

AQUA PENNSYLVANIA, INC.

INDEX TO DIRECT TESTIMONY

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AP STATEMENT NO. 1

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

AQUA PENNSYLVANIA, INC.

DOCKET NO. R-2018-3003068

**DIRECT TESTIMONY OF
WILLIAM C. PACKER**

**With Regard To
The Company's Need for Rate Relief, Overview of the Principal Accounting Exhibits
Certain Expense Claims, Rate Base Claims, Rate Design, Proposed Capitalization Ratios,
Return on Equity Considerations,
And Various Other Matters**

August 17, 2018

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1 **I. INTRODUCTION AND PURPOSE OF TESTIMONY**

2 **Q. What is your name and business address?**

3 A. William C. Packer. My business address is 762 W. Lancaster Avenue, Bryn Mawr,
4 Pennsylvania 19010.

5 **Q. By whom are you employed and in what capacity?**

6 A. I am employed by Aqua Pennsylvania, Inc. (“Aqua PA” or the “Company”) as Vice
7 President – Controller. In addition, I oversee certain financial operations for Aqua PA,
8 and Aqua New Jersey, Inc. (“Aqua NJ”).

9 **Q. Please describe your education and business experience.**

10 A. I graduated from the Richard Stockton College of New Jersey in 1998 with a Bachelor of
11 Science degree in Business Studies with a concentration in Accounting. In 1998, I joined
12 GE Capital Mortgage Services Inc. as a Staff Accountant. In September 1999, I joined
13 New Jersey American Water Company as a General Staff Accountant responsible for
14 financial statement preparation, account reconciliation, financial support for rate cases,
15 and account analysis. In September 2001, I was transferred to American Water Works
16 Service Company’s (“American”) Shared Services operation located in Mt. Laurel, New
17 Jersey. I was employed there for four years in a variety of positions, including Senior
18 Fixed Assets/Job Cost Accountant, Financial Support Analyst, and Accounting
19 Supervisor Fixed Assets. At American, I had the opportunity to support the rate-making
20 process by working closely with operating subsidiaries in 23 states preparing schedules
21 and exhibits and answering interrogatories.

22 In March 2005, I joined Aqua NJ where I served as Assistant Controller until
23 December 2006 when I transferred to Aqua America. In July 2008, I was promoted to

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1 the position of Mid-Atlantic Manager of Rates. I was promoted to Regional Controller
2 for Aqua PA and Aqua NJ in October 2012. In April 2017, I was promoted to my current
3 position of Vice President – Controller of Aqua PA.

4 In addition to my corporate experience, I am currently serving in my third term as
5 a Councilman in the Borough of Woodbury Heights, New Jersey. In this role, I currently
6 serve as the Chairman of the Finance, Administration, and Personnel committee and as a
7 member of the Public Safety and Street/Roads committees. The Borough of Woodbury
8 Heights is one of 565 municipalities in the state and has a population of approximately
9 3,000.

10 **Q. What are your duties as Vice President - Controller?**

11 A. As Controller, I oversee all financial accounting and reporting activities of Aqua PA. My
12 responsibilities also include oversight of all regulatory filings including base rate cases,
13 surcharges, and other compliance filings. I report directly to the Chief Accounting
14 Officer of Aqua America, who reports directly to the Chief Financial Officer.

15 **Q. What is the purpose of your testimony?**

16 A. The purpose of my testimony is as follows: (1) to explain the Company's need for rate
17 relief; (2) to identify and describe the principal accounting exhibits (AP Exhibits 1-A and
18 1-B) submitted in support of Aqua PA's proposed rate increase for water and wastewater
19 operations, respectively; (3) to explain and support the derivation of certain Company
20 expense and rate base claims; (4) to describe any major changes or other matters related
21 to rate structure and rate design; (5) to describe the Company's proposed capital
22 structure; (6) to recommend the appropriate return on equity to be utilized in this
23 proceeding in light of the analysis of Mr. Paul R. Moul (AP Statement No. 4); (7) to

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1 provide an overview proposed Purchased Water and Energy Adjustment mechanisms; (8)
2 to address return on equity considerations (9) to discuss the Company's satisfaction of the
3 commitments it made in the settlement of certain issues in its last water base rate case.

4 **Q. For which of the Company's exhibits are you responsible?**

5 A. I am responsible for the primary accounting exhibits for water and wastewater operations,
6 respectively, AP Exhibits 1-A and 1-B, and Exhibit 2, which supports the Company's
7 labor expense claims. In addition, I oversaw and assisted in the preparation of the backup
8 volumes that contain responses to the Pennsylvania Public Utility Commission's ("PUC"
9 or the "Commission") standard rate case filing requirements with respect to: A. Statement
10 of Income, B. Operating Revenues, C. Operating Expenses, D. Taxes, E. Rate Base, G.
11 Rate of Return, H. Rate Structure, J. Balance Sheet, and K. Other Data.

12 style="text-align:center">**II. AQUA PA'S NEED FOR RATE RELIEF**

13 **Q. Why is Aqua PA seeking rate relief at this time?**

14 A. The Company's last water base rate case was filed nearly seven years ago. Rates
15 established in that case went effective on June 8, 2012. The Company has not filed a
16 base rate increase for its wastewater operations since October 29, 2010. Since that time,
17 the Company invested nearly \$1.4 billion in utility infrastructure through March 31, 2018
18 and another \$800 million approximately is projected to be invested through the fully
19 projected test year ("FPFTY") ending March 31, 2020.

20 The Company was able to support this level of investment without increasing its
21 base rates and for a majority of this time period without implementing a Distribution
22 System Improvement Charge ("DSIC") because of its decision to adopt a change to its
23 method of tax accounting with regard to units of property. This change allowed the

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1 Company to deduct certain expenditures that were previously capitalized for tax
2 accounting purposes. The change in method of accounting for repairs is described in
3 more detail in the direct testimony of William Jerdon (AP Statement No. 7). Pursuant to
4 the terms of the settlement of the Company's 2011 water base rate case, the Company
5 flowed-through the tax effects of such repairs deductions for book and ratemaking
6 purposes.

7 The settlement of the Company's 2011 base rate case also provided that the
8 Company would notify the Commission and the statutory parties if it decided to change
9 its method of accounting to treat certain expenditures as deductible repairs. Accordingly,
10 at the end of 2012, the Company concluded its analysis of the units of property it would
11 use under its changed method of tax for its 2012 tax year. The change, combined with
12 the use of flow-through accounting, allowed the Company to reduce its Federal and State
13 income taxes. The Company, in its December 2012 DSIC surcharge filing, reduced its
14 DSIC from its then-effective rate of 2.82% to 0.00%. The reduction of the DSIC was
15 done on a forward-looking basis in anticipation of exceeding the DSIC allowable return
16 on equity.

17 In May of 2013, the Company notified the Commission and statutory parties that:
18 (1) beginning in tax year 2013, it would begin to amortize the Internal Revenue Code
19 Section 481(a) adjustment (the "catch-up" adjustment that is described in more detail by
20 Mr. Jerdon); and (2) it would not file a base rate case in November 2013 as was
21 anticipated at the time the Company's 2011 water rate case was filed.

22 Because of the reduction in Federal and State tax expense that resulted from the
23 Company's decision to change its method of accounting to deduct capitalized repairs and

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1 the flow-through of the tax effect of those deductions discussed in the terms of the
2 settlement of its 2011 base rate case, both the Company and customers benefitted.
3 Notably, the Company was able to avoid charging a DSIC and, keep customers' base
4 rates stable for a period of almost seven years, while also supporting its investment in
5 nearly \$2.2 billion of infrastructure as projected through the end of the FPFTY in this
6 case.

7 **Q. Please describe the Company's level of investment since the last rate case?**

8 A. Since the end of its last water rate case, the Company's annual capital expenditure
9 program for water and wastewater operations has been approximately \$300 million
10 annually. Indeed, the Company had been investing in new and replacement infrastructure
11 for many years at an accelerated rate in order to proactively address aging infrastructure
12 and evolving regulatory requirements. The accelerated levels of investment, particularly
13 since the establishment of the DSIC in 1996, have enabled significant enhancements to
14 the Company's utility infrastructure. As a result, main breaks and water quality
15 complaints have been reduced and the Company's unaccounted for water metrics have
16 been improving, particularly for smaller acquired systems.

17 Beginning in 2019, the Company's capital expenditure program investment level,
18 while still above depreciation, will reflect a more normalized level of investment that is
19 closer to the investment levels experienced prior to 2016. The lowering of the
20 Company's overall capital expenditures as compared to historical patterns of investment
21 will result in a concomitant reduction in the Company's annual tax repair deductions for
22 the FPFTY and, therefore, an increase in its current Federal and State income tax

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1 expense. The tax effect of this reduction in repair deductions is reflected in the
2 Company's revenue requirement in this case.

3 Considering the investments that have been made, the Company need for rate
4 relief includes recovery for an increase in annual depreciation expense, which is further
5 explained and supported in the testimony of Company witness John Spanos, AP
6 Statement No. 6.

7 **Q. What are some of the other factors driving the Company's need for rate relief?**

8 A. While there are several factors driving the need for rate relief, I want to highlight two that
9 are of particular importance, namely, a continuing trend of declining per-customer water
10 usage and the historically low returns produced by the Company's wastewater operations.

11 The rates established by the settlement of the Company 2011 rate case were
12 designed to produce approximately \$425 million of annual water sales revenue. The
13 approved rates were designed to achieve that level of revenues based on pro forma water
14 sales of approximately 37 billion gallons annually. Since 2011, the Company's annual
15 sales have fallen to as low as 33.8 billion gallons or a compound annual growth rate of
16 approximately negative 1.3%. About 70% of the Company's revenues come from
17 volumetric (per gallon) charges, thus, the Company has not been able to realize the level
18 of revenue that the rates established in that case were intended to produce. The declining
19 trend of overall sales, which is net of increases in annual sales due to organic growth and
20 the acquisition of new systems, has been experienced since the early 1970s. In this case,
21 the Company has employed water sales levels used to develop its pro forma revenues that
22 properly reflect the continuing trend of declining per-customer usage. The adjustments

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1 necessary to reflect the effect of declining usage on the Company's overall sales level is
2 supported by Company witness Paul Herbert in AP Statement No. 5.

3 **Q. Please elaborate on the need for rate relief related to the Company's wastewater**
4 **systems.**

5 A. In regard to wastewater, Aqua PA began to provide this service in 1996, with the
6 acquisition of the Little Washington Service Area. Since then, Aqua PA as acquired and
7 rehabilitated many small, troubled wastewater systems and, currently, furnishes
8 wastewater service to approximately 20,000 customers. While small in comparison to the
9 Company's water utility business, which services approximately 430,000 customers, the
10 wastewater business requires a considerable amount of investment and is a business
11 expected to increase in size materially as the Company follows the Commission's
12 policies on consolidation and assists the Commonwealth with the problems of small,
13 troubled and non-viable wastewater systems.

14 Aqua Wastewater (or its corporate predecessors) began filing wastewater rate
15 cases in the 2008 – 2010 timeframe, when it also began the process of consolidating
16 many individual systems throughout the Commonwealth with the goal of being able to
17 file a single rate case on a consolidated basis for all of its wastewater operations. That
18 goal has been achieved in this case with a single revenue requirement study
19 encompassing all of Aqua Wastewater's operations in one filing.

20 Notably, notwithstanding Aqua Wastewater's filing of base rate cases in the past,
21 the historical returns for its wastewater operations have been inadequate by any
22 reasonable measure. In fact, the returns on equity have been less than 2.50% on average
23 over the period from 2003 to 2017. The Company's request for rate relief is necessary to

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1 provide a reasonable opportunity to have its wastewater operations earn a fair rate of
2 return.

3 **Q. Please explain the Company's efforts to reduce its overall borrowing costs?**

4 A. Aqua PA historically has had, and currently has, a solid A+ credit rating from Standard
5 and Poor's, which results in a lower cost of borrowing. Given its favorable credit rating
6 and the opportunity afforded by the historically low interest rate environment that has
7 prevailed since its last water base rate case, the Company has proactively taken advantage
8 of long-term debt with interest rates in the 4.0% to 4.5% range for the significant level of
9 investments it made through the end of the historic test year ("HTY") in this case (\$1.4
10 billion) when its capital investment program was at its peak. The Company is planning to
11 continue to use the relatively low interest rate environment to lock in favorable
12 borrowing costs for the additional \$800 million that it will invest during the future test
13 year ("FTY") and the FPFTY in this case. In addition, as it has done historically, the
14 Company has continued to refinance callable/expiring long term debt at lower rates. As a
15 result, the Company has been able utilize very low cost of debt rates for the next 20 to 30
16 years for a large portion of its rate base. The beneficial results of the Company's prudent
17 financing and refinancing efforts since its last water base rate case are exhibited by the
18 reduction in its weighted average cost rate of long term debt from 5.41% in its 2011 case
19 to 4.43% as forecasted for the FPFTY in this case. This reduction in embedded long-
20 term debt costs results in annual savings to customers of approximately \$16 million,
21 based on the Company's 47.15% long-term debt ratio.

22

23

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1 Shortly after the Company’s 2011 rate case concluded, BCWSA notified the Company
2 that it would implement a series of future rate increases over several years that,
3 cumulatively, would produce a projected future cost to Aqua PA of almost \$17 million
4 annually to purchase approximately 2.7 billion gallons of water from BCSWA. The
5 Company studied the available alternatives and determined that the projected increases
6 quickly made it economically feasible for the Company to invest approximately \$50
7 million to replace BCWSA with a Company-owned source of water supply. In 2017, the
8 Company’s last contract with BCWSA expired and the Company is now supplying its
9 own water at a cost of approximately \$7.9 million annually, which includes the return on
10 and return of its investment in the source of water supply that replaced BCWSA. In
11 summary, this project reduced the cost of service for the Company and ultimately its
12 customers.

IV. PRINCIPAL ACCOUNTING EXHIBIT

14 **Q. Were the exhibits entitled “Aqua Pennsylvania, Inc., Exhibit 1-A, Revenue, Expense**
15 **and Rate Base Claims” and “Aqua Pennsylvania, Inc., Exhibit 1-B, Revenue,**
16 **Expense and Rate Base Claims” prepared by you or under your supervision?**

17 A. Yes, they were.

18 **Q. Please explain the content of Exhibits 1-A and 1-B.**

19 A. Exhibits 1-A and 1-B are being submitted in support of Aqua PA’s proposed rate increase
20 for water and wastewater operations, respectively. They present the Company’s pro
21 forma revenue, expense and rate base data based on HTY (March 31, 2018), FTY (March
22 31, 2019), and FPFTY (March 31, 2020). Data for the HTY were obtained from the
23 Company’s books and records. For the FTY, revenues are based on the estimated

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1 number of customers served as of March 31, 2019. Correspondingly, for the FPFTY,
2 revenues are based on the estimated number of customers served as of March 31, 2020.
3 Operating expenses have been similarly adjusted to reflect, for the most part, FTY and
4 FPFTY-end conditions. The Company's claimed rate base includes its estimated net
5 Utility Plant in Service at March 31, 2019 and March 31, 2020.

6 **Q. Do you anticipate the need to make additional adjustments to the data set forth in**
7 **Exhibits 1-A or 1-B?**

8 A. Not at this time. However, in the course of this proceeding, further adjustments or
9 revisions may be called for based upon, for example, substituting known and experienced
10 data for estimates or correcting inadvertent errors.

11 **Q. Does the Company propose to submit revised accounting exhibits to reflect any such**
12 **adjustments or revisions?**

13 A. Yes. As it has consistently done in previous base rate proceedings, the Company will
14 submit, during the rebuttal phase of this case, exhibits to be identified as Exhibit 1-A (a)
15 and Exhibit 1-B (a), which will correct any errors that may be identified, incorporate
16 known changes and adopt any other appropriate adjustments that come to the Company's
17 attention during the litigation process.

18 **Q. You indicated that the Company submitted data for HTY, FTY and FPFTY. What**
19 **data set will the Company principally rely upon to support its proposed revenue**
20 **increase?**

21 A. The Company will rely principally upon the data for its FPFTY. This is the first base rate
22 proceeding by the Company employing the FPFTY data since Act 11 of 2012 amended

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1 Section 315 of the Public Utility Code, 66 Pa. C.S. § 315, to allow a utility to utilize
2 either a FTY or a FPFTY when filing a base rate case.

3 **Q. How were the FTY and FPFTY data that appear in Exhibits 1-A and 1-B**
4 **developed?**

5 A. Exhibits 1-A and 1-B were, for the most part, developed in the same manner that the
6 Company has used in numerous prior cases, with the addition of data for a FPFTY ending
7 March 31, 2020. The actual results for the year ended March 31, 2018, as taken from the
8 Company's books and records, were used as the starting point for purposes of developing
9 projected revenue and expense levels anticipated as of March 31, 2019 and March 31,
10 2020. Specific HTY, FTY and FPFTY rate adjustments are set forth in both of the
11 referenced exhibits. The FTY capital additions and retirements, described in the Rate
12 Base section of my testimony, were added to the Utility Plant in Service at March 31,
13 2018 to arrive at the FTY amount. Correspondingly, the FPFTY capital additions and
14 retirements were added to the Utility Plant in Service at March 31, 2019 to arrive at the
15 FPFTY amount. The Utility Plant in Service, Accumulated Depreciation, Customer
16 Advances for Construction ("CAC"), and Contributions In Aid Of Construction
17 ("CIAC") for the HTY, FTY, and FPFTY are shown in Exhibits 6-A and 6-B, Parts I, II,
18 and III and summarized on Exhibits 1-A and 1-B on Schedules G-1, G-6, and G-7,
19 respectively.

20 **Q. Mr. Packer, please explain the data on Schedule A-2 of Exhibit 1-A and 1-B.**

21 A. Schedule A-2, of Exhibit 1-A and Exhibit 1-B shows the number of customers served at
22 March 31, 2018 and anticipated to be served at March 31, 2019 and March 31, 2020 by
23 customer classification. Aside from most fire hydrants, Schedule A-2 of Exhibit 1-A

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1 indicates that the bills of most existing metered accounts and some newly-acquired
2 metered accounts will be increased or decreased by Tariff Water-PA P.U.C. No. 2. In
3 addition, Schedule A-2 of Exhibit 1-B shows the bills of some metered accounts will be
4 increased or decreased by Tariff Sewer-PA P.U.C. No. 2.

V. OPERATING EXPENSES

Q. What is shown on Schedule C-3 of Exhibits 1-A and 1-B?

7 A. This schedule summarizes the adjustments to operating expenses under present rates, the
8 details of which are shown on Schedules C-4.1 through C-10.1 in Exhibit 1-A and
9 schedules C-4.1 through C-10.2 in Exhibit 1-B. Most of these adjustments are self-
10 explanatory. Additional supporting information is included in the back-up books entitled
11 “Balance Sheet” and “Operating Expense”. As shown in Schedule C-3 of Exhibit 1-A,
12 these adjustments result in a net increase in HTY operating expenses of \$961,808, in FTY
13 operating expenses of \$2,165,367 and in FPFTY operating expenses of \$3,971,342. As
14 shown in Schedule C-3 of Exhibit 1-B, these adjustments result in a net increase in HTY
15 operating expenses of \$87,076, in FTY operating expenses of \$395,838, and in FPFTY
16 operating expenses of \$328,570. I would note that these same adjustments are carried
17 forward to the third, fifth, and seventh columns in Schedule A-1 of Exhibits 1-A and 1-B.

**Q. Mr. Packer, are you sponsoring each of the expense adjustments noted in Schedule
C-3 of Exhibit 1-A and 1-B?**

A. No. The witnesses who are responsible for the expense adjustments are as follows:

EXPENSE ADJUSTMENT	SCHEDULE	RESPONSIBLE WITNESS	EXHIBIT(S)
General Price Level Adjustment	C-4.1	E. Feeney	1-A and 1-B
Uncollectible Accounts	C-4.2	E. Feeney	1-A and 1-B

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Additional Cost of Serving Customers	C-4.3	R. Marquis	1-A
Rate Case Expense	C-4.4	W. Packer	1-A and 1-B
Payroll	C-4.5	W. Packer	1-A and 1-B
Insurance Expense	C-4.6	E. Feeney	1-A and 1-B
Management Service & Sundry	C-4.7	W. Packer	1-A and 1-B
Customer Service & Sundry	C-4.8	W. Packer	1-A and 1-B
Miscellaneous Adjustment	C-4.9	W. Packer	1-A and 1-B
Specific Expenses Not Subject To Inflation	C-4.10	E. Feeney	1-A and 1-B
Amortization of New Positive Acquisition Adjustments	C-5.1	R. Marquis	1-A and 1-B
Amortization of New Negative Acquisition Adjustments	C-5.2	R. Marquis	1-A and 1-B
Purchased Power Expense	C-6.1	E. Feeney	1-A and 1-B
Chemical Expense	C-6.2	E. Feeney	1-A and 1-B
Purchased Water Expense	C-7.1	E. Feeney	1-A
Purchased Wastewater Treatment Expense	C-7.1	E. Feeney	1-B
Water Production Adjustment	C-7.2	E. Feeney	1-A
Employee Group Insurance	C-8.1	W. Packer	1-A
Employee Benefits	C-8.1	W. Packer	1-B
Pension	C-8.2	W. Packer	1-A
Post-Retirement Benefits	C-8.3	W. Packer	1-A
Remove Intracompany Benefits	C-8.4	W. Packer	1-A
Legal Expense	C-9.1	W. Packer	1-A
Eliminate North Heidelberg Expenses	C-9.1	W. Packer	1-B
Eliminate NAWC Lobbying Expense	C-9.2	E. Feeney	1-A
Annualization of Sun Valley	C-10.1	W. Packer	1-A
Annualization of Avon Grove	C-10.1	W. Packer	1-B

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Annualization of Tobyhanna

C-10.2

W. Packer

1-B

1 **Q. Please explain the Company's claim for rate case expense of \$1,975,000 presented on**
2 **Schedules C-4.4 of Exhibit 1-A and 1-B.**

3 A. The adjustments in Schedules C-4.4 reflect the estimated costs of this rate case. 95.76%
4 of the total cost is being allocated to the water cost of service and 4.24% is being
5 allocated to the wastewater cost of service based on the ratio of customers served to total
6 customers. The Company proposes to normalize this cost over a thirty-six month period,
7 which is the anticipated interval between this and the Company's next base rate case.

8 **Q. Please explain the Company's claim for payroll expense.**

9 A. The Company's claim for payroll expense is developed in Exhibit 2, and is summarized
10 in Schedules C-4.5 of Exhibits 1-A and 1-B. The adjustment reflects known or
11 anticipated changes to the Company's union and non-union employees at the end of the
12 FPFTY. The Company's FTY and FPFTY claims for payroll expense related to water
13 service approximates \$31.9 million and \$32.8 million, respectively. The Company's
14 claim for payroll expense related to wastewater service approximates \$1.6 million for
15 both the FTY and FPFTY (there is only a \$43,669 difference between the two periods).

16 In calculating those costs, I included the salaries and wages associated with the
17 Company's present complement of authorized positions. In addition, salary and wage
18 levels were adjusted to reflect known or projected changes in compensation as follows:

19 Exhibits 1-A & 1-B Non-Union Payroll – Employees are granted individual salary
20 increases through an annual performance review. The water non-union gross payroll, at
21 FTY and FPFTY salary levels, was determined to be \$18,686,410 and \$19,238,752,

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1 respectively. The wastewater non-union gross payroll, at FTY and FPFTY salary levels,
2 was determined to be \$1,405,675 and \$1,447,226 respectively. In deriving these claims, I
3 first started with employees' April 1, 2018 actual labor rates and annualized expenses at
4 those rates. In addition, for the FPFTY, I anticipated an additional merit pay increase for
5 all employees, which was also annualized. The assumed percentage increases are
6 included in Schedule 6 of Exhibit 2. The Company's labor claims also include cash
7 short-term incentive compensation for eligible employees. To the extent that an
8 employee's base pay was increased as I described earlier, a commensurate adjustment in
9 the amount of eligible incentive pay would follow accordingly at the same percentage
10 levels.

11 Exhibit 1-A & 1-B Union Payroll – Aqua PA has six different unions, each with
12 its own collective bargaining agreements and anniversary dates that changes in hourly
13 rates will become effective. The water gross union payroll, at the FTY and FPFTY levels
14 was determined to be \$28,891,759 and \$29,592,720 respectively. The wastewater union
15 gross payroll, at FTY and FPFTY wage levels was determined to be \$468,974 and
16 \$480,352 respectively. The Company's claims were developed to annualize the actual
17 pay rates effective for each union in both the FTY and FPFTY as of March 31, 2020.
18 Further details regarding contractual increase percentages are provided in Exhibit 2 –
19 Payroll.

20 The gross payroll amounts in Exhibits 1-A and 1-B reflect a reasonable vacancy
21 adjustment that is in line with the Company's actual experience. These amounts are
22 further reduced by capitalized labor and non-operating labor as experienced in the HTY
23 and applied to the FTY and FPFTY to arrive at the total expense labor.

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1 **Q. What services are provided by Aqua Services, Inc. (“Aqua Services”)?**

2 A. The services, which are set forth in an affiliated interest agreement previously approved
3 by the Commission and submitted with this rate filing in response to filing requirement
4 OE6, cover a full range of corporate support services, including, but not limited to;
5 accounting and financial, administration, communications, corporate secretarial,
6 customer service and billing, engineering, financial, fleet, human resources, information
7 systems, operation, rates and regulatory, risk management, water quality, legal, and
8 purchasing, contracts and sales of real estate. Please see the Attachment to OE6 for
9 further details.

10 **Q. How are the costs of those services charged out to Aqua America’s subsidiaries?**

11 A. Aqua Services’ personnel keep daily time records and, where appropriate, their time and
12 related overheads are directly assigned to the subsidiary for which they are working.
13 Where costs are incurred in rendering services in common to multiple companies and
14 cannot be identified and related exclusively to a particular company, they are allocated to
15 all such companies based on the number of customers served by each company at the end
16 of the immediately preceding calendar year.

17 **Q. Please explain the adjustments on Schedule 4.7 of Exhibits 1-A and 1-B entitled**
18 **“Management Service & Sundry”.**

19 A. The amounts listed in Schedule C-4.7 of Exhibit 1-A summarize the Company’s
20 estimated additional annual payroll expense and the increase in the Company portion of
21 employee group insurance premiums of the Aqua Services employees whose time was
22 charged to Aqua PA during the test year. The same data are shown in Schedule C-4.7 of

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1 Exhibit 1-B for Aqua Services employees whose time was charged to Aqua Wastewater
2 during the test year.

3 **Q. Please explain the adjustment to Aqua Customer Operations appearing on Schedule**
4 **C-4.8 of Exhibits 1-A and 1-B.**

5 A. The amounts listed in Schedule C-4.8 of Exhibit 1-A summarize the Company's
6 estimated additional annual payroll expense and the increase in the Company portion of
7 employee group insurance premiums of the Aqua Customer Operations employees whose
8 time was charged to Aqua PA during the test year. The same data are shown in Schedule
9 C-4.8 of Exhibit 1-B for Aqua Customer Operations employees whose time was charged
10 to Aqua Wastewater during the test year.

11 **Q. Please explain the miscellaneous adjustments shown in Schedule 4.9 of Exhibits 1-A**
12 **and 1-B.**

13 A. Schedule 4.9 removes various transactions that were not appropriate to leave in the HTY,
14 including accrual reversals for fines that were out of period, non-operating expenses
15 being moved below-the-line, the elimination of costs associated with a removed Aqua PA
16 position, and an anticipated increase in annual Pennsylvania Department of
17 Environmental Protection ("DEP") fees for annual operating permits.

18 **Q. Please explain the adjustments appearing on Schedule C-8.1 of Exhibit 1-A for**
19 **Employee Group Insurance.**

20 A. Aqua PA provides healthcare coverage to all of its full-time employees. The adjustment
21 utilizes the coverage level associated with the Company's present complement of
22 authorized positions times the FTY contract prices, less the employee co-pay, a vacancy
23 credit, and an adjustment for the portion not charged to operations.

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1 **Q. Please explain the adjustment to Pension Expense as shown in Schedule C-8.2 of**
2 **Exhibit 1-A.**

3 A. The adjustment set forth in Schedule C-8.2 was derived from an analysis performed by
4 the Company's actuary, Willis Towers Watson, and is based on the forecasted 2018 and
5 2019 actuarial results provided to the Company by Willis Towers Watson in September
6 2017. As set forth in Aqua PA's response to filing data request OE-14, Willis Towers
7 Watson estimated that the Company will have a minimum funding requirement under the
8 Employee Retirement Income Security Act ("ERISA") of \$6.7 million for 2017 but could
9 contribute up to \$161.1 million to its pension fund on a tax-deductible basis. These
10 amounts are also forecasted for the FTY and FPFTY. In the past, the Company has often
11 based its ratemaking claim on the mid-point of the ERISA minimum and the tax-
12 deductible maximum. That calculation would result in a claim of \$83.9 million ($(\6.7
13 million + \$161.1 million) divided by 2). In this case, the Company is requesting a
14 pension expense allowance of \$6.1 million (for both the FTY and FPFTY), which, in my
15 judgement, is a reasonable estimate of the annual amount that the Company will
16 contribute to its pension funds on an ongoing basis. From that figure, I deducted the
17 portion expected to be capitalized and not charged to operating expense. The
18 capitalization percentage is the same as that used in the Payroll Expense adjustment in
19 Schedule C-4.5 of Exhibit 1-A. This resulted in a net rounded expense decrease of \$3.0
20 million for the FTY and no change in the FPFTY level. Lastly, as I mentioned earlier,
21 this is a \$6.1 million reduction to the Company's claim for pension funding since its 2011
22 rate case.

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1 **Q. Can you explain the Company’s adjustment to Other Post-Employment Benefits or**
2 **OPEBs recorded pursuant to Statement of Financial Accounting Standards**
3 **(“SFAS”) 106 that is shown in Schedule C-8.3 in Exhibit 1-A?**

4 A. Yes. The Company’s claim consists of two components: (1) the annual expense, which
5 was developed by Willis Towers Watson; and (2) the amortization over a three-year
6 period beginning April 1, 2019 which is the beginning of the FPPTY. The summation of
7 the two components identified above is reduced by the portion that is capitalized. The
8 capitalization percentage is the same as that used in the Payroll Expense adjustment in
9 Schedule C-4.5 of Exhibit 1-A. The 2018 anticipated annual expense for the Company’s
10 employees is based on the Actuarial Valuation Report dated March 2017/2018 for the
11 Company’s Post Retirement Welfare Plan, which has been submitted in response to filing
12 data request OE-14.

13 **Q. Please explain the adjustments in Schedule C-8.4 of Exhibit 1-A and Schedule C-8.1**
14 **of Exhibit 1-B.**

15 A. These adjustments reduce operating expenses for water operations as presented in
16 Schedule C-8.4 of Exhibit 1-A and increase expenses for wastewater operations as
17 presented in Schedule C-8.1 of Exhibit 1-B which is an allocation of employee benefits
18 and other general overheads necessary to reflect an appropriate amount of expenses
19 attributable to wastewater operations.

20 **Q. Please explain the Legal Expense adjustment in Schedule C-9.1 of Exhibit 1-A.**

21 A. The Company incurs costs for general legal services during the normal course of business
22 to protect and defend the Company’s interests and to comply with a variety of regulatory

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1 matters. This adjustment normalizes the Company's legal expense claim experienced in
2 the HTY to levels that are expected to be more in line with prior experience.

3 **Q. Please discuss the background and expense annualization adjustment associated**
4 **with the Sun Valley Water Company, as quantified in Schedule C-10.1 of Exhibit 1-**
5 **A.**

6 A. Commission records identify the Sun Valley Water Company ("Sun Valley") as a *de*
7 *facto* utility that had been using the Sun Valley System to provide public water service in
8 the territory it served. Sun Valley initiated service on or about 1985 and, to the
9 Company's knowledge, operated at all times without having first obtained a certificate of
10 public convenience. Commission staff attempted to address the matter of Sun Valley's
11 uncertified operations in 2000, 2002, 2004, 2006, and in 2006 in a formal complaint of
12 the Law Bureau Prosecutory Staff at Docket No. C-20065889.

13 In 2017, the Commission, the DEP, and several legislators sought Aqua PA's
14 assistance to review and develop possible solutions to bring the system to regulatory
15 compliance, and to improve public health and safety. Aqua PA determined that
16 rehabilitation of the entire water system was necessary to meet these goals. However,
17 purchasing the existing distribution facilities was not possible because the Company was
18 not able to identify a representative of Sun Valley willing to address a transfer of the
19 distribution facilities. On September 26, 2017, Aqua PA submitted an application to
20 begin to provide water service to the service territory in Sun Valley Lake Village and
21 requested appointment as a receiver to use the existing distribution facilities on an interim
22 basis while the system was replaced and rehabilitated. The Company estimated that the
23 entire rehabilitation cost for the Sun Valley water system would be approximately \$2.3

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1 million, to be financed with a PENNVEST grant and loan. A final order was issued on
2 January 18, 2018 that approved the application. Upon taking over operations of the
3 system, Aqua PA replaced the holding tanks and has begun replacing the distribution
4 system.

5 The adjustment in Schedule C-10.1 of Exhibit 1-A annualizes the cost of the Sun
6 Valley system to reflect a full year's level of expense from a date of ownership of
7 January 29, 2018.

8 **Q. Please explain the elimination of North Heidelberg expenses as shown in Schedule**
9 **C-9.1 of Exhibit 1-B.**

10 A. Aqua Wastewater was appointed the receiver for the North Heidelberg Sewer Company
11 ("NHSC") beginning on March 5, 2018. As receiver, Aqua Wastewater is responsible for
12 specific receivership duties as defined in Appendix A of the Commission's Order entered
13 February 9, 2018 at Docket No. M-2018-2645983, including establishing a deferred
14 expense account for expenses incurred by NHSC that are payable to the receiver. As
15 such, an adjustment was made to remove the operating expenses attributable to NHSC for
16 purposes of this rate case.

17 **Q. Please explain the adjustments reflected in Schedules C-10.1 and C-10.2 of Exhibit**
18 **1-B.**

19 A. Both of these adjustments annualize expenses for systems that were acquired during the
20 historic test year.

21 Schedule C-10.1 of Exhibit 1-B reflects a full year's level of expenses, excluding
22 labor, for the Avon Grove System. This system was acquired on September 8, 2017.

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1 Schedule C-10.2 of Exhibit 1-B reflects a full year’s level of expenses, excluding
2 labor and bad debt, for the Tobyhanna System. The system was acquired on July 1, 2017.

VI. DEPRECIATION, TAXES AND OTHER ITEMS

4 **Q. The next series of adjustments to the Company’s Statement of Income is found in**
5 **Schedules D-1 through D-2.5, E-1 through E-4, and F-1 through F-2 of Exhibits 1-A**
6 **and 1-B. Who are the responsible witnesses for these adjustments?**

7 A. The responsible witnesses for the adjustments are as follows:

ADJUSTMENT	SCHEDULE	RESPONSIBLE WITNESS	EXHIBIT(S)
Summary of Depreciation	D-1	R. Marquis & J. Spanos	1-A and 1-B
Summary of Adjustments To Taxes Other Than Income	D-2	W. Packer	1-A and 1-B
PUC - General Assessment	D-2.1	E. Feeney	1-A and 1-B
OCA and OSBA - General Assessment	D-2.2	E. Feeney	1-A and 1-B
Public Utility Realty Tax	D-2.3	W. Packer	1-A and 1-B
Pennsylvania Property Tax	D-2.4	W. Packer	1-A and 1-B
Payroll Taxes	D-2.5	W. Packer	1-A and 1-B
Interest on Long-Term Debt	E-1	W. Packer	1-A and 1-B
Amortization of Debt Discount and Expense	E-2	W. Packer	1-A and 1-B
Other Interest Charges	E-3	W. Packer	1-A and 1-B
Interest During Construction	E-4	W. Packer	1-A and 1-B
Summary of Adjustment to Income Taxes	F-1	W. Jerdon	1-A and 1-B
Computation of Federal and State Income Taxes Under Present and Proposed Rates	F-2	W. Jerdon	1-A and 1-B

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Q. Please explain the summary provided in Schedule D-2 of Exhibits 1-A and 1-B.

A. The schedules referenced show a summary of the adjustments to taxes other than income taxes for the HTY, FTY, and FPFTY at present rates and the FPFTY at proposed rates. Each of the adjustments is discussed below.

Q. Please explain the adjustment for Public Utility Realty Tax in Schedule D-2.3 of Exhibit 1-A.

A. The taxes imposed by the Public Utility Realty Tax Act (“PURTA”) for the FTY and FPFTY are based on the tax liability for 2018. This is the latest statement that the Company has received from the Commonwealth of Pennsylvania.

Q. Please explain the adjustments for Pennsylvania property tax listed in Schedule D-2.4 of Exhibits 1-A and 1-B.

A. The Company’s claim for property taxes is its actual HTY property taxes. Historically, the Company has not seen a tremendous amount of volatility in its property tax liability. Should information arise during the course of this proceeding that would justify an adjustment, I will revise the Company’s claim accordingly.

Q. Please explain the Company’s adjustment for payroll taxes.

A. The Company’s adjustment to Federal and State payroll taxes appears in Schedule D-2.5 in Exhibit 1-A. The FTY and FPFTY adjustments for both Federal and State payroll taxes is based on the Company’s FTY and FPFTY payroll claims. The Federal Insurance Contribution Act tax was calculated using the tax rates and taxable wage bases that are in effect in 2018. The Federal and State unemployment taxes were calculated using the Company’s current tax rates and taxable wage bases.

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1 The pro forma tax amounts were then reduced by the amount not charged to
2 operations. Payroll taxes applicable to wastewater operations are an allocated portion of
3 total Company taxes and handled as a component of the intracompany allocation of
4 expenses shown in Exhibit 1-A, Schedule C-8.4.

5 **Q. Please explain your calculation of interest on long-term debt that appears on**
6 **Schedules E-1 of Exhibits 1-A and 1-B.**

7 A. A calculation is made to synchronize the interest expense applicable to the long-term debt
8 portion with the original cost rate base as of March 31, 2018. I have used the same
9 capital structure as recommended by Mr. Moul for rate of return purposes (see AP
10 Statement No. 4 and Exhibit 4). The projected weighted cost rate of long-term debt (for
11 both water and wastewater) as of March 31, 2019 and March 31, 2020 is 4.43%. The
12 synchronized interest was used to adjust the interest expense recorded for the year ended
13 March 31, 2018 and the resulting adjustment carried forward to Schedule A-1 of Exhibit
14 1-A and 1-B.

15 **Q. The next adjustment is for amortization of debt discount and expense appearing on**
16 **Schedule E-2 of Exhibit 1-A and 1-B. Please explain this adjustment.**

17 A. This adjustment removes those costs because, consistent with the way these costs are
18 reflected for ratemaking in Pennsylvania, their recovery has been reflected in the yield-
19 to-maturity calculation of the Company's claimed long-term debt cost rate.

20 **Q. Schedule E-3 of Exhibits 1-A and 1-B reflects decreases in other interest charges.**
21 **Please explain this adjustment.**

22 A. Other interest charges of the year ending March 31, 2018 were principally for funds
23 borrowed through bank loans to finance the Company's capital expenditures. The bank

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1 loans outstanding are anticipated to be refinanced with long-term debt prior to the end of
2 the FTY. Therefore, the interest on bank loans has been eliminated.

3 **Q. The last adjustment, on Schedule E-4 of Exhibits 1-A and 1-B, is for interest during**
4 **construction. Please explain this adjustment.**

5 A. For financial accounting purposes, interest during construction is recorded as income.
6 However, for ratemaking purposes, it is reflected in the allowance for funds used during
7 construction (“AFUDC”) and included in the original cost of utility plant. This
8 adjustment is made to eliminate interest during construction as income and is consistent
9 with the treatment accorded this item in the Company’s previous rate cases.

VII. RATE BASE

11 **Q. Please describe the data presented in Schedule G-1 of Exhibit 1-A and 1-B.**

12 A. Those pages show the Company’s claimed original cost measure of value as anticipated
13 under present and proposed rates for the FTY and FPFTY.

14 **Q. Mr. Packer, Schedules G-2 through G-9 in Exhibits 1-A and 1-B set forth various**
15 **components of the Company’s rate base claim. Please identify the responsible**
16 **witnesses for these items.**

17 A. Certainly. Witness responsibilities are as follows:

18

ADJUSTMENT	SCHEDULE	RESPONSIBLE WITNESS	EXHIBIT(S)
Utility Plant in Service & Accumulated Depreciation	G-2	R. Marquis & J. Spanos	1-A and 1-B
Utility Plant Acquisition Adjustments	G-3	R. Marquis	1-A and 1-B
Materials & Supplies	G-4	W. Packer	1-A and 1-B

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Cash Working Capital	G-5	W. Packer	1-A and 1-B
Contributions In Aid Of Construction (CIAC)	G-6	R. Marquis & J. Spanos	1-A and 1-B
Customer Advances For Construction (CAC)	G-7	R. Marquis & J. Spanos	1-A and 1-B
Deferred Income Taxes	G-8	W. Jerdon	1-A and 1-B

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2 **Q. Please explain the \$6,954,190 addition in Exhibit 1-A for materials and supplies.**

3 A. As shown in Schedule G-4 of Exhibit 1-A, this amount was developed by averaging the
4 monthly balances in the Materials and Supplies account for the thirteen months ended
5 March 31, 2018. While Exhibit 1-B contains a schedule G-4, the Company does not
6 maintain a significant amount of standby materials and supplies for wastewater
7 operations and, therefore, material and supplies are expensed as they are purchased.

8 **Q. Has the Company included a claim for cash working capital in rate base?**

9 A. Yes. The results of the Company's lead/lag study yielded a positive result, thus the
10 Company, consistent with Commission practice, is making a claim for cash working
11 capital. The calculations and schedules are included in Exhibit 1-A and 1-B, Schedules
12 G-5.1, G-5.2, G-5.3, and G-5.4.

13

VIII. RATE DESIGN

14 **Q. Please provide an overview of the Company's rate design proposal in this case?**

15 A. The majority of the Company's customers are charged the rates applicable to the
16 Company's Main Division, which is designated Rate Zone 1. Over the years, as the
17 Company has filed rate cases, divisions that were not being charged rates at the same
18 level as the Main Division were gradually equalized with Main Division rates.
19 Sometimes, this can be done over one or two rate cases; in other circumstances, it was

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1 appropriate to achieve rate equalization over several rate cases. In this case, the
2 Company is proposing to move several divisions equal or closer to Main Division rates.
3 For water operations the Company has continued to make progress consolidating the rates
4 for those service areas that represent acquired systems into the Main Division. Company
5 witness Paul Herbert provides an explanation of the Company's rate design and cost of
6 service allocation study in AP Statement No. 5 and accompanying exhibits.

IX. SUPERIOR WATER COMPANY, INC. MERGER

8 **Q. Please discuss the Company's request to merge Superior Water Company, Inc.**
9 **("Superior") into the Company's proposed tariff.**

10 A. Aqua PA acquired Superior on January 1, 2016 through a stock transaction.¹ Superior
11 was kept as a separate subsidiary of Aqua PA. Superior currently has its own tariff,
12 DSIC, long-term infrastructure improvement plan ("LTIIIP"), and provides separate
13 earnings reports to the Commission. Superior customers currently receive bills bearing
14 Aqua PA's logo. As a subsidiary of Aqua PA, Superior receives services provided by
15 Aqua Services pursuant to affiliated interest agreements on file with the Commission.
16 Further, Superior has had access to all of Aqua PA's financing capabilities and benefits
17 from the economies of scale available from its association with Aqua PA, as the
18 Commission recognized in its Order approving Aqua PA's acquisition of Superior.
19 Superior's current residential charges are close to Aqua PA's Main Division water rates.
20 Contemporaneously with the filing of this rate case, Aqua PA and Superior filed a Joint

¹ See *Joint Application of Aqua Pennsylvania, Inc. and Superior Water Company, Inc. for Approval of a Transfer of Control, by Merger, of Superior Water Company, Inc. to Aqua Pennsylvania, Inc.*, Docket Nos. A-2015-2472472 and A-2015-2472473, Opinion and Order entered September 17, 2015, slip op. at 7-8 (hereinafter "*Superior Acquisition*").

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1 Application for approval to merge Superior into Aqua PA. In addition, Aqua PA and
2 Superior will requested that the Joint Application be consolidated with this case.

3 **Q. Please describe Aqua PA’s satisfaction of the fitness requirements as they may**
4 **pertain to the request to merge Superior into Aqua PA.**

5 A. The Commission has already determined that Aqua PA possesses the technical expertise,
6 professional staff, and financial resources to operate the Superior system.²

7 **Q. Did the Commission determine that the acquisition of Superior by Aqua PA was**
8 **necessary or proper for the service, accommodation, convenience, or safety of the**
9 **public?**

10 A. Yes, that determination was made when Aqua PA acquired Superior.

11 **Q. Please describe the affirmative public benefit of merging Superior into Aqua PA.**

12 A. The merger of Superior into Aqua PA will reduce administrative expense by eliminating
13 the additional administrative costs of maintaining Superior as a separate corporate entity
14 and the attendant requirements for separate reporting to the Commission and separate
15 fulfilment of other Commission filing requirements. Additionally, Superior’s LTIIP will
16 be merged with the Aqua PA’s and a single DSIC will apply to all of Aqua PA’s water
17 operations including the formerly separate Superior service area. The Company, the
18 Commission, and customers will benefit from the reduction in administrative filings and
19 reporting that would need to be reviewed.

² *Superior Acquisition*, slip op. at 6-7.

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X. PURCHASED WATER ADJUSTMENT CLAUSE

1
2 **Q. What is the Purchased Water Adjustment (“PWA”) Clause?**

3 A. The PWA is an adjustment clause that the Company is proposing to capture increases and
4 decreases in the rates charged by non-affiliated suppliers from whom the Company
5 purchases water. The PWA is included as a rider in the proposed water tariff submitted
6 with this filing and describes the mechanics of the clause.

7 **Q. How would the PWA operate?**

8 A. The PWA would adjust customers’ bills by adding a charge or credit to reflect increases
9 or decreases, respectively, in the Company’s Baseline Cost. The Baseline Cost is the
10 annual purchased water costs approved as an operating expense in the Company’s then
11 most recently concluded base rate case. When one or more of the Company’s suppliers
12 change the rates for water purchased by the Company, the Company will re-compute its
13 annual purchased water costs based on the level of consumption and other billing
14 determinants that formed the basis for the Company’s calculation of its Baseline Cost. If
15 there is a change in purchased water costs above or below the Baseline Cost, a charge or
16 credit, as applicable, would be added to customers’ bills. The Company would have the
17 option to implement a charge to recover an increase in purchased water costs. However,
18 if the change was a decrease in purchase water costs, the Company would be required to
19 implement a credit to reflect that decrease.

20 **Q. Why has the Company proposed the PWA?**

21 A. The Company purchases water from a number of different suppliers in order to meet its
22 customers’ demands on a reliable and cost-effective basis. Most of the Company’s
23 suppliers are municipalities or municipal authorities. As such, they can implement rate

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1 increases quicker and more frequently than public utilities that are regulated by the
2 Commission and the rate increases become effective even if they are contested by one or
3 more customers. As a result, the Company's water suppliers frequently implement rate
4 increases at times that do not coincide with base rate cases filed by the Company and well
5 before the Company could reasonably expect to file a base rate case to reflect those
6 increases in its rates. As a consequence, the Company frequently experiences a
7 significant lag between the time its suppliers increase their rates and when the Company
8 can recover those increases in the rates it charges its customers. The PWA would help to
9 reduce this lag.

10 **Q. Will the PWA be subject to audit and reconciliation?**

11 A. Yes, the operation of the PWA, as proposed, will be subject to audit by the Commission
12 and will also be subject to an annual reconciliation process, which is spelled out in the
13 proposed tariff rider. In addition, the Company's costs to purchase water, including the
14 prudence of its decision to purchase water rather than develop its own source of supply in
15 a given area, increases its efforts to minimize purchases from high-cost suppliers, and its
16 efforts to contest, stop, reduce or delay rate increases by its suppliers, can be examined by
17 interested parties at the time a PWA charge is implemented, at the time of the annual
18 reconciliation and in subsequent base rate proceedings. Consequently, the purchased
19 water costs recovered through the PWA could be subject to greater scrutiny than a claim
20 for recovery of purchased water costs made solely in a base rate case, where it is only one
21 of many issues competing for the attention of the parties. For this reason, among others,
22 the Company would have ample incentive to take advantage of every reasonable
23 opportunity to prevent increases and pursue decreases in its purchased water costs.

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XI. ENERGY COST ADJUSTMENT MECHANISM

Q. What is the Energy Cost Adjustment (“ECA”) Mechanism?

A. The ECA is an adjustment clause that the Company is proposing to capture changes in its energy costs. Such a mechanism ensures that the Company recovers the costs of energy used to provide water to its customers and only those costs. Customers also benefit from any and all of the Company’s efforts to control costs as well as having the assurance that, if energy prices fall from current levels, they benefit from those market-driven reductions.

Q. How would such a mechanism work?

A. The mechanism would collect or refund any difference between the energy costs included in base rates from the Company’s last rate filing and the actual energy costs incurred in the period of calculation. Within 60 days after the rate year, the Company would file a reconciliation of its actual costs to the amount recovered in base rates per actual thousand gallons sold as established in the last rate case. Any increase or decrease in these costs would be divided by the projected normalized volumes increased for growth to develop a volumetric surcharge/surcredit applied to metered customers in the following 12-month period. In this way, the Company is protected from uncontrollable increases in costs and customers will receive the benefit of decreases if those costs are less than those included in rates. The ECA is included as a rider in the proposed tariff submitted with this filing and describes the mechanics of the clause. At the end of a 12-month period, the amount refunded/collected via the mechanism would be compared to the actual costs to be refunded/collected and the difference would be added or subtracted to the difference to be recovered/refunded in the following period.

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XII. CAPITAL STRUCTURE RATIOS

1
2 **Q. Mr. Moul's proposed rate of return, as set forth in Exhibit 4-A, is based on a**
3 **FPPTY-end capital structure consisting of 47.15% long-term debt and 52.85%**
4 **common equity. How were these figures derived?**

5 A. Consistent with past practice, the starting point was the Company's actual capitalization
6 at the end of the HTY. The respective amounts of long-term debt and common equity at
7 March 31, 2018 were then adjusted to reflect anticipated changes during the FTY and
8 FPPTY. In sum, Aqua PA's total permanent capitalization is expected to increase by
9 approximately \$515 million over that period.

10 **Q. What accounts for that increase?**

11 A. There are several factors. Aqua PA's long-term debt balance is anticipated to grow by
12 nearly \$275 million as a result of the issuance of new and the retirement of existing debt
13 series. The net effect of these financings is a slight increase in the Company's embedded
14 long-term debt cost rate from 4.40% to 4.43%. The Company's common equity is
15 projected to increase by \$240 million, by virtue of common equity infusions from its
16 parent, Aqua America, and FPPTY retained earnings. Details regarding all of these
17 changes are provided on Schedule 5 of Exhibit 4-A. Total capitalization and total rate
18 base are both projected to be approximately \$3.4 billion by the end of the FPPTY.

19 **Q. Please describe the Company's overall long-term cost of debt since the last rate case.**

20 A. As I previously explained, Aqua PA has taken advantage of the low interest rate
21 environment that prevailed since its last base rate case to reduce its embedded long-term
22 debt cost. At the conclusion of its 2011 water rate case, the Company's overall average
23 cost of long-term debt was 5.41%. Currently, that cost rate is 4.42% and is projected to

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1 become 4.43% by the end of the FPPTY. This is a difference of .98%, which provides
2 tangible savings to customers, as I explained earlier in my testimony, of approximately
3 \$16 million annually.

XIII. RETURN ON EQUITY CONSIDERATIONS

5 **Q. Please explain how the Company derived its requested equity allowance in this**
6 **filing.**

7 A. In AP Statement No. 4, Mr. Moul has recommended a return on common equity (“ROE”)
8 of at least 11.00%. His testimony and Exhibit 4-A offer a through explanation of his
9 calculation methodology. The various methodologies produced an ROE range of 10.54%
10 to 12.95%. Looking only at the Discounted Cash Flow (“DCF”) and Risk Premium
11 (“RP”) methods (which is reflective of past Commission practice) produces a narrower
12 range of 10.50%-11.25%. Based on this range, as well as the Company’s exemplary
13 managerial performance, Mr. Moul recommends an ROE of at least 11%.

14 Notwithstanding his recommendation, I have chosen an ROE of 10.75% for the purposes
15 of calculating the Company’s overall revenue requirement in this instant proceeding,
16 which is certainly reasonable and again, within Mr. Moul’s range of ROEs I described
17 earlier.

18 **Q. Please explain why you believe the Company is entitled to an equity allowance that**
19 **recognizes exemplary managerial performance.**

20 A. For many years, Aqua PA has provided its customers with excellent water service at
21 reasonable rates. This has not come about by accident, but instead is the product of a
22 dedicated and knowledgeable workforce that is constantly seeking to improve quality and
23 control costs. To this end, the Company has accepted the challenge of acquiring troubled

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1 or weaker water systems in an effort to promote the Commission's goal of water supply
2 regionalization and has implemented a program to facilitate the payment of water bills by
3 its low income residential customers. More recently, Aqua PA is also helping the
4 Commonwealth deal with the problems created by small, troubled or non-viable
5 wastewater systems. Aqua PA is an acknowledged leader in the water utility and
6 wastewater industries and, in my opinion, its exemplary performance should be
7 recognized through the equity return rate authorized in this proceeding. Indeed, this
8 recognition reinforces the Company's own goal of continuously seeking ways of
9 providing better service at reasonable cost and also provides an example that creates
10 incentives for other utilities to do the same.

11 **Q. Could you be more specific with respect to the measures undertaken by the**
12 **Company that you believe should enter into the Commission's determination of an**
13 **appropriate equity return rate?**

14 A. Certainly. In my view, the Company's performance in the following areas fully supports
15 a return of at least 10.75%:

16 **1. Water Quality**

17 Aqua PA has achieved significant compliance with all existing Federal
18 and State drinking water standards in its 113 water systems in Pennsylvania.

19 Aqua PA provides filtration for all surface water sources and disinfection for all
20 ground water sources and specialized treatment for specific contaminants where
21 necessary.

22 Aqua PA has proactively upgraded its surface water plants over the past
23 three decades with new equipment, instrumentation, and technology in advance of

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1 increasingly stringent drinking water regulations and standards – including
2 optimization of disinfection by products and corrosion control for lead and
3 copper. The last several years water regulations have increased monitoring,
4 reporting, and public notification requirements. In Pennsylvania, recent adoption
5 of the Chapter 109 changes will require additional upgrades to maintain high
6 quality water. The Chapter 109 changes will require higher chlorine levels in the
7 distribution system at all times and require additional monitoring and treatment
8 reporting. The events in Flint, Michigan have caused the water industry and
9 regulators to redouble their efforts to reduce lead in drinking water. Aqua PA has
10 been actively participating in Pennsylvania’s Lead Task Force and in the national
11 Lead Service Line Collaborative developing best practices to identify and remove
12 lead service lines from homes.

13 The good quality of Aqua PA’s source water can, in part, be attributed to
14 decades of effort by the Company to protect its surface water sources. As such,
15 we continue to protect our water supply using advanced monitoring technologies,
16 participating the Delaware Valley Warning System, and using WaterSuite to
17 identify potential upstream sources.

18 While constantly optimizing our systems to provide even better water
19 quality, Aqua PA and its expert staff also prepare for future regulations and
20 emerging contaminants. Under the Contaminant Candidate List and Unregulated
21 Monitoring Rules, the EPA identifies groups of chemicals for future regulation
22 and requires their monitoring. To keep ahead of the regulations, Aqua PA
23 operates a central water-quality laboratory in Bryn Mawr that conducts hundreds

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1 of thousands of tests annually on water samples from Aqua PA’s systems across
2 the Commonwealth. The laboratory has a national reputation in the field of
3 testing for trace levels of compounds. In fact, the laboratory operates testing
4 equipment that can detect down to the part per trillion level. One part per trillion
5 is the equivalent of one grain of sand in an Olympic size swimming pool. For
6 example, one group of emerging contaminants called per- and polyfluoroalkyl
7 substances or PFAS. These chemicals were used in many home products, food
8 products, and fire-fighting foams since the 1940s. Though not currently
9 regulated by DEP or EPA, there is an EPA Health Advisory of 70 parts per
10 trillion. To date, removal of these compounds can only be completely achieved
11 by Granular Activated Carbon (“GAC”) or Ion Exchange technologies. Aqua PA
12 has two wells with PFAS levels that were near the 70ppt limit and GAC treatment
13 was installed. Customer water quality is incredibly important to Aqua PA.
14 Therefore, the Company maintains a Technical Services Department that is
15 located in the laboratory and is staffed to handle water quality complaints
16 exclusively. Having this staff with ready access to the resources of Aqua PA’s
17 central laboratory allows for prompt response, investigations, and resolution of
18 water quality complaints. I believe the low level of water quality complaints from
19 Aqua PA customers attests to the ongoing commitment of Aqua PA’s
20 management to the quality of water delivered to our customers.

21 **2. Wastewater Treatment Compliance**

22 As I noted earlier, the Company has been growing its wastewater utility
23 service for over the last twenty years, mostly through the acquisition of small,

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1 troubled systems. The Company has demonstrated that it can be the solution to
2 ever growing wastewater utility challenges and continues to make improvements
3 to wastewater utility infrastructure as reflected by the capital additions included in
4 its utility plant in service in this case, which include some larger-scale treatment
5 plant upgrades.

6 **3. System Reliability**

7 The goal of reliable utility service is to achieve 24-hour per day
8 uninterrupted service to all customers and, especially, to customers with specific
9 health care and public safety needs such as hospitals, outpatient surgical centers,
10 schools, and public and private fire protection systems. The Company responded
11 promptly and effectively to a loss of service event caused by a sink hole in 2017
12 in the Cheltenham portion of its service area, and was justifiably given accolades
13 for its emergency response and timeliness of service restoration. Furthermore, as
14 I mentioned in my testimony earlier, the Company's capital improvement
15 program is producing declining levels of main breaks, reductions in water
16 quality/discolored water complaints, and increasing service reliability.

17 The facilities that Aqua PA has installed over the years, combined with its
18 professional operations and maintenance staff, assures that customers' needs are
19 met and uninterrupted service is provided. These proactive measures include, but
20 are not limited to:

- 21 a. Improvements to Aqua PA's Neshaminy plant through upgraded
22 electrical systems and redundant generators to ensure continued
23 service in case of power outages and increased efficiency.

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1 b. The rehabilitation a booster pump station at Aqua PA’s Bristol
2 treatment plant which has improved energy efficiency and the overall
3 treatment process. The Company also performed a main replacement
4 at the plant to the pump station further enhancing reliability.

5 Moreover, the Company added another filter to the Bristol plant to
6 increase its capacity and further improve water quality.

7 c. Improvements to Aqua PA’s Pickering East plant with the installation
8 of plate settlers to its sedimentation basin which enhances the overall
9 treatment process.

10 In each case these, and other, improvements have enhanced the efficiency,
11 reliability, and the quality of service to customers. The Company has, and will,
12 continue to invest in its infrastructure to improve its systems.

13 **4. Cost Containment**

14 The Company continually looks for ways to control operating costs.

15 While the acquisitions over the past several years have contributed to the overall
16 gains in productivity, there has also been a conscious effort by management to
17 review staffing needs and operating procedures with the purpose of improving
18 service while controlling costs. To this end, Aqua PA reviews its workforce
19 complement and cost drivers on a consistent basis. Lastly, it is worth noting again
20 that the Company’s the Company’s efforts have produced the result of a less than
21 1% compound annual growth rate in O&M expense since its last water rate case.

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1 As I previously noted, the Company has proactively taken advantage of
2 refinancing opportunities and lowered interest rates on its long-term debt from a
3 weighted cost of 8.5% at year-end 1994 to 4.43% as proposed in this filing.

4 **5. Reasonable Rates**

5 As the result of its cost containment efforts and quality management, Aqua
6 PA has been able to keep its rates stable for an extended period, notwithstanding a
7 tremendous investment in new and replacement plant since its last water base rate
8 case nearly seven years ago. And, during most of that period, Aqua PA did not
9 charge a DSIC. The Company's reasonable rates have been cited by Standard &
10 Poor's as one of the Company's strengths.

11 **6. Customer Service**

12 For many years, Aqua PA has provided its customers with a high level of
13 customer service. In recent years, through a combination of technological and
14 management initiatives, the Company's customer service operations have
15 improved key call-center statistics. Continuing a long history of excellence, Aqua
16 PA's customer service operations launched new self-service options and
17 environmentally-friendly paperless billing and payment service.

18 **7. Acquisition of Troubled or Weaker Water and Wastewater Systems**

19 In the last twenty years, Aqua PA has acquired many community water
20 systems previously owned and operated by entities within the public and private
21 (private investor-owned or homeowners' associations) sectors. While several of
22 these systems were included on the Commission's troubled water company list, a
23 majority, if not all of those systems, served less than 3,300 connections and

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1 exhibited problems that would have also qualified them to be included on the
2 Commission’s list. Upon acquiring these systems, Aqua PA made immediate
3 improvements in quality, supply and customer service. At the same time, existing
4 customers have received the benefits of improved efficiency and the spreading of
5 fixed costs over a larger customer base. From a more macro viewpoint, the
6 regionalization of water and wastewater systems will allow for consistent, reliable
7 service, which, in turn, improves the economics and quality of life of the regions
8 the Company serves. The Company intends to continue to acquire systems within
9 its existing 32-county service area in Pennsylvania as well as adjacent areas in
10 order to provide solutions to the long-term water supply requirements of an even
11 larger portion of Pennsylvania. Some of the recent acquisitions reflected in
12 filings made with the Commission include the Sun Valley Water system, the
13 Avon Grove School District, Tobyhanna Wastewater, the Beech Mountain water
14 and wastewater system, Kidder Township Wastewater, and the Treasure Lake
15 Community Water and Wastewater systems. In addition, the Company has
16 agreed to be the receiver for NHSC. Attached hereto as Attachment A is a
17 sampling of recent newspaper clippings regarding Aqua PA’s exemplary service
18 to newly acquired customers.

19 **8. A Helping Hand – Low-Income Customer Assistance Program**

20 Aqua PA implemented a program in 1994 designed to facilitate the
21 payment of water bills by its low-income residential customers. This program is
22 called “A Helping Hand.” It is the first program of its kind offered by any
23 investor-owned water utility in Pennsylvania and has been looked at as a model

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1 by other utilities. This program provides water audits, appropriate repairs where
2 necessary and, upon the identification of qualified customers, the partial
3 forgiveness of prior arrearages or a grant.

4 **9. Infrastructure Rehabilitation**

5 Twenty-two years ago, Aqua PA embarked on a substantial capital
6 program intended to ensure long-term viability of its underground piping
7 infrastructure through significant annual investments in infrastructure
8 rehabilitation (main replacements). Having previously rehabilitated less than
9 0.1% of its infrastructure on an annual basis, the Company was then on a schedule
10 to rehabilitate its aging system over approximately 1,000 years. Recognizing that
11 the life of a pipe approximated 100 years, it was imperative that the infrastructure
12 that was installed during the Company's first 100 years of service be replaced
13 during its second 100 years of service. Since that time, Aqua PA has dramatically
14 increased its infrastructure rehabilitation program. Unlike numerous other water
15 and wastewater systems in the country, Aqua has positioned itself well to ensure
16 continuity of service through a sound utility infrastructure for the foreseeable
17 future.

18 **10. Tax Programs**

19 Aqua takes advantage of key tax programs to ensure the lowest possible
20 cost of service for its customers. Over the years, Aqua has continually taken
21 advantage of bonus tax depreciation whenever it was available to generate key tax
22 savings, which are then incorporated into the Company's base rate calculations to
23 reflect the associated tax-book timing difference as a source of cost-free capital to

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1 support the Company’s infrastructure capital investments. In addition, consistent
2 with the terms of the settlement of its last water base rate case the Company is
3 using tax repair deductions and flow-through accounting to reduce its effective
4 tax rate in this case and provide significant current benefits to its customers. As I
5 previously explained, the use of repair deductions and flow-through accounting
6 was the main reason Aqua PA could maintain almost seven years of base rate
7 stability an only recently implemented a DSIC charge.

8 **11. Environmentally Friendly Initiatives**

9 Energy is the single biggest purchased expense that Aqua PA manages.
10 To minimize its purchased power costs, the Company began to look at creative
11 opportunities to utilize renewable energy. Aqua has operated two solar fields
12 since 2011 which produce enough power annually to power over 300 homes,
13 reducing the need for purchased power by 8% at our Ingram’s Mills and Pickering
14 Water Plant complexes in Southeast PA. Further helping reduce our
15 environmental impact, Aqua PA purchases certified wind power for 10% of our
16 electric supply bringing the companies statewide renewable electric consumption
17 to 12%. Compressed Natural Gas (“CNG”) as a vehicle fuel for heavy duty fleet
18 provides for a lower carbon energy source and at a lower cost. CNG accounts for
19 28% of miles driven by our heavy-duty fleet. Renewable and low carbon energy
20 is only one measure of success but an overarching goal is to drive down our
21 energy usage. We do this through energy audits to identify locations where we
22 can replace fixed speed pumps with variable speed (“VFD”) and right size pumps
23 to reduce our electrical demand and consumption. Aqua PA also reviewed and

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1 employs better control of unit heaters in pump houses and LED lighting but more,
2 importantly new and rehabilitated locations are being designed with energy
3 efficiency built-in.

4 In a recent energy project last year, a VFD blower at the companies
5 Willistown Woods wastewater treatment plant was installed and reduced our
6 energy consumption by 40% and we received an energy efficiency rebate through
7 the Pennsylvania Act 120 program. Aqua PA also participates in electrical Peak
8 Reduction programs from both our retail electrical supplier and through
9 Pennsylvania Act 129 were our 3-Megawatt load reduction helps to stabilize the
10 electrical grid during peak events and also provides us a financial incentive
11 though performance payments and the ability to obtain low cost of electric in the
12 future. In addition, Aqua America made its first disclosure of our climate impact
13 in August 2018, through the internationally based CDP in disclosing our climate
14 risks and impacts. The CDP process provides us the framework to reduce our
15 energy demand and environmental impact in a cost prudent manner.

16 **12. From time-to-time, Aqua PA is recognized in Pennsylvania for excellence in a**
17 **key area of operations. Following are examples of awards the Company has**
18 **received since its last rate filing:**

- 19 a. **Partnership for Safe Water (2017).** Aqua PA's Roaring Creek plant
20 received the Phase IV President's Award, which recognizes treatment
21 plants that have achieved the highest possible levels of individual filter
22 performance. The partnership is a national volunteer initiative
23 developed by the Environmental Protection agency and other water

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1 organizations that strive to provide drinking water that surpasses
2 federal regulations.

- 3 b. **Energy Solutions Center Partnership Award (2013).** This award is
4 given to energy users that have worked with their energy utility system
5 to implement an innovative, energy-efficient technology or solution.
6 The Partnership Award is based on Aqua America being an early
7 adopter of Compressed Natural Gas (“CNG”) vehicles. Aqua
8 America’s largest subsidiary, Aqua PA, piloted CNG vehicles for
9 more than a year before installing a slow-fill station at its Springfield
10 Operations Center in Delaware County.

11 **XIV. SATISFACTION OF COMMITMENTS FROM THE COMPANY’S 2011 RATE**
12 **CASE SETTLEMENT**

13 **Q. Has the Company satisfied the commitments it made in the Joint Petition for**
14 **Settlement at Docket No. R-2011-2267958?**

15 A. Yes, it has. Pages 4 through 13 of the settlement agreement in that case set forth various
16 commitments made by the Company. To the best of my knowledge, the Company has
17 satisfied all of these commitments.

18 **XV. CONCLUSION**

19 **Q. Mr. Packer, please summarize why you believe the Commission should grant that**
20 **Company’s requested rate increase.**

21 A. Only with the approval of an adequate ROE can the Company hope to continue to
22 address the formidable tasks of rehabilitating its infrastructure, acquiring and repairing
23 troubled systems, and maintaining quality service. The Commission has given clear

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1 signals that service quality is a critical component in establishing rates. The Commission
2 should now give a signal that it is prepared to assist utilities in maintaining excellent
3 service quality by approving Aqua PA's requested rate increase.

4 **Q. Does that conclude your testimony at this time?**

5 A. Yes, however I reserve the right to supplement my testimony as needing during the
6 progression of this case.

ATTACHMENT 1

to

AP Statement No. 1

Pocono Record

Sun Valley's failing water system to receive makeover

Two water storage tanks at Sun Valley which are scheduled to be replaced by April 2019. [Photo provided]

The well station interior at Sun Valley in Chestnuthill Township. The water system is being taken over and upgraded by Aqua Pennsylvania. [Photo provided]

Two water storage tanks at Sun Valley which are scheduled to be replaced by April 2019. [Photo provided]

The well station interior at Sun Valley in Chestnuthill Township. The water system is being taken over and upgraded by Aqua Pennsylvania. [Photo provided]

Two water storage tanks at Sun Valley which are scheduled to be replaced by April 2019. [Photo provided]

By [Howard Frank](#)

Pocono Record Writer

Monday

Posted at 2:43 PM Updated at 2:43 PM

The Aqua America water company has agreed to take over of the abandoned water system at the Sun Valley development in Effort, Chestnuthill Township, where residents have had to boil their water since 2015.

Sun Valley Water Company's only known owner died that year, leaving about 70 households to make do with a deteriorating system without any employees. Residents have endured low water pressure, chronic outages and poor quality.

"Deplorable would be a word that comes to mind. Unreliable, aged and just in a rundown condition," Pat Burke, Aqua's director of operations for the region said of the development's water system.

Aqua Pennsylvania will be taking over water service for approximately 200 residents in the community.

The Pennsylvania Public Utility Commission officially approved Aqua Pennsylvania to service the Sun Valley water system on Jan. 18 but continued the boil advisory, according to Aqua America spokeswoman Kelly Hackenbrack.

The boil water advisory was lifted Friday.

"Aqua has since added disinfection to the water system," Hackenbrack said. "Two sets of water samples were collected from the distribution system on Wednesday and Thursday, and tested for total coliform bacteria. Results from both sets of samples were absent of total coliform bacteria on Friday. As a result, it is no longer necessary to use boiled water or bottled water for drinking, making ice, brushing teeth, washing dishes and food preparation."

Aqua provides water and wastewater services to approximately three million people in eight states. It already serves territories near Sun Valley.

Aqua America plans on replacing the well station including all the chemical treatment, telemetry controls, a new 10,000 gallon welded steel storage tank and replace every pipe in the water system, including distribution and service lines. That's over 10,000 feet of pipe for the water mains in the street alone.

"They are going to end up with a brand spanking new water system when everything is in place," Burke said.

The project will cost \$2.4 million and Burke expects it to be completed by April of 2019. In the meantime, Aqua has taken remedial steps to make the system reliable and safe. It will be funded with state grants and loans.

The central water system at Sun Valley was started around 1969 by the Cameron family, developer of Sun Valley. After the sole remaining known owner — Donald Cameron of Emmaus — died in 2015, users have volunteered to help maintain the system.

"A lot of people were going to lose their water," State Rep. Jack Rader said. "Sen. (Mario) Scavello and our office, we got involved early to try to get them water. Aqua stepped up early in the process. They didn't have to do it. It's not going to be a big money maker for them. I have to give them credit."

Scavello and Rader approached Aqua, which was willing to take over the system. It was a collaborative effort, Rader said.

"I give credit to DEP and PUC and Aqua Pennsylvania and Jack Rader's office," Scavello said. "The problem with that system is you need a totally new system and now the community will have a quality system with pure water."

The legislators even got state grants to cover the cost of user's new hookups to the new water system, since homeowners' existing pipes might not be able to handle the pressure from a new system. That cost can be as much as \$5,000 to \$6,000 per hookup, Rader said, in a relatively low income area.

Anyone with questions about the water system can call Aqua's customer service at 877-987-2782.

Treasure Lake water main project underway

By Elaine Haskins

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See Water, A4

is to increase that number even more by having replaced 30 percent of the distribution system by the end of 2019.”

Willard also stated that some level of unaccounted-for-water is reasonable, citing water used for flush as an example.

“The project that we are looking at here today is representative of hundreds that are taking place at Aqua Pennsylvania on any given day throughout the year,” said Lucca.

Lucca referred to the U.S. Environmental Protection Agency’s estimate that \$384 billion is needed to replace thousands of miles of pipes and thousands of treatment plants, storage tanks and other infrastructure that is vital to public health and the economy through 2030. He also talked about the “D” grade given to the nation’s water systems by the American Society of Civil Engineers in its 2017 Infrastructure Report Card.

“If you couple the information from the EPA and the ASCE, there leaves little question about the importance of doing the type of work you are seeing here today,” Lucca said. He added that in 2016, Aqua Pennsylvania replaced 136 miles of old water main throughout the state.

“What we have seen in projects like this across the state is that main breaks go down,” Lucca continued. “We see a loss of water go down. So, unaccounted-for water goes down. We see water quality. We see better pressure. And overall, we see a reduction in customer service calls. Because they understand, they start to see, and they recognize the improvements really do matter to them. It really does make a difference. We recognize that. And so it’s something we believe in, because we believe and we talk about the fact that communities just like this cannot thrive, it’s not possible to thrive, if you don’t have a water and a waste-water infrastructure, if you don’t have wells, if you don’t have treatment plants that you can rely on.”

Lucca asked who would want to come to a community where the infrastructure, the buried-into-structure, is not reliable.

“How could you possibly want to live in a community? How do you bring in, maybe not so much here, but how do you bring in development? How do you bring in businesses?” Lucca said. “How do you entice people to want to come and share what you have in these beautiful mountains and hills if you simply don’t have the ability and the infrastructure to service them? We believe that. Whether it’s a community like Treasure Lake, or whether it’s in a downtown city where we work, we believe that. We believe that the people there should be able to rely on and trust that the water service will always be there, that the water quality will always be safe.”

Over the last 20 years about 60 percent of the work that Aqua has done in Pennsylvania has been on main replacements, because it recognizes that these communities just cannot exist, can’t survive without it, Lucca said.

Willard stated that while the project is disruptive, “It is a short-term inconvenience for long-term improvement.”

“In this particular case, this segment is part of a larger

DuBOIS — A first-hand look at a \$1.4 million Treasure Lake main replacement project took place Thursday morning on Bay Road between Woolendean and Treasure Lake roads. Aqua Pennsylvania President Marc Lucca, along with other Aqua PA representatives, were on hand to provide details on the replacement of approximately 2,050 feet of leak-prone PVC pipe and polybutylene services with new cement-lined ductile iron pipe and copper service lines.

“The new pipe will resolve issues with leaks, which were a significant problem for Aqua when it took ownership of the system in February 2013 — and provide greater flow, which will prepare the system for future firefighting capability,” according to a press release issued by Aqua.

The project is one of several that make up Aqua’s \$24.4 million 2017 capital program for its Western Pennsylvania Division, of which Treasure Lake is a part.

Thursday, Aqua’s Western Pennsylvania Area Manager Jim Willard said that pipe replacements like this have helped the system reduce its unaccounted-for water.

“When we purchased this system, which has 79 miles of water mains, only about 60 percent of the water leaving the well stations reached customers, primarily because of the significant number of leaks on the old pipe,” Willard said. “We have since replaced 15 percent of the distribution system, which has resulted in an increase of treated water delivered to customers to nearly 80 percent. Our goal



project that will completely go around the lake here, and also replace a water line that goes through the dam that is just down below us," Willard continued. "This segment will set up for another project that will happen early next year, which will go down in the valley and up the other side, and then we will abandon the line that is currently embedded in the dam, again, towards public safety.

"The steps of this project, and the things that your residents and customers don't necessarily see is all the things that happen to ensure that when they turn their faucets on in the morning, you have a safe, steady, clean supply of water. So, once this line is installed, it will be disinfected, it will pass pressure tests, we will have lab results to confirm it's been flushed, and it meets all drinking water compliance standards before we begin the process of transferring customer services over to private housing," Willard continued.

Willard also noted to ensure the long-term safety and structure of the dam, when the line is abandoned, Aqua will pump it full of concrete.

"So, it is a long, solid, skinny piece of concrete, which will ensure the long-term stability of the dam," Willard said.

The state Department of Environmental Protection is aware of the project, Willard added.

Patrick Burke, director of operations for Aqua Pennsylvania's Greater Pennsylvania Region, said the region provides water to approximately 200,000 people across the state.

"We want to showcase this project which is just an example of a type of project that we do constantly and every year in order to make sure that our customers are provided with service from reliable infrastructure," Burke said. "Maybe 20 or 30 years ago that really wasn't much of a buzz word, the infrastructure, but in today's day and age, you really can't get through a week without hearing some media report about some failure of some infrastructure somewhere in the country. A lot of times those needs are most keenly felt in smaller municipalities, smaller towns, older towns and a lot of the towns in which we provide service."

"What we are hoping you are going to take away from this today is just an idea of the types of work we are doing to try to address those infrastructure needs," Burke said.

The project is among several that Aqua Pennsylvania plans to complete throughout its Western Pennsylvania Division this year at a cost of \$24.4 million.

"In Treasure Lake itself, this total here will bring our replacement to nearly 15 percent of the total system here within our first three years of ownership, and in the next two years we'll bring that total up to nearly 30 percent," said Willard.

By year-end, the company will have spent nearly \$81 million on improvements throughout the division over the past five years (2013 through 2017), including the replacement of more than 63 miles of old water main.

Sandy Township Supervisors' Chairman Jim Jeffers was also in attendance for Thursday's tour.

"I've been observing them putting in the lines up there since the beginning, I'm a resident here and they've went past my house," Jeffers said. "And in my capacity as a supervisor, I've watched their construction, too. I'm impressed and pleased with the type of work they do up here. So I think the communities and the township at large will benefit by the work that being done and the improvements."



Elaine Haskins

A \$1.4 million main replacement project by Aqua Pennsylvania is currently underway in Treasure Lake.

EMERGENCY RESPONSE

Water work helps firefighters

By Kevin Kearney

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HONESDALE — Aqua Pennsylvania Inc. said its \$10.3 million investment to replace its aging distribution system in Honesdale has significantly improved the borough's firefighting capability over the last five years.

Since 2008, Aqua has spent \$14.6 million on the water system in the borough, of which \$10.3 million was invested on infrastructure improvements including the replacement of smaller diameter cast iron water mains with new, larger ductile iron mains.

The main replacement projects included the replacement of old fire hydrants.

A fire on East Street on June 7 was brought under control within 10 minutes of the fire department's arrival, according to Fire Chief Steve Bates.

Steve Clark, Aqua area manager, said East Street was the first in Honesdale

on which the company replaced water main after purchasing the system in 2008.

"One of the reasons we addressed East Street first was because there had been a terrible residential fire there just prior to our ownership of the Honesdale system," Clark said in a release.

That fire was at a house in the 1700 block of East Street.

"That fire destroyed two houses and the flames got so hot they melted siding on houses across the street," Bates said. "There's no question that a sound water distribution system can make a big difference in whether a property is lost to fire."

Bates said he can "definitely" see a difference in the water system from the 2008 fire and the one June 7.

Another improvement the water company has made to enhance firefighting is the installation of Storz adapter fittings on all replacement hydrants in Honesdale.

"The Storz fitting allows the fire department to connect to a hydrant much more quickly than a standard threaded fitting," explained Clark.

SEE WATER WORK, All

The Storz requires just a quarter turn to lock onto a hydrant versus a typical threaded fitting which could take 10 full turns to tighten onto a hydrant, Clark said.

The hydrant used to fight the recent fire on East Street is equipped with the Storz fitting.

Aqua plans to spend \$930,000 on similar distribution system improvements in Honesdale this year.

Aqua Pennsylvania's Honesdale Division serves a population of more than 25,000 people in Wayne, Lackawanna, Monroe and Pike counties.

Overall, the company serves approximately 1.4 million people in 31 counties throughout Pennsylvania.



Scranton Times Tribune

Aqua America upgrading Thornhurst wastewater system

KYLE WIND, STAFF WRITER

Published: August 9, 2014

THORNHURST TWP. — Crews will soon replace about a half-mile of sewer lines at Thornhurst Country Club Estates to prevent the same environmental problem the Environmental Protection Agency this summer ordered 44 area municipalities to address.

Within two weeks, Leeward Construction will begin the \$475,000 replacement of deteriorating pipes that allow rainwater and groundwater into the sewer system, Aqua Pennsylvania Chief Executive Officer Nicholas DeBenedictis announced on Friday.

Without the project, outside water penetrating the wastewater collection system could dilute the treatment process, hurt the 70,000-gallon-per-day system's capacity and lead to sewage overflowing into Pond Creek.

“This is the collection system,” Mr. DeBenedictis explained. “The well is good. The sewer plant is good. It's just the arteries and veins in between that we want to keep in good shape. It's 50 years, 60 years old, so it needs a little bit of rehab work.”

The pipe installation will happen along Fir and Thistle lanes, as well as Hawthorn Drive.

Thornhurst Country Club Estates started out as a resort community and is now a major population center in the 1,085-resident township.

The homeowner's association was unable to set much money aside for fixing up the aging infrastructure, and Aqua Pennsylvania ended up buying the development's water and wastewater systems in 2004.

The company spent about \$2 million upgrading the development's water mains and likely will spend around another \$1 million replacing more mains over the next two years, Mr. DeBenedictis said.

Aqua Pennsylvania will likely replace more of the sewer mains at some point, but Mr. DeBenedictis said the company put the development's system on a priority list with other systems it manages.

The company runs 69 water and wastewater systems in Northeast Pennsylvania, said Steve Clark, the Aqua Pennsylvania's northeast area manager.

Aqua Pennsylvania is paying for the work with a program that lets utilities spread charges for infrastructure improvements across wider groups of customers.

Contact the writer:

kwind@timeshamrock.com,

@kwindTT on Twitter

Emlenton sees year of changes

By KRISTI RUNYAN
Staff Writer

EMLENTON — It was a year of changes for the Borough of Emlenton in 2012, and 2013 is looking like even more changes are on the way.

Some new businesses entered the borough, there were changes among the Emlenton Borough Council members, and there were upgrades to the sewer and water lines in the borough.

In 2009, less than a year into owning and operating Emlenton Borough's water system, Aqua Pennsylvania announced its plans to plug \$2.6 million into building a new water treatment plant and pump station.

The project also included replacing the borough's water lines and fire hydrants.

Barry Louise, borough council president and assistant chief of the fire department, said the project was completed in 2012 and that 11,400 feet of new water lines were installed.

"The water line project was set out to be a five-year project, but they did it in two," borough manager Nancy Marano said. "They have some stuff right outside of town to connect, but everything in town is done and they're tying up loose ends and now the gas company's moving in and will start as soon as the weather breaks."

Aqua Pennsylvania purchased the former Emlenton Water Co. in late 2008. The water company serves about 400 customers in Emlenton Borough and Richland Township in Venango County as well as Richland Township, Clarion County.

Those communities were

put under a state-mandated boil water advisory in April 2008 because the filtration system was contaminated.

"Now we have new gas lines and water lines and our infrastructure really got a huge boost, considering we were boiling water just a few years ago," Marano said.

The improvements to the borough's water system will have even more benefits for residents, Marano said.

With the new hydrants and water lines, the borough's water pressure has improved and residents will be able to get a better ISO (Insurance Service Office) rating.

"A new ISO rating will eventually help everyone's insurance rates for homeowner and fire insurance to get a better rate," Marano said. "What we lacked was water pressure and working fire hydrants."

"The borough is going to apply for a new ISO rating and 40 percent of what they rate it on is water distribution and water pressure," Louise said. "We remained very low for the past 100 years on water distribution for fires, but it's now really high and that means there will be a significant deduction in people's homeowners insurance, no matter what company."

Throughout the process, the borough also eliminated some of its fire hydrants as they were unnecessary.

"We didn't need all of them," Marano said. "When the town was first staged out with hydrants, we didn't have the pumper truck capacity and the water line capacity we do now."

"It's a completely new system from the pumps to the distribution," Louise added. "We're very lucky that this

company took this over and did that."

Columbia Gas completed a pipeline improvement project in Emlenton during the fall of 2012 that involved state-of-the-art technology to bore under the Allegheny River.

The \$1.6 million pipeline improvement project started early in October and replaced about 1,500 feet of existing steel pipe just north of the Interstate 80 bridge in Emlenton.

Columbia Gas is spending more than \$2 million to replace gas lines in Emlenton and will continue the project this year on Myrtle and Main streets, and some of the work on Hill Street has already been completed.

"These projects will benefit everybody," Marano said.

Borough business, council and road project news

A few changes took place on the Emlenton Borough Council as Gary Kingsley, chairperson for the maintenance committee, resigned from his post and moved out of the area. He later passed away, Marano said.

Council member Al Smith took Kingsley's place and Jessie Armstrong was appointed to the council's vacant spot.

The borough is still working on deed work for the Honeywell property in Emlenton and its future development. The 45-acre property has been eyed by the Oil Region Alliance and the organization hopes to develop the land and eventually create jobs at the former site of the Quaker State oil refinery, located off Hill Street.

Emlenton brought back its Light-Up Night holiday celebration on Nov. 29 after a



long hiatus.

As for new businesses in Emlenton, the borough became home to a Segway business when Bruce Knight relocated his business, Segway of Western PA, from Foxburg to a new space on Main Street in Emlenton in May.

Two new restaurants opened on Main Street in Emlenton earlier in 2012, including Pandora's Pizza at 615 Main St. and The Eatery at The Emlenton Mill at 201 Main St.

Amazing Stitches, a screen printing and embroidery company, opened on Main Street in the summer.

Not all business news in the borough was good news, however.

It was reported in early 2012 that the Fuchs Lubrodal plant in Emlenton will close and relocate to Illinois in the spring, according to the company. Fuchs' 23 employees in Emlenton will have the option to relocate to Illinois or find other employment.

Fuchs manufactures specialty lubricants that are sold into the forging industry.

"That's going to be bad," Marano said. "The complete and total shutdown will be in March, I believe."

In April, council voted to not reopen the Emlenton pool due to myriad items in need of repair or replacement as well as new regulations from the U.S Department of Justice, specifically the Americans With Disabilities Act.

Some significant road projects are in the works, including the major PennDOT project on the Emlenton hill that's set to begin this spring and that will result in the hill being closed for more than a year.

Also, a renovation project of the Interstate 80 bridge that crosses the Allegheny River in the Emlenton area is also set to be under construction at the same time, resulting in lane closures to part of the posted detour of the Emlenton hill project, but officials from both PennDOT districts involved have said they are working together to ensure the road closure and detour will flow as easily as possible.



Columbia Gas workers installed a new pipeline last year in Emlenton Borough. Crews worked on the south bank of the Allegheny River under the Interstate 80 bridge in October. The new line replaced about 1,500 feet of old gas line under the Allegheny River.

Emlenton benefits from quick finish to water, sewer projects

By KRISTI RUNYAN

KristiCummins.TheDerrick@gmail.com
Staff Writer

Emlenton Borough's infrastructure got a huge upgrade in 2012 when its water and sewer lines were replaced, and residents will continue to see the benefits of those projects.

Aqua Pennsylvania announced its plans in 2009 to plug \$2.6 million into building a new water treatment plant and pump station and replacing the borough's water lines and fire hydrants.

Barry Louise, the president of Emlenton Borough Council and assistant chief of Emlenton Volunteer Fire Department, said the project was completed last year and that 11,400 feet of new water lines were installed.

"The water line project was set out to be a five-year project, but they did it in two," borough manager Nancy Marano said. "They have some stuff right outside of town to connect, but everything in town is done and they're tying up loose ends and now the gas company's moving in and will start as soon as the weather breaks."

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See **EMLENTON**, Page 6

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said. "We remained very low for the past 100 years on water distribution for fires, but it's now really high and that means there will be a significant deduction in people's homeowners insurance, no matter what company."

Throughout the process, the borough also eliminated some of its fire hydrants as they were unnecessary.

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"It's a completely new system from the pumps to the distribution," Louise added. "We're very lucky that this company took this over and did that."

Columbia Gas completed a pipeline improvement project in Emlenton last fall that involved state of the art technology to bore under the Allegheny River.

The \$1.6 million pipeline improvement project started early in October and replaced about 1,500 feet of existing steel pipe just north of the Interstate 80 bridge in Emlenton.

Columbia Gas is also spending more than \$2 million to replace gas lines in Emlenton and will continue the project this year on Myrtle and Main streets, and some of the work on Hill Street has already been completed.

"These projects will benefit everybody," Marano said.

Borough business, council and road projects

Emlenton Borough Council experienced some changes last year as council member Gary Kingsley, who was chairman of the borough maintenance committee, resigned and moved out of the area. Kingsley later died.

Councilman Al Smith replaced Kingsley as chairman of the maintenance committee, and Jessie Armstrong was appointed to replace Kingsley on council.

The borough is still involved with deed work for the Honeywell property in Emlenton and its future development. The 45-acre property has been eyed by the Oil Region Alliance, and the organization hopes to develop the land and eventually create jobs at the former site of the Quaker State oil refinery located off Hill Street.

As for new businesses in Emlenton in 2012, the borough became home to a Segway business, two new restaurants and a screen printing and embroidery company, all on Main Street.

Not all business news in the borough was good news, however.

It was reported in early 2012 that the Fuchs Lubrodal plant in Emlenton would close and relocate to Illinois in the spring, according to the company. Fuchs' 23 employees in Emlenton will have the option to relocate to Illinois or find other employment.

Fuchs manufactures specialty lubricants that are sold into the forging industry.

In April, borough council voted to not reopen the Emlenton pool this summer or ever again, due to a myriad of items in need of repair or replacement as well as new regulations from the U.S. Depart-



ment of Justice, specifically the Americans With Disabilities Act (ADA).

Some significant road projects are in the works, including the major PennDOT project on the Emlenton hill that's set to begin construction this spring and that will result in the hill being closed for more than a year.

Also, a renovation project of the Interstate 80 bridge that crosses the Allegheny River in the Emlenton area is set to be under construction at the same time, resulting in lane closures to part of the posted detour of the Emlenton hill project.

Beech Mountain water supplier unveils upgrades

By **KELLY MONITZ**

Staff Writer

An estimated 5 gallons per minute of water sprayed skyward from a leaking pipe that Aqua Pennsylvania crews found along Hell's Kitchen Court in Beech Mountain Lakes in Drums this week.

Crews discovered 22 such leaks in the development's water system, which serves 2,300 people in Butler and Dennison townships, since May, when Aqua acquired the well-driven system from Total Environmental Solutions Inc., said Aqua CEO Nicholas DeBenedictis during an on-site press conference on a rainy Friday morning.

"This water system wasn't built for the 100 years that most systems are," he said, explaining that plastic, instead of copper, pipes were used and their 20- to 30-year life expectancy is at an end.

Repairing these leaks, Aqua estimates the company has already saved 180,000 gallons a day — or enough water to fill an Olympic-sized swimming pool in three days, DeBenedictis said.

Aqua, expecting upgrades and improvements to the system, will

invest \$1 million in the Beech Mountain system alone and \$10 million across the White Haven Division, said Anthony J. Donatoni, vice president.

In addition to the aggressive leak detection system, the company contracted with DB Water Specialities of Bloomsburg to install a radio-frequency meter reading system, which will eliminate the need for entering a home to read the meter.

The system will allow Aqua personnel to send a signal from inside a truck to read the meter, said Don Bennett, of DB Water Specialities. The battery inside the transmitter should last 20 years, he said.

More than 15 percent of Beech Mountain's 970 homes have the radio-frequency meters installed, Bennett said, and residents should expect letters and call to set up an appointment for the installation.

Bennett explained the company continues to work in sections of the development to facilitate half-hour appointments, including Saturday hours.

Because crews can obtain actual meter readings without entering the home, customers will not receive estimated bills, DeBenedictis said.

"We have very few estimated bills," he said.

Butler Township Supervisor Ransom Young told Aqua's principals that the township looks forward to

working with the company, which plans to install a tank to alleviate low-water pressure and flow problems in the next two to three years.

The private community's fire hydrants have not been usable, Young said, adding they've been fortunate not to have a fire.

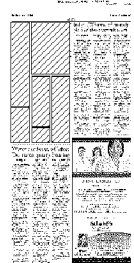
"I'm glad you're looking at these hydrants," he said, noting that the township fire company will be willing to work with them on testing.

Aqua's White Haven Division serves about 20,000 customers, including Oneida and Cove Village in North Union and East Union townships, and Eagle Rock Resort in Hazle Township. The company also purchased the water system serving the Sand Springs Golf Community in Butler Township last year.

In June, the state Public Utility Commission approved a settlement allowing Aqua to raise rates by 4.1 percent, instead of the 9.4 percent increase it requested, to offset \$450 million it invested on upgrades to its distribution and treatment systems since 2009.

The increase means a customer using about 4,745 gallons of water a month will see their bill increase by \$1.99 to \$54.85 a month, according to the PUC.

kmonitz@standardspeaker.com





ERIC CONOVER/Staff Photographer

Donny Bennett, left, and **Bill Evert**, both of DB Water Specialties of Bloomsburg, show the new water meters they are installing in Beech Mountain Lakes during a news conference Friday at a home on Hell's Kitchen Court in the development in Butler Township. Aqua Pennsylvania has taken over the water system in the development and hired regional contractors to repair leaks and install the new meters.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

AQUA PENNSYLVANIA, INC.

DOCKET NO. R-2018-3003068

**DIRECT TESTIMONY OF
RENEE T. MARQUIS**

**With Regard To
Revenue Data, Certain Expense Adjustments,
Various Rate Base Claims, and Acquisitions**

August 17, 2018

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**AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS**

1 **I. INTRODUCTION AND SCOPE OF TESTIMONY**

2 **Q. What is your name and business address?**

3 A. Renee T. Marquis. My business address is 762 W. Lancaster Avenue, Bryn Mawr,
4 Pennsylvania, 19010.

5 **Q. By whom are you employed and in what capacity?**

6 A. I am employed by Aqua Pennsylvania, Inc. (“AP” or the “Company”) as Manager, Financial
7 Analysis.

8 **Q. Please describe your education and business experience.**

9 A. I graduated from Widener University in 2004 with a Bachelor of Science degree in Business
10 Administration with a concentration in Accounting. I also have my Master of Business
11 Administration, with a concentration in Business Process Management, which was attained
12 in 2016. Prior to joining Aqua, I worked for KPMG, LLP as a Senior Associate where I
13 performed financial statement audits and reviewed internal control practices for a variety of
14 clients. In 2009, I joined Widener University in the position of Senior Accountant, where I
15 continued to utilize my background in financial accounting by performing various functions
16 including, but not limited to, account reconciliations, variance analysis, and account analysis
17 including property, plant, and equipment. In August of 2014, I joined Aqua Services, Inc.
18 (“Aqua Services”) as a Director, Property Accounting, where I was responsible for oversight
19 and administration of Aqua America Inc.’s (“Aqua America”) utility plant accounting

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 subledger. In July of 2015, I was promoted to Manager of Rates and Planning at AP, which
2 was subsequently renamed to Manager, Financial Analysis.

3 **Q. What are your duties as Manager, Financial Analysis?**

4 A. As Manager, Financial Analysis, my duties primarily include the preparation of various
5 financial regulatory filings submitted with the Pennsylvania Public Utility Commission
6 (“PUC” or the “Commission”). Those filings include, but are not limited to the following:
7 Quarterly Earnings Reports, Distribution System Improvement Charge (“DSIC”) Surcharge
8 filings, water and wastewater tariff compliance filings, and other regulatory compliance
9 filings upon request of the PUC. My duties also include the preparation of base rate cases
10 and supporting those applications as a primary accounting witness. I report directly to the
11 Vice President – Controller of AP, with whom I assist in the oversight and direction of
12 regulatory accounting matters for the Company.

13 **Q. What is the purpose of your testimony?**

14 A. The purpose of my testimony is as follows: (1) to explain and support the derivation of
15 certain adjustments of the Company’s revenue, expense and rate base claims; and (2) to
16 provide an overview of the Company’s acquisitions since the end of its last water and
17 wastewater base rate cases.

18 **Q. For which of the Company’s Exhibits are you responsible?**

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 A. I am responsible for portions of Exhibits 1-A and 1-B, and for Exhibits 3-A and 3-B. In
2 addition, I assisted in the preparation of the following backup volumes that contain responses
3 to the Commission's standard rate case filing requirements: Statement of Income, Operating
4 Revenue, Operating Expense, Rate Base, Rate of Return, Rate Structure, Balance Sheet, and
5 Other Data.

II. OPERATING REVENUE

7 **Q. Please describe the derivation of the Company's pro forma operating revenue claim.**

8 A. The Company's revenue claim, as summarized on Schedule B-1 of Exhibits 1-A and 1-B,
9 was derived from revenue recorded in the twelve months ended March 31, 2018 for all
10 Pennsylvania water and wastewater operations. I worked in conjunction with the Company
11 witness Paul Herbert, AP Statement No. 5, on the preparation of the operating revenue
12 schedules in this case which are further supported by a billing analysis and bill frequency
13 analysis of the historic test year, included with the application as Exhibits 5-A and 5-B. I
14 coordinated the delivery of the billing data to witness Herbert such that he could conduct a
15 thorough analysis and calculation of the billing determinants in this proceeding. Schedule B-
16 1 of Exhibits 1-A and 1-B were prepared in the same manner, in that they display the typical
17 adjustments one would expect to see in the preparation of a utility billing analysis. Those
18 adjustments include the following: 1.) Application of Present Rates in effect; 2.)
19 Annualization adjustments for DSIC surcharges and newly acquired service areas; 3.)
20 Adjustment to add revenue for organic customer growth; 4.) Adjustment to reduce revenues
21 for anticipated continued decline in residential per customer usage; and 5.) Other

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 miscellaneous revenue adjustments including the removal of availability charge revenue and
2 acquisition revenue not included in this application. Projected customer additions during the
3 future test year (“FTY”) and fully projected future test year (“FPFTY”) were determined on
4 the basis of a three year historical growth average exclusive of acquisitions.

5 **Q. Can you please list the various adjustments to operating revenue that were applied to**
6 **historical test year data?**

7 A. Yes, the following adjustments were made for water operations: (1) Change in Customers;
8 (2) Declining Residential Usage; (3) Annualization of Acquisition – Sun Valley; (4) DSIC
9 Annualization Adjustment; (5) Superior Water Company, Inc. (“Superior”) DSIC
10 Annualization Adjustment; and (6) Elimination of Availability Charge.

11 The following adjustments were made for wastewater operations: (1) Change in Customers;
12 (2) Annualization of Acquisition - Tobyhanna; (3) Annualization of Acquisition – Avon
13 Grove; (4) Elimination of North Heidelberg Revenue; and (5) Elimination of Availability
14 Charge.

15 **Q. Please describe the Change in Customers adjustment reflected on Schedule B-3 of**
16 **Exhibit 1-A.**

17 A. Schedule B-3 lists adjustments for the estimated change in number of customers during the
18 FTY and FPFTY. Water customer growth is expected in the Residential and Commercial
19 classes, while a decrease is expected in the Industrial class based on the Company’s historical

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 experience, in which the industrial class has decreased by approximately 40 accounts since
2 the last rate case.

3 **Q. Exhibit 1-A, which is regarding water data, has an adjustment to revenue for declining**
4 **residential usage. Can you please explain?**

5 A. Yes. Schedule B-4 of Exhibit 1-A shows an adjustment for declining residential usage.
6 Declining consumption is a well-documented trend in the water industry that is largely
7 attributed to an increase in appliance efficiency and a more positive attitude towards
8 conservation. As Witness Packer, AP Statement No. 1, has testified, the Company's annual
9 consumptive sales from the 2011 case to the current case have declined from approximately
10 37 billion gallons to 34 billion gallons. This trend is expected to continue in the future. As
11 such, an revenue reduction adjustment of (\$389,335) was made for both the FTY and FPFTY
12 has been made to account for this trend. For additional information, refer to the direct
13 testimony of Paul Herbert (AP Statement No. 5).

14 **Q. Exhibit 1-A lists three additional adjustments that are unique to the water data. Can**
15 **you please explain the adjustments?**

16 A. Yes. Schedule B-5 shows the annualization of the acquisition of the Sun Valley water
17 system. In AP Statement No. 1, Mr. Packer discusses in further detail the acquisition of the
18 Sun Valley water system, which was acquired as of January 30, 2018.

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 Schedule B-6 shows a revenue adjustment which was made to reflect the annualization of the
2 DSIC revenues for March 31, 2019 based on the Company's pro forma level at March 31,
3 2018 and the 7.50% rate that became effective on April 1, 2018.

4 Likewise, Schedule B-7 shows a revenue adjustment which was made to reflect the
5 annualization of the DSIC for Superior revenues for March 31, 2019 based on the
6 Company's pro forma level at March 31, 2018 and the 2.42% rate that became effective on
7 June 1, 2018.

8 **Q. Exhibit 1-B includes annualization adjustments for two wastewater system acquisitions.**
9 **Can you please explain the adjustments?**

10 A. Yes, Schedule B-4 lists an adjustment for the annualization of the Tobyhanna wastewater
11 system, and Schedule B-5 lists an adjustment for the annualization of the Avon Grove
12 wastewater system, which were acquired on July 1, 2017 and September 8, 2017,
13 respectively. Since both wastewater systems were acquired during the historic test year, and
14 have only partial year revenue listed for the twelve months ended March 31, 2018, these
15 adjustments annualize the revenues for the FTY and FPFTY.

16 **Q. Schedule B-6 of Exhibit 1-B shows an adjustment that eliminates the revenue from the**
17 **North Heidelberg Sewer Company ("NHSC"). Can you please explain this adjustment**
18 **and why it is necessary?**

19 A. Yes. Aqua Pennsylvania Wastewater, Inc. ("APW") was appointed as receiver for NHSC
20 beginning on March 5, 2018. As receiver, APW is responsible for specific receivership

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 duties as defined in Appendix A of the Commission’s Order entered February 9, 2018 at
2 Docket No. M-2018-2645983, including assuming NHSC’s billing and collection functions.
3 APW will continue its receivership duties during the ongoing 529 proceeding. As such,
4 APW receives revenues attributed to NHSC that must be removed from the operating
5 revenues of APW for purposes of this base rate case.

6 **Q. Schedule B-8 in Exhibit 1-A and Schedule B-7 in Exhibit 1-B present several**
7 **miscellaneous revenue adjustments. Please explain.**

8 A. Schedule B-8 in Exhibit 1-A adjusts the test year revenue amounts to eliminate the
9 availability charge, unbilled public fire revenue, and the State Tax Adjustment Surcharge
10 (“STAS”) refunds. As it has done in previous cases, the Company has eliminated availability
11 charges due to the fact they remain highly uncollectible. Availability charges that the
12 Company currently has are the result of the acquisition of new service areas in which they
13 were charged by the previous ownership. Such charges are not a rate design strategy
14 employed by AP and their elimination has been approved by the PUC in previous rate cases
15 filed by the Company. Schedule B-7 in Exhibit 1-B adjusts the test year revenue amounts to
16 eliminate backbills, which are out of period revenues that should not be included as present
17 rate revenues, and also removes availability charges for the same reasons noted for water.

III. CERTAIN OPERATING EXPENSES

18
19 **Q. Did you prepare any adjustments to the Operating Expenses?**

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 A. Yes, I am responsible for the following adjustments in Exhibit 1-A: (1) Cost of Serving
2 Additional Customers; and the following adjustments in both Exhibit 1-A and 1-B: (2)
3 Amortization of New Positive Acquisition Adjustments; and (3) Amortization of New
4 Negative Acquisition Adjustments.

5 **Q. Please explain the adjustment for Cost of Serving Additional Customers appearing on**
6 **Schedule C-4.3 of Exhibits 1-A.**

7 A. This adjustment recognizes the incremental expense associated with providing service to
8 additional customers. The derivation of the operating ratio between incremental operating
9 expenses and revenue is developed in the lower portion of the schedule. The application of
10 the operating ratio to the additional revenue from new customers connected during the three
11 years ended March 31, 2020 (exclusive of acquisitions) is shown in the upper portion of the
12 schedule. In Exhibit 1-A, an adjustment of \$216,381 is produced from the calculation. This
13 is the additional operating expense that is incurred in conjunction with the \$4,051,907 of
14 additional operating revenue from the new water customers connected during the three years
15 ended March 31, 2020.

16 **Q. Please explain the Amortization of New Positive and New Negative Acquisition**
17 **Adjustments on Schedules C-5.1 and C-5.2 of Exhibit 1-A and 1-B.**

18 A. The Company is proposing to amortize certain positive and negative acquisition adjustments
19 involving acquisitions that were closed after the last AP and APW rate cases were filed.
20 Listed on Schedule C-5.1 of Exhibits 1-A and 1-B is the first year amortization of the new

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 positive acquisition adjustments, and Schedule C-5.2 of the same exhibits list the first year
2 amortization of the new negative acquisition adjustments. A twenty-year amortization period
3 was selected similar to the treatment of prior acquisition adjustments approved by the
4 Commission.

5 **IV. OTHER EXPENSE ADJUSTMENTS - DEPRECIATION**

6 **Q. Please explain the Statement of Depreciation shown on Schedule D-1 of Exhibit 1-A and**
7 **Exhibit 1-B.**

8 A. The Statement of Depreciation in Exhibit 1-A and Exhibit 1-B shows the Company's annual
9 depreciation expense claims for the FTY and FPFTY for both water and wastewater assets.
10 The annual provision for depreciation was computed by Gannett Fleming Valuation and Rate
11 Consultants, LLC for utility plant in service at March 31, 2019 and March 31, 2020 using the
12 straight-line remaining life method as set forth in Mr. Spanos' Exhibit No. 6-A and 6-B. The
13 amount computed by Mr. Spanos relates to utility plant in service, inclusive of customers'
14 advances for construction ("CAC"), contributions in aid of construction ("CIAC") and any
15 related retirements of assets. Comparing the Company's claimed amount with the
16 depreciation expense recorded on the Company's books for the year ended March 31, 2018,
17 results in a FTY increase of \$9,632,994 and a FPFTY increase of \$6,173,184 for water
18 assets; additionally, a FTY increase of \$1,404,767 and a FPFTY increase of \$926,917 for
19 wastewater assets.

20 **V. CERTAIN COMPONENTS OF RATE BASE**

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 **Q. Please describe the data presented in Schedule G-2 of Exhibits 1-A and 1-B and identify**
2 **who is responsible for this data.**

3 A. Schedule G-2 shows the Company's actual utility plant in service as of March 31, 2018, and
4 the projected utility plant in service per scheduled additions and retirements for the twelve
5 months ending March 31, 2019 and March 31, 2020. It also shows the Accumulated
6 Depreciation for each year associated with the Utility Plant in Service. I worked closely
7 with Mr. Spanos by providing him Company data on projected FTY and FPFTY additions
8 and retirements. Accordingly, the aforementioned data was used as the basis for Mr. Spanos'
9 Exhibit No. 6-A and 6-B.

10 **Q. Please explain the derivation of the total Original Cost of Utility Plant in Service for**
11 **both water and wastewater assets for the FTY and FPFTY as reflected in Schedule G-2**
12 **and referenced in Schedule G-1 of Exhibits 1-A and 1-B.**

13 A. The starting point for both water and wastewater utility plant in service was the historic test
14 year ending balance of \$4,104,653,138 for water and \$145,207,627 for wastewater. That
15 figure was then increased to reflect FTY and FPFTY plant additions (net of retirements) and
16 acquired systems (utility plant acquisition adjustments ("UPAA") will be discussed later in
17 this statement). The anticipated additions and retirements of water assets for the years ended
18 March 31, 2019 and March 31, 2020 are set forth in detail in Attachment 1 to my testimony
19 and comprise needed improvements to the Company's infrastructure including, but not
20 limited to: water supply, storage, and distribution facilities. The majority of the Company's
21 capital investment remains in distribution assets such as mains, services, hydrants, valves,

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF RENEE T. MARQUIS

1 and meters. The anticipated additions and retirements of wastewater assets for the years
2 ended March 31, 2019 and March 31, 2020 are set forth in detail in Attachment 2 to my
3 testimony. Details of wastewater capital investments are covered in AP Statement No. 8 by
4 Witness Mark J. Bubel, Sr. Details of the accumulated depreciation used in Schedules G-2
5 can be found in AP Statement No. 6 by Witness John Spanos.

6 **Q. Please explain the adjustments on Schedule G-3 of Exhibit 1-A.**

7 A. The adjustments in Schedule G-3 of Exhibit 1-A reflect the recognition of the positive UPAA
8 associated with the acquisition of various water utility assets pursuant to the terms of the
9 Commission-approved settlement of the Company's rate cases at Docket Nos. R-00038805,
10 R-00051030, R-00072711, and R-2009-2132019. In addition, the Company is requesting
11 recognition of the positive UPAA associated with its acquisition of the water assets for Sand
12 Springs, Mifflin Township, Beech Mountain, Treasure Lake, Concord Park, Mt. Jewett, and
13 Sun Valley. The requirements of these positive UPAA's will be discussed further in this
14 Statement.

15 **Q. Please explain the adjustments on Schedule G-3 of Exhibit 1-B.**

16 A. The adjustments in Schedule G-3 of Exhibit 1-B reflect the recognition of the positive UPAA
17 associated with the acquisition of various wastewater utility assets pursuant to the terms of
18 the Commission-approved settlement of the Company's rate cases at Docket Nos. R-
19 00072319, R-2008-2081738, and R-2010-2207833 and R-2010-2297853. In addition, the
20 Company is requesting recognition of the positive UPAA associated with its acquisition of

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1 the wastewater assets for Treasure Lake, Bunker Hill, Tobyhanna, and Avon Grove. The
2 requirements of these positive UPAAAs will be discussed further in this Statement. The
3 Company is also requesting recognition of the negative UPAA associated with its acquisition
4 of the wastewater assets for Washington Park. Washington Park is an exception to the
5 treatment of negative acquisition adjustments as provided for in Section 1327 of the Public
6 Utility Code (“Section 1327”) , 66 Pa. C.S. § 1327, because it was stipulated in the order
7 approving its acquisition (Docket No. A-230550F2000) that rate base for rate making
8 purposes would be limited to purchase price. To accomplish that requirement, the negative
9 acquisition adjustment has to be included as a deduction to rate base.

10 **Q. Please explain the reductions from rate base for CIAC and CAC as listed on Schedules**
11 **G-6 and G-7 of Exhibits 1-A and 1-B.**

12 A. These reductions to rate base are summarized in Mr. Spanos’ Exhibit 6-A and 6-B. The
13 CIAC and CAC related to plant in service at March 31, 2018 reflect the actual CIAC and
14 CAC recorded on the Company’s books of account as of that date.

VI. ACQUISITIONS

16 **Q. Please provide an overview of the acquisitions which the Company is reflecting in this**
17 **rate base.**

18 A. Since the Company’s last water rate case was filed, the Company has completed the
19 following acquisitions not yet reflected in rate base: (1) WA-1, Sand Springs (11/2011); (2)
20 WA-2, Mifflin Township (4/2012); (3) WA-3, Beech Mountain (5/2012); (4) WA-4, Yalick

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1 Farms (12/2012); (5) WA-5, Treasure Lake (3/2013); (6) WA-6, Concord Park (3/2013); (7)
2 WA-7, Bristol Township (8/2013); (8) WA-8, Mt. Jewett (5/2015); (9) WA-9, Bunker Hill
3 (8/2015); (10) WA-10, Robin Hood Lakes (10/2015); (11) WA-11, East Cameron Township
4 (12/2016); and (12) WA-12, Sun Valley (1/2018). Superior, which was acquired on January
5 1, 2016 via a stock transaction, is also reflected in rate base during this case due to the
6 Company's proposal to merge Superior into AP.

7 Since the Company's last wastewater rate case was filed, the Company has completed the
8 following acquisitions not yet reflected in rate base: (1) WW-1, Washington Park (3/2009);
9 (2) WW-2, Cove Village (8/2009); (3) WW-3, Village at Valley Forge (3/2012); (4) WW-4,
10 Beech Mountain (5/2012); (5) WW-5, Kidder Township (10/2012); (6) WW-6, Sage Hill
11 (12/2012); (7) WW-7, Treasure Lake (3/2013); (8) WW-8, Penn Township (3/2014); (9)
12 WW-9, Bunker Hill (8/2015); (10) WW-10, Honeycroft (11/2016); (11) WW-11, Emlenton
13 (12/2016); (12) WW-12, Tobyhanna (7/2017); and (13) WW-13, Avon Grove (9/2017).

14 Exhibit 3-A and 3-B contain the journal entries and the original cost studies for the water and
15 wastewater acquisitions, respectively, as mentioned above corresponding to the listed
16 classification system.

17 **Q. Please characterize the nature of the service being provided by these systems at the time**
18 **of their acquisition by the Company.**

19 A. In virtually all instances, the owners lacked the technical expertise and/or financial resources
20 needed to provide safe, adequate and reliable water or wastewater service. Some systems

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1 were plagued by water quality or wastewater treatment problems; others frequently
2 experienced water shortages. Stated simply, service, in my judgment, was inadequate.

3 **Q. Please describe the price paid in acquisition of these systems.**

4 A. The Company acquired 14 water and wastewater systems where the purchase price was less
5 than the depreciated original cost (“DOC”) and 11 water and wastewater systems where the
6 purchase price exceeded the DOC. In total, the average purchase price per customer acquired
7 was approximately \$4,500, which is less than to the Company’s historic test year combined
8 water and wastewater rate base per customer of approximately \$6,300 in the instant
9 proceeding.

10 **Q. How does the Company propose to treat these acquisitions for rate purposes?**

11 A. In those instances where the Company paid less than DOC, the assets acquired were recorded
12 on its regulatory books of account at DOC and the Company has amortized the difference
13 between DOC and purchase price as an offset (i.e., reduction) to revenue requirement
14 consistent with Section 1327. These are considered “negative” acquisition adjustments.
15 Where the Company paid more than DOC, the assets acquired were recorded on its
16 regulatory books of account at DOC and the Company has requested a return on and return of
17 purchase price, which is reflected as a “positive” acquisition adjustment.

18 **Q. Section 1327 enumerates certain criteria that an acquiring company must meet in order**
19 **to include a positive acquisition adjustment in rate base. Do you believe that the**

**LIST OF ATTACHMENTS
TO AP STATEMENT NO. 2**

Attachment No.	Description
1.	Water Utility Plant – FTY and FPFTY Additions and Retirements
2.	Wastewater Utility Plant – FTY and FPFTY Additions and Retirements
3.	Section 1327 – Positive Acquisition Adjustments

2018 RATE CASE

WATER TEST YEAR ADDITIONS AND RETIREMENTS BY CATEGORY OF INVESTMENT

FUTURE TEST YEAR ADDITIONS AND RETIREMENTS

Work Order Group	Capital Additions	Capital Retirements
0050-Expense Tracking Projects	1,000,000	-
0095-General Overhead	330,046	-
0096-Payroll Overhead	(2,878)	-
0105-New Mains (Ext @ Cost)	32,169	-
0107-Install Mains- Co Expense	1,784,825	-
0108-Mains Partially Funded By	766,876	-
0109-Main Replacements (NS)	6,760,696	304,231
0110-Main Replacements (SC)	164,857,466	7,380,944
0116-Tie-In Dead End Mains (SC)	3,572,249	160,751
0125-Capitalized Main Breaks	4,369,803	196,641
0130-Highway Relocations (NS)	932,899	41,980
0132-Highway Relocations (SC)	2,756,811	125,626
0136-Valve Replacements (SC)	2,096,191	94,329
0141-Cathodic Protection Equip (NS)	506,565	22,795
0145-Tank Painting	12,441,322	559,859
0150-Contributions in Aid of Constr	(1,215,553)	-
0198-Other Main/DistrSysImpr (SC)	1,818,605	81,870
0199-Other Main/DistrSysImpr (NS)	2,561,407	-
0205-Eligible Meters (SC)	8,017,834	360,808
0210-Eligible Meters (NS)	164,137	-
0215-Supplies Meters (NS)	234,784	10,565
0225-ERT Devices (SC)	3,055,515	137,498
0299-Other Meter Projects	618,029	2,936
0305-New Services	3,412,911	-
0310-Renewal Services-Regular (SC)	2,945,682	132,556
0315-Renewal Services - Main Rehab	19,013,168	139,334
0405-New Hydrants	201,993	-
0410-Replace/Relocate Hydrants	5,518,000	242,910
0415-Eliminate No Drain Hydrants	300,000	13,500
0505-Chlorination Enhancements	1,680,963	53,509
0510-Automated Distr Controls	2,848,964	-
0512-Treatment Plants	35,257,341	1,586,580
0514-Boosters (TPB)	6,990,279	157,142
0515-Improvements Other (TPB) (NS)	6,967,143	303,421
0517-Pumping Equipment Water (NS)	1,118,365	12,376
0520-Equipment (TPB)	186,875	4,992
0521-Wells	19,890,486	340,407
0522-Dams	3,252,107	63,795
0525-Tanks/Resvrs/Standpipes	9,740,968	57,157
0599-Other (TPB)	80,341	394
0610-Treatment Equipment (Lt) (NS)	437,424	7,471
0615-Lab Equipment (Lt)	646,707	19,684
0699-Other Lab/Treatment Work	429,300	-
0705-Fence Replacements	265,473	11,946
0710-Office Furniture	636,547	-
0715-Office Equipment	241,745	-
0720-Improvements	15,792,611	565,816
0730-Backflow Prevention	61,318	59
0805-New Vehicles	3,124,726	-
0810-Mechanical Equipment	1,529,133	-
0900-Information System Expenditure	16,699,658	-
0901-Working Tools	820,613	77
0902-Safety	2,232,167	1,625
0903-Land Purchases/Disposals	203,110	-
0904-Reserves	1,423,206	-
0905-Retirements W/O Replacement	279,560	-
0911-Security	3,914,304	43,727
0997-Contributed Property (CWIP)	2,828,613	-
0998-Contributed Property (CIAC)	(2,828,613)	-
TOTAL	385,602,988	13,239,313

2018 RATE CASE

WATER TEST YEAR ADDITIONS AND RETIREMENTS BY CATEGORY OF INVESTMENT

FULLY PROJECTED FUTURE TEST YEAR ADDITIONS AND RETIREMENTS

Work Order Group	Capital Additions	Capital Retirements
0050-Expense Tracking Projects	500,000.00	-
0095-General Overhead	495,068.95	-
0096-Payroll Overhead	(4,316.26)	-
0105-New Mains (Ext @ Cost)	41,504.18	-
0107-Install Mains- Co Expense	1,800,973.38	-
0108-Mains Partially Funded By	641,377.17	-
0109-Main Replacements (NS)	2,566,044.26	115,471.99
0110-Main Replacements (SC)	130,133,589.35	5,833,129.10
0116-Tie-In Dead End Mains (SC)	2,422,914.95	109,031.17
0125-Capitalized Main Breaks	4,416,000.00	198,720.00
0130-Highway Relocations (NS)	337,699.13	15,196.46
0132-Highway Relocations (SC)	2,490,273.01	112,062.29
0136-Valve Replacements (SC)	1,844,654.13	83,009.44
0141-Cathodic Protection Equip (NS)	206,397.09	9,287.87
0145-Tank Painting	7,405,233.32	333,235.50
0150-Contributions in Aid of Constr	(968,500.00)	-
0198-Other Main/DistrSysImpr (SC)	1,819,804.62	81,891.21
0199-Other Main/DistrSysImpr (NS)	2,579,149.74	-
0205-Eligible Meters (SC)	6,116,295.00	275,233.28
0210-Eligible Meters (NS)	615,170.00	3,037.50
0215-Supplies Meters (NS)	304,360.00	13,673.70
0225-ERT Devices (SC)	2,732,055.00	122,942.48
0299-Other Meter Projects	899,818.40	4,218.75
0305-New Services	3,695,074.97	-
0310-Renewal Services-Regular (SC)	3,667,903.96	165,055.68
0315-Renewal Services - Main Rehab	16,182,600.00	557,337.60
0405-New Hydrants	183,000.00	-
0410-Replace/Relocate Hydrants	3,577,952.58	157,407.87
0415-Eliminate No Drain Hydrants	1,200,000.00	54,000.00
0505-Chorination Enhancements	743,119.61	31,682.24
0510-Automated Distr Controls	2,067,895.20	-
0512-Treatment Plants	24,076,690.00	1,083,451.05
0514-Boosters (TPB)	3,473,793.70	120,212.63
0515-Improvements Other (TPB) (NS)	2,784,069.47	127,753.07
0517-Pumping Equipment Water (NS)	732,397.62	6,138.00
0520-Equipment (TPB)	159,562.18	1,526.15
0521-Wells	17,543,049.03	268,607.97
0522-Dams	3,857,336.00	96,955.40
0525-Tanks/Resvrs/Standpipes	3,824,911.64	32,176.61
0599-Other (TPB)	106,686.63	2,531.25
0610-Treatment Equipment (Lt) (NS)	227,435.36	2,039.70
0615-Lab Equipment (Lt)	563,347.74	21,441.24
0699-Other Lab/Treatment Work	287,500.00	-
0705-Fence Replacements	149,610.14	6,732.46
0710-Office Furniture	526,987.80	-
0715-Office Equipment	68,541.80	-
0720-Improvements	16,123,341.14	628,523.14
0730-Backflow Prevention	40,580.37	26.12
0805-New Vehicles	3,036,389.69	-
0810-Mechanical Equipment	791,198.77	-
0900-Information System Expenditure	13,875,166.58	-
0901-Working Tools	593,506.97	-
0902-Safety	1,329,187.69	5,098.50
0903-Land Purchases/Disposals	142,235.68	-
0905-Retirements W/O Replacement	355,000.00	-
0911-Security	2,442,227.80	39,603.38
0997-Contributed Property (CWIP)	-	-
0998-Contributed Property (CIAC)	-	-
TOTAL	297,823,866	10,718,441

2018 RATE CASE

WASTEWATER TEST YEAR ADDITIONS AND RETIREMENTS BY CATEGORY OF INVESTMENT

FUTURE TEST YEAR ADDITIONS AND RETIREMENTS

Work Order Group	Capital Additions	Capital Retirements
0112-Gravity Mains Sewer (NS)	76,660	3,450
0117-Forced Mains Sewer (SC)	629,348	28,321
0118-Gravity Mains Sewer (SC)	7,438,583	334,745
0150-Contributions in Aid of Constr	-	-
0211-Flow Measuring Devices Sewer	4,567	205
0305-New Services	219,117	-
0310-Renewal Services-Regular (SC)	19,318	869
0510-Automated Distr Controls	738,829	-
0512-Treatment Plants	754,671	33,960
0515-Improvements Other (TPB) (NS)	18,342,476	825,412
0516-Pumping Equipment Sewer (NS)	1,189,477	42,375
0518-Pumping Equipment Sewer (SC)	1,095,704	23,706
0520-Equipment (TPB)	6,119,525	108,942
0550-Grinder Pumps (NS)	22,500	1,013
0599-Other (TPB)	50,000	-
0610-Treatment Equipment (Lt) (NS)	65,591	2,952
0615-Lab Equipment (Lt)	62,357	338
0705-Fence Replacements	48,000	2,160
0715-Office Equipment	20	-
0720-Improvements	9,204	15
0740-Effluent Disposal System	379,116	16,838
0760-Power Generation Equip (NS)	200,000	9,000
0761-Power Generation Equip (SC)	59,792	-
0799-Other Building/Maintenance Work	75,000	-
0805-New Vehicles	112,537	-
0900-Information System Expenditure	498,054	-
0901-Working Tools	1,250	-
0902-Safety	241,728	4,101
0905-Retirements W/O Replacement	70,000	-
0911-Security	240,164	7
0611-Treatment Equipment (Lt) (SC)	5,000	225
TOTAL	38,768,587	1,438,634

2018 RATE CASE

WASTEWATER TEST YEAR ADDITIONS AND RETIREMENTS BY CATEGORY OF INVESTMENT

FULLY PROJECTED FUTURE TEST YEAR ADDITIONS AND RETIREMENTS

Work Order Group	Capital Additions	Capital Retirements
0112-Gravity Mains Sewer (NS)	39,990.74	1,799.58
0117-Forced Mains Sewer (SC)	78,396.83	3,527.86
0118-Gravity Mains Sewer (SC)	3,613,275.25	162,601.07
0211-Flow Measuring Devices Sewer	2,012.40	90.56
0305-New Services	125,550.01	-
0310-Renewal Services-Regular (SC)	22,627.28	1,018.23
0510-Automated Distr Controls	335,412.15	-
0512-Treatment Plants	802,004	36,090
0515-Improvements Other (TPB) (NS)	18,534,817	834,067
0516-Pumping Equipment Sewer (NS)	686,754	26,078
0518-Pumping Equipment Sewer (SC)	864,745	37,098
0520-Equipment (TPB)	2,843,430	74,369
0599-Other (TPB)	200,000	-
0610-Treatment Equipment (Lt) (NS)	12,137	546
0615-Lab Equipment (Lt)	29,786	1,013
0705-Fence Replacements	32,000	1,440
0720-Improvements	9,812	46
0740-Effluent Disposal System	103,674	4,332
0761-Power Generation Equip (SC)	14,688	-
0805-New Vehicles	65,556	-
0900-Information System Expenditure	311,889	-
0901-Working Tools	3,750	-
0902-Safety	91,342	29
0911-Security	180,000	-
0150-Contributions in Aid of Constr	(225,000)	-
0905-Retirements W/O Replacement	80,000	-
0550-Grinder Pumps (NS)	37,500	1,688
0611-Treatment Equipment (Lt) (SC)	-	-
TOTAL	28,896,149	1,185,834

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Sand Springs Water Company, Inc.

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On November 1, 2011, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Water System Assets (“Assets”) of the Sand Springs Water Company, Inc. (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, Sand Springs Water Company, Inc. was providing water service to 330 residential customers in portions of Butler Township, Luzerne County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2011-2250344 and A-2011-2250345</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p>	Yes	

<p>violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and</p>	<p>Yes</p>	

reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On June 28, 2011, the parties filed a <i>Joint Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered August 25, 2011, at Docket Nos. A-2011-2250344 and A-2011-2250345, the PUC granted the approvals requested in the <i>Joint Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$1,550,000 and was negotiated at arm's length. The Commission approved the company's application to acquire Sand Springs Water Company, Inc. and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket Nos. A-2011-2250344 and A-2011-2250345
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Mifflin Township Water Authority

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On April 2, 2012, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Water System Assets (“Assets”) of the Mifflin Township Water Authority (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, Mifflin Township Water Authority, Inc. was providing water service to 483 residential customers and 5 commercial customers in portions of Mifflin Township, Columbia County, Pennsylvania.</p> <p>Reference: Commission Order Docket No. A-2011-2272163</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p> <p>violation of statutory or regulatory requirements</p>	Yes	

<p>of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and reasonable service;</p>	<p>Yes</p>	

<p>(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;</p>	<p>Yes</p>	<p>Aqua and the Seller entered into an <i>Asset Purchase Agreement</i>, which was negotiated at arm's length. On November 8, 2011, Aqua filed an <i>Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered February 17, 2012, at Docket No. A-2011-2272163, the PUC granted the approvals requested in the <i>Application</i>.</p>
<p>(6) the actual purchase price is reasonable;</p>	<p>Yes</p>	<p>The total purchase price for Seller's Assets was \$1,114,000 and was negotiated at arm's length. The Commission approved the company's application to acquire Mifflin Township Water Authority and an original cost study was prepared to support the utility plant purchase.</p> <p>Reference: Commission Order Docket No. A-2011-2272163</p>
<p>(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;</p>	<p>Yes</p>	<p>The Seller is not an affiliated interest of Aqua.</p>
<p>(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and</p>	<p>Yes</p>	<p>The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.</p>
<p>(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.</p>	<p>Yes</p>	<p>The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.</p>

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Total Environmental Solutions, Inc. (TESI) - Beech Mountain Lakes Resort Community Water System

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	<p>Yes</p>	<p>On May 4, 2012, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Water System Assets (“Assets”) of the Total Environmental Solutions, Inc. (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	<p>Yes</p>	<p>Prior to Aqua’s acquisition of Seller’s Assets, Total Environmental Solutions, Inc. was providing water service to 962 customers in the Beech Mountain Lakes Resort Community in portions of Butler and Dennison Township, Luzerne County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2011-2276845, A-2011-2276847, A-2011-2276856, and A-2011-2276857</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p>	<p>Yes</p>	

<p>(i) violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the</p>	<p>Yes</p>	

property will receive adequate, efficient, safe and reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On December 1, 2011, the parties filed a <i>Joint Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered February 17, 2012, at Docket Nos. A-2011-2276845, A-2011-2276847, A-2011-2276856, and A-2011-2276857, the PUC granted the approvals requested in the <i>Joint Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$1,500,000 for the combined water and wastewater system and was negotiated at arm's length. The Commission approved the company's application to acquire Total Environmental Solutions, Inc. (TESI) - Beech Mountain Lakes Resort Community Water System and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket Nos. A-2011-2276845, A-2011-2276847, A-2011-2276856, and A-2011-2276857
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base

over a reasonable period of time with corresponding reductions in the rate base.		rates become effective.
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**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Total Environmental Solutions, Inc. (TESI) - Treasure Lake Community Water System

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On March 1, 2013, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Water System Assets (“Assets”) of the Total Environmental Solutions, Inc. (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, Total Environmental Solutions, Inc. was providing water service to 2,175 customers in the Treasure Lake Community in a portion of Sandy Township, Clearfield County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2012-2322416, A-2012-2322501, A-2012-2322448, and A-2012-2322509</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p>	Yes	

<p>violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and</p>	<p>Yes</p>	

reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On August 31, 2012, the parties filed a <i>Joint Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered December 20, 2012, at Docket Nos. A-2012-2322416, A-2012-2322501, A-2012-2322448, and A-2012-2322509, the PUC granted the approvals requested in the <i>Joint Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$11,800,000 for the combined water and wastewater system and was negotiated at arm's length. The Commission approved the company's application to acquire Total Environmental Solutions, Inc. (TESI) - Treasure Lake Community Water System and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket Nos. A-2012-2322416, A-2012-2322501, A-2012-2322448, and A-2012-2322509
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.

corresponding reductions in the rate base.		
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**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

BCWSA/Concord Park Community

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On March 30, 2013, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Concord Park Water System Assets (“Assets”) of Bucks County Water & Sewer Authority (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, Bucks County Water & Sewer Authority was providing water service to 168 customers in the Concord Park section in a portion of Bensalem Township, Bucks County, Pennsylvania.</p> <p>Reference: Commission Order Docket No. A-2012-2282709</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p> <p>violation of statutory or regulatory requirements</p>	Yes	

<p>of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and reasonable service;</p>	<p>Yes</p>	

<p>(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;</p>	<p>Yes</p>	<p>Aqua and the Seller entered into an <i>Asset Purchase Agreement</i>, which was negotiated at arm's length. On December 28, 2011, Aqua filed an <i>Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered March 15, 2012, at Docket No. A-2012-2282709, the PUC granted the approvals requested in the <i>Application</i>.</p>
<p>(6) the actual purchase price is reasonable;</p>	<p>Yes</p>	<p>The total purchase price for the Seller's Assets was \$399,336 and was negotiated at arm's length. The Commission approved the company's application to acquire the Concord Park assets of Bucks County Water & Sewer Authority and an original cost study was prepared to support the utility plant purchase.</p> <p>Reference: Commission Order Docket No. A-2012-2282709</p>
<p>(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;</p>	<p>Yes</p>	<p>The Seller is not an affiliated interest of Aqua.</p>
<p>(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and</p>	<p>Yes</p>	<p>The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.</p>
<p>(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.</p>	<p>Yes</p>	<p>The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.</p>

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Mt. Jewett Borough Water System

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	<p>Yes</p>	<p>On May 6, 2015, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Water System Assets (“Assets”) of the Mount Jewett Borough (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	<p>Yes</p>	<p>Prior to Aqua’s acquisition of Seller’s Assets, Mount Jewett Borough was providing water service to 453 residential, 17 commercial, 2 industrial, 9 institutional, and 3 “other” customers in Mount Jewett Borough and a portion of Hamlin Township, McKean County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2014-2448000</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p>	<p>Yes</p>	

<p>violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p style="text-align: center;">(ii)</p> <p>a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p style="text-align: center;">(iii)</p> <p>a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p style="text-align: center;">(iv)</p> <p>a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p style="text-align: center;">(v)</p> <p>any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p style="text-align: center;">(4)</p> <p>reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and</p>	<p>Yes</p>	

reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On October 15, 2014, Aqua filed an <i>Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered February 26, 2015, at Docket No. A-2014-2448000, the PUC granted the approvals requested in the <i>Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$1,126,350 and was negotiated at arm's length. The Commission approved the company's application to acquire Mount Jewett Borough assets and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket No. A-2014-2448000
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Sun Valley Water Company

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On January 30, 2018, Aqua Pennsylvania, Inc. (“Aqua”) acquired the Water System Assets (“Assets”) of Sun Valley Water Company (“Seller”). The Seller’s Assets were used and useful in providing water service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, Sun Valley Water Company was providing water service to approximately 70 residential customers in a portion of Chestnuthill Township, Monroe County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2017-2626577</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p> <p>violation of statutory or regulatory requirements</p>	Yes	

<p>of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and reasonable service;</p>	<p>Yes</p>	

<p>(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;</p>	<p>Yes</p>	<p>On September 26, 2017, Aqua filed an <i>Application</i> with the PUC requesting for appointment of Aqua as the receiver for the Sun Valley Water Company's assets. By <i>Order</i> entered January 18, 2018, at Docket No. A-2017-2626577, the PUC granted the approvals requested in the <i>Application</i>.</p>
<p>(6) the actual purchase price is reasonable;</p>	<p>Yes</p>	<p>The total purchase price for Seller's Assets was \$501. The Commission approved the company's application to acquire Sun Valley Water Company's assets and an original cost study was prepared to support the utility plant purchase.</p> <p>Reference: Commission Order Docket No. A-2017-2626577</p>
<p>(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;</p>	<p>Yes</p>	<p>The Seller is not an affiliated interest of Aqua.</p>
<p>(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and</p>	<p>Yes</p>	<p>The <i>Asset Purchase Agreement</i> and the <i>PUC Order</i> stipulated that Aqua adopt the Seller's existing rate structure.</p>
<p>(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.</p>	<p>Yes</p>	<p>The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.</p>

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Total Environmental Solutions, Inc. (TESI) - Treasure Lake Community Sewer System

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On March 1, 2013, Aqua Pennsylvania Wastewater, Inc. (“Aqua”) acquired the Wastewater System Assets (“Assets”) of the Total Environmental Solutions, Inc. (“Seller”). The Seller’s Assets were used and useful in providing wastewater service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, Total Environmental Solutions, Inc. was providing wastewater service to 2,175 customers in the Treasure Lake Community in a portion of Sandy Township, Clearfield County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2012-2322416, A-2012-2322501, A-2012-2322448, and A-2012-2322509</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p>	Yes	

<p>violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p style="text-align: center;">(ii)</p> <p>a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p style="text-align: center;">(iii)</p> <p>a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p style="text-align: center;">(iv)</p> <p>a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p style="text-align: center;">(v)</p> <p>any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p style="text-align: center;">(4)</p> <p>reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and</p>	<p style="text-align: center;">Yes</p>	

reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On August 31, 2012, the parties filed a <i>Joint Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered December 20, 2012, at Docket Nos. A-2012-2322416, A-2012-2322501, A-2012-2322448, and A-2012-2322509, the PUC granted the approvals requested in the <i>Joint Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$11,800,000 for the combined water and wastewater system and was negotiated at arm's length. The Commission approved the company's application to acquire Total Environmental Solutions, Inc. (TESI) - Treasure Lake Community Sewer System and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket Nos. A-2012-2322416, A-2012-2322501, A-2012-2322448, and A-2012-2322509
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Bunker Hill Sewer Company, Inc.

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	<p>Yes</p>	<p>On August 12, 2015, Aqua Pennsylvania Wastewater, Inc. (“Aqua”) acquired the Wastewater System Assets (“Assets”) of the Bunker Hill Sewer Company, Inc. (“Seller”). The Seller’s Assets were used and useful in providing wastewater service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	<p>Yes</p>	<p>Prior to Aqua’s acquisition of Seller’s Assets, Bunker Hill Sewer Company, Inc. was providing wastewater service to 68 residential customers in a portion of Clinton Township, Wyoming County, Pennsylvania.</p> <p>Reference: Commission Order Docket Nos. A-2014-2439909 and A-2014-2439910</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p>	<p>Yes</p>	

<p>(i) violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the</p>	<p>Yes</p>	

property will receive adequate, efficient, safe and reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On August 12, 2014, the parties filed a <i>Joint Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered July 8, 2015, at Docket Nos. A-2014-2439909 and A-2014-2439910, the PUC granted the approvals requested in the <i>Joint Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$100,000 and was negotiated at arm's length. The Commission approved the company's application to acquire Bunker Hill Sewer Company, Inc. and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket Nos. A-2014-2439909 and A-2014-2439910
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Township of Tobyhanna

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	<p style="text-align: center;">Yes</p>	<p>On July 1, 2017, Aqua Pennsylvania Wastewater, Inc. (“Aqua”) acquired the Wastewater System Assets (“Assets”) of the Township of Tobyhanna (“Seller”). The Seller’s Assets were used and useful in providing wastewater service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	<p style="text-align: center;">Yes</p>	<p>Prior to Aqua’s acquisition of Seller’s Assets, the Township of Tobyhanna was providing wastewater service to 639 residential and 88 commercial customers in a portion of Tobyhanna Township, Monroe County, Pennsylvania.</p> <p>Reference: Commission Order Docket No. A-2016-2575001</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p> <p>violation of statutory or regulatory requirements</p>	<p style="text-align: center;">Yes</p>	

<p>of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p>(ii) a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p>(iii) a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p>(iv) a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p>(v) any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p>(4) reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and reasonable service;</p>	<p>Yes</p>	

<p>(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;</p>	<p>Yes</p>	<p>Aqua and the Seller entered into an <i>Asset Purchase Agreement</i>, which was negotiated at arm's length. On November 8, 2016, Aqua filed an <i>Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered March 16, 2017, at Docket No. A-2016-2575001, the PUC granted the approvals requested in the <i>Application</i>.</p>
<p>(6) the actual purchase price is reasonable;</p>	<p>Yes</p>	<p>The total purchase price for Seller's Assets was \$5,500,000 and was negotiated at arm's length and an additional \$45,000 was paid towards the Seller's share of closing cost. The Commission approved the company's application to acquire the wastewater assets of Tobyhanna Township and an original cost study was prepared to support the utility plant purchase.</p> <p>Reference: Commission Order Docket No. A-2016-2575001</p>
<p>(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;</p>	<p>Yes</p>	<p>The Seller is not an affiliated interest of Aqua.</p>
<p>(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and</p>	<p>Yes</p>	<p>The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.</p>
<p>(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.</p>	<p>Yes</p>	<p>The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.</p>

**SATISFACTION OF THE CRITERIA ESTABLISHED BY §1327(A)
FOR INCLUDING IN RATE BASE A POSITIVE ACQUISITION ADJUSTMENT**

Avon Grove School District

Section 1327(a) Criteria	Satisfied (Y/N)	Explanation
<p style="text-align: center;">(1)</p> <p>the property is used and useful in providing water or sewer service;</p>	Yes	<p>On September 8, 2017, Aqua Pennsylvania Wastewater, Inc. (“Aqua”) acquired the Wastewater System Assets (“Assets”) of Avon Grove School District (“Seller”). The Seller’s Assets were used and useful in providing wastewater service and an original cost study was prepared and submitted to the Commission.</p> <p>Reference: Original Cost Study</p>
<p style="text-align: center;">(2)</p> <p>the public utility acquired the property from another public utility, a municipal corporation or a person which had 3,300 or fewer customer connections or which was nonviable in the absence of the acquisition;</p>	Yes	<p>Prior to Aqua’s acquisition of Seller’s Assets, the Avon Grove School District was providing wastewater service to the Administration Building, the Penn London Elementary School and the Avon Grove Intermediate School in portions of New London and Penn Township, Chester County, Pennsylvania.</p> <p>Reference: Commission Order Docket No. A-2017-2586983</p>
<p style="text-align: center;">(3)</p> <p>the public utility, municipal corporation or person from which the property was acquired was not, at the time of acquisition, furnishing and maintaining adequate, efficient, safe and reasonable service and facilities, evidence of which shall include, but not be limited to, any one or more of the following:</p> <p style="text-align: center;">(i)</p>	Yes	

<p>violation of statutory or regulatory requirements of the Department of Environmental Resources or the commission concerning the safety, adequacy, efficiency or reasonableness of service and facilities;</p> <p style="text-align: center;">(ii)</p> <p>a finding by the commission of inadequate financial, managerial or technical ability of the small water or sewer utility;</p> <p style="text-align: center;">(iii)</p> <p>a finding by the commission that there is a present deficiency concerning the availability of water, the palatability of water or the provision of water at adequate volume and pressure;</p> <p style="text-align: center;">(iv)</p> <p>a finding by the commission that the small water or sewer utility, because of necessary improvements to its plant or distribution system, cannot reasonably be expected to furnish and maintain adequate service to its customers in the future at rates equal to or less than those of the acquiring public utility; or</p> <p style="text-align: center;">(v)</p> <p>any other facts, as the commission may determine, that evidence the inability of the small water or sewer utility to furnish or maintain adequate, efficient, safe and reasonable service and facilities;</p>		
<p style="text-align: center;">(4)</p> <p>reasonable and prudent investments will be made to assure that the customers served by the property will receive adequate, efficient, safe and</p>	<p style="text-align: center;">Yes</p>	

reasonable service;		
(5) the public utility, municipal corporation or person whose property is being acquired is in agreement with the acquisition and the negotiations which led to the acquisition were conducted at arm's length;	Yes	Aqua and the Seller entered into an <i>Asset Purchase Agreement</i> , which was negotiated at arm's length. On February 2, 2017, Aqua filed an <i>Application</i> with the PUC requesting the approvals necessary for the proposed transfer. By <i>Order</i> entered July 12, 2017, at Docket No. A-2017-2586983, the PUC granted the approvals requested in the <i>Application</i> .
(6) the actual purchase price is reasonable;	Yes	The total purchase price for Seller's Assets was \$100,000 and was negotiated at arm's length. The Commission approved the company's application to acquire the wastewater assets of Avon Grove School District and an original cost study was prepared to support the utility plant purchase. Reference: Commission Order Docket No. A-2017-2586983
(7) neither the acquiring nor the selling public utility, municipal corporation or person is an affiliated interest of the other;	Yes	The Seller is not an affiliated interest of Aqua.
(8) the rates charged by the acquiring public utility to its pre-acquisition customers will not increase unreasonably because of the acquisition; and	Yes	The <i>Asset Purchase Agreement</i> and the PUC <i>Order</i> stipulated that Aqua adopt the Seller's existing rate structure.
(9) the excess of the acquisition cost over the depreciated original cost will be added to the rate base to be amortized as an addition to expense over a reasonable period of time with corresponding reductions in the rate base.	Yes	The excess of the acquisition cost over depreciated original cost has been included in Aqua's rate base claim in this case and will be amortized over 20 years commencing on the date new base rates become effective.

AP STATEMENT NO. 3

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

AQUA PENNSYLVANIA, INC.

DOCKET NO. R-2018-3003068

**DIRECT TESTIMONY OF
ERIN M. FEENEY**

**With Regard To
Various Expense Adjustments**

August 17, 2018

1 **I. INTRODUCTION AND SCOPE OF TESTIMONY**

2 **Q. What is your name and business address?**

3 A. My name is Erin M. Feeney. My business address is 762 W. Lancaster Avenue, Bryn Mawr,
4 Pennsylvania 19010.

5 **Q. By whom are you employed and in what capacity?**

6 A. I am employed by Aqua Pennsylvania, Inc. (“Aqua PA”, “AP”, or the “Company”) as a
7 Financial Analyst II.

8 **Q. Please describe your education and business experience.**

9 A. I graduated from La Salle University in 2012 with a Bachelor of Science degree in Business
10 Administration, with a major in Accounting. I have also completed the Utility Rate School
11 course sponsored by the National Association of Regulatory Utility Commissioners.

12 I have been employed by Aqua PA or Aqua Services, Inc. (“Aqua Services”), the service
13 company for Aqua America, Inc. (“Aqua America”), since 2009. Throughout my university
14 education, I worked at Aqua Services part-time in a variety of departments, including
15 Finance Projects, Tax, and Financial Planning and Analysis. Upon graduation, I was hired as
16 a full-time Financial Analyst in the Financial Planning and Analysis (“FP&A”) department,
17 and in 2014 I was promoted to a Financial & Systems Analyst. My duties in the FP&A
18 department included developing, preparing and maintaining financial reports, variance
19 analysis and other financial models while closely supporting the budgeting and long term
20 planning needs of Aqua America’s subsidiaries. In 2016, I transferred to Aqua PA where I
21 filled my current role in the Rates & Planning Department.

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 **Q. What are your duties as a Financial Analyst II in Rates & Planning?**

2 A. I assist in the preparation of rate filings, quarterly and annual filings for Distribution System
3 Improvement Charge (“DSIC”) surcharges, earnings report filings and tariff updates. I build
4 and maintain financial reports, variance analysis, ad hoc reports, and other complex financial
5 models while streamlining these processes and automating reports. I report directly to the
6 Manager, Financial Analysis of Aqua PA.

7 **Q. What is the purpose of your testimony?**

8 A. The purpose of my testimony is to identify and describe various expense adjustments in
9 Exhibits 1-A and 1-B submitted in support of Aqua PA’s proposed rate increase for water
10 and wastewater operations, respectively, including; (1) the general price level adjustment; (2)
11 uncollectible accounts; (3) insurance expense; (4) purchased power expense; (5) chemical
12 expense; (6) purchased water expense; (7) water production adjustment; (8) purchased
13 wastewater treatment expense; (9) the elimination of the National Association of Water
14 Companies (“NAWC”) lobbying expense; and (10) the adjustments for the Pennsylvania
15 Public Utility Commission (“PUC”), Office of Consumer Advocate (“OCA”), and Office of
16 Small Business Advocate (“OSBA”) General Assessments.

17 **Q. For which of the Company’s Exhibits are you responsible?**

18 A. I am responsible for portions of the primary accounting exhibits for water and wastewater
19 operations, respectively, Exhibits 1-A and 1-B. In addition, I assisted in the preparation of the
20 following backup volumes that contain responses to the Commission’s standard rate case

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 filing requirements with respect to: A. Statement of Income, B. Operating Revenues, C.
2 Operating Expenses, E. Rate Base, G. Rate of Return and J. Balance Sheet.

II. OPERATING EXPENSE ADJUSTMENTS

4 **Q. Please explain the General Price Level Adjustment appearing on Schedule C-4.1 of**
5 **Exhibits 1-A and 1-B.**

6 A. This adjustment reflects the anticipated effect of inflation on operating expenses that were not
7 specifically adjusted in this case. The future test year (“FTY”) adjustment in Exhibits 1-A
8 and 1-B is derived from the total pro forma historic test year (“HTY”) operating expenses,
9 less the amounts specifically adjusted in this filing or not otherwise subject to inflation. The
10 remaining amount which is subject to the effect of inflation is then multiplied by the average
11 GDP chained price index forecast from the second quarter of 2018 through the first quarter of
12 2019 to arrive at the inflationary increase amount for the twelve months ending March 31,
13 2019. The fully projected future test year (“FPFTY”) adjustment in both Exhibits is derived
14 from the total pro forma FTY operating expenses, less the amounts specifically adjusted in
15 this filing or not otherwise subject to inflation. The remaining amount which is subject to the
16 effect of inflation is then multiplied by the average GDP chained price index forecast from
17 the second quarter of 2019 through the first quarter of 2020¹ to arrive at the inflationary
18 increase amount for the twelve months ending March 31, 2020.

19 **Q. Please describe Schedule C-4.10, which is titled, “Specific Expenses Not Subject To**
20 **Inflation”.**

¹ The index data for both adjustments was obtained from the Blue Chip Economic Indicators, dated January 10, 2018. Data for the first quarter of 2020 is not available in the Blue Chip Report; therefore data from the prior quarter was used. The calculation for the annual rate can be found in Schedule C-4.1.i in both Exhibits 1-A and 1-B.

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 A. This schedule lists those expenses that are not separately adjusted for or are otherwise not
2 subject to growth from inflation. As I explained earlier, these expenses were eliminated from
3 the operating expenses subject to the inflationary adjustment in Schedule C-4.1.

4 **Q. Please explain the adjustment to Uncollectible Accounts expense on Schedule C-4.2 of**
5 **Exhibits 1-A and 1-B.**

6 A. The Company's claims for uncollectible accounts expense were developed by applying the
7 three year average factor of net write-offs (as supported in Schedule C-4.2.i) to the HTY,
8 FTY and FPFTY level revenues at present rates for both Exhibits 1-A and 1-B.

9 The annualized uncollectible accounts factor was calculated by utilizing the Company's
10 actual write-off experience for the three years ended March 31, 2018 divided by the Total
11 Sales to General Customers for the three years ended March 31, 2018. For water, Schedule
12 C-4.2.i in Exhibit 1-A calculates an annualized uncollectible accounts factor of 0.51060%.
13 For wastewater, Schedule C-4.2.i in Exhibit 1-B calculates an annualized uncollectible
14 accounts factor of 1.17051%.

15 **Q. Please explain the adjustment to Insurance Expense on Schedule C-4.6 of Exhibits 1-A**
16 **and 1-B.**

17 A. The Company has insurance policies for General Liability, Workers Compensation, Vehicle,
18 and Miscellaneous Other (Surety Bonds, Flood, Executive Risk, etc.) forms of coverage. The
19 policies in effect are reviewed and analyzed annually by the Company and its third-party
20 insurance broker and carrier, utilizing a multi-year claims history to determine the required
21 reserve necessary for each type of insurance. The Company's historical average annual

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 increase in this expense line was 5.06% for the years 2014 through 2018. This average, along
2 with the most recent actual premiums experienced in 2018 were utilized as a basis for the
3 FTY ended March 31, 2019 and FPFTY March 31, 2020 claims. The amounts calculated for
4 both the FTY and FPFTY were reduced by the appropriate amounts not charged to operating
5 expense.

6 **Q. Please explain the adjustment to Purchased Power detailed in Schedule C-6.1 of**
7 **Exhibits 1-A and 1-B.**

8 The Purchased Power Expense in both of the referenced exhibits is composed of two
9 classifications – Electric (Schedule C-6.1.i) and Gas (Schedule C-6.1.ii).

10 The electric purchased power expense claim on Schedule C-6.1.i was generally derived by
11 multiplying projected usage by electric power supply rates through the FPFTY. For water
12 operations, usage adjustments were made to reflect changes in usage of new utility accounts
13 that did not have a full twelve months of operation in the HTY, exclusive of acquisitions.

14 There were no such adjustments made for wastewater electric usage in Exhibit 1-B. Electric
15 costs for the HTY reflected are based on current rates. Electric costs were adjusted based on
16 current contract rates through the FPFTY. For non-contracted electric power supply rates, a
17 2% annual increase was assumed.

18 With respect to its water operations, Aqua also participates in supply, utility and PJM peak
19 and demand response programs where possible to reduce electric costs. Additionally, the
20 Company utilizes solar generated power at its Pickering and Ingrams Mill treatment plants
21 that produce electric savings in the form of usage reductions. Both the program-related costs

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 savings and solar power-related usage reductions are shown in Schedule C-6.1.i of Exhibit 1-
2 A. Because the Constellation and PECO Act 129 program rebates have been highly variable
3 in the past, the Company's FTY and FPFTY rebate values are less than the HTY value.

4 In the gas purchased power expense claim, as shown on Schedules C-6.1.ii, costs for the
5 HTY are based on current rates and with an assumed 10% increase in the FTY and no
6 additional increase for the FPFTY. Projected cost escalations for natural gas are based on
7 U.S. Energy Information Administration "EIA" estimates.

8 **Q. Please explain the adjustment to Chemicals Expense in Schedule C-6.2 of Exhibits 1-A**
9 **and 1-B.**

10 A. The Company utilizes various chemicals in the water and wastewater treatment process. In
11 order to secure the best available pricing, the Company conducts a competitive bidding
12 process to establish unit price contracts for the chemical requirements at its various treatment
13 plants. The claim for chemical expense in Schedule C-6.2 for Exhibit 1-A was developed by
14 first determining the cost per million gallons produced for this historic test year. This cost
15 was then further increased in both the FTY and FPFTY by the compound annual growth rate
16 of 4.21% for the proceeding three years ended March 2017, 2016, and 2015. The resulting
17 cost per million gallons was multiplied by the production send out in millions of gallons for
18 the twelve months ended March 31, 2018, to arrive at the Chemical Expense rate adjustments
19 for both the FTY and FPFTY. The claim for chemical expense in Schedule C-6.2 of Exhibit
20 1-B was calculated by taking the average chemical expense for the three years ended March
21 31, 2018, normalized for acquisitions to arrive at the claim for the FTY and FPFTY.

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 **Q. Please explain the adjustment to Purchased Water Expense detailed in Schedule C-7.1**
2 **of Exhibit 1-A.**

3 A. The purchased water expense claim was generally derived by taking HTY gallons, adjusted
4 to reflect the termination of purchases from the Bucks County Water and Sewer Authority as
5 discussed by Mr. Packer in AP Statement No. 1, and then applying current rates - adjusted to
6 reflect the following projected increases from the Philadelphia Water Department (9%),
7 Chester Water Authority (10%), Downingtown Municipal Authority (2%), and Aqua Ohio
8 (3.5%) that are expected to become effective in 2019 for all, and in 2020 for Downingtown
9 and Aqua Ohio - to estimated FTY and FPFTY levels.

10 **Q. Explain the adjustment to Purchased Wastewater Treatment Expense in Schedule C-7.1**
11 **of Exhibit 1-B.**

12 A. The Company's claim for purchased wastewater treatment expense normalizes the cost of
13 services provided by two wastewater treatment providers for the Company's Beech Mountain
14 and Village at Valley Forge service areas. The service providers are Butler Township Sewer
15 Authority and Upper Merion Sewer.

16 **Q. Please explain the Water Production Adjustment on Schedule C-7.2 of Exhibit 1-A.**

17 A. The Company sets forth an adjustment to operating expenses to reflect changes in power and
18 chemical costs due to changes in water production. As a result of eliminating the portion of
19 the Company's purchased water sourced from Bucks County Water and Sewer Authority –
20 Bensalem, the Company is claiming the production costs associated with producing its own
21 water in the FTY and FPFTY. Additionally, the Company has set forth an adjustment to

AQUA PENNSYLVANIA, INC.
DIRECT TESTIMONY OF ERIN M. FEENEY

1 address the trend of declining residential consumption as discussed in detail by Ms. Marquis
2 in AP Statement No. 2. As a result, the Company is reflecting a reduction of expenses
3 associated with the decreased production. The production cost per thousand gallons was
4 applied to the estimated change in gallons produced for the FTY and FPFTY.

5 **Q. Schedule C-9.2 of Exhibit 1-A lists an adjustment to remove NAWC lobbying expenses.**

6 **Can you please explain this adjustment?**

7 A. Consistent with past rate cases, the lobbying portion of the annual dues paid to the NAWC
8 has been removed from the Company's operating expense claim. The resulting adjustment
9 reduces pro-forma operating expense by \$32,926.

10 **III. OTHER EXPENSES**

11 **Q. Please explain the adjustments for Commission, OCA and OSBA General Assessments**
12 **within Exhibits 1-A and 1-B.**

13 A. The adjustment set forth on Schedules D-2.1 and D-2.2 of Exhibits 1-A and 1-B are based on
14 the actual Commission, OCA and OSBA assessment factors billed for the fiscal year April 1,
15 2017 to March 31, 2018. The assessed rates were applied to Gross Utility Revenues at
16 present rates for the FTY and FPFTY and at proposed rates for the FPFTY.

17 **IV. CONCLUSION**

18 **Q. Does that conclude your testimony at this time?**

19 A. Yes, it does, but I reserve the right to supplement my testimony as needed during this
20 proceeding.

AQUA PENNSYLVANIA, INC.

Docket No. R-2018 - 3003068

DIRECT TESTIMONY OF
PAUL R. MOUL
WITH REGARD TO
COST OF CAPITAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

August 17, 2018

Agua Pennsylvania, Inc.
Direct Testimony of Paul R. Moul
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Appendix A - Educational Background, Business Experience and Qualifications

DIRECT TESTIMONY OF PAUL R. MOUL

GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	DEFINED TERM
AFUDC	Allowance for Funds Used During Construction
AA	Aqua America, Inc.
AP	Aqua Pennsylvania, Inc.
b	Represents the retention rate that consists of the fraction of earnings that are not paid out as dividends
β	Beta
b x r	Represents internal growth
CAPM	Capital Asset Pricing Model
CCR	Corporate Credit Rating
CE	Comparable Earnings
CTWS	Connecticut Water Service, Inc.
CWIP	Construction Work in Progress
DCF	Discounted Cash Flow
DDBP	Disinfectants/Disinfection By-Products
EPA	Environmental Protection Agency
ESWTR	Enhanced Surface Water Treatment Rule
FOMC	Federal Open Market Committee
g	Growth rate
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Product
IDB	Industrial Development Bonds
IGF	Internally generated funds
Lev	Leverage modification
M&A	Merger and Acquisition
MTBE	Methyl Tertiary Butyl Ether
MTN	Medium Term Notes
PPUC	Pennsylvania Public Utility Commission

DIRECT TESTIMONY OF PAUL R. MOUL

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INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

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

A. My name is Paul Ronald Moul. My business address is 251 Hopkins Road, Haddonfield, New Jersey 08033-3062. I am Managing Consultant at the firm P. Moul & Associates, an independent financial and regulatory consulting firm. My educational background, business experience and qualifications are provided in Appendix A that follows my direct testimony.

2. Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony presents evidence, analysis and a recommendation concerning the appropriate cost of equity and overall rate of return that the Pennsylvania Public Utility Commission (“PPUC” or the “Commission”) should recognize in the determination of the revenues that Aqua Pennsylvania, Inc. (“AP” or the “Company”) should realize as a result of this proceeding. My analysis and recommendation are supported by the detailed financial data contained in AP Exhibit 4-A, which is a multi-page document divided into fourteen (14) schedules.

3. Q. BASED UPON YOUR ANALYSIS, WHAT IS YOUR CONCLUSION CONCERNING THE APPROPRIATE RATE OF RETURN FOR THE COMPANY?

A. Based upon my independent analysis, my conclusion is that the Company should be afforded an opportunity to earn a rate of return on common equity of not less than 10.75%. My cost of equity determination should be viewed in the context of increasing capital costs revealed by rising interest rates and the need for supportive regulation. Moreover, as I will describe below, the Company faces more risk because of the changes in the tax law made by the Tax Cut

DIRECT TESTIMONY OF PAUL R. MOUL

1 and Jobs Act of 2017 (“TCJA”) enacted on December 22, 2017.

2 The 10.75% rate of return on common equity that the Company
3 employed to develop its proposed revenue requirement in this case is within the
4 range of returns indicated by the various models I used to determine the
5 Company’s cost of equity. However, the Company determined that it would
6 select an equity return rate within the lower end of my range. The Company
7 has indicated that it selected its proposed equity return rate to moderate the
8 customer impact of its proposed rate increase. Although the Company needs a
9 material increase in rates, and it has been approximately seven years since it
10 filed its last base rate case, the Company believes that its proposed equity
11 return rate will support its ability to continue to furnish customers high-quality
12 water and wastewater service and enable it to continue to make substantial
13 investments in water and wastewater infrastructure while also mitigating the
14 impact of its proposed increase.

15 On Schedule 1, I have calculated the Company’s weighted average
16 cost of capital for the fully projected future test year of 7.77%, which includes
17 the Company’s proposed 10.75% rate of return on common equity. The
18 calculation of the weighted average cost of capital, requires the selection of
19 appropriate capital structure ratios and a determination of the cost rate for each
20 capital component. In the case of the capital structure ratios, the components
21 are projected through March 31, 2020, which is the end of the fully projected
22 future test year. The overall cost of capital is the product of weighting the
23 individual capital costs by the proportion of each respective type of capital. The
24 resulting weighted average cost of capital must provide a compensatory level of
25 return for the use of capital and provide the Company the ability to attract

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1 capital on reasonable terms.

2 **4. Q. WHAT BACKGROUND INFORMATION CONCERNING THE COMPANY**
3 **HAVE YOU CONSIDERED AS PART OF YOUR TESTIMONY?**

4 A. At December 31, 2017, AP provided water service to 433,683 customers in the
5 five counties that comprise the Philadelphia suburbs, as well as in twenty-four
6 (24) additional counties in the northwestern, central, and Pocono Mountains
7 regions of Pennsylvania. The Company meets its customers' needs from
8 surface and ground water supplies and from purchases. The Company also
9 furnishes wastewater service to 21,306 wastewater customers located
10 throughout Pennsylvania. Its service areas are concentrated in Southeastern,
11 Northeastern, and Western areas of the Commonwealth, however, most are not
12 contiguous and are operated independently.

13 AP has been a leader in implementing the Commission's policy of
14 consolidating separate water utility systems throughout Pennsylvania. The
15 Company's first major acquisition occurred in 1985 with the purchase of the
16 assets of Great Valley Water Company. AP has completed approximately 160
17 acquisitions since 1995. Some of these acquisitions included multiple systems.

18 The benefits of regionalization accrue to all of the Company's
19 constituencies. New customers benefit from the Company's management
20 expertise and access to capital needed for system improvements, which
21 enhances service reliability and water quality of the acquired systems; existing
22 customers benefit from the economies of scale derived from adding new
23 customers; the Company's employees benefit from a wider scope of
24 responsibilities and opportunities for professional development; and investors
25 benefit from the additional growth obtained by Aqua America, Inc. ("AA"), the

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1 parent company of AP.

2 **5. Q. IN YOUR OPINION, WHAT FACTORS SHOULD THE COMMISSION**
3 **CONSIDER WHEN DETERMINING THE COMPANY'S COST OF CAPITAL IN**
4 **THIS PROCEEDING?**

5 A. The Commission's rate of return allowance must be set to cover the Company's
6 interest and dividend payments, provide a reasonable level of earnings
7 retention, produce an adequate level of internally-generated funds to meet
8 capital requirements, be commensurate with the risk to which the Company's
9 capital is exposed, assure confidence in the financial integrity of the Company,
10 support reasonable credit quality, and allow the Company to raise capital on
11 reasonable terms. The return the Company has selected fulfills these
12 established standards of a fair rate of return set forth by the landmark Bluefield
13 and Hope cases.¹ That is to say, the proposed rate of return is commensurate
14 with returns available on investments having corresponding risks.

15 **6. Q. HOW HAVE YOU DETERMINED THE COST OF EQUITY FOR THE**
16 **COMPANY?**

17 A. My cost of equity recommendation was developed using capital market and
18 financial data relied upon by investors when assessing the relative risk, and
19 hence cost of equity, for a water utility, such as AP. In analyzing the
20 Company's cost of equity, I have relied on four well-recognized measures: the
21 Discounted Cash Flow ("DCF") model, the Risk Premium ("RP") analysis, the
22 Capital Asset Pricing Model ("CAPM"), and the Comparable Earnings ("CE")
23 approach. By considering the results of a variety of approaches, my analysis is
24 consistent with well-recognized principles for determining a fair rate of return. I

¹ Bluefield Water Works & Improvement Co. v. P.S.C. of West Virginia, 262 U.S. 679 (1923)
and F.P.C. v. Hope Natural Gas Co., 320 U.S. 591 (1944).

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1 have measured the cost of equity for the Company using data from a proxy
2 group of nine (9) water companies that are identified on page 2 of Schedule 3.
3 I will refer to my proxy group of nine water companies as the “Water Group.”

4 **7. Q. HOW HAVE YOU PERFORMED YOUR COST OF EQUITY ANALYSIS WITH**
5 **THE MARKET DATA FOR THE WATER GROUP?**

6 A. I have applied the models/methods for estimating the cost of equity using the
7 average data for the Water Group. I have not measured separately the cost of
8 equity for the individual companies within the Water Group, because the
9 determination of the cost of equity for an individual company has become
10 increasingly problematic. By employing group average data, rather than
11 individual company analysis, I have helped to minimize the effect of extraneous
12 influences on the market data for an individual company.

13 **8. Q. PLEASE SUMMARIZE THE BASIS FOR YOUR COST OF EQUITY**
14 **RECOMMENDATION IN THIS PROCEEDING.**

15 A. My recommendation is derived from the results of the four methods/models
16 previously identified. In general, the use of more than one approach provides a
17 superior foundation to arrive at the cost of equity. At any point in time, a single
18 method can provide an incomplete measure of the cost of equity depending
19 upon extraneous factors which may influence market sentiment. The specific
20 application of these methods/models will be described later in my testimony.

21 The following table provides a summary of the indicated costs of equity
22 using each of these approaches.

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	<u>Water Group</u>
DCF	10.54%
Risk Premium	11.25%
CAPM	12.95%
Comparable Earnings	12.45%
Average	11.80%
Median	11.85%
Mid-point	11.75%

1 An average of the results of the market-based models (i.e., DCF, Risk Premium
2 and CAPM) is 11.58% ($10.54\% + 11.25\% + 12.95\% = 34.74\% \div 3$).
3 Recognizing the Commission's general approach of giving greater reliance to
4 the DCF method, I have narrowed that range by viewing the results of the DCF
5 and RP measures, which produces a range of the cost of equity from 10.54% to
6 11.25%. On a rounded basis, the range would be 10.50% to 11.25%.
7 Consequently, the equity return rate of 10.75% being employed by the
8 Company in this case is within my range of returns, although near the lower
9 end of that range.

10 The Commission has determined in a prior Aqua base rate case that
11 the Company's cost of equity should reflect the exemplary performance of its
12 management, including Aqua's efforts to help the Commission deal with the
13 problems created by small and non-viable water and wastewater systems
14 throughout the Commonwealth. The Company's excellent management
15 performance once again has been exhibited since its last base rate case, as

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1 Mr. Packer explains in his direct testimony (AP Statement No. 1). Because of
2 the Company's decision to employ an equity return rate near the low end of my
3 recommended range in order to moderate its proposed rate increase, I have not
4 quantified the increment to recognize the Company's superior management
5 performance. However, increments for recognition of superior management
6 performance granted by the Commission have ranged from 0.12% to 0.25%,
7 and the Commission granted Aqua an increment for superior management
8 performance of 0.22% in its 2008 base rate case. The superior performance of
9 Aqua's management and the increments that the Commission has added to
10 recognize excellent management performance in prior cases, including Aqua's,
11 are factors the Commission should consider in assessing all of the evidence
12 presented on the issue of cost of capital in this case.

WATER UTILITY RISK FACTORS

13
14 **9. Q. PLEASE IDENTIFY SOME OF THE RISK FACTORS WHICH IMPACT THE**
15 **WATER UTILITY INDUSTRY.**

16 A. The business risk of water utilities has been, and continues to be, strongly
17 influenced by water quality concerns. The Safe Drinking Water Act
18 Amendments of 1996 ("SDWA"), which re-authorized the SDWA for the second
19 time since its original passage in 1974, instituted more rigorous policies and
20 procedures governing water quality. Significant aspects of the 1996 Act
21 provide that the federal Environmental Protection Agency ("EPA"), in
22 conjunction with other interested parties, will develop a list of contaminants for
23 possible regulation that must be updated every 5 years. From that list, EPA
24 must select at least five contaminants and determine whether to regulate them.
25 This process must be repeated every five years. The EPA may bypass this

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1 process and adopt interim regulations for contaminants which pose an urgent
2 health threat.

3 EPA's current priorities include regulations directed to: microbial,
4 disinfectants and disinfection byproducts, per chlorate, and other contaminants,
5 such as pharmaceuticals, lead and copper, and radio nuclides. The regulations
6 EPA issues concerning potentially hazardous substances, such as those noted
7 above, together with the requirements imposed by the Federal Clean Water Act
8 and the Resource Conservation and Recovery Act, contribute directly to the
9 total business risk faced by water utilities. Moreover, most of these regulations
10 affect the entire water industry in contrast with the disparate impact on electric
11 utilities of regulations issued under the Clean Air Act, which may affect only a
12 subset of the individual companies in that industry. Investors are also
13 increasingly sensitive to the business risk water suppliers would face from the
14 range of possible adverse effects of global climate change. All of these
15 business risk factors, together with the inherent importance of maintaining
16 sound and reliable water and wastewater infrastructure capable of meeting
17 customers' current and future needs, has focused increasing public policy
18 attention on the unique challenges faced by water and wastewater utilities.

19 One of the challenges water utilities face is the legacy of utility-owned
20 and customer-owned lead service lines that remain in service. This issue
21 achieved national prominence after lead pipes and service lines were identified
22 as a source of possible lead contamination in the drinking water of the
23 municipally-owned Flint, Michigan, water system. However, even before the
24 events in Flint – and certainly thereafter – investors have had a heightened
25 awareness of the implications for public health of exposure to lead and of the

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1 steps that water utilities would need to take to deal with this issue, including
2 possible government mandates to remove and replace lead service lines.
3 Significantly, water utilities deliver a product that is ingested by the public and,
4 therefore, they are the only type of utility that faces public health issues related
5 to a product intended for human consumption. As Mr. Packer explains (AP
6 Statement No. 1), the Company has been vigilant in dealing with the potential
7 risks posed by the presence of lead in both service lines and customers' interior
8 plumbing. AP's efforts have included the use of sound water-treatment
9 processes to prevent the lead from leaching into the water it delivers. For that
10 reason, the Company has consistently complied with the Lead and Copper
11 Rule² imposed by the EPA and the Pennsylvania Department of Environmental
12 Protection. Nonetheless, because of the increasing concerns about the need to
13 eliminate the risk of lead in drinking water, the Company is taking proactive
14 steps to remove and replace the lead service lines that remain in service.

15 **10. Q. HOW DO THESE ISSUES IMPACT THE WATER UTILITY INDUSTRY?**

16 A. The Company must conform its operations to the requirements of the SDWA,
17 and comply with the Lead and Copper Rule, the Disinfectants/Disinfection By-
18 Products ("DDBP") rule, and other contaminant standards. Managers of water
19 utilities have in the past, and will in the future, focus increased attention on
20 environmental and related regulatory issues. Drinking water quality has also
21 received heightened attention out of concern over the integrity of the source of
22 supply, which is often threatened by changing land use and the permissible
23 level of discharged contaminants established by state and federal agencies,
24 and now potential threats from terrorists. Moreover, water companies have

2 25 Pa. Code §§ 109.1101 through 109.1108.

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1 experienced increased water treatment and monitoring requirements and
2 escalating costs in order to comply with the increasingly stringent regulatory
3 requirements noted above. Water utilities may also be required to expend
4 resources to undertake research and employ technological innovations to
5 comply with potential regulatory requirements. These factors are symptomatic
6 of the changing business risk faced by water utilities.

7 **11. Q. ARE THERE OTHER FACTORS THAT INFLUENCE THE BUSINESS RISK**
8 **OF WATER UTILITIES?**

9 A. Yes. Being the sole purveyor of potable water from an established
10 infrastructure does not insulate a water utility's operations from general
11 business conditions, regulatory policy, the influence of weather, and customers'
12 usage habits. It is also important to recognize that water companies face
13 higher degrees of capital intensity than other utilities, more costly waste
14 disposal requirements, and threats to their sources of supply. Notably, the
15 Company's investment in net plant is 7.95 times its revenue, as compared to
16 the Water Group's investment in net plant which is 4.06 times its revenue.

17 **12. Q. ARE THERE OTHER STRUCTURAL ISSUES THAT AFFECT THE**
18 **BUSINESS RISK OF WATER UTILITIES?**

19 A. Yes. As noted above, the high fixed costs of water utilities make earnings
20 vulnerable to significant variations when usage fluctuates with weather, the
21 economy, and customer conservation efforts. Conservation efforts can take the
22 form of low water-use clothes washers, toilets and shower heads, and other
23 reductions due to changes in usage. While the wise use of water is always the
24 objective, the business risk of the water utility industry can be affected by
25 increased customer awareness of conservation. Moreover, current building

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1 standards have mandated the use of fixtures which must comply with more
2 stringent water use requirements.

3 **13. Q. HOW IS THE COMPANY'S RISK PROFILE AFFECTED BY ITS**
4 **CONSTRUCTION PROGRAM?**

5 A. The Company is engaged in a continuing capital expenditure program
6 necessary to meet the needs of its customers and to comply with various
7 regulations. For the future, the Company expects its capital expenditures to be:

<u>Year</u>	<u>Capital Expenditures</u>
2018	\$ 336,700,000
2019	309,600,000
2020	244,500,000
2021	238,100,000
2022	<u>202,800,000</u>
Total	<u><u>\$1,331,700,000</u></u>

8 The Company's total capital expenditures over the next five years will represent
9 approximately 40% ($\$1,331,700,000 \div \$3,291,046,000$) of its net utility plant in
10 service at December 31, 2017. As previously noted, a fair rate of return for the
11 Company represents a key to a financial profile that will provide the Company
12 the ability to raise the capital necessary to meet its capital needs on reasonable
13 terms.

14 **14. Q. You indicated previously that recent changes in federal income tax law**
15 **will add to the Company's risk. Please explain.**

16 A. There are several major financial consequences arising from the TCJA's
17 changes in the federal income tax law that will negatively impact the Company.
18 First, a lower federal income tax rate will lower the Company's pre-tax interest
19 coverage because, for a rate-regulated utility, a reduction in the income tax rate

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1 reduces revenues. For example, page 1 of Schedule 1 shows that, with the
2 new marginal federal corporate income tax rate, AP's pre-tax interest coverage
3 will be 4.82x (pre-tax NOI will be 4.82 times the interest charges reflected in my
4 proposed overall rate of return). Under the old 35% marginal federal corporate
5 income tax rate, AP's pre-tax interest coverage would have been 5.65x. All
6 else being equal, when pre-tax interest coverage declines, credit quality falls
7 and credit risk increases.

8 Second, with a lower marginal federal corporate income tax rate, the
9 Company's return variability will increase, thereby increasing its business risk.
10 When the federal corporate income tax rate was formerly 35%, investors only
11 needed to absorb 65% of any changes in revenues and expenses. At a 21%
12 federal corporate income tax rate, investors will need to absorb 79% of
13 changes in revenues and expenses. That is to say, the reduced federal income
14 taxes will make investor returns more variable than formerly, thereby increasing
15 the Company's risk.

16 Third, utilities will require more investor-supplied capital to fund their
17 construction programs because the level of deferred taxes, which is source of
18 internally-generated funds, will decline as a result of lower tax rates and the
19 elimination of "bonus" depreciation³ for regulated utilities under the TCJA. The
20 reduction in deferred taxes will also reduce an important credit metric, which is
21 expressed as a percentage of internally-generated funds to construction. This
22 metric measures the percentage of gross construction expenditures provided

³ Before the TCJA, most businesses (including utilities) could claim either 40% or 50% bonus depreciation (depending on the nature of the property) on assets placed in service in 2018 and 30% or 40% bonus depreciation for similar property placed in service in 2019. Bonus depreciation is not available to utilities. under after the TCJA.

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1 by funds from operations after payment of dividends.⁴ This percentage will
2 decline with the new lower income tax rate, and a decline in this percentage is
3 regarded as a negative effect on a company's credit metrics.

4 The financial challenges caused by the changes in the federal tax law I
5 described above are likely to drive the need for utilities to reduce the
6 percentage of debt in their capital structures to respond to higher business risk
7 and weaker credit quality measures.

8 **15. Q. HOW SHOULD THE COMMISSION RESPOND TO THE INCREASED**
9 **BUSINESS RISK FACING THE COMPANY?**

10 A. The Company faces the need to continue to invest in new facilities and to
11 maintain and upgrade existing facilities in its service territory. Where
12 substantial ongoing capital investment is required to continue to furnish the high
13 quality service that customers demand, supportive regulation is absolutely
14 essential.

15 **FUNDAMENTAL RISK ANALYSIS**

16 **16. Q. IS IT NECESSARY TO CONDUCT A FUNDAMENTAL RISK ANALYSIS TO**
17 **PROVIDE A FRAMEWORK FOR DETERMINATING A UTILITY'S COST OF**
18 **EQUITY?**

19 A. Yes. It is necessary to establish a company's relative risk position within its
20 industry through a fundamental analysis of various quantitative and qualitative
21 factors that bear upon investors' assessment of overall risk. The qualitative
22 factors have already been discussed. The quantitative risk analysis follows.
23 For this purpose, I have compared the Company to the Standard & Poor's
24 Corporation's ("S&P") Public Utilities Index ("S&P Public Utilities") and the

4 Funds from operations consist of net income, depreciation, amortization, net deferred income taxes, and investment tax credits less AFUDC.

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1 Water Group.

2 **17. Q. WHAT ARE THE COMPONENTS OF THE S&P PUBLIC UTILITIES?**

3 A. The S&P Public Utilities is a widely recognized index that is comprised of
4 electric power and natural gas companies contained in the S&P 500 Index. It is
5 recognized as a reasonable proxy for the gas and electric utility industry overall.
6 The companies in the S&P Public Utilities are identified on page 3 of Schedule
7 4.

8 **18. Q. WHAT CRITERIA HAVE YOU EMPLOYED TO ASSEMBLE YOUR WATER
9 GROUP?**

10 A. The companies in the Water Group have the following common characteristics:
11 (i) they are listed in the "Water Utility Industry" section (basic and expanded) of
12 The Value Line Investment Survey and (ii) their stock is publicly traded. The
13 members of my Water Group are: American States Water, American Water
14 Works Co., Aqua America, Inc., Artesian Resources Corp., California Water
15 Serv. Grp., Connecticut Water Services, Middlesex Water Company, SJW
16 Corporation, and York Water Company. Since my Water Group was
17 assembled, Connecticut Water Service and SJW Corporation have entered into
18 a merger agreement. There have also been competing offers for both
19 companies since the announcement of the merger. As such, I have shown the
20 results for my Water Group both including and excluding these companies.

21 **19. Q. IS KNOWLEDGE OF A UTILITY'S CREDIT-QUALITY RATING AN
22 IMPORTANT FACTOR IN ASSESSING ITS RISK AND COST OF CAPITAL?**

23 A. Yes. It is important to know a company's credit quality rating because the cost
24 of each type of capital is directly related to the associated risk of the firm.
25 Therefore, although the yield on a company's bonds and the ratings assigned

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1 to those instruments by credit rating agencies measure a company's credit-
2 quality risk, these relative credit risk assessments are also relevant to its cost of
3 equity. This is because a firm's cost of equity is represented by its borrowing
4 cost plus the additional compensation to equity investors that is necessary to
5 recognize the higher risk of owning an equity investment as compared to a debt
6 instrument in the same company.

7 **20. Q. HOW DO THE CREDIT-QUALITY RATINGS COMPARE FOR AP, THE**
8 **WATER GROUP, AND THE S&P PUBLIC UTILITIES?**

9 A. S&P provides a corporate credit-quality rating ("CCR"), while Moody's provides
10 a Long-Term ("LT") issuer rating. Both ratings focus upon the credit quality of
11 the issuer of the debt, rather than upon the debt obligation itself. The CCR
12 assigned to AP by S&P is A+. For the Water Group, the average CCR
13 assigned by S&P is A, and the average Long Term ("LT") issuer rating assigned
14 by Moody's is A3. For the S&P Public Utilities, the average composite rating is
15 BBB+ by S&P and A3 by Moody's. Many of the financial indicators that I will
16 subsequently discuss are considered during the rating process.

17 **21. Q. HOW DO THE FINANCIAL DATA COMPARE FOR AP, THE WATER**
18 **GROUP, AND THE S&P PUBLIC UTILITIES?**

19 A. The broad categories of financial data that I will discuss are shown on
20 Schedules 2, 3, and 4. The data cover the five-year period 2013-2017. The
21 important categories of relative risk may be summarized as follows:

22 Size. In terms of capitalization, the Company is fairly similar to the
23 average size of the Water Group. The average size of the S&P Public Utilities
24 is, however, many times larger than the Water Group and AP. All other things
25 being equal, a smaller company is riskier than a larger company because a

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1 given change in revenue and expense has a proportionately greater impact on
2 a small firm. As I will demonstrate later, the size of a firm can impact its cost of
3 equity.

4 Market Ratios. Market-based financial ratios, such as earnings/price
5 ratios and dividend yields, provide a partial measure of the investor-required
6 cost of equity. If all other factors are equal, investors will require a higher return
7 on equity for companies that exhibit greater risk as compensation for that risk.
8 That is to say, a firm that investors perceive to have higher risks will experience
9 a lower price per share in relation to expected earnings.

10 There are no market ratios available for AP because its stock is
11 owned by AA. The five-year average price-earnings multiple for the Water
12 Group was higher than that of the S&P Public Utilities. The five-year average
13 dividend yield was lower for the Water Group than for the S&P Public Utilities.
14 On average, the historical market-to-book ratios were higher for the Water
15 Group than the S&P Public Utilities.

16 Common Equity Ratio. The level of financial risk is measured by the
17 proportion of long-term debt and other senior capital that is contained in a
18 company's capitalization. Financial risk is also analyzed by comparing common
19 equity ratios (the complement of the ratio of debt and other senior capital).
20 That is to say, a firm with a high common equity ratio has lower financial risk,
21 while a firm with a low common equity ratio has higher financial risk. The five-
22 year average common equity ratios, based on permanent capital, were 54.4%
23 for the Company, 54.1% for the Water Group, and 43.6% for the S&P Public
24 Utilities. The financial risk of AP and the Water Group is similar.

25 Return on Book Equity. Greater variability (i.e., uncertainty) of a firm's

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1 earned returns signifies relative levels of risk, as shown by the coefficient of
2 variation (standard deviation ÷ mean) of the rate of return on book common
3 equity. The higher the coefficient of variation, the greater the degree of
4 variability. For the five-year period, the coefficients of variation were 0.083
5 (1.1% ÷ 13.3%) for the Company, 0.048 (0.5% ÷ 10.4%) for the Water Group,
6 and 0.064 (0.6% ÷ 9.4%) for the S&P Public Utilities. The earnings variability
7 for the Company was higher than the Water Group and S&P Public Utilities,
8 indicating that the Company has higher risk. And, as I indicated previously,
9 recent changes in the federal income tax law will likely make these variability
10 statistics higher in the future.

11 Operating Ratios. I have also compared operating ratios (the
12 percentage of revenues consumed by operating expense, depreciation and
13 taxes other than income).⁵ The five-year average operating ratios were 51.1%
14 for the Company, 68.7% for the Water Group, and 79.7% for the S&P Public
15 Utilities. The Company's lower operating ratio (and correspondingly higher
16 operating margin) is, however, a function of its high capital intensity. Because
17 the Company is more capital intensive, a larger percentage of each dollar of
18 revenue is attributed to return and income taxes on that return.

19 Coverage. The level of fixed charge coverage (i.e., the multiple by
20 which available earnings cover fixed charges, such as interest expense and
21 preferred stock dividends) provides an indication of the earnings protection for
22 creditors. Higher levels of coverage, and hence earnings protection for fixed
23 charges, are usually associated with superior grades of creditworthiness. The
24 five-year average pre-tax interest coverage (excluding AFUDC) was 4.08 times

⁵ The complement of the operating ratio is the operating margin which provides a measure of profitability. The higher the operating ratio, the lower the operating margin.

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1 for the Company, 4.31 times for the Water Group, and 3.22 times for the S&P
2 Public Utilities. However, as discussed above, these credit quality indicators
3 will decline prospectively with the implementation of the new lower federal
4 income tax rate (e.g., under the new marginal federal corporate income tax
5 rate, the pre-tax interest coverage will be lower for AP, and the Water Group
6 and the S&P Public Utilities will be similarly impacted).

7 Quality of Earnings. Measures of earnings quality are usually
8 revealed by the percentage of Allowance for Funds Used During Construction
9 (“AFUDC”) related to income available for common equity, the effective income
10 tax rate, and other cost deferrals. These measures of earnings quality usually
11 influence a firm's internally generated funds because poor quality of earnings
12 would not generate high levels of cash flow. The Company's low historical
13 effective income tax rate reflects a tax accounting method that permits the
14 expensing of qualifying utility asset improvement costs that were previously
15 being capitalized and depreciated for book and tax purposes. This accounting
16 provides for flow-through treatment of qualifying income tax benefits,
17 generating a reduction in income tax expense and reducing the amount of
18 taxes currently payable.

19 Internally Generated Funds. Internally generated funds (“IGF”)
20 provide an important source of new investment capital for a utility and represent
21 a key measure of credit strength. Historically, the five-year average percentage
22 of IGF to capital expenditures was 85.1% for the Company, 77.3% for the
23 Water Group, and 79.5% for the S&P Public Utilities. The Company expects
24 that it will continue to require external capital to finance construction
25 expenditures. As noted previously, the IGF to construction expenditures will

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1 decline for AP as a result of the changes in the federal income tax law made by
2 the TCJA. Again, the Water Group and the S&P Public Utilities should be
3 similarly impacted.

4 Betas. The financial data I have been discussing relate primarily to
5 company-specific risks. Market risk for firms with traded stock is measured by
6 beta coefficients. Beta coefficients attempt to identify systematic risk, i.e., the
7 risk associated with changes in the overall market for common equities. Value
8 Line publishes such a statistical measure of a stock's relative historical volatility
9 to the rest of the market. A comparison of market risk is shown by the average
10 betas of 0.71 for the Water Group (see page 2 of Schedule 3) and 0.75 for the
11 S&P Public Utilities (see page 3 of Schedule 4).

12 **22. Q. PLEASE SUMMARIZE YOUR RISK EVALUATION OF THE COMPANY AND**
13 **THE WATER GROUP.**

14 A. The risk of the Company parallels that of the Water Group in certain respects.
15 The Company's size, financial risk, coverages, and IGF to construction are
16 fairly similar to the Water Group. The Company's operating ratio is lower, but
17 this is the product of much higher capital intensity. The Company's earnings
18 variability is higher, pointing to higher risk compared to the Water Group. For
19 the future, the risk of the water industry will be strongly influenced by the
20 regulatory requirements associated with the SDWA, the need to maintain
21 adequate supply, the need to rehabilitate infrastructure, high capital intensity, a
22 low rate of capital recovery, and relatively low percentages of IGF to
23 construction. As such, the Water Group provides a reasonable basis for
24 measuring the Company's cost of equity.

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CAPITAL STRUCTURE RATIOS

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23. Q. PLEASE EXPLAIN THE SELECTION OF CAPITAL STRUCTURE RATIOS FOR AP.

A. If a public utility raises its own debt directly in the capital markets, as is the case for the Company, it is proper to employ the capital structure ratios and senior capital cost rates of the regulated public utility for rate of return purposes. Furthermore, consistency requires that the embedded cost rate of the Company's senior securities also be employed. This procedure is consistent with the ratesetting procedures used by the Commission in numerous prior rate cases for AP.

24. Q. DOES SCHEDULE 5 PROVIDE THE CAPITALIZATION AND CAPITAL STRUCTURE RATIOS YOU HAVE CONSIDERED?

A. Yes. Schedule 5 presents the Company's capitalization and related capital structure ratios based upon investor-provided capital. The March 31, 2018 capitalization corresponds with the end of the historic test year in this case. The March 31, 2020 capitalization is an estimate of the Company's capitalization as of the end of the fully projected future test year. The forecast of the Company's March 31, 2020 capital structure reflects redemptions and maturities of \$138.800 million of existing debt, PENNVEST loan payments of \$11.489 million, and the issuance of new First Mortgage Bonds in the principal amount of \$425.000 million. Retained earnings as of March 31, 2020 are forecasted to increase based upon net income of \$360.000 million less common stock dividend payments of \$120.000 million for the next two fiscal years.

25. Q. WHAT CAPITAL STRUCTURE RATIOS DO YOU RECOMMEND BE

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1 **ADOPTED FOR RATE OF RETURN PURPOSES IN THIS PROCEEDING?**

2 A. Since ratesetting is prospective, the rate of return should, at a minimum, reflect
3 known or reasonably foreseeable changes that will occur during the course of
4 the future and fully projected future test years. As a result, I will adopt the
5 Company's fully projected future test year-end (March 31, 2020) capital
6 structure ratios of 47.15% long-term debt and 52.85% common equity. These
7 capital structure ratios are the best approximation of the mix of capital the
8 Company will employ to finance its rate base during the period new rates are in
9 effect. I have excluded short-term debt from these ratios because the amount
10 is less than the balance of construction work in progress ("CWIP"). Short-term
11 debt provides bridge financing for construction work in progress, until the
12 magnitude of short-term debt reaches a point where a permanent financing with
13 long-term debt and equity is economic. That is to say, short-term debt is
14 temporary financing pending the issuance of long-term debt and equity in the
15 desired proportions that support the Company's capital structure goals. The
16 Commission uses a formula for computing AFUDC that assigns short-term debt
17 first to the AFUDC rate and additional amounts, if any, above the CWIP
18 balance are assigned the overall rate of return. Given the Company's
19 procedure of calculating its AFUDC, it has been the Commission's policy to
20 exclude short-term debt from the capital structure.

21 **COST OF SENIOR CAPITAL**

22 **26. Q. WHAT COST RATE HAVE YOU ASSIGNED TO THE LONG-TERM DEBT**
23 **PORTION OF AP'S CAPITAL STRUCTURE?**

24 A. Consistent with the capital structure ratios of the Company, the embedded cost
25 of AP's senior securities must also be employed. As I previously explained, this

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1 procedure is consistent with the ratesetting procedures used by the
2 Commission in numerous prior AP rate cases. The determination of the cost of
3 debt is essentially an arithmetic exercise. This is due to the fact that the
4 Company has contracted for the use of this capital for a specific period of time
5 at a specified cost rate. As shown on page 1 of Schedule 6, the actual
6 embedded cost rate of long-term debt was 4.40% on March 31, 2018. By
7 March 31, 2020, the embedded debt cost rate is estimated to be 4.43%, as
8 shown on page 3 of Schedule 6. The Company's fully projected future test year
9 embedded cost of debt reflects four new issuances of First Mortgage bonds.
10 For the June 2018 issue, the nominal coupon rate is 4.06%. For the November
11 2018 issue, the projected nominal coupon rate is 4.10%. For the two issues in
12 2019, a nominal coupon rate of 4.25% has been projected. The details leading
13 to the development of the individual effective cost rates for each series of long-
14 term debt, using the cost rate to maturity technique, are shown on pages 2 and
15 4 of Schedule 6. The cost rate, or yield to maturity, is the rate of discount that
16 equates the present value of all future interest and principal payments with the
17 net proceeds of the bond.

18 I will use the 4.43% prospective embedded cost of long-term debt for
19 rate of return purposes. The 4.43% long-term debt cost rate is related to the
20 amount of long-term debt shown on Schedule 5 that provides the basis for the
21 47.15% long-term debt ratio at March 31, 2020.

COST OF EQUITY – GENERAL APPROACH

22
23 **27. Q. PLEASE DESCRIBE THE PROCESS YOU EMPLOYED TO DETERMINE**
24 **THE COST OF EQUITY FOR AP.**

25 A. Although my fundamental financial analysis provides the required framework to

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1 establish the risk relationships among AP, the Water Group, and the S&P
2 Public Utilities, the cost of equity must be measured by standard financial
3 models identified above. That said, differences in risk traits, such as size,
4 business diversification, geographical diversity, regulatory policy, financial
5 leverage, and bond ratings must be considered when analyzing the cost of
6 equity.

7 It is also important to reiterate that no one method or model of the cost
8 of equity can be effectively applied in an isolated manner. Rather, informed
9 judgment must be used in considering the relative risk traits of the company. It
10 is for this reason that I have used more than one method to measure AP's cost
11 of equity. As I describe below, each of the methods used to measure the cost
12 of equity is based on suboptimal, incomplete and/or overly restrictive
13 assumptions and constraints. Therefore, I favor considering the results from a
14 variety of methods. In this regard, I applied each of the methods with data
15 taken from the Water Group and concluded that a cost of equity of at least
16 10.75% is the minimum opportunity that should be provided to AP.

DISCOUNTED CASH FLOW ANALYSIS

17
18 **28. Q. PLEASE DESCRIBE THE DISCOUNTED CASH FLOW ("DCF") MODEL.**

19 A. The DCF model determines the value of an asset based on the present value of
20 future expected cash flows, discounted at the appropriate risk-adjusted rate of
21 return. In its simplest form, the DCF return on common stock consists of a
22 current cash (dividend) yield and future price appreciation (growth) of the
23 investment. The dividend discount equation is the familiar DCF valuation
24 model and assumes future dividends are systematically related to one another
25 by a constant growth rate. The DCF formula is derived from the standard

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1 valuation model: $P = D/(k-g)$, where P = price, D = dividend, k = the cost of
2 equity, and g = growth in cash flows. By rearranging the terms, we obtain the
3 familiar DCF equation: $k = D/P + g$. All of the terms in the DCF equation
4 represent investors' assessment of expected future cash flows that they will
5 receive in relation to the value that they set for a share of stock (P). The DCF
6 equation is sometimes referred to as the "Gordon" model. My DCF results are
7 provided on page 2 of Schedule 1 for the Water Group. The DCF return,
8 including the leverage adjustment described below, is 10.54%. Excluding
9 Connecticut Water Service ("CTWS") and SJW Corp. ("SJW"), the DCF results
10 are 10.65%.

11 Among other limitations of the model, there is a certain element of
12 circularity in the DCF method when applied in rate cases. This is because
13 investors' expectations for the future depend upon regulatory decisions. In
14 turn, when regulators depend upon the DCF model to set the cost of equity,
15 they rely upon investor expectations that include an assessment of how
16 regulators will decide rate cases. Due to this circularity, the DCF model may
17 not fully reflect the true risk of a utility.

18 **29. Q. WHAT IS THE DIVIDEND YIELD COMPONENT OF A DCF ANALYSIS?**

19 A. The dividend yield reveals the portion of investors' cash flow that is generated
20 by the return provided by dividend receipts. It is measured by the dividends per
21 share relative to the price per share. The DCF methodology requires the use of
22 an expected dividend yield to establish the investor-required cost of equity. For
23 the twelve months ended May 2018, the monthly dividend yields for the Water
24 Group are shown on Schedule 7 and reflect an adjustment to the month-end
25 prices to reflect the buildup of the dividend in the price that has occurred since

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1 the last ex-dividend date (i.e., the date by which a shareholder must own the
2 shares to be entitled to the dividend payment—usually about two to three
3 weeks prior to the actual payment).

4 For the twelve months ending May 2018, the average dividend yield
5 was 2.06% for the Water Group, (2.12% excl. CTWS and SJW) calculated
6 using annualized dividend payments and adjusted month-end stock prices.
7 The dividend yields for the more recent six- and three-month periods were
8 2.11% (2.16% excl. CTWS and SJW) and 2.11% (2.16% excl. CTWS and
9 SJW), respectively. I have used, for the purpose of the DCF model, the six-
10 month average dividend yield of 2.11% for the Water Group (2.16% excl.
11 CTWS & SJW). The use of this dividend yield will reflect current capital costs,
12 while avoiding the variability inherent in spot yields. For the purpose of a DCF
13 calculation, the average dividend yield must be adjusted to reflect the
14 prospective nature of the dividend payments, i.e., the higher expected
15 dividends for the future. Recall that the DCF is an expectational model that
16 must reflect investor anticipated cash flows for the Water Group. I have
17 adjusted the six-month average dividend yield in three different, but generally
18 accepted, manners (1/2 growth, discrete and quarterly)⁶ and have used the
19 average of the three adjusted values as calculated in the lower panel of data
20 presented on Schedule 7. This adjustment adds seven basis points to the six-

⁶ Under the 1/2 growth approach, the procedure to adjust the average dividend yield for the expectation of a dividend increase during the initial investment period will be at a rate of one-half the growth component, which assumes that two dividend payments will be at the expected higher rate during the initial investment period. Under the discrete approach, the “*g*” in the DCF model reflects the discrete growth in the quarterly dividend, which is required for the periodic form of the DCF in order to properly recognize that dividends grow on a discrete basis. The quarterly approach takes into account that investors have the opportunity to reinvest quarterly dividend receipts. Recognizing the compounding of the periodic quarterly dividend payments (D_0), results in this third DCF formulation. This DCF equation provides no further recognition of growth in the quarterly dividend. A compounding of the quarterly dividend yield provides another procedure to recognize the necessity for an adjusted dividend yield.

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1 month average historical yield, thus producing the 2.18% adjusted dividend
2 yield for the Water Group (2.23% excl. CTWS and SJW).

3 **30. Q. What are the most significant factors that influence investors' growth**
4 **expectations?**

5 A. As noted previously, investors are interested principally in the dividend yield
6 and future growth of their investment (i.e., the price per share of the stock).
7 Future growth in earnings per share represents the DCF model's primary focus
8 because under the constant price-earnings multiple assumption of the model,
9 the price per share of stock will grow at the same rate as earnings per share.
10 In conducting a growth rate analysis, a wide variety of variables can be
11 considered when reaching a prospective growth rate, including: earnings,
12 dividends, book value, and cash flow stated on a per share basis. Historical
13 values for these variables can be considered, as well as analysts' forecasts,
14 which are widely available to investors. A fundamental growth rate analysis is
15 sometimes represented by the internal growth (" $b \times r$ "), where " r " represents the
16 expected rate of return on common equity and " b " is the retention rate that
17 consists of the fraction of earnings that are not paid out as dividends. To be
18 complete, the internal growth rate should be modified to account for sales of
19 new common stock—this is called external growth (" $s \times v$ "), where " s "
20 represents the new common shares expected to be issued by a firm and " v "
21 represents the value that accrues to existing shareholders from selling stock at
22 a price different from book value. Fundamental growth, which combines
23 internal and external growth, provides an explanation of the factors that cause
24 book value per share to grow over time.

25 Growth also can be expressed in multiple stages. This expression of

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1 growth consists of an initial “growth” stage where a company enjoys rapidly
2 expanding markets, high profit margins, and abnormally high growth in earnings
3 per share. Thereafter, a company enters a “transition” stage where fewer
4 technological advances and increased product saturation begin to reduce
5 growth rates and profit margins come under pressure. During the “transition”
6 phase, investment opportunities begin to mature, capital requirements decline,
7 and a company begins to pay out a larger percentage of earnings to
8 shareholders. Finally, the mature or “steady-state” stage is reached when a
9 company’s earnings growth, payout ratio, and return on equity stabilizes at
10 levels where they remain for the life of a company. The three stages of growth
11 assume a step-down of high initial growth to lower sustainable growth. Even if
12 these three stages of growth can be expected, the third “steady-state” growth
13 stage, which is assumed to remain fixed in perpetuity, may not last because the
14 three stages of growth can repeat. That is to say, the stages can be repeated
15 where growth for a firm ramps-up and ramps-down in cycles over time.

16 **31. Q. How did you determine an appropriate growth rate?**

17 A. The growth rate used in a DCF calculation should measure investor
18 expectations. Investors consider both company-specific variables and overall
19 market sentiment (i.e., level of inflation rates, interest rates, economic
20 conditions, etc.) when balancing their capital gains expectations with their
21 dividend yield requirements. Investors are not influenced solely by a single set
22 of company-specific variables weighted in a formulaic manner. Therefore, all
23 relevant growth rate indicators using a variety of techniques must be evaluated
24 when formulating a judgment of investor-expected growth.

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1 **32. Q. Did you consider company-specific data in your growth rate analysis?**

2 A. Yes. As presented on Schedules 8 and 9, I have considered both historical and
3 projected growth rates in earnings per share, dividends per share, book value
4 per share, and cash flow per share for the Water Group. While investors will
5 review all measures of growth as I have done, it is earnings per share growth
6 that directly influences the expectations of investors for utility stocks. Forecasts
7 of earnings growth are required within the context of the DCF because the
8 model is forward-looking, and with a constant price-earnings multiple and
9 payout ratio, all other measures of growth will mirror earnings growth. So,
10 according to assumptions underlying the DCF model, all forward-looking
11 variables should be similar in the context of a constant price-earnings multiple,
12 earned return, and payout ratio.

13 As to the potential use of historical data, investors cannot purchase
14 past earnings of a utility; rather, they are only entitled to future earnings. In
15 addition, assigning significant weight to historical growth rates results in double
16 counting of these measures of growth. Historical data is already factored into
17 the analysts' forecasts of earnings growth. That is to say, in developing a
18 forecast of future earnings growth, an analyst would first evaluate the historical
19 performance of a company.

20 Schedule 8 shows the historical growth rates in earnings per share,
21 dividends per share, book value per share, and cash flow per share for the
22 Water Group. The historical growth rates were taken from the Value Line
23 publication that provides these data. As shown on Schedule 8, the historical
24 growth of earnings per share was in the range of 9.61% to 7.07% for the Water
25 Group (8.00% to 6.70% excl. CTWS and SJW).

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1 **33. Q. DID YOU ALSO CONSIDER ANALYSTS' EXPECTATIONS OF EXPECTED**
2 **GROWTH?**

3 A. Yes. Schedule 9 provides projected earnings per share growth rates taken
4 from five-year forecasts compiled by IBES/First Call, Zacks, Morningstar, and
5 Value Line. IBES/First Call, Zacks, and Morningstar are reliable authorities of
6 projected growth upon which investors rely. The IBES/First Call and Zacks
7 growth rates are consensus forecasts taken from a survey of analysts that
8 make projections of growth for these companies. The IBES/First Call, Zacks,
9 and Morningstar estimates are posted online and easily obtained by investors.
10 First Call is among the sources most frequently quoted by the financial press
11 when reporting on earnings forecasts. The Value Line forecasts also are easily
12 available to investors and can be obtained by subscription or free-of-charge at
13 most public and collegiate libraries. The IBES/First Call, Zacks, and
14 Morningstar forecasts are limited to earnings per share growth, whereas Value
15 Line makes projections of other financial variables. The Value Line forecasts of
16 dividends per share, book value per share, and cash flow per share have also
17 been included on Schedule 9 for the Water Group.

18 **34. Q. IS A FIVE-YEAR INVESTMENT HORIZON ASSOCIATED WITH THE**
19 **ANALYSTS' FORECASTS CONSISTENT WITH THE TRADITIONAL DCF**
20 **MODEL?**

21 A. Yes. The constant form of the DCF assumes an infinite stream of cash flows,
22 but investors do not expect to hold an investment indefinitely. Rather than
23 viewing the DCF in the context of an endless stream of growing dividends (e.g.,
24 a century of cash flows), the growth in the share value (i.e., capital
25 appreciation, or capital gains yield) is most relevant to investors' total return

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1 expectations. Hence, the sale price of a stock can be viewed as a liquidating
2 dividend that can be discounted along with the annual dividend receipts during
3 the investment-holding period to arrive at the investor expected return. The
4 growth in the price per share will equal the growth in earnings per share absent
5 any change in price-earnings (“P-E”) multiple—a necessary assumption of the
6 DCF. As such, my company-specific growth analysis, which focuses principally
7 upon five-year forecasts of earnings per share growth, is the type of analysis
8 that influences the actual total return expectation of investors. Moreover,
9 academic research focuses on five-year growth rates as they influence stock
10 prices. Indeed, if investors really required forecasts that extended beyond five
11 years to properly value common stocks, then I am sure that some investment
12 advisory service would begin publishing that information for individual stocks to
13 meet the demands of investors. The absence of such publication suggests that
14 there is no market for this information because investors do not require infinite
15 forecasts to purchase and sell stocks in the marketplace.

16 **35. Q. WHAT ARE THE PROJECTED GROWTH RATES PUBLISHED BY THE**
17 **SOURCES YOU DISCUSSED?**

18 A. As to the five-year forecast growth rates, Schedule 9 indicates that the
19 projected earnings per share growth rates for the Water Group are 6.51% by
20 IBES/First Call, 6.07% by Zacks, 7.60% by Morningstar, and 7.50% by Value
21 Line. Excluding CTWS and SJW, the growth rates are 5.51% by IBES/First
22 Call, 6.07% by Zacks, 7.60% by Morningstar, and 8.08% by Value Line. As
23 noted earlier, with the constant price-earnings multiple assumption of the DCF
24 model, growth for the Water Group companies will occur at the higher earnings
25 per share growth rate, thus producing the capital gains yield expected by

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1 investors.

2 **36. Q. WHAT OTHER FACTORS DID YOU CONSIDER IN DEVELOPING A**
3 **GROWTH RATE?**

4 A. I considered a variety of factors to reach my conclusion on the DCF growth
5 rate. However, certain growth rate variables were given greater weight than
6 others. From the various alternative measures of growth identified above,
7 earnings per share should and did receive the greatest emphasis. Growth in
8 earnings per share is the primary determinant of investors' expectations
9 regarding their total returns in the stock market. This is because the capital
10 gains yield (i.e., price appreciation) will track earnings growth with a constant
11 price earnings multiple (a key assumption of the DCF model). Moreover,
12 earnings per share (derived from net income) are the source of dividend
13 payments and are the primary driver of retention growth and its surrogate, i.e.,
14 book value per share growth. As such, under these circumstances, greater
15 emphasis must be placed upon projected earnings per share growth. In this
16 regard, it is worthwhile to note that Professor Myron Gordon,⁷ the foremost
17 proponent of the DCF model in rate cases, concluded that the best measure of
18 growth in the DCF model is a forecast of earnings per share growth. Hence, to
19 follow Professor Gordon's findings, projections of earnings per share growth,
20 such as those published by IBES/First Call, Zacks, Morningstar, and Value
21 Line, represent a reasonable assessment of investor expectations.

22 **37. Q. WHAT GROWTH RATE DO YOU USE IN YOUR DCF MODEL?**

23 A. The forecasts of earnings per share growth, as shown on Schedule 9, provide a
24 range of average growth rates of 6.07% to 7.60% (5.51% to 8.08% excl. CTWS

⁷ David A. Gordon, Myron J. Gordon and Lawrence I. Gould, "Choice Among Methods of Estimating Share Yield", The Journal of Portfolio Management, Spring 1989, at 50-55.

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1 and SJW). Although the DCF growth rates cannot be established solely with a
2 mathematical formulation, it is my opinion that an investor-expected growth rate
3 of 6.75% is a reasonable estimate of investor expected growth within the array
4 of earnings per share growth rates shown by the analysts' forecasts. The
5 improved economic growth supports a relatively high DCF growth rate for the
6 Water Group. Moreover, for water utilities, additional emphasis on
7 infrastructure rehabilitation suggests that growth will be near the higher end of
8 the range.

9 **38. Q. ARE THE DIVIDEND YIELD AND GROWTH COMPONENTS OF THE DCF**
10 **ADEQUATE TO EXPLAIN THE RATE OF RETURN ON COMMON EQUITY**
11 **WHEN IT IS USED IN THE CALCULATION OF THE WEIGHTED AVERAGE**
12 **COST OF CAPITAL?**

13 A. Yes, however, this is true only if the capital structure ratios are measured with
14 the market value of debt and equity. In the case of the Water Group, those
15 average market value capital structure ratios are 23.79% long-term debt, 0.05%
16 preferred stock, and 76.16% common equity, as shown on Schedule 10. If
17 book values are used to compute the capital structure ratios, then a leverage
18 adjustment is required.

19 **39. Q. WHAT IS A LEVERAGE ADJUSTMENT?**

20 A. Where a company's capitalization, as measured by its stock price, diverges
21 from its book value capitalization, the potential exists for a financial risk
22 difference, because the capitalization of a utility measured at its market value
23 contains more equity, less debt and, therefore, less risk than the capitalization
24 measured at its book value. A leverage adjustment accounts for this difference
25 between market value and book value capital structures.

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1 **40. Q. WHY IS A LEVERAGE ADJUSTMENT NECESSARY?**

2 A. To make the DCF results relevant to the capitalization measured at book value
3 (as is done for ratesetting purposes), the market-derived cost rate must be
4 adjusted to account for this difference in financial risk. The only fact that is
5 important to investors is the return that they can realize on the market value of
6 their investment. As I have measured the DCF, the simple yield (D/P) plus
7 growth (g) provides a return applicable strictly to the price (P) that an investor is
8 willing to pay for a share of stock. The need for the leverage adjustment arises
9 when the results of the DCF model (k) are applied to a capital structure that is
10 different than indicated by the market price (P). From the market perspective,
11 the financial risk of the Water Group is accurately measured by the capital
12 structure ratios calculated from the market capitalization of a company. If the
13 ratesetting process used the market capitalization ratios, then no additional
14 analysis or adjustment would be required, and the simple yield (D/P) plus
15 growth (g) components of the DCF would satisfy the financial risk associated
16 with the market value of the equity capitalization. Because the ratesetting
17 process uses a different set of ratios calculated from the book value
18 capitalization, further analysis is required to synchronize the financial risk of the
19 book capitalization with the required return on the book value of the equity.
20 This adjustment is developed through precise mathematical calculations, using
21 widely recognized analytical procedures consistent with accepted financial
22 theory. To arrive at that return, the rate of return on common equity is the
23 unleveraged cost of capital (or equity return at 100% equity) plus one or more
24 terms reflecting the increase in financial risk resulting from the use of leverage
25 in the capital structure. The calculations presented in the lower panel of data

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1 shown on Schedule 10, under the heading “M&M,” provides a return of 7.96%
2 when applicable to a capital structure with 100% common equity, i.e., the return
3 on equity equals the overall rate of return.

4 **41. Q. ARE THERE SPECIFIC FACTORS THAT INFLUENCE MARKET-TO-BOOK**
5 **RATIOS THAT DETERMINE WHETHER THE LEVERAGE ADJUSTMENT**
6 **SHOULD BE MADE?**

7 A. No. The leverage adjustment is not intended, nor was it designed, to address
8 the reasons that stock prices vary from book value. Hence, any observations
9 concerning market prices relative to book are irrelevant. The leverage
10 adjustment deals with the issue of financial risk and does not transform the
11 DCF result to a book value return through a market-to-book adjustment. Again,
12 the leverage adjustment that I propose is based on the fundamental financial
13 precept that the cost of equity is equal to the rate of return for an unleveraged
14 company (i.e., where the overall rate of return equates to the cost of equity with
15 a capital structure that contains 100% equity) plus the additional return required
16 for introducing debt and/or preferred stock leverage into the capital structure.

17 Further, as noted previously, the relatively high market prices of utility
18 stocks cannot be attributed solely to the expectation that these companies will
19 earn a return on equity that differs from their cost of equity. Stock prices above
20 book value are common for utility stocks, and indeed the stock prices of non-
21 regulated companies exceed book values by even greater margins. In this
22 regard, according to the Barron’s issue of June 25, 2018, the major market
23 indices’ market-to-book ratios are well above unity. The Dow Jones Utility
24 index traded at a multiple of 2.02 times book value, which is below the market
25 multiple of other indices. For example, the S&P Industrial index was at 4.38

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1 times book value, and the Dow Jones Industrial index was at 4.22 times book
2 value. It is difficult to accept that the vast majority of all companies operating in
3 our economy are generating returns far in excess of their cost of capital.
4 Certainly, in our free-market economy, competition should contain such
5 “excesses” if they indeed exist.

6 Finally, the leverage adjustment adds stability to the final DCF cost
7 rate. That is to say, as the market capitalization increases relative to its book
8 value, the leverage adjustment increases while the simple yield (D/P) plus
9 growth (g) result declines. The reverse is also true, such that when the market
10 capitalization declines, the leverage adjustment also declines as the simple
11 yield (D/P) plus growth (g) result increases.

12 **42. Q. IS THE LEVERAGE ADJUSTMENT THAT YOU PROPOSE DESIGNED TO**
13 **TRANSFORM THE MARKET RETURN INTO ONE THAT IS DESIGNED TO**
14 **PRODUCE A PARTICULAR MARKET-TO-BOOK RATIO?**

15 A. No, it is not. The adjustment that I label as a “leverage adjustment” is merely a
16 convenient way of showing the amount that must be added to (or subtracted
17 from) the result of the simple DCF model (i.e., $D/P + g$), in the context of a
18 return that applies to the capital structure used in ratemaking, which is
19 computed with book value weights rather than market value weights, to arrive
20 at the utility’s total cost of equity. I specify a separate factor, which I call the
21 “leverage adjustment,” but there is no reason to do so other than providing
22 identification for this factor. If I expressed my return solely in the context of the
23 book value weights that we use to calculate the weighted average cost of
24 capital and ignore the familiar $D/P + g$ expression entirely, then there would be
25 no separate element to reflect the financial leverage change from market value

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1 to book value capitalization. As shown in the bottom panel of data on Schedule
2 10, the equity return applicable to the book value common equity ratio is equal
3 to 7.96%, which is the return for the Water Group applicable to its equity with
4 no debt in its capital structure (i.e., the cost of capital is equal to the cost of
5 equity with a 100% equity ratio) plus 2.58% compensation for having a 45.50%
6 debt ratio, plus 0.00% for having a 0.10% preferred stock ratio. The sum of the
7 parts is 10.54% (7.96% + 2.58% + 0.00%), and there is no need to even
8 address the cost of equity in terms of $D/P + g$. To express this same return in
9 the context of the familiar DCF model, I summed the 2.18% dividend yield, the
10 6.75% growth rate, and the 1.61% for the leverage adjustment to arrive at the
11 same 10.54% (2.18% + 6.75% + 1.61%) return. I know of no means to
12 mathematically solve for the 1.61% leverage adjustment by expressing it in
13 terms of any particular relationship of market price to book value. The 1.61%
14 adjustment is merely a convenient way to compare the 10.54% return
15 computed directly with the Modigliani & Miller⁸ formulas to the 8.93% return
16 generated by the DCF model (i.e., $D_1/P_0 + g$, or the traditional form of the
17 DCF—see page 1 of Schedule 7) based on a market value capital structure.
18 An 8.93% return assigned to anything other than the market value of equity
19 cannot equate to a reasonable return on book value that has higher financial
20 risk. My point is that when using a market-determined cost of equity developed
21 from the DCF model, it reflects a level of financial risk that is different (in this
22 case, lower) than the capital structure stated at book value. This process has
23 nothing to do with targeting any particular market-to-book ratio. In the case

⁸ Franco Modigliani and Merton H. Miller, *The Cost of Capital, Corporation Finance, and the Theory of Investments*, American Economic Review, June 1958, at 261-297. Franco Modigliani and Merton H. Miller, *Taxes and the Cost of Capital: A Correction*, American Economic Review, June 1963, at 433-443.

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1 where CTWS and SJW are excluded from the financial risk calculations, the
2 financial risk adjustment would be 1.67% and the DCF return would be 10.65%.

3 **43. Q. WHAT DOES YOUR DCF ANALYSIS SHOW?**

4 A. As explained previously, I have used a six-month average dividend yield
5 ("D₁/P₀") adjusted in a forward-looking manner for my DCF calculation. This
6 dividend yield is used in conjunction with the growth rate ("g") previously
7 developed. The DCF also includes the leverage modification ("lev.") required
8 when the book value equity ratio is used in determining the weighted average
9 cost of capital in the ratesetting process rather than the market value equity
10 ratio related to the price of stock. The resulting DCF cost rate is:

$$\begin{array}{rccccccccc} & D_1/P_0 & + & g & + & lev. & = & k & & \\ & & & & & & & & & \\ \text{Water Group} & 2.18\% & + & 6.75\% & + & 1.61\% & = & 10.54\% & & \end{array}$$

11 The DCF result shown above represents the simplified (i.e., Gordon) form of
12 the model that contains a constant growth assumption. I should reiterate,
13 however, that the DCF-indicated cost rate provides an explanation of the rate of
14 return on common stock market prices without regard to the prospect of a
15 change in the price-earnings multiple. An assumption that there will be no
16 change in the price-earnings multiple is not supported by the realities of the
17 equity market, because price-earnings multiples do not remain constant. This
18 is one of the constraints of this model and why I believe it is important to
19 consider other model results when determining AP's cost of equity.

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RISK PREMIUM ANALYSIS

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44. Q. PLEASE DESCRIBE YOUR USE OF THE RISK PREMIUM APPROACH TO DETERMINE THE COST OF EQUITY.

A. With the Risk Premium approach, the cost of equity capital is determined by corporate bond yields plus a premium to account for the fact that common equity is exposed to greater investment risk than debt capital. The result of my Risk Premium study is 11.25%, as shown on page 2 of Schedule 1.

45. Q. WHAT LONG-TERM PUBLIC UTILITY DEBT COST RATE DID YOU USE IN YOUR RISK PREMIUM ANALYSIS?

A. I used a 4.75% yield, which represents a reasonable estimate of the prospective yield on long-term A-rated public utility bonds for reasons described below.

46. Q. WHAT WAS THE SOURCE OF THE HISTORICAL YIELDS USED IN YOUR RISK PREMIUM ANALYSIS?

A. I have analyzed the historical yields on the Moody's index of long-term public utility debt as shown on page 1 of Schedule 11. Specifically, for the twelve months ending May 2018, the average monthly yield on Moody's index of A-rated public utility bonds was 3.98%. For the six and three-month periods ending May 2018, the yields were 4.05% and 4.19%, respectively. During the twelve-months ending May 2018, the range of the yields on A-rated public utility bonds was 3.79% to 4.28%. Page 2 of Schedule 11 shows the long-run spread in yields between A-rated public utility bonds and long-term Treasury bonds. As shown on page 3 of Schedule 11, the yields on A-rated public utility bonds have exceeded those on Treasury bonds by 1.06% on a twelve-month average basis, 1.04% on a six-month average basis, and 1.10% on a three-month

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1 average basis. From these averages, 1.00% represents a reasonable spread
2 for the yield on A-rated public utility bonds over Treasury bonds. This spread is
3 derived from data applicable to the entire public utility industry and is related to
4 very large debt issues by major utilities.

5 **47. Q. WHICH FORECASTS OF INTEREST RATES HAVE YOU CONSIDERED IN**
6 **YOUR ANALYSIS?**

7 A. I have determined the prospective yield on A-rated public utility debt by using
8 the Blue Chip Financial Forecasts (“Blue Chip”) along with the spread in the
9 yields that I describe below. Blue Chip is a reliable authority and contains
10 consensus forecasts of a variety of interest rates compiled from a panel of
11 banking, brokerage, and investment advisory services. In early 1999, Blue
12 Chip stopped publishing forecasts of yields on A-rated public utility bonds
13 because the Federal Reserve deleted these yields from its Statistical Release
14 H.15. To independently project a forecast of the yields on A-rated public utility
15 bonds, I combined the forecast yields on long-term Treasury bonds published
16 on June 1, 2018, and a yield spread of 1.00%, derived from historical data. As
17 shown on page 1 of Schedule 11, there has been an increase in the yield on A-
18 rated public utility bonds. The data show that the yield has increased by 0.49%
19 (i.e., 3.79% to 4.28%) from December 2017 to May 2018.

20 **48. Q. HOW HAVE YOU USED THESE DATA TO PROJECT THE YIELD ON A-**
21 **RATED PUBLIC UTILITY BONDS FOR THE PURPOSE OF YOUR RISK**
22 **PREMIUM ANALYSES?**

23 A. Shown below is my calculation of the prospective yield on A-rated public utility
24 bonds using the building blocks discussed above, i.e., the Blue Chip forecast of
25 Treasury bond yields and the public utility bond yield spread. For comparative

DIRECT TESTIMONY OF PAUL R. MOUL

1 purposes, I also have shown the Blue Chip forecasts of Aaa-rated and Baa-
 2 rated corporate bonds. These forecasts are:

Quarter	Blue Chip Financial Forecasts			A-rated Public Utility	
	Corporate		30-Year	Spread	Yield
	Aaa-rated	Baa-rated	Treasury		
Second	4.1%	4.8%	3.2%	1.00%	4.20%
Third	4.3%	5.0%	3.3%	1.00%	4.30%
Fourth	4.4%	5.2%	3.4%	1.00%	4.40%
First	4.6%	5.3%	3.5%	1.00%	4.50%
Second	4.7%	5.5%	3.7%	1.00%	4.70%
Third	4.8%	5.6%	3.8%	1.00%	4.80%

3 **49. Q. Are there additional forecasts of interest rates that extend beyond those**
 4 **shown above?**

5 A. Yes. Twice yearly, Blue Chip provides long-term forecasts of interest rates. In
 6 its June 1, 2017 publication, Blue Chip provided the following longer-term
 7 forecasts of interest rates:

Averages	Blue Chip Financial Forecasts		
	Corporate		30-Year
	Aaa-rated	Baa-rated	Treasury
2020-2024	5.3%	6.1%	4.2%
2025-2029	5.4%	6.3%	4.4%

8
 9 The longer-term forecasts by Blue Chip suggest that interest rates will move up
 10 from the levels revealed by the near-term forecasts. By focusing more on these
 11 forecasts, a 4.75% yield on A-rated public utility bonds represents a
 12 conservative benchmark and relates to an average period covering a variety of
 13 market conditions likely to exist over the next several years. This public utility
 14 bond yield is distinct from interest rates that will likely prevail at specific points
 15 in time in the future.

DIRECT TESTIMONY OF PAUL R. MOUL

1 **50. Q. WHAT EQUITY RISK PREMIUM HAVE YOU DETERMINED FOR PUBLIC**
2 **UTILITIES?**

3 A. Consistent with forecasts predicting an upward movement of interest rates from
4 historically low levels, I have used a 6.50% equity risk premium. To develop an
5 appropriate equity risk premium, I analyzed the results from 2017 SBBI
6 Yearbook.⁹ My analysis determined that the equity risk premium varies
7 according to the level of interest rates. That is to say, the equity risk premium
8 increases as interest rates decline and declines as interest rates increase. This
9 inverse relationship is revealed by the summary data presented below and
10 shown on page 1 of Schedule 12.

Common Equity Risk Premiums		
Low Interest Rates		7.08%
Average Across All Interest Rates		5.64%
High Interest Rates		4.18%

11 Analysis of the historical data shows that the equity risk premium was 7.08%
12 when the marginal cost of long-term government bonds was low (i.e., 2.96%,
13 which was the average yield during periods of low rates). Conversely, when
14 the yield on long-term government bonds was high (i.e., 7.22% on average
15 during periods of high interest rates) the spread narrowed to 4.18%. Over the
16 entire spectrum of interest rates, the equity risk premium was 5.64% when the
17 average government bond yield was 5.07%. The 6.50% equity risk premium
18 used is between the 7.08% premium related to periods of low interest rates and

⁹ 2017 SBBI Yearbook: Stocks, Bonds, Bills, and Inflation: U.S. Capital Markets Performance by Asset Class 1926-2016 by Roger G. Ibbotson and contributors from Duff & Phelps (Wiley, 2017)

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1 the 5.64% premium related to average interest rates across all levels.

2 **51. Q. WHAT COMMON EQUITY COST RATE DID YOU DETERMINE BASED ON**
3 **YOUR RISK PREMIUM ANALYSIS?**

4 A. The cost of equity (i.e., "k") is represented by the sum of the prospective yield
5 for long-term public utility debt (i.e., "i") and the equity risk premium (i.e., "RP").
6 As determined through my analysis, the Risk Premium approach provides a
7 cost of equity as follows:

$$i + RP = k$$

Water Group 4.75% + 6.50% = 11.25%

8 **CAPITAL ASSET PRICING MODEL**

9 **52. Q. PLEASE EXPLAIN GENERALLY HOW THE CAPM IS USED TO MEASURE**
10 **THE COST OF EQUITY?**

11 A. The CAPM uses the yield on a risk-free interest-bearing obligation plus a rate of
12 return premium that is proportional to the systematic risk of an investment. As
13 shown on page 2 of Schedule 1, the result of my CAPM analysis is 12.95%.
14 Excluding CTWS and SJW, the CAPM result is 13.04%. To compute the cost
15 of equity with the CAPM, three components are necessary: a risk-free rate of
16 return ("Rf"), the beta measure of systematic risk ("β"), and the market risk
17 premium ("Rm-Rf") derived from the total return on the market of equities
18 reduced by the risk-free rate of return. The CAPM specifically accounts for
19 differences in systematic risk (i.e., market risk as measured by the beta)
20 between an individual firm or group of firms and the entire market of equities.

21 **53. Q. WHAT BETAS HAVE YOU CONSIDERED IN THE CAPM?**

22 A. For my CAPM analysis, I initially considered the Value Line betas. As shown
23 on page 2 of Schedule 3, the average beta is 0.71 for the Water Group.

DIRECT TESTIMONY OF PAUL R. MOUL

1 54. Q. DID YOU USE THE VALUE LINE BETAS IN YOUR CAPM DETERMINED
2 COST OF EQUITY?

3 A. I used the Value Line betas as a foundation for the leverage adjusted betas that
4 I used in my CAPM analysis. The betas must be reflective of the financial risk
5 associated with the ratesetting capital structure that is measured at book value.
6 Therefore, Value Line betas cannot be used directly in the CAPM, unless the
7 cost rate developed using those betas is applied to a capital structure
8 measured with market values. To develop a CAPM cost rate applicable to a
9 book-value capital structure, the Value Line (market value) betas have been
10 unleveraged and releveraged for the book value common equity ratios using
11 the Hamada formula, as follows:

$$\beta l = \beta u [1 + (1 - t) D/E + P/E]$$

12 where βl = the leveraged beta, βu = the unleveraged beta, t = income tax rate,
13 D = debt ratio, P = preferred stock ratio, and E = common equity ratio. The
14 betas published by Value Line have been calculated with the market price of
15 stock and are related to the market value capitalization. With the application of
16 the formula shown above and the capital structure ratios measured at market
17 value, the beta becomes 0.57 for the Water Group if the Group employed no
18 leverage and was 100% equity financed. Those calculations are shown on
19 Schedule 10 under the section labeled "Hamada."¹⁰ With the unleveraged beta
20 as a base, I calculated the leveraged beta of 0.95 for the book value capital
21 structure of the Water Group. The book value leveraged beta that I will employ
22 in the CAPM cost of equity is 0.95 for the Water Group. The leverage adjusted
23

¹⁰ Robert S. Hamada, *The Effects of the Firm's Capital Structure on the Systematic Risk of Common Stocks*, The Journal of Finance Vol. 27, No. 2, Papers and Proceedings of the Thirtieth Annual Meeting of the American Finance Association, New Orleans, Louisiana, December 27-29, 1971 (May 1972), at 435-452.

DIRECT TESTIMONY OF PAUL R. MOUL

1 beta is 0.96 for the Water Group excluding CTWS and SJW.

2 **55. Q. WHAT RISK-FREE RATE HAVE YOU USED IN YOUR CAPM ANALYSIS**
3 **AND EXPLAIN HOW IT WAS DERIVED?**

4 A. I have used a 3.75% risk-free rate of return for CAPM purposes. On page 1 of
5 Schedule 13, I provided the historical yields on Treasury notes and bonds. For
6 the twelve months ended May 2018, the average yield on 30-year Treasury
7 bonds was 2.92%. For the six- and three-months ending May 2018, the yields
8 on 30-year Treasury bonds were 3.01% and 3.10%, respectively. During the
9 twelve-months ended May 2018, the range of the yields on 30-year Treasury
10 bonds was 2.77% to 3.13%.

11 **56. Q. WHAT ARE SOME OF THE FACTORS THAT HAVE INFLUENCED**
12 **HISTORICAL TREASURY YIELDS?**

13 A. The low yields that existed during recent periods can be traced to the financial
14 crisis and its aftermath commonly referred to as the "Great Recession." The
15 resulting decline in the yields on Treasury obligations was attributed to a
16 number of factors, including: the sovereign debt crisis in the Euro Zone,
17 concern over a possible double dip recession and the potential for deflation, the
18 expansion of the Federal Reserve's large balance sheet through the purchase
19 of Treasury obligations and mortgage-backed securities (also known as QEI,
20 QEII, and QEIII), and the reinvestment of proceeds from maturing obligations
21 and the lengthening of the maturity of the Fed's bond portfolio through the sale
22 of short-term Treasuries and the purchase of long-term Treasury obligations
23 (also known as "operation twist"). Essentially, low interest rates were the
24 product of the policy of the Federal Open Market Committee ("FOMC") in its
25 attempt to deal with stagnant job growth, which is part of its dual mandate. The

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1 FOMC ended its bond purchasing program at its policy meeting on October 29,
2 2014.

3 **57. Q. ARE TREASURY YIELDS NOW MOVING TO HIGHER LEVELS?**

4 A. Yes. As I noted above, the FOMC ended its bond purchasing program at its
5 policy meeting on October 29, 2014. At its December 16, 2015 meeting, the
6 FOMC increased the federal funds rate range by 0.25 percentage points. On
7 December 14, 2016, the FOMC acted again by raising the Fed Funds rate by
8 one-quarter percentage point. The FOMC also used this occasion to express a
9 more aggressive approach to future increases in interest rates. In addition, the
10 Fed has indicated that it will reduce the size of its balance sheet. FOMC
11 increased the fed funds rate on three occasions in 2017 (i.e., March 15, 2017,
12 June 14, 2017 and December 13, 2017) by one-quarter percentage point each.
13 At its policy meetings on March 21, 2018 and June 13, 2018, the FOMC acted
14 again to increase the federal funds rate by one-quarter percentage point in
15 each instance. There have been seven (7) one-quarter percentage point
16 increases in the Fed Funds rate since the FOMC began to normalize interest
17 rates following the financial crisis and the Great Recession. Going forward,
18 there is an expectation of possibly two additional interest rate increases in 2018
19 and three increases in 2019. Additional increases may be expected depending
20 upon the rate of increase in price levels. This buttresses the prospect that
21 higher interest rates are on the horizon.

22 As shown on page 2 of Schedule 13, forecasts published by Blue Chip
23 on June 1, 2018, indicate that the yields on long-term Treasury bonds are
24 expected to be in the range of 3.2% to 3.8% during the next six quarters. The
25 longer-term forecasts described previously show that the yields on 30-year

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1 Treasury bonds will average 4.2% from 2020 through 2024 and 4.4% from
2 2025 to 2029. For the reasons explained previously, forecasts of interest rates
3 should be emphasized at this time in selecting the risk-free rate of return in
4 CAPM. Hence, I have used a 3.75% risk-free rate of return for CAPM
5 purposes, which considers the Blue Chip forecasts.

6 **58. Q. WHAT MARKET PREMIUM HAVE YOU USED IN YOUR CAPM ANALYSIS**
7 **AND EXPLAIN HOW IT WAS DERIVED?**

8 A. I used a market premium of 8.61%. As shown in the lower panel of data
9 presented on page 2 of Schedule 13, the market premium is derived from
10 historical data and the Value Line and S&P 500 returns. For the historically
11 based market premium, I have used the arithmetic mean obtained from the
12 data presented on page 1 of Schedule 12. As shown on Schedule 12, the
13 market return was 11.97% on large stocks during periods of low interest rates.
14 During those periods, the yield on long-term government bonds was 2.96%. As
15 previously described, interest rates are forecast to trend upward in the future.
16 To recognize that trend, I have given weight to the average returns and yields
17 across all interest rate levels. As such, I carried over to page 2 of Schedule 13
18 the average large common stock returns of 11.96% ($11.97\% + 11.95\% =$
19 $23.92\% \div 2$) and the average yield on long-term government bonds of 4.02%
20 ($2.96\% + 5.07\% = 8.03\% \div 2$). These financial returns rest between those
21 experienced during periods of low interest rates and those experienced across
22 all levels of interest rates. The resulting market premium is 7.94% ($11.96\% -$
23 4.02%) based on historical data, as shown on page 2 of Schedule 13. As also
24 shown on page 2 of Schedule 13, I calculated the forecast returns, which show
25 an 11.83% total market return from the Value Line data and a DCF return of

DIRECT TESTIMONY OF PAUL R. MOUL

1 14.21% for the S&P 500. With the average forecast return of 13.02% (11.83%
2 + 14.21% = 26.04% ÷ 2), I calculated a market premium of 9.27% (13.02% -
3 3.75%) using forecast data. The market premium applicable to the CAPM
4 derived from these sources equals 8.61% (9.27% + 7.94% = 17.21% ÷ 2).

5 **59. Q. ARE ADJUSTMENTS TO THE CAPM NECESSARY TO FULLY REFLECT**
6 **THE RATE OF RETURN ON COMMON EQUITY?**

7 A. Yes. The technical literature supports an adjustment relating to the size of the
8 company or portfolio for which the calculation is performed. As the size of a
9 company decreases, its risk and required return increases. Moreover, in his
10 discussion of the cost of capital, Professor Brigham¹¹ indicated that smaller
11 companies have higher capital costs than otherwise similar but larger
12 companies. Also, the Fama/French study¹² established that the size of a
13 company helps explain stock returns. In an October 15, 1995 article in Public
14 Utility Fortnightly, entitled "Equity and the Small-Stock Effect,"¹³ it was
15 demonstrated that the CAPM could understate the cost of equity significantly
16 according to a company's size. Indeed, it was demonstrated in the SBBI
17 Yearbook that the returns for stocks in lower deciles (i.e., smaller stocks) were
18 in excess of those shown by the simple CAPM. Essentially, in relation to the
19 market as a whole, a CAPM result for the Water Group should include a "mid-
20 cap" adjustment to reflect that the cost of equity for these companies is higher
21 than for the market as a whole, due to their relatively smaller size. This mid-cap
22 adjustment of 1.02% is revealed on page 3 of Schedule 13.

¹¹ See Eugene F. Brigham, *FUNDAMENTALS OF FINANCIAL MANAGEMENT* 623 (5th ed. 1989).

¹² See Eugene F. Fama and Kenneth R. French, *The Cross-Section of Expected Stock Returns*, *The Journal of Finance*, June 1992, at 427-465.

¹³ See Michael Annin, *Equity and the Small-Stock Effect*, *Public Utilities Fortnightly*, October 15, 1995, at 42-43.

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1 comparable risks. Using this approach, the business lines of the comparable
2 companies become unimportant. The latter approach is preferable with the
3 qualification that the comparable risk companies that are considered exclude
4 regulated companies to avoid the circular reasoning implicit in the use of the
5 achieved earnings/book ratios of other regulated firms. The United States
6 Supreme Court has held that:

7 A public utility is entitled to such rates as will permit it to earn
8 a return on the value of the property which it employs for the
9 convenience of the public equal to that generally being made
10 at the same time and in the same general part of the country
11 on investments in other business undertakings which are
12 attended by corresponding risks and uncertainties. The
13 return should be reasonably sufficient to assure confidence
14 in the financial soundness of the utility and should be
15 adequate, under efficient and economical management, to
16 maintain and support its credit and enable it to raise the
17 money necessary for the proper discharge of its public
18 duties. *Bluefield Water Works vs. Public Service*
19 *Commission*, 262 U.S. 668 (1923).

20 **62. Q. DID YOU COMPARE THE RESULTS OF YOUR DCF, RISK PREMIUM AND**
21 **CAPM ANALYSES TO THE RESULTS INDICATED BY A COMPARABLE**
22 **EARNINGS APPROACH?**

23 A. Yes. I selected companies from The Value Line Investment Survey for
24 Windows that have six categories of risk that established comparability
25 between the non-regulated companies that I selected and the Water Group.
26 These screening criteria were based upon the range of risks as defined by the
27 rankings of the companies in the Water Group. The measures of risk that were
28 considered include: Timeliness Rank, Safety Rank, Financial Strength, Price
29 Stability, Value Line betas, and Technical Rank. The parameters for selection
30 are provided on page 3 of Schedule 14. The identities of the companies
31 selected for the Comparable Earnings group and their rankings are identified on

DIRECT TESTIMONY OF PAUL R. MOUL

1 page 1 of Schedule 14.

2 I relied upon Value Line data because they provide a comprehensive
3 basis for evaluating the risks of comparable companies. As to the returns
4 calculated by Value Line for these companies, there is some downward bias in
5 the figures shown on page 2 of Schedule 14, because Value Line computes the
6 returns on year-end rather than average book value. The use of year-end book
7 values creates a downward bias under the situation of increasing book values
8 year over year. If average book values had been employed, the rates of return
9 would have been slightly higher. Nevertheless, these are the returns
10 considered by investors when taking positions in these stocks. Because many
11 of the same comparability factors and published returns are used by investors
12 in selecting stocks, and because investors rely on the Value Line service to
13 gauge returns, it is an appropriate database for measuring comparable return
14 opportunities.

15 **63. Q. WHAT DATA HAVE YOU USED IN YOUR COMPARABLE EARNINGS**
16 **ANALYSIS?**

17 A. I used both historical realized returns and forecasted returns for non-utility
18 companies in my comparable earnings analysis. As noted previously, I have
19 not used returns for utility companies to avoid the circularity that arises from
20 using regulatory-influenced returns to determine a regulated return. It is
21 appropriate to consider a relatively long measurement period in the
22 Comparable Earnings approach to cover conditions over an entire business
23 cycle. A ten-year period (five historical years and five projected years) is
24 sufficient to cover an average business cycle. Unlike the DCF and CAPM, the
25 results of the Comparable Earnings method can be applied directly to the book

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1 value capitalization because the nature of the analysis relates to book value.
2 Hence, Comparable Earnings does not pose the risk of potential
3 misspecification that is posed by market models when the market capitalization
4 and book value capitalization diverge significantly.

5 The historical rate of return on book common equity was 11.9% using
6 only the returns that were less than 20% as shown on page 2 of Schedule 14.
7 Points of demarcation were chosen to eliminate the results of highly profitable
8 enterprises, which the Bluefield case stated were not the type of returns that a
9 utility was entitled to earn, and unrepresentatively low returns. For this
10 purpose, I used 20% as the point where those returns could be viewed as
11 highly profitable and should be excluded from the Comparable Earnings
12 approach. The forecast rate of return, as published by Value Line, is 13.0%, as
13 indicated on page 2 of Schedule 14.

14 **64. Q. WHAT RATE OF RETURN ON COMMON EQUITY HAVE YOU DETERMINED**
15 **IN THIS CASE USING THE COMPARABLE EARNINGS APPROACH?**

16 A. The average of the historical and forecast rates of return is:

	<u>Historical</u>	<u>Forecast</u>	<u>Average</u>
Comparable Earnings Group	11.9%	13.0%	12.45%

17 **CONCLUSION**

18 **65. Q. WHAT IS YOUR CONCLUSION REGARDING AP'S COST OF COMMON**
19 **EQUITY?**

20 A. Based upon the application of a variety of methods and models described
21 previously, it is my opinion that the return rate on common equity of 10.75%
22 being employed in this case is within – in fact, near the low end – of the range
23 of reasonable equity return rates for AP. The rate of return on common equity

DIRECT TESTIMONY OF PAUL R. MOUL

1 used by AP to develop its proposed revenue requirement in this case should be
2 considered in the context of AP's risk characteristics, as well as the general
3 condition of the capital markets. It is essential that the Commission employ a
4 variety of techniques to measure AP's cost of equity because of the
5 limitations/infirmities that are inherent in each method. It is also important that
6 the Commission consider the exemplary performance of the Company's
7 management when making a final determination on the equity return in this
8 case.

9 **66. Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY AT THIS TIME?**

10 A. Yes. However, I reserve the right to supplement my testimony, if necessary,
11 and to respond to witnesses presented by other parties.

APPENDIX A TO DIRECT TESTIMONY OF PAUL R. MOUL

**EDUCATIONAL BACKGROUND, BUSINESS EXPERIENCE
AND QUALIFICATIONS**

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I was awarded a degree of Bachelor of Science in Business Administration by Drexel University in 1971. While at Drexel, I participated in the Cooperative Education Program which included employment, for one year, with American Water Works Service Company, Inc., as an internal auditor, where I was involved in the audits of several operating water companies of the American Water Works System and participated in the preparation of annual reports to regulatory agencies and assisted in other general accounting matters.

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Upon graduation from Drexel University, I was employed by American Water Works Service Company, Inc., in the Eastern Regional Treasury Department where my duties included preparation of rate case exhibits for submission to regulatory agencies, as well as responsibility for various treasury functions of the thirteen New England operating subsidiaries.

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In 1973, I joined the Municipal Financial Services Department of Betz Environmental Engineers, a consulting engineering firm, where I specialized in financial studies for municipal water and wastewater systems.

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In 1974, I joined Associated Utility Services, Inc., now known as AUS Consultants. I held various positions with the Utility Services Group of AUS Consultants, concluding my employment there as a Senior Vice President.

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In 1994, I formed P. Moul & Associates, an independent financial and regulatory consulting firm. In my capacity as Managing Consultant and for the past twenty-nine years, I have continuously studied the rate of return requirements for cost of service-regulated firms. In this regard, I have supervised the preparation of rate of return studies, which were employed, in connection with my testimony and in the past for other individuals. I have

APPENDIX A TO DIRECT TESTIMONY OF PAUL R. MOUL

1 presented direct testimony on the subject of fair rate of return, evaluated rate of return
2 testimony of other witnesses, and presented rebuttal testimony.

3 My studies and prepared direct testimony have been presented before thirty-seven (37)
4 federal, state and municipal regulatory commissions, consisting of: the Federal Energy
5 Regulatory Commission; state public utility commissions in Alabama, Alaska, California,
6 Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa,
7 Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri,
8 New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania,
9 Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia, Wisconsin, and
10 the Philadelphia Gas Commission, and the Texas Commission on Environmental Quality.

11 My testimony has been offered in over 300 rate cases involving electric power, natural gas
12 distribution and transmission, resource recovery, solid waste collection and disposal,
13 telephone, wastewater, and water service utility companies. While my testimony has
14 involved principally fair rate of return and financial matters, I have also testified on capital
15 allocations, capital recovery, cash working capital, income taxes, factoring of accounts
16 receivable, and take-or-pay expense recovery. My testimony has been offered on behalf of
17 municipal and investor-owned public utilities and for the staff of a regulatory commission. I
18 have also testified at an Executive Session of the State of New Jersey Commission of
19 Investigation concerning the BPU regulation of solid waste collection and disposal.

20 I was a co-author of a verified statement submitted to the Interstate Commerce
21 Commission concerning the 1983 Railroad Cost of Capital (Ex Parte No. 452). I was also
22 co-author of comments submitted to the Federal Energy Regulatory Commission regarding
23 the Generic Determination of Rate of Return on Common Equity for Public Utilities in 1985,
24 1986 and 1987 (Docket Nos. RM85-19-000, RM86-12-000, RM87-35-000 and RM88-25-
25 000). Further, I have been the consultant to the New York Chapter of the National

APPENDIX A TO DIRECT TESTIMONY OF PAUL R. MOUL

1 Association of Water Companies, which represented the water utility group in the
2 Proceeding on Motion of the Commission to Consider Financial Regulatory Policies for New
3 York Utilities (Case 91-M-0509). I have also submitted comments to the Federal Energy
4 Regulatory Commission in its Notice of Proposed Rulemaking (Docket No. RM99-2-000)
5 concerning Regional Transmission Organizations and on behalf of the Edison Electric
6 Institute in its intervention in the case of Southern California Edison Company (Docket No.
7 ER97-2355-000). Also, I was a member of the panel of participants at the Technical
8 Conference in Docket No. PL07-2 on the Composition of Pipeline Proxy Groups for
9 Determining Gas and Oil Pipeline Return on Equity.

10 In late 1978, I arranged for the private placement of bonds on behalf of an investor-
11 owned public utility. I have assisted in the preparation of a report to the Delaware Public
12 Service Commission relative to the operations of the Lincoln and Ellendale Electric
13 Company. I was also engaged by the Delaware P.S.C. to review and report on the
14 proposed financing and disposition of certain assets of Sussex Shores Water Company
15 (P.S.C. Docket Nos. 24-79 and 47-79). I was a co-author of a Report on Proposed
16 Mandatory Solid Waste Collection Ordinance prepared for the Board of County
17 Commissioners of Collier County, Florida.

18 I have been a consultant to the Bucks County Water and Sewer Authority
19 concerning rates and charges for wholesale contract service with the City of Philadelphia.
20 My municipal consulting experience also included an assignment for Baltimore County,
21 Maryland, regarding the City/County Water Agreement for Metropolitan District customers
22 (Circuit Court for Baltimore County in Case 34/153/87-CSP-2636).

AQUA PENNSYLVANIA, INC.

Docket No. R-2018-_____

EXHIBIT TO ACCOMPANY
THE DIRECT TESTIMONY OF
PAUL R. MOUL
WITH REGARD TO
COST OF CAPITAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

August 17, 2018

AQUA PENNSYLVANIA, INC.
Index of Schedules

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Aqua Pennsylvania, Inc.
Summary Cost of Capital
Estimated at March 31, 2020

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	47.15%	4.43%	2.09%
Common Equity	<u>52.85%</u>	10.75%	<u>5.68%</u>
Total	<u>100.00%</u>		<u>7.77%</u>

Indicated levels of fixed charge coverage assuming that the Company could actually achieve its overall cost of capital:

Pre-tax coverage of interest expense based upon a 28.8921% composite federal and state income tax rate (10.08% ÷ 2.09%)	4.82 x
Post-tax coverage of interest expense (7.77% ÷ 2.09%)	3.72 x

Agua Pennsylvania, Inc.

Cost of Equity
as of May 31, 2018

Discounted Cash Flow (DCF)	D_1/P_0	⁽¹⁾	+	g	⁽²⁾	+	$lev.$	⁽³⁾	=	k			
Water Group	2.18%		+	6.75%		+	1.61%		=	10.54%			
Water Group Excl. CTWS and SJW	2.23%		+	6.75%		+	1.67%		=	10.65%			
Risk Premium (RP)				I	⁽⁴⁾	+	RP	⁽⁵⁾	=	k			
Water Group				4.75%		+	6.50%		=	11.25%			
Capital Asset Pricing Model (CAPM)	R_f	⁽⁶⁾	+	β	⁽⁷⁾	x	$(R_m - R_f)$	⁽⁸⁾	+	$size$	⁽⁹⁾	=	k
Water Group	3.75%		+	0.95		x	(8.61%)		+	1.02%		=	12.95%
Water Group Excl. CTWS and SJW	3.75%		+	0.96		x	(8.61%)		+	1.02%		=	13.04%
Comparable Earnings (CE)							Historical	Forecast		Average			
Comparable Earnings Group							11.9%	13.0%		12.45%			

- References
- ⁽¹⁾ Schedule 7, page 1
 - ⁽²⁾ Schedule 9, page 1
 - ⁽³⁾ Schedule 10, page 1
 - ⁽⁴⁾ A-rated public utility bond yield comprised of a 3.75% risk-free rate of return (Schedule 13, page 2) and a yield spread of 1.00% (Schedule 11, page 3)
 - ⁽⁵⁾ Schedule 12, page 1
 - ⁽⁶⁾ Schedule 13, page 2
 - ⁽⁷⁾ Schedule 9, page 1
 - ⁽⁸⁾ Schedule 13, page 2
 - ⁽⁹⁾ Schedule 13, page 3
 - ⁽¹⁰⁾ Schedule 14, page 2

Aqua Pennsylvania, Inc.
Capitalization and Financial Statistics
2017-2013, Inclusive

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	
	(Millions of Dollars)					
Amount of Capital Employed						
Permanent Capital	\$ 2,851.4	\$ 2,609.7	\$ 2,438.3	\$ 2,256.1	\$ 2,124.4	
Short-Term Debt	\$ 3.7	\$ 5.5	\$ 7.3	\$ 13.7	\$ 30.0	
Total Capital	<u>\$ 2,855.1</u>	<u>\$ 2,615.2</u>	<u>\$ 2,445.6</u>	<u>\$ 2,269.7</u>	<u>\$ 2,154.4</u>	
Capital Structure Ratios						<u>Average</u>
Based on Permanent Capital:						
Long-Term Debt	46.4%	45.6%	46.3%	44.6%	45.0%	45.6%
Common Equity ⁽¹⁾	53.6%	54.4%	53.7%	55.4%	55.0%	54.4%
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Based on Total Capital:						
Total Debt incl. Short Term	46.5%	45.7%	46.5%	45.0%	45.7%	45.9%
Common Equity ⁽¹⁾	53.5%	54.3%	53.5%	55.0%	54.3%	54.1%
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Rate of Return on Book Common Equity ⁽¹⁾	12.0%	12.7%	13.4%	13.3%	14.9%	13.3%
Operating Ratio ⁽²⁾	52.2%	51.7%	49.9%	51.8%	50.1%	51.1%
Coverage incl. AFUDC ⁽³⁾						
Pre-tax: All Interest Charges	3.80 x	4.17 x	4.41 x	4.20 x	4.38 x	4.19 x
Post-tax: All Interest Charges	4.21 x	4.40 x	4.48 x	4.29 x	4.42 x	4.36 x
Coverage excl. AFUDC ⁽³⁾						
Pre-tax: All Interest Charges	3.60 x	4.04 x	4.30 x	4.12 x	4.34 x	4.08 x
Post-tax: All Interest Charges	4.00 x	4.27 x	4.38 x	4.21 x	4.38 x	4.25 x
Quality of Earnings & Cash Flow						
AFC/Income Avail. for Common Equity	6.3%	29.4%	3.1%	2.6%	1.1%	8.5%
Effective Income Tax Rate	-14.6%	-7.2%	-2.2%	-2.9%	-1.1%	-5.6%
Internal Cash Generation/Construction ⁽⁴⁾	67.7%	85.5%	70.5%	100.7%	100.9%	85.1%
Gross Cash Flow/ Avg. Total Debt ⁽⁵⁾	19.3%	20.0%	21.2%	22.7%	22.0%	21.0%
Gross Cash Flow Interest Coverage ⁽⁶⁾	5.68 x	5.85 x	5.51 x	5.57 x	5.42 x	5.61 x
Common Dividend Coverage ⁽⁷⁾	4.86 x	7.77 x	3.81 x	15.16 x	x	7.90 x

See Page 2 for Notes.

Aqua Pennsylvania, Inc.
Capitalization and Financial Statistics
2013-2017, Inclusive

Notes:

- (1) Excluding Accumulated Other Comprehensive Income ("OCI") from the equity account.
- (2) Total operating expenses, maintenance, depreciation and taxes other than income as a percentage of operating revenues.
- (3) Coverage calculations represent the number of times available earnings, both including and excluding AFUDC (allowance for funds used during construction) as reported in its entirety, cover fixed charges.
- (4) Internal cash generation/gross construction is the percentage of gross construction expenditures provided by internally-generated funds from operations after payment of all cash dividends divided by gross construction expenditures.
- (5) Gross Cash Flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFUDC) as a percentage of average total debt.
- (6) Gross Cash Flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less total AFUDC) plus interest charges, divided by interest charges.
- (7) Common dividend coverage is the relationship of internally generated funds from operations after payment of preferred stock dividends to common dividends paid.

Source of Information: Certified Annual Reports by PricewaterhouseCoopers LLP

Water Group
Capitalization and Financial Statistics ⁽¹⁾
2013-2017, Inclusive

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	
	(Millions of Dollars)					
Amount of Capital Employed						
Permanent Capital	\$ 2,302.9	\$ 2,167.1	\$ 2,053.2	\$ 1,951.4	\$ 1,858.7	
Short-Term Debt	\$ 147.3	\$ 123.2	\$ 85.7	\$ 66.7	\$ 86.2	
Total Capital	<u>\$ 2,450.2</u>	<u>\$ 2,290.3</u>	<u>\$ 2,138.9</u>	<u>\$ 2,018.1</u>	<u>\$ 1,944.9</u>	
Market-Based Financial Ratios						<u>Average</u>
Price-Earnings Multiple	28 x	25 x	21 x	19 x	21 x	23 x
Market/Book Ratio	296.2%	265.6%	219.3%	206.6%	202.1%	238.0%
Dividend Yield	2.1%	2.3%	2.8%	2.9%	2.9%	2.6%
Dividend Payout Ratio	56.8%	56.8%	58.0%	56.0%	63.5%	58.2%
Capital Structure Ratios						
Based on Permanent Capital:						
Long-Term Debt	45.3%	45.7%	46.0%	45.7%	46.3%	45.8%
Preferred Stock	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Common Equity ⁽²⁾	<u>54.6%</u>	<u>54.2%</u>	<u>53.9%</u>	<u>54.2%</u>	<u>53.6%</u>	<u>54.1%</u>
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Based on Total Capital:						
Total Debt incl. Short Term	48.3%	48.1%	47.5%	47.3%	48.0%	47.8%
Preferred Stock	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Common Equity ⁽²⁾	<u>51.6%</u>	<u>51.9%</u>	<u>52.4%</u>	<u>52.6%</u>	<u>51.9%</u>	<u>52.1%</u>
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Rate of Return on Book Common Equity ⁽²⁾	10.9%	10.7%	10.2%	10.8%	9.6%	10.4%
Operating Ratio ⁽³⁾	68.3%	67.9%	69.1%	68.2%	70.2%	68.7%
Coverage incl. AFUDC ⁽⁴⁾						
Pre-tax: All Interest Charges	4.61 x	4.60 x	4.30 x	4.43 x	3.95 x	4.38 x
Post-tax: All Interest Charges	3.53 x	3.50 x	3.35 x	3.39 x	3.00 x	3.35 x
Overall Coverage: All Int. & Pfd. Div.	3.52 x	3.49 x	3.33 x	3.37 x	2.99 x	3.34 x
Coverage excl. AFUDC ⁽⁴⁾						
Pre-tax: All Interest Charges	4.50 x	4.52 x	4.24 x	4.38 x	3.90 x	4.31 x
Post-tax: All Interest Charges	3.43 x	3.42 x	3.29 x	3.33 x	2.96 x	3.29 x
Overall Coverage: All Int. & Pfd. Div.	3.41 x	3.41 x	3.28 x	3.32 x	2.94 x	3.27 x
Quality of Earnings & Cash Flow						
AFC/Income Avail. for Common Equity	4.6%	3.3%	2.7%	2.2%	2.6%	3.1%
Effective Income Tax Rate	28.9%	30.5%	28.6%	30.6%	32.7%	30.3%
Internal Cash Generation/Construction ⁽⁵⁾	60.9%	65.4%	82.9%	94.6%	82.9%	77.3%
Gross Cash Flow/ Avg. Total Debt ⁽⁶⁾	23.8%	23.8%	24.2%	26.2%	21.9%	24.0%
Gross Cash Flow Interest Coverage ⁽⁷⁾	5.96 x	5.88 x	5.85 x	6.00 x	5.23 x	5.78 x
Common Dividend Coverage ⁽⁸⁾	3.76 x	3.83 x	3.83 x	4.24 x	3.92 x	3.92 x

See Page 2 for Notes.

Water Group
Capitalization and Financial Statistics
2013-2017, Inclusive

Notes:

- (1) All capitalization and financial statistics for the group are the arithmetic average of the achieved results for each individual company in the group.
- (2) Excluding Accumulated Other Comprehensive Income (“OCI”) from the equity account.
- (3) Total operating expenses, maintenance, depreciation and taxes other than income taxes as a percent of operating revenues.
- (4) Coverage calculations represent the number of times available earnings, both including and excluding AFUDC (allowance for funds used during construction) as reported in its entirety, cover fixed charges.
- (5) Internal cash generation/gross construction is the percentage of gross construction expenditures provided by internally-generated funds from operations after payment of all cash dividends divided by gross construction expenditures.
- (6) Gross Cash Flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less total AFUDC) plus interest charges, divided by interest charges.
- (7) Gross Cash Flow plus interest charges divided by interest charges.
- (8) Common dividend coverage is the relationship of internally-generated funds from operations after payment of preferred stock dividends to common dividends paid.

Basis of Selection:

The Water Group companies have the following common characteristics: (i) they are listed in the “Water Utility Industry” section (basic and expanded editions) of The Value Line Investment Survey, and (ii) their stock is publicly traded.

Ticker	Company	Corporate Credit Ratings		Stock Traded	S&P Stock Ranking	Value Line Beta
		Moody's	S&P			
AWR	American States Water	A2	A+	NYSE	B+	0.75
AWK	American Water Works Co.	A3	A	NYSE	NR	0.65
WTR	Aqua America, Inc.	-	A+	NYSE	A	0.70
ARTNA	Artesian Resources Corp.	-	-	NASDAQ	NR	0.60
CWT	California Water Serv. Grp.	-	A+	NYSE	A-	0.75
CTWS	Connecticut Water Services	-	A	NASDAQ	A-	0.65
MSEX	Middlesex Water Company	-	A	NASDAQ	A-	0.80
SJW	SJW Corporation	-	A	NYSE	A-	0.70
YORW	York Water Company	-	A-	NASDAQ	A	0.80
	Average	<u>A3</u>	<u>A</u>		<u>A-</u>	<u>0.71</u>

Note: Ratings are those of utility subsidiaries

Source of Information: Utility COMPUSTAT
Moody's Investors Service
Standard & Poor's Corporation
S&P Stock Guide

Standard & Poor's Public Utilities
Capitalization and Financial Statistics ⁽¹⁾
2013-2017, Inclusive

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	
	(Millions of Dollars)					
Amount of Capital Employed						
Permanent Capital	\$ 32,875.9	\$ 31,133.4	\$ 28,468.3	\$ 27,468.3	\$ 25,958.6	
Short-Term Debt	\$ 1,106.5	\$ 1,113.4	\$ 930.9	\$ 963.9	\$ 764.3	
Total Capital	<u>\$ 33,982.4</u>	<u>\$ 32,246.8</u>	<u>\$ 29,399.2</u>	<u>\$ 28,432.2</u>	<u>\$ 26,722.9</u>	
Market-Based Financial Ratios						<u>Average</u>
Price-Earnings Multiple	22 x	21 x	20 x	20 x	19 x	20 x
Market/Book Ratio	206.6%	191.5%	179.3%	179.1%	164.4%	184.2%
Dividend Yield	3.4%	3.6%	3.7%	3.6%	3.9%	3.6%
Dividend Payout Ratio	74.0%	75.0%	70.0%	73.2%	73.3%	73.1%
Capital Structure Ratios						
Based on Permanent Capital:						
Long-Term Debt	56.9%	56.7%	54.9%	53.3%	53.3%	55.0%
Preferred Stock	1.4%	1.8%	1.5%	1.3%	1.1%	1.4%
Common Equity ⁽²⁾	41.7%	41.5%	43.6%	45.4%	45.7%	43.6%
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Based on Total Capital:						
Total Debt incl. Short Term	58.4%	58.3%	56.3%	55.0%	54.7%	56.5%
Preferred Stock	1.4%	1.8%	1.5%	1.3%	1.0%	1.4%
Common Equity ⁽²⁾	40.3%	39.9%	42.2%	43.7%	44.3%	42.1%
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Rate of Return on Book Common Equity ⁽²⁾	10.4%	9.0%	9.2%	9.6%	9.0%	9.4%
Operating Ratio ⁽³⁾	77.4%	78.8%	80.4%	81.2%	80.7%	79.7%
Coverage incl. AFUDC ⁽⁴⁾						
Pre-tax: All Interest Charges	3.26 x	3.15 x	3.41 x	3.56 x	3.22 x	3.32 x
Post-tax: All Interest Charges	2.78 x	2.53 x	2.65 x	2.71 x	2.48 x	2.63 x
Overall Coverage: All Int. & Pfd. Div.	2.76 x	2.50 x	2.62 x	2.67 x	2.45 x	2.60 x
Coverage excl. AFUDC ⁽⁴⁾						
Pre-tax: All Interest Charges	3.16 x	3.05 x	3.31 x	3.46 x	3.13 x	3.22 x
Post-tax: All Interest Charges	2.68 x	2.43 x	2.55 x	2.62 x	2.39 x	2.53 x
Overall Coverage: All Int. & Pfd. Div.	2.66 x	2.40 x	2.52 x	2.58 x	2.36 x	2.50 x
Quality of Earnings & Cash Flow						
AFC/Income Avail. for Common Equity	6.0%	6.4%	6.0%	7.1%	6.4%	6.4%
Effective Income Tax Rate	18.9%	28.1%	31.5%	28.6%	33.2%	28.1%
Internal Cash Generation/Construction ⁽⁵⁾	76.4%	78.7%	70.6%	88.7%	83.2%	79.5%
Gross Cash Flow/ Avg. Total Debt ⁽⁶⁾	19.6%	20.7%	20.0%	22.8%	22.4%	21.1%
Gross Cash Flow Interest Coverage ⁽⁷⁾	5.47 x	5.56 x	5.39 x	5.66 x	5.46 x	5.51 x
Common Dividend Coverage ⁽⁸⁾	4.26 x	4.37 x	4.23 x	4.80 x	4.41 x	4.41 x

See Page 2 for Notes.

Standard & Poor's Public Utilities
Capitalization and Financial Statistics
2013-2017, Inclusive

Notes:

- (1) All capitalization and financial statistics for the group are the arithmetic average of the achieved results for each individual company in the group.
- (2) Excluding Accumulated Other Comprehensive Income ("OCI") from the equity account
- (3) Total operating expenses, maintenance, depreciation and taxes other than income taxes as a percent of operating revenues.
- (4) Coverage calculations represent the number of times available earnings, both including and excluding AFUDC (allowance for funds used during construction) as reported in its entirety, cover fixed charges.
- (5) Internal cash generation/gross construction is the percentage of gross construction expenditures provided by internally-generated funds from operations after payment of all cash dividends divided by gross construction expenditures.
- (6) Gross Cash Flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less total AFUDC) as a percentage of average total debt.
- (7) Gross Cash Flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less total AFUDC) plus interest charges, divided by interest charges.
- (8) Common dividend coverage is the relationship of internally-generated funds from operations after payment of preferred stock dividends to common dividends paid.

Source of Information: Annual Reports to Shareholders
Utility COMPUSTAT

Standard & Poor's Public Utilities
Company Identities

	Ticker	Credit Rating ⁽¹⁾		Common Stock Traded	S&P Stock Ranking	Value Line Beta
		Moody's	S&P			
AGL Resources Inc.	GAS	A2	BBB+	NYSE	A	0.60
Ameren Corporation	AEE	Baa1	BBB+	NYSE	B	0.75
American Electric Power	AEP	Baa1	BBB	NYSE	B	0.70
CMS Energy	CMS	A3	BBB	NYSE	B	0.75
CenterPoint Energy	CNP	A3	A-	NYSE	B	0.85
Consolidated Edison	ED	A2	A-	NYSE	B+	0.60
DTE Energy Co.	DTE	A2	BBB+	NYSE	B+	0.75
Dominion Resources	D	A2	A-	NYSE	B+	0.70
Duke Energy	DUK	A1	BBB+	NYSE	B	0.65
Edison Int'l	EIX	A2	BBB+	NYSE	B	0.70
Entergy Corp.	ETR	Baa1	BBB	NYSE	A	0.70
EQT Corp.	EQT	Baa3	BBB	NYSE	B+	1.20
Exelon Corp.	EXC	A2	BBB	NYSE	B+	0.70
Eversource	NU	Baa1	A-	NYSE	B	0.75
FirstEnergy Corp.	FE	Baa2	BBB-	NYSE	B+	0.70
NextEra Energy Inc.	NEE	A1	A-	NYSE	A	0.75
NiSource Inc.	NI	Baa2	BBB+	NYSE	B	NMF
NRG Energy Inc.	NRG	Ba3	BB-	NYSE	B	1.00
ONEOK, Inc.	OKE	Baa3	BB+	NYSE	A-	0.85
PG&E Corp.	PCG	A3	BBB	NYSE	B	0.65
PPL Corp.	PPL	Baa1	BBB	NYSE	B+	0.70
Pinnacle West Capital	PNW	A3	A-	NYSE	B	0.75
Public Serv. Enterprise Inc.	PEG	A2	BBB+	NYSE	B+	0.75
SCANA Corp.	SCG	Baa2	BBB+	NYSE	A-	0.75
Sempra Energy	SRE	A1	A	NYSE	B+	0.80
Southern Co.	SO	A3	A	NYSE	A-	0.60
TECO Energy	TE	A2	BBB+	NYSE	B	0.85
Wisconsin Energy Corp.	WEC	A1	A-	NYSE	A	0.70
Xcel Energy Inc	XEL	A2	A-	NYSE	B+	0.65
Average for S&P Utilities		<u>A3</u>	<u>BBB+</u>		<u>B+</u>	<u>0.75</u>

Note: ⁽¹⁾ Ratings are those of utility subsidiaries

Source of Information: SNL Financial LLC
Standard & Poor's Stock Guide
Value Line Investment Survey for Windows

Aqua Pennsylvania, Inc.
Capitalization and Related Capital Structure Ratios
Actual at March 31, 2018 and Estimated at March 31, 2020

	Actual at March 31, 2018			Estimated at March 31, 2020		
	Amount Outstanding (\$000)	Excl. S-T Debt Ratios	Incl. S-T Debt Ratios	Amount Outstanding (\$000)	Excl. S-T Debt Ratios	Incl. S-T Debt Ratios
Long-Term Debt ⁽¹⁾	<u>\$ 1,333,383</u>	46.05%	45.73%	<u>\$ 1,608,094</u> ⁽²⁾	47.15%	46.47%
Common Equity						
Common stock	100			100		
Capital in excess of par value	106,178			106,178		
Retained earnings	1,455,902			1,695,902 ⁽³⁾		
Total Common Equity	<u>1,562,181</u>	<u>53.95%</u>	<u>53.57%</u>	<u>1,802,181</u>	<u>52.85%</u>	<u>52.08%</u>
Total Permanent Capital	2,895,563	<u>100.00%</u>	99.30%	3,410,274	<u>100.00%</u>	98.56%
Revolving Credit Facility	<u>20,342</u>		<u>0.70%</u>	<u>50,000</u> ⁽⁴⁾		<u>1.44%</u>
Total Capital Employed	<u>\$ 2,915,906</u>		<u>100.00%</u>	<u>\$ 3,460,274</u>		<u>100.00%</u>

Notes: ⁽¹⁾ Includes current portion of long-term debt.

⁽²⁾ Reflects the issuance and retirement of long-term debt as follows:

Series	
Redemptions & maturities	\$ (138,800)
Pennvest payments	(11,489)
First Mortgage Bonds	425,000
Total	<u>\$ 274,711</u>

⁽³⁾ Reflects build-up of Retained Earnings of:

Net Income	\$ 360,000
Dividends	(120,000)
Total	<u>\$ 240,000</u>

⁽⁴⁾ Projection of short-term debt.

Source of Information: Company provided data

Agua Pennsylvania, Inc.
Calculation of the Embedded Cost of Long-Term Debt
Actual at March 31, 2018

Series		Principal Amount Outstanding	Percent to Total	Effective Cost Rate ⁽¹⁾	Weighted Cost Rate
First Mortgage Bonds	Due 6/1/2018	\$ 5,000,000	0.37%	10.07%	0.04%
First Mortgage Bonds	Due 9/15/2021	1,600,000	0.12%	9.22%	0.01%
First Mortgage Bonds	Due 9/15/2026	12,000,000	0.90%	9.36%	0.08%
First Mortgage Bonds	Due 5/15/2025	15,000,000	1.12%	7.81%	0.09%
First Mortgage Bonds	Due 5/15/2019	15,000,000	1.12%	5.90%	0.07%
First Mortgage Bonds	Due 5/15/2019	5,000,000	0.37%	5.90%	0.02%
First Mortgage Bonds	Due 5/10/2027	15,000,000	1.12%	6.18%	0.07%
First Mortgage Bonds	Due 5/10/2027	5,000,000	0.37%	6.18%	0.02%
First Mortgage Bonds	Due 5/15/2028	3,000,000	0.22%	6.10%	0.01%
First Mortgage Bonds	Due 12/1/2041	40,000,000	3.00%	3.92%	0.12%
First Mortgage Bonds	Due 12/1/2042	20,000,000	1.50%	3.93%	0.06%
First Mortgage Bonds	Due 12/1/2047	20,000,000	1.50%	3.97%	0.06%
First Mortgage Bonds	Due 11/1/2031	25,000,000	1.87%	4.05%	0.08%
First Mortgage Bonds	Due 11/1/2045	25,000,000	1.87%	4.69%	0.09%
First Mortgage Bonds	Due 11/1/2046	25,000,000	1.87%	4.70%	0.09%
First Mortgage Bonds	Due 1/15/2035	25,000,000	1.87%	3.68%	0.07%
First Mortgage Bonds	Due 1/15/2040	15,000,000	1.12%	4.05%	0.05%
First Mortgage Bonds	Due 1/15/2045	13,000,000	0.97%	4.09%	0.04%
First Mortgage Bonds	Due 12/29/2054	12,000,000	0.90%	4.14%	0.04%
First Mortgage Bonds	Due 1/15/2036	65,000,000	4.87%	3.87%	0.19%
First Mortgage Bonds	Due 1/15/2037	20,000,000	1.50%	3.84%	0.06%
First Mortgage Bonds	Due 1/15/2038	25,000,000	1.87%	3.87%	0.07%
First Mortgage Bonds	Due 1/15/2046	60,000,000	4.50%	4.18%	0.19%
First Mortgage Bonds	Due 1/15/2047	20,000,000	1.50%	4.20%	0.06%
First Mortgage Bonds	Due 1/15/2048	20,000,000	1.50%	4.22%	0.06%
First Mortgage Bonds	Due 1/15/2051	25,000,000	1.87%	3.90%	0.07%
First Mortgage Bonds	Due 1/15/2056	60,000,000	4.50%	4.00%	0.18%
First Mortgage Bonds	Due 2/1/2042	10,000,000	0.75%	3.70%	0.03%
First Mortgage Bonds	Due 2/1/2044	40,000,000	3.00%	3.74%	0.11%
First Mortgage Bonds	Due 7/15/2055	40,000,000	3.00%	4.05%	0.12%
First Mortgage Bonds	Due 7/15/2057	40,000,000	3.00%	4.20%	0.13%
First Mortgage Bonds	Due 10/15/2054	35,000,000	2.62%	4.07%	0.11%
First Mortgage Bonds	Due 10/15/2055	20,000,000	1.50%	4.13%	0.06%
First Mortgage Bonds	Due 10/15/2057	20,000,000	1.50%	4.10%	0.06%
Tax Exempt	Due 7/1/2042	24,830,000	1.86%	5.34%	0.10%
Tax Exempt	Due 7/1/2043	24,830,000	1.86%	5.33%	0.10%
Tax Exempt	Due 10/1/2018	13,000,000	0.97%	7.09%	0.07%
Tax Exempt	Due 10/1/2039	58,000,000	4.35%	5.37%	0.23%
Tax Exempt	Due 11/15/2040	62,165,000	4.66%	5.06%	0.24%
Tax Exempt	Due 11/15/2040	12,520,000	0.94%	5.03%	0.05%
Tax Exempt	Due 12/1/2033	25,910,000	1.94%	5.25%	0.10%
Tax Exempt	Due 12/1/2034	19,270,000	1.45%	5.34%	0.08%
Tax Exempt	Due 12/1/2042	15,000,000	1.12%	4.83%	0.05%
Tax Exempt	Due 12/1/2043	81,205,000	6.09%	4.89%	0.30%
Unsecured Note	Due 3/31/2023	10,000,000	0.75%	5.98%	0.04%
Unsecured Note	Due 3/31/2024	10,000,000	0.75%	5.98%	0.04%
Unsecured Note	Due 3/31/2033	10,000,000	0.75%	5.97%	0.04%
Unsecured Note	Due 3/31/2034	10,000,000	0.75%	5.97%	0.04%
Unsecured Note	Due 9/30/2020	5,466,000	0.41%	5.67%	0.02%
Unsecured Note	Due 9/30/2021	5,461,000	0.41%	5.67%	0.02%
PNC Bank Note	Due 5/6/2018	50,000,000	3.75%	1.98%	0.07%
PNC Bank Note	Due 9/29/2019	50,000,000	3.75%	2.48%	0.09%
Pennvest loans:					
Hawley	Due 10/1/2021	142,300	0.01%	1.02%	0.00%
Ferndale Booster	Due 12/1/2020	77,285	0.01%	1.37%	0.00%
Hawley	Due 12/1/2020	57,088	0.00%	1.37%	0.00%
Bristol	Due 8/1/2019	605,647	0.05%	3.58%	0.00%
Susquehanna	Due 12/1/2020	31,188	0.00%	3.66%	0.00%
Glenside Tank	Due 12/1/2020	73,247	0.01%	4.08%	0.00%
Fernhill Tank	Due 12/1/2020	133,256	0.01%	4.08%	0.00%
Susquehanna	Due 5/1/2021	88,986	0.01%	3.66%	0.00%
Pickering Dam	Due 8/1/2021	165,580	0.01%	4.08%	0.00%
North Wayne # 2	Due 8/1/2021	266,188	0.02%	4.08%	0.00%
Shenango	Due 9/1/2021	288,888	0.02%	3.06%	0.00%
North Wayne # 1	Due 8/1/2022	355,807	0.03%	3.84%	0.00%
Ingrams Mill	Due 11/14/2021	2,972,729	0.22%	3.50%	0.01%
Tank Paintings	Due 12/13/2021	692,268	0.05%	3.82%	0.00%
Tinicum Boster	Due 12/13/2021	143,662	0.01%	3.50%	0.00%
Well #20	Due 4/10/2022	217,966	0.02%	3.36%	0.00%
NUI	Due 3/1/2024	1,903,226	0.14%	2.76%	0.00%
Fawn Lake	Due 4/1/2024	790,464	0.06%	2.80%	0.00%
Ralpho Tank	Due 11/1/2023	227,457	0.02%	1.18%	0.00%
Meyers Tract	Due 7/23/2023	422,754	0.03%	3.46%	0.00%
Neshmainy	Due 1/1/2025	2,465,139	0.18%	3.50%	0.01%
Crum Water Treatment	Due 5/1/2025	3,757,754	0.28%	3.49%	0.01%
Caanan	Due 3/1/2024	634,122	0.05%	2.80%	0.00%
Wapwallopen	Due 6/1/2024	120,783	0.01%	2.80%	0.00%
Tafton Water System	Due 4/1/2035	319,151	0.02%	1.02%	0.00%
NE PA Mains	Due 3/23/2025	954,968	0.07%	2.70%	0.00%
Coal Twsp Tank	Due 5/1/2026	432,623	0.03%	2.74%	0.00%
Shickshinny	Due 4/1/2026	145,278	0.01%	2.80%	0.00%
White Rock Acres	Due 5/1/2026	314,852	0.02%	3.50%	0.00%
Wilbar	Due 5/1/2027	1,028,504	0.08%	2.80%	0.00%
Moscow	Due 10/1/2028	518,250	0.04%	3.08%	0.00%
Paupac	Due 10/1/2028	1,213,273	0.09%	3.40%	0.00%
Midway Manor	Due 7/1/2027	1,355,748	0.10%	2.80%	0.00%
NE Mains 2005	Due 4/1/2027	627,212	0.05%	2.58%	0.00%
Pickering West	Due 10/1/2027	1,215,034	0.09%	3.22%	0.00%
Eagle Rock/Oneida	Due 5/1/2028	771,985	0.06%	2.58%	0.00%
Sharon New Castle	Due 10/1/2028	286,979	0.02%	2.58%	0.00%
Roaring Creek Main Repl	Due 2/1/2029	858,823	0.06%	2.58%	0.00%
Mountain Home	Due 2/1/2030	1,274,336	0.10%	2.57%	0.00%
NE Mains 2007	Due 7/1/2029	387,379	0.03%	2.57%	0.00%
Crum Filtration	Due 8/1/2029	906,536	0.07%	3.08%	0.00%
Brush Valley Wells	Due 5/1/2030	1,025,737	0.08%	2.57%	0.00%
Forest Park	Due 9/1/2030	741,240	0.06%	2.57%	0.00%
Country Club Gardens	Due 1/1/2031	822,073	0.06%	2.57%	0.00%
Honesdale Water	Due 11/1/2030	807,709	0.06%	2.72%	0.00%
Shady Acres	Due 9/1/2030	866,778	0.07%	2.58%	0.00%
Bristol Residuals	Due 2/1/2031	1,430,764	0.11%	3.17%	0.00%
Emlenton	Due 10/1/2030	2,098,778	0.16%	1.54%	0.00%
2009 NE Mains	Due 12/1/2030	1,586,532	0.12%	2.58%	0.00%
Washington Park Water	Due 1/1/2031	694,589	0.05%	2.58%	0.00%
Neshaminy Water Treatment	Due 1/1/2034	6,533,925	0.49%	1.02%	0.00%
Shenango Intake Dam	Due 4/1/2031	935,520	0.07%	1.02%	0.00%
Eagle Rock Phase II	Due 12/1/2033	522,685	0.04%	2.57%	0.00%
Little Washington Wastewater	Due 5/1/2019	218,887	0.02%	1.01%	0.00%
Rivercrest	Due 7/1/2025	177,218	0.01%	2.81%	0.00%
Washington Park WW	Due 1/1/2032	577,247	0.04%	1.05%	0.00%
Little Washington Treasure Lake	Due 2/1/2023	841,393	0.06%	1.24%	0.00%
Long Term- Debt		<u>\$ 1,333,382,786</u>	<u>100.00%</u>		<u>4.40%</u>

Notes: ⁽¹⁾ As calculated on page 2 of this schedule.

Source of Information: Company provided data

Aqua Pennsylvania, Inc.
Calculation of the Effective Cost of Long-Term Debt by Series
Actual at March 31, 2018

Series	Date of Issue	Date of Maturity	Coupon Rate	Principal Amount Issued	Discount and Expense	Net Proceeds	Net Proceeds Ratio	Effective Cost Rate ⁽¹⁾
First Mortgage Bonds	06/01/88	06/01/18	9.97%	\$ 5,000,000	\$ 46,489	\$4,953,511	99.07%	10.07%
First Mortgage Bonds	11/01/91	09/15/21	9.17%	8,000,000	44,192	7,955,808	99.45%	9.22%
First Mortgage Bonds	11/01/91	09/15/26	9.29%	12,000,000	90,983	11,909,017	99.24%	9.36%
First Mortgage Bonds	05/19/95	05/15/25	7.72%	15,000,000	160,429	14,839,571	98.93%	7.81%
First Mortgage Bonds	05/10/04	05/15/19	5.75%	15,000,000	219,891	14,780,109	98.53%	5.90%
First Mortgage Bonds	05/10/04	05/15/19	5.75%	5,000,000	73,297	4,926,703	98.53%	5.90%
First Mortgage Bonds	05/10/04	05/10/27	6.06%	15,000,000	219,891	14,780,109	98.53%	6.18%
First Mortgage Bonds	05/10/04	05/10/27	6.06%	5,000,000	73,297	4,926,703	98.53%	6.18%
First Mortgage Bonds	05/10/04	05/15/28	5.98%	3,000,000	43,978	2,956,022	98.53%	6.10%
First Mortgage Bonds	11/13/12	12/01/41	3.79%	40,000,000	927,429	39,072,571	97.68%	3.92%
First Mortgage Bonds	11/13/12	12/01/42	3.80%	20,000,000	463,715	19,536,285	97.68%	3.93%
First Mortgage Bonds	11/13/12	12/01/47	3.85%	20,000,000	463,715	19,536,285	97.68%	3.97%
First Mortgage Bonds	10/24/13	11/01/31	3.94%	25,000,000	340,228	24,659,772	98.64%	4.05%
First Mortgage Bonds	10/24/13	11/01/45	4.61%	25,000,000	340,228	24,659,772	98.64%	4.69%
First Mortgage Bonds	10/24/13	11/01/46	4.62%	25,000,000	340,228	24,659,772	98.64%	4.70%
First Mortgage Bonds	12/29/14	01/15/35	3.64%	25,000,000	145,122	24,854,878	99.42%	3.68%
First Mortgage Bonds	12/29/14	01/15/40	4.01%	15,000,000	87,088	14,912,912	99.42%	4.05%
First Mortgage Bonds	12/29/14	01/15/45	4.06%	13,000,000	75,466	12,924,534	99.42%	4.09%
First Mortgage Bonds	12/29/14	12/29/54	4.11%	12,000,000	69,655	11,930,345	99.42%	4.14%
First Mortgage Bonds	12/03/15	01/15/36	3.77%	65,000,000	944,500	64,055,500	98.55%	3.87%
First Mortgage Bonds	12/03/15	01/15/37	3.82%	20,000,000	57,700	19,942,300	99.71%	3.84%
First Mortgage Bonds	12/03/15	01/15/38	3.85%	25,000,000	72,125	24,927,875	99.71%	3.87%
First Mortgage Bonds	12/03/15	01/15/46	4.16%	60,000,000	173,101	59,826,899	99.71%	4.18%
First Mortgage Bonds	12/03/15	01/15/47	4.18%	20,000,000	57,700	19,942,300	99.71%	4.20%
First Mortgage Bonds	12/03/15	01/15/48	4.20%	20,000,000	57,700	19,942,300	99.71%	4.22%
First Mortgage Bonds	12/15/16	01/15/51	3.85%	25,000,000	222,673	24,777,327	99.11%	3.90%
First Mortgage Bonds	12/15/16	01/15/56	3.95%	60,000,000	534,415	59,465,585	99.11%	4.00%
First Mortgage Bonds	01/31/17	02/01/42	3.65%	10,000,000	83,638	9,916,362	99.16%	3.70%
First Mortgage Bonds	01/31/17	02/01/44	3.69%	40,000,000	330,054	39,669,946	99.17%	3.74%
First Mortgage Bonds	07/21/17	07/15/55	4.04%	40,000,000	64,967	39,935,033	99.84%	4.05%
First Mortgage Bonds	07/21/17	07/15/57	4.06%	40,000,000	1,059,048	38,940,952	97.35%	4.20%
First Mortgage Bonds	10/26/17	10/15/54	4.06%	35,000,000	55,927	34,944,073	99.84%	4.07%
First Mortgage Bonds	10/26/17	10/15/55	4.07%	20,000,000	214,193	19,785,807	98.93%	4.13%
First Mortgage Bonds	10/26/17	10/15/57	4.09%	20,000,000	31,958	19,968,042	99.84%	4.10%
Tax Exempt	12/20/07	07/01/42	5.25%	24,830,000	334,241	24,495,759	98.65%	5.34%
Tax Exempt	12/20/07	07/01/43	5.25%	24,830,000	333,880	24,496,120	98.66%	5.33%
Tax Exempt	12/18/08	10/01/18	6.75%	15,000,000	309,196	12,930,804	87.62%	7.08%
Tax Exempt	07/16/09	10/01/39	5.00%	58,000,000	3,206,179	54,793,821	94.47%	5.37%
Tax Exempt	11/17/09	11/15/40	5.00%	62,165,000	601,078	61,563,922	99.03%	5.06%
Tax Exempt	11/17/09	11/15/40	4.75%	12,520,000	541,477	11,978,523	95.68%	5.03%
Tax Exempt	11/17/10	12/01/33	5.00%	25,910,000	852,493	25,057,507	96.71%	5.25%
Tax Exempt	11/17/10	12/01/34	5.00%	19,270,000	890,025	18,379,975	95.38%	5.34%
Tax Exempt	11/17/10	12/01/42	4.50%	15,000,000	813,938	14,186,062	94.57%	4.83%
Tax Exempt	11/17/10	12/01/43	5.00%	81,205,000	(1,505,773)	82,710,773	101.85%	4.89%
Unsecured Note	03/31/06	03/31/23	5.95%	10,000,000	28,082	9,971,918	99.72%	5.98%
Unsecured Note	03/31/06	03/31/24	5.95%	10,000,000	28,082	9,971,918	99.72%	5.98%
Unsecured Note	03/31/06	03/31/33	5.95%	10,000,000	28,082	9,971,918	99.72%	5.97%
Unsecured Note	03/31/06	03/31/34	5.95%	10,000,000	28,082	9,971,918	99.72%	5.97%
Unsecured Note	09/29/06	09/30/20	5.64%	5,466,000	15,453	5,450,547	99.72%	5.67%
Unsecured Note	09/29/06	09/30/21	5.64%	5,461,000	15,453	5,445,547	99.72%	5.67%
PNC Bank Note	05/06/15	05/06/18	1.98%	50,000,000	-	50,000,000	100.00%	1.98%
PNC Bank Note	09/29/17	09/29/19	2.48%	50,000,000	-	50,000,000	100.00%	2.48%
Pennvest loans:								
Hawley	05/01/94	10/01/21	1.000%	972,041	4,410	967,631	99.55%	1.02%
Ferndale Booster	03/22/00	12/01/20	1.349%	651,125	2,954	648,171	99.55%	1.37%
Hawley	04/19/00	12/01/20	1.349%	343,845	1,560	342,285	99.55%	1.37%
Bristol	08/01/00	08/01/19	3.552%	5,949,630	26,994	5,922,636	99.55%	3.58%
Susquehanna	08/08/00	12/01/20	3.631%	175,725	797	174,928	99.55%	3.66%
Glenside Tank	08/08/00	12/01/20	4.047%	415,250	1,884	413,366	99.55%	4.08%
Fernhill Tank	08/08/00	12/01/20	4.047%	768,543	3,487	765,056	99.55%	4.08%
Susquehanna	11/29/00	05/01/21	3.631%	487,000	2,210	484,790	99.55%	3.66%
Pickering Dam	11/29/00	08/01/21	4.047%	920,802	4,178	916,624	99.55%	4.08%
North Wayne # 2	11/29/00	08/01/21	4.050%	1,174,916	5,331	1,169,585	99.55%	4.08%
Shenango	03/13/01	09/01/21	3.030%	1,715,000	7,781	1,707,219	99.55%	3.06%
North Wayne # 1	03/13/01	08/01/22	3.810%	1,346,773	6,110	1,340,663	99.55%	3.84%
Ingrams Mill	11/14/01	11/14/21	3.468%	9,582,806	43,478	9,539,328	99.55%	3.50%
Tank Paintings	12/13/01	12/13/21	3.790%	2,025,180	9,188	2,015,992	99.55%	3.82%
Tinicum Booster	12/13/01	12/13/21	3.468%	356,520	1,618	354,902	99.55%	3.50%
Well #20	04/10/02	04/10/22	3.330%	843,227	3,826	839,401	99.55%	3.36%
NUI	06/27/02	03/01/24	2.730%	5,538,900	25,130	5,513,770	99.55%	2.76%
Fawn Lake	11/05/02	04/01/24	2.774%	2,201,840	9,990	2,191,850	99.55%	2.80%
Ralpho Tank	12/12/02	11/01/23	1.156%	778,625	3,533	775,092	99.55%	1.18%
Meyers Tract	07/23/03	07/23/23	3.430%	1,547,054	7,019	1,540,035	99.55%	3.46%
Neshmainy	08/07/03	01/01/25	3.470%	6,366,625	28,886	6,337,739	99.55%	3.50%
Crum Water Treatment	08/07/03	05/01/25	3.460%	9,975,741	45,261	9,930,480	99.55%	3.49%
Caanan	12/19/03	03/01/24	2.774%	1,646,400	7,470	1,638,930	99.55%	2.80%
Wapwallopen	06/01/04	06/01/24	2.774%	333,878	1,515	332,363	99.55%	2.80%
Tafton Water System	12/01/04	04/01/35	1.000%	600,000	2,722	597,278	99.55%	1.02%
NE PA Mains	03/23/05	03/23/25	2.668%	2,122,850	9,632	2,113,218	99.55%	2.70%
Coal Twsp Tank	04/21/05	05/01/26	2.711%	1,054,868	4,786	1,050,082	99.55%	2.74%
Shickshinny	05/25/05	04/01/26	2.774%	321,522	1,459	320,063	99.55%	2.80%
White Rock Acres	05/25/05	05/01/26	3.468%	677,839	3,075	674,764	99.55%	3.50%
Wilbar	08/02/05	05/01/27	2.774%	2,311,200	10,486	2,300,714	99.55%	2.80%
Moscow	08/25/05	10/01/26	3.052%	1,151,000	5,222	1,145,778	99.55%	3.08%
Paupac	10/02/05	10/01/26	3.365%	2,249,960	10,208	2,239,752	99.55%	3.40%
Midway Manor	04/05/06	07/01/27	2.774%	2,611,380	11,848	2,599,532	99.55%	2.80%
NE Mains 2005	07/25/06	04/01/27	2.556%	1,253,000	5,685	1,247,315	99.55%	2.58%
Pickering West	07/25/06	10/01/27	3.195%	2,225,000	10,095	2,214,905	99.55%	3.22%
Eagle Rock/Oneida	04/18/07	05/01/28	2.554%	1,395,800	6,333	1,389,467	99.55%	2.58%
Sharon New Castle	05/27/08	10/01/28	2.547%	698,000	3,167	694,833	99.55%	2.58%
Roaring Creek Main Repl	06/04/08	02/01/29	2.547%	1,708,100	7,750	1,700,350	99.55%	2.58%
Mountain Home	06/17/08	02/01/30	2.547%	2,045,000	9,278	2,035,722	99.55%	2.57%
NE Mains 2007	09/30/08	07/01/29	2.547%	723,069	3,281	719,788	99.55%	2.57%
Crum Filtration	09/30/08	08/01/29	3.046%	1,493,848	6,778	1,487,070	99.55%	3.08%
Brush Valley Wells	02/05/09	05/01/30	2.547%	1,697,000	7,699	1,689,301	99.55%	2.57%
Forest Park	07/22/09	09/01/30	2.547%	1,132,200	5,137	1,127,063	99.55%	2.57%
Country Club Gardens	01/26/10	01/01/31	2.547%	1,226,000	5,562	1,220,438	99.55%	2.57%
Honesdale Water	04/15/10	11/01/30	2.690%	1,217,305	5,523	1,211,782	99.55%	2.72%
Shady Acres	09/09/10	09/01/30	2.547%	1,402,518	6,363	1,396,155	99.55%	2.58%
Bristol Residuals	09/09/10	02/01/31	3.143%	2,144,750	9,731	2,135,019	99.55%	3.17%
Emlenton	10/07/10	10/01/30	1.510%	3,138,825	14,241	3,124,584	99.55%	1.54%
2009 NE Mains	12/15/10	12/01/30	2.547%	2,347,056	10,649	2,336,407	99.55%	2.58%
Washington Park Water	01/27/11	01/01/31	2.547%	975,645	4,427	971,218	99.55%	2.58%
Neshmainy Water Treatment	01/27/11	01/01/34	1.000%	9,955,500	45,169	9,910,331	99.55%	1.02%
Shenango Intake Dam	04/12/11	04/01/31	1.000%	1,413,729	6,414	1,407,315	99.55%	1.02%
Eagle Rock Phase II	11/30/10	12/01/33	2.547%	882,000	4,002	877,998	99.55%	2.57%
Little Washington Wastewater	03/12/02	05/01/19	1.000%	3,251,000	3,223	3,247,777	99.90%	1.01%
Rivercrest	12/15/04	07/01/25	2.774%	419,630	2,609	417,021	99.38%	2.81%
Washington Park WW	09/22/10	01/01/32	1.000%	975,645	8,498	967,147	99.13%	1.05%
Little Washington Treasure Lake	03/01/13	02/01/23	1.156%	1,635,581	12,387	1,623,194	99.24%	1.24%

Notes: ⁽¹⁾ The effective cost for each issue is the yield to maturity using as inputs the date of issue, the date of maturity, the coupon rate, and the net proceeds ratio.

Aqua Pennsylvania, Inc.
Calculation of the Embedded Cost of Long-Term Debt
Actual at March 31, 2020

Series		Principal Amount Outstanding	Percent to Total	Effective Cost Rate ⁽¹⁾	Weighted Cost Rate
First Mortgage Bonds	Due 9/15/2021	\$ 800,000	0.05%	9.22%	0.00%
First Mortgage Bonds	Due 9/15/2026	12,000,000	0.75%	9.36%	0.07%
First Mortgage Bonds	Due 5/15/2025	15,000,000	0.93%	7.81%	0.07%
First Mortgage Bonds	Due 5/10/2027	15,000,000	0.93%	6.18%	0.06%
First Mortgage Bonds	Due 5/10/2027	5,000,000	0.31%	6.18%	0.02%
First Mortgage Bonds	Due 5/15/2028	3,000,000	0.19%	6.10%	0.01%
First Mortgage Bonds	Due 12/1/2041	40,000,000	2.49%	3.92%	0.10%
First Mortgage Bonds	Due 12/1/2042	20,000,000	1.24%	3.93%	0.05%
First Mortgage Bonds	Due 12/1/2047	20,000,000	1.24%	3.97%	0.05%
First Mortgage Bonds	Due 11/1/2031	25,000,000	1.55%	4.05%	0.06%
First Mortgage Bonds	Due 11/1/2045	25,000,000	1.55%	4.69%	0.07%
First Mortgage Bonds	Due 11/1/2046	25,000,000	1.55%	4.70%	0.07%
First Mortgage Bonds	Due 1/15/2035	25,000,000	1.55%	3.68%	0.06%
First Mortgage Bonds	Due 1/15/2040	15,000,000	0.93%	4.05%	0.04%
First Mortgage Bonds	Due 1/15/2045	13,000,000	0.81%	4.09%	0.03%
First Mortgage Bonds	Due 12/29/2054	12,000,000	0.75%	4.14%	0.03%
First Mortgage Bonds	Due 1/15/2036	65,000,000	4.04%	3.87%	0.16%
First Mortgage Bonds	Due 1/15/2037	20,000,000	1.24%	3.84%	0.05%
First Mortgage Bonds	Due 1/15/2038	25,000,000	1.55%	3.87%	0.06%
First Mortgage Bonds	Due 1/15/2046	60,000,000	3.73%	4.18%	0.16%
First Mortgage Bonds	Due 1/15/2047	20,000,000	1.24%	4.20%	0.05%
First Mortgage Bonds	Due 1/15/2048	20,000,000	1.24%	4.22%	0.05%
First Mortgage Bonds	Due 1/15/2051	25,000,000	1.55%	3.90%	0.06%
First Mortgage Bonds	Due 1/15/2056	60,000,000	3.73%	4.00%	0.15%
First Mortgage Bonds	Due 2/1/2042	10,000,000	0.62%	3.70%	0.02%
First Mortgage Bonds	Due 2/1/2044	40,000,000	2.49%	3.74%	0.09%
First Mortgage Bonds	Due 7/15/2055	40,000,000	2.49%	4.05%	0.10%
First Mortgage Bonds	Due 7/15/2057	40,000,000	2.49%	4.20%	0.10%
First Mortgage Bonds	Due 10/15/2054	35,000,000	2.18%	4.07%	0.09%
First Mortgage Bonds	Due 10/15/2055	20,000,000	1.24%	4.13%	0.05%
First Mortgage Bonds	Due 10/15/2057	20,000,000	1.24%	4.10%	0.05%
First Mortgage Bonds	Due 6/1/2038	100,000,000	6.22%	4.09%	0.25%
First Mortgage Bonds	Due 11/1/2038	125,000,000	7.77%	4.13%	0.32%
First Mortgage Bonds	Due 6/1/2039	100,000,000	6.22%	4.28%	0.27%
First Mortgage Bonds	Due 11/1/2039	100,000,000	6.22%	4.28%	0.27%
First Mortgage Bonds	Due 7/1/2042	24,830,000	1.54%	5.34%	0.06%
Tax Exempt	Due 7/1/2043	24,830,000	1.54%	5.33%	0.06%
Tax Exempt	Due 10/1/2039	58,000,000	3.61%	5.37%	0.19%
Tax Exempt	Due 11/15/2040	62,165,000	3.87%	5.06%	0.20%
Tax Exempt	Due 11/15/2040	12,520,000	0.78%	5.03%	0.04%
Tax Exempt	Due 12/1/2033	25,910,000	1.61%	5.25%	0.08%
Tax Exempt	Due 12/1/2034	19,270,000	1.20%	5.34%	0.06%
Tax Exempt	Due 12/1/2042	15,000,000	0.93%	4.83%	0.05%
Tax Exempt	Due 12/1/2043	81,205,000	5.05%	4.89%	0.25%
Unsecured Note	Due 3/31/2023	10,000,000	0.62%	5.98%	0.04%
Unsecured Note	Due 3/31/2024	10,000,000	0.62%	5.98%	0.04%
Unsecured Note	Due 3/31/2033	10,000,000	0.62%	5.97%	0.04%
Unsecured Note	Due 3/31/2034	10,000,000	0.62%	5.97%	0.04%
Unsecured Note	Due 9/30/2020	5,466,000	0.34%	5.67%	0.02%
Unsecured Note	Due 9/30/2021	5,461,000	0.34%	5.67%	0.02%
Pennvest loans:					
Hawley	Due 10/1/2021	63,505	0.00%	1.02%	0.00%
Ferndale Booster	Due 12/1/2020	21,362	0.00%	1.37%	0.00%
Hawley	Due 12/1/2020	15,779	0.00%	1.37%	0.00%
Susquehanna	Due 12/1/2020	8,817	0.00%	3.66%	0.00%
Glenside Tank	Due 12/1/2020	20,790	0.00%	4.08%	0.00%
Fernhill Tank	Due 12/1/2020	37,823	0.00%	4.08%	0.00%
Susquehanna	Due 5/1/2021	33,979	0.00%	3.66%	0.00%
Pickering Dam	Due 8/1/2021	63,480	0.00%	4.08%	0.00%
North Wayne # 2	Due 8/1/2021	114,845	0.01%	4.08%	0.00%
Shenango	Due 9/1/2021	127,567	0.01%	3.06%	0.00%
North Wayne # 1	Due 8/1/2022	202,061	0.01%	3.84%	0.00%
Ingrams Mill	Due 11/14/2021	1,845,012	0.11%	3.50%	0.00%
Tank Paintings	Due 12/13/2021	453,003	0.03%	3.82%	0.00%
Tinicum Booster	Due 12/13/2021	104,537	0.01%	3.50%	0.00%
Well #20	Due 4/10/2022	130,369	0.01%	3.36%	0.00%
NUI	Due 3/1/2024	1,303,035	0.08%	2.76%	0.00%
Fawn Lake	Due 4/1/2024	545,138	0.03%	2.80%	0.00%
Ralphy Tank	Due 11/1/2023	148,873	0.01%	1.18%	0.00%
Meyers Tract	Due 7/23/2023	239,223	0.01%	3.46%	0.00%
Neshmainy	Due 1/1/2025	1,764,781	0.11%	3.50%	0.00%
Crum Water Treatment	Due 5/1/2025	2,734,101	0.17%	3.49%	0.01%
Caanan	Due 3/1/2024	434,347	0.03%	2.80%	0.00%
Wapwallopen	Due 6/1/2024	84,383	0.01%	2.80%	0.00%
Tafton Water System	Due 4/1/2035	284,541	0.02%	1.02%	0.00%
NE PA Mains	Due 3/23/2025	715,742	0.04%	2.70%	0.00%
Coal Twsp Tank	Due 5/1/2026	335,348	0.02%	2.74%	0.00%
Shickshinny	Due 4/1/2026	112,303	0.01%	2.80%	0.00%
White Rock Acres	Due 5/1/2026	245,771	0.02%	3.50%	0.00%
Wilbar	Due 5/1/2027	825,832	0.05%	2.80%	0.00%
Moscow	Due 10/1/2026	409,315	0.03%	3.08%	0.00%
Paupac	Due 10/1/2026	960,999	0.06%	3.40%	0.00%
Midway Manor	Due 7/1/2027	1,093,992	0.07%	2.80%	0.00%
NE Mains 2005	Due 4/1/2027	501,320	0.03%	2.58%	0.00%
Pickering West	Due 10/1/2027	991,191	0.06%	3.22%	0.00%
Eagle Rock/Onaida	Due 5/1/2028	635,512	0.04%	2.58%	0.00%
Sharon New Castle	Due 10/1/2028	238,498	0.01%	2.58%	0.00%
Roaring Creek Main Repl	Due 2/1/2029	718,789	0.04%	2.58%	0.00%
Mountain Home	Due 2/1/2030	1,086,510	0.07%	2.57%	0.00%
NE Mains 2007	Due 7/1/2029	326,839	0.02%	2.57%	0.00%
Crum Filtration	Due 8/1/2029	769,588	0.05%	3.08%	0.00%
Brush Valley Wells	Due 5/1/2030	878,154	0.05%	2.57%	0.00%
Forest Park	Due 9/1/2030	637,896	0.04%	2.57%	0.00%
Country Club Gardens	Due 1/1/2031	710,934	0.04%	2.57%	0.00%
Honesdale Water	Due 11/1/2030	697,721	0.04%	2.72%	0.00%
Shady Acres	Due 9/1/2030	749,595	0.05%	2.58%	0.00%
Bristol Residuals	Due 2/1/2031	1,242,403	0.08%	3.17%	0.00%
Emlenton	Due 10/1/2030	1,799,963	0.11%	1.54%	0.00%
2009 NE Mains	Due 12/1/2030	1,379,946	0.09%	2.58%	0.00%
Washington Park Water	Due 1/1/2031	609,849	0.04%	2.58%	0.00%
Neshaminy Water Treatment	Due 1/1/2034	5,770,714	0.36%	1.02%	0.00%
Shenango Intake Dam	Due 4/1/2031	810,552	0.05%	1.02%	0.00%
Eagle Rock Phase II	Due 12/1/2033	458,464	0.03%	2.57%	0.00%
Rivercrest	Due 7/1/2025	132,400	0.01%	2.81%	0.00%
Washington Park WW	Due 1/1/2032	498,644	0.03%	1.05%	0.00%
Little Washington Treasure Lake	Due 2/1/2023	510,663	0.03%	1.24%	0.00%
Long Term Debt		\$ 1,608,093,800	100.00%		4.43%

Notes: ⁽¹⁾ As calculated on page 4 of this schedule.

Source of Information: Company provided data

Agua Pennsylvania, Inc.
Calculation of the Effective Cost of Long-Term Debt by Series
Actual at March 31, 2020

Series	Date of Issue	Date of Maturity	Coupon Rate	Principal Amount Issued	Discount and Expense	Net Proceeds	Net Proceeds Ratio	Effective Cost Rate ⁽¹⁾
First Mortgage Bonds	11/01/91	09/15/21	9.17%	\$ 8,000,000	\$ 44,192	\$ 7,955,808	99.45%	9.22%
First Mortgage Bonds	11/01/91	09/15/26	9.29%	12,000,000	90,983	11,909,017	99.24%	9.36%
First Mortgage Bonds	05/19/95	05/15/25	7.72%	15,000,000	160,429	14,839,571	98.93%	7.81%
First Mortgage Bonds	05/10/04	05/10/27	6.06%	15,000,000	219,891	14,780,109	98.53%	6.18%
First Mortgage Bonds	05/10/04	05/10/27	6.06%	5,000,000	73,297	4,926,703	98.53%	6.18%
First Mortgage Bonds	05/10/04	05/15/28	5.98%	3,000,000	43,978	2,956,022	98.53%	6.10%
First Mortgage Bonds	11/13/12	12/01/41	3.79%	40,000,000	927,429	39,072,571	97.68%	3.92%
First Mortgage Bonds	11/13/12	12/01/42	3.80%	20,000,000	463,715	19,536,285	97.68%	3.93%
First Mortgage Bonds	11/13/12	12/01/47	3.85%	20,000,000	463,715	19,536,285	97.68%	3.97%
First Mortgage Bonds	10/24/13	11/01/31	3.94%	25,000,000	340,228	24,659,772	98.64%	4.05%
First Mortgage Bonds	10/24/13	11/01/45	4.61%	25,000,000	340,228	24,659,772	98.64%	4.69%
First Mortgage Bonds	10/24/13	11/01/46	4.62%	25,000,000	340,228	24,659,772	98.64%	4.70%
First Mortgage Bonds	12/29/14	01/15/35	3.64%	25,000,000	145,122	24,854,878	99.42%	3.68%
First Mortgage Bonds	12/29/14	01/15/40	4.01%	15,000,000	87,088	14,912,912	99.42%	4.05%
First Mortgage Bonds	12/29/14	01/15/45	4.06%	13,000,000	75,466	12,924,534	99.42%	4.09%
First Mortgage Bonds	12/29/14	12/29/54	4.11%	12,000,000	69,655	11,930,345	99.42%	4.14%
First Mortgage Bonds	12/03/15	01/15/36	3.77%	65,000,000	944,500	64,055,500	98.55%	3.87%
First Mortgage Bonds	12/03/15	01/15/37	3.82%	20,000,000	57,700	19,942,300	99.71%	3.84%
First Mortgage Bonds	12/03/15	01/15/38	3.85%	25,000,000	72,125	24,927,875	99.71%	3.87%
First Mortgage Bonds	12/03/15	01/15/46	4.16%	60,000,000	173,101	59,826,899	99.71%	4.18%
First Mortgage Bonds	12/03/15	01/15/47	4.18%	20,000,000	57,700	19,942,300	99.71%	4.20%
First Mortgage Bonds	12/03/15	01/15/48	4.20%	20,000,000	57,700	19,942,300	99.71%	4.22%
First Mortgage Bonds	12/15/16	01/15/51	3.85%	25,000,000	222,673	24,777,327	99.11%	3.90%
First Mortgage Bonds	12/15/16	01/15/56	3.95%	60,000,000	534,415	59,465,585	99.11%	4.00%
First Mortgage Bonds	01/31/17	02/01/42	3.65%	10,000,000	83,638	9,916,362	99.16%	3.70%
First Mortgage Bonds	01/31/17	02/01/44	3.69%	40,000,000	330,054	39,669,946	99.17%	3.74%
First Mortgage Bonds	07/21/17	07/15/55	4.04%	40,000,000	64,967	39,935,033	99.84%	4.05%
First Mortgage Bonds	07/21/17	07/15/57	4.06%	40,000,000	1,059,048	38,940,952	97.35%	4.20%
First Mortgage Bonds	10/26/17	10/15/54	4.06%	35,000,000	55,927	34,944,073	99.84%	4.07%
First Mortgage Bonds	10/26/17	10/15/55	4.07%	20,000,000	214,193	19,785,807	98.93%	4.13%
First Mortgage Bonds	10/26/17	10/15/57	4.09%	20,000,000	31,958	19,968,042	99.84%	4.10%
First Mortgage Bonds	06/01/18	06/01/38	4.06%	100,000,000	400,000	99,600,000	99.60%	4.09%
First Mortgage Bonds	11/01/18	11/01/38	4.10%	125,000,000	500,000	124,500,000	99.60%	4.13%
First Mortgage Bonds	06/01/19	06/01/39	4.25%	100,000,000	400,000	99,600,000	99.60%	4.28%
First Mortgage Bonds	11/01/19	11/01/39	4.25%	100,000,000	400,000	99,600,000	99.60%	4.28%
Tax Exempt	12/20/07	07/01/42	5.25%	24,830,000	334,241	24,495,759	98.65%	5.34%
Tax Exempt	12/20/07	07/01/43	5.25%	24,830,000	333,880	24,496,120	98.66%	5.33%
Tax Exempt	07/16/09	10/01/39	5.00%	58,000,000	3,206,179	54,793,821	94.47%	5.37%
Tax Exempt	11/17/09	11/15/40	5.00%	62,165,000	601,078	61,563,922	99.03%	5.06%
Tax Exempt	11/17/09	11/15/40	4.75%	12,520,000	541,477	11,978,523	95.68%	5.03%
Tax Exempt	11/17/10	12/01/33	5.00%	25,910,000	852,493	25,057,507	96.71%	5.25%
Tax Exempt	11/17/10	12/01/34	5.00%	19,270,000	890,025	18,379,975	95.38%	5.34%
Tax Exempt	11/17/10	12/01/42	4.50%	15,000,000	813,938	14,186,062	94.57%	4.83%
Tax Exempt	11/17/10	12/01/43	5.00%	81,205,000	(1,505,773)	82,710,773	101.85%	4.89%
Unsecured Note	03/31/06	03/31/23	5.95%	10,000,000	28,082	9,971,918	99.72%	5.98%
Unsecured Note	03/31/06	03/31/24	5.95%	10,000,000	28,082	9,971,918	99.72%	5.98%
Unsecured Note	03/31/06	03/31/33	5.95%	10,000,000	28,082	9,971,918	99.72%	5.97%
Unsecured Note	03/31/06	03/31/34	5.95%	10,000,000	28,082	9,971,918	99.72%	5.97%
Unsecured Note	09/29/06	09/30/20	5.64%	5,466,000	15,453	5,450,547	99.72%	5.67%
Unsecured Note	09/29/06	09/30/21	5.64%	5,461,000	15,453	5,445,547	99.72%	5.67%
Pennvest loans:								
Hawley	05/01/94	10/01/21	1.000%	972,041	4,410	967,631	99.55%	1.02%
Ferndale Booster	03/22/00	12/01/20	1.349%	651,125	2,954	648,171	99.55%	1.37%
Hawley	04/19/00	12/01/20	1.349%	343,845	1,560	342,285	99.55%	1.37%
Susquehanna	08/08/00	12/01/20	3.631%	175,725	797	174,928	99.55%	3.66%
Glenside Tank	08/08/00	12/01/20	4.047%	415,250	1,884	413,366	99.55%	4.08%
Fernhill Tank	08/08/00	12/01/20	4.047%	768,543	3,487	765,056	99.55%	4.08%
Susquehanna	11/29/00	05/01/21	3.631%	487,000	2,210	484,790	99.55%	3.66%
Pickering Dam	11/29/00	08/01/21	4.047%	920,802	4,178	916,624	99.55%	4.08%
North Wayne # 2	11/29/00	08/01/21	4.050%	1,174,916	5,331	1,169,585	99.55%	4.08%
Shenango	03/13/01	09/01/21	3.030%	1,715,000	7,781	1,707,219	99.55%	3.06%
North Wayne # 1	03/13/01	08/01/22	3.810%	1,346,773	6,110	1,340,663	99.55%	3.84%
Ingrams Mill	11/14/01	11/14/21	3.468%	9,582,806	43,478	9,539,328	99.55%	3.50%
Tank Paintings	12/13/01	12/13/21	3.790%	2,025,180	9,188	2,015,992	99.55%	3.82%
Tinicum Booster	12/13/01	12/13/21	3.468%	356,520	1,618	354,902	99.55%	3.50%
Well #20	04/10/02	04/10/22	3.300%	843,227	3,826	839,401	99.55%	3.36%
NUI	06/27/02	03/01/24	2.730%	5,538,900	25,130	5,513,770	99.55%	2.76%
Fawn Lake	11/05/02	04/01/24	2.774%	2,201,840	9,990	2,191,850	99.55%	2.80%
Ralpo Tank	12/12/02	11/01/23	1.156%	778,625	3,533	775,092	99.55%	1.18%
Meyers Tract	07/23/03	07/23/23	3.430%	1,547,054	7,019	1,540,035	99.55%	3.46%
Neshmainy	08/07/03	01/01/25	3.470%	6,366,625	28,886	6,337,739	99.55%	3.50%
Crum Water Treatment	08/07/03	05/01/25	3.460%	9,975,741	45,261	9,930,480	99.55%	3.49%
Caanan	12/19/03	03/01/24	2.774%	1,646,400	7,470	1,638,930	99.55%	2.80%
Wapwallopen	06/01/04	06/01/24	2.774%	333,878	1,515	332,363	99.55%	2.80%
Tafton Water System	12/01/04	04/01/35	1.000%	600,000	2,722	597,278	99.55%	1.02%
NE PA Mains	03/23/05	03/23/25	2.668%	2,122,850	9,632	2,113,218	99.55%	2.70%
Coal Twsp Tank	04/21/05	05/01/26	2.711%	1,054,868	4,786	1,050,082	99.55%	2.74%
Shickshinny	05/25/05	04/01/26	2.774%	321,522	1,459	320,063	99.55%	2.80%
White Rock Acres	05/25/05	05/01/26	3.468%	677,839	3,075	674,764	99.55%	3.50%
Wilbar	08/02/05	05/01/27	2.774%	2,311,200	10,486	2,300,714	99.55%	2.80%
Moscow	08/25/05	10/01/26	3.052%	1,151,000	5,222	1,145,778	99.55%	3.08%
Paupac	10/02/05	10/01/26	3.365%	2,249,960	10,208	2,239,752	99.55%	3.40%
Midway Manor	04/05/06	07/01/27	2.774%	2,611,380	11,848	2,599,532	99.55%	2.80%
NE Mains 2005	07/25/06	04/01/27	2.556%	1,253,000	5,685	1,247,315	99.55%	2.58%
Pickering West	07/25/06	10/01/27	3.195%	2,225,000	10,095	2,214,905	99.55%	3.22%
Eagle Rock/Oneida	04/18/07	05/01/28	2.544%	1,395,800	6,333	1,389,467	99.55%	2.58%
Sharon New Castle	05/27/08	10/01/28	2.547%	698,000	3,167	694,833	99.55%	2.58%
Roaring Creek Main Repl	06/04/08	02/01/29	2.547%	1,708,100	7,750	1,700,350	99.55%	2.58%
Mountain Home	06/17/08	02/01/30	2.547%	2,045,000	9,278	2,035,722	99.55%	2.57%
NE Mains 2007	09/30/08	07/01/29	2.547%	723,069	3,281	719,788	99.55%	2.57%
Crum Filtration	09/30/08	08/01/29	3.046%	1,493,848	6,778	1,487,070	99.55%	3.08%
Brush Valley Wells	02/05/09	05/01/30	2.547%	1,697,000	7,699	1,689,301	99.55%	2.57%
Forest Park	07/22/09	09/01/30	2.547%	1,132,200	5,137	1,127,063	99.55%	2.57%
Country Club Gardens	01/26/10	01/01/31	2.547%	1,226,000	5,562	1,220,438	99.55%	2.57%
Honesdale Water	04/15/10	11/01/30	2.690%	1,217,305	5,523	1,211,782	99.55%	2.72%
Shady Acres	09/09/10	09/01/30	2.547%	1,402,518	6,363	1,396,155	99.55%	2.58%
Bristol Residuals	09/09/10	02/01/31	3.143%	2,144,750	9,731	2,135,019	99.55%	3.17%
Emlenton	10/07/10	10/01/30	1.510%	3,138,825	14,241	3,124,584	99.55%	1.54%
2009 NE Mains	12/15/10	12/01/30	2.547%	2,347,056	10,649	2,336,407	99.55%	2.58%
Washington Park Water	01/27/11	01/01/31	2.547%	975,645	4,427	971,218	99.55%	2.58%
Neshaminy Water Treatment	01/27/11	01/01/34	1.000%	9,955,500	45,169	9,910,331	99.55%	1.02%
Shenango Intake Dam	04/12/11	04/01/31	1.000%	1,413,729	6,414	1,407,315	99.55%	1.02%
Eagle Rock Phase II	11/30/10	12/01/33	2.547%	882,000	4,002	877,998	99.55%	2.57%
Rivercrest	12/15/04	07/01/25	2.774%	419,630	2,609	417,021	99.38%	2.81%
Washington Park WW	09/22/10	01/01/32	1.000%	975,645	8,498	967,147	99.13%	1.05%
Little Washington Treasure Lake	03/01/13	02/01/23	1.156%	1,635,581	12,387	1,623,194	99.24%	1.24%

Notes: ⁽¹⁾ The effective cost for each issue is the yield to maturity using as inputs the date of issue, the date of maturity, the coupon rate, and the net proceeds ratio.

**Monthly Dividend Yields for
Water Group
for the Twelve Months Ending May 2018**

<u>Company</u>	<u>Jun-17</u>	<u>Jul-17</u>	<u>Aug-17</u>	<u>Sep-17</u>	<u>Oct-17</u>	<u>Nov-17</u>	<u>Dec-17</u>	<u>Jan-18</u>	<u>Feb-18</u>	<u>Mar-18</u>	<u>Apr-18</u>	<u>May-18</u>	12-Month Average	6-Month Average	3-Month Average
American States Water Co (AWR)	2.05%	2.07%	2.07%	2.08%	1.91%	1.77%	1.77%	1.85%	1.92%	1.93%	1.84%	1.81%			
American Water Works Co Inc (AWK)	2.14%	2.06%	2.05%	2.06%	1.90%	1.81%	1.82%	2.01%	2.09%	2.03%	2.11%	2.19%			
Aqua America Inc (WTR)	2.30%	2.47%	2.45%	2.47%	2.32%	2.16%	2.09%	2.27%	2.40%	2.41%	2.34%	2.36%			
Artesian Resource Corp Class A (ARTNA)	2.47%	2.40%	2.50%	2.46%	2.33%	2.22%	2.45%	2.54%	2.85%	2.59%	2.51%	2.45%			
California Water Service Group (CWT)	1.96%	1.86%	1.93%	1.89%	1.72%	1.58%	1.59%	1.85%	1.98%	2.02%	1.94%	1.87%			
Connecticut Water Service Inc (CTWS)	2.15%	2.10%	2.19%	2.01%	1.93%	1.88%	2.08%	2.25%	2.30%	1.97%	1.84%	1.94%			
Middlesex Water Co (MSEX)	2.14%	2.16%	2.23%	2.16%	2.07%	1.94%	2.25%	2.39%	2.53%	2.45%	2.16%	2.02%			
SJW Corp (SJW)	1.77%	1.65%	1.57%	1.54%	1.47%	1.28%	1.37%	1.88%	2.12%	2.13%	1.86%	1.78%			
The York Water Co (YORW)	1.84%	1.84%	1.95%	1.89%	1.90%	1.80%	1.97%	2.11%	2.38%	2.15%	2.08%	2.05%			
Average	2.09%	2.07%	2.10%	2.06%	1.95%	1.83%	1.93%	2.13%	2.29%	2.19%	2.08%	2.05%	2.06%	2.11%	2.11%
Excl. CTWS and SJW	2.13%	2.12%	2.17%	2.14%	2.02%	1.90%	1.99%	2.15%	2.31%	2.23%	2.14%	2.11%	2.12%	2.16%	2.16%

Note: Monthly dividend yields are calculated by dividing the annualized quarterly dividend by the month-end closing stock price adjusted by the fraction of the ex-dividend.

Source of Information: <http://performance.morningstar.com/stock/performance-return>
<http://www.nasdaq.com>

Forward-looking Dividend Yield	1/2 Growth	D ₀ /P ₀	(.5g)	D ₁ /P ₀	Excl. CTWS and SJW	
		2.11%	1.033750	2.18%	2.23%	$K = \frac{D_0(1+g)^0 + D_0(1+g)^1 + D_0(1+g)^2 + D_0(1+g)^3}{P_0} + g$
	Discrete	D ₀ /P ₀	Adj.	D ₁ /P ₀	2.25%	$K = \frac{D_0(1+g)^{25} + D_0(1+g)^{50} + D_0(1+g)^{75} + D_0(1+g)^{100}}{P_0} + g$
		2.11%	1.041843	2.20%		
	Quarterly	D ₀ /P ₀	Adj.	D ₁ /P ₀	2.21%	$K = \left[\left(1 + \frac{D_0(1+g)^{25}}{P_0} \right)^4 - 1 \right] + g$
		0.5279%	1.016464	2.16%	2.21%	
	Average			2.18%	2.23%	
	Growth rate			6.75%	6.75%	
	K			8.93%	8.98%	

Historical Growth Rates
Earnings Per Share, Dividends Per Share,
Book Value Per Share, and Cash Flow Per Share

<u>Company</u>	<u>Earnings per Share</u>		<u>Dividends per Share</u>		<u>Book Value per Share</u>		<u>Cash Flow per Share</u>	
	Value Line		Value Line		Value Line		Value Line	
	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
American States Water	9.50%	10.00%	10.50%	7.00%	5.00%	5.50%	6.50%	7.50%
American Water Works Co., Inc.	11.00%	-	9.00%	-	4.00%	1.50%	8.50%	23.00%
Aqua America, Inc.	11.00%	8.50%	8.00%	8.00%	7.50%	7.00%	7.00%	7.50%
Artesian Res. Corp.	6.00%	-	3.00%	-	3.00%	-	5.00%	-
California Water Serv. Grp.	4.00%	4.50%	2.50%	2.00%	5.00%	4.50%	3.50%	5.50%
Connecticut Water Services	12.00%	8.00%	3.00%	2.50%	9.00%	6.00%	9.50%	6.50%
Middlesex Water Company	8.00%	5.00%	1.50%	1.50%	3.00%	4.00%	6.50%	4.50%
SJW Corporation	18.50%	8.00%	5.00%	4.50%	8.00%	5.50%	11.00%	7.00%
York Water Company	6.50%	5.50%	3.50%	3.50%	3.50%	5.00%	6.00%	6.00%
Average	<u>9.61%</u>	<u>7.07%</u>	<u>5.11%</u>	<u>4.14%</u>	<u>5.33%</u>	<u>4.88%</u>	<u>7.06%</u>	<u>8.44%</u>
Excl. CTWS and SJW	<u>8.00%</u>	<u>6.70%</u>	<u>5.43%</u>	<u>4.40%</u>	<u>4.43%</u>	<u>4.58%</u>	<u>6.14%</u>	<u>9.00%</u>

Source of Information: Value Line Investment Survey, April 13, 2018

Earnings Per Share, Dividends Per Share,
Book Value Per Share, and Cash Flow Per Share

<u>Water Group</u>	<u>I/B/E/S First Call</u>	<u>Zacks</u>	<u>Morningstar</u>	<u>Value Line</u>				
				<u>Earnings Per Share</u>	<u>Dividends Per Share</u>	<u>Book Value Per Share</u>	<u>Cash Flow Per Share</u>	<u>Percent Retained to Common Equity</u>
American States Water	4.00%	5.00%	-	6.50%	7.50%	4.00%	6.00%	6.00%
American Water Works	8.20%	7.70%	7.60%	8.50%	10.00%	5.00%	7.00%	4.50%
Aqua America, Inc.	5.00%	5.50%	-	7.00%	9.00%	6.50%	6.00%	4.50%
Artesian Resources Corp.	4.00%	NA	-	-	-	-	-	-
California Water Serv. Grp.	9.80%	NA	-	9.50%	6.50%	3.00%	4.50%	5.50%
Connecticut Water Services	6.00%	NA	-	5.50%	5.50%	4.50%	5.00%	5.00%
Middlesex Water Company	2.70%	NA	-	8.00%	5.00%	4.00%	6.50%	6.00%
SJW Corporation	14.00%	NA	-	6.00%	8.50%	3.00%	3.50%	8.00%
York Water Company	4.90%	NA	-	9.00%	8.00%	4.50%	7.50%	5.00%
Average	<u>6.51%</u>	<u>6.07%</u>	<u>7.60%</u>	<u>7.50%</u>	<u>7.50%</u>	<u>4.31%</u>	<u>5.75%</u>	<u>5.56%</u>
Excl. CTWS and SJW	<u>5.51%</u>	<u>6.07%</u>	<u>7.60%</u>	<u>8.08%</u>	<u>7.67%</u>	<u>4.50%</u>	<u>6.25%</u>	<u>5.25%</u>

Source of Information :

Yahoo First Call, May 30, 2018
Zacks, May 30, 2018
Morningstar, May 30, 2018
Value Line, April 13, 2018

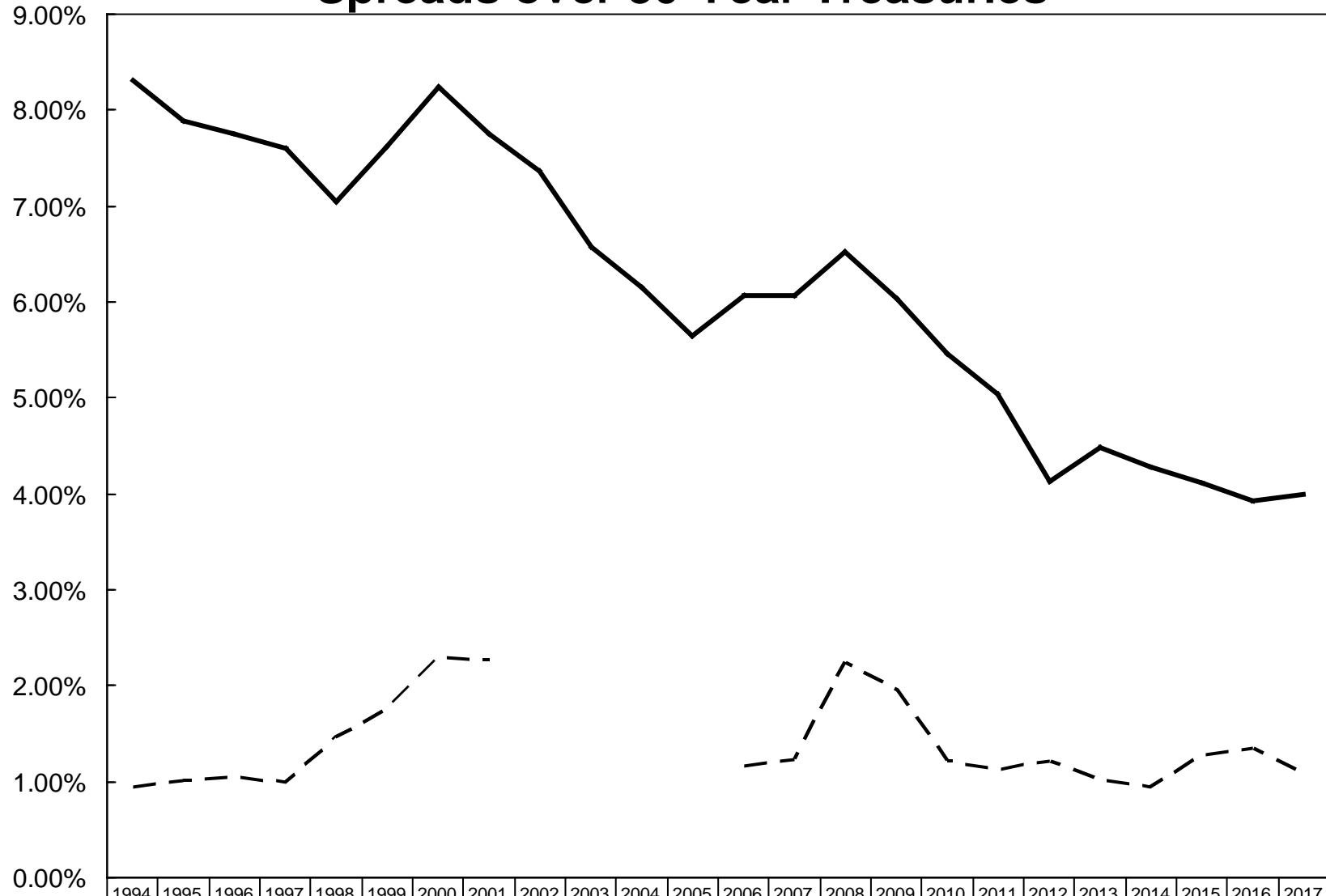
Water Group
Financial Risk Adjustment

Fiscal Year	American States	American Water	Aqua America	Artesian	California Water	Connecticut	Middlesex Water	SJW Corp	The York Water	Average										
	Water Co (NYSE:AWR)	Works Co. (NYSE:AWK)	Inc. (NYSE:WTR)	Resources Corp (NDS:ARTNA)	Service Group (NYSE:CWT)	Water Service (NDS:CTWS)	Co. (NDS:MSEX)	(NYSE:SJW)	Company (NDS:YORW)											
	12/31/17	12/31/17	12/31/17	12/31/17	12/31/17	12/31/17	12/31/17	12/31/17	12/31/17											
Capitalization at Fair Values																				
Debt(D)	\$424,042	\$7,643,000	\$2,262,785	\$110,524	\$607,492	\$268,628	\$150,536	\$537,840	\$108,000	1,345,872										
Preferred(P)	0	14,000	0	0	0	772	2,433	0	0	1,912										
Equity(E)	2,124,185	16,325,892	6,971,718	355,330	2,177,344	692,653	652,608	1,309,846	436,386	3,449,551										
Total	\$2,548,227	\$23,982,892	\$9,234,503	\$465,854	\$2,784,836	\$962,053	\$805,577	\$1,847,686	\$544,386	4,797,335										
Capital Structure Ratios																				
Debt(D)	16.64%	31.87%	24.50%	23.73%	21.81%	27.92%	18.69%	29.11%	19.84%	23.79%										
Preferred(P)	0.00%	0.06%	0.00%	0.00%	0.00%	0.08%	0.30%	0.00%	0.00%	0.05%										
Equity(E)	83.36%	68.07%	75.50%	76.27%	78.19%	72.00%	81.01%	70.89%	80.16%	76.16%										
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%										
Common Stock																				
Issued	36,680,794	182,508,564	180,700,251	9,215,000	48,012,000	12,065,016	16,352,000	20,520,856	12,872,742											
Treasury	0,000	4,064,010	2,986,308	0,000	0,000	0,000	0,000	0,000	0,000											
Outstanding	36,680,794	178,444,554	177,713,943	9,215,000	48,012,000	12,065,016	16,352,000	20,520,856	12,872,742											
Market Price	\$57.91	\$91.49	\$39.23	\$38.56	\$45.35	\$57.41	\$39.91	\$63.83	\$33.90											
Capitalization at Carrying Amounts																				
Debt(D)	\$325,265	\$6,809,000	\$2,143,127	\$106,931	\$531,713	\$258,272	\$147,822	\$435,000	\$92,833	1,205,551										
Preferred(P)	0	10,000	0	0	0	772	2,433	0	0	1,467										
Equity(E)	529,945	5,385,000	1,957,621	146,644	693,462	293,630	229,175	463,209	119,405	1,090,899										
Total	\$855,210	\$12,204,000	\$4,100,748	\$253,575	\$1,225,175	\$552,674	\$379,430	\$898,209	\$212,238	2,297,918										
Capital Structure Ratios																				
Debt(D)	38.03%	55.79%	52.26%	42.17%	43.40%	46.73%	38.96%	48.43%	43.74%	45.50%										
Preferred(P)	0.00%	0.08%	0.00%	0.00%	0.00%	0.14%	0.64%	0.00%	0.00%	0.10%										
Equity(E)	61.97%	44.12%	47.74%	57.83%	56.60%	53.13%	60.40%	51.57%	56.26%	54.40%										
Total	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%										
Betas																				
Value Line	0.75	0.65	0.70	0.60	0.75	0.65	0.80	0.70	0.80	0.71										
Hamada																				
BI	=	Bu	[1+	(1 - t)	D/E	+	P/E]												
0.71	=	Bu	[1+	(1-0.21)	0.3124	+	0.0007]												
0.71	=	Bu	[1+	0.79	0.3124	+	0.0007]												
0.71	=	Bu	1.2475																	
0.57	=	Bu																		
Hamada																				
BI	=	0.57	[1+	(1 - t)	D/E	+	P/E]												
BI	=	0.57	[1+	0.79	0.8364	+	0.0018]												
BI	=	0.57	1.6626																	
BI	=	0.95																		
M&M																				
ku	=	ke	- (((ku	-	i)	1-t)	D	/	E)-(ku	-	d)	P	/	E
7.95%	=	8.93%	- (((7.96%	-	4.05%)	0.79)	23.79%	/	76.16%)-(7.96%	-	5.68%)	0.05%	/	76.16%
7.95%	=	8.93%	- (((3.91%)			0.79)	0.3124)-(2.28%)			0.0007		
7.95%	=	8.93%	- ((3.09%)					0.3124)-(2.28%)			0.0007		
7.95%	=	8.93%	-	0.97%									-	0.00%						
M&M																				
ke	=	ku	+ (((ku	-	i)	1-t)	D	/	E)+(ku	-	d)	P	/	E
10.54%	=	7.96%	+ (((7.96%	-	4.05%)	0.79)	45.50%	/	54.40%)+(7.96%	-	5.68%)	0.10%	/	54.40%
10.54%	=	7.96%	+ (((3.91%)			0.79)	0.8364)+(2.28%)			0.0018		
10.54%	=	7.96%	+ ((3.09%)					0.8364)+(2.28%)			0.0018		
10.54%	=	7.96%	+	2.58%									+	0.00%						

**Interest Rates for Investment Grade Public Utility Bonds
Yearly for 2013-2017
and the Twelve Months Ended May 2018**

<u>Years</u>	<u>Aa Rated</u>	<u>A Rated</u>	<u>Baa Rated</u>	<u>Average</u>
2013	4.24%	4.48%	4.98%	4.57%
2014	4.19%	4.28%	4.80%	4.42%
2015	4.00%	4.12%	5.03%	4.38%
2016	3.73%	3.93%	4.68%	4.11%
2017	3.82%	4.00%	4.38%	4.07%
Five-Year Average	<u>4.00%</u>	<u>4.16%</u>	<u>4.77%</u>	<u>4.31%</u>
 <u>Months</u>				
Jun-17	3.77%	3.94%	4.32%	4.01%
Jul-17	3.82%	3.99%	4.36%	4.06%
Aug-17	3.67%	3.86%	4.23%	3.92%
Sep-17	3.70%	3.87%	4.24%	3.93%
Oct-17	3.74%	3.91%	4.26%	3.97%
Nov-17	3.65%	3.83%	4.16%	3.88%
Dec-17	3.62%	3.79%	4.14%	3.85%
Jan-18	3.69%	3.86%	4.18%	3.91%
Feb-18	3.94%	4.09%	4.42%	4.15%
Mar-18	3.97%	4.13%	4.52%	4.21%
Apr-18	3.99%	4.17%	4.58%	4.24%
May-18	4.10%	4.28%	4.71%	4.36%
Twelve-Month Average	<u>3.81%</u>	<u>3.98%</u>	<u>4.34%</u>	<u>4.04%</u>
Six-Month Average	<u>3.89%</u>	<u>4.05%</u>	<u>4.43%</u>	<u>4.12%</u>
Three-Month Average	<u>4.02%</u>	<u>4.19%</u>	<u>4.60%</u>	<u>4.27%</u>

Yields on A-rated Public Utility Bonds and Spreads over 30-Year Treasuries



— A-rated Public Utility	8.31%	7.89%	7.75%	7.60%	7.04%	7.62%	8.24%	7.76%	7.37%	6.58%	6.16%	5.65%	6.07%	6.07%	6.53%	6.04%	5.46%	5.04%	4.13%	4.48%	4.28%	4.12%	3.93%	4.00%
- - Spread vs. 30-year	0.94%	1.01%	1.04%	0.99%	1.46%	1.75%	2.30%	2.27%					1.16%	1.23%	2.25%	1.96%	1.21%	1.13%	1.21%	1.03%	0.94%	1.28%	1.34%	1.10%

A rated Public Utility Bonds over 30-Year Treasuries

Year	A-rated Public Utility	30-Year Treasuries		Year	A-rated Public Utility	30-Year Treasuries		Year	A-rated Public Utility	30-Year Treasuries		Year	A-rated Public Utility	30-Year Treasuries		Year	A-rated Public Utility	30-Year Treasuries				
		Yield	Spread			Yield	Spread			Yield	Spread			Yield	Spread			Yield	Spread			
Jan-99	6.97%	5.16%	1.81%	Jan-03	7.07%			Jan-07	5.96%	4.85%	1.11%	Jan-11	5.57%	4.52%	1.05%	Jan-15	3.58%	2.46%	1.12%			
Feb-99	7.09%	5.37%	1.72%	Feb-03	6.93%			Feb-07	5.90%	4.82%	1.08%	Feb-11	5.68%	4.65%	1.03%	Feb-15	3.67%	2.57%	1.10%			
Mar-99	7.26%	5.58%	1.68%	Mar-03	6.79%			Mar-07	5.85%	4.72%	1.13%	Mar-11	5.56%	4.51%	1.05%	Mar-15	3.74%	2.63%	1.11%			
Apr-99	7.22%	5.55%	1.67%	Apr-03	6.64%			Apr-07	5.97%	4.87%	1.10%	Apr-11	5.55%	4.50%	1.05%	Apr-15	3.75%	2.59%	1.16%			
May-99	7.47%	5.81%	1.66%	May-03	6.36%			May-07	5.99%	4.90%	1.09%	May-11	5.32%	4.29%	1.03%	May-15	4.17%	2.96%	1.21%			
Jun-99	7.74%	6.04%	1.70%	Jun-03	6.21%			Jun-07	6.30%	5.20%	1.10%	Jun-11	5.26%	4.23%	1.03%	Jun-15	4.39%	3.11%	1.28%			
Jul-99	7.71%	5.98%	1.73%	Jul-03	6.57%			Jul-07	6.25%	5.11%	1.14%	Jul-11	5.27%	4.27%	1.00%	Jul-15	4.40%	3.07%	1.33%			
Aug-99	7.91%	6.07%	1.84%	Aug-03	6.78%			Aug-07	6.24%	4.93%	1.31%	Aug-11	4.69%	3.65%	1.04%	Aug-15	4.25%	2.86%	1.39%			
Sep-99	7.93%	6.07%	1.86%	Sep-03	6.56%			Sep-07	6.18%	4.79%	1.39%	Sep-11	4.48%	3.18%	1.30%	Sep-15	4.39%	2.95%	1.44%			
Oct-99	8.06%	6.26%	1.80%	Oct-03	6.43%			Oct-07	6.11%	4.77%	1.34%	Oct-11	4.52%	3.13%	1.39%	Oct-15	4.29%	2.89%	1.40%			
Nov-99	7.94%	6.15%	1.79%	Nov-03	6.37%			Nov-07	5.97%	4.52%	1.45%	Nov-11	4.25%	3.02%	1.23%	Nov-15	4.40%	3.03%	1.37%			
Dec-99	8.14%	6.35%	1.79%	Dec-03	6.27%			Dec-07	6.16%	4.53%	1.63%	Dec-11	4.33%	2.98%	1.35%	Dec-15	4.35%	2.97%	1.38%			
Jan-00	8.35%	6.63%	1.72%	Jan-04	6.15%			Jan-08	6.02%	4.33%	1.69%	Jan-12	4.34%	3.03%	1.31%	Jan-16	4.27%	2.86%	1.41%			
Feb-00	8.25%	6.23%	2.02%	Feb-04	6.15%			Feb-08	6.21%	4.52%	1.69%	Feb-12	4.36%	3.11%	1.25%	Feb-16	4.11%	2.62%	1.49%			
Mar-00	8.28%	6.05%	2.23%	Mar-04	5.97%			Mar-08	6.21%	4.39%	1.82%	Mar-12	4.48%	3.28%	1.20%	Mar-16	4.16%	2.68%	1.48%			
Apr-00	8.29%	5.85%	2.44%	Apr-04	6.35%			Apr-08	6.29%	4.44%	1.85%	Apr-12	4.40%	3.18%	1.22%	Apr-16	4.00%	2.62%	1.38%			
May-00	8.70%	6.15%	2.55%	May-04	6.62%			May-08	6.28%	4.60%	1.68%	May-12	4.20%	2.93%	1.27%	May-16	3.93%	2.63%	1.30%			
Jun-00	8.36%	5.93%	2.43%	Jun-04	6.46%			Jun-08	6.38%	4.69%	1.69%	Jun-12	4.08%	2.70%	1.38%	Jun-16	3.78%	2.45%	1.33%			
Jul-00	8.25%	5.85%	2.40%	Jul-04	6.27%			Jul-08	6.40%	4.57%	1.83%	Jul-12	3.93%	2.59%	1.34%	Jul-16	3.57%	2.23%	1.34%			
Aug-00	8.13%	5.72%	2.41%	Aug-04	6.14%			Aug-08	6.37%	4.50%	1.87%	Aug-12	4.00%	2.77%	1.23%	Aug-16	3.59%	2.26%	1.33%			
Sep-00	8.23%	5.83%	2.40%	Sep-04	5.98%			Sep-08	6.49%	4.27%	2.22%	Sep-12	4.02%	2.88%	1.14%	Sep-16	3.66%	2.35%	1.31%			
Oct-00	8.14%	5.80%	2.34%	Oct-04	5.94%			Oct-08	7.56%	4.17%	3.39%	Oct-12	3.91%	2.90%	1.01%	Oct-16	3.77%	2.50%	1.27%			
Nov-00	8.11%	5.78%	2.33%	Nov-04	5.97%			Nov-08	7.60%	4.00%	3.60%	Nov-12	3.84%	2.80%	1.04%	Nov-16	4.08%	2.86%	1.22%			
Dec-00	7.84%	5.49%	2.35%	Dec-04	5.92%			Dec-08	6.52%	2.87%	3.65%	Dec-12	4.00%	2.88%	1.12%	Dec-16	4.27%	3.11%	1.16%			
Jan-01	7.80%	5.54%	2.26%	Jan-05	5.78%			Jan-09	6.39%	3.13%	3.26%	Jan-13	4.15%	3.08%	1.07%	Jan-17	4.14%	3.02%	1.12%			
Feb-01	7.74%	5.45%	2.29%	Feb-05	5.61%			Feb-09	6.30%	3.59%	2.71%	Feb-13	4.18%	3.17%	1.01%	Feb-17	4.18%	3.03%	1.15%			
Mar-01	7.68%	5.34%	2.34%	Mar-05	5.83%			Mar-09	6.42%	3.64%	2.78%	Mar-13	4.20%	3.16%	1.04%	Mar-17	4.23%	3.08%	1.15%			
Apr-01	7.94%	5.65%	2.29%	Apr-05	5.64%			Apr-09	6.48%	3.76%	2.72%	Apr-13	4.00%	2.93%	1.07%	Apr-17	4.12%	2.94%	1.18%			
May-01	7.99%	5.78%	2.21%	May-05	5.53%			May-09	6.49%	4.23%	2.26%	May-13	4.17%	3.11%	1.06%	May-17	4.12%	2.96%	1.16%			
Jun-01	7.85%	5.67%	2.18%	Jun-05	5.40%			Jun-09	6.20%	4.52%	1.68%	Jun-13	4.53%	3.40%	1.13%	Jun-17	3.94%	2.80%	1.14%			
Jul-01	7.78%	5.61%	2.17%	Jul-05	5.51%			Jul-09	5.97%	4.41%	1.56%	Jul-13	4.68%	3.61%	1.07%	Jul-17	3.99%	2.88%	1.11%			
Aug-01	7.59%	5.48%	2.11%	Aug-05	5.50%			Aug-09	5.71%	4.37%	1.34%	Aug-13	4.73%	3.76%	0.97%	Aug-17	3.86%	2.80%	1.06%			
Sep-01	7.75%	5.48%	2.27%	Sep-05	5.52%			Sep-09	5.53%	4.19%	1.34%	Sep-13	4.80%	3.79%	1.01%	Sep-17	3.87%	2.78%	1.09%			
Oct-01	7.63%	5.32%	2.31%	Oct-05	5.79%			Oct-09	5.55%	4.19%	1.36%	Oct-13	4.70%	3.68%	1.02%	Oct-17	3.91%	2.88%	1.03%			
Nov-01	7.57%	5.12%	2.45%	Nov-05	5.88%			Nov-09	5.64%	4.31%	1.33%	Nov-13	4.77%	3.80%	0.97%	Nov-17	3.83%	2.80%	1.03%			
Dec-01	7.83%	5.48%	2.35%	Dec-05	5.80%			Dec-09	5.79%	4.49%	1.30%	Dec-13	4.81%	3.89%	0.92%	Dec-17	3.79%	2.77%	1.02%			
Jan-02	7.66%	5.45%	2.21%	Jan-06	5.75%			Jan-10	5.77%	4.60%	1.17%	Jan-14	4.63%	3.77%	0.86%	Jan-18	3.86%	2.88%	0.98%			
Feb-02	7.54%	5.40%	2.14%	Feb-06	5.82%	4.54%	1.28%	Feb-10	5.87%	4.62%	1.25%	Feb-14	4.53%	3.66%	0.87%	Feb-18	4.09%	3.13%	0.96%			
Mar-02	7.76%			Mar-06	5.98%	4.73%	1.25%	Mar-10	5.84%	4.64%	1.20%	Mar-14	4.51%	3.62%	0.89%	Mar-18	4.13%	3.09%	1.04%			
Apr-02	7.57%			Apr-06	6.29%	5.06%	1.23%	Apr-10	5.81%	4.69%	1.12%	Apr-14	4.41%	3.52%	0.89%	Apr-18	4.17%	3.07%	1.10%			
May-02	7.52%			May-06	6.42%	5.20%	1.22%	May-10	5.50%	4.29%	1.21%	May-14	4.26%	3.39%	0.87%	May-18	4.28%	3.13%	1.15%			
Jun-02	7.42%			Jun-06	6.40%	5.15%	1.25%	Jun-10	5.46%	4.13%	1.33%	Jun-14	4.29%	3.42%	0.87%							
Jul-02	7.31%			Jul-06	6.37%	5.13%	1.24%	Jul-10	5.26%	3.99%	1.27%	Jul-14	4.23%	3.33%	0.90%							
Aug-02	7.17%			Aug-06	6.20%	5.00%	1.20%	Aug-10	5.01%	3.80%	1.21%	Aug-14	4.13%	3.20%	0.93%							
Sep-02	7.08%			Sep-06	6.00%	4.85%	1.15%	Sep-10	5.01%	3.77%	1.24%	Sep-14	4.24%	3.26%	0.98%							
Oct-02	7.23%			Oct-06	5.98%	4.85%	1.13%	Oct-10	5.10%	3.87%	1.23%	Oct-14	4.06%	3.04%	1.02%	Average:						
Nov-02	7.14%			Nov-06	5.80%	4.69%	1.11%	Nov-10	5.37%	4.19%	1.18%	Nov-14	4.09%	3.04%	1.05%	12-months			1.06%			
Dec-02	7.07%			Dec-06	5.81%	4.68%	1.13%	Dec-10	5.56%	4.42%	1.14%	Dec-14	3.95%	2.83%	1.12%	6-months			1.04%			
																			3-months			1.10%

Common Equity Risk Premiums
Years 1926-2016

	<u>Large Common Stocks</u>	<u>Long- Term Corp. Bonds</u>	<u>Equity Risk Premium</u>	<u>Long- Term Govt. Bonds Yields</u>
Low Interest Rates	11.97%	4.89%	7.08%	2.96%
Average Across All Interest Rates	11.95%	6.31%	5.64%	5.07%
High Interest Rates	11.93%	7.75%	4.18%	7.22%

Source of Information: 2017 SBBI Yearbook Stocks, Bonds, Bills, and Inflation

Basic Series
Annual Total Returns (except yields)

Year	Large Common Stocks	Long- Term Corp. Bonds	Long- Term Govt. Bonds Yields
1940	-9.78%	3.39%	1.94%
1945	36.44%	4.08%	1.99%
1941	-11.59%	2.73%	2.04%
1949	18.79%	3.31%	2.09%
1946	-8.07%	1.72%	2.12%
1950	31.71%	2.12%	2.24%
1939	-0.41%	3.97%	2.26%
1948	5.50%	4.14%	2.37%
1947	5.71%	-2.34%	2.43%
1942	20.34%	2.60%	2.46%
1944	19.75%	4.73%	2.46%
2012	16.00%	10.68%	2.46%
2014	13.69%	17.28%	2.46%
1943	25.90%	2.83%	2.48%
1938	31.12%	6.13%	2.52%
1936	33.92%	6.74%	2.55%
2011	2.11%	17.95%	2.55%
2015	1.38%	-1.02%	2.68%
1951	24.02%	-2.69%	2.69%
1954	52.62%	5.39%	2.72%
2016	11.96%	6.70%	2.72%
1937	-35.03%	2.75%	2.73%
1953	-0.99%	3.41%	2.74%
1935	47.67%	9.61%	2.76%
1952	18.37%	3.52%	2.79%
1934	-1.44%	13.84%	2.93%
1955	31.56%	0.48%	2.95%
2008	-37.00%	8.78%	3.03%
1932	-8.19%	10.82%	3.15%
1927	37.49%	7.44%	3.17%
1957	-10.78%	8.71%	3.23%
1930	-24.90%	7.98%	3.30%
1933	53.99%	10.38%	3.36%
1928	43.61%	2.84%	3.40%
1929	-8.42%	3.27%	3.40%
1956	6.56%	-6.81%	3.45%
1926	11.62%	7.37%	3.54%
2013	32.39%	-7.07%	3.78%
1960	0.47%	9.07%	3.80%
1958	43.36%	-2.22%	3.82%
1962	-8.73%	7.95%	3.95%
1931	-43.34%	-1.85%	4.07%
2010	15.06%	12.44%	4.14%
1961	26.89%	4.82%	4.15%
1963	22.80%	2.19%	4.17%
1964	16.48%	4.77%	4.23%
1959	11.96%	-0.97%	4.47%
1965	12.45%	-0.46%	4.50%
2007	5.49%	2.60%	4.50%
1966	-10.06%	0.20%	4.55%
2009	26.46%	3.02%	4.58%
2005	4.91%	5.87%	4.61%
2002	-22.10%	16.33%	4.84%
2004	10.88%	8.72%	4.84%
2006	15.79%	3.24%	4.91%
2003	28.68%	5.27%	5.11%
1998	28.58%	10.76%	5.42%
1967	23.98%	-4.95%	5.56%
2000	-9.10%	12.87%	5.58%
2001	-11.89%	10.65%	5.75%
1971	14.30%	11.01%	5.97%
1968	11.06%	2.57%	5.98%
1972	18.99%	7.26%	5.99%
1997	33.36%	12.95%	6.02%
1995	37.58%	27.20%	6.03%
1970	3.86%	18.37%	6.48%
1993	10.08%	13.19%	6.54%
1996	22.96%	1.40%	6.73%
1999	21.04%	-7.45%	6.82%
1969	-8.50%	-8.09%	6.87%
1976	23.93%	18.65%	7.21%
1973	-14.69%	1.14%	7.26%
1992	7.62%	9.39%	7.26%
1991	30.47%	19.89%	7.30%
1974	-26.47%	-3.06%	7.60%
1986	18.67%	19.85%	7.89%
1994	1.32%	-5.76%	7.99%
1977	-7.16%	1.71%	8.03%
1975	37.23%	14.64%	8.05%
1989	31.69%	16.23%	8.16%
1990	-3.10%	6.78%	8.44%
1978	6.57%	-0.07%	8.98%
1988	16.61%	10.70%	9.19%
1987	5.25%	-0.27%	9.20%
1985	31.73%	30.09%	9.56%
1979	18.61%	-4.18%	10.12%
1982	21.55%	42.56%	10.95%
1984	6.27%	16.86%	11.70%
1983	22.56%	6.26%	11.97%
1980	32.50%	-2.76%	11.99%
1981	-4.92%	-1.24%	13.34%

**Yields for Treasury Constant Maturities
Yearly for 2013-2017
and the Twelve Months Ended May 2018**

<u>Years</u>	<u>1-Year</u>	<u>2-Year</u>	<u>3-Year</u>	<u>5-Year</u>	<u>7-Year</u>	<u>10-Year</u>	<u>20-Year</u>	<u>30-Year</u>
2013	0.13%	0.31%	0.54%	1.17%	1.74%	2.35%	3.12%	3.45%
2014	0.12%	0.46%	0.90%	1.64%	2.14%	2.54%	3.07%	3.34%
2015	0.32%	0.69%	1.03%	1.53%	1.89%	2.14%	2.55%	2.84%
2016	0.61%	0.84%	1.01%	1.34%	1.64%	1.84%	2.23%	2.60%
2017	1.20%	1.40%	1.58%	1.91%	2.16%	2.33%	2.65%	2.90%
Five-Year Average	<u>0.48%</u>	<u>0.74%</u>	<u>1.01%</u>	<u>1.52%</u>	<u>1.91%</u>	<u>2.24%</u>	<u>2.72%</u>	<u>3.03%</u>
<u>Months</u>								
Jun-17	1.20%	1.34%	1.49%	1.77%	2.01%	2.19%	2.54%	2.80%
Jul-17	1.22%	1.37%	1.54%	1.87%	2.13%	2.32%	2.65%	2.88%
Aug-17	1.23%	1.34%	1.48%	1.78%	2.03%	2.21%	2.55%	2.80%
Sep-17	1.28%	1.38%	1.51%	1.80%	2.03%	2.20%	2.53%	2.78%
Oct-17	1.40%	1.55%	1.68%	1.98%	2.20%	2.36%	2.65%	2.88%
Nov-17	1.56%	1.70%	1.81%	2.05%	2.23%	2.35%	2.60%	2.80%
Dec-17	1.70%	1.84%	1.96%	2.18%	2.32%	2.40%	2.60%	2.77%
Jan-18	1.80%	2.03%	2.15%	2.38%	2.51%	2.58%	2.73%	2.88%
Feb-18	1.96%	2.18%	2.36%	2.60%	2.78%	2.86%	3.02%	3.13%
Mar-18	2.06%	2.28%	2.42%	2.63%	2.77%	2.84%	2.97%	3.09%
Apr-18	2.15%	2.38%	2.52%	2.70%	2.82%	2.87%	2.96%	3.07%
May-18	2.27%	2.51%	2.66%	2.82%	2.93%	2.98%	3.05%	3.13%
Twelve-Month Average	<u>1.65%</u>	<u>1.83%</u>	<u>1.97%</u>	<u>2.21%</u>	<u>2.40%</u>	<u>2.51%</u>	<u>2.74%</u>	<u>2.92%</u>
Six-Month Average	<u>1.99%</u>	<u>2.20%</u>	<u>2.35%</u>	<u>2.55%</u>	<u>2.69%</u>	<u>2.76%</u>	<u>2.89%</u>	<u>3.01%</u>
Three-Month Average	<u>2.16%</u>	<u>2.39%</u>	<u>2.53%</u>	<u>2.72%</u>	<u>2.84%</u>	<u>2.90%</u>	<u>2.99%</u>	<u>3.10%</u>

Measures of the Risk-Free Rate & Corporate Bond Yields

The forecast of Treasury and Corporate yields
per the consensus of nearly 50 economists
reported in the Blue Chip Financial Forecasts dated June 1, 2018

Year	Quarter	Treasury					Corporate	
		1-Year Bill	2-Year Note	5-Year Note	10-Year Note	30-Year Bond	Aaa Bond	Baa Bond
2018	Second	2.2%	2.5%	2.8%	3.0%	3.2%	4.1%	4.8%
2018	Third	2.4%	2.6%	2.9%	3.1%	3.3%	4.3%	5.0%
2018	Fourth	2.6%	2.8%	3.0%	3.2%	3.4%	4.4%	5.2%
2019	First	2.7%	2.9%	3.1%	3.3%	3.5%	4.6%	5.3%
2019	Second	2.9%	3.0%	3.2%	3.4%	3.7%	4.7%	5.5%
2019	Third	3.0%	3.1%	3.3%	3.5%	3.8%	4.8%	5.6%

Measures of the Market Premium

Value Line Return

As of:	Dividend Yield	+	Median Appreciation Potential	=	Median Total Return
25-May-18	2.1%		9.73%		11.83%

DCF Result for the S&P 500 Composite

D/P	(1+5g)	+	g	=	k
1.89%	(1.0610)		12.20%		14.21%

where:

Price (P)	at	30-May-18	=	2705.27
Dividend (D)	for	1st Qtr. '18	=	12.79
Dividend (D)		annualized	=	51.16
Growth (g)	by	Morningstar	=	12.20%

Summary

Value Line		11.83%
S&P 500		14.21%
Average		13.02%
Risk-free Rate of Return (Rf)		3.75%
Forecast Market Premium		9.27%
Historical Market Premium (Rm)	(Rf)	
1926-2016 Arith. mean	11.96%	4.02%
		7.94%
Average - Forecast/Historical		8.61%

Exhibit 7.8: Size-Decile Portfolios of the NYSE/NYSE MKT/NASDAQ Long-Term Returns in Excess of CAPM
1926–2016

<u>Size Grouping</u>	<u>OLS Beta</u>	<u>Arithmetic Mean</u>	<u>Return in Excess of Risk-free Rate (actual)</u>	<u>Return in Excess of Risk-free Rate (as predicted by CAPM)</u>	<u>Size Premium</u>
Mid-Cap (3–5)	1.12	13.82%	8.80%	7.79%	1.02%
Low-Cap (6–8)	1.22	15.26%	10.24%	8.49%	1.75%
Micro-Cap (9–10)	1.35	18.04%	13.02%	9.35%	3.67%
<u>Breakdown of Deciles 1–10</u>					
1-Largest	0.92	11.05%	6.04%	6.38%	-0.35%
2	1.04	12.82%	7.81%	7.19%	0.61%
3	1.11	13.57%	8.55%	7.66%	0.89%
4	1.13	13.80%	8.78%	7.80%	0.98%
5	1.17	14.62%	9.60%	8.09%	1.51%
6	1.17	14.81%	9.79%	8.14%	1.66%
7	1.25	15.41%	10.39%	8.67%	1.72%
8	1.30	16.14%	11.12%	9.04%	2.08%
9	1.34	16.97%	11.96%	9.28%	2.68%
10-Smallest	1.39	20.27%	15.25%	9.66%	5.59%

Betas are estimated from monthly returns in excess of the 30-day U.S. Treasury bill total return, January 1926–December 2016. Historical riskless rate measured by the 91-year arithmetic mean income return component of 20-year government bonds (5.02%). Calculated in the context of the CAPM by multiplying the equity risk premium by beta. The equity risk premium is estimated by the arithmetic mean total return of the S&P 500 (11.95%) minus the arithmetic mean income return component of 20-year government bonds (5.02%) from 1926–2016. Source: Morningstar *Direct* and CRSP. Calculated based on data from CRSP US Stock Database and CRSP US Indices Database ©2017 Center for Research. Used with permission. All calculations performed by Duff & Phelps, LLC.

Comparable Earnings Approach

Using Non-Utility Companies with
Timeliness of 2, 3 & 4; Safety Rank of 2 & 3; Financial Strength of B+, B++, & A;
Price Stability of 60 to 100; Betas of .60 to .80; and Technical Rank of 2, 3, 4 & 5

<u>Company</u>	<u>Industry</u>	<u>Timeliness Rank</u>	<u>Safety Rank</u>	<u>Financial Strength</u>	<u>Price Stability</u>	<u>Beta</u>	<u>Technical Rank</u>
Altria Group Inc	Tobacco	3	2	B+	95	0.70	3
Brinker International Inc	Restaurant	3	3	B+	65	0.80	4
Campbell Soup Co	Food Processing	4	2	B++	90	0.70	3
Capitol Federal Financial Inc	Thrift	4	2	B+	100	0.75	4
Caseys General Stores Inc	Retail/Wholesale Food	4	3	B+	70	0.75	3
Cboe Global Markets	Brokers & Exchanges	2	2	B++	80	0.75	2
Cheesecake Factory Inc	Restaurant	4	3	A	80	0.75	3
Chemed Corporation	Diversified Co.	2	3	B++	80	0.80	4
Clorox Co	Household Products	4	2	B++	100	0.70	3
CME Group Inc	Brokers & Exchanges	3	2	A	90	0.75	2
Constellation Brands	Beverage	2	3	A	90	0.80	2
Cracker Barrel Old Country Store Inc	Restaurant	3	2	A	70	0.80	2
Dunkin Brands Group Inc	Restaurant	3	3	B+	80	0.65	4
Erie Indemnity Company	Insurance (Prop/Cas.)	3	2	B++	95	0.80	3
Estee Lauder Companies Inc	Toiletries/Cosmetics	2	2	A	95	0.80	2
Hershey Company	Food Processing	3	2	B++	90	0.80	3
Hormel Foods Corporation	Food Processing	3	2	A	85	0.75	3
Integra LifeSciences Holdings Corporat	Med Supp Invasive	3	3	B+	75	0.80	3
Intercontinental Exch.	Brokers & Exchanges	2	2	A	90	0.80	2
Jack in the Box Inc	Restaurant	4	3	B+	60	0.80	4
Northwest Bancshares Inc	Thrift	3	2	B+	95	0.80	3
Pinnacle Foods Inc	Food Processing	3	3	B+	85	0.80	3
Republic Services Inc	Environmental	2	2	B++	100	0.80	2
Schweitzer Mauduit International Inc	Tobacco	4	3	B+	60	0.80	3
Average		3	2	A	84	0.77	3
Water Group	Average	3	3	B++	79	0.71	3

Source of Information: Value Line Investment Survey for Windows, May 2018

Comparable Earnings Approach
Five -Year Average Historical Earned Returns
for Years 2012-2016 and
Projected 3-5 Year Returns

Company	2012	2013	2014	2015	2016	Average	Projected 2019-21
Altria Group Inc	NMF	NMF	NMF	NMF	41.5%	41.5%	53.0%
Brinker International Inc	51.0%	NMF	NMF	NMF	NMF	51.0%	NMF
Campbell Soup Co	87.2%	64.6%	49.5%	60.2%	59.9%	64.3%	26.5%
Capitol Federal Financial Inc	4.1%	4.2%	5.2%	5.5%	6.0%	5.0%	7.0%
Caseys General Stores Inc	18.4%	18.7%	20.9%	20.9%	14.9%	18.8%	16.0%
Cboe Global Markets	65.8%	61.9%	75.9%	79.0%	58.4%	68.2%	12.5%
Cheesecake Factory Inc	17.9%	19.7%	18.3%	20.4%	23.1%	19.9%	21.5%
Chemed Corporation	19.7%	17.2%	22.0%	21.5%	20.7%	20.2%	23.5%
Clorox Co	-	NMF	NMF	NMF	NMF	-	53.5%
CME Group Inc	4.7%	4.6%	5.4%	6.1%	7.5%	5.7%	8.5%
Constellation Brands	14.6%	12.9%	15.5%	16.9%	20.1%	16.0%	22.0%
Cracker Barrel Old Country Store Inc	28.2%	24.6%	25.6%	30.5%	36.0%	29.0%	37.5%
Dunkin Brands Group Inc	42.8%	40.7%	50.7%	-	NMF	44.7%	NMF
Erie Indemnity Company	-	-	23.8%	22.7%	25.9%	24.1%	26.0%
Estee Lauder Companies Inc	33.0%	31.0%	31.2%	29.9%	31.2%	31.3%	49.0%
Hershey Company	71.4%	52.6%	61.6%	91.2%	120.7%	79.5%	42.5%
Hormel Foods Corporation	17.7%	15.9%	16.7%	17.9%	20.0%	17.6%	18.5%
Integra LifeSciences Holdings Corporation	16.8%	10.5%	4.8%	0.9%	8.9%	8.4%	13.5%
Intercontinental Exch.	15.1%	5.1%	8.9%	9.2%	10.6%	9.8%	10.5%
Jack in the Box Inc	15.3%	17.2%	39.9%	718.3%	NMF	197.7%	NMF
Northwest Bancshares Inc	5.6%	5.8%	5.8%	5.2%	4.2%	5.3%	9.5%
Pinnacle Foods Inc	5.9%	11.5%	11.9%	11.8%	13.0%	10.8%	16.5%
Republic Services Inc	8.6%	9.0%	9.0%	9.3%	9.9%	9.2%	13.5%
Schweitzer Mauduit International Inc	16.4%	14.0%	18.3%	19.2%	16.3%	16.8%	17.5%
Average						<u>34.6%</u>	<u>23.7%</u>
Average (excluding companies with values >20%)						<u>11.9%</u>	<u>13.0%</u>

Comparable Earnings Approach

Screening Parameters

Timeliness Rank

The rank for a stock's probable relative market performance in the year ahead. Stocks ranked 1 (Highest) or 2 (Above Average) are likely to outpace the year-ahead market. Those ranked 4 (Below Average) or 5 (Lowest) are not expected to outperform most stocks over the next 12 months. Stocks ranked 3 (Average) will probably advance or decline with the market in the year ahead. Investors should try to limit purchases to stocks ranked 1 (Highest) or 2 (Above Average) for Timeliness.

Safety Rank

A measure of potential risk associated with individual common stocks rather than large diversified portfolios (for which Beta is good risk measure). Safety is based on the stability of price, which includes sensitivity to the market (see Beta) as well as the stock's inherent volatility, adjusted for trend and other factors including company size, the penetration of its markets, product market volatility, the degree of financial leverage, the earnings quality, and the overall condition of the balance sheet. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit purchases to equities ranked 1 (Highest) or 2 (Above Average) for Safety.

Financial Strength

The financial strength of each of the more than 1,600 companies in the VS II data base is rated relative to all the others. The ratings range from A++ to C in nine steps. (For screening purposes, think of an A rating as "greater than" a B). Companies that have the best relative financial strength are given an A++ rating, indicating ability to weather hard times better than the vast majority of other companies. Those who don't quite merit the top rating are given an A+ grade, and so on. A rating as low as C++ is considered satisfactory. A rating of C+ is well below average, and C is reserved for companies with very serious financial problems. The ratings are based upon a computer analysis of a number of key variables that determine (a) financial leverage, (b) business risk, and (c) company size, plus the judgment of Value Line's analysts and senior editors regarding factors that cannot be quantified across-the-board for companies. The primary variables that are indexed and studied include equity coverage of debt, equity coverage of intangibles, "quick ratio", accounting methods, variability of return, fixed charge coverage, stock price stability, and company size.

Price Stability Index

An index based upon a ranking of the weekly percent changes in the price of the stock over the last five years. The lower the standard deviation of the changes, the more stable the stock. Stocks ranking in the top 5% (lowest standard deviations) carry a Price Stability Index of 100; the next 5%, 95; and so on down to 5. One standard deviation is the range around the average weekly percent change in the price that encompasses about two thirds of all the weekly percent change figures over the last five years. When the range is wide, the standard deviation is high and the stock's Price Stability Index is low.

Beta

A measure of the sensitivity of the stock's price to overall fluctuations in the New York Stock Exchange Composite Average. A Beta of 1.50 indicates that a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Average. Use Beta to measure the stock market risk inherent in any diversified portfolio of, say, 15 or more companies. Otherwise, use the Safety Rank, which measures total risk inherent in an equity, including that portion attributable to market fluctuations. Beta is derived from a least squares regression analysis between weekly percent changes in the price of a stock and weekly percent changes in the NYSE Average over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. The Betas are periodically adjusted for their long-term tendency to regress toward 1.00.

Technical Rank

A prediction of relative price movement, primarily over the next three to six months. It is a function of price action relative to all stocks followed by Value Line. Stocks ranked 1 (Highest) or 2 (Above Average) are likely to outpace the market. Those ranked 4 (Below Average) or 5 (Lowest) are not expected to outperform most stocks over the next six months. Stocks ranked 3 (Average) will probably advance or decline with the market. Investors should use the Technical and Timeliness Ranks as complements to one another.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DIRECT TESTIMONY OF
PAUL R. HERBERT

ON BEHALF OF
AQUA PENNSYLVANIA, INC.

CONCERNING
COST OF SERVICE ALLOCATION
AND
CUSTOMER RATE DESIGN

DOCKET NO. R-2018-3003068

AUGUST 17, 2018

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: AQUA PENNSYLVANIA, INC.
DOCKET R-2018-3003068

DIRECT TESTIMONY OF PAUL R. HERBERT

1 **Q. Please state your name and address.**

2 A. My name is Paul R. Herbert. My business address is 207 Senate Avenue, Camp
3 Hill, Pennsylvania.

4 **Q. By whom are you employed?**

5 A. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC.

6 **Q. Please describe your position with Gannett Fleming Valuation and Rate
7 Consultants, LLC, and briefly state your general duties and responsibilities.**

8 A. I am President. My duties and responsibilities include the preparation of
9 accounting and financial data for revenue requirement and cash working capital
10 claims, the allocation of cost of service to customer classifications, and the design
11 of customer rates in support of public utility rate filings.

12 **Q. Have you presented testimony in rate proceedings before a regulatory
13 agency?**

14 A. Yes. I have testified before the Pennsylvania Public Utility Commission (the
15 Commission), the New Jersey Board of Public Utilities, the Public Utilities
16 Commission of Ohio, the Public Service Commission of West Virginia, the
17 Kentucky Public Service Commission, the Iowa State Utilities Board, the Virginia
18 State Corporation Commission, the Missouri Public Service Commission, the New
19 Mexico Public Regulation Commission, the Public Utilities Commission of the State
20 of California, the Illinois Commerce Commission, the Delaware Public Service
21 Commission, the Arizona Corporation Commission, the Connecticut Department of

1 Public Utility Control, the Idaho Public Utilities Commission, the Hawaii Public
2 Utilities Commission, the New York State Public Service Commission, and the
3 Tennessee Regulatory Authority, concerning revenue requirements, cost of service
4 allocation, rate design and cash working capital claims. A list of cases in which I
5 have testified is attached to my testimony.

6 **Q. What is your educational background?**

7 A. I have a Bachelor of Science Degree in Finance from the Pennsylvania State
8 University, University Park, Pennsylvania.

9 **Q. Would you please describe your professional affiliations?**

10 A. I am a member of the American Water Works Association (AWWA) and serve as a
11 member of the Management Committee for the Pennsylvania Section. I am also a
12 member of the Pennsylvania Municipal Authorities Association. In 1998, I became
13 a member of the National Association of Water Companies, as well as a member
14 of its Rates and Revenue Committee.

15 **Q. Briefly describe your work experience.**

16 A. I joined the Valuation Division of Gannett Fleming Corddry and Carpenter, Inc.,
17 predecessor to Gannett Fleming Valuation and Rate Consultants, LLC and the
18 Valuation Division of Gannett Fleming, Inc., in September 1977, as a Junior Rate
19 Analyst. Since then, I advanced through several positions and was assigned the
20 position of Manager of Rate Studies on July 1, 1990. On June 1, 1994, I was
21 promoted to the position of Vice President. On November 3, 2003, I was promoted
22 to the position of Senior Vice President and on July 1, 2007, I was promoted to my
23 current position of President.

1 While attending Penn State, I was employed during the summers of 1972,
2 1973 and 1974 by the United Telephone System - Eastern Group in its accounting
3 department. Upon graduation from college in 1975, I was employed by Herbert
4 Associates, Inc., Consulting Engineers (now Herbert Rowland and Grubic, Inc.), as
5 a field office manager until September 1977.

6 **Q. What is the purpose of your testimony in this proceeding?**

7 A. My testimony is in support of the cost of service allocation and rate design studies
8 conducted under my direction and supervision for both the water and wastewater
9 utility operations of Aqua Pennsylvania, Inc. (“Aqua” or “Company”).

10 **Q. Have you prepared exhibits presenting the results of your studies?**

11 A. Yes. Exhibit No. 5-A, Part I presents the results of the allocation of the pro forma
12 cost of water service as of March 31, 2020. Exhibit No. 5-A, Part II presents the
13 application of rates to the water customers' consumption analysis. Exhibit No. 5-B,
14 Part I presents the results of the allocation of the pro forma cost of wastewater
15 service as of March 31, 2020. Exhibit No. 5-B, Part II presents the application of
16 rates to the wastewater customers' consumption analysis.

17
18 **WATER COST OF SERVICE ALLOCATION**

19 **Q. Briefly describe the purpose of your water cost allocation study in Exhibit 5-
20 A, Part I.**

21 A. The purpose of the study was to allocate the total cost of water service, which is
22 the total revenue requirement, to the several customer classifications. The cost of
23 service study includes the total water operations across Aqua's service territory. In
24 the study, the total costs were allocated to the residential, commercial, industrial,

1 public, other water utilities, private fire protection and public fire protection
2 classifications in accordance with generally-accepted principles and procedures.
3 The cost of service allocation results in indications of the relative cost
4 responsibilities of each class of customers. The allocated cost of service is one of
5 several criteria appropriate for consideration in designing customer rates to
6 produce the required revenues.

7 **Q. Have you prepared an exhibit presenting the results of your study?**

8 A. Yes. As previously noted, the results of my allocation of the pro forma cost of
9 service as of March 31, 2020, are presented in Exhibit No. 5-A, Part I.

10 **Q. Do you have any comments regarding the revenue requirements included in**
11 **the cost of service for water operations?**

12 A. Yes. The cost of service I prepared for the Company's water operations includes a
13 portion of the revenue requirement associated with the Company's wastewater
14 operations with its total water operations revenue requirement, as authorized by
15 Section 1311(c) of the Public Utility Code. The manner in which a portion of the
16 Company's wastewater revenue requirement has been allocated to the water
17 revenue requirement for purposes of this case is explained in the Company's
18 Statement No. 1, which is the direct testimony of William Packer. Using the
19 revenue requirement developed by the Company, as described by Mr. Packer, I
20 prepared the cost of service study for water operations set forth in Exhibit No. 5-A.
21 The cost of service study allocates among the water customer classes: (1) the
22 entire revenue requirement of the Company's water operations; and (2) the portion
23 of the revenue requirement of the Company's wastewater operations that will not
24 be recovered from wastewater customers under the Company's proposed

1 wastewater rates, which I will refer to, collectively, as the cost of service or total
2 revenue requirement.

3 **Q. Please describe the method of cost allocation that was used in your study.**

4 A. The base-extra capacity method, as described in the 2017 and prior editions of the
5 Water Rates Manuals published by the American Water Works Association
6 (AWWA), was used to allocate the pro forma costs that comprise the total revenue
7 requirement. It is a recognized method for allocating the cost of providing water
8 service to customer classifications in proportion to the classifications' use of the
9 commodity, facilities and services. It has been used by the Company and
10 accepted by this Commission in the Company's rate cases for over 30 years.

11 **Q. Is the method described in Exhibit No. 5-A, Part I?**

12 A. Yes. It is described on pages 3 and 4 of the exhibit.

13 **Q. Please describe the procedure followed in the cost allocation study.**

14 A. Each identified classification of cost in the pro forma cost of service was allocated
15 to the customer classifications through the use of appropriate allocation factors.
16 This allocation is presented in Schedule D on pages 10 through 16 of Exhibit No.
17 5-A, Part I. The items of cost, which include operation and maintenance expenses,
18 depreciation expense, taxes and income available for return, are identified in
19 columns 1 and 2 of Schedule D. The cost of each item, shown in column 4, is
20 allocated to the several customer classifications based on allocation factors
21 referenced in column 3. The development of the allocation factors is presented in
22 Schedule E of the exhibit.

23 I will use some of the larger cost items to illustrate the principles and
24 considerations used in the cost allocation methodology. Water purchased for

1 resale, purchased electric power and treatment chemicals are examples of costs
2 that tend to vary with the amount of water consumed and are thus considered base
3 costs. They are allocated to the several customer classifications in direct
4 proportion to the average daily consumption of those classifications through the
5 use of Factor 1. The development of Factor 1 is shown in Schedule E on page 16
6 of Exhibit No. 5-A, Part I.

7 Other source-of-supply, pumping, purification and transmission costs are
8 associated with meeting usage requirements in excess of the average, generally to
9 meet maximum day requirements. Costs of this nature were allocated to customer
10 classifications partially as base costs, proportional to average daily consumption,
11 partially as maximum day extra capacity costs, in proportion to maximum day extra
12 capacity, and, in the case of pumping stations and transmission mains, partially as
13 fire protection costs, through the use of Factors 2 and 3. The development of the
14 allocation factors, referenced as Factors 2 and 3, is shown in Schedule E, on
15 pages 16 and 17 and pages 18 and 19, respectively, of Exhibit No. 5-A, Part I.

16 Costs associated with distribution mains and storage facilities were
17 allocated partly on the basis of average consumption and partly on the basis of
18 maximum hour extra demand, including the demand for fire protection service,
19 because these facilities are designed to meet maximum hour and fire demand
20 requirements. The development of the factors, referenced as Factors 4 and 5,
21 used for these allocations is shown in Schedule E, on pages 20 through 23, of
22 Exhibit No. 5-A, Part I. Fire demand costs were allocated to public and private fire
23 protection service and general service in proportion to the relative potential
24 demands on the system by hydrants, fire services and commercial service lines

1 sized to provide both fire protection and general service, as presented in Schedule
2 G on page 39 of Exhibit No. 5-A, Part I.

3 Costs associated with fire hydrants were allocated to private and public
4 fire protection based on the number of hydrants shown in Factor 6.

5 Costs associated with meters and service lines were allocated to customer
6 classifications in proportion to the capital costs of the sizes and quantities of
7 meters and service lines serving each classification. The development of factors
8 for meters and service lines, referenced as Factor 7 and Factor 8, is presented on
9 pages 24 through 27 of Exhibit No. 5-A, Part I.

10 Costs for customer accounting, billing and collecting were allocated on the
11 basis of the number of bills for each classification, and costs for meter reading
12 were allocated on the basis of the number of bills rendered to metered customers.
13 The development of these factors, referenced as Factor 9 and Factor 10, is
14 presented on page 28 of Exhibit No. 5-A, Part I.

15 Administrative and general costs were allocated on the basis of allocated
16 direct costs excluding those costs such as purchased water, power and chemicals
17 which require little administrative and general expense. The development of
18 factors for this allocation, referenced as Factor 14, is presented on page 30 of
19 Exhibit No. 5-A, Part I.

20 Annual depreciation accruals were allocated on the basis of the function of
21 the facilities in each plant account to which depreciation expense is recorded. The
22 original cost less accrued depreciation of utility plant in service was similarly
23 allocated based on the function of the plant recorded in each account for the
24 purpose of developing Factor 18, which is used to allocate items such as income

1 taxes and return. The development of Factor 18 is presented on pages 33 through
2 36 of Exhibit No. 5-A, Part I.

3 **Q. What was the source of the total cost of service data set forth in column 4 of**
4 **Schedule D of Exhibit No. 5-A, Part I?**

5 A. The pro forma costs of service were furnished by the rate department of the
6 Company, and are set forth in Exhibit No. 1-A.

7 **Q. Refer to Schedule E, pages 17 and 21 of Exhibit No. 5-A, Part I, and explain**
8 **the source of the system maximum day and maximum hour ratios used in**
9 **the development of factors referenced as Factors 2, 3, 4 and 5.**

10 A. The ratios were based on a review of experienced Company data set forth on
11 Schedule F of Exhibit No. 5-A, Part I. The maximum day ratio of 1.4 times the
12 average day approximates the ratio of maximum daily send-out experienced by the
13 Company in 1999, 2001, 2010, and 2011, the year in which the most recent
14 maximum day delivery was experienced. The maximum hour ratio of 2.0 times the
15 average hour approximates the peak hour consumption experienced by the
16 Company in 1995, 1997, 2001, 2010, and 2011.

17 **Q. Are the system maximum day and maximum hour ratios the same as the**
18 **ratios used in the study presented in Docket No. R-2011-2267958?**

19 A. Yes, they are.

20 **Q. What factors were considered in estimating the maximum day extra capacity**
21 **and maximum hour extra capacity demands used for the customer**
22 **classifications in the development of Factors 2, 3, 4 and 5?**

23 A. The estimated demands were based on judgment which considered field studies of
24 customer class demands conducted for the Company, field observations of the

1 service areas of the Company, field studies of similar service areas in
2 Pennsylvania conducted by my firm, and generally-accepted customer class
3 maximum day and maximum hour demand ratios. The Company's study of
4 customer class demands was initiated in 1991 with the selection and monitoring of
5 Residential customers and neighborhoods. Monitoring continued for these
6 customers with some additional modifications and for customers from other
7 classes. The results of the demand study are presented in the Appendix of Exhibit
8 No. 5-A, Part I. A discussion of the specific factors considered for each class also
9 is presented in the Appendix.

10 **Q. Are the customer class extra capacity factors the same as those used in the**
11 **most recent cost of service study for the Company presented in Docket No.**
12 **R-2011-2267958?**

13 A. Yes, they are.

14 **Q. Please describe why the unrecovered portion of public fire protection is**
15 **allocated to other classes.**

16 A. The study reallocates the unrecovered portion of public fire protection to the
17 residential, commercial, industrial and public classifications. This was done
18 pursuant to Section 1328 of the Public Utility Code which states that public fire
19 hydrant rates may only recover 25% of the cost of service and the unrecovered
20 portion should be recovered in the other classes' fixed charges. Effectively, the
21 statute has reassigned the unrecovered costs to other classes, and it is
22 appropriate to reflect that reassignment in the cost of service.

23 **Q. How did you allocate the unrecovered portion of public fire service?**

1 A. Based on the requirement that these costs are to be recovered in fixed charges, I
2 allocated the unrecovered public fire costs using Factor 21, which is based on the
3 meter equivalents of the residential, commercial, industrial and public
4 classifications.

5 **Q. What is the total amount of wastewater revenue requirement allocated to the**
6 **Company's water operations?**

7 A. As shown in column 3 of Schedule A of Exhibit No. 5-A, Part I, the wastewater
8 revenue requirement allocated to the cost of water service is \$ 8,073,988.

9 **Q. Have you summarized the results of your cost allocation study?**

10 A. Yes. The results are summarized in columns 1 through 5 of Schedule A on page 7
11 of Exhibit No. 5-A, Part I. Column 2 sets forth the total allocated pro forma cost of
12 water service as of March 31, 2020, for each customer classification identified in
13 column 1. Column 3 shows the amount of Act 11 wastewater cost of service to be
14 recovered in water rates and column 4 shows the total water and Act 11 cost of
15 service. Column 5 presents each customer classification's cost responsibility as a
16 percent of the total cost.

17 **Q. Have you compared these cost responsibilities with the proportionate**
18 **revenue under existing rates for each customer classification?**

19 A. Yes. A comparison of the allocated cost responsibilities and the percentage
20 revenue under existing rates can be made by comparing columns 5 and 7 of
21 Schedule A of Exhibit 5-A, Part I. A similar comparison of the percentage cost
22 responsibilities (relative cost of service) and the percentage of pro forma revenues
23 (relative revenues) under proposed rates can be made by comparing columns 5

1 and 9 of Schedule A of Exhibit No. 5-A, Part I. Columns 10 and 11 show the
2 amount of the proposed increase and the percent increase by class.

3 **Q. How was the amount of Act 11 cost to be recovered in water rates**
4 **determined?**

5 A. The amount of Act 11 recovery was determined by subtracting the proposed level
6 of wastewater revenue after an approximate 40% increase from the pro forma cost
7 of wastewater service for the twelve months ended March 31, 2020.

8 WATER RATE DESIGN

9 **Q. Are you responsible for the design of the water rate schedules proposed by**
10 **the Company in this proceeding?**

11 A. Mr. Packer and I are responsible for the rate design.

12 **Q. Is the proposed rate structure presented in an exhibit?**

13 A. Yes. A comparison of the present and proposed rate schedules is presented in the
14 response to Standard Data Request OR-3.

15 **Q. What are the appropriate factors to be considered in the design of the rate**
16 **structure?**

17 A. In preparing a rate structure, one should consider the allocated costs of service,
18 the impact of radical changes from the present rate structure, the understandability
19 and ease of application of the rate structure, community and social influences, and
20 the value of service, particularly competitive concerns. General guidelines should
21 be developed with management to determine the extent to which each of these
22 criteria is to be incorporated in the rate structure to be designed, inasmuch as the
23 pricing of a commodity or service ultimately should be a function of management.

1 **Q. Did you develop rate design guidelines during discussions with Company**
2 **management?**

3 A. Yes, I did. The guidelines were: (1) maintain separate rate divisions for those
4 areas with year-round usage and those areas with seasonal usage; (2) maintain a
5 low-use block for the residential class at 2,000 gallons per month in each division,
6 and a sixth block for the industrial classification for usage over 10 million gallons
7 per month; (3) continue movement of those areas with year-round usage toward
8 the Main Division rates and those with seasonal usage toward seasonal rate
9 structure; (4) increase existing Main Division private fire rates by approximately
10 15% and move the private fire rates of the remaining divisions toward the Main
11 Division rates; and (5) increase the existing Public Fire Hydrant rate up to the 25%
12 of cost of service level. For those rate divisions with a public fire hydrant rate
13 below \$19.00 per month, propose an increase so that achieving the State-wide
14 rate can be accomplished in two or more rate cases. I would note that questions
15 concerning these guidelines should be directed to Mr. Packer.

16 **Q. Do the proposed rates comply with these guidelines?**

17 A. Yes, they do.

18 **Q. In what manner has the goal of rate equalization been continued for each of**
19 **the divisions?**

20 A. In general, the proposed customer charges and consumption rates for these
21 Divisions represent a movement toward the Main Division rates by varying
22 degrees.

23 For Main Division, the 5/8-inch customer charge was set at \$18.50 per
24 month. This represents a 15.6% base rate increase (7.6% over present rates

1 including the Distribution System Improvement Charge (DSIC)) but is still below
2 the customer cost analysis for a 5/8-inch meter of \$24.46 per month. Base rates
3 for all other meter sizes were increased by 15.6%. Consumption charges were
4 increased so that revenues by class move toward cost of service indicators and to
5 recover the total revenue requirement.

6 **Q. Please explain the proposed rates for all of the non-seasonal divisions.**

7 A. The following non-seasonal divisions are proposed to merge to Main Division in
8 this case:

- 9 • Bensalem, Clarendon, Kratzerville, Honesdale, Mt. Jewett and East
10 Cameron. Superior Water and Chalfont will merge to Main with the
11 exception of the customer charges for meter sizes ¾-inch through 4-inch.

12
13 The following Divisions are being moved toward Main Division, but will require
14 additional rate cases to achieve Main Division Rates:

- 15 • Country Club Gardens, Sand Springs, Mifflin Township, Beech Mountain,
16 Treasure Lake, Concord Park, Bristol, Bunker Hill, Robin Hood Estates,
17 and Sun Valley.

18
19 **Q. Please explain the rate structure for seasonal areas.**

20 A. Western (including Tanglewood, Eagle Rock, Fawn Lake, Woodledge Village,
21 Pinecrest and Thornhurst Divisions), Oakland Beach/Lakeside Acres, and CS
22 Water/Masthope Divisions have a significant number of seasonal customers and
23 will continue to be served under the merged seasonal rate design. The customer
24 charge is increased to \$30.10 per month offset with a lower first block consumption
25 rate than Main Division for the first 4,000 gallons. The bills for the seasonal rate
26 structure are equalized with Main Division at the 4,080 gallon average per month
27 and greater consumption levels.

1 **Q. Please explain the concerns regarding competing sources of supply for**
2 **Industrial, Public and Sales to Other Water Utilities customers.**

3 A. Many of the Company's very large customers are capable of developing alternative
4 sources of water. In order to avoid the loss of very large customers from which the
5 Company recovers a significant amount of its fixed costs, competitive service
6 riders were proposed and approved in the Company's 1997 rate proceeding. The
7 competitive service riders DIS (Demand-Based Industrial Service), DRS (Demand-
8 Based Resale Service) and EGS (Electric Generation Service) enable the
9 Company to retain customers who are able to develop water supplies at average
10 costs per hundred gallons that are less than the Company's tariff rates. These
11 customers, in return for a negotiated rate that is less than the tariff rate, are
12 required to enter into a contract with the Company, purchase a minimum amount of
13 water each month and maintain favorable load factors. The use of such riders
14 retains the recovery of significant fixed costs from these customers that otherwise
15 would have to be recovered from all other customers.

16 **Q. Have you reflected revenues based on negotiated rates in developing the**
17 **Industrial and Sales to Other Water Utilities classes' revenues to be**
18 **produced under proposed rates?**

19 A. Yes, I have. The revenues for the industrial, public and sales to other water
20 utilities classifications include contract revenues for three Industrial customers, one
21 Commercial customer, three Public customers and twelve Other Water Utilities
22 customers. There also is a special tariff rate for Masury Water Company served
23 from the Shenango Valley Division.

24 **Q. What are you proposing for the Main Division public fire hydrant rate?**

1 A. The present annual rate of \$303 per year is less than 25 percent of the annual cost
2 per hydrant. Section 1328 of the Public Utility Code requires that public fire
3 hydrant rates recover no more than 25 percent of the cost of service. The
4 Company is proposing that the Main Division public fire hydrant rate be increased
5 to this level.

6 **Q. What is the annual public fire hydrant cost of service?**

7 A. The annual cost of service for a public fire hydrant is \$1,241.42. The public fire
8 cost at 25% of the cost of service is \$310.36 or \$25.86 per month.

9 **Q. What changes are proposed for the public fire hydrant rates in the other**
10 **divisions?**

11 A. For those divisions where the existing rate per month is \$19.00 or less, the
12 Company is proposing to move toward the \$25.86 rate over two or more rate
13 cases. Refer to Schedule 7B of Exhibit 5-A, Part II.

14 **Q. How were the present metered private fire rates increased under proposed**
15 **rates?**

16 A. The present Main Division base rates for private fire customers were increased
17 approximately 15%. The rates for other divisions were moved toward or equal to
18 Main Division rates. See Schedule 7A of Exhibit No. 5-A, Part II.

19 **Q. Please describe the development of the rates for the standby tariff.**

20 A. The proposed Industrial Standby Rates and Resale and Electric Generation
21 Standby Rates include service, demand and commodity rates. The service
22 charges are the same as those set forth on the Schedule of Rates for the Main
23 Division proposed in this case.

1 The demand and commodity rates are based on the results of the cost of
2 service allocation to cost functions found in the Appendix of Exhibit No. 5-A, Part I.
3 The firm standby demand charge includes fixed operating and capital costs in the
4 base and extra capacity functions. The interruptible standby demand charge
5 includes fixed operating costs in the base and extra capacity functions.

6 The commodity rate associated with deliveries pursuant to firm standby
7 demand includes variable operating costs. The commodity rate associated with
8 deliveries pursuant to interruptible standby demand includes variable operating
9 costs and capital costs in the base and extra capacity functions. The commodity
10 rate for deliveries in excess of the firm and interruptible standby demand is the rate
11 for the first block for the Main Division.

12 **Q. Did you prepare a schedule to show the calculation of the standby rates?**

13 A. Yes. Schedule H of Exhibit No. 5-A, Part I, sets forth the calculation of the firm and
14 interruptible standby rates based on the cost of service data submitted in this case.

15 **APPLICATION OF WATER RATES TO CUSTOMERS'**
16 **CONSUMPTION ANALYSIS**
17

18 **Q. Please describe Exhibits No. 5-A, Part II.**

19 A. Exhibit No. 5-A, Part II, titled "Operating Revenue From Sales of Water for the
20 Twelve Months Ended March, 31, 2020" presents the application of the present
21 rates to the bill analysis for each rate division as of March 31, 2018, and the
22 development of pro forma revenues under proposed rates based on estimated
23 conditions during the fully projected future test year ended March 31, 2020.

24 **Q. What was the purpose of the rate application?**

1 A. The purpose of the rate application was to establish the level of revenues to be
2 derived from each customer classification under present and proposed rates based
3 on consumption for the twelve months ended March 31, 2018 and March 31, 2020.

4 **Q. Please outline the contents of Exhibit No. 5-A, Part II.**

5 A. Exhibit No. 5-A, Part II, includes the plan of the exhibit, an explanation of the rate
6 application procedures, summaries of the rate applications and the application of
7 present rates to the several consumption analyses.

8 Schedule 1 on page 3 presents the summary of pro forma revenues for
9 the consolidated divisions under proposed rates for the twelve months ended
10 March 31, 2020.

11 Schedule 2 on page 4 presents a summary of the application of proposed
12 rates and the development of the pro forma revenues for the twelve months ended
13 March 31, 2020 under proposed rates for each division.

14 Schedule 3 on page 5 presents a summary of the pro forma revenues for
15 the consolidated divisions under present rates, for the twelve months ending March
16 31, 2018.

17 Schedule 4 on page 6 presents a summary of the application of revenues
18 under present rates for the twelve months ending March 31, 2018 for each division.

19 Schedule 5 on pages 8 through 42 presents the application of present
20 rates to the consumption analysis for each of the divisions. Schedule 6 presents
21 adjustments to the application of present and proposed rates for Divisions that
22 experienced customer growth, showed declining usage, required availability
23 charges to be eliminated, or required annualization of Divisions that were acquired
24 during the historic test year.

1 Schedules 7A and 7B set forth the application of rates under present and
2 proposed metered private fire and private and public fire hydrants.

3 **Q. Please explain the calculations associated with the application of the rates to**
4 **consumption.**

5 A. An analysis of customer consumption for the twelve months ended March 31,
6 2018, was prepared by the Company and was provided in electronic form. The
7 Company's analysis is summarized, and the results are presented in the
8 Introduction of Exhibit No. 5-A, Part II. The present rates for each division were
9 applied to the consumption data and summarized in Schedule 4. The total
10 revenues from Schedule 4 were brought forward to column 5 of Schedule 3.

11 Column 9 applies the 7.5% DSIC surcharge to the consumption analysis
12 revenue to determine revenues under present rates in column 10. The revenues
13 are further adjusted for pro forma revenue adjustments in columns 7 and 8 to
14 develop the total revenues in column 10.

15 The development of pro forma revenues under present and proposed
16 rates for each division is presented in Schedule 5 and for Private Fire in Schedule
17 7A and for Public Fire in Schedule 7B. Pro forma revenue adjustments under
18 present and proposed rates are shown in Schedule 6. A comparison of customer
19 bills is provided on Schedule 8 in response to Standard Data Request OR-3.

20
21 **COST OF WASTEWATER SERVICE ALLOCATION**

22 **Q. Please describe the overall cost of service allocation for the Company's**
23 **Wastewater Operations.**

1 A. The cost of service allocation study for the Company's wastewater operations,
2 includes the combined revenue requirements for the Company's wastewater
3 service divisions.

4 The purpose of the study was to allocate the total cost of service, which is
5 the total revenue requirement, to the several customer classifications. In the study,
6 the total costs were allocated to the residential, non-residential, and bulk sales
7 customer classifications in accordance with generally accepted cost of service
8 principles and procedures.

9 **Q. Have you prepared an exhibit presenting the results of your study?**

10 A. Yes. The results of my allocation of the pro forma cost of service as of March 31,
11 2020, and proposed customer rates to produce the pro forma revenue requirement
12 as of that date are presented in Exhibit No. 5-B, Part I.

13 **Q. Please describe the method of cost allocation that was used in your study.**

14 A. I used the functional cost allocation methodology described in "Financing and
15 Changes for Wastewater Systems", Manual of Practice No. 27, published by the
16 Water Environment Federation ("Manual of Practice No. 27"). This method
17 allocated the cost of providing wastewater service to customer classifications in
18 proportion to each classifications' use of the service provider's facilities and
19 services. Costs are assigned to cost components using predominant operational
20 purposes as cost-causative factors. The functional cost method is generally
21 accepted as a sound method for allocating the cost of wastewater service.

22 **Q. What procedures did you use to apply the cost allocation methodology to**
23 **wastewater operations?**

1 A. Each element of the cost of service is allocated to customer classifications
2 according to the functional categories of flow, infiltration and inflow (“I&I”),
3 customer facilities and customer accounting. The functional costs are allocated to
4 customer classifications based on the amount of flow contributed to the system,
5 the amount of I&I allocated to each class, and the number and relative size of
6 customers.

7 **Q. Have you summarized the results of your cost allocation study?**

8 A. Yes. The results are summarized in columns 1 through 5 of Schedule WW-A of
9 Exhibit 5-B, Part I. Column 2 sets forth the total allocated pro forma cost of service
10 for each customer classification identified in column 1. Column 3 shows the
11 amount of wastewater revenue requirement that is proposed to be recovered in
12 water rates, as reflected in Exhibit No. 5-A, Part I – Schedule A. Column 4 shows
13 the revised total allocated pro forma cost of service for each customer
14 classification identified in column 1. Column 5 presents each customer
15 classification's cost responsibility as a percent of the total cost. The cost of service
16 by class in column 2 was developed in Schedule WW-B, which allocates the
17 functional cost of service to customer classes. The factors that allocate the
18 functional costs to customer classes are presented in Schedule WW-C. Schedule
19 WW-D sets forth the allocation of each element of the cost of service to the
20 functional components. The factors that allocate the cost of service to the cost
21 functions are shown in Schedule WW-E.

22 **Q. Have you compared these cost responsibilities with the proportionate**
23 **revenue under existing rates for each customer classification?**

1 A. Yes. A comparison of the allocated cost responsibilities and the percentage
2 revenue under existing rates can be made by comparing columns 5 and 7 of
3 Schedule WW-A of Exhibit 5-B, Part I. The proposed revenues and the percent of
4 total are shown in columns 8 and 9 respectively. The proposed increase in
5 revenue and the percent increase is shown in columns 10 and 11.

6 **WASTEWATER RATE DESIGN**

7 **Q. Are you responsible for the design of the rate schedules proposed by the**
8 **Company in this proceeding?**

9 A. Mr. Packer and I are responsible for the rate design.

10 **Q. Is the proposed rate structure presented in an exhibit?**

11 A. Yes. A comparison of the present and proposed rate schedules is presented in the
12 response to Standard Data Request OR-3.

13 **Q. Did you develop rate design guidelines during discussions with Company**
14 **management?**

15 A. Yes, I did. The guidelines were: (1) reduce the current 33 rate areas into
16 approximately 5 separate rate zones; (2) for metered areas, develop a rate
17 structure that includes a customer charge and a single block usage charge; and (3)
18 for unmetered areas, develop a monthly flat rate to equal 4,000 gallons priced-out
19 at the respective zone rates.

20 **Q. Does the proposed rate design comply with these guidelines?**

21 A. Yes, for the most part. Of the 33 current rates areas, 30 were transferred into one
22 of the 5 proposed rate zones. The remaining three rate areas will continue to be
23 outliers.

24 **Q. Please describe the 5 rate zones.**

1 A. In order to mitigate the increases to certain rate areas, the rate zones were
 2 developed so that customers in lower rate areas would transfer to the lowest new
 3 rate zone or Rate Zone 1. The next several rate areas would move to Rate Zone 2
 4 and so forth. The table below shows the monthly customer charge for a customer
 5 using a 5/8" meter, the consumption charge per hundred gallons, and the monthly
 6 flat rate charge based on 4,000 gallons per month for each rate zone:

7	Rate	Customer	Usage	Flat
8	<u>Zone</u>	<u>Charge</u>	<u>Charge</u>	<u>Rate</u>
9				
10	1	\$31.00	\$0.760	\$61.40
11	2	36.00	0.810	68.40
12	3	46.00	0.850	80.00
13	4	62.00	0.950	100.00
14	5	74.00	0.960	112.40

15
 16 **Q. Please indicate which rate areas are proposed for each rate zone.**

17 A. Rate Zone 1 includes Media, CS Water/Masthope, Village at Valley Forge,
 18 Treasure Lake, and Bunker Hill.

19 Rate Zone 2 includes Pinecrest, Bridlewood, and Eagle Rock.

20 Rate Zone 3 includes Willistown Woods, White Haven, Thornhurst,
 21 Rivercrest, Laurel Lakes, Deerfield Knoll, Beech Mountain, Woodloch Springs,
 22 Stony Creek, Penn Township, and Emlenton.

23 Rate Zone 4 includes Links at Gettysburg, Twin Hills, Peddlers View, New
 24 Daleville, Lake Harmony, Honeycroft Village, and Tobyhanna.

25 Rate Zone 5 includes East Bradford, Plumsock, Little Washington, and
 26 The Greens at Penn Oaks.

1 Also shown on the Rate Zone 5 tariff page are three areas that will have
2 their own special charges apart from Rate Zone 5 rates. These three areas
3 include Newlin Green, Sage Hill, and Avon Grove School District.

4 **Q. Why were three rate areas left out of the Rate Zone 5?**

5 A. Newlin Green and Sage Hill both have existing rates significantly above Rate Zone
6 5 rates and the Company did not want to propose a significant decrease for these
7 areas at this time. Avon Grove School District has a customer-specific flat rate
8 which did not fit into any of the rate zones.

9
10 **APPLICATION OF WASTEWATER RATES TO CUSTOMERS'**
11 **CONSUMPTION ANALYSIS**
12

13 **Q. Please describe Exhibits No. 5-B, Part II.**

14 A. Exhibit No. 5-B, Part II, titled "Operating Revenue From Sales of Wastewater for
15 the Twelve Months Ended March, 31, 2020" presents the application of the present
16 rates to the bill analysis for each rate division and the development of pro forma
17 revenues under present rates as of March 31, 2018, and the development of pro
18 forma revenues under proposed rates based on estimated conditions during the
19 fully projected future test year ended March 31, 2020.

20 **Q. What was the purpose of the rate application?**

21 A. The purpose of the rate application was to establish the level of revenues to be
22 derived from each customer classification under present and proposed rates based
23 on consumption for the twelve months ended March 31, 2018 and March 31, 2020.

24 **Q. Please outline the contents of Exhibit No. 5-B, Part II.**

1 A. Exhibit No. 5-B, Part II, includes the plan of the exhibit, an explanation of the rate
2 application procedures, summaries of the rate applications and the application of
3 present rates to the several consumption analyses.

4 Schedule WW-1 on page 5 presents the summary of pro forma revenues
5 for the consolidated rate zones under proposed rates for the twelve months ended
6 March 31, 2020.

7 Schedule WW-2 on page 6 presents a summary of the application of
8 proposed rates and the development of the pro forma revenues for the twelve
9 months ended March 31, 2020 under proposed rates for each division.

10 Schedule WW-3 on page 8 presents a summary of the pro forma
11 revenues for the consolidated divisions under present rates, for the twelve months
12 ending March 31, 2018.

13 Schedule WW-4 on page 9 presents a summary of the application of
14 revenues under present rates for the twelve months ending March 31, 2018 for
15 each division.

16 Schedule WW-5 on pages 11 through 47 presents the application of
17 present rates and proposed to the consumption analysis for each of the divisions.
18 Schedule 6 presents adjustments to the application of present and proposed rates
19 related to the elimination of availability charges and includes adjustments for
20 wastewater divisions acquired during the historic test year.

21 **Q. Please explain the calculations associated with the application of the rates to**
22 **consumption.**

23 A. An analysis of customer consumption for the twelve months ended March 31,
24 2020, was prepared by the Company and was provided in electronic form. The

1 Company's analysis is summarized, and the results are presented in the
2 Introduction of Exhibit No. 5-B, Part II. The present rates for each division were
3 applied to the consumption data and summarized in Schedule WW-4. The total
4 revenues from Schedule WW-4 were brought forward to column 5 of Schedule
5 WW-3.

6 Column 9 applies the 5.0% DSIC surcharge to the consumption analysis
7 revenue to determine revenues under present rates in column 10. The revenues
8 are further adjusted for pro forma revenue adjustments in columns 7 and 8 to
9 develop the total revenues in column 10.

10 The development of pro forma revenues under proposed rates for each
11 division is presented in Schedule WW-5. A comparison of the present and
12 proposed rates for each division, as well as comparisons of customer bills, is
13 provided on Schedule WW-7.

14 **Q. Does this conclude your direct testimony?**

15 A. Yes, it does.

16

PAUL R. HERBERT – LIST OF CASES TESTIFIED

<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client/Utility</u>	<u>Subject</u>	
1.	1983	Pa. PUC	R-832399	T. W. Phillips Gas and Oil Co.	Pro Forma Revenues
2.	1989	Pa. PUC	R-891208	Pennsylvania-American Water Company	Bill Analysis and Rate Application
3.	1991	WV PSC	91-106-W-MA	Clarksburg Water Board	Revenue Requirements (Rule 42)
4.	1992	Pa. PUC	R-922276	North Penn Gas Company	Cash Working Capital
5.	1992	NJ BPU	WR92050532J	The Atlantic City Sewerage Company	Cost Allocation and Rate Design
6.	1994	Pa. PUC	R-943053	The York Water Company	Cost Allocation and Rate Design
7.	1994	Pa. PUC	R-943124	City of Bethlehem	Revenue Requirements, Cost Allocation, Rate Design and Cash Working Capital
8.	1994	Pa. PUC	R-943177	Roaring Creek Water Company	Cash Working Capital
9.	1994	Pa. PUC	R-943245	North Penn Gas Company	Cash Working Capital
10.	1994	NJ BPU	WR94070325	The Atlantic City Sewerage Company	Cost Allocation and Rate Design
11.	1995	Pa. PUC	R-953300	Citizens Utilities Water Company of Pennsylvania	Cost Allocation and Rate Design
12.	1995	Pa. PUC	R-953378	Apollo Gas Company	Rev. Requirements and Rate Design
13.	1995	Pa. PUC	R-953379	Carnegie Natural Gas Company	Rev. Requirements and Rate Design
14.	1996	Pa. PUC	R-963619	The York Water Company	Cost Allocation and Rate Design
15.	1997	Pa. PUC	R-973972	Consumers Pennsylvania Water Company Shenango Valley Division	Cash Working Capital
16.	1998	Ohio PUC	98-178-WS-AIR	Citizens Utilities Company of Ohio	Water and Wastewater Cost Allocation and Rate Design
17.	1998	Pa. PUC	R-984375	City of Bethlehem - Bureau of Water	Revenue Requirement, Cost Allocation and Rate Design
18.	1999	Pa. PUC	R-994605	The York Water Company	Cost Allocation and Rate Design
19.	1999	Pa. PUC	R-994868	Philadelphia Suburban Water Company	Cost Allocation and Rate Design
20.	1999	WV PSC	99-1570-W-MA	Clarksburg Water Board	Revenue Requirements (Rule 42), Cost Allocation and Rate Design
21.	2000	Ky. PSC	2000-120	Kentucky-American Water Company	Cost Allocation and Rate Design
22.	2000	Pa. PUC	R-00005277	PPL Gas Utilities	Cash Working Capital
23.	2000	NJ BPU	WR00080575	Atlantic City Sewerage Company	Cost Allocation and Rate Design
24.	2001	Ia. St Util Bd	RPU-01-4	Iowa-American Water Company	Cost Allocation and Rate Design
25.	2001	Va. St. CC	PUE010312	Virginia-American Water Company	Cost Allocation and Rate Design
26.	2001	WV PSC	01-0326-W-42T	West-Virginia American Water Company	Cost Allocation And Rate Design
27.	2001	Pa. PUC	R-016114	City of Lancaster	Tapping Fee Study
28.	2001	Pa. PUC	R-016236	The York Water Company	Cost Allocation and Rate Design
29.	2001	Pa. PUC	R-016339	Pennsylvania-American Water Company	Cost Allocation and Rate Design
30.	2001	Pa. PUC	R-016750	Philadelphia Suburban Water Company	Cost Allocation and Rate Design
31.	2002	Va.St.CC	PUE-2002-0375	Virginia-American Water Company	Cost Allocation and Rate Design
32.	2003	Pa. PUC	R-027975	The York Water Company	Cost Allocation and Rate Design
33.	2003	Tn Reg Auth	03-	Tennessee-American Water Company	Cost Allocation and Rate Design
34.	2003	Pa. PUC	R-038304	Pennsylvania-American Water Company	Cost Allocation and Rate Design
35.	2003	NJ BPU	WR03070511	New Jersey-American Water Company	Cost Allocation and Rate Design
36.	2003	Mo. PSC	WR-2003-0500	Missouri-American Water Company	Cost Allocation and Rate Design
37.	2004	Va.St.CC	PUE-200 -	Virginia-American Water Company	Cost Allocation and Rate Design
38.	2004	Pa. PUC	R-038805	Pennsylvania Suburban Water Company	Cost Allocation and Rate Design
39.	2004	Pa. PUC	R-049165	The York Water Company	Cost Allocation and Rate Design
40.	2004	NJ BPU	WRO4091064	The Atlantic City Sewerage Company	Cost Allocation and Rate Design
41.	2005	WV PSC	04-1024-S-MA	Morgantown Utility Board	Cost Allocation and Rate Design
42.	2005	WV PSC	04-1025-W-MA	Morgantown Utility Board	Cost Allocation and Rate Design
43.	2005	Pa. PUC	R-051030	Aqua Pennsylvania, Inc.	Cost Allocation and Rate Design
44.	2006	Pa. PUC	R-051178	T. W. Phillips Gas and Oil Co.	Cost Allocation and Rate Design
45.	2006	Pa. PUC	R-061322	The York Water Company	Cost Allocation and Rate Design
46.	2006	NJ BPU	WR-06030257	New Jersey American Water Company	Cost Allocation and Rate Design
47.	2006	Pa. PUC	R-061398	PPL Gas Utilities, Inc.	Cost Allocation and Rate Design
48.	2006	NM PRC	06-00208-UT	New Mexico American Water Company	Cost Allocation and Rate Design
49.	2006	Tn Reg Auth	06-00290	Tennessee American Water Company	Cost Allocation and Rate Design
50.	2007	Ca. PUC	U-339-W	Suburban Water Systems	Water Conservation Rate Design
51.	2007	Ca. PUC	U-168-W	San Jose Water Company	Water Conservation Rate Design
52.	2007	Pa. PUC	R-00072229	Pennsylvania American Water Company	Cost Allocation and Rate Design
53.	2007	Ky. PSC	2007-00143	Kentucky American Water Company	Cost Allocation and Rate Design
54.	2007	Mo. PSC	WR-2007-0216	Missouri American Water Company	Cost Allocation and Rate Design

PAUL R. HERBERT – LIST OF CASES TESTIFIED

<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client/Utility</u>	<u>Subject</u>	
55.	2007	Oh. PUC	07-1112-WS-IR	Ohio American Water Company	Cost Allocation and Rate Design
56.	2007	Il. CC	07-0507	Illinois American Water Company	Customer Class Demand Study
57.	2007	Pa. PUC	R-00072711	Aqua Pennsylvania, Inc.	Cost Allocation and Rate Design
58.	2007	NJ BPU	WR07110866	The Atlantic City Sewerage Company	Cost Allocation and Rate Design
59.	2007	Pa. PUC	R-00072492	City of Bethlehem – Bureau of Water	Revenue Reqmts, Cost Alloc.
60.	2007	WV PSC	07-0541-W-MA	Clarksburg Water Board	Cost Allocation and Rate Design
61.	2007	WV PSC	07-0998-W-42T	West Virginia American Water Company	Cost Allocation and Rate Design
62.	2008	NJ BPU	WR08010020	New Jersey American Water Company	Cost Allocation and Rate Design
63.	2008	Va St CC	PUE-2008-0009	Virginia American Water Company	Cost Allocation and Rate Design
64.	2008	Tn.Reg.Auth.	08-00039	Tennessee American Water Company	Cost Allocation and Rate Design
65.	2008	Mo PSC	WR-2008-0311	Missouri American Water Company	Cost Allocation and Rate Design
66.	2008	De PSC	08-96	Artesian Water Company, Inc.	Cost Allocation and Rate Design
67.	2008	Pa PUC	R-2008-2032689	Penna. American Water Co. – Coatesville Wastewater	Cost Allocation and Rate Design
68.	2008	AZ CC.	W-01303A-08-0227 SW-01303A-08-0227	Arizona American Water Co. - Water - Wastewater	Cost Allocation and Rate Design
69.	2008	Pa PUC	R-2008-2023067	The York Water Company	Cost Allocation and Rate Design
70.	2008	WV PSC	08-0900-W-42T	West Virginia American Water Company	Cost Allocation and Rate Design
71.	2008	Ky PSC	2008-00250	Frankfort Electric and Water Plant Board	Cost Allocation and Rate Design
72.	2008	Ky PSC	2008-00427	Kentucky American Water Company	Cost Allocation and Rate Design
73.	2009	Pa PUC	2008-2079660	UGI – Penn Natural Gas	Cost of Service Allocation
74.	2009	Pa PUC	2008-2079675	UGI – Central Penn Gas	Cost of Service Allocation
75.	2009	Pa PUC	2009-2097323	Pennsylvania American Water Co.	Cost Allocation and Rate Design
76.	2009	Ia St Util Bd	RPU-09-	Iowa-American Water Company	Cost Allocation and Rate Design
77.	2009	Il CC	09-0319	Illinois-American Water Company	Cost Allocation and Rate Design
78.	2009	Oh PUC	09-391-WS-AIR	Ohio-American Water Company	Cost Allocation and Rate Design
79.	2009	Pa PUC	R-2009-2132019	Aqua Pennsylvania, Inc.	Cost Allocation and Rate Design
80.	2009	Va St CC	PUE-2009-0059	Aqua Virginia, Inc.	Cost Allocation (only)
81.	2009	Mo PSC	WR-2010-0131	Missouri American Water Company	Cost Allocation and Rate Design
82.	2010	VaSt CorpCom	PUE-2010-00001	Virginia American Water Company	Cost Allocation and Rate Design
83.	2010	Ky PSC	2010-00036	Kentucky American Water Company	Cost Allocation and Rate Design
84.	2010	NJ BPU	WR10040260	New Jersey American Water Company	Cost Allocation and Rate Design
85.	2010	Pa PUC	2010-2167797	T.W. Phillips Gas and Oil Co.	Cost Allocation and Rate Design
86.	2010	Pa PUC	2010-2166212	Pennsylvania American Water Co. - Wastewater	Cost Allocation and Rate Design
87.	2010	Pa PUC	R-2010-2157140	The York Water Company	Cost Allocation and Rate Design
88.	2010	Ky PSC	2010-00094	Northern Kentucky Water District	Cost Allocation and Rate Design
89.	2010	WV PSC	10-0920-W-42T	West Virginia American Water Co.	Cost Allocation and Rate Design
90.	2010	Tn Reg Auth	10-00189	Tennessee American Water Company	Cost Allocation and Rate Design
91.	2010	Ct PU RgAth	10-09-08	United Water Connecticut	Cost Allocation and Rate Design
92.	2010	Pa PUC	R-2010-2179103	City of Lancaster-Bureau of Water	Rev Rqmts, Cst Alloc/Rate Design
93.	2011	Pa PUC	R-2010-2214415	UGI Central Penn Gas, Inc.	Cost Allocation
94.	2011	Pa PUC	R-2011-2232359	The Newtown Artesian Water Co.	Revenue Requirement
95.	2011	Pa PUC	R-2011-2232243	Pennsylvania-American Water Co.	Cost Allocation and Rate Design
96.	2011	Pa PUC	R-2011-2232985	United Water Pennsylvania Inc.	Demand Study, COS/Rate Design
97.	2011	Pa PUC	R-2011-2244756	City of Bethlehem-Bureau of Water	Rev. Rqmts/COS/Rate Design
98.	2011	Mo PSC	WR-2011-0337-338	Missouri American Water Company	Cost Allocation and Rate Design
99.	2011	Oh PUC	11-4161-WS-AIR	Ohio American Water Company	Cost Allocation and Rate Design
100.	2011	NJ BPU	WR11070460	New Jersey American Water Company	Cost Allocation and Rate Design
101.	2011	Id PUC	UWI-W-11-02	United Water Idaho Inc.	Cost Allocation and Rate Design
102.	2011	Il CC	11-0767	Illinois-American Water Company	Cost Allocation and Rate Design
103.	2011	Pa PUC	R-2011-2267958	Aqua Pennsylvania, Inc.	Cost Allocation and Rate Design
104.	2011	VaStCom	2011-00099	Aqua Virginia, Inc.	Cost Allocation
105.	2011	VaStCom	2011-00127	Virginia American Water Company	Cost Allocation and Rate Design
106.	2012	TnRegAuth	12-00049	Tennessee American Water Company	Cost Allocation and Rate Design
107.	2012	Ky PSC	2012-00072	Northern Kentucky Water District	Cost Allocation and Rate Design
108.	2012	Pa PUC	R-2012-2310366	Lancaster, City of – Sewer Fund	Cost Allocation and Rate Design
109.	2012	Ky PSC	2012-00520	Kentucky American Water Co.	Cost Allocation and Rate Design
110.	2013	WV PSC	12-1649-W-42T	West Virginia American Water Co.	Cost Allocation and Rate Design
111.	2013	Ia St Util Bd	RPU-2013-000_	Iowa American Water Company	Cost Allocation and Rate Design
112.	2013	Pa PUC	R-2013-2355276	Pennsylvania American Water Co.	Cost Allocation and Rate Design

PAUL R. HERBERT – LIST OF CASES TESTIFIED

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client/Utility</u>	<u>Subject</u>
113.	2013	Pa PUC	R-2012-2336379	The York Water Company	Cost Allocation and Rate Design
114.	2013	Pa PUC	R-2013-2350509	City of DuBois – Bureau of Water	Cost Allocation and Rate Design
115.	2013	Pa PUC	R-2013-2390244	City of Bethlehem – Bureau of Water	Cost Allocation and Rate Design
116.	2014	Pa PUC	R-2014-2418872	City of Lancaster – Bureau of Water	Cost Allocation and Rate Design
117.	2014	Pa PUC	R-2014-2428304	Borough of Hanover	Cost Allocation and Rate Design
118.	2014	VASCom	2014-00045	Aqua Virginia, Inc.	Cost Allocation
119.	2015	NJ BPU	WR15010035	New Jersey American Water Company	Cost Allocation and Rate Design
120.	2015	Pa PUC	R-2015-2462723	United Water PA	Cost Allocation and Rate Design
121.	2015	WV PSC	15-0676-W-42T	West Virginia American Water Company	Cost Allocation and Rate Design
122.	2015	Id PUC	UWI-W-15-01	United Water Idaho Inc.	Pro Forma Revenues
123.	2015	Mo PSC	WR-2015-0301	Missouri American Water Company	Cost Allocation and Rate Design
124.	2015	Va St Com	PUE-2015-00097	Virginia American Water Company	Cost Allocation and Rate Design
125.	2015	Hi PSC	2015-0350	HOH Utilities, Inc.	Cost Allocation and Rate Design
126.	2016	Ky PSC	2015-00418	Kentucky American Water Company	Cost Allocation and Rate Design
127.	2016	Pa PUC	R-2015-2518438	UGI Utilities, Inc. - Gas Division	Cost Allocation
128.	2016	Il CC	16-0093	Illinois American Water Company	Cost Alloc/Rate Dsgn/Demand Sty
129.	2016	NY PSC	16-W-0130	SUEZ Water New York Inc.	Cost Allocation and Rate Design
130.	2016	Oh PUC	16-0907-WW-AIR	Aqua Ohio, Inc.	Cost Allocation and Rate Design
131.	2016	Ia St Util Bd	RPU-2016-0002	Iowa American Water Company	Cost Allocation and Rate Design
132.	2016	NJ BPU	WR16100957	Atlantic City Sewerage Company	Cost Allocation and Rate Design
133.	2017	Pa PUC	R-2016-2580030	UGI Penn Natural Gas, Inc.	Cost Allocation and Rate Design
134.	2017	Pa PUC	R-2017-2595853	Pennsylvania American Water Co.	Cost Allocation and Rate Design
135.	2017	IL CC	17-0259	Aqua Illinois, Inc.	Cost Allocation and Rate Design
136.	2017	NY PSC	17-W-0528	SUEZ Water Owego-Nichols, Inc.	Cost Allocation and Rate Design
137.	2017	NJ BPU	WR17090985	New Jersey American Water Company	Cost Allocation and Rate Design
138.	2017	Ca PUC	A.18-01-004	San Jose Water Company	Rate Design
139.	2018	PaPUC	R-2018-3000834	SUEZ Water Pennsylvania Inc.	Cost Allocation and Rate Design
140.	2018	PaPUC	R-2018-3000019	The York Water Company	Cost Allocation and Rate Design
141.	2018	NJ BPU	WR18050593	SUEZ Water New Jersey, Inc.	Cost Allocation and Rate Design

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DIRECT TESTIMONY OF
JOHN J. SPANOS
ON BEHALF OF
AQUA PENNSYLVANIA, INC.

DEPRECIATION

DOCKET NO. R-2018-3003068

August 17, 2018

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: AQUA PENNSYLVANIA, INC.

DIRECT TESTIMONY OF JOHN J. SPANOS

1 **Q. Please state your name and address.**

2 A. My name is John J. Spanos. My business address is 207 Senate Avenue,
3 Camp Hill, Pennsylvania 17011.

4 **Q. With what firm are you associated?**

5 A. Yes, I am associated with the firm of Gannett Fleming Valuation and Rate
6 Consultants, LLC ("Gannett Fleming").

7 **Q. How long have you been associated with Gannett Fleming?**

8 A. I have been associated with the firm since college graduation in June, 1986.

9 **Q. What is your position in the firm?**

10 A. I am Senior Vice President.

11 **Q. What is your educational background?**

12 A. I have Bachelor of Science degrees in Industrial Management and
13 Mathematics from Carnegie-Mellon University and a Master of Business
14 Administration from York College of Pennsylvania.

15 **Q. Are you a member of any professional societies?**

16 A. Yes. I am a member and past President of the Society of Depreciation
17 Professionals. I am also a member of the American Gas
18 Association/Edison Electric Institute Industry Accounting Committee.

19 **Q. Do you hold any special certification as a depreciation expert?**

1 A. Yes. The Society of Depreciation Professionals has established national
2 standards for depreciation professionals. The Society administers an
3 examination to become certified in this field. I passed the certification exam
4 in September 1997 and was recertified in August 2003, February 2008,
5 January 2013 and February 2018.

6 **Q. What is the extent of your formal instruction with respect to utility
7 plant depreciation?**

8 A. I have completed the “Techniques of Life Analysis”, “Techniques of Salvage
9 and Depreciation Analysis”, “Forecasting Life and Salvage”, “Modeling and
10 Life Analysis Using Simulation” and “Managing a Depreciation Study”
11 programs conducted by Depreciation Programs, Inc. Also, I have
12 completed the “Introduction to Public Utility Accounting” program conducted
13 by the American Gas Association.

14 **Q. Please outline your experience in the field of depreciation.**

15 A. I have over 32 years of depreciation experience which includes giving
16 expert testimony in over 290 cases before 40 regulatory commissions,
17 including this Commission. Please refer to Appendix A for my qualifications.
18 In addition to the cases that I have submitted testimony, I have supervised
19 in over 600 other depreciation or valuation projects.

20 **Q. What is the purpose of your testimony?**

21 A. I was asked by Aqua Pennsylvania, Inc. to prepare depreciation studies with
22 regards to plant in service as of March 31, 2018 and, as claimed by the
23 Company, as of March 31, 2019 and March 31, 2020 for water assets and
24 for the wastewater assets.

25 **Q. Have you prepared exhibits presenting the results of your studies?**

1 A. Yes. Exhibit Nos. 6-A, Part I and 6-B, Part I present the results of each
2 depreciation study as of March 31, 2018. Exhibit Nos. 6-A, Part II and 6-B,
3 Part II present the results of each depreciation study as of March 31, 2019.
4 Exhibit Nos. 6-A, Part III and 6-B, Part III present the results of each
5 depreciation study as of March 31, 2020. In addition, I am responsible for
6 the responses to Depreciation Data Filing Requirements FR VI.1, FR VI.2,
7 FR VI.3, FR VI.4, FR VI.5 and FR VI.6 that are presented as Appendix B to
8 this testimony.

9 **Q. Please describe Exhibit Nos. 6-A and 6-B.**

10 A. Exhibit No. 6-A, Part I titled "2018 Depreciation Study - Calculated Annual
11 Depreciation Accruals Related to Water Plant as of March 31, 2018,"
12 includes the results of the depreciation study related to the water assets as
13 of March 31, 2018. The report also includes the detailed depreciation
14 calculations. Exhibit No. 6-A, Part II, titled "2019 Depreciation Study -
15 Calculated Annual Depreciation Accruals Related to Water Plant as of
16 March 31, 2019" includes the results of the depreciation study related to the
17 estimated water assets as of March 31, 2019. The report also includes
18 explanatory text, statistics related to the estimation of service life, and the
19 detailed depreciation calculations. Exhibit No. 6-A, Part III titled "2020
20 Depreciation Study – Calculated Annual Depreciation Accruals Related to
21 Water Plant as of March 31, 2020", includes the results of the depreciation
22 study related to the estimated water assets as of March 31, 2020. The
23 Exhibit Nos. 6-B, Part I through 6-B, Part III are organized in the same
24 fashion for the Wastewater Assets.

1 **Q. What was the purpose of your depreciation studies?**

2 A. The purpose of the depreciation studies was to estimate the annual
3 depreciation accruals related to water and wastewater plant in service for
4 ratemaking purposes and, using Commission-approved procedures, to
5 estimate Aqua Pennsylvania, Inc.'s book reserve as of March 31, 2019 and
6 March 31, 2020.

7 **Q. Is Aqua Pennsylvania, Inc.'s claim for annual depreciation in the**
8 **current proceeding based on the same method of depreciation as was**
9 **used in its most recent water rate proceeding in Docket No. R-2011-**
10 **2267958?**

11 A. Yes, it is. For most plant accounts, the current claim for annual depreciation
12 is based on the straight line remaining life method of depreciation which has
13 been used for over twenty-five years. For Accounts 340, 341.2, 342, 343,
14 346, 347 and 348 for water assets and Accounts 390, 392, 393, 394, 396,
15 397 and 398 for wastewater assets, the claim is based on the straight line
16 remaining life method of amortization. The annual amortization is based on
17 amortization accounting, which distributes the unrecovered cost of fixed
18 capital assets over the remaining amortization period selected for each
19 account.

20 **Q. What group procedure is being used in this proceeding for depreciable**
21 **accounts?**

22 A. The same group procedures as in the last approved rate proceeding are
23 used for each study. The equal life group procedure is used in the current
24 proceeding for all depreciable accounts and installation years of water plant.

1 This is the initial rate proceeding for wastewater plant, however, the same
2 group procedure is utilized as for the water plant.

3 **Q. Is Aqua Pennsylvania, Inc.'s claim for accrued depreciation in the**
4 **current proceeding made on the same basis as has been used for over**
5 **thirty years?**

6 A. Yes. The current claim for accrued depreciation for water assets is the book
7 reserve brought forward from the book reserves approved by the
8 Commission at Dockets No. R-850174. Similarly, for wastewater assets,
9 accrued depreciation is brought forward from the previously approved level
10 at the time of acquisition.

11 **Q. How was the book reserve used in the calculation of annual deprecia-**
12 **tion?**

13 A. The book reserve by account was allocated to vintages to determine original
14 cost less accrued depreciation by vintage. The total annual accrual is the
15 sum of the results of dividing the original costs less accrued depreciation by
16 the vintage composite remaining lives.

17 **Q. How was the book reserve as of March 31, 2019 and March 31, 2020**
18 **estimated?**

19 A. The book reserve as of March 31, 2019 and March 31, 2020, by account,
20 was projected by adding estimated accruals, salvage and the amortization
21 of net salvage, and subtracting estimated retirements and cost of removal
22 from the book reserve as of March 31, 2018. Annual accruals were
23 calculated based on an average yearly or monthly plant balance. For most
24 accounts, salvage and cost of removal were estimated by (1) expressing
25 actual salvage and cost of removal as a percent of retirements by account,

1 for the most recent five-year period, and (2) applying those percents to the
2 projected retirements by account. The projected book reserve by account
3 was allocated to vintages for the purpose of the annual accrual calculation
4 based on calculated accrued depreciation as of March 31, 2019 and March
5 31, 2020.

6 **Q. Has a service life study of Aqua Pennsylvania, Inc.'s water and**
7 **wastewater utility property been performed?**

8 A. Yes. Service life studies were performed during 2015 for the water assets
9 and during 2018 for the wastewater assets. The service life studies were
10 the basis for the service lives I used to calculate annual accruals.

11 **Q. Briefly outline the procedure used in performing the service life**
12 **studies.**

13 A. The service life studies consisted of assembling and compiling historical
14 data from the records related to the water and wastewater plant of Aqua
15 Pennsylvania, Inc. and its predecessors; statistically analyzing such data to
16 obtain historical trends of survivor characteristics; obtaining supplementary
17 information from management and operating personnel concerning
18 Company practices and plans as they relate to plant operations; and
19 interpreting the above data to form judgments of service life characteristics.
20 Iowa type survivor curves were used to describe the estimated survivor
21 characteristics of the mass property groups. Individual service lives were
22 used for major individual units of plant, such as reservoirs and buildings
23 housing treatment plants, pump stations, offices and shops. The life span
24 concept was recognized by coordinating the lives of associated plant

1 installed in subsequent years with the probable retirement date defined by
2 the life estimated for the major unit.

3 **Q. What statistical data were employed in the historical analyses**
4 **performed for the purpose of estimating service life characteristics?**

5 A. The data consisted of the entries made to record retirements and other
6 transactions related to the water plant during the period 1954-2014 and the
7 wastewater plant during the period 2010-2017. These entries were
8 classified by depreciable group, type of transaction, the year in which the
9 transaction took place, and the year in which the plant was installed. Types
10 of transactions included in the data were plant additions, retirements,
11 transfers, and balances.

12 **Q. What was the source of these data?**

13 A. They were assembled from Company records related to its utility plant in
14 service.

15 **Q. Were the methods used in the service life study the same as those**
16 **used in other depreciation studies for water and wastewater plant**
17 **presented before this Commission?**

18 A. Yes. The methods are the same ones that have been presented previously
19 for Aqua Pennsylvania, Inc. and for other water and wastewater companies
20 before the Pennsylvania Public Utility Commission and that have been
21 accepted by the Commission in its past orders concerning water and
22 wastewater utilities.

23 **Q. Are the factors considered in your estimates of service life presented**
24 **in Exhibit Nos. 6-A, Part II and 6-B, Part II?**

1 A. Yes. A discussion of the factors considered in the estimation of service
2 lives is presented in Part III, Service Life Considerations, of 6-A, Part II and
3 in Part III, Service Life Considerations, of Exhibit No. 6-B, Part II.

4 **Q. Please outline the contents of Exhibit Nos. 6-A, Part II and 6-B, Part II.**

5 A. Exhibit No. 6-A, Part II is presented in eight parts. Part I, Introduction,
6 contains statements with respect to the plan of the report, and the basis of
7 the study. Part II, Estimation of Survivor Curves, presents descriptions of
8 the considerations and the methods used in the service life studies. Part III,
9 Service Life Considerations, presents the factors and judgment utilized in
10 the average service life analysis. Part IV, Calculation of Annual and
11 Accrued Depreciation, describes the procedures used in the calculation of
12 group depreciation. Part V, Results of Study, presents a summary by
13 depreciable group of annual depreciation accrual rates and amounts. Part
14 VI, Service Life Statistics, presents the statistical analysis of service life
15 estimates. Part VII, Detailed Depreciation Calculations, presents the
16 detailed tabulations of annual depreciation. Part VIII, Experienced and
17 Estimated Net Salvage, presents the cost of removal and gross salvage
18 recorded for the period 2014-2018.

19 Table 1, pages V-4 through V-7, presents the estimated survivor curve,
20 the original cost as of March 31, 2019, and the book reserve and calculated
21 annual depreciation for each account or subaccount of Water Plant. Table
22 2, pages V-8 and V-9, presents the bringforward to March 31, 2019, of the
23 book depreciation reserve as of March 31, 2018. Table 3 on page V-10 sets
24 forth the calculation of the annual accruals used in the bringforward. Table

1 4, page V-11, presents the experienced and estimated net salvage during
2 the five-year period, 2014 through 2018.

3 The section beginning on page VI-2 presents the results of the
4 retirement rate analyses prepared as the historical bases for the service life
5 estimates. The section beginning on page VII-2 presents the depreciation
6 calculations related to original cost. The tabulation on pages VII-3 through
7 VII-6 presents the cumulative depreciated original cost by year installed.
8 The tabulations on pages VII-8 through VII-176 present the calculation of
9 annual depreciation by vintage by account for each depreciable group of
10 water plant. The tabulation on pages VIII-2 through VIII-4 presents the
11 retirements, salvage, and cost of removal by account for each year during
12 the period 2014 through 2018. Exhibit No. 6-B, Part II is presented in the
13 same fashion for wastewater plant.

14 **Q. Please outline the contents in Exhibit Nos. 6-A, Part III and 6-B, Part III.**

15 A. Exhibit No. 6-A, Part III includes a description of the results, summaries of
16 the depreciation calculations, and the detailed depreciation calculations as
17 of March 31, 2020. The descriptions and explanations presented in Exhibit
18 No. 6-A, Part II are also applicable to the depreciation calculations
19 presented in Exhibit No. 6-A, Part III. The graphs and tables related to
20 service lives presented in Exhibit No. 6-A, Part II also support the service
21 life estimates used in Exhibit No. 6-A, Part III inasmuch as the estimates are
22 the same for both test years. The summary tables and detailed depreciation
23 calculations as of March 31, 2020, are organized and presented in the same

1 manner as those as of March 31, 2019. Exhibit No 6-B, Part III is presented
2 in the same fashion for wastewater plant.

3 **Q. Please outline the contents of Exhibit Nos. 6-A, Part I and 6-B, Part I.**

4 A. Exhibit No. 6-A, Part I includes a description of the results, summaries of the
5 depreciation calculations, and the detailed depreciation calculations as of
6 March 31, 2018. The descriptions and explanations presented in Exhibit
7 No. 6-A, Part II are also applicable to the depreciation calculations
8 presented in Exhibit No. 6-A, Part I. The graphs and tables related to
9 service lives presented in Exhibit No. 6-A, Part II also support the service
10 life estimates used in Exhibit No. 6-A, Part I, inasmuch as the estimates are
11 the same for both test years. The summary tables and detailed depreciation
12 calculations as of March 31, 2018, are organized and presented in the same
13 manner as those as of March 31, 2019. Exhibit No. 6-B, Part I is presented
14 in the same fashion for wastewater plant.

15 **Q. Please use an example to illustrate the manner in which the study is
16 presented in Exhibit Nos. 6-A, Part I through 6-B, Part III.**

17 A. I will use Account 331.03, Mains and Accessories – 12 Inch and Over, as
18 my example, inasmuch as it is one of the largest depreciable group of water
19 assets and represents approximately 12 percent of the original cost of
20 depreciable water utility plant as of March 31, 2019.

21 The retirement rate method was used to analyze the survivor
22 characteristics of this group. The life tables for the 1954-2014 and 1985-
23 2014 experience bands are presented on pages VI-105 through VI-112 of
24 Exhibit No. 6-A, Part II. The life tables, or original survivor curves, are

1 plotted along with the estimated smooth survivor curve, the 110-R3, on
2 page VI-104.

3 The calculation of the annual depreciation related to the original cost of
4 water plant as of March 31, 2018 is presented on pages II-97 through II-100
5 of Exhibit No. 6-A, Part I. The calculation is based on the 110-R3 survivor
6 curve, the attained age, and the allocated book reserve. The calculation as
7 of March 31, 2019 is presented on pages VII-99 through VII-101 of Exhibit
8 No.6-A, Part II and is based in part on the bringforward of the book reserve.
9 The calculation as of March 31, 2020 is presented on pages II-99 through II-
10 101 of Exhibit No. 6-A, Part III and is based in part on the bringforward of
11 the book reserve. The tabulations in Exhibits 6-A, Part I through III set forth
12 the installation year, the original cost, calculated accrued depreciation,
13 allocated book reserve, future accruals, remaining life and annual accrual.
14 The totals are brought forward to Table 1 on page I-4 in Exhibit No. 6-A,
15 Part I on page V-5 in Exhibit No. 6-A, Part II, and page I-4 in Exhibit No. 6-
16 A, Part III. The same process is conducted for the wastewater plant.

17 **Q. In what manner is net salvage incorporated in the depreciation**
18 **calculations?**

19 A. As stated on page IV-6 of Exhibit No. 6-A, Part II, no adjustment for net
20 salvage was made to the calculated annual depreciation amounts. The total
21 calculated annual depreciation set forth on page I-6 of Exhibit No. 6-A, Part
22 I, on page V-7 of Exhibit No. 6-A, Part II and on page I-6 of Exhibit No. 6-A,
23 Part III reflects an addition for the amortization of negative net salvage in
24 accordance with the practice of this Commission. The amortization is based

1 on experience during the period 2013 through 2017 for the calculation as of
2 March 31, 2018, on experience during the period 2014 through December
3 31, 2017, plus estimates for the year 2018 for the calculation as of March
4 31, 2019, and on experience during the period 2015 through December 31,
5 2017, plus estimates for the years 2018 and 2019 for the calculation as of
6 March 31, 2020. The detail by plant account of regular retirements,
7 salvage, and cost of removal for each year is presented on pages III-2
8 through III-5 of Exhibit No. 6-A, Part I and on pages VIII-2 through VIII-4 of
9 Exhibit No. 6-A, Part II and on pages III-2 through III-4 of Exhibit No. 6-A,
10 Part III. The totals are brought forward to Table 2 on page I-7 of Exhibit No.
11 6-A, Part I, to Table 4 on page V-11 of Exhibit No. 6-A, Part II and to Table 4
12 on page I-10 of Exhibit No. 6-A, Part III in which the amounts of the five-year
13 amortizations are calculated. The same calculations are presented in the
14 wastewater studies.

15 **Q. Does this complete your testimony at this time?**

16 A. Yes, it does.

Appendix A

JOHN SPANOS

DEPRECIATION EXPERIENCE

Q. Please state your name.

A. My name is John J. Spanos.

Q. What is your educational background?

A. I have Bachelor of Science degrees in Industrial Management and Mathematics from Carnegie-Mellon University and a Master of Business Administration from York College.

Q. Do you belong to any professional societies?

A. Yes. I am a member and past President of the Society of Depreciation Professionals and a member of the American Gas Association/Edison Electric Institute Industry Accounting Committee.

Q. Do you hold any special certification as a depreciation expert?

A. Yes. The Society of Depreciation Professionals has established national standards for depreciation professionals. The Society administers an examination to become certified in this field. I passed the certification exam in September 1997 and was recertified in August 2003, February 2008 and January 2013.

Q. Please outline your experience in the field of depreciation.

A. In June, 1986, I was employed by Gannett Fleming Valuation and Rate Consultants, Inc. as a Depreciation Analyst. During the period from June, 1986 through December, 1995, I helped prepare numerous depreciation and original cost studies for utility companies in various industries. I helped perform depreciation studies for the following telephone companies: United Telephone of Pennsylvania, United Telephone of New Jersey, and Anchorage Telephone Utility. I helped perform depreciation studies for the following

companies in the railroad industry: Union Pacific Railroad, Burlington Northern Railroad, and Wisconsin Central Transportation Corporation.

I helped perform depreciation studies for the following organizations in the electric utility industry: Chugach Electric Association, The Cincinnati Gas and Electric Company (CG&E), The Union Light, Heat and Power Company (ULH&P), Northwest Territories Power Corporation, and the City of Calgary - Electric System.

I helped perform depreciation studies for the following pipeline companies: TransCanada Pipelines Limited, Trans Mountain Pipe Line Company Ltd., Interprovincial Pipe Line Inc., Nova Gas Transmission Limited and Lakehead Pipeline Company.

I helped perform depreciation studies for the following gas utility companies: Columbia Gas of Pennsylvania, Columbia Gas of Maryland, The Peoples Natural Gas Company, T. W. Phillips Gas & Oil Company, CG&E, ULH&P, Lawrenceburg Gas Company and Penn Fuel Gas, Inc.

I helped perform depreciation studies for the following water utility companies: Indiana-American Water Company, Consumers Pennsylvania Water Company and The York Water Company; and depreciation and original cost studies for Philadelphia Suburban Water Company and Pennsylvania-American Water Company.

In each of the above studies, I assembled and analyzed historical and simulated data, performed field reviews, developed preliminary estimates of service life and net salvage, calculated annual depreciation, and prepared reports for submission to state public utility commissions or federal regulatory agencies. I performed these studies under the general direction of William M. Stout, P.E.

In January, 1996, I was assigned to the position of Supervisor of Depreciation Studies. In July, 1999, I was promoted to the position of Manager, Depreciation and Valuation Studies. In December, 2000, I was promoted to the position as Vice-President of Gannett Fleming Valuation and Rate Consultants, Inc. and in April 2012, I was promoted to my present position as Senior Vice President of the Valuation and Rate Division of Gannett Fleming Inc. (now doing business as Gannett Fleming Valuation and Rate Consultants, LLC). In my current position I am responsible for conducting all depreciation, valuation and original cost studies, including the preparation of final exhibits and responses to data requests for submission to the appropriate regulatory bodies.

Since January 1996, I have conducted depreciation studies similar to those previously listed including assignments for Pennsylvania-American Water Company; Aqua Pennsylvania; Kentucky-American Water Company; Virginia-American Water Company; Indiana-American Water Company; Iowa-American Water Company; New Jersey-American Water Company; Hampton Water Works Company; Omaha Public Power District; Enbridge Pipe Line Company; Inc.; Columbia Gas of Virginia, Inc.; Virginia Natural Gas Company National Fuel Gas Distribution Corporation - New York and Pennsylvania Divisions; The City of Bethlehem - Bureau of Water; The City of Coatesville Authority; The City of Lancaster - Bureau of Water; Peoples Energy Corporation; The York Water Company; Public Service Company of Colorado; Enbridge Pipelines; Enbridge Gas Distribution, Inc.; Reliant Energy-HLP; Massachusetts-American Water Company; St. Louis County Water Company; Missouri-American Water Company; Chugach Electric Association; Alliant Energy; Oklahoma Gas & Electric Company; Nevada Power Company; Dominion Virginia Power; NUI-Virginia Gas

Companies; Pacific Gas & Electric Company; PSI Energy; NUI - Elizabethtown Gas Company; Cinergy Corporation – CG&E; Cinergy Corporation – ULH&P; Columbia Gas of Kentucky; South Carolina Electric & Gas Company; Idaho Power Company; El Paso Electric Company; Aqua North Carolina; Aqua Ohio; Aqua Texas, Inc.; Ameren Missouri; Central Hudson Gas & Electric; Centennial Pipeline Company; CenterPoint Energy-Arkansas; CenterPoint Energy – Oklahoma; CenterPoint Energy – Entex; CenterPoint Energy - Louisiana; NSTAR – Boston Edison Company; Westar Energy, Inc.; United Water Pennsylvania; PPL Electric Utilities; PPL Gas Utilities; Wisconsin Power & Light Company; TransAlaska Pipeline; Avista Corporation; Northwest Natural Gas; Allegheny Energy Supply, Inc.; Public Service Company of North Carolina; South Jersey Gas Company; Duquesne Light Company; MidAmerican Energy Company; Laclede Gas; Duke Energy Company; E.ON U.S. Services Inc.; Elkton Gas Services; Anchorage Water and Wastewater Utility; Kansas City Power and Light; Duke Energy North Carolina; Duke Energy South Carolina; Monongahela Power Company; Potomac Edison Company; Duke Energy Ohio Gas; Duke Energy Kentucky; Duke Energy Indiana; Duke Energy Progress; Northern Indiana Public Service Company; Tennessee-American Water Company; Columbia Gas of Maryland; Bonneville Power Administration; NSTAR Electric and Gas Company; EPCOR Distribution, Inc.; B. C. Gas Utility, Ltd; Entergy Arkansas; Entergy Texas; Entergy Mississippi; Entergy Louisiana; Entergy Gulf States Louisiana; the Borough of Hanover; Louisville Gas and Electric Company; Kentucky Utilities Company; Madison Gas and Electric; Central Maine Power; PEPCO; PacifiCorp; Minnesota Energy Resource Group; Jersey Central Power & Light Company; Cheyenne Light, Fuel and Power Company; United Water Arkansas; Central Vermont Public Service Corporation; Green Mountain Power; Portland

General Electric Company; Atlantic City Electric; Nicor Gas Company; Black Hills Power; Black Hills Colorado Gas; Black Hills Kansas Gas; Black Hills Service Company; Black Hills Utility Holdings; Public Service Company of Oklahoma; City of Dubois; Peoples Gas Light and Coke Company; North Shore Gas Company; Connecticut Light and Power; New York State Electric and Gas Corporation; Rochester Gas and Electric Corporation; Greater Missouri Operations; Tennessee Valley Authority; Omaha Public Power District; Indianapolis Power & Light Company; Vermont Gas Systems, Inc.; Metropolitan Edison; Pennsylvania Electric; West Penn Power; Pennsylvania Power; PHI Service Company - Delmarva Power and Light; Atmos Energy Corporation; Citizens Energy Group; PSE&G Company; Berkshire Gas Company; Alabama Gas Corporation; Mid-Atlantic Interstate Transmission, LLC; SUEZ Water; WEC Energy Group; Rocky Mountain Natural Gas, LLC; Illinois-American Water Company and Northern Illinois Gas Company.

My additional duties include determining final life and salvage estimates, conducting field reviews, presenting recommended depreciation rates to management for its consideration and supporting such rates before regulatory bodies.

Q. Have you submitted testimony to any state utility commission on the subject of utility plant depreciation?

A. Yes. I have submitted testimony to the Pennsylvania Public Utility Commission; the Commonwealth of Kentucky Public Service Commission; the Public Utilities Commission of Ohio; the Nevada Public Utility Commission; the Public Utilities Board of New Jersey; the Missouri Public Service Commission; the Massachusetts Department of Telecommunications and Energy; the Alberta Energy & Utility Board; the Idaho Public Utility Commission; the Louisiana Public Service Commission; the State

Corporation Commission of Kansas; the Oklahoma Corporate Commission; the Public Service Commission of South Carolina; Railroad Commission of Texas – Gas Services Division; the New York Public Service Commission; Illinois Commerce Commission; the Indiana Utility Regulatory Commission; the California Public Utilities Commission; the Federal Energy Regulatory Commission (“FERC”); the Arkansas Public Service Commission; the Public Utility Commission of Texas; Maryland Public Service Commission; Washington Utilities and Transportation Commission; The Tennessee Regulatory Commission; the Regulatory Commission of Alaska; Minnesota Public Utility Commission; Utah Public Service Commission; District of Columbia Public Service Commission; the Mississippi Public Service Commission; Delaware Public Service Commission; Virginia State Corporation Commission; Colorado Public Utility Commission; Oregon Public Utility Commission; South Dakota Public Utilities Commission; Wisconsin Public Service Commission; Wyoming Public Service Commission; Maine Public Utility Commission; Iowa Utility Board; Connecticut Public Utilities Regulatory Authority; New Mexico Public Regulation Commission; Commonwealth of Massachusetts Department of Public Utilities; Rhode Island Public Utilities Commission and the North Carolina Utilities Commission.

Q. Have you had any additional education relating to utility plant depreciation?

A. Yes. I have completed the following courses conducted by Depreciation Programs, Inc.: “Techniques of Life Analysis,” “Techniques of Salvage and Depreciation Analysis,” “Forecasting Life and Salvage,” “Modeling and Life Analysis Using Simulation,” and “Managing a Depreciation Study.” I have also completed the “Introduction to Public Utility Accounting” program conducted by the American Gas Association.

Q. Does this conclude your qualification statement?

A. Yes.

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
01.	1998	PA PUC	R-00984375	City of Bethlehem – Bureau of Water	Original Cost and Depreciation
02.	1998	PA PUC	R-00984567	City of Lancaster	Original Cost and Depreciation
03.	1999	PA PUC	R-00994605	The York Water Company	Depreciation
04.	2000	D.T.&E.	DTE 00-105	Massachusetts-American Water Company	Depreciation
05.	2001	PA PUC	R-00016114	City of Lancaster	Original Cost and Depreciation
06.	2001	PA PUC	R-00017236	The York Water Company	Depreciation
07.	2001	PA PUC	R-00016339	Pennsylvania-American Water Company	Depreciation
08.	2001	OH PUC	01-1228-GA-AIR	Cinergy Corp – Cincinnati Gas & Elect Co.	Depreciation
09.	2001	KY PSC	2001-092	Cinergy Corp – Union Light, Heat & Power Co.	Depreciation
10.	2002	PA PUC	R-00016750	Philadelphia Suburban Water Company	Depreciation
11.	2002	KY PSC	2002-00145	Columbia Gas of Kentucky	Depreciation
12.	2002	NJ BPU	GF02040245	NUI Corporation/Elizabethtown Gas Co.	Depreciation
13.	2002	ID PUC	IPC-E-03-7	Idaho Power Company	Depreciation
14.	2003	PA PUC	R-0027975	The York Water Company	Depreciation
15.	2003	IN URC	R-0027975	Cinergy Corp – PSI Energy, Inc.	Depreciation
16.	2003	PA PUC	R-00038304	Pennsylvania-American Water Co.	Depreciation
17.	2003	MO PSC	WR-2003-0500	Missouri-American Water Co.	Depreciation
18.	2003	FERC	ER-03-1274-000	NSTAR-Boston Edison Company	Depreciation
19.	2003	NJ BPU	BPU 03080683	South Jersey Gas Company	Depreciation
20.	2003	NV PUC	03-10001	Nevada Power Company	Depreciation
21.	2003	LA PSC	U-27676	CenterPoint Energy – Arkla	Depreciation
22.	2003	PA PUC	R-00038805	Pennsylvania Suburban Water Company	Depreciation
23.	2004	AB En/Util Bd	1306821	EPCOR Distribution, Inc.	Depreciation
24.	2004	PA PUC	R-00038168	National Fuel Gas Distribution Corp (PA)	Depreciation
25.	2004	PA PUC	R-00049255	PPL Electric Utilities	Depreciation
26.	2004	PA PUC	R-00049165	The York Water Company	Depreciation
27.	2004	OK Corp Cm	PUC 200400187	CenterPoint Energy – Arkla	Depreciation
28.	2004	OH PUC	04-680-EI-AIR	Cinergy Corp. – Cincinnati Gas and Electric Company	Depreciation
29.	2004	RR Com of TX	GUD#	CenterPoint Energy – Entex Gas Services Div.	Depreciation
30.	2004	NY PUC	04-G-1047	National Fuel Gas Distribution Gas (NY)	Depreciation
31.	2004	AR PSC	04-121-U	CenterPoint Energy – Arkla	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
32.	2005	IL CC	05-	North Shore Gas Company	Depreciation
33.	2005	IL CC	05-	Peoples Gas Light and Coke Company	Depreciation
34.	2005	KY PSC	2005-00042	Union Light Heat & Power	Depreciation
35.	2005	IL CC	05-0308	MidAmerican Energy Company	Depreciation
36.	2005	MO PSC	GF-2005	Laclede Gas Company	Depreciation
37.	2005	KS CC	05-WSEE-981-RTS	Westar Energy	Depreciation
38.	2005	RR Com of TX	GUD #	CenterPoint Energy – Entex Gas Services Div.	Depreciation
39.	2005	FERC		Cinergy Corporation	Accounting
40.	2005	OK CC	PUD 200500151	Oklahoma Gas and Electric Co.	Depreciation
41.	2005	MA Dept Tele- com & Ergy	DTE 05-85	NSTAR	Depreciation
42.	2005	NY PUC	05-E-934/05-G-0935	Central Hudson Gas & Electric Co.	Depreciation
43.	2005	AK Reg Com	U-04-102	Chugach Electric Association	Depreciation
44.	2005	CA PUC	A05-12-002	Pacific Gas & Electric	Depreciation
45.	2006	PA PUC	R-00051030	Aqua Pennsylvania, Inc.	Depreciation
46.	2006	PA PUC	R-00051178	T.W. Phillips Gas and Oil Co.	Depreciation
47.	2006	NC Util Cm.		Pub. Service Co. of North Carolina	Depreciation
48.	2006	PA PUC	R-00051167	City of Lancaster	Depreciation
49.	2006	PA PUC	R00061346	Duquesne Light Company	Depreciation
50.	2006	PA PUC	R-00061322	The York Water Company	Depreciation
51.	2006	PA PUC	R-00051298	PPL GAS Utilities	Depreciation
52.	2006	PUC of TX	32093	CenterPoint Energy – Houston Electric	Depreciation
53.	2006	KY PSC	2006-00172	Duke Energy Kentucky	Depreciation
54.	2006	SC PSC		SCANA	
55.	2006	AK Reg Com	U-06-6	Municipal Light and Power	Depreciation
56.	2006	DE PSC	06-284	Delmarva Power and Light	Depreciation
57.	2006	IN URC	IURC43081	Indiana American Water Company	Depreciation
58.	2006	AK Reg Com	U-06-134	Chugach Electric Association	Depreciation
59.	2006	MO PSC	WR-2007-0216	Missouri American Water Company	Depreciation
60.	2006	FERC	ISO82, ETC. AL	TransAlaska Pipeline	Depreciation
61.	2006	PA PUC	R-00061493	National Fuel Gas Distribution Corp. (PA)	Depreciation
62.	2007	NC Util Com.	E-7 SUB 828	Duke Energy Carolinas, LLC	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
63.	2007	OH PSC	08-709-EL-AIR	Duke Energy Ohio Gas	Depreciation
64.	2007	PA PUC	R-00072155	PPL Electric Utilities Corporation	Depreciation
65.	2007	KY PSC	2007-00143	Kentucky American Water Company	Depreciation
66.	2007	PA PUC	R-00072229	Pennsylvania American Water Company	Depreciation
67.	2007	KY PSC	2007-0008	NiSource – Columbia Gas of Kentucky	Depreciation
68.	2007	NY PSC	07-G-0141	National Fuel Gas Distribution Corp (NY)	Depreciation
69.	2008	AK PSC	U-08-004	Anchorage Water & Wastewater Utility	Depreciation
70.	2008	TN Reg Auth	08-00039	Tennessee-American Water Company	Depreciation
71.	2008	DE PSC	08-96	Artesian Water Company	Depreciation
72.	2008	PA PUC	R-2008-2023067	The York Water Company	Depreciation
73.	2008	KS CC	08-WSEE1-RTS	Westar Energy	Depreciation
74.	2008	IN URC	43526	Northern Indiana Public Service Co.	Depreciation
75.	2008	IN URC	43501	Duke Energy Indiana	Depreciation
76.	2008	MD PSC	9159	NiSource – Columbia Gas of Maryland	Depreciation
77.	2008	KY PSC	2008-000251	Kentucky Utilities	Depreciation
78.	2008	KY PSC	2008-000252	Louisville Gas & Electric	Depreciation
79.	2008	PA PUC	2008-20322689	Pennsylvania American Water Co.-Wastewater	Depreciation
80.	2008	NY PSC	08-E887/08-00888	Central Hudson	Depreciation
81.	2008	WV TC	VE-080416/VG-8080417	Avista Corporation	Depreciation
82.	2008	IL CC	ICC-09-166	Peoples Gas, Light and Coke Co.	Depreciation
83.	2009	IL CC	ICC-09-167	North Shore Gas Company	Depreciation
84.	2009	DC PSC	1076	Potomac Electric Power Company	Depreciation
85.	2009	KY PSC	2009-00141	NiSource – Columbia Gas of Kentucky	Depreciation
86.	2009	FERC	ER08-1056-002	Entergy Services	Depreciation
87.	2009	PA PUC	R-2009-2097323	Pennsylvania American Water Co.	Depreciation
88.	2009	NC Util Cm	E-7, Sub 090	Duke Energy Carolinas, LLC	Depreciation
89.	2009	KY PSC	2009-00202	Duke Energy Kentucky	Depreciation
90.	2009	VA St. CC	PUE-2009-00059	Aqua Virginia, Inc.	Depreciation
91.	2009	PA PUC	2009-2132019	Aqua Pennsylvania, Inc.	Depreciation
92.	2009	MS PSC	09-	Entergy Mississippi	Depreciation
93.	2009	AK PSC	09-08-U	Entergy Arkansas	Depreciation
94.	2009	TX PUC	37744	Entergy Texas	Depreciation
95.	2009	TX PUC	37690	El Paso Electric Company	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
96.	2009	PA PUC	R-2009-2106908	The Borough of Hanover	Depreciation
97.	2009	KS CC	10-KCPE-415-RTS	Kansas City Power & Light	Depreciation
98.	2009	PA PUC	R-2009-	United Water Pennsylvania	Depreciation
99.	2009	OH PUC		Aqua Ohio Water Company	Depreciation
100.	2009	WI PSC	3270-DU-103	Madison Gas & Electric Co.	Depreciation
101.	2009	MO PSC	WR-2010	Missouri American Water Co.	Depreciation
102.	2009	AK Reg Cm	U-09-097	Chugach Electric Association	Depreciation
103.	2010	IN URC	43969	Northern Indiana Public Service Co.	Depreciation
104.	2010	WI PSC	6690-DU-104	Wisconsin Public Service Corp.	Depreciation
105.	2010	PA PUC	R-2010-2161694	PPL Electric Utilities Corp.	Depreciation
106.	2010	KY PSC	2010-00036	Kentucky American Water Company	Depreciation
107.	2010	PA PUC	R-2009-2149262	Columbia Gas of Pennsylvania	Depreciation
108.	2010	MO PSC	GR-2010-0171	Laclede Gas Company	Depreciation
109.	2010	SC PSC	2009-489-E	South Carolina Electric & Gas Co.	Depreciation
110.	2010	NJ BD OF PU	ER09080664	Atlantic City Electric	Depreciation
111.	2010	VA St. CC	PUE-2010-00001	Virginia American Water Company	Depreciation
112.	2010	PA PUC	R-2010-2157140	The York Water Company	Depreciation
113.	2010	MO PSC	ER-2010-0356	Greater Missouri Operations Co.	Depreciation
114.	2010	MO PSC	ER-2010-0355	Kansas City Power and Light	Depreciation
115.	2010	PA PUC	R-2010-2167797	T.W. Phillips Gas and Oil Co.	Depreciation
116.	2010	PSC SC	2009-489-E	SCANA – Electric	Depreciation
117.	2010	PA PUC	R-2010-22010702	Peoples Natural Gas, LLC	Depreciation
118.	2010	AK PSC	10-067-U	Oklahoma Gas and Electric Co.	Depreciation
119.	2010	IN URC		Northern Indiana Public Serv. Co. - NIFL	Depreciation
120.	2010	IN URC		Northern Indiana Public Serv. Co. - Kokomo	Depreciation
121.	2010	PA PUC	R-2010-2166212	Pennsylvania American Water Co - WW	Depreciation
122.	2010	NC Util Cn.	W-218,SUB310	Aqua North Carolina, Inc.	Depreciation
123.	2011	OH PUC	11-4161-WS-AIR	Ohio American Water Company	Depreciation
124.	2011	MS PSC	EC-123-0082-00	Entergy Mississippi	Depreciation
125.	2011	CO PUC	11AL-387E	Black Hills Colorado	Depreciation
126.	2011	PA PUC	R-2010-2215623	Columbia Gas of Pennsylvania	Depreciation
127.	2011	PA PUC	R-2010-2179103	Lancaster, City of – Bureau of Water	Depreciation
128.	2011	IN URC	43114 IGCC 4S	Duke Energy Indiana	Depreciation
129.	2011	FERC	IS11-146-000	Enbridge Pipelines (Southern Lights)	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
130.	2011	IL CC	11-0217	MidAmerican Energy Corporation	Depreciation
131.	2011	OK CC	201100087	Oklahoma Gas & Electric Co.	Depreciation
132.	2011	PA PUC	2011-2232243	Pennsylvania American Water Company	Depreciation
133.	2011	FERC	2011-2232243	Carolina Gas Transmission	Depreciation
134.	2012	WA UTC	UE-120436/JG-120437	Avista Corporation	Depreciation
135.	2012	AK Reg Cm	U-12-009	Chugach Electric Association	Depreciation
136.	2012	MA PUC	DPU 12-25	Columbia Gas of Massachusetts	Depreciation
137.	2012	TX PUC	40094	El Paso Electric Company	Depreciation
138.	2012	ID PUC	IPC-E-12	Idaho Power Company	Depreciation
139.	2012	PA PUC	R-2012-2290597	PPL Electric Utilities	Depreciation
140.	2012	PA PUC	R-2012-2311725	Hanover, Borough of – Bureau of Water	Depreciation
141.	2012	KY PSC	2012-00222	Louisville Gas and Electric Company	Depreciation
142.	2012	KY PSC	2012-00221	Kentucky Utilities Company	Depreciation
143.	2012	PA PUC	R-2012-2285985	Peoples Natural Gas Company	Depreciation
144.	2012	DC PSC	Case 1087	Potomac Electric Power Company	Depreciation
145.	2012	OH PSC	12-1682-EL-AIR	Duke Energy Ohio (Electric)	Depreciation
146.	2012	OH PSC	12-1685-GA-AIR	Duke Energy Ohio (Gas)	Depreciation
147.	2012	PA PUC	R-2012-2310366	Lancaster, City of – Sewer Fund	Depreciation
148.	2012	PA PUC	R-2012-2321748	Columbia Gas of Pennsylvania	Depreciation
149.	2012	FERC	ER-12-2681-000	ITC Holdings	Depreciation
150.	2012	MO PSC	ER-2012-0174	Kansas City Power and Light	Depreciation
151.	2012	MO PSC	ER-2012-0175	KCPL Greater Missouri Operations Co.	Depreciation
152.	2012	MO PSC	GO-2012-0363	Laclede Gas Company	Depreciation
153.	2012	MN PUC	G007,001/D-12-533	Integrays – MN Energy Resource Group	Depreciation
153.	2012	TX PUC		Aqua Texas	Depreciation
155.	2012	PA PUC	2012-2336379	York Water Company	Depreciation
156.	2013	NJ BPU	ER12121071	PHI Service Co.– Atlantic City Electric	Depreciation
157.	2013	KY PSC	2013-00167	Columbia Gas of Kentucky	Depreciation
158.	2013	VA St CC	2013-00020	Virginia Electric and Power Co.	Depreciation
159.	2013	IA Util Bd	2013-0004	MidAmerican Energy Corporation	Depreciation
160.	2013	PA PUC	2013-2355276	Pennsylvania American Water Co.	Depreciation
161.	2013	NY PSC	13-E-0030, 13-G-0031, 13-S-0032	Consolidated Edison of New York	Depreciation
162.	2013	PA PUC	2013-2355886	Peoples TWP LLC	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
163.	2013	TN Reg Auth	12-0504	Tennessee American Water	Depreciation
164.	2013	ME PUC	2013-168	Central Maine Power Company	Depreciation
165.	2013	DC PSC	Case 1103	PHI Service Co. – PEPSCO	Depreciation
166.	2013	WY PSC	2003-ER-13	Cheyenne Light, Fuel and Power Co.	Depreciation
167.	2013	FERC	ER13- -0000	Kentucky Utilities	Depreciation
168.	2013	FERC	ER13- -0000	MidAmerican Energy Company	Depreciation
169.	2013	FERC	ER13- -0000	PPL Utilities	Depreciation
170.	2013	PA PUC	R-2013-2372129	Duquesne Light Company	Depreciation
171.	2013	NJ BPU	ER12111052	Jersey Central Power and Light Co.	Depreciation
172.	2013	PA PUC	R-2013-2390244	Bethlehem, City of – Bureau of Water	Depreciation
173.	2013	OK CC	UM 1679	Oklahoma, Public Service Company of	Depreciation
174.	2013	IL CC	13-0500	Nicor Gas Company	Depreciation
175.	2013	WY PSC	20000-427-EA-13	PacifiCorp	Depreciation
176.	2013	UT PSC	13-035-02	PacifiCorp	Depreciation
177.	2013	OR PUC	UM 1647	PacifiCorp	Depreciation
178.	2013	PA PUC	2013-2350509	Dubois, City of	Depreciation
179.	2014	IL CC	14-0224	North Shore Gas Company	Depreciation
180.	2014	FERC	ER14-	Duquesne Light Company	Depreciation
181.	2014	SD PUC	EL14-026	Black Hills Power Company	Depreciation
182.	2014	WY PSC	20002-91-ER-14	Black Hills Power Company	Depreciation
183.	2014	PA PUC	2014-2428304	Hanover, Borough of – Municipal Water Works	Depreciation
184.	2014	PA PUC	2014-2406274	Columbia Gas of Pennsylvania	Depreciation
185.	2014	IL CC	14-0225	Peoples Gas Light and Coke Company	Depreciation
186.	2014	MO PSC	ER-2014-0258	Ameren Missouri	Depreciation
187.	2014	KS CC	14-BHCG-502-RTS	Black Hills Service Company	Depreciation
188.	2014	KS CC	14-BHCG-502-RTS	Black Hills Utility Holdings	Depreciation
189.	2014	KS CC	14-BHCG-502-RTS	Black Hills Kansas Gas	Depreciation
190.	2014	PA PUC	2014-2418872	Lancaster, City of – Bureau of Water	Depreciation
191.	2014	WV PSC	14-0701-E-D	First Energy – MonPower/PotomacEdison	Depreciation
192.	2014	VA St CC	PUC-2014-00045	Aqua Virginia	Depreciation
193.	2014	VA St CC	PUE-2013	Virginia American	Depreciation
194.	2014	OK CC	PUD201400229	Oklahoma Gas and Electric	Depreciation
195.	2014	OR PUC	UM1679	Portland General Electric	Depreciation
196.	2014	IN URC	Cause No. 44576	Indianapolis Power & Light	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
197.	2014	MA DPU	DPU. 14-150	NSTAR Gas	Depreciation
198.	2014	CT PURA	14-05-06	Connecticut Light and Power	Depreciation
199.	2014	MO PSC	ER-2014-0370	Kansas City Power & Light	Depreciation
200.	2014	KY PSC	2014-00371	Kentucky Utilities Company	Depreciation
201.	2014	KY PSC	2014-00372	Louisville Gas and Electric Company	Depreciation
202.	2015	PA PUC	R-2015-2462723	United Water Pennsylvania Inc.	Depreciation
203.	2015	PA PUC	R-2015-2468056	Columbia Gas of Pennsylvania	Depreciation
204.	2015	NY PSC	15-E-0283/15-G-0284	New York State Electric and Gas Corporation	Depreciation
205.	2015	NY PSC	15-E-0285/15-G-0286	Rochester Gas and Electric Corporation	Depreciation
206.	2015	MO PSC	WR-2015-0301/SR-2015-0302	Missouri American Water Company	Depreciation
207.	2015	OK CC	PUD 201500208	Oklahoma, Public Service Company of	Depreciation
208.	2015	WV PSC	15-0676-W-42T	West Virginia American Water Company	Depreciation
209.	2015	PA PUC	2015-2469275	PPL Electric Utilities	Depreciation
210.	2015	IN URC	Cause No. 44688	Northern Indiana Public Service Company	Depreciation
211.	2015	OH PSC	14-1929-EL-RDR	First Energy-Ohio Edison/Cleveland Electric/ Toledo Edison	Depreciation
212.	2015	NM PRC	15-00127-UT	El Paso Electric	Depreciation
213.	2015	TX PUC	PUC-44941; SOAH 473-15-5257	El Paso Electric	Depreciation
214.	2015	WI PSC	3270-DU-104	Madison Gas and Electric Company	Depreciation
215.	2015	OK CC	PUD 201500273	Oklahoma Gas and Electric	Depreciation
216.	2015	KY PSC	Doc. No. 2015-00418	Kentucky American Water Company	Depreciation
217.	2015	NC UC	Doc. No. G-5, Sub 565	Public Service Company of North Carolina	Depreciation
218.	2016	WA UTC	Docket UE-17	Puget Sound Energy	Depreciation
219.	2016	NY PSC	Case No. 16-W-0130	Suez Water New York, Inc.	Depreciation
220.	2016	MO PSC	ER-2016-0156	KCPL – Greater Missouri	Depreciation
221.	2016	WI PSC		Wisconsin Public Service Commission	Depreciation
222.	2016	KY PSC	Case No. 2016-00026	Kentucky Utilities Company	Depreciation
223.	2016	KY PSC	Case No. 2016-00027	Louisville Gas and Electric Company	Depreciation
224.	2016	OH PUC	Case No. 16-0907-WW-AIR	Aqua Ohio	Depreciation
225.	2016	MD PSC	Case 9417	Columbia Gas of Maryland	Depreciation
226.	2016	KY PSC	2016-00162	Columbia Gas of Kentucky	Depreciation
227.	2016	DE PSC	16-0649	Delmarva Power and Light Co. – Electric	Depreciation
228.	2016	DE PSC	16-0650	Delmarva Power and Light Co. – Gas	Depreciation
229.	2016	NY PSC	Case 16-G-0257	National Fuel Gas Distribution Corp – NY Div	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
230.	2016	PA PUC	R-2016-2537349	Metropolitan Edison Company	Depreciation
231.	2016	PA PUC	R-2016-2537352	Pennsylvania Electric Company	Depreciation
232.	2016	PA PUC	R-2016-2537355	Pennsylvania Power Company	Depreciation
233.	2016	PA PUC	R-2016-2537359	West Penn Power Company	Depreciation
234.	2016	PA PUC	R-2016-2529660	Columbia Gas of PA	Depreciation
235.	2016	KY PSC	Case No. 2016-00063	Kentucky Utilities / Louisville Gas & Electric Co	Depreciation
236.	2016	MO PSC	ER-2016-0285	KCPL Missouri	Depreciation
237.	2016	AR PSC	16-052-U	Oklahoma Gas & Electric Co	Depreciation
238.	2016	PSCW	6680-DU-104	Wisconsin Power and Light	Depreciation
239.	2016	ID PUC	IPC-E-16-23	Idaho Power Company	Depreciation
240.	2016	OR PUC	UM1801	Idaho Power Company	Depreciation
241.	2016	ILL CC	16-	MidAmerican Energy Company	Depreciation
242.	2016	KY PSC	Case No. 2016-00370	Kentucky Utilities Company	Depreciation
243.	2016	KY PSC	Case No. 2016-00371	Louisville Gas and Electric Company	Depreciation
244.	2016	IN URC		Indianapolis Power & Light	Depreciation
245.	2016	AL RC	U-16-081	Chugach Electric Association	Depreciation
246.	2017	MA DPU	D.P.U. 17-05	NSTAR Electric Company and Western Massachusetts Electric Company	Depreciation
247.	2017	TX PUC	PUC-26831, SOAH 973-17-2686	El Paso Electric Company	Depreciation
248.	2017	WA UT&C	UE-17033 and UG-170034	Puget Sound Energy	Depreciation
249.	2017	OH PUC	Case No. 17-0032-EL-AIR	Duke Energy Ohio	Depreciation
250.	2017	VA SCC	Case No. PUE-2016-00413	Virginia Natural Gas, Inc.	Depreciation
251.	2017	OK CC	Case No. PUD201700151	Oklahoma, Public Service Company of	Depreciation
252.	2017	MD PSC	Case No. 9447	Columbia Gas of Maryland	Depreciation
253.	2017	NC UC	Docket No. E-2, Sub 1142	Duke Energy Progress	Depreciation
254.	2017	VA SCC	Case No. PUR-2017-00090	Dominion Virginia Electric and Power Company	Depreciation
255.	2017	FERC	ER17-1162	MidAmerican Energy Company	Depreciation
256.	2017	PA PUC	R-2017-2595853	Pennsylvania American Water Company	Depreciation
257.	2017	OR PUC	UM1809	Portland General Electric	Depreciation
258.	2017	FERC	ER17-217	Jersey Central Power & Light	Depreciation
259.	2017	FERC	ER17-211	Mid-Atlantic Interstate Transmission, LLC	Depreciation
260.	2017	MN PUC	Docket No. G007/D-17-442	Minnesota Energy Resources Corporation	Depreciation
261.	2017	IL CC	Docket No. 17-0124	Northern Illinois Gas Company	Depreciation
262.	2017	OR PUC	UM1808	Northwest Natural Gas Company	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	<u>Year</u>	<u>Jurisdiction</u>	<u>Docket No.</u>	<u>Client Utility</u>	<u>Subject</u>
263.	2017	NY PSC	Case No. 17-W-0528	SUEZ Water Owego-Nichols	Depreciation
264.	2017	MO PSC	GR-2017-0215	Laclede Gas Company	Depreciation
265.	2017	MO PSC	GR-2017-0216	Missouri Gas Energy	Depreciation
266.	2017	ILL CC	Docket No. 17-0337	Illinois-American Water Company	Depreciation
267.	2017	FERC	Docket No. ER17-____	PPL Electric Utilities Corporation	Depreciation
268.	2017	IN URC	Cause No. 44988	Northern Indiana Public Service Company	Depreciation
269.	2017	NJ BPU	BPU Docket No. WR17090985	New Jersey American Water Company, Inc.	Depreciation
270.	2017	RI PUC	Docket No. 4800	SUEZ Water Rhode Island	Depreciation
271.	2017	OK CC	Cause No. PUD 201700496	Oklahoma Gas and Electric Company	Depreciation
272.	2017	NJ BPU	ER18010029 & GR18010030	Public Service Electric and Gas Company	Depreciation
273.	2017	NC Util Com.	Docket No. E-7, SUB 1146	Duke Energy Carolinas, LLC	Depreciation
274.	2017	KY PSC	Case No. 2017-00321	Duke Energy Kentucky, Inc.	Depreciation
275.	2017	MA DPU	D.P.U. 18-40	Berkshire Gas Company	Depreciation
276.	2018	IN IURC	Cause No. 44992	Indiana-American Water Company, Inc.	Depreciation
277.	2018	IN IURC	Cause No. 45029	Indianapolis Power and Light	Depreciation
278.	2018	NC Util Com.	Docket No. W-218, Sub 497	Aqua North Carolina, Inc.	Depreciation
279.	2018	PA PUC	Docket No. R-2018-2647577	Columbia Gas of Pennsylvania, Inc.	Depreciation
280.	2018	OR PUC	Docket UM 1933	Avista Corporation	Depreciation
281.	2018	WA UTC	Docket No. UE-108167	Avista Corporation	Depreciation
282.	2018	ID PUC	AVU-E-18-03, AVU-G-18-02	Avista Corporation	Depreciation
283.	2018	IN URC	Cause No. 45039	Citizens Energy Group	Depreciation
284.	2018	FERC	Docket No. ER18-	Duke Energy Progress	Depreciation
285.	2018	PA PUC	Docket No. R-2018-	Duquesne Light Company	Depreciation
286.	2018	MD PSC	Case No. 948	Columbia Gas of Maryland	Depreciation
287.	2018	MA DPU	D.P.U. 18-45	Columbia Gas of Massachusetts	Depreciation
288.	2018	OH PUC	Case No. 18-0299-GA-ALT	Vectren Energy Delivery of Ohio	Depreciation
289.	2018	PA PUC	Docket No. R-2018-3000834	SUEZ Water Pennsylvania Inc.	Depreciation
290.	2018	MD PSC	Case No.	Maryland-American Water Company	Depreciation
291.	2018	PA PUC	Docket No. R-2018-3000019	The York Water Company	Depreciation

Appendix B

Aqua Pennsylvania, Inc.
Data Requirements of the Pennsylvania Public Utility Commission
Depreciation Study

FR VI.1

Aqua Pennsylvania, Inc.
VI. Depreciation

1. Provide a description of the depreciation methods used to calculate annual depreciation amounts and depreciation reserves, together with a discussion of the factors which were considered in arriving at estimates of service life and dispersion by account. Supply a comprehensive statement of any changes made in method of depreciation. Provide dates of all field inspections and facilities visited.

Answer:

The depreciation methods utilized in calculating annual and accrued depreciation are discussed in Exhibit No. 6-A, Part II in Part IV. Calculation of Annual and Accrued Depreciation, and in Exhibit No. 6-B, Part II in Part IV. Calculation of Annual and Accrued Depreciation.

Field trips and facilities visited for Aqua Pennsylvania, Inc. are presented in Exhibit No. 6-A, Part II in Part III. Service Life Considerations, and in Exhibit No. 6-B, Part II in Part III. Service Life Considerations.

Aqua Pennsylvania, Inc.
Data Requirements of the Pennsylvania Public Utility Commission
Depreciation Study

FR VI.2

Aqua Pennsylvania, Inc.
VI. Depreciation

2. Set forth, in exhibit form, charts depicting the original and estimated survivor curves and a tabular presentation of the original life table plotted on the chart for each account where the retirement rate method of analysis is utilized.

Answer:

Charts depicting the original and estimated survivor curves and a tabular presentation of the original life table plotted on the chart for each account where the retirement rate method of analysis is utilized is presented in Exhibit No. 6-A, Part II in Part VI. Service Life Statistics, and in Exhibit No. 6-B, Part II in Part VI. Service Life Statistics.

Aqua Pennsylvania, Inc.
Data Requirements of the Pennsylvania Public Utility Commission
Depreciation Study

FR VI.3

Aqua Pennsylvania, Inc.
VI. Depreciation

3. Provide the surviving original cost at historic test year-end by vintage by account and include applicable depreciation reserves and accruals. These calculations should be provided for plant in service as well as other categories of plant, including contributions in aid of construction and customers' advances for construction.

Answer:

The surviving original cost at the end of the historical year March 31, 2018 by vintage by account and the applicable depreciation reserve for utility plant are presented in Exhibit No. 6-A, Part I beginning on page II-7, and in Exhibit No. 6-B, Part I beginning on page II-5.

The surviving original cost at test year end March 31, 2019, by vintage by account and the applicable depreciation reserve for utility plant are presented in Exhibit No. 6-A, Part II beginning on page VII-7, and in Exhibit No. 6-B, Part II beginning on page VII-5.

The surviving original cost at test year end March 31, 2020, by vintage by account and the applicable depreciation reserve for utility plant are presented in Exhibit No. 6-A, Part III beginning on page II-7, and in Exhibit No. 6-B, Part III beginning on page II-4.

Aqua Pennsylvania, Inc.
Data Requirements of the Pennsylvania Public Utility Commission
Depreciation Study

FR VI.4

Aqua Pennsylvania, Inc.
VI. Depreciation

4. Provide a comparison of the calculated depreciation reserve used for ratemaking purposes v. the book reserve by account at the end of the test year, if they differ.

Answer:

A comparison of the calculated depreciation reserve v. book reserve by account at March 31, 2018, at March 31, 2019 and at March 31, 2020, are attached as pages FR VI.4 (2) through (13) for both water and wastewater assets.

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2018

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
DEPRECIABLE PLANT		
304.2 POWER AND PUMPING STRUCTURES	11,540,258	13,564,878
304.3 PURIFICATION BUILDINGS	47,010,515	47,696,204
304.61 OFFICE BUILDINGS	15,989,210	19,892,456
304.62 STORES, SHOP AND GARAGE BUILDINGS	4,615,663	4,479,851
304.63 MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	8,607,384	10,009,371
305 COLLECTING AND IMPOUNDING RESERVOIRS	14,176,809	10,074,408
306 LAKE, RIVER AND OTHER INTAKES	5,584,543	6,242,267
307 WELLS AND SPRINGS	13,242,106	17,442,454
310.4 OTHER POWER PRODUCTION EQUIPMENT	7,217,821	6,021,074
311 ELECTRIC PUMPING EQUIPMENT	34,379,136	33,323,542
320 PURIFICATION SYSTEM		
STRUCTURES	32,417,722	34,296,924
EQUIPMENT	27,792,617	30,048,150
COMPUTERS	6,690,167	6,630,085
PAINTING	182,957	181,319
FILTER MEDIA	2,915,607	2,900,321
<i>TOTAL ACCOUNT 320</i>	<u>69,999,070</u>	<u>74,056,799</u>
330 DISTRIBUTION RESERVOIRS AND STANDPIPES	51,313,322	50,165,238
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 4 INCH AND UNDER	6,554,782	5,127,520
CAST IRON MAINS - 6, 8 AND 10 INCH	202,757,377	158,608,251
CAST IRON MAINS - 12 INCH AND OVER	68,936,213	53,925,793
STEEL MAINS	4,912,998	3,843,224
LOCK JOINT MAINS	3,259,097	2,549,449
VALVES	10,192,426	7,973,090
SPECIAL CONSTRUCTION	8,704,949	6,809,502
CEMENT WROUGHT IRON MAINS	133,818	104,680
WROUGHT IRON MAINS	61,100	47,796
COPPER MAINS	182,807	143,002
ASBESTOS CEMENT MAINS	4,505,018	3,524,079
PLASTIC	8,822,818	6,901,706
MAIN CLEANING AND LINING	32,333,154	25,292,816
<i>TOTAL ACCOUNT 331</i>	<u>351,356,557</u>	<u>274,850,908</u>
333 SERVICES	78,520,027	83,430,569
334 METERS		
REMOTE	62,540,096	77,773,938
ERTS	27,579,109	31,940,934
<i>TOTAL ACCOUNT 334</i>	<u>90,119,205</u>	<u>109,714,872</u>
335 FIRE HYDRANTS	18,941,287	17,469,594
336 BACKFLOW PREVENTION DEVICES	30,069	29,702
340 OFFICE FURNITURE AND EQUIPMENT	33,341,657	29,701,171
341 TRANSPORTATION EQUIPMENT		
VEHICLES	11,550,980	13,443,507
OTHER	636,205	580,842
<i>TOTAL ACCOUNT 341</i>	<u>12,187,185</u>	<u>14,024,349</u>
342 STORES EQUIPMENT	487,968	507,126
343.1 SHOP EQUIPMENT	628,486	623,871
343.2 TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	6,910,252	6,966,359
344 LABORATORY EQUIPMENT	2,881,273	3,356,494
346 COMMUNICATION EQUIPMENT	7,200,005	6,281,505
347 MISCELLANEOUS EQUIPMENT	1,172,925	1,156,648
348 OTHER TANGIBLE PLANT	10,664	9,836
<i>TOTAL DEPRECIABLE PLANT</i>	<u>887,463,397</u>	<u>841,091,545</u>
TOTAL WATER PLANT IN SERVICE	<u>887,463,397</u>	<u>841,091,545</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2018

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
CUSTOMERS' ADVANCES FOR CONSTRUCTION		
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 6, 8 AND 10 INCH	2,045,428	7,549,294
CAST IRON MAINS - 12 INCH AND OVER	35,051	129,367
TOTAL ACCOUNT 331	<u>2,080,479</u>	<u>7,678,661</u>
333 SERVICES	302,542	299
335 FIRE HYDRANTS	<u>100,593</u>	<u>314,255</u>
TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	<u>2,483,614</u>	<u>7,993,215</u>
CONTRIBUTIONS IN AID OF CONSTRUCTION		
DEPRECIABLE PLANT		
304.2 POWER AND PUMPING STRUCTURES	215,047	286,347
304.3 PURIFICATION BUILDINGS	23,115	22,156
304.63 MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	6,994	11,728
307 WELLS AND SPRINGS	537,330	783,640
310.2 POWER GENERATION EQUIPMENT	280,350	470,842
311 ELECTRIC PUMPING EQUIPMENT	857,228	850,759
320 PURIFICATION SYSTEM - EQUIPMENT	31,341	40,300
330 DISTRIBUTION RESERVOIRS AND STANDPIPES	830,395	1,199,052
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 4 INCH AND UNDER	36,377	29,994
CAST IRON MAINS - 6, 8 AND 10 INCH	26,534,575	21,878,444
CAST IRON MAINS - 12 INCH AND OVER	1,186,870	978,605
VALVES	195,103	160,867
ASBESTOS CEMENT MAINS	1,957,423	1,613,946
PLASTIC	881,282	726,641
TOTAL ACCOUNT 331	<u>30,791,630</u>	<u>25,388,497</u>
333 SERVICES	1,110,359	1,581,966
334 METERS - CONVENTIONAL	66,954	74,494
335 FIRE HYDRANTS	1,785,036	1,701,971
343.2 TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	84	84
344.2 LABORATORY EQUIPMENT - ELECTRONIC	<u>1,287</u>	<u>1,662</u>
TOTAL DEPRECIABLE PLANT	36,537,150	32,413,499
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	<u>36,537,150</u>	<u>32,413,499</u>
TOTAL WATER PLANT	<u>848,442,633</u>	<u>800,684,831</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2019

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
DEPRECIABLE PLANT		
304.2 POWER AND PUMPING STRUCTURES	12,437,417	14,287,816
304.3 PURIFICATION BUILDINGS	51,002,643	51,475,339
304.61 OFFICE BUILDINGS	17,340,344	20,571,037
304.62 STORES, SHOP AND GARAGE BUILDINGS	4,863,491	4,715,529
304.63 MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	9,699,348	10,924,714
305 COLLECTING AND IMPOUNDING RESERVOIRS	14,677,351	10,658,794
306 LAKE, RIVER AND OTHER INTAKES	6,063,330	6,660,560
307 WELLS AND SPRINGS	14,236,325	18,290,696
310.4 OTHER POWER PRODUCTION EQUIPMENT	8,402,775	6,898,471
311 ELECTRIC PUMPING EQUIPMENT	36,592,844	35,879,882
320 PURIFICATION SYSTEM		
STRUCTURES	34,870,887	36,894,445
EQUIPMENT	30,116,175	31,863,815
COMPUTERS	6,741,459	6,734,762
PAINTING	184,696	184,320
FILTER MEDIA	2,954,684	2,989,142
<i>TOTAL ACCOUNT 320</i>	<u>74,867,901</u>	<u>78,666,484</u>
330 DISTRIBUTION RESERVOIRS AND STANDPIPES	56,788,757	55,759,117
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 4 INCH AND UNDER	7,035,305	5,583,829
CAST IRON MAINS - 6, 8 AND 10 INCH	221,194,796	175,559,414
CAST IRON MAINS - 12 INCH AND OVER	72,942,476	57,893,488
STEEL MAINS	4,961,851	3,938,156
LOCK JOINT MAINS	3,302,628	2,621,253
VALVES	10,964,641	8,702,492
SPECIAL CONSTRUCTION	9,139,644	7,254,016
CEMENT WROUGHT IRON MAINS	134,995	107,144
WROUGHT IRON MAINS	61,318	48,667
COPPER MAINS	191,247	151,790
ASBESTOS CEMENT MAINS	4,619,314	3,666,289
PLASTIC	9,400,249	7,460,854
MAIN CLEANING AND LINING	34,937,531	27,729,461
<i>TOTAL ACCOUNT 331</i>	<u>378,885,995</u>	<u>300,716,853</u>
333 SERVICES	84,357,209	89,734,130
334 METERS		
REMOTE	66,459,660	80,811,584
ERTS	29,434,277	33,754,038
<i>TOTAL ACCOUNT 334</i>	<u>95,893,937</u>	<u>114,565,622</u>
335 FIRE HYDRANTS	20,240,002	18,749,643
336 BACKFLOW PREVENTION DEVICES	39,915	39,495
339 OTHER PLANT AND MISCELLANEOUS	25,145	17,305
340 OFFICE FURNITURE AND EQUIPMENT	42,803,868	38,376,533
341 TRANSPORTATION EQUIPMENT		
VEHICLES	13,597,478	15,552,639
OTHER	789,702	727,973
<i>TOTAL ACCOUNT 341</i>	<u>14,387,180</u>	<u>16,280,612</u>
342 STORES EQUIPMENT	622,529	647,670
343.1 SHOP EQUIPMENT	684,723	679,416
343.2 TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	7,855,873	7,867,531
344 LABORATORY EQUIPMENT	3,079,647	3,525,349
346 COMMUNICATION EQUIPMENT	9,241,490	8,244,087
347 MISCELLANEOUS EQUIPMENT	1,270,056	1,253,553
348 OTHER TANGIBLE PLANT	12,244	11,416
<i>TOTAL DEPRECIABLE PLANT</i>	<u>966,372,339</u>	<u>915,497,651</u>
TOTAL WATER PLANT IN SERVICE	<u>966,372,339</u>	<u>915,497,651</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2019

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
CUSTOMERS' ADVANCES FOR CONSTRUCTION		
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 6, 8 AND 10 INCH	2,573,451	8,022,159
CAST IRON MAINS - 12 INCH AND OVER	38,186	119,036
TOTAL ACCOUNT 331	<u>2,611,637</u>	<u>8,141,195</u>
333 SERVICES	419,936	128,092
335 FIRE HYDRANTS	<u>151,813</u>	<u>362,865</u>
TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	<u>3,183,386</u>	<u>8,632,152</u>
CONTRIBUTIONS IN AID OF CONSTRUCTION		
DEPRECIABLE PLANT		
304.2 POWER AND PUMPING STRUCTURES	225,184	292,323
304.3 PURIFICATION BUILDINGS	24,126	23,343
304.63 MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	10,669	15,448
307 WELLS AND SPRINGS	575,501	818,758
310.2 POWER GENERATION EQUIPMENT	318,000	511,942
311 ELECTRIC PUMPING EQUIPMENT	902,362	904,159
320 PURIFICATION SYSTEM - EQUIPMENT	31,899	40,598
330 DISTRIBUTION RESERVOIRS AND STANDPIPES	873,473	1,236,563
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 4 INCH AND UNDER	38,575	32,463
CAST IRON MAINS - 6, 8 AND 10 INCH	27,871,247	23,455,380
CAST IRON MAINS - 12 INCH AND OVER	1,314,287	1,106,054
VALVES	243,926	205,279
ASBESTOS CEMENT MAINS	2,001,888	1,684,713
PLASTIC	1,052,504	885,747
TOTAL ACCOUNT 331	<u>32,522,427</u>	<u>27,369,636</u>
333 SERVICES	1,211,266	1,679,988
334 METERS - CONVENTIONAL	67,511	74,600
335 FIRE HYDRANTS	1,946,606	1,871,332
343.2 TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	84	84
344.2 LABORATORY EQUIPMENT - ELECTRONIC	<u>1,324</u>	<u>1,662</u>
TOTAL DEPRECIABLE PLANT	<u>38,710,432</u>	<u>34,840,436</u>
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	<u>38,710,432</u>	<u>34,840,436</u>
TOTAL WATER PLANT	<u>924,478,521</u>	<u>872,025,063</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2020

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
DEPRECIABLE PLANT		
304.2 POWER AND PUMPING STRUCTURES	13,520,328	15,310,032
304.3 PURIFICATION BUILDINGS	55,505,435	55,929,361
304.61 OFFICE BUILDINGS	19,468,052	22,135,175
304.62 STORES, SHOP AND GARAGE BUILDINGS	5,139,161	5,004,353
304.63 MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	10,909,591	12,131,686
305 COLLECTING AND IMPOUNDING RESERVOIRS	15,277,055	11,334,272
306 LAKE, RIVER AND OTHER INTAKES	6,568,596	7,110,345
307 WELLS AND SPRINGS	15,372,621	19,298,725
310.4 OTHER POWER PRODUCTION EQUIPMENT	10,157,399	8,098,646
311 ELECTRIC PUMPING EQUIPMENT	38,878,691	38,559,278
320 PURIFICATION SYSTEM		
STRUCTURES	37,323,524	39,217,712
EQUIPMENT	33,168,611	34,851,935
COMPUTERS	6,747,002	6,747,002
PAINTING	186,435	186,321
FILTER MEDIA	2,988,789	3,077,963
<i>TOTAL ACCOUNT 320</i>	<u>80,414,361</u>	<u>84,080,933</u>
330 DISTRIBUTION RESERVOIRS AND STANDPIPES	62,628,422	61,878,975
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 4 INCH AND UNDER	7,565,711	6,108,405
CAST IRON MAINS - 6, 8 AND 10 INCH	242,073,839	195,445,607
CAST IRON MAINS - 12 INCH AND OVER	77,851,289	62,855,583
STEEL MAINS	5,027,279	4,058,925
LOCK JOINT MAINS	3,349,572	2,704,378
VALVES	11,816,371	9,540,303
SPECIAL CONSTRUCTION	9,550,691	7,711,038
CEMENT WROUGHT IRON MAINS	136,055	109,848
WROUGHT IRON MAINS	61,497	49,651
COPPER MAINS	200,903	162,205
ASBESTOS CEMENT MAINS	4,728,846	3,817,976
PLASTIC	10,024,975	8,093,966
MAIN CLEANING AND LINING	37,531,465	30,302,160
<i>TOTAL ACCOUNT 331</i>	<u>409,918,493</u>	<u>330,960,045</u>
333 SERVICES	90,295,549	94,647,773
334 METERS		
REMOTE	70,746,442	84,390,218
ERTS	31,392,382	35,686,214
<i>TOTAL ACCOUNT 334</i>	<u>102,138,824</u>	<u>120,076,433</u>
335 FIRE HYDRANTS	21,663,853	20,231,582
336 BACKFLOW PREVENTION DEVICES	51,179	51,000
339 OTHER PLANT AND MISCELLANEOUS	57,804	51,193
340 OFFICE FURNITURE AND EQUIPMENT	53,619,053	48,865,299
341 TRANSPORTATION EQUIPMENT		
VEHICLES	15,829,399	17,952,761
OTHER	1,001,624	939,612
<i>TOTAL ACCOUNT 341</i>	<u>16,831,023</u>	<u>18,892,372</u>
342 STORES EQUIPMENT	781,862	806,428
343.1 SHOP EQUIPMENT	747,675	742,344
343.2 TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	8,876,666	8,883,075
344 LABORATORY EQUIPMENT	3,305,268	3,731,126
346 COMMUNICATION EQUIPMENT	11,700,437	10,707,552
347 MISCELLANEOUS EQUIPMENT	1,367,388	1,350,857
348 OTHER TANGIBLE PLANT	13,824	12,996
<i>TOTAL DEPRECIABLE PLANT</i>	<u>1,055,208,610</u>	<u>1,000,881,856</u>
TOTAL WATER PLANT IN SERVICE	<u>1,055,208,610</u>	<u>1,000,881,856</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2020

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
CUSTOMERS' ADVANCES FOR CONSTRUCTION		
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 6, 8 AND 10 INCH	3,106,053	8,490,774
CAST IRON MAINS - 12 INCH AND OVER	41,321	112,956
TOTAL ACCOUNT 331	<u>3,147,374</u>	<u>8,603,730</u>
333 SERVICES	539,923	255,092
335 FIRE HYDRANTS	<u>204,275</u>	<u>411,474</u>
TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	<u>3,891,572</u>	<u>9,270,296</u>
CONTRIBUTIONS IN AID OF CONSTRUCTION		
DEPRECIABLE PLANT		
304.2 POWER AND PUMPING STRUCTURES	237,913	303,272
304.3 PURIFICATION BUILDINGS	25,289	24,521
304.63 MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	14,237	19,097
307 WELLS AND SPRINGS	617,931	854,564
310.2 POWER GENERATION EQUIPMENT	354,600	551,242
311 ELECTRIC PUMPING EQUIPMENT	947,176	956,648
320 PURIFICATION SYSTEM - EQUIPMENT	32,348	40,887
330 DISTRIBUTION RESERVOIRS AND STANDPIPES	917,989	1,273,793
331 MAINS AND ACCESSORIES		
CAST IRON MAINS - 4 INCH AND UNDER	40,758	34,904
CAST IRON MAINS - 6, 8 AND 10 INCH	29,222,262	25,025,222
CAST IRON MAINS - 12 INCH AND OVER	1,442,646	1,235,446
VALVES	294,199	251,945
ASBESTOS CEMENT MAINS	2,045,280	1,751,527
PLASTIC	1,216,863	1,042,091
TOTAL ACCOUNT 331	<u>34,262,008</u>	<u>29,341,135</u>
333 SERVICES	1,315,579	1,777,278
334 METERS - CONVENTIONAL	68,035	74,698
335 FIRE HYDRANTS	2,110,610	2,042,703
343.2 TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	84	84
344.2 LABORATORY EQUIPMENT - ELECTRONIC	<u>1,356</u>	<u>1,662</u>
TOTAL DEPRECIABLE PLANT	40,905,155	37,261,585
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	<u>40,905,155</u>	<u>37,261,585</u>
TOTAL WATER PLANT	<u>1,010,411,883</u>	<u>954,349,975</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2018

DEPRECIABLE GROUP		CALCULATED ACCRUED DEPRECIATION	BOOK RESERVE
(1)		(2)	(3)
DEPRECIABLE PLANT			
354.00	STRUCTURES AND IMPROVEMENTS		
	COLLECTION	1,232,021	1,927,173
	PUMPING	967,764	1,211,853
	TREATMENT AND DISPOSAL	8,233,944	7,028,558
	RECLAIMED WATER TREATMENT	7,929	10,637
	GENERAL	235,894	260,150
	<i>TOTAL ACCOUNT 354</i>	<u>10,677,552</u>	<u>10,438,371</u>
355.00	POWER GENERATING EQUIPMENT		
	COLLECTION	34,505	21,449
	PUMPING	174,636	143,064
	TREATMENT AND DISPOSAL	331,152	246,811
	<i>TOTAL ACCOUNT 355</i>	<u>540,293</u>	<u>411,324</u>
360.00	COLLECTION MAINS - FORCE	6,098,166	5,350,931
361.00	COLLECTION MAINS - GRAVITY	6,298,047	5,691,946
362.00	SPECIAL COLLECTING STRUCTURES	6,485	4,046
363.00	SERVICES	2,779,121	3,346,570
364.00	METERS	91,954	66,147
370.30	RECEIVING WELLS	251,974	215,675
371.00	PUMPING EQUIPMENT		
	PUMPING	3,749,138	4,035,692
	RECLAIMED WATER TREATMENT	151,177	137,649
	<i>TOTAL ACCOUNT 371</i>	<u>3,900,315</u>	<u>4,173,341</u>
380.00	TREATMENT AND DISPOSAL EQUIPMENT	7,035,636	7,459,648
381.00	PLANT SEWERS		
	TREATMENT AND DISPOSAL	32,236	22,006
	RECLAIMED WATER TREATMENT	1,639	888
	<i>TOTAL ACCOUNT 381</i>	<u>33,875</u>	<u>22,894</u>
382.00	OUTFALL LINES	28,346	25,740
389.00	OTHER PLANT AND MISCELLANEOUS EQUIPMENT		
	COLLECTION	341,908	228,636
	PUMPING	24,066	19,699
	TREATMENT AND DISPOSAL	12,215	24,988
	<i>TOTAL ACCOUNT 389</i>	<u>378,189</u>	<u>273,323</u>
390.00	OFFICE FURNITURE AND EQUIPMENT		
	FURNITURE	3,864	6,440
	OFFICE EQUIPMENT	151,941	70,878
	COMPUTER HARDWARE	340,461	302,962
	COMPUTER SOFTWARE	4,092	26,547
	<i>TOTAL ACCOUNT 390</i>	<u>500,358</u>	<u>406,828</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2018

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
391.00 TRANSPORTATION EQUIPMENT	96,313	229,126
392.00 STORES EQUIPMENT	5,690	6,792
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	73,551	17,175
394.00 LABORATORY EQUIPMENT	176,061	205,758
395.00 POWER OPERATED EQUIPMENT	105,326	112,958
COMMUNICATION EQUIPMENT		
396.00 GENERAL	83,350	64,829
396.70 SCADA	17,151	4,205
TOTAL ACCOUNT 396	<u>100,501</u>	<u>69,035</u>
397.00 MISCELLANEOUS EQUIPMENT	7,130	10,929
398.00 OTHER TANGIBLE PLANT	<u>80</u>	<u>119</u>
TOTAL DEPRECIABLE PLANT	39,184,963	38,538,677
TOTAL WASTEWATER PLANT IN SERVICE	<u>39,184,963</u>	<u>38,538,677</u>
CUSTOMERS' ADVANCES FOR CONSTRUCTION		
361.00 COLLECTION MAINS - GRAVITY	<u>26,334</u>	<u>0</u>
TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	26,334	0
CONTRIBUTIONS IN AID OF CONSTRUCTION		
DEPRECIABLE PLANT		
354.00 STRUCTURES AND IMPROVEMENTS		
COLLECTION	205,086	409,543
PUMPING	102,165	122,337
TREATMENT AND DISPOSAL	2,429,943	1,836,991
GENERAL	9,786	8,523
TOTAL ACCOUNT 354	<u>2,746,980</u>	<u>2,377,394</u>
360.00 COLLECTION MAINS - FORCE	1,403,030	1,286,248
361.00 COLLECTION MAINS - GRAVITY	913,342	769,857
363.00 SERVICES	299,498	517,616
371.30 PUMPING EQUIPMENT - PUMPING	55,291	35,266
380.00 TREATMENT AND DISPOSAL EQUIPMENT	685,453	762,551
381.40 PLANT SEWERS - TREATMENT AND DISPOSAL	1,258	1,220
382.00 OUTFALL LINES	1,327	1,220
389.20 OTHER PLANT AND MISCELLANEOUS EQUIPMENT - COLLECTION	4,874	4,882
390.10 OFFICE FURNITURE AND EQUIPMENT - FURNITURE	275	260
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	4,449	4,504
394.00 LABORATORY EQUIPMENT	<u>1,362</u>	<u>1,383</u>
TOTAL DEPRECIABLE PLANT	6,117,139	5,762,401
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	<u>6,117,139</u>	<u>5,762,401</u>
TOTAL WASTEWATER PLANT	<u>33,041,490</u>	<u>32,776,275</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2019

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
DEPRECIABLE PLANT		
354.00 STRUCTURES AND IMPROVEMENTS		
COLLECTION	1,332,902	1,993,739
PUMPING	1,060,528	1,281,841
TREATMENT AND DISPOSAL	8,654,899	7,484,624
RECLAIMED WATER TREATMENT	8,576	11,268
GENERAL	246,677	271,252
TOTAL ACCOUNT 354	<u>11,303,582</u>	<u>11,042,723</u>
355.00 POWER GENERATING EQUIPMENT		
COLLECTION	37,893	26,306
PUMPING	203,449	159,727
TREATMENT AND DISPOSAL	417,503	294,271
TOTAL ACCOUNT 355	<u>658,845</u>	<u>480,303</u>
360.00 COLLECTION MAINS - FORCE	6,450,660	5,743,148
361.00 COLLECTION MAINS - GRAVITY	6,678,935	5,898,082
362.00 SPECIAL COLLECTING STRUCTURES	11,719	7,343
363.00 SERVICES	2,928,114	3,482,179
364.00 METERS	110,085	83,304
370.00 RECEIVING WELLS	264,287	231,011
371.00 PUMPING EQUIPMENT		
PUMPING	4,220,707	4,515,600
RECLAIMED WATER TREATMENT	155,150	147,053
TOTAL ACCOUNT 371	<u>4,375,857</u>	<u>4,662,653</u>
380.00 TREATMENT AND DISPOSAL EQUIPMENT	8,005,379	7,793,650
381.00 PLANT SEWERS		
TREATMENT AND DISPOSAL	35,151	26,093
RECLAIMED WATER TREATMENT	1,787	1,099
TOTAL ACCOUNT 381	<u>36,938</u>	<u>27,192</u>
382.00 OUTFALL LINES	28,779	25,247
389.00 OTHER PLANT AND MISCELLANEOUS EQUIPMENT		
COLLECTION	370,652	276,985
PUMPING	27,416	23,842
TREATMENT AND DISPOSAL	13,508	25,482
TOTAL ACCOUNT 389	<u>411,576</u>	<u>326,309</u>
390.00 OFFICE FURNITURE AND EQUIPMENT		
FURNITURE	4,373	6,693
OFFICE EQUIPMENT	223,476	147,826
COMPUTER HARDWARE	472,424	443,253
COMPUTER SOFTWARE	10,105	30,059
TOTAL ACCOUNT 390	<u>710,378</u>	<u>627,831</u>

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2019

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
391.00 TRANSPORTATION EQUIPMENT	128,555	242,132
392.00 STORES EQUIPMENT	6,237	7,215
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	88,369	46,284
394.00 LABORATORY EQUIPMENT	202,281	227,819
395.00 POWER OPERATED EQUIPMENT	111,495	121,284
COMMUNICATION EQUIPMENT		
396.00 GENERAL	144,097	111,341
396.70 SCADA	59,984	36,866
<i>TOTAL ACCOUNT 396</i>	<u>204,081</u>	<u>148,208</u>
397.00 MISCELLANEOUS EQUIPMENT	8,570	11,722
398.00 OTHER TANGIBLE PLANT	1,600	0
TOTAL DEPRECIABLE PLANT	42,726,322	41,235,639
TOTAL WASTEWATER PLANT IN SERVICE	42,726,322	41,235,639
CUSTOMERS' ADVANCES FOR CONSTRUCTION		
361.00 COLLECTION MAINS - GRAVITY	28,060	2,419
TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	28,060	2,419
CONTRIBUTIONS IN AID OF CONSTRUCTION		
DEPRECIABLE PLANT		
354.00 STRUCTURES AND IMPROVEMENTS		
COLLECTION	231,648	434,189
PUMPING	123,680	143,926
TREATMENT AND DISPOSAL	2,545,801	1,999,766
GENERAL	9,967	8,877
<i>TOTAL ACCOUNT 354</i>	<u>2,911,096</u>	<u>2,586,758</u>
360.00 COLLECTION MAINS - FORCE	1,553,053	1,451,118
361.00 COLLECTION MAINS - GRAVITY	968,652	835,606
363.00 SERVICES	321,950	535,477
371.30 PUMPING EQUIPMENT - PUMPING	80,603	67,831
380.00 TREATMENT AND DISPOSAL EQUIPMENT	714,590	799,221
381.40 PLANT SEWERS - TREATMENT AND DISPOSAL	1,272	1,252
382.00 OUTFALL LINES	1,343	1,265
389.20 OTHER PLANT AND MISCELLANEOUS EQUIPMENT - COLLECTION	5,534	5,603
390.10 OFFICE FURNITURE AND EQUIPMENT - FURNITURE	275	260
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	4,449	4,504
394.00 LABORATORY EQUIPMENT	1,362	1,383
TOTAL DEPRECIABLE PLANT	6,564,179	6,290,278
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	6,564,179	6,290,278
TOTAL WASTEWATER PLANT	36,134,083	34,942,942

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2020

DEPRECIABLE GROUP		CALCULATED ACCRUED DEPRECIATION	BOOK RESERVE
(1)		(2)	(3)
DEPRECIABLE PLANT			
354.00	STRUCTURES AND IMPROVEMENTS		
	COLLECTION	1,456,394	2,074,082
	PUMPING	1,173,175	1,363,080
	TREATMENT AND DISPOSAL	9,177,723	8,013,188
	RECLAIMED WATER TREATMENT	9,217	11,896
	GENERAL	<u>257,296</u>	<u>282,239</u>
	<i>TOTAL ACCOUNT 354</i>	12,073,805	11,744,485
355.00	POWER GENERATING EQUIPMENT		
	COLLECTION	41,135	31,043
	PUMPING	239,791	203,430
	TREATMENT AND DISPOSAL	<u>527,856</u>	<u>419,072</u>
	<i>TOTAL ACCOUNT 355</i>	808,782	653,544
360.00	COLLECTION MAINS - FORCE	6,804,381	6,179,651
361.00	COLLECTION MAINS - GRAVITY	7,215,575	6,380,860
362.00	SPECIAL COLLECTING STRUCTURES	16,476	12,389
363.00	SERVICES	3,075,976	3,620,713
364.00	METERS	127,725	104,530
370.00	RECEIVING WELLS	276,825	247,313
371.00	PUMPING EQUIPMENT		
	PUMPING	4,774,934	5,115,504
	RECLAIMED WATER TREATMENT	<u>159,137</u>	<u>155,762</u>
	<i>TOTAL ACCOUNT 371</i>	4,934,071	5,271,265
380.00	TREATMENT AND DISPOSAL EQUIPMENT	9,703,829	9,021,489
381.00	PLANT SEWERS		
	TREATMENT AND DISPOSAL	37,970	30,046
	RECLAIMED WATER TREATMENT	<u>1,934</u>	<u>1,305</u>
	<i>TOTAL ACCOUNT 381</i>	39,904	31,351
382.00	OUTFALL LINES	32,034	28,626
389.00	OTHER PLANT AND MISCELLANEOUS EQUIPMENT		
	COLLECTION	396,722	323,350
	PUMPING	30,653	27,891
	TREATMENT AND DISPOSAL	<u>14,751</u>	<u>25,972</u>
	<i>TOTAL ACCOUNT 389</i>	442,126	377,213
390.00	OFFICE FURNITURE AND EQUIPMENT		
	FURNITURE	4,883	6,948
	OFFICE EQUIPMENT	314,147	246,155
	COMPUTER HARDWARE	613,724	586,104
	COMPUTER SOFTWARE	<u>16,119</u>	<u>33,595</u>
	<i>TOTAL ACCOUNT 390</i>	948,873	872,802

AQUA PENNSYLVANIA, INC.

COMPARISON OF CALCULATED ACCRUED DEPRECIATION
AND BOOK RESERVE AS OF MARCH 31, 2020

DEPRECIABLE GROUP (1)	CALCULATED ACCRUED DEPRECIATION (2)	BOOK RESERVE (3)
391.00 TRANSPORTATION EQUIPMENT	166,696	265,290
392.00 STORES EQUIPMENT	6,786	7,637
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	105,667	74,805
394.00 LABORATORY EQUIPMENT	229,024	251,514
395.00 POWER OPERATED EQUIPMENT	117,083	129,039
COMMUNICATION EQUIPMENT		
396.00 GENERAL	220,927	185,278
396.70 SCADA	114,157	89,248
<i>TOTAL ACCOUNT 396</i>	<u>335,084</u>	<u>274,525</u>
397.00 MISCELLANEOUS EQUIPMENT	10,133	13,113
398.00 OTHER TANGIBLE PLANT	11,644	7,236
TOTAL DEPRECIABLE PLANT	47,482,499	45,569,391
TOTAL WASTEWATER PLANT IN SERVICE	<u>47,482,499</u>	<u>45,569,391</u>
CUSTOMERS' ADVANCES FOR CONSTRUCTION		
361.00 COLLECTION MAINS - GRAVITY	29,761	4,826
TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	29,761	4,826
CONTRIBUTIONS IN AID OF CONSTRUCTION		
DEPRECIABLE PLANT		
354.00 STRUCTURES AND IMPROVEMENTS		
COLLECTION	258,082	458,324
PUMPING	144,919	165,515
TREATMENT AND DISPOSAL	2,658,745	2,159,926
GENERAL	10,185	9,219
<i>TOTAL ACCOUNT 354</i>	<u>3,071,931</u>	<u>2,792,985</u>
360.00 COLLECTION MAINS - FORCE	1,695,550	1,612,039
361.00 COLLECTION MAINS - GRAVITY	1,023,432	900,539
363.00 SERVICES	343,315	553,338
371.30 PUMPING EQUIPMENT - PUMPING	103,129	96,912
380.00 TREATMENT AND DISPOSAL EQUIPMENT	741,638	834,803
381.40 PLANT SEWERS - TREATMENT AND DISPOSAL	1,286	1,282
382.00 OUTFALL LINES	1,350	1,306
389.20 OTHER PLANT AND MISCELLANEOUS EQUIPMENT - COLLECTION	6,179	6,310
390.10 OFFICE FURNITURE AND EQUIPMENT - FURNITURE	275	260
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	4,449	4,504
394.00 LABORATORY EQUIPMENT	1,362	1,383
TOTAL DEPRECIABLE PLANT	6,993,896	6,805,661
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	<u>6,993,896</u>	<u>6,805,661</u>
TOTAL WASTEWATER PLANT	<u>40,458,842</u>	<u>38,758,904</u>

Aqua Pennsylvania, Inc.
Data Requirements of the Pennsylvania Public Utility Commission
Depreciation Study

FR VI.5

Aqua Pennsylvania, Inc.
VI. Depreciation

5. Supply a schedule by account and depreciable group showing the survivor curve and annual accrual rate estimated to be appropriate:
- a. For the purposes of this filing.
 - b. For the purposes of the most recent rate increase filing prior to the current proceedings.

Answer:

- a. Refer to Table 1 in Exhibit Nos. 6-A, Part I through 6-B, Part III.
- b. Refer to pages FR VI.5 (2) to FR VI.5 (9) for survivor curves and annual accrual rates estimated to be appropriate in the most recent prior water rate filings. This is the initial wastewater filing, so there is no prior proceeding.

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2011

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2011 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCURUAL RATE PERCENT (8)
INTANGIBLE PLANT							
301 ORGANIZATION	NONDEPR.	5,750,726.43					
302 FRANCHISES AND CONSENTS	NONDEPR.	1,797,470.21					
303 MISCELLANEOUS INTANGIBLE PLANT	NONDEPR.	1,552,576.89					
TOTAL INTANGIBLE PLANT		9,100,773.53					
NONDEPRECIABLE PLANT							
303.11 WATER RIGHTS	NONDEPR.	1,703,879.22					
303.12 RESERVOIR LAND	NONDEPR.	2,810,235.84					
303.13 OTHER SOURCE OF SUPPLY LAND	NONDEPR.	6,455,412.13					
303.2 POWER AND PUMPING LAND	NONDEPR.	1,064,985.76					
303.3 PURIFICATION LAND	NONDEPR.	1,286,645.42					
303.4 TRANSMISSION AND DISTRIBUTION LAND AND RIGHTS OF WAY	NONDEPR.	1,155,453.75					
303.5 DISTRIBUTION RESERVOIR AND STANDPIPE LAND	NONDEPR.	1,323,147.51					
303.61 OFFICE LAND	NONDEPR.	3,128,180.15					
303.62 STORES, SHOP AND GARAGE LAND	NONDEPR.	1,002,954.67					
303.63 MISCELLANEOUS LAND	NONDEPR.	918,797.63					
TOTAL NONDEPRECIABLE PLANT		20,849,692.08					
DEPRECIABLE PLANT							
304.2 POWER AND PUMPING STRUCTURES							
MAJOR TREATMENT PLANTS	100-R2 *	7,916,497.65	2,806,037	5,110,460	129,056	39.6	1.63
OTHER STRUCTURES	45-R3	19,735,657.69	6,311,463	13,424,196	449,893	29.8	2.28
TOTAL ACCOUNT 304.2		27,652,155.34	9,117,500	18,534,656	578,949		
304.3 PURIFICATION BUILDINGS							
MAJOR TREATMENT PLANTS	85-S2.5 *	137,481,138.73	22,749,001	114,732,134	3,111,989	36.9	2.26
OTHER STRUCTURES	45-R3	7,317,690.96	1,353,069	5,964,625	195,488	30.5	2.67
TOTAL ACCOUNT 304.3		144,798,829.69	24,102,070	120,696,759	3,307,477		
304.61 OFFICE BUILDINGS							
OFFICES	60-S1 *	37,186,535.39	12,261,399	24,925,133	1,195,495	20.8	3.21
OTHER STRUCTURES	50-R3	161,779.52	10,199	151,580	3,753	40.4	2.32
TOTAL ACCOUNT 304.61		37,348,314.91	12,271,598	25,076,713	1,199,248		
304.62 STORES, SHOP AND GARAGE BUILDINGS							
MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	85-R3 *	8,016,543.92	3,290,199	4,726,348	206,397	22.9	2.57
COLLECTING AND IMPOUNDING RESERVOIRS	70-S1 *	20,798,399.56	3,847,557	16,950,842	762,394	22.2	3.67
LAKE, RIVER AND OTHER INTAKES	120-R1.5 *	26,457,701.63	5,364,683	21,093,023	497,992	42.4	1.88
WELLS AND SPRINGS	100-R2.5 *	14,929,017.17	3,279,580	11,649,441	434,253	26.8	2.91
OTHER POWER PRODUCTION EQUIPMENT	50-R3	40,428,130.90	11,260,699	29,167,430	797,152	36.6	1.97
OIL ENGINE PUMPING EQUIPMENT	40-R0.5 *	12,268,127.32	934,638	11,333,486	560,769	20.2	4.57
ELECTRIC PUMPING EQUIPMENT	SQUARE *	9,969.20	9,114	856	856	1.0	8.59
	36-S2	60,925,473.33	19,834,852	41,090,620	1,992,269	20.6	3.27

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2011

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2011 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCRUAL RATE PERCENT (8)
320	PURIFICATION SYSTEM						
	STRUCTURES	74,817,860.62	18,966,963	55,850,894	1,927,696	29.0	2.58
	WELLS AND BOOSTERS	4,060,428.86	819,838	3,240,588	102,260	31.7	2.52
	SUBTOTAL	78,878,289.48	19,786,801	59,091,482	2,029,956		
	EQUIPMENT	67,266,447.31	14,613,121	52,653,329	1,818,034	29.0	2.70
	COMPUTERS	6,787,983.59	4,266,901	2,521,083	405,015	6.2	5.97
	PAINTING	176,435.71	176,436	0	0	-	-
	FILTER MEDIA	2,984,392.20	2,668,752	315,637	90,764	3.5	3.04
	TOTAL ACCOUNT 320	156,093,548.29	41,512,011	114,581,531	4,343,769		
330	DISTRIBUTION RESERVOIRS AND STANDPIPES						
	TANKS	57,319,685.96	17,212,819	40,106,868	1,056,715	38.0	1.84
	TANK PAINTING	21,392,474.81	10,696,790	10,695,684	1,471,041	7.3	6.88
	TOTAL ACCOUNT 330	78,712,160.77	27,909,609	50,802,552	2,527,756		
331	MAINS AND ACCESSORIES						
	CAST IRON MAINS - 4 INCH AND UNDER	20,403,857.13	2,531,491	17,872,366	296,620	60.3	1.45
	CAST IRON MAINS - 6, 8 AND 10 INCH	889,377,505.73	76,889,858	812,487,653	10,550,213	77.0	1.19
	CAST IRON MAINS - 12 INCH AND OVER	286,524,718.91	33,989,237	232,535,482	2,901,047	80.2	1.09
	STEEL MAINS	6,809,344.56	3,178,485	3,630,859	161,752	22.4	2.38
	LOCK JOINT MAINS	6,013,953.08	1,613,927	4,400,029	79,221	55.5	1.32
	VALVES	29,705,488.94	6,159,664	23,545,828	527,625	44.6	1.78
	SPECIAL CONSTRUCTION	29,879,986.42	5,408,061	24,471,927	540,918	45.2	1.81
	CEMENT WROUGHT IRON MAINS	347,240.44	212,062	135,180	10,380	13.0	2.99
	WROUGHT IRON MAINS	71,036.24	54,935	16,099	2,355	6.8	3.32
	COPPER MAINS	514,249.99	176,589	337,662	12,400	27.2	2.41
	ASBESTOS CEMENT MAINS	9,898,721.78	3,021,909	6,876,813	137,515	50.0	1.39
	GALVANIZED STEEL MAINS	588,610.78	185,837	402,777	17,225	23.4	2.93
	PLASTIC	11,309,128.38	2,259,871	9,049,259	190,556	47.5	1.68
	MAIN CLEANING AND LINING	85,818,682.91	13,845,876	71,972,807	1,859,455	38.7	2.17
	TOTAL ACCOUNT 331	1,357,262,525.29	149,527,802	1,207,734,741	17,287,282		
333	SERVICES	237,654,518.34	41,263,771	196,390,749	4,094,180	48.0	1.72
334	METERS						
	REMOTE	86,996,216.83	46,473,232	40,522,986	5,051,636	8.0	5.81
	ERTS	33,305,834.62	15,084,541	18,221,293	2,373,393	7.7	7.13
	TOTAL ACCOUNT 334	120,302,051.45	61,557,773	58,744,279	7,425,029		
335	FIRE HYDRANTS	49,528,262.19	8,318,633	41,209,630	1,047,545	39.3	2.12
340	OFFICE FURNITURE AND EQUIPMENT						
	FURNITURE	6,922,441.13	2,399,153	4,523,289	254,774	17.8	**
	MECHANICAL EQUIPMENT	3,223,989.70	1,407,752	1,816,239	455,006	4.0	**
	COMPUTERS	39,467,642.64	20,726,522	18,741,120	8,138,075	2.3	**
	TOTAL ACCOUNT 340	49,614,073.47	24,533,427	25,080,648	8,847,855		

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2011

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2011 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCRUAL RATE PERCENT (8)
341	TRANSPORTATION EQUIPMENT VEHICLES OTHER TOTAL ACCOUNT 341	12,248,360.51 1,246,326.25 13,494,686.76	6,241,875 408,457 6,650,332	6,006,488 837,871 6,844,359	1,568,272 49,248 1,617,520	3.8 17.0	12.80 **
342	STORES EQUIPMENT	460,173.88	115,127	345,046	18,322	18.8	**
343.1	SHOP EQUIPMENT	1,198,086.35	383,150	814,937	43,636	18.7	**
343.2	TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	10,412,378.92	4,186,738	6,225,644	490,829	12.7	**
344	LABORATORY EQUIPMENT CONVENTIONAL ELECTRONIC TOTAL ACCOUNT 344	1,366,340.56 2,900,803.79 4,266,144.35	599,750 1,737,224 2,336,974	765,593 1,163,583 1,929,176	36,109 103,901 140,010	21.2 11.2	2.64 3.58
346	COMMUNICATION EQUIPMENT COMMUNICATION EQUIPMENT SCADA TOTAL ACCOUNT 346	3,726,303.81 2,154,664.64 5,880,968.45	1,789,975 711,625 2,501,600	1,936,328 1,443,040 3,379,368	251,095 227,854 478,949	7.7 6.3	** **
347	MISCELLANEOUS EQUIPMENT	2,252,016.98	583,251	1,668,767	92,491	18.0	**
348	OTHER TANGIBLE PLANT	20,707.55	3,318	17,389	848	20.5	**
	TOTAL DEPRECIABLE PLANT	2,480,784,966.01	464,696,006	2,016,088,990	58,793,777		
	TOTAL WATER PLANT IN SERVICE	2,510,735,431.62	464,696,006	2,016,088,990	58,793,777		
	CUSTOMERS' ADVANCES FOR CONSTRUCTION						
331	MAINS AND ACCESSORIES CAST IRON MAINS - 6, 8 AND 10 INCH CAST IRON MAINS - 12 INCH AND OVER TOTAL ACCOUNT 331	34,405,343.76 305,322.19 34,710,665.95	8,004,572 50,494 8,055,066	26,400,772 254,828 26,655,600	323,683 2,807 326,490	81.6 90.8	0.94 0.92
333	SERVICES	1,577,397.81	18,975	1,558,422	27,072	57.6	1.72
335	FIRE HYDRANTS	1,868,702.81	20,510	1,848,192	37,839	48.8	2.02
	TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	38,156,766.57	8,094,551	30,062,214	391,401		
	CONTRIBUTIONS IN AID OF CONSTRUCTION						
	NONDEPRECIABLE PLANT						
303.2	POWER AND PUMPING LAND	3,605.04					
303.4	TRANSMISSION AND DISTRIBUTION LAND AND LAND RIGHTS	4,505.75					
303.5	DISTRIBUTION AND STANDPIPE LAND	8,199.00					
	TOTAL NONDEPRECIABLE PLANT	16,309.79					

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2011

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2011 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCRUAL RATE PERCENT (8)
DEPRECIABLE PLANT							
304.2	POWER AND PUMPING STRUCTURES	45-R3	357,319.57	176,682	180,638	20.5	2.47
304.3	PURIFICATION BUILDINGS	85-S2.5 *	77,762.76	12,137	65,626	54.1	1.56
307	WELLS AND SPRINGS	50-R3	519,556.88	503,203	16,353	30.6	0.10
311	ELECTRIC PUMPING EQUIPMENT	36-S2	197,275.89	146,281	50,994	12.4	2.08
320	PURIFICATION SYSTEM - EQUIPMENT	45-R2	27,693.81	21,535	6,159	21.1	1.05
330	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-R4	913,626.76	578,426	335,200	39.0	0.94
331	MAINS AND ACCESSORIES						
	CAST IRON MAINS - 4 INCH AND UNDER	90-S1	68,121.61	9,305	58,817	52.8	1.64
	CAST IRON MAINS - 6, 8 AND 10 INCH	100-R3	75,211,263.22	10,135,968	65,075,297	70.8	1.22
	CAST IRON MAINS - 12 INCH AND OVER	110-R3	2,775,887.09	327,220	2,448,667	82.4	1.07
	VALVES	70-R3	69,562.69	10,803	58,760	50.8	1.66
	ASBESTOS CEMENT MAINS	90-R4	3,767,278.11	999,106	2,768,171	51.8	1.42
	PLASTIC	75-R2.5	341,777.72	58,214	283,564	49.8	1.67
	TOTAL ACCOUNT 331		82,233,890.44	11,540,616	70,693,276		
333	SERVICES	70-R3	2,152,203.04	587,402	1,564,805	43.3	1.68
334	METERS - CONVENTIONAL	22-L2 *	74,473.95	74,474	0	-	-
335	FIRE HYDRANTS	60-R3	2,211,328.87	734,892	1,476,439	32.4	2.06
	TOTAL DEPRECIABLE PLANT		88,765,131.97	14,375,648	74,389,490		
	TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION		88,781,441.76	14,375,648	74,389,490		
	AMORTIZATION OF NET SALVAGE						
	TOTAL WATER PLANT		2,383,797,223.29	442,225,807	1,911,637,286		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

** ACCRUALS CALCULATED FOR EACH ASSET BY THE COMPANY'S PROPERTY RECORD SYSTEM USING THE AMORTIZATION PERIOD SET FORTH IN COLUMN 2.

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2012

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2012 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCRUAL RATE PERCENT (8)
INTANGIBLE PLANT							
301 ORGANIZATION	NONDEPR.	5,751,926.43					
302 FRANCHISES AND CONSENTS	NONDEPR.	1,797,470.21					
303 MISCELLANEOUS INTANGIBLE PLANT	NONDEPR.	1,552,576.89					
TOTAL INTANGIBLE PLANT							
		9,101,973.53					
NONDEPRECIABLE PLANT							
303.11 WATER RIGHTS	NONDEPR.	1,703,879.22					
303.12 RESERVOIR LAND	NONDEPR.	2,984,535.80					
303.13 OTHER SOURCE OF SUPPLY LAND	NONDEPR.	6,548,232.13					
303.2 POWER AND PUMPING LAND	NONDEPR.	1,077,260.76					
303.3 PURIFICATION LAND	NONDEPR.	1,420,928.39					
303.4 TRANSMISSION AND DISTRIBUTION LAND AND RIGHTS OF WAY	NONDEPR.	1,197,453.75					
303.5 DISTRIBUTION RESERVOIR AND STANDPIPE LAND	NONDEPR.	1,360,227.51					
303.61 OFFICE LAND	NONDEPR.	3,128,180.15					
303.62 STORES, SHOP AND GARAGE LAND	NONDEPR.	1,002,954.67					
303.63 MISCELLANEOUS LAND	NONDEPR.	1,005,737.31					
TOTAL NONDEPRECIABLE PLANT							
		21,429,389.69					
DEPRECIABLE PLANT							
304.2 POWER AND PUMPING STRUCTURES	100-R2 *	7,916,497.65	2,936,687	4,979,810	127,791	39.0	1.61
MAJOR TREATMENT PLANTS	45-R3	25,714,398.87	6,797,289	18,917,113	601,657	31.4	2.34
OTHER STRUCTURES		33,630,896.52	9,733,976	23,896,923	729,448		
TOTAL ACCOUNT 304.2							
304.3 PURIFICATION BUILDINGS							
MAJOR TREATMENT PLANTS	85-S2.5 *	140,636,496.20	26,019,594	114,616,899	3,263,588	35.1	2.32
OTHER STRUCTURES	45-R3	13,968,983.13	1,557,223	12,411,759	368,242	33.7	2.64
TOTAL ACCOUNT 304.3		154,605,479.33	27,576,817	127,028,658	3,631,830		
304.61 OFFICE BUILDINGS							
OFFICES	60-S1 *	37,767,556.28	13,469,442	24,298,112	1,205,435	20.2	3.19
OTHER STRUCTURES	50-R3	849,208.66	13,495	835,713	19,999	41.8	2.36
TOTAL ACCOUNT 304.61		38,616,764.94	13,482,937	25,133,825	1,225,434		
304.62 STORES, SHOP AND GARAGE BUILDINGS							
MISCELLANEOUS STRUCTURES AND IMPROVEMENTS	85-R3 *	8,126,423.92	3,497,636	4,628,791	215,116	21.5	2.65
COLLECTING AND IMPOUNDING RESERVOIRS	70-S1 *	20,919,878.56	4,582,531	16,337,346	803,277	20.3	3.84
LAKE, RIVER AND OTHER INTAKES	120-R1.5 *	31,747,972.37	5,915,241	25,832,735	653,124	39.6	2.06
WELLS AND SPRINGS	100-R2.5 *	15,434,558.47	3,721,370	11,713,194	436,819	26.8	2.83
OTHER POWER PRODUCTION EQUIPMENT	50-R3	46,572,933.29	12,028,132	34,544,802	941,852	36.7	2.02
OIL ENGINE PUMPING EQUIPMENT	40-R0.5 *	20,727,581.95	1,678,193	19,049,384	870,622	21.9	4.20
ELECTRIC PUMPING EQUIPMENT	SQUARE *	9,969.20	9,970	0	0	-	-
	36-S2	63,592,052.60	22,068,010	41,524,045	2,029,233	20.5	3.19

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2012

	DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2012 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCRUAL PERCENT (8)
320	PURIFICATION SYSTEM	90-R2.5 *	77,189,988.55	20,897,990	56,292,007	2,017,672	27.9	2.61
	STRUCTURES	45-R3	6,926,451.25	934,428	5,992,026	176,678	33.9	2.55
	WELLS AND BOOSTERS		84,116,449.80	21,832,418	62,284,033	2,194,350		
	SUBTOTAL							
	EQUIPMENT	45-R2	85,684,527.24	16,050,227	69,634,297	2,407,074	28.9	2.81
	COMPUTERS	10-SQ	13,875,397.22	4,886,834	8,988,564	1,106,399	8.1	7.97
	PAINTING	10-SQ	176,435.71	176,436	0	0	-	-
	FILTER MEDIA	10-S3	2,984,392.20	2,750,995	233,394	69,574	3.4	2.33
	TOTAL ACCOUNT 320		186,837,202.17	45,696,910	141,140,288	5,777,397		
330	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-R4	63,157,943.43	17,989,577	45,168,368	1,167,054	38.7	1.85
	TANKS	10-SQ	25,843,739.14	12,234,829	13,608,909	1,881,579	7.2	7.28
	TANK PAINTING		89,001,682.57	30,224,406	58,777,277	3,048,633		
	TOTAL ACCOUNT 330							
331	MAINS AND ACCESSORIES	90-S1	21,295,907.73	2,707,191	18,588,720	309,542	60.1	1.45
	CAST IRON MAINS - 4 INCH AND UNDER	100-R3	987,708,977.23	83,144,261	904,564,712	11,688,614	77.4	1.18
	CAST IRON MAINS - 6, 8 AND 10 INCH	110-R3	283,419,718.92	35,662,884	247,756,831	3,087,595	80.2	1.09
	CAST IRON MAINS - 12 INCH AND OVER	70-R3	6,809,344.56	3,205,567	3,603,777	165,746	21.7	2.43
	STEEL MAINS	110-R3	6,014,498.55	1,646,492	4,368,009	79,865	54.7	1.33
	LOCK JOINT MAINS	70-R3	34,474,082.93	6,362,979	28,111,107	608,753	46.2	1.77
	VALVES	65-R3	30,695,844.95	5,756,241	24,939,606	557,495	44.7	1.82
	SPECIAL CONSTRUCTION	90-R3	347,240.44	210,827	136,415	10,733	12.7	3.09
	CEMENT WROUGHT IRON MAINS	55-R2	71,036.24	54,436	16,598	2,694	6.2	3.79
	WROUGHT IRON MAINS	60-R2.5	514,249.99	180,105	334,146	12,515	26.7	2.43
	COPPER MAINS	90-R4	9,898,721.78	3,081,047	6,817,675	138,926	49.1	1.40
	ASBESTOS CEMENT MAINS	50-S0	588,610.78	191,060	397,554	17,368	22.9	2.95
	GALVANIZED STEEL MAINS	75-R2.5	11,309,128.38	2,355,647	8,953,483	190,809	46.9	1.69
	PLASTIC	50-L4	93,357,988.75	15,141,901	78,216,087	2,031,749	38.5	2.18
	MAIN CLEANING AND LINING		1,486,505,351.23	159,700,638	1,326,804,720	18,902,404		
	TOTAL ACCOUNT 331							
333	SERVICES	70-R3	248,914,983.69	47,489,487	201,425,500	4,192,628	48.0	1.68
334	METERS	17-S1.5	91,964,454.14	51,479,585	40,484,867	5,021,435	8.1	5.46
	REMOTE	15-S1.5	34,316,236.43	17,447,768	16,868,469	2,302,283	7.3	6.71
	ERTS		126,280,690.57	68,927,353	57,353,336	7,323,718		
	TOTAL ACCOUNT 334							
335	FIRE HYDRANTS	60-R3	51,896,895.53	9,795,730	42,101,160	1,067,648	39.4	2.06
340	OFFICE FURNITURE AND EQUIPMENT	20-SQ	7,061,637.93	2,599,921	4,461,718	267,578	16.7	**
	FURNITURE	10-SQ	3,408,717.70	1,739,000	1,669,719	494,596	3.4	**
	MECHANICAL EQUIPMENT	5-SQ	51,812,073.18	29,026,333	22,785,740	8,359,942	2.7	**
	COMPUTERS		62,282,428.81	33,365,254	28,917,177	9,122,116		
	TOTAL ACCOUNT 340							

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TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2012

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2012 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCRUAL RATE PERCENT (8)
341	TRANSPORTATION EQUIPMENT VEHICLES OTHER TOTAL ACCOUNT 341	15,641,803.38 2,167,978.25 17,809,781.63	7,867,845 451,089 8,318,934	7,773,957 1,716,891 9,490,848	1,799,725 95,873 1,895,598	4.3 17.9	11.51 **
342	STORES EQUIPMENT	858,273.88	134,188	724,085	38,296	18.9	**
343.1	SHOP EQUIPMENT	1,323,649.26	431,438	892,212	48,453	18.4	**
343.2	TOOLS AND WORK EQUIPMENT - GENERAL EQUIPMENT	11,321,201.18	4,714,237	6,606,967	523,106	12.6	**
344	LABORATORY EQUIPMENT CONVENTIONAL ELECTRONIC TOTAL ACCOUNT 344	1,466,535.48 2,989,686.72 4,456,222.20	630,052 1,843,953 2,474,005	836,482 1,145,735 1,982,217	39,324 104,556 143,880	21.3 11.0	2.68 3.50
346	COMMUNICATION EQUIPMENT COMMUNICATION EQUIPMENT SCADA TOTAL ACCOUNT 346	3,879,371.81 2,841,746.35 6,721,118.16	2,039,460 955,630 2,995,090	1,839,911 1,886,117 3,726,028	261,356 267,540 528,896	7.0 7.0	** **
347	MISCELLANEOUS EQUIPMENT	2,294,351.98	679,169	1,615,184	93,997	17.2	**
348	OTHER TANGIBLE PLANT	65,707.55	5,047	60,660	2,626	23.1	**
	TOTAL DEPRECIABLE PLANT	2,730,554,051.56	519,246,699	2,211,307,362	64,246,151		
	TOTAL WATER PLANT IN SERVICE	2,761,085,414.78	519,246,699	2,211,307,362	64,246,151		
	CUSTOMERS' ADVANCES FOR CONSTRUCTION						
331	MAINS AND ACCESSORIES CAST IRON MAINS - 6, 8 AND 10 INCH CAST IRON MAINS - 12 INCH AND OVER TOTAL ACCOUNT 331	34,405,343.76 305,322.19 34,710,665.95	8,326,744 54,603 8,381,347	26,078,600 250,719 26,329,319	322,153 2,768 324,921	81.0 90.6	0.94 0.91
333	SERVICES	1,577,397.81	46,106	1,531,291	26,883	57.0	1.70
335	FIRE HYDRANTS	1,868,702.81	58,258	1,810,444	37,497	48.3	2.01
	TOTAL CUSTOMERS' ADVANCES FOR CONSTRUCTION	38,156,766.57	8,485,711	29,671,054	389,301		
	CONTRIBUTIONS IN AID OF CONSTRUCTION						
	NONDEPRECIABLE PLANT						
303.2	POWER AND PUMPING LAND	3,605.04					
303.4	TRANSMISSION AND DISTRIBUTION LAND AND LAND RIGHTS	4,505.75 8,199.00					
303.5	DISTRIBUTION AND STANDPIPE LAND						
	TOTAL NONDEPRECIABLE PLANT	16,309.79					

AQUA PENNSYLVANIA, INC.

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF JUNE 30, 2012

DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF JUNE 30, 2012 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	ANNUAL ACCRUAL AMOUNT (6)	COMPOSITE REMAINING LIFE (7)	ANNUAL ACCURAL RATE PERCENT (8)
DEPRECIABLE PLANT							
304.2	POWER AND PUMPING STRUCTURES	357,319.57	185,508	171,812	8,737	19.7	2.45
304.3	PURIFICATION BUILDINGS	77,762.76	13,350	64,413	1,213	53.1	1.56
307	WELLS AND SPRINGS	519,556.88	503,723	15,833	531	29.8	0.10
310.4	OTHER POWER PRODUCTION EQUIPMENT	1,500,000.00	0	1,500,000	60,000	25.0	4.00
311	ELECTRIC PUMPING EQUIPMENT	197,275.89	150,384	46,891	3,903	12.0	1.98
320	PURIFICATION SYSTEM - EQUIPMENT	27,693.81	21,826	5,868	286	20.5	1.03
330	DISTRIBUTION RESERVOIRS AND STANDPIPES	913,626.76	587,014	326,612	8,601	38.0	0.94
331	MAINS AND ACCESSORIES						
	CAST IRON MAINS - 4 INCH AND UNDER	68,121.61	10,130	57,992	1,109	52.3	1.63
	CAST IRON MAINS - 6, 8 AND 10 INCH	75,211,263.22	11,050,506	64,160,759	915,802	70.1	1.22
	CAST IRON MAINS - 12 INCH AND OVER	2,775,887.09	356,308	2,419,579	29,536	81.9	1.06
	VALVES	69,562.69	11,912	57,651	1,149	50.2	1.65
	ASBESTOS CEMENT MAINS	3,767,278.11	1,059,808	2,707,469	53,135	51.0	1.41
	PLASTIC	341,777.72	63,429	278,349	5,656	49.2	1.65
	TOTAL ACCOUNT 331	82,233,890.44	12,552,093	69,681,799	1,006,387		
333	SERVICES	2,152,203.04	623,559	1,528,648	35,892	42.6	1.67
334	METERS - CONVENTIONAL	74,473.95	74,474	0	0	-	-
335	FIRE HYDRANTS	2,211,328.87	780,445	1,430,886	45,112	31.7	2.04
	TOTAL DEPRECIABLE PLANT	90,265,131.97	15,492,376	74,772,762	1,170,662		
	TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION	90,281,441.76	15,492,376	74,772,762	1,170,662		
	AMORTIZATION OF NET SALVAGE				6,119,369		
	TOTAL WATER PLANT	2,632,647,206.45	495,268,612	2,106,863,546	68,805,557		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

** ACCRUALS CALCULATED FOR EACH ASSET BY THE COMPANY'S PROPERTY RECORD SYSTEM USING THE AMORTIZATION PERIOD SET FORTH IN COLUMN 2.

Aqua Pennsylvania, Inc.
Data Requirements of the Pennsylvania Public Utility Commission
Depreciation Study

FR VI.6

Aqua Pennsylvania, Inc.
VI. Depreciation

6. Provide an exhibit showing gross salvage, cost of removal, and net salvage for the five most recent calendar or fiscal years by account.

Answer:

The information is presented on pages III-2 through III-5 of Exhibit No. 6-A, Part I for the historic test year, pages VIII-2 through VIII-4 of Exhibit No. 6-A, Part II for the future test year and pages III-2 through III-4 of Exhibit No. 6-A, Part III for the fully forecasted test year for water assets.

The information is presented on pages III-2 through III-4 of Exhibit No. 6-B, Part I for the historic test year, pages VIII-2 through VIII-4 of Exhibit No. 6-B, Part II of the future test year and pages III-2 through III-4 of Exhibit No. 6-B, Part III for the fully forecasted test year for wastewater assets.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

AQUA PENNSYLVANIA, INC.

Docket No. R-2018-3003068

**DIRECT TESTIMONY OF
WILLIAM J. JERDON**

**ADDRESSING THE EFFECTS OF THE TAX CUTS AND JOBS ACT ON THE
COMPANY'S REVENUE REQUIREMENT, DESCRIBING THE FLOW-THROUGH
TREATMENT OF DEDUCTIONS FOR REPAIRS, AND EXPLAINING THE
COMPANY'S INCOME TAX CALCULATION**

August 17, 2018

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1 A. I am primarily responsible for the Company’s tax compliance, tax accounting and
2 tax strategy relating to income and non-income federal, state, and local taxes.

3 5. Q. **What is the purpose of your testimony?**

4 A. The purpose of my testimony is three-fold. First, I will address how the Tax Cuts
5 and Jobs Act (“TCJA”) affects the development of the Company’s revenue
6 requirement in this case. Second, I will describe how the Company is reflecting the
7 effects of its tax treatment of repairs pursuant to the terms of the Joint Petition for
8 Settlement of its last base rate case, which was approved by the Pennsylvania Public
9 Utility Commission’s (“PUC” or the “Commission”) final order entered June 7, 2012
10 at Docket No. R-2011-2267958. Third, I will explain the calculation of the
11 Company’s federal and state income tax expenses claims in this case.

12 **II. EFFECTS OF THE TCJA**

13 6. Q. **Please provide a brief overview of the TCJA.**

14 A. The TCJA was signed into law on December 22, 2017. This is the most significant
15 tax legislation since 1986 and it makes changes to the law that will materially affect
16 AP and its customers. For AP and its customers, the most impactful aspects of the
17 TCJA are its reduction in the corporate federal income tax rate, its changes to AP’s
18 ability to claim accelerated (i.e., bonus) tax depreciation and its change to the
19 taxability of contributions in aid of construction (“Contributions”) and customer
20 advances for construction (“Advances”).

21 7. Q. **Please describe the corporate tax rate reduction.**

1 A. Section 13001 of the TCJA reduces the federal corporate income tax rate from 35%
2 to 21%. This reduction is effective for taxable years beginning after December 31,
3 2017. Thus, the new, lower rate is effective for the fully projected future test year
4 (“FPFTY”) in this case.

5 8. Q. **Does the corporate tax rate reduction have any additional implications?**

6 A. Yes, it does. Because future tax rates will be lower, the tax rate reduction obviated
7 the necessity for maintaining a portion of the accumulated deferred income tax
8 (“ADIT”) balance that had previously been accumulated. This unneeded, or excess,
9 ADIT amount is, therefore, available to be flowed to customers. Section 13001 of
10 the TCJA includes a provision that requires that a certain portion of the excess be
11 flowed to customers no faster than using the average rate assumption method
12 (“ARAM”). I will discuss this later on in my testimony.

13 9. Q. **Please describe the TCJA’s impact on AP’s ability to claim accelerated tax**
14 **depreciation.**

15 A. Prior to the TCJA, most businesses would have been able to claim either 40% or
16 50% bonus depreciation (depending on the construction period of the asset) on assets
17 placed in service in 2018 and 30% or 40% bonus depreciation (again, depending on
18 the construction period of the asset) on assets placed in service in 2019. While,
19 under section 13201 of the TCJA, most businesses are able to treat as a tax-
20 deductible expense 100% of their investment in qualified assets acquired and placed
21 in service after September 27, 2017, that provision is inapplicable to regulated utility
22 businesses. Thus, AP can only claim “regular” depreciation on such assets under the

1 pre-existing Modified Accelerated Cost Recovery System (“MACRS”). As a
2 consequence, the amount of depreciation available to be claimed in the early years of
3 an asset’s life is less than if “bonus” depreciation continued to be available to public
4 utilities.

5 10. Q. **Please describe the impact of the TCJA on the taxability of Contributions and**
6 **Advances.**

7 A. Since 1996, Contributions and Advances paid to water and wastewater utilities have
8 been non-taxable to the recipient utility. Section 13312 of the TCJA amends the law
9 to render such contributions taxable by treating them as taxable income.

10 11. Q. **What impact does the federal income tax rate reduction have on AP’s combined**
11 **income tax rate?**

12 A. AP’s Pennsylvania income tax rate is 9.99%. Since state taxes are deductible for
13 federal income tax purposes, prior to the TCJA, the cost of state income taxes after
14 federal benefit was 6.494% (9.99% X (1-35%)). When that was added to the federal
15 income tax rate of 35%, AP’s combined income tax rate was 41.494% (before
16 “special” items such as credits, etc.). Under the TCJA, AP’s combined income tax
17 rate is 28.892% (21% + (9.99% X (1-21%)) (again, before “special” items). This
18 12.60% reduction in AP’s combined income tax is, as one would expect, slightly less
19 than the 14% federal income tax rate reduction (35% - 21%) due to the reduced
20 benefit that deducting AP’s state income taxes produces.

21 12. Q. **How does the TCJA impact AP’s income tax expense element of cost of service?**

1 A. The Company's income tax element of cost of service is impacted in two ways.
2 First, the Company's income tax calculations utilize the lower statutory effective tax
3 rate as a result of the decrease in the federal income tax rate from 35% to 21%. The
4 result is a new statutory effective tax rate of 28.89% (21% Federal + 7.89% State)
5 versus 41.49% (35% Federal + 6.45%) prior to TCJA. Second, the Company's
6 income tax calculations include a flowback of excess deferred income taxes, which I
7 will discuss later. Ultimately, between the decrease in the statutory effective income
8 tax rate and the flowback of excess deferred income taxes, cost of service is reduced
9 as a result of TCJA.

10 13. **Q. Is there another way in which the TCJA impacts AP's income tax expense?**

11 A. Yes, there is. Due to the change from the pre-TCJA availability of bonus
12 depreciation to no bonus depreciation, AP's 2019 taxable income will be higher than
13 it would have been under the pre-TCJA depreciation regime. Accordingly, the tax
14 expense element of AP's cost of service, consisting of current and deferred income
15 tax, reflects an increase in the current tax component of tax expense and an exact
16 offsetting adjustment that reduces the deferred tax component of tax expense when
17 compared to what would have transpired under pre-TCJA tax law. There is,
18 however, no impact on total income tax expense.

19 14. **Q. Please explain the excess ADIT balance you described previously.**

20 A. In years between 1988 and 2017, when AP claimed (and was able to use) tax
21 deductions in excess of its book expenses – most particularly accelerated (including
22 bonus) tax depreciation – the Company reduced its taxable income and, hence, its

1 income tax liability, by an amount equal to the incremental tax deduction multiplied
2 by the corporate tax rate (34% or 35%, depending on the year). In those instances
3 where normalization tax accounting was used, the cash benefit of the income tax
4 reduction was retained by AP, recorded as ADIT and reflected in ratemaking as an
5 offset to rate base. This amount was recorded as a liability because it was
6 anticipated that the amount would eventually have to be paid back to the government
7 in the form of higher income taxes when, later on in the life of the depreciable assets,
8 book depreciation would exceed the available tax depreciation deductions.
9 However, a reduction in the tax rate alters the amount of the anticipated liability.
10 When, eventually, the higher taxable income is produced, it will be taxed at 21%, not
11 34% or 35%. Consequently, some portion of the deferred tax reserve previously
12 recorded on the presumption that the future taxable income would be taxed at 34% or
13 35% is rendered unnecessary for that purpose.

14 15. Q. **What changes did the Company record on its books to reflect this fact?**

15 A. The reduction in the corporate federal income tax rate from 35% to 21% was
16 reflected on AP's financial statements as of December 31, 2017. To account for the
17 rate reduction, the ADIT was reduced by the amount of the excess ADIT and a
18 corresponding regulatory liability was established.

19 16. Q. **Please describe how the excess ADIT was calculated?**

20 A. The Company revalued the ADIT downward from 35% to 21% as of December 31,
21 2017. This reduction in deferred taxes was recorded as a regulatory liability on the

1 balance sheet. The regulatory liability was “grossed up” to reflect the tax change to
2 21%. The “gross up” also includes the state income tax affect.

3 17. Q. **Can this excess ADIT amount be flowed through to customers?**

4 A. Yes, it can be, although the timing of the flow-through of some of the amount is
5 restricted by the tax law.

6 18. Q. **Please explain.**

7 A. Section 13001 of the TCJA establishes a rule that is very similar to the one
8 established in the Tax Reform Act of 1986 when the corporate tax rate was reduced
9 from 46% to 34%. Specifically, the statute defines the term “excess tax reserve” as
10 the excess of the ADIT reserve required by the normalization rules (that is, the
11 reserve attributable to accelerated depreciation) as of the day prior to the TCJA tax
12 rate reduction over the amount that would have been in the reserve had the lower
13 corporate tax rate been in effect for all prior periods. The “excess tax reserve” (often
14 referred to as the “protected” excess reserve) can be flowed through to customers no
15 faster than permitted using the ARAM, that is, as the underlying timing differences
16 reverse. Alternatively, if the utility doesn’t have the records necessary to apply the
17 ARAM, the excess ADIT may be flowed to customers ratably over the remaining life
18 of the property.

19 19. Q. **Is there any restriction in the tax law on the timing of flowing through to**
20 **customers any of the excess ADIT balance that is attributable to the portion of**
21 **the ADIT reserve that was not required by the normalization rules?**

1 A. No there is not. The flow through of those amounts (often referred to as the
2 “unprotected” excess reserve) can occur at whatever rate the regulator deems
3 reasonable and appropriate.

4 20. Q. **How does the Company propose to treat the resultant regulatory liability in this**
5 **case?**

6 A. The regulatory liability established for the excess ADIT will be returned to
7 customers over a period of time as a reduction in the deferred tax component of tax
8 expense.

9 21. Q. **What is the proposed period for the amortization of the regulatory liability?**

10 A. The regulatory liability is made up of two components. Protected excess ADIT
11 relates to the amounts required by the tax normalization rules and the amortization
12 period cannot be faster than the period in which the amounts would have amortized
13 previously. Unprotected ADIT relate to amounts of ADIT that were normalized and
14 may be amortized over a different period. The Company is utilizing the ARAM, as it
15 is required by law to do, for the amortization of the regulatory liability attributable to
16 the protected ADIT and proposes to amortize its unprotected excess ADIT balance
17 over 10 years.

18 22. Q. **What are the amounts of these amortizations in this case?**

19 A. The annual amortization amounts of protected excess ADIT during the FPFTY are
20 \$3,710,939 and \$61,651 for water and wastewater, respectively. The corresponding

1 annual unprotected amount is (\$244,192) and \$892 for water and wastewater,
2 respectively.

3 23. Q. **How does the Company propose to treat the change in taxability of**
4 **Contributions and Advances?**

5 A. The Company has decided to pay the tax on taxable Contributions and Advances and
6 “socialize” the cost over all of its customers rather than have the contributor or
7 developer pay the cost. The Company will normalize the tax it will pay on receipt of
8 Contributions and Advances, thereby creating an ADIT asset. This ADIT asset will
9 be included in the Company’s rate base calculation in subsequent cases. For this
10 filing, the Company has not estimated the taxable Contributions and Advances due to
11 the uncertainty of the amounts it will collect.

12 24. Q. **Do the effects of the TCJA for the year ending December 31, 2018 require the**
13 **Company to implement a credit to reflect a reduction in income tax expense for**
14 **2018?**

15 A. No, it does not. As required by the Commission’s Secretary Letter dated February
16 12, 2018 in Docket No. M-2018-2641242, the Company provided responses to the
17 Commission’s data requests showing the effects of the TCJA on the Company’s
18 financial position for the twelve months ending December 31, 2018. In those
19 responses, the Company set forth a calculation that demonstrated the changes made
20 by the TCJA would actually increase the Company’s income tax expense and,
21 therefore, if any adjustment were to be made to its rates to reflect the effects of the
22 TCJA on its operations for 2018, it would need to be a surcharge to offset the

1 negative effects of the TCJA, which the Company chose not to request in light of the
2 impending filing of this case. As the Company also noted in its responses to the
3 Commission's data requests, because of the effects of the settlement of its 2011 rate
4 case and the resulting decrease in the Company's effective tax rates well below
5 statutory tax rates both prior to, and after TCJA, a negative surcharge to the
6 Company's customers is not required. The benefits of the Company's tax repair
7 election and use of flow-through accounting were anticipated in, and reflected in, the
8 terms of the settlement. As I noted earlier, the Company's calculation of its income
9 tax claims in this case fully reflects the lower federal income tax rate of 21% and
10 also include a flow-back of excess deferred income taxes.

11 **III. THE COMPANY'S TREATMENT OF REPAIRS DEDUCTIONS**
12 **FOR RATEMAKING PURPOSES IN THIS CASE**

13 25. Q. **Please begin by explaining what qualifies as a repair for tax purposes?**

14 A. Work performed on an asset to keep it in its normal working condition which does
15 not materially extend its life, increase its value or change its use generally qualifies
16 as a repair for tax purposes.

17 26. Q. **What is the usual tax treatment of repair costs?**

18 A. Expenditures for incidental repairs are deductible as incurred for tax purposes.

19 27. Q. **What is a unit of property?**

20 A. The unit of property is the asset to which the "repair" test is applied. The concept is,
21 therefore, critical for distinguishing between repairs (which are currently deductible)

1 and capital costs (which are not). A simple illustration will make this clear. Take
2 the changing of a truck's spark plugs. If each spark plug is defined as a separate unit
3 of property, then the changing of 6 spark plugs represents the retirement of 6 units of
4 property and the installation of 6 new units of property. Because the removal of a
5 unit of property does not, by definition, keep that unit in its normal operating
6 condition, the installation of a new unit of property is a capital cost and not a repair.
7 Consequently, the installation of each spark plug would be a capital addition that
8 would be depreciated over the tax life of the asset. By contrast, if the truck was
9 defined as the unit of property, then the changing of spark plugs would not constitute
10 the installation of new units of property. Because a tune- up (of which the spark plug
11 replacements are a part) keeps the truck in its normal operating condition, it would
12 meet the definition of a repair and, as such, be fully deductible when the repair
13 occurs. Thus, the same work can produce radically different tax results depending
14 on the definition of a unit of property.

15 28. Q. **What does this example illustrate about units of property?**

16 A. It demonstrates the fundamental characteristic that the larger the unit of property, the
17 more likely it is that projects associated with that asset will qualify as deductible
18 repairs.

19 29. Q. **Are there specific rules that govern how taxpayers must define their units of**
20 **property?**

21 A. The current Treasury Regulations provide several helpful definitions and examples.
22 However, with respect to network assets such as gas and oil pipelines, electric lines,

1 railroad track and water and wastewater systems, the regulations are singularly
2 unhelpful. In this regard, they state:

3 (B) Unit of property for network assets. In the case of
4 network assets, the unit of property is determined by the taxpayer's
5 particular facts and circumstances except as otherwise provided in
6 published guidance in the federal register or in the Internal
7 Revenue Bulletin (see §601.601(d)(2)(ii)(b) of this chapter). For
8 these purposes, the functional interdependence standard provided
9 in paragraph (e)(3)(i) of this section is not determinative.

10 Treasury Regulations §1.263-3(e)(3)(iii)(B).

11
12
13 30. Q. **Has the IRS issued any published guidance with respect to network assets?**

14 A. It has for certain types of network assets – but not for water and wastewater network
15 assets.

16 31. Q. **Prior to filing its 2012 federal income tax return, what units of property did AP
17 use for determining whether a particular cost was a repair or a capital
18 expenditure?**

19 A. AP used the same units of property for tax purposes that it used for book purposes.
20 That is, the Company followed its books in determining what expenditures were and
21 were not repairs for tax purposes.

22 32. Q. **What caused the Company to eventually change its units of property for tax
23 purposes?**

24 A. In 2006, the Internal Revenue Service ("IRS") issued proposed regulations in which,
25 for the first time, it addressed the determination of a unit of property in a systematic
26 way. In 2008, it withdrew these proposed regulations and issued a revised version.

1 While these revised proposed regulations provided principles and helpful examples
2 for many types of assets, with respect to network assets they said nothing. The
3 preamble to these proposed regulations contained the following statement:

4 The IRS and Treasury Department generally think that the unit of
5 property rules for network assets should be addressed on an
6 industry by industry basis in internal revenue bulletin guidance.
7 Industries are invited to submit requests for guidance under the
8 industry issue resolution (IIR) program after these regulations are
9 finalized.

10 This invitation indicates that the final determination of units of property for network
11 assets has to be negotiated for each industry group interested in pursuing a common
12 definition for that industry.

13 33. Q. **Is there a tax rule that creates a particular problem for linear units of property?**

14 A. Yes, there is. One historical tax rule has been that the replacement of a material
15 portion of a linear unit of property is a capital expenditure — not a repair. When a
16 taxpayer uses large units of property, this requires that one must be able to draw a
17 line that divides a material replacement from a non-material replacement. The
18 dividing line is a percentage of the unit of property. Unfortunately, there is no
19 specific percentage that the IRS has identified as being acceptable. It could be 5% or
20 10% or 20% or some other percentage. Thus, even were the units of property
21 certain, the identification of repairs remains uncertain.

22 34. Q. **Have any of the segments of the utility industry reached agreement with the IRS**
23 **regarding the appropriate units of property and the threshold for material**
24 **replacements for network assets?**

1 A. Yes. The electric industry has reached agreement with regard to electric
2 transmission and distribution assets. The gas transmission and distribution industry
3 is awaiting finalization of their agreement (they have been waiting over six years).

4 35. Q. **Have the water and wastewater industries commenced a process to reach a**
5 **similar agreement?**

6 A. The water and wastewater industries have no process under way.

7 36. Q. **Please describe the Company's change in its treatment of repairs?**

8 A. Recognizing that the IRS would allow it to change its units of property for tax
9 purposes to larger units than it had previously used which would entitle it to
10 significant incremental tax deductions, on its 2012 consolidated Federal income tax
11 return, Aqua America, Inc. (parent company of AP) filed Form 3115, Application for
12 Change in Accounting Method, to allow AP to currently deduct a large quantity of
13 expenditures in the year incurred rather than capitalizing and depreciating them, as it
14 was doing (and continued to do) for book purposes.

15 37. Q. **How was the change in accounting method recorded on the Company's 2012**
16 **Federal income tax return?**

17 A. The change had two components. First, all costs incurred in 2012 that qualified as
18 repairs under the Company's new accounting method (that is, its use of larger units
19 of property) were deducted. This enhanced deduction will continue each year into
20 the future. The second component is referred to as a "Section 481(a)" adjustment. It
21 is a "one time" deduction. When a taxpayer changes a tax accounting method, its tax

1 books and records are essentially restated to conform to what they would have
2 looked like had the taxpayer always used its new method. The Company restated the
3 tax basis of its assets as if it had always deducted those projects that would have
4 been repairs had its new unit of property definition been in use for all prior years.
5 Since the tax life of water and wastewater assets is 25 years, it needed to go back 25
6 years and determine in each year what projects it capitalized that would have
7 qualified as repairs under its new unit of property definition. However, since the
8 costs of those projects had, in fact, been capitalized and depreciated for tax purposes,
9 the cumulative incremental repair amount must be reduced by the tax depreciation
10 already claimed to arrive at a net amount by which the tax basis of the distribution
11 assets will be reduced. Because reducing the tax basis will deprive the utility of ever
12 claiming a deduction for the costs reflected in this basis reduction, the tax rules allow
13 the company to claim the entire amount as a deduction in the year in which the
14 change is made. The Section 481(a) adjustment is, in reality, a "catch-up"
15 adjustment.

16 38. Q. **How much was the Section 481(a) adjustment?**

17 A. The Section 481(a) adjustments were \$377,140,949 and \$2,268,632 for water and
18 wastewater, respectively. This amount was claimed as a deduction on the
19 Company's 2012 Federal and State income tax returns.

20 39. Q. **How does all of this background relate to the treatment of repairs in this case?**

21 A. In November of 2011, the Company filed for a water rate increase. The proceeding
22 (Docket R-2011-2267958) was resolved by a settlement. During the pendency of the

1 case, all parties were aware of the probability that the Company would change its
2 accounting method for tax repairs in the relatively near future. Although the
3 Company had not changed its accounting method at the time the settlement was
4 reached, the parties decided to lay out the terms and conditions for any eventual
5 change in the settlement agreement. The Joint Petition for Settlement, which was
6 approved by the Commission, stated, in pertinent part:

- 7 1. Should the Company decide to make the tax repair election in a return
8 filed after 2012 (that is, for a tax year later than 2011), the Company will
9 so notify the signatories to the Joint Petition for Settlement within 30
10 days after its return is filed;
- 11 2. The Company will utilize flow-through accounting for the tax benefits
12 of the repair election; it will first utilize the current repair deduction, and
13 only then utilize any available catch-up deduction;
- 14 3. The Company may only initiate the flow-through of the repair catch-up
15 deduction to income upon notification to the signatory parties that it will
16 not file its next water base rate filing in 2013 [when the Company had
17 anticipated filing its next base rate case];
- 18 4. Following such notification, and annually following the repair election,
19 the Company will flow-through the catch-up deduction utilized to offset
20 taxable income in the tax year (i.e., not creating a net operating loss), or
21 10% of the total catch-up amount, whichever is less; and
- 22 5. The treatment of the catch-up deduction related to the portion not yet
23 flowed through will be addressed and dealt with in the Company's next
24 water base rate case.

25 40. Q. **Please describe how the Company treated the tax consequences of the**
26 **accounting method change since the Order was entered approving the**
27 **settlement?**

28 A. In accordance with the terms of the settlement, the Company has flowed through the
29 annual repair deduction each year (subject to the FIN 48 adjustment discussed

1 below). With respect to the Section 481(a) adjustment, it commenced flow-through
2 accounting beginning in calendar year 2013 subject to the limitation imposed by the
3 Order; that is, the annual flow through has been limited to the lesser of (1) 10% of
4 the total Section 481(a) adjustment (\$377,140,949 X 10%, or \$37,714,095, for water
5 and \$2,268,632 X 10%, or \$226,863, for wastewater); or (2) taxable income on the
6 federal income tax return of that year. The Company has not been constrained by the
7 taxable income limitation so it has flowed through 1/10th of the tax benefit of the
8 Section 481(a) adjustment each year (again, subject to the FIN 48 adjustment
9 discussed below).

10 41. Q. **What is FIN 48?**

11 A. FIN 48 is an accounting pronouncement issued in 2006 by the Financial Accounting
12 Standards Board, the body that establishes the rules that constitute generally
13 accepted accounting principles. FIN 48 prescribes the way in which companies must
14 analyze, quantify and display the consequences of tax positions that are technically
15 uncertain.

16 42. Q. **What is the purpose of FIN 48?**

17 A. Each taxpayer has the responsibility both for filing tax returns to report how much
18 tax it owes and for paying that amount. This self-reporting is subject to review (i.e.,
19 audit) by the relevant taxing authorities. The tax law is exceedingly complex and
20 contains many provisions that are subject to more than one interpretation. Moreover,
21 it is often possible to view business transactions in more than one way. It is not
22 uncommon for a taxpayer to, either knowingly or unknowingly, interpret the tax law

1 in a way that could be disputed by the taxing authorities. It is similarly not
2 uncommon for a taxpayer to view a transaction, and, hence, the tax consequences of
3 the transaction, in a way that could be disputed by the taxing authorities. FIN 48
4 prescribes a single standard, a single process, and a single disclosure regime for
5 uncertain tax positions taken by a taxpayer, i.e., tax positions taken by a taxpayer
6 that may be disputed by the tax authorities.

7 43. Q. **What happens as a result of the application of FIN 48?**

8 A. FIN 48 requires that a taxpayer identify all of its "tax positions." The definition of a
9 tax position is very broad. It really goes to the way in which an economic action is
10 reflected on a tax return. With respect to those tax positions that are uncertain (i.e.,
11 subject to dispute by the tax authorities), the extent of the uncertainty must be
12 evaluated.

13 44. Q. **What is the nature of this evaluation?**

14 A. The evaluation process is extremely rigorous. Not only does the company's internal
15 tax department analyze the positions and assess the risk levels, the company's
16 external auditors, most especially their auditor's tax experts, thoroughly review the
17 results of the company's process and often challenge its conclusions. At the end of
18 the process, the company and its external auditors generally reach a consensus as to
19 the amount of tax at risk with respect to each uncertain tax position (i.e., how much
20 incremental tax is it likely will be paid or recovered).

21 45. Q. **How is the amount at risk reflected?**

1 A. As a general proposition, the amount of tax that it is more likely than not will be paid
2 to the taxing authorities in connection with the uncertain position must be reflected
3 by the company on its balance sheet as a tax liability. Interest must be accrued on
4 any amount recorded as a liability under FIN 48 at the interest rates imposed by the
5 relevant taxing authorities on tax underpayments. In addition, where appropriate,
6 any applicable penalties must be accrued.

7 46. Q. **Is there a check on the veracity of the amounts determined to be FIN 48**
8 **amounts?**

9 A. I would note again that the FIN 48 analysis involves a rigorous review process for
10 assessing the likelihood of having to make additional tax payments (with interest and
11 penalties) to taxing authorities. In the case of all companies with publicly traded
12 securities, the independent auditors review the company’s conclusions. Because of
13 the adverse earnings implications of designating amounts FIN 48 amounts (that is,
14 the necessity to accrue incremental interest expense, to provide a financial statement
15 disclosure and to include a schedule UTP (uncertain tax position) as part of the
16 company’s federal tax return), no company has an incentive to designate a larger FIN
17 48 amount than it has to. Finally, the purpose of the auditor review is to ensure that
18 the financial statements the investing public relies upon provide information that is
19 as accurate as possible about the true nature of the company’s liabilities. The result
20 of the review is reflected in the company’s filings with the Securities and Exchange
21 Commission (“SEC”). The adverse consequences of misreporting to the SEC can be
22 significant.

1 47. Q. **How does FIN 48 relate to the treatment of repairs in this case?**

2 A. As I described above, the Company's position regarding what constitutes a repair for
3 tax purposes is largely dependent on two factors: its appropriate units of property
4 and the threshold for determining a material replacement of a unit of property. There
5 are no explicit guidelines for either of these factors. The water/wastewater industry
6 has no relevant agreement with the IRS and the Company's asserted positions in
7 these regards have not yet been audited by any taxing authority. Thus, although the
8 Company believes the positions are reasonable, they remain untested and unproven.
9 The Company, in conjunction with its independent auditors, has evaluated its
10 positions pursuant to the dictates of FIN 48 and determined that it is more likely than
11 not that a portion of its claimed deductions – both with respect to the Section 481(a)
12 adjustment and the annual repair deduction – will be disallowed. It has, therefore,
13 characterized a portion of each of its deductions as being a FIN 48 amount. The
14 benefit of its repair deductions has, accordingly, been reduced. The FPPTY Section
15 481(a) adjustment flow-through amount of \$37,714,095 for water, and \$226,863 for
16 wastewater (10% of the total Section 481(a) adjustment) has been reduced by
17 \$5,119,565 for water, and \$0 for wastewater (FIN 48 only applies to water). The
18 annual repair deduction amount for that same year has been reduced from
19 approximately \$164,000,000 to \$160,000,000. In short, customers are receiving the
20 benefit of all repair deductions that are not uncertain. This benefit is reflected as a
21 reduction in the deferred tax expense element cost of service.

22 48. Q. **How were these amounts determined?**

1 A. The income tax computation is shown on Schedules F-2 of AP Exhibit Nos. 1-A
2 (Water) and AP Exhibit 1-B (Wastewater). Both schedules are titled “Computation of
3 Federal and State Income Taxes Under Present and Proposed Rates”.

4 51. Q. **Please explain the basis for the state and federal income tax computations set
5 forth on Schedule F-2 of AP Exhibit Nos. 1-A and 1-B.**

6 A. As a threshold matter, Schedule F-2 of AP Exhibit Nos. 1-A and 1-B each contain
7 four income tax expense computations: one for the historic test year at base rates then
8 in effect (which are the same as current base rates), one for the future test year at
9 current base rates, one for the FPFTY at current base rates and one for the FPFTY at
10 the rates proposed by the Company. All four of the computations employ the same
11 methodology but, since it is the level of income tax expense applicable to the FPFTY
12 at proposed rates that is of greatest relevance in this case, I will describe that
13 computation (columns (9) and (10)) of each schedule. Because the computations are
14 similar, I will focus principally on Schedule F-2 of AP Exhibit No. 1-A. The
15 calculation of total income tax expense consists of two parts. First, the schedule
16 shows the computation of current state and federal income tax expense – that is, the
17 income tax that would be paid with respect to operations during the year assuming the
18 projected levels of income and expense are achieved. The second part is the
19 computation of deferred federal and state tax expense. The two components, when
20 combined, equal the Company’s total income tax expense to be recovered in proposed
21 base rates.

22 52. Q. **How is the Company’s current income tax expense calculated?**

1 A. The calculation of current income tax expense begins with pre-tax income (operating
 2 income before income taxes and also before interest expense). There are three
 3 adjustments made to this number that are the same for both federal and state income
 4 tax purposes. These are interest expense, tax repairs and book depreciation. Interest
 5 expense (line 2) is not reflected in pre-tax income but is deductible for both federal
 6 and state income tax purposes. Consequently, an adjustment must be made. The tax
 7 repair deduction (line 4) is the deduction that the Company projects it will claim
 8 during the test year for both federal and state income tax purposes net of the FIN 48
 9 reserve. The nature of this deduction and the FIN 48 reservation are described earlier
 10 in my testimony. Book depreciation is added back to both the federal and state
 11 computation (line 5). Tax depreciation is then deducted for both state and federal
 12 income tax purposes (line 6).

13 53. Q. **What depreciable lives and depreciation methods does the Company use for**
 14 **federal income tax purposes?**

15 A. The Company uses the following depreciable lives and depreciation methods for tax
 16 purposes:

17 Utility Property Vintages

1969 and prior	50 years ⁽¹⁾	Straight-Line
1970	50 years ⁽¹⁾	Double Declining Balance Switching to Straight-Line
1971 to 1980	40 years ⁽²⁾	Double Declining Balance Switching to Straight-Line
1981 to 1986	15 years	Accelerated Cost Recovery System (ACRS)

1987 to June, 1996 20 years Modified Accelerated Cost Recovery System (MACRS)

June, 1996 and subsequent 25 years Straight-Line

Tax Exempt Financed 50 years Straight-Line
Property

Buildings

1970 and prior 45 years (1) Straight-Line

1971 to 1980 45 years (2) Straight-Line

1981 to 1984 (portion) 15 years ACRS

1984 (portion) to 1985 18 years ACRS

1986 19 years ACRS

Buildings

1987 and subsequent 31 1/2 years Straight-Line

Office Equipment

1970 and prior 10 years (1) Straight-Line

1971 to 1980 8 years (2) Double Declining Balance

1981 to 1986 5 years ACRS

1987 and subsequent 7 years MACRS

Qualified Technological
Equipment

1987 and subsequent 5 years MACRS

1 (1) Guideline Lives

2 (2) Lives under Asset Depreciation Range (ADR)

3

4 54. Q. **Why do the federal and state tax depreciation amounts differ from one another?**

5 A. The federal tax depreciation amounts are approximately \$75 million for water and \$4
6 million for wastewater, while the comparable state amounts are approximately \$84

1 million for water and \$5 million for wastewater. The higher state income tax
2 amounts are the result of deducting in the current year a portion of prior years' bonus
3 depreciation that was not deductible for Pennsylvania income tax purposes in the year
4 that the property was placed in service.

5 55. Q. **Are there any other adjustments?**

6 A. Just one. Since state income taxes are deductible for federal purposes, once the
7 current state income tax liability is computed (column (10), line 11) by multiplying
8 state taxable income (column (10), line 7) by the state income tax rate (column (10),
9 line 8), that amount is deducted (column (9), line 3) to derive federal taxable income.
10 Federal taxable income is then multiplied by the new, 21% federal income tax rate.

11 56. Q. **What is the total current income tax provision?**

12 A. Total current federal income tax expense for the FPFTY at proposed rates is projected
13 to be \$10,790,755 federal for water and \$1,236,984 for wastewater, while total
14 current state income tax expense for the FPFTY is projected to be \$4,708,291 for
15 water and \$556,141 for wastewater.

16 57. Q. **Please explain the deferred income tax component of the Company's total
17 income tax expense.**

18 A. Certainly. Pennsylvania regulatory policy is, generally, to charge customers a level
19 of tax expense equal to the taxes the utility expects to pay currently. This is referred
20 to as "flow through" tax accounting. However, there are exceptions to this policy –
21 particularly as it relates to the tax benefits of accelerated depreciation (which is

1 subject to the tax normalization rules). Further, in the Company’s case, because of
2 the settlement of its last base rate case at Docket R-2011-2267958, there is also an
3 exception for the Section 481(a) adjustment relating to the tax repairs change in
4 accounting method, which I described earlier in this testimony. As to the Section
5 481(a) adjustment (the so-called “catch-up” adjustment), the Company agreed to
6 amortize the tax effect of that deduction in the manner set forth in the settlement of its
7 last case, as I explained previously. As to accelerated depreciation related to property
8 subject to the normalization requirement, the Company records deferred taxes. The
9 provision of deferred income taxes is the accounting and ratemaking mechanism that
10 implements the normalization requirement the Internal Revenue Code imposes as a
11 condition for using the liberalized depreciation methodologies allowed for income tax
12 purposes. The normalization requirement does not permit the tax benefit of tax
13 depreciation in excess of book depreciation to be flowed-through to customers as a
14 tax deduction in the year(s) those deductions occur. Instead, the tax effects of those
15 amounts are recorded as deferred taxes. These taxes are deferred, not eliminated; the
16 taxes that are deferred will be paid to the government later in the life of the
17 depreciable asset when the relationship between book and tax depreciation reverses.
18 To recognize the fact that deferred taxes are a source of capital to the Company that
19 does not have an attendant capital cost, accumulated deferred income taxes are
20 deducted from rate base for ratemaking purposes. The Company’s deferred tax
21 expense in this case also includes the flow-through of excess ADIT, as described
22 earlier in my testimony, and the amortization of some older vintage investment tax
23 credits, as I will explain hereafter.

1 58. Q. **Please explain the provision of deferred income tax expense for accelerated**
2 **depreciation.**

3 A. As I explained previously, deferred income tax expense arises from the normalization
4 requirement imposed by the Internal Revenue Code and reflects the difference
5 between tax depreciation and book depreciation for post-1969 utility property. Tax
6 depreciation is calculated by multiplying the tax basis of assets by the applicable
7 depreciation rates used for income tax purposes. The applicable depreciation rates
8 are a function of the depreciable lives and depreciation methods that I previously
9 described for each relevant vintage of the Company's property. Because depreciable
10 lives and methods differ based on the year plant was placed in service, the difference
11 between tax and book depreciation and the associated tax effect differs depending on
12 the vintage year of the property involved. For assets acquired prior to 1970, there are
13 no deferred taxes because this property was not subject to a normalization
14 requirement. In total, the difference between tax depreciation and book depreciation
15 when multiplied by the new, 21% federal income tax rate is \$113,174 for water and
16 \$108,287 for wastewater (AP Exhibit Nos. 1-A and 1-B, Schedule F-2, column (9),
17 line 19).

18 59. Q. **Does the Company record deferred state tax income expense related to its use of**
19 **accelerated depreciation?**

20 A. No, it does not. The federal tax normalization rules only apply to the federal income
21 tax.

1 60. Q. **Please explain the effect of the Section 481(a) adjustment on the Company’s**
2 **deferred income tax expense.**

3 A. The ten-year amortization of the Section 481(a) adjustment provided for in the terms of
4 the settlement of the Company’s last case, net of the FIN 48 reserved amount,
5 multiplied by the federal tax rate of 21% reduces the Company’s deferred income tax
6 expense. This reduction is \$7,641,370 for water and \$53,179 for wastewater as
7 reflected in column (9), on line 15 of Schedule F-2 for AP Exhibit Nos. 1-A and 1-B.
8 The amortization of the state income tax effect of the Section 481(a) adjustment
9 (column (10), line 13) is greater than the corresponding amortization of the federal
10 income tax effect because of the state’s limitation on the amount of bonus depreciation
11 that could be deducted in prior years. The limitation on bonus depreciation created a
12 higher tax basis for state purposes to which the Section 481(a) calculation was applied.

13 61. Q. **Schedule F-2 of AP Exhibits Nos. 1-A and 1-B show the amortization of the net**
14 **Section 481(a) adjustment increasing from March 31, 2019 to March 31, 2020**
15 **under present and proposed rates. Why does that increase occur?**

16 A. The increase occurs because the Company is proposing to increase the annual
17 amortization amount so that the amortization will be completed before the anticipated
18 implementation of new rates from the Company’s next base rate case. By increasing
19 the amortization slightly above 10%, the total amount of the Section 481(a)
20 adjustment will be fully amortized before the Company files its next base rate case.
21 This increase provides a benefit to customers in the present rate case and will simplify
22 the next rate case.

1 62. Q. **Please explain the impact of excess ADIT on the Company’s deferred income tax**
2 **expense.**

3 A. The Company’s deferred tax expense is reduced by the flow-back to customers of a
4 portion of the excess ADIT resulting from the reduction in federal tax rates from 46%
5 to 34% and 35% that occurred in 1986 and 1993, respectively (column (9), line 20).
6 The adjustment of \$57,648 for water and \$0 for wastewater continues the flow-back
7 using the same method and amortization period(s) proposed and accepted in the
8 Company’s prior rate filings. Deferred tax expense is also reduced by the flow- back of
9 the protected ADIT resulting from the TCJA tax rate reduction. This flow-back is
10 computed using the ARAM and is \$3,710,939 for water and \$61,151 for wastewater, as
11 shown in column (9), on line 21, of Schedule F-2 of AP Exhibit Nos. 1-A and 1-B. The
12 amounts of (\$244,192) for water and \$892 for wastewater (column (9), line 22), that
13 flow back the unprotected ADIT actually increase deferred tax expense (the TCJA
14 change in the tax rate gave rise to a deferred tax shortfall). This amount is being
15 amortized over ten years.

16 63. Q. **Please explain the impact of investment tax credit amortization on the**
17 **Company’s deferred income tax expense.**

18 A. The tax effect of investment tax credits is flowed back to customers over the book lives
19 of the assets that generated the credits. The appropriate amounts of \$253,413 for water
20 and \$0 for wastewater are reflected in column (9), on line 25, of Schedule F-2 for
21 each division.

22 64. Q. **What is the Company’s total projected deferred income tax expense?**

1 A. The total amount of these various components constitutes the Company's anticipated
2 federal deferred tax expense of (\$11,278,940) for water and (\$224,009) for wastewater
3 for the FPFTY at proposed rates as set forth on Schedule F-2 of Exhibit Nos. 1-A and
4 1-B. The corresponding state amounts (\$5,075,947) for water and (\$38,101) for
5 wastewater.

6 65. Q. **What is the Company's total projected income tax expense?**

7 A. The Company projects total federal income tax expense of (\$741,598) for water and
8 \$1,012,975 for wastewater, and state income tax expense of (\$367,655) for water and
9 \$518,040 for wastewater

10 66. Q. **How is the ADIT set forth in the Company's rate base calculation on Schedule
11 G-1 & G-8 of Exhibits 1-A & 1-B derived?**

12 A. The ADIT for the rate base calculation, as shown on Schedule G-1 of both AP Exhibit
13 No. 1-A and AP Exhibit No. 1-B, is calculated by including the normalized deferred
14 taxes and the unamortized excess ADIT related to the 46% to 34%/35% tax rate
15 reduction resulting from the tax law changes made in 1986 and 1993 at the end of the
16 FPFTY. This amount is \$195,052,725 for water and \$2,510,362 for wastewater. The
17 ADIT also includes the excess ADIT resulting from the TCJA rate reduction. These
18 additional amounts of \$149,454,365 for water and \$2,868,350 for wastewater,
19 although classified as a regulatory liability on the Company's balance sheet, are
20 considered ADIT for purposes of the rate base calculation. The total ADIT set forth
21 in the Company's rate base calculation on Schedule G-1 of each of AP Exhibit Nos.

1 1-A and 1-B is the sum of these two amounts, or \$344,507,090 for water and
2 \$5,378,712 for wastewater.

3 **V. CONCLUSION**

4 67. Q. **Does this conclude your direct testimony?**

5 A. Yes.

6

AP STATEMENT NO. 8

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

AQUA PENNSYLVANIA, INC.

DOCKET NO. R-2018-3003068

**DIRECT TESTIMONY OF
MARK J. BUBEL, SR. P.E.**

**With Regard To
Wastewater System Capital Investment**

August 17, 2018

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DIRECT TESTIMONY OF MARK J. BUBEL, SR. P.E.

I. INTRODUCTION AND SCOPE OF TESTIMONY

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Q. Please state your name and business address.

A. My name is Mark J. Bubel, Sr. My business address is 762 W. Lancaster Avenue, Bryn Mawr, Pennsylvania 19010.

Q. By whom are you employed and in what capacity?

A. I am employed by Aqua Services, Inc., (“Aqua Services”) the Service Company for Aqua America, Inc., (“Aqua America”) as a Project Engineer III.

Q. Please provide a brief description of your education and work experience.

A. I received a Bachelor’s of Science Degree (B.S.) in Civil Engineering in 1980 from Lehigh University and a Master’s Degree in Civil Engineering (M.C.E.) with a concentration in Environmental Engineering in 1983 from Villanova University. I have worked in various engineering roles and have over 37 years of experience in environmental engineering related to municipal and industrial wastewater treatment and operations. I have worked at Aqua America since 2003 in roles related to wastewater treatment facilities including planning, design, start-up, and operational troubleshooting. I am a Registered Professional Engineer in Pennsylvania, Delaware, Maryland, North Carolina, and Florida. I am also a Licensed Water and Wastewater Operator in Pennsylvania.

Q. Have you previously testified before the Pennsylvania Public Utility Commission (“PUC” or the “Commission”)?

A. Yes. I provided testimony in Aqua Pennsylvania Wastewater, Inc.’s (“APW”) New Garden, Limerick, and East Bradford Section 1329 Application proceedings at Docket Nos. A-2016-2580061, A-2017-2605434, A-2018-3001582.

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1 **Q. What is the purpose of your testimony?**

2 A. The purpose of my testimony is to discuss APW’s wastewater system capital investments
3 since the last rate case and the projected investments scheduled to occur in the Future
4 Test Year (“FTY”) and Fully Projected Future Test Year (“FPFTY”).

5 **Q. Are you sponsoring any exhibits?**

6 A. No.

7 **Q. Please describe APW and its wastewater systems.**

8 A. APW is a subsidiary of Aqua Pennsylvania, Inc. (“AP”) (collectively APW and AP are
9 referred to as the “Company”) and currently furnishes wastewater service to
10 approximately 20,000 customers in its 33 separate systems in 17 counties in the
11 Commonwealth. Many of APW’s systems are smaller systems in the northeast area of
12 Pennsylvania, and have required significant capital from the time of acquisition to bring
13 them into compliance under Pennsylvania Department of Environmental Protection
14 (“DEP”) regulations.

15 APW’s last base rate case proceedings were in 2010 for its southeast consolidated
16 systems and in 2008 for its northeast consolidated systems. The Company began
17 consolidating its systems with the goal of filing a single revenue requirement for this base
18 rate case proceeding.

19 **II. WASTEWATER SYSTEM CAPITAL INVESTMENT**

20 **Q. Does the Company have a capital investment planning process?**

21 A. Yes, the capital investment planning process involves an assessment of each system’s
22 physical condition, compliance history and status, regulatory permit water quality

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1 requirements and projected flow requirements to arrive at a plan for capital improvements
2 needed to maintain, improve, and or meet the needs of the system.

3 **Q. Are there any environmental regulations that affect the amount of capital**
4 **investment spent while operating a wastewater system?**

5 A. I will discuss a few key examples of how water quality requirements can lead to
6 additional capital investment. First, when a new water quality parameter is added to an
7 existing plant discharge permit, capital investment is required to implement a system to
8 remove or reduce the level of the parameter. Taking total phosphorus as an example, a
9 chemical feed system would need to be installed to remove total phosphorus. This
10 system can then result in the generation of additional sludge for the facility. In some
11 instances, it would be necessary to add additional waste sludge storage volume depending
12 on what percentage of the permitted flow exists given the current facility flow rate. In the
13 case of a facility with a flow rate close to its permitted capacity, additional sludge storage
14 volume may likely be needed insofar as the existing facility was not originally designed
15 to account for the additional sludge generation resulting from the precipitation of total
16 phosphorus.

17 Second, the tightening of effluent water quality limits can also require additional
18 capital investment in a treatment facility. If effluent ammonia nitrogen limits were
19 lowered for example a capital upgrade may be needed to provide for additional treatment
20 volume to reliably achieve a reduced effluent ammonia discharge limit. Alternately, an
21 upgrade to the facility aeration system and or supplemental alkalinity chemical feed
22 system may be required to reliably meet a reduced ammonia limit. Aqua wastewater
23 facilities have also experienced reductions in total residual chlorine (“TRC”) limits which

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1 requires the addition of a chemical feed system that uses a dechlorination agent for the
2 removal of TRC just prior to discharge. Effluent TRC limits can be so low, however, that
3 one may not be able to reliably meet the effluent TRC limit even with the addition of a
4 dechlorination chemical. In such cases, there is a need to invest in an alternate approach
5 for disinfection, such UV disinfection system.

6 The gradual imposition of total nitrogen effluent stream discharge standards also
7 dictates the need for capital investment. A treatment facility not originally designed to
8 remove nitrogen must be reconfigured or modified to permit the incorporation of the
9 necessary biological units and equipment needed for the removal of total nitrogen in the
10 process. Additional tank volume may also be required.

11 **Q. Can you provide any other examples?**

12 A. Yes, the method of disposal for effluent can affect the amount of capital investment
13 required. If a regulator favors land application effluent disposal in lieu of stream
14 discharge for new systems, then a treatment system is required to reduce total nitrogen to
15 the groundwater standard for potable water of 10 mg/l. Operational control of these types
16 of systems requires the provision of online instrumentation and supplemental carbon
17 chemical feed systems to reliably ensure compliance with the facility effluent discharge
18 limits. Additionally, land application can require investment in spray irrigation, drip
19 irrigation, as well as subsurface disposal methods, which are more expensive than stream
20 discharge.

21 **Q. How does the Capital Investment Planning Process affect the Company's claim for**
22 **wastewater utility plant?**

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1 A. The Company relied upon data from its capital investment planning process to support
2 the plant claims for the FTY and FPFTY. Thus, those claims reflect capital expenditures
3 required to address the physical condition of facilities, to maintain or achieve required
4 regulatory compliance, and to accommodate projected capacity needs.

5 **Q. Please describe the Company's overall rate base claims as listed in Schedule G-2 of**
6 **Exhibit 1-B.**

7 A. Aqua Pennsylvania Wastewater is claiming overall utility plant in service of
8 \$145,207,672 for the historic test year, \$182,540,440 for the FTY, and \$210,253,125 for
9 the FPFTY. This includes total plant additions of \$38,771,521 for the FTY and
10 \$28,898,630 for the FPFTY, with retirements of (\$1,438,709) for the FTY and
11 (\$1,185,946) for the FPFTY. For more information please consult the testimony of
12 Witness Marquis (AP Statement No. 2).

13 **Q. Please provide a few examples of major projects that are included in the Company's**
14 **claimed utility plant in service through the FPFTY.**

15 A. Borough of Media: A major upgrade of this wastewater treatment facility is currently
16 underway. This facility was last upgraded in 1986 with many of the system elements
17 exceeding their useful life. The existing headworks facilities are inadequate and outdated
18 and will be replaced with grit removal facilities as well as enhanced influent screening
19 which will provide for better treatment and reduced operation and maintenance cost. The
20 existing treatment process configuration will be modified to permit the biological
21 removal of nitrogen from the effluent. In addition, phosphorus will be removed with the
22 modifications to the treatment process as well as provision of new final clarification.
23 Energy efficiency will also be provided with the provision of dissolved oxygen aeration

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1 blower control within the aerated zones of the reconfigured treatment process as well as
2 sophisticated aeration blower control using online ammonia probes which will further
3 reduce electrical consumption by providing the required aeration for treatment such that
4 the effluent ammonia permit limitation is met close to the discharge from the treatment
5 tank. This approach further enhances and fine tunes the energy savings possible from
6 dissolved oxygen (“DO”) setpoint aeration blower control. Problems with the existing
7 final clarification system will be addressed with new circular mechanical clarifiers. It is
8 expected that the facility compliance with its effluent total suspended solids discharge
9 requirements will be enhanced to the benefit of this receiving stream. Effluent
10 disinfection will be upgraded from the existing gas chlorine disinfection system to UV
11 light disinfection which will benefit the receiving stream micro-life. The sludge handling
12 system for the plant will also be upgraded with a sludge thickening system and a new
13 anaerobic digester heating system and enhanced mixing system for gas production.

14 Treasure Lake: The Company has made improvements to both the East and West
15 Wastewater Treatment Plants (“WWTP”) of the Treasure Lake system since its
16 acquisition in 2013, including, aeration system improvements to the East and West
17 WWTPs, significant collection system upgrades to address infiltration and inflow (“I&I”)
18 including pump station improvements. The Company is performing a major treatment
19 system upgrade project expanding the West WWTP and is decommissioning the
20 antiquated East WWTP which is being converted into a pumping station. The East
21 WWTP is in a deteriorated condition and has surpassed its serviceable life. The planned
22 upgrade includes upgraded headworks facilities, treatment tankage expansion including
23 provision of accommodations for future total nitrogen removal, upgraded effluent UV

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1 disinfection, and online monitoring of the treatment process for increased efficiency.

2 This project which is currently underway will result in enhanced treatment for the total
3 Treasure Lake flow at the West WWTP benefiting the environment as well as resulting in
4 enhanced efficiencies with the operation of only one wastewater treatment facility.

5 Willistown Woods: The Company is performing a major treatment system
6 upgrade project involving the implementation of a membrane bioreactor (“MBR”)
7 treatment process which includes upgraded headworks facilities, influent pumping
8 improvements, membrane modules for solids-liquid separation, recycle pumping system,
9 and new aeration equipment. The upgrade of this wastewater treatment facility to a MBR
10 treatment system will provide enhanced state-of-the-art treatment and address current
11 treatment process shortfalls relative to available treatment volume and inadequacy of the
12 existing final clarification system. Integration of online nutrient monitors will further
13 ensure system compliance and discharge of a high-quality effluent into the receiving
14 stream.

15 Lake Harmony: The Lake Harmony system will undergo a significant upgrade to
16 bring the existing Sequencing Batch Reactor (“SBR”) system in line with required
17 capacity. A new headworks system including both grit removal and enhanced screening
18 will be provided and address current issues with grit and screenings within the existing
19 treatment process. A new SBR will be added to enhance capacity and treatment
20 performance of the system. Online monitors will be employed to guide the operation of
21 the system. The existing problematic effluent filtration system will be replaced with a
22 state-of-the-art cloth media disc filter system. A new effluent UV disinfection system will

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1 be installed thus replacing an existing UV system which has been problematic given
2 difficulty in obtaining replacement parts.

3 New Daleville: This project will involve modification of the existing biological
4 nutrient removal (“BNR”) process as well as change out of the existing final clarification
5 system which has been historically problematic. New more conventional final clarifiers
6 will be provided. Here as well, online nutrient monitors will be employed to provide
7 enhanced operational control of the facility. In addition, a new sophisticated
8 programmable logic controller (“PLC”) based effluent discharge control system will be
9 installed for the accurate dosing of treated effluent to the land application dispersal
10 system.

11 **Q. Are there any other improvements the Company has made to rehabilitate and**
12 **improve its acquired systems?**

13 A. Yes, the following are a few of the projects the Company has completed to improve
14 treatment and environmental compliance.

15 Washington Park: At the time of acquisition in 2009, the system was in very poor
16 condition. The DEP had indicated that the receiving stream was in fact dead for three
17 quarters of a mile downstream of the facility discharge. Because of the Company’s
18 investment the facility has consistently met its effluent discharge requirements and the
19 receiving stream shows improvement from a clarity perspective as well as the presence of
20 stream life including minnows within a year of the completion of improvements.

21 Penn Township: Prior to acquisition by the Company in 2014, this system was in
22 violation of its effluent dissolved oxygen permit requirements, effluent total suspended
23 solids (“TSS”) requirements, as well as its effluent total phosphorus discharge

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1 requirements. The Company's investments allowed the system to consistency comply
2 with those requirements.

3 Avon Grove: The Company invested in process improvements since its
4 acquisition in 2017 which permitted this facility to achieve its effluent total nitrogen
5 requirements which it had not been able to achieve prior to the Company's modifications.
6 This is a significant project outcome since the facility had not been able to meet its
7 effluent discharge requirements for total nitrogen since approximately December 2014.

8 **Q. Have there been any routine system improvements that are included in the capital
9 investment figures but are not part of a major project?**

10 A. Yes, the Company completed a significant amount of collection system improvement
11 work throughout the service territory under the distribution system improvement charge
12 ("DSIC") program including sewer main replacement, sewer main lining, manhole repair,
13 and pump station improvements. These projects have helped increase the efficiency of
14 the systems, improved environmental compliance, and have reduced I&I.

15 **Q. Please explain the Company's involvement with the North Heidelberg Sewer
16 Company ("NHSC").**

17 A. The Company agreed to become the receiver for NHSC during the pendency of a
18 proceeding under Section 529 of the Public Utility Code ("Section 529"), 66 Pa. C.S. §
19 529. The Commission entered an Order dated February 9, 2018 at Docket No. M-2018-
20 2645983 identifying the Company the receiver and specifying certain duties for the
21 Company to perform during the Section 529 proceeding.

22 On March 5, 2018, the Company assumed its role as receiver for NHSC and
23 conducted site inspection of the facility. The Company identified operational and capital

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1 issues that were detailed in status reports to filed with the Commission. The Company
2 will continue to operate and improve the system as receiver for NHSC during the Section
3 529 proceeding.

4 **III. CONCLUSION**

5 **Q. Does this conclude your testimony?**

6 A. Yes, however, I reserve the right to supplement my testimony as additional issues and
7 facts arise during the course of this proceeding.