-14W	934	1,023	1,957					1,957
Plaistow	99-40	1,637	2,082	3,719					3,719
Salem	9/5899/1	1,872	2,146	4,018					4,018
2008 Municipal Property Tax Assessment				$ 1,623,980				$ 2,364	$1,621,617
Add: 2008 NH State Utility Property Tax									
	State Valuation		$59,002,154						
	State Tax Rate per $1,000		* $ 6.60						
	2008 State Utility Tax Assessment		/ $ 1,000	389,414					389,414
Total 2008 Property Tax Assessment				$ 2,013,395					$2,011,031
Less: Property Tax Expense - 2007									(1,512,803)
Less: Proforma Adjustment for Property Taxes per Co Filing									(599,805)
Staff Pro-forma Adjustment for Property Taxes									$ (101,577)

^ = Includes a State School Tax assessment by the municipality.

Attachment JPL-4
Schedule 1

DW 08-073
PENNICHUCK WATER WORKS, INC.
REVENUE REQUIREMENT - STEP ADJUSTMENT # 1

Rate Base (Sch 2)	$ 7,179,944
Rate of Return	7.07%
Operating Income Requirement	507,622
Operating Income (Sch 3)	(273,410)
Revenue Deficiency Before Taxes	781,032
Divided by Tax Factor (Att JPL-1; Sch 1A)	60.39%
Revenue Deficiency	1,293,314
Test Year Water Revenue (Sch 3)	21,703,068
Revenue Requirement	$ 22,996,382
Percent Increase	5.96%

(Amounts have neither been finalized by the Company nor audited by Staff.)

Attachment JPL-4
Schedule 2

DW 08-073
PENNICHUCK WATER WORKS, INC.
RATE BASE - STEP ADJUSTMENT # 1

	(1) Rate Base Additions per Original Filing (Tab 14; Sch 3)	(2) Company's Adjustments to Original Filing	(3) Revised Rate Base Additions (Tab 14; Sch 3 - Revised)	(4) Pro-forma Adj's Per Staff	(5) Sch 2A	(6) Adjusted Rate Base Per Staff
Plant in Service	$ 6,356,346	$ -	$ 6,356,346			$ 6,356,346
Accumulated Depreciation	823,598	-	823,598			823,598
Deferred Rental Credit - Hecop III	-	-	-			-
Acquisition Adjustment - Net	-	-	-			-
Contributions in Aid of Construction - Net	-	-	-			-
Net Plant in Service	7,179,944	-	7,179,944	-		7,179,944
Cash Working Capital	-	-	-			-
Materials and Supplies	-	-	-			-
Prepayments	-	-	-			-
Unamortized Deferred Debits	-	-	-			-
Customer Advances	-	-	-			-
Customer Deposits	-	-	-			-
Deferred Income Taxes	-	-	-			-
Regulatory Liability	-	-	-			-
Unamortized Investment Credit	-	-	-			-
Unfunded FAS 106 and 158 Costs	-	-	-			-
TOTAL RATE BASE	$ 7,179,944	$ -	$ 7,179,944	$ -		$ 7,179,944

(Amounts have neither been finalized by the Company nor audited by Staff.)

DW 08-073
PENNICHUCK WATER WORKS, INC.
OPERATING INCOME STATEMENT - STEP ADJUSTMENT # 1

	(1) Oper Inc/Exp Additions per Original Filing (Tab 14; Sch 1)	(2) Company's Adjustments to Original Filing	(3) Revised Oper Inc/Exp Addit's (Tab 14; Sch 1 - Revised)	(4) Staff Pro-forma Adjustments	(5)	(6) Pro-forma Test Year	(7) Revenue Deficiency (Sch 1)	(8) Test Year Pro-forma (Sch 1)
OPERATING REVENUES								
Water Sales	$ -	$ -	$ -			$ -	$ 1,293,314	$ 1,293,314
Water Sales for Resale	-	-	-			-		-
Other	-	-	-			-		-
Gain on Disposal of Utility Property	-	-	-			-		-
Total Operating Revenues	-	-	-	-		-	1,293,314	1,293,314
OPERATING EXPENSES								
O & M Expenses								
Production	-	-	-			-		-
Transmission and Distribution	-	-	-			-		-
Engineering	-	-	-			-		-
Customer Accounting	-	-	-			-		-
Administrative and General	-	-	-			-		-
Inter-Division Management Fee	-	-	-			-		-
Total O & M Expenses	-	-	-	-		-	-	-
Depreciation Exp / Acquisition Adj	166,535	-	166,535	144,440	**29-30**	310,975		310,975
Amortization Expense - CIAC	-	-	-			-		-
Amortization Expense - Other	-	-	-			-		-
Rent Expense Fit-up Allowance	-	-	-			-		-
Payroll Taxes	-	-	-			-		-
Real Estate Taxes	-	-	-	141,765	**31-32**	141,765		141,765
Taxes - Other	-	-	-			-		-
Total Operating Expenses	166,535	-	166,535	286,205		452,740	-	452,740
Net Operating Income Before Income Tax	(166,535)	-	(166,535)	(286,205)		(452,740)	1,293,314	840,574
Income Taxes:								
NH Business Profits Tax *	(14,155)	-	(14,155)	(24,327)	**Sch 3B**	(38,482)	109,932	71,449
Federal Income Taxes *	(51,809)	-	(51,809)	(89,038)	**Sch 3B**	(140,847)	402,350	261,503
Provision for ITC	-		-			-		-
Total Income Taxes	(65,964)	-	(65,964)	(113,366)		(179,330)	512,282	332,952
NET OPERATING INCOME	$ (100,571)	$ -	$ (100,571)	$ (172,839)		$ (273,410)	$ 781,032	$ 507,622

* Includes deferred taxes

(Amounts have neither been finalized by the Company nor audited by Staff.)

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO REVENUE AND EXPENSES - STEP ADJUSTMENT # 1

Adj #			
	PRO-FORMA ADJUSTMENTS TO EXPENSES:		
	DEPRECIATION EXPENSE / ACQUISITION ADJUSTMENT		
29	To adjust depreciation expense in order to recognize a full year of additional depreciation on new plant in service. (Per Co response to Staff DR 2-24)		$ 154,764
30	To adjust depreciation expense in order to recognize a full year of reduced depreciation on retired plant in service. (Per Co response to Staff DR 2-24)		(10,324)
	Total Adjustments - Depreciation Expense / Acquisition Adjustment		$ 144,440
	REAL ESTATE TAXES		
31	To reflect additional property tax expense associated with new plant in service. (Based on Co response to Staff DR 2-23):		
	New Plant in Service - Step Adjustment # 1	$ 6,970,119	
	Less: 1/2 Year Depreciation	(154,764)	
	New Net Plant in Service	$ 6,815,355	
	Combined Tax Rate per $1,000 ($15.30 Nashua / $6.60 St of NH)	x $ 21.90	$ 149,256
32	To reflect reduced property tax expense associated with retired plant in service. (Based on Co response to Staff DR 2-23):		
	Retired Plant in Service - Step Adjustment # 1	$ (613,773)	
	Less: Accumulated Depreciation	271,700	
	New Net Plant in Service	$ (342,073)	
	Combined Tax Rate per $1,000 ($15.30 Nashua / $6.60 St of NH)	x $ 21.90	(7,491)
	Total Adjustments - Real Estate Taxes		$ 141,765
	Net Staff Pro-forma Adjustments to Operating Income before Tax Effect		**$ (286,205)**

(Amounts have neither been finalized by the Company nor audited by Staff.)

Attachment JPL-4
Schedule 3B

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO INCOME TAXES - STEP ADJUSTMENT # 1

INCOME TAXES
To reflect the income tax effect of pro-forma adjustments to revenue and expense:

Pro-forma Adjustments per Staff:	
Water Sales	$ -
Water Sales for Resale	-
Other Revenue	-
Gain on Disposal of Utility Property	-
Production Expense	-
Transmission and Distribution Expense	-
Engineering Expense	-
Customer Accounting Expense	-
Administrative & General Expense	-
Inter-Division Management Fee	-
Depreciation Expense / Acquisition Adj	(144,440)
Amortization Expense - CIAC	-
Amortization Expense - Other	-
Rent Expense Fit-up Allowance	-
Payroll Tax Expense	-
Real Estate Tax Expense	(141,765)
Net Income/(Expense) before Income Tax Resulting from Staff Pro-forma Adjustments	(286,205)
Less: New Hampshire Business Profits Tax @ 8.5%	24,327
Net Income/(Expense) from Staff Pro-forma Adjustments Subject to Federal Income Tax	(261,877)
Less: Federal income Tax @ 34%	89,038
Net Pro-forma Adjustments per Staff	$ (172,839)

(Amounts have neither been finalized by the Company nor audited by Staff.)

Attachment JPL-5
Schedule 1

DW 08-073
PENNICHUCK WATER WORKS, INC.
REVENUE REQUIREMENT - STEP ADJUSTMENT # 2

Rate Base (Sch 2)	$ 4,711,329
Rate of Return	7.07%
Operating Income Requirement	333,091
Operating Income (Sch 3)	(273,654)
Revenue Deficiency Before Taxes	606,745
Divided by Tax Factor (Att JPL-1; Sch 1A)	60.39%
Revenue Deficiency	1,004,711
Test Year Water Revenue (Sch 3)	21,703,068
Revenue Requirement	$ 22,707,779
Percent Increase	4.63%

(Amounts have neither been finalized by the Company nor audited by Staff.)

Attachment JPL-5
Schedule 2

DW 08-073
PENNICHUCK WATER WORKS, INC.
RATE BASE - STEP ADJUSTMENT # 2

	(1) Rate Base Additions per Original Filing (Tab 14; Sch 3)	(2) Company's Adjustments to Original Filing	(3) Revised Rate Base Additions (Tab 14; Sch 3 - Revised)	(4) Pro-forma Adj's Per Staff	(5) Sch 2A	(6) Adjusted Rate Base Per Staff
Plant in Service	$ 7,197,398	$ (2,445,326)	$ 4,752,072	$ (25,489)	**33**	$ 4,726,583
Accumulated Depreciation	954,160	(260,693)	693,467	157,691	**34-35**	851,158
Deferred Rental Credit - Hecop III	-	-	-			-
Acquisition Adjustment - Net	-	-	-			-
Contributions in Aid of Construction - Net	-	-	-			-
Net Plant in Service	8,151,558	(2,706,019)	5,445,539	132,202		5,577,741
Cash Working Capital	-	-	-	13,943	**36**	13,943
Materials and Supplies	-	-	-			-
Prepayments	-	-	-			-
Unamortized Deferred Debits	-	-	-	(1,093,606)	**37-38**	(1,093,606)
Customer Advances	-	-	-			-
Customer Deposits	-	-	-			-
Deferred Income Taxes	-	-	-			-
Regulatory Liability	-	-	-			-
Unamortized Investment Credit	-	-	-			-
Unfunded FAS 106 and 158 Costs	-	-	-	213,251	**39**	213,251
TOTAL RATE BASE	$ 8,151,558	$ (2,706,019)	$ 5,445,539	$ (734,210)		$ 4,711,329

(Amounts have neither been finalized by the Company nor audited by Staff.)

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO RATE BASE - STEP ADJUSTMENT # 2

Adj #			
	PLANT IN SERVICE		
33	To record reduction in plant in service relative to cost of removal of replaced mains. (Per Co response to Staff DR 2-24)		$ (25,489)
	ACCUMULATED DEPRECIATION		
34	To reduce accumulated depreciation relative to cost of removal adjustment for replaced mains. (Per Co response to Staff DR 2-24)		$ 191
35	To correct cost of removal adjustment so as to incluce the cost of removal associated with the Merrimack Village Dam. (Per Co response to Staff DR 2-28)		157,500
	Total Adjustments - Accumulated Depreciation		$ 157,691
	CASH WORKING CAPITAL		
36	To adjust Cash Working Capital in order to reflect Staff's O&M pro-forma adj's as well as the Co's switch from quarterly customer billing to monthly customer billing:		
	Total O & M Expenses (Att JPL-5; Sch 3; Column (6))	$ 113,095	
	X 45 days / 365 days (Reflective of Monthly Customer Billing)	12.33%	
	Cash Working Capital allowance	13,943	
	Less: Amount per Company filing	-	$ 13,943
	UNAMORTIZED DEFERRED DEBITS		
37	To allocate a portion of certain Unamortized Deferred Debits to PWW's affiliates.		
	Deferred Pension Costs (FAS 158)	$ 2,244,921	
	Deferred Post Employment Health Costs (FAS 158)	413,530	
	Deferred Post Retirement Health Costs (FAS 158)	122,254	
	Deferred Asset - SERP	450,893	
	VEBA Trust - Union	363,948	
	VEBA Trust - Non-union	164,951	
	Employee Recruiter Fees	120,177	
	Union Negotiations -- 2006 - 2007	33,258	
	2004 Compensation Study	32,987	
	Synergen Training - 2007	9,739	
	Total	3,956,658	
	Composit Affiliate Allocation Percentage	28.10%	$ (1,111,821)
38	To record Co's portion of 2008 Compensation Study. (See Att JPL-1; Sch 2A; Adj # 8)		
	2008 Compensation Study Cost	$ 38,000	
	Less: Annual Amortization (3 years)	(12,667)	
	Net 2008 Compensation Study	25,333	
	Composit PWW Allocation Percentage	71.90%	18,215
	Total Adjustments - Unamortized Deferred Debits		$ (1,093,606)

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO RATE BASE - STEP ADJUSTMENT # 2

Adj #			
	UNFUNDED FAS 106 AND 158 COSTS		
39	To allocate a portion of Unfunded FAS 106 and 158 Costs to PWW's affiliates.		
	Unfunded FAS 106 and 158 Costs	$ (758,902)	
	Composit Affiliate Allocation Percentage	28.10%	$ 213,251
	Net Staff Pro-forma Adjustments to Rate Base		**$ (734,210)**

(Amounts have neither been finalized by the Company nor audited by Staff.)

DW 08-073
PENNICHUCK WATER WORKS, INC.
OPERATING INCOME STATEMENT - STEP ADJUSTMENT # 2

	(1) Oper Inc/Exp Additions per Original Filing (Tab 14; Sch 1)	(2) Company's Adjustments to Original Filing	(3) Revised Oper Inc/Exp Addit's (Tab 14; Sch 1 - Revised)	(4) Staff Pro-forma Adjustments	(5) Sch 3A	(6) Pro-forma Test Year	(7) Revenue Deficiency (Sch 1)	(8) Test Year Pro-forma (Sch 1)
OPERATING REVENUES								
Water Sales	$ -	$ -	$ -			$ -	$ 1,004,711	$ 1,004,711
Water Sales for Resale	-	-	-			-		-
Other	-	-	-			-		-
Gain on Disposal of Utility Property	-	-	-			-		-
Total Operating Revenues	-	-	-	-		-	1,004,711	1,004,711
OPERATING EXPENSES								
O & M Expenses:								
Production	-	-	-			-		-
Transmission and Distribution	-	-	-			-		-
Engineering	-	-	-			-		-
Customer Accounting	-	-	-			-		-
Administrative and General	-	-	-	113,095	**40**	113,095		113,095
Inter-Division Management Fee	-	-	-			-		-
Total O & M Expenses	-	-	-	113,095		113,095	-	113,095
Depreciation Exp / Acquisition Adj	141,743	(22,288)	119,455	108,025	**41-43**	227,480		227,480
Amortization Expense - CIAC	-	-	-			-		-
Amortization Expense - Other	-	-	-	2,001	**44-45**	2,001		2,001
Rent Expense Fit-up Allowance	-	-	-			-		-
Payroll Taxes	-	-	-			-		-
Real Estate Taxes	-	-	-	110,568	**46-47**	110,568		110,568
Taxes - Other	-	-	-			-		-
Total Operating Expenses	141,743	(22,288)	119,455	333,689		453,144	-	453,144
Net Operating Income Before Income Tax	(141,743)	22,288	(119,455)	(333,689)		(453,144)	1,004,711	551,567
Income Taxes:								
NH Business Profits Tax *	(12,048)	1,894	(10,154)	(28,364)	**Sch 3B**	(38,518)	85,400	46,883
Federal Income Taxes *	(44,096)	6,934	(37,162)	(103,811)	**Sch 3B**	(140,973)	312,566	171,593
Provision for ITC	-		-			-		-
Total Income Taxes	(56,144)	8,828	(47,316)	(132,174)		(179,490)	397,966	218,476
NET OPERATING INCOME	$ (85,599)	$ 13,460	$ (72,139)	$ (201,515)		$ (273,654)	$ 606,745	$ 333,091

* Includes deferred taxes

(Amounts have neither been finalized by the Company nor audited by Staff.)

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO REVENUE AND EXPENSES - STEP ADJUSTMENT # 2

Adj #			
	PRO-FORMA ADJUSTMENTS TO EXPENSES:		
	ADMINISTRATIVE AND GENERAL EXPENSES		
40	To adjust Company's Pension Expense to 2008 level. (See Co response to Staff DR 3-8)		
	2008 Pension Expense	$ 782,273	
	Less: 2007 Pension Expense	(624,978)	
	Increase in Pension Expense	157,295	
	Composit PWW Allocation Percentage	71.90%	$ 113,095
	DEPRECIATION EXPENSE / ACQUISITION ADJUSTMENT		
41	To adjust depreciation expense in order to recognize a full year of additional depreciation on new plant in service. (Per Co response to Staff DR 2-24)		$ 116,904
42	To adjust depreciation expense in order to recognize a full year of reduced depreciation on retired plant in service. (Per Co response to Staff DR 2-24)		(8,497)
43	To reduce accumulated depreciation relative to cost of removal adjustment for replaced mains. (Per Co response to Staff DR 2-24)		(382)
	Total Adjustments - Depreciation Expense / Acquisition Adjustment		$ 108,025
	AMORTIZATION EXPENSE - OTHER		
44	To allocate a portion of amortization expense relative to certain unamortized deferred debits to the Co's affiliates.		
	Union Negotiations -- 2006 - 2007	$ 22,095	
	2004 Compensation Study	2,639	
	Synergen Training - 2007	556	
	Total	25,290	
	Composite affiliate allocation percentage	28.10%	$ (7,106)
45	To record Co's portion of amortization expense relative to 2008 Compensation Study. (See Att JPL-1; Sch 3A; Adj # 27)		
	Annual Amortization: 2008 Compensation Study	$ 12,667	
	Composit PWW Allocation Percentage	71.90%	9,107
	Total Adjustments - Amortization Expense - Other		$ 2,001
	REAL ESTATE TAXES		
46	To reflect additional property tax expense associated with new plant in service.		
	New Plant in Service - Step Adjustment # 2	$ 5,366,261	
	Less: 1/2 Year Depreciation	(116,904)	
	New Net Plant in Service	$ 5,249,357	
	Combined Tax Rate per $1,000 ($15.30 Nashua / $6.60 St of NH)	x $ 21.90	$ 114,961

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO REVENUE AND EXPENSES - STEP ADJUSTMENT # 2

Adj #			
47	To reflect reduced property tax expense associated with retired plant in service.		
	Retired Plant in Service - Step Adjustment # 2	$ (614,189)	
	Less: Accumulated Depreciation	413,603	
	New Net Plant in Service	$ (200,586)	
	Combined Tax Rate per $1,000 ($15.30 Nashua / $6.60 St of NH)	x $ 21.90	(4,393)
	Total Adjustments - Real Estate Taxes		$ 110,568
	Net Staff Pro-forma Adjustments to Operating Income before Income Tax Effect		**$ (333,689)**

(Amounts have neither been finalized by the Company nor audited by Staff.)

Attachment JPL-5
Schedule 3B

DW 08-073
PENNICHUCK WATER WORKS, INC.
PRO-FORMA ADJUSTMENTS TO INCOME TAXES - STEP ADJUSTMENT # 2

INCOME TAXES
To reflect the income tax effect of pro-forma adjustments to revenue and expense:

Pro-forma Adjustments per Staff:	
Water Sales	$ -
Water Sales for Resale	-
Other Revenue	-
Gain on Disposal of Utility Property	-
Production Expense	-
Transmission and Distribution Expense	-
Engineering Expense	-
Customer Accounting Expense	-
Administrative & General Expense	(113,095)
Inter-Division Management Fee	-
Depreciation Expense / Acquisition Adj	(108,025)
Amortization Expense - CIAC	-
Amortization Expense - Other	(2,001)
Rent Expense Fit-up Allowance	-
Payroll Tax Expense	-
Real Estate Tax Expense	(110,568)
Net Income/(Expense) before Income Tax Resulting from Staff Pro-forma Adjustments	(333,689)
Less: New Hampshire Business Profits Tax @ 8.5%	28,364
Net Income/(Expense) from Staff Pro-forma Adjustments Subject to Federal Income Tax	(305,325)
Less: Federal income Tax @ 34%	103,811
Net Pro-forma Adjustments per Staff	$ (201,515)

(Amounts have neither been finalized by the Company nor audited by Staff.)

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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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

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

Q. PLEASE SUMMARIZE YOUR EDUCATION BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I hold B.A. (1969) and M.A. (1970) degrees in economics from Virginia Polytechnic Institute and State University (Virginia Tech) and a M.B.A. (1985) from Virginia Commonwealth University. I have been a consulting economist with Technical Associates since 1970. I have provided cost of capital testimony in public utility ratemaking proceedings dating back to 1972. In connection with this, I have previously filed testimony and/or testified in over 400 utility proceedings before more than 40 regulatory agencies in the United States and Canada. Appendix 1 provides a more complete description of my education and relevant work experience.

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

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

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

A. Yes, I have prepared one exhibit, identified as Schedule 1 through Schedule 13. This exhibit was prepared either by me or under my direction. The information contained in this exhibit is correct to the best of my knowledge and belief.

II. RECOMMENDATIONS AND SUMMARY

Q. WHAT ARE YOUR RECOMMENDATIONS IN THIS PROCEEDING?

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

	Percent	Cost	Return
Long-Term Debt	57.78%	5.30%	3.06%
Common Equity	42.22%	9.00-10.00%	3.80-4.22%
Total	100.00%		6.86-7.28%
			7.07% mid-point

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

Q. PLEASE SUMMARIZE YOUR COST OF CAPITAL ANALYSES AND RELATED CONCLUSIONS FOR PWW.

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

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

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

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

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

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

III. ECONOMIC/LEGAL PRINCIPLES AND METHODOLOGIES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IV. GENERAL ECONOMIC CONDITIONS

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

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

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

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

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

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

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

Business Cycle	Expansion Cycle	Contraction Period
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

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

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

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

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

Q. WHAT HAVE BEEN THE TRENDS IN INTEREST RATES?

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

During the past several years, long-term interest rates have remained low by historic standards. During the 2001 recession and early in the succeeding expansion, the 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.

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

V. PENNICHUCK'S OPERATIONS AND RISKS

Q. PLEASE SUMMARIZE PWW AND ITS OPERATIONS.

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

Q. PLEASE DESCRIBE PC.

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

- **Pennichuck Water Works, Inc.** ("PWW") our principal subsidiary, was established in 1985 and services the City of Nashua, New Hampshire and 10 surrounding New Hampshire municipalities located in southern New Hampshire with an estimated population of 110,000, almost 10% of the population of the State of New Hampshire.

- **Pennichuck Water Service Corporation** ("PWSC") is in the contract operations field. Currently, PWSC has operations and management agreements with the towns of Hudson, NH and Salisbury and Hyannis, MA. PWSC is the certified operator for many non-community water systems, providing laboratory testing, monitoring and consulting services.

- **Pennichuck East Utility, Inc.** ("PEU") was organized in 1998 and serves 15 communities most of which are located in southern and central New Hampshire.

- **Pittsfield Aqueduct Company** which was acquired in 1998 serves customers in Pittsfield, New Hampshire, as well as three other communities in central and northern New Hampshire.

- **The Southwood Corporation** is engaged in real estate management and commercialization activities. Southwood's holdings include approximately 450 acres of developable land located in Nashua and Merrimack New Hampshire.

Q. WHAT ARE THE SEGMENT RATIOS OF PC?

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

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

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

Q. WHAT ARE THE CURRENT BOND RATINGS OF PC?

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

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

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

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

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

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

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

VI. CAPITAL STRUCTURE AND COST OF DEBT

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

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

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

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

Q. HOW HAVE YOU EVALUATED THE CAPITAL STRUCTURE OF PWW AND PC?

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

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

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

	Pennichuck Water Works	Pennichuck Corporation
2003	47.9%	52.5%
2004	49.9%	52.9%
2005	51.0%	52.4%
2006	49.0%	48.0%
2007	40.9%	41.3%
Nov. 30, 2008	42.3%	42.5%

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

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

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

Year	Value Line Water Group	AUS Utility Reports
2003	46%	46%
2004	52%	50%
2005	49%	48%
2006	50%	50%
2007	51%	50%

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

Q. WHAT CAPITAL STRUCTURE RATIOS HAS PWW REQUESTED IN THIS PROCEEDING?

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

Q. DO YOU AGREE WITH PWW'S REVISED COST OF DEBT METHODOLOGY?

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

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

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

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

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

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

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

VII. SELECTION OF PROXY GROUPS

Q. HOW HAVE YOU ESTIMATED THE COST OF COMMON EQUITY FOR PWW?

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

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

VIII. DISCOUNTED CASH FLOW ANALYSIS

Q. WHAT IS THE THEORY AND METHODOLOGICAL BASIS OF THE DISCOUNTED CASH FLOW MODEL?

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

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

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

where: K = discount rate (cost of capital)
P = current price
D = current dividend rate
G = constant rate of expected growth

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

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

Q. WHAT DO YOU CONCLUDE FROM YOUR DCF ANALYSES?

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

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

IX. CAPITAL ASSET PRICING MODEL ANALYSIS

Q. PLEASE DESCRIBE THE THEORY AND METHODOLOGICAL BASIS OF THE CAPITAL ASSET PRICING MODEL.

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

Q. HOW IS THE CAPM DERIVED?

A. The general form of the CAPM is:

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

where: K = cost of equity

R_f = risk free rate

R_m = return on market

β = beta

R_m-R_f = market risk premium

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

Q. WHAT GROUPS OF COMPANIES HAVE YOU UTILIZED TO PERFORM YOUR CAPM ANALYSES?

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

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

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

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

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

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

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

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

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

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

	S&P 500	L-T Gov't Bonds	Risk Premium
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:

	Mean	Median
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 PWW is also 8½ percent to 9 percent.

X. COMPARABLE EARNINGS ANALYSIS

Q. PLEASE DESCRIBE THE BASIS OF THE CE METHODOLOGY.

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

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

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

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

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

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

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

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

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

Q. PLEASE DESCRIBE YOUR CE ANALYSIS.

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

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

	Historic		Prospective
Group	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%

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

Q. HAVE YOU ALSO REVIEWED EARNINGS OF UNREGULATED FIRMS?

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

Q. HOW CAN THE ABOVE INFORMATION BE USED TO ESTIMATE THE COST OF EQUITY FOR PWW?

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

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

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

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

XI. RETURN ON EQUITY RECOMMENDATION

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR THREE COST OF EQUITY ANALYSES.

A. My three methodologies produce the following:

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

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

XII. TOTAL COST OF CAPITAL

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

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

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

A. Yes, it does. Schedule 12 shows the pre-tax coverage that would result if PWW earned the mid-point of my cost of capital recommendation. As the results indicate, the mid-point of my recommended range would produce a coverage level within the benchmark range for an A rated utility. In addition, the debt ratio (which reflects the capital structure 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?

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

Q. PLEASE BEGIN WITH HIS DCF MODEL AND CONCLUSIONS.

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

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

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

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

A. No, I do not.

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

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

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

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

> For the most part, despite providing limited incentives for board members to safeguard shareholder interest, this paradigm has worked well. We are fortunate for financial markets have had no realistic alternative other than to depend on the chief executive Division to ensure an objective evaluation of the prospects of the corporation. Apart from a relatively few large institutional investors, not many existing or potential shareholders have the research capability to analyze corporate reports and thus judge the investment value of a corporation. This vitally important service has become dominated by firms in the business of underwriting or selling securities.
>
> But, **as we can see from recent history, long-term earnings forecasts of brokerage-based securities analysts, on average, had been persistently overly optimistic. Three-to five-years earnings forecasts for each of the S&P 500 corporations, compiled from projections of securities analysts by I/B/E/S, averaged almost 12 percent per year between 1985 and 2001. Actual earnings growth over the period averaged about 9 percent.**
>
> Perhaps the last sixteen years for which systematic data have been available are a historic aberration. But the persistence of the bias year after year suggests that it more likely results, at least in part, from the proclivity of firms that sell securities to retain and promote analysts with an optimistic inclination. Moreover, the bias apparently has been especially large when the brokerage firm issuing the forecast also serves as an underwriter for the company=s securities.
> (Emphasis added).

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

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

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

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

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

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

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

Q. PLEASE DESCRIBE YOUR DISAGREEMENTS WITH MR. WALKER'S CAPM ANALYSIS.

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

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

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

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

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

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

Q. PLEASE DESCRIBE MR. WALKER'S RISK PREMIUM METHODOLOGY AND CONCLUSIONS.

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

Q. PLEASE DESCRIBE YOUR DISAGREEMENTS WITH MR. WALKER'S RISK PREMIUM ANALYSIS.

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

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

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

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

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

Q. DOES THIS CONCLUDE YOUR PRE-FILED TESTIMONY?

A. Yes, it does.

Exhibit___(DCP-1)
Schedule 1

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	Unemployment 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	$20,848,718	$0
	47.9%	52.1%	0.0%
	47.9%	52.1%	
2004	$20,370,404	$20,490,163	$0
	49.9%	50.1%	0.0%
	49.9%	50.1%	
2005	$36,927,977	$35,458,105	$10,000
	51.0%	49.0%	0.0%
	51.0%	49.0%	
2006	$39,919,799	$41,624,883	$0
	49.0%	51.0%	0.0%
	49.0%	51.0%	
2007	$40,258,454	$58,164,687	$0
	40.9%	59.1%	0.0%
	40.9%	59.1%	
Nov. 30, 2008	$41,462,366	$56,542,054	$0
	42.3%	57.7%	0.0%
	42.3%	57.7%	

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

Source: Response to Staff 2-35.

Exhibit___(DCP-1)
Schedule 5

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 Utilitly Reports.

PROXY WATER UTILITIES
DIVIDEND YIELD

COMPANY	DPS	December 2008 - February 2009 HIGH	LOW	AVERAGE	YIELD
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.

Exhibit___(DCP-1)
Schedule 8

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 Grou	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%
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	10.9%	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%
Artesian 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 Grou	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, In	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%	8.8%	10.6%	8.7%			
SJW Corporation	11.8%	11.8%	9.6%	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 Grou	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 Grou	147%	172%	157%	140%	160%	191%	207%	202%	186%	201%	199%	189%	218%	264%	223%	219%	176%	219%
Connecticut Water Service, Ir	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.

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	42.22%	9.50%	4.01%	6.69%	(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.

Exhibit___(DCP-1)
Schedule 13

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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