December 20, 2021

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: Pennsylvania Public Utility Commission
v.
The Borough of Hanover –
Hanover Municipal Waterworks
Docket No. R-2021-3026116

Dear Secretary Chiavetta:

Consistent with 52 Pa. Code Section 5.412a of the Commission's regulations, which requires the electronic submission of pre-served testimony, enclosed for electronic filing please find the following Pre-Served Testimony and Exhibits on behalf of the Office of Consumer Advocate (OCA) in the above-referenced proceeding. Please note that the documents listed below were admitted into the record per the Interim Order Granting Joint Stipulation for Admission of Evidence entered on December 14, 2021.

Office of Consumer Advocate's Direct Testimony

OCA Statement 1 - Direct Testimony of Stacy L. Sherwood – Appendix A and Schedules SLS-1 through SLS-11

OCA Statement 2 - Direct Testimony of David J. Garrett – Appendix A, Appendix B, and Exhibits DJG-1 through DJG-17

OCA Statement 3 - Direct Testimony of Jerome D. Mierzwa – Schedule JDM-1

OCA Statement 4 - Direct Testimony of Terry L. Fought – Appendix A and Exhibits TLF-1 through TLF-3

Office of Consumer Advocate's Surrebuttal Testimony

OCA Statement 1SR - Surrebuttal Testimony of Stacy L. Sherwood – Schedules SLS-1SR, SLS-
2SR and SLS-11SR

OCA Statement 2SR - Surrebuttal Testimony of David J. Garrett

OCA Statement 3SR - Surrebuttal Testimony of Jerome D. Mierzwa

OCA Statement 4SR - Surrebuttal Testimony of Terry L. Fought

All testimony is accompanied by a witness verification. The OCA's submission also addresses the requirements of the Commission's January 10, 2013 Implementation Order at Docket M-2012-2331973, which requires electronic access to pre-served testimony.

All parties and the presiding officer have been served previously with the testimony and exhibits. This letter has been served per the attached Certificate of Service.

Respectfully submitted,

/s/ Laura J. Antinucci
Laura J. Antinucci
Assistant Consumer Advocate
PA Attorney I.D. # 327217
E-Mail: LAntinucci@paoca.org

Enclosures:
cc: The Honorable F. Joseph Brady **(email only)**
        Certificate of Service
*321313

Re: Pennsylvania Public Utility Commission   :
                                                  :
                        v.   :   Docket No. R-2021-3026116
                                                  :
       The Borough of Hanover --   :
       Hanover Municipal Waterworks   :

I hereby certify that I have this day served a true copy of the following document, Letter

Re: Electronic Filing of the Office of Consumer Advocate's Pre-Served Testimony and Exhibits,

upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code

§ 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 20th day of December 2021.

SERVICE BY E-MAIL ONLY

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Dated: December 20, 2021
*319928

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	))	
	)	
v.	)	Docket No. R-2021-3026116
	)	
THE BOROUGH OF HANOVER – MUNICIPAL WATERWORKS	)))	

DIRECT TESTIMONY

OF

STACY L. SHERWOOD

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

September 30, 2021

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APPENDIX A: Resume of Stacy L. Sherwood
APPENDIX B: Schedules SLS-1 through SLS-11

I. **INTRODUCTION**

Q.   PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A.   My name is Stacy L. Sherwood. I am a Senior Analyst with Exeter Associates, Inc. ("Exeter").   Our offices are located at 10480 Little Patuxent Parkway, Suite 300, Columbia, Maryland 21044. Exeter is a firm of consulting economists specializing in issues pertaining to public utilities.

Q.   PLEASE DESCRIBE YOUR QUALIFICATIONS, WORK EXPERIENCE,
              AND EDUCATIONAL BACKGROUND.

A.   I have over 12 years of experience in the energy sector, related specifically to the review and development of energy efficiency and demand response programs and policies for the use of advanced technologies for pollution prevention and energy efficiency. With Exeter, I have provided technical support and analysis to state and federal clients on energy efficiency, distributed resources, demand response, and renewable energy. I have also participated in water rate cases in Rhode Island, Pennsylvania, and New Jersey and wastewater cases in Pennsylvania.   I hold a Bachelor's Degree in Accounting, Business, and Economics from McDaniel College. My resume is provided in Appendix A.

Q.   HAVE YOU PREVIOUSLY TESTIFIED IN REGULATORY
              PROCEEDINGS ON UTILITY ISSUES?

A.   Yes. I have testified on a range of issues including revenue requirement and adequacy of service for electric, natural gas, water, and wastewater utility services, energy efficiency programs, and automated metering infrastructure. I have testified before the Maryland Public Service Commission, Pennsylvania Public Utility Commission, and

1		Rhode Island Public Utility Commission. My resume, provided in Appendix A, has
2		further details on my experience in testifying.
3	Q.	ON WHOSE BEHALF ARE YOU APPEARING**?**
4	A.	I am presenting testimony on behalf of the Pennsylvania Office of Consumer Advocate
5		("OCA").
6	Q.	WHAT IS THE PURPOSE OF YOUR TESTIMONY?
7	A.	Exeter was retained by the OCA to assist in the evaluation of the water and wastewater
8		rate filings submitted by The Borough of Hanover - Municipal Waterworks ("Hanover"
9		or "Borough") to the Pennsylvania Public Utility Commission ("PA PUC" or
10		"Commission") on June 29, 2021. This testimony presents my findings and
11		recommendations with regard to the overall revenue increase that Hanover has
12		supported. In addition, I discuss other factors the Commission should consider when
13		evaluating whether and how much of a rate increase is reasonable at this time.
14		OCA witness David J. Garrett will address the Borough's rate of return in OCA
15		Statement 2. OCA witness Jerome D. Mierzwa will address Hanover's Cost of Service
16		studies and rate design proposals in OCA Statement 3. OCA witness Terry L. Fought
17		will address issues related to the quality of service provided by the Borough in OCA
18		Statement 4.
19	Q.	HAVE YOU PREPARED SCHEDULES TO ACCOMPANY YOUR
20		TESTIMONY?
21	A.	Yes. I have prepared Schedules SLS-1 through SLS-11. Schedule SLS-1 provides a
22		summary of my recommended total revenue requirement, SLS-2 provides a summary
23		of my recommended adjustments, and SLS-3 provides the rate base. Schedules SLS-4
24		through SLS-11 detail my individual recommended adjustments. The schedules are
25		provided in Appendix B.

1   Q.   WHAT TIME PERIODS HAVE YOU UTILIZED IN MAKING YOUR

2   DETERMINATION OF HANOVER'S REVENUE REQUIREMENTS?

3   A.   Consistent with the Borough's filings, I have utilized a historical test year ("HTY") that

4   corresponds to the year ended December 31, 2020; a future test year ("FTY") that

5   corresponds to the year ending December 31, 2021; and a fully projected future test

6   year ("FPFTY") that corresponds to the year ending December 31, 2022, as the basis

7   for determining the Borough's revenue requirements and the revenue increase

8   necessary to recover those requirements.

9   Q.   WHAT IS YOUR RECOMMENDATION WITH REGARD TO REVENUE

10   REQUIREMENT IN THIS PROCEEDING?

11 A.   Considering my adjustments to the Borough's claims, as discussed below, and applying

12   an overall cost of capital of 5.18 percent (calculated by OCA rate of return witness

13   David J. Garrett in OCA Statement 2), I have calculated the overall revenue

14   requirement increase to be $1,201,216 in this proceeding. That recommendation is

15           $334,884 less than the increase of $1,536,100 that Hanover has requested in this case.

16   HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?

17 A.   In the remainder of my testimony, I discuss the reasonableness of a rate increase at this

18   time, and I document and explain each of the nine revenue requirement adjustments I

19   am recommending that the Commission approve. My discussion of these adjustments

20   is organized into sections corresponding to the issue being addressed.

21

22   **II.** **<u>REASONABLENESS OF INCREASING RATES AT THIS TIME</u>**

23 Q.   DO YOU BELIEVE THE TIMING OF THIS RATE INCREASE MAY

24   NEGATIVELY IMPACT CUSTOMERS, MORE SO THAN IN OTHER

25   TIMES?

1   A.   Yes. In March 2020, the Coronavirus ("COVID-19") began negatively impacting the

2   U.S. economy resulting in significant levels of unemployment and a constrained

3   housing market, which exacerbated affordability issues. As a result of the COVID-19

4   pandemic, the federal government offered numerous stimulus packages in 2020 and

5   early 2021 to individuals and businesses.[1] Additionally, the federal and some state

6   governments instituted moratoriums on evictions, foreclosures, and utility shutoffs.[2,3]

7   While the magnitude of the financial and economic impacts has lessened since March

8   2020, the issue of utility affordability continues to impact Americans, including those

9   not previously qualified as low-income, and the negative impacts on the economy

10   continue. Pennsylvanians have not been spared from the impacts of this pandemic, with

11   unemployment rates ranging from 16.2 percent in April 2020 to 6.9 percent in June

12   2021.[4] It is unclear how long the impacts of COVID-19 will be felt on the economy at

13   this time and how long it may take for individuals to recover.

14   Q.   WHAT SHOULD THE COMMISSION CONSIDER WHEN EVALUATING

15   THE REASONABLENESS OF THE RATES PRODUCED IN SETTING

16   THE REVENUE REQUIREMENT IN THIS PROCEEDING?

17   A.   In determining an appropriate revenue requirement, consideration should be given to

18   whether the revenues produce rates that are just and reasonable, not only from the

19   Borough's perspective, but also from the ratepayers' perspective.

20   The Commission should consider the impacts of the COVID-19 pandemic when

21   reaching its decision as to the level of increase authorized for Hanover in this

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[1] https://home.treasury.gov/policy-issues/coronavirus.

[2] https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/24/fact-sheet-biden-harris-administration-announces-initiatives-to-promote-housing-stability-by-supporting-vulnerable-tenants-and-preventing-foreclosures/.

[3] Pennsylvania PUC Docket No. M-2020-3019244, Emergency Order (March 13, 2020).

[4] https://www.bls.gov/regions/mid-atlantic/pennsylvania.htm#eag.

1   proceeding. The level of the increase at this time may worsen hardships, including

2   intensifying arrearages.

3

4   **III. <u>ACCOUNT 387 RATE CASE EXPENSE</u>**

5   Q.   DO YOU AGREE WITH THE BOROUGH'S POSITION TO NORMALIZE

6   THE RATE CASE EXPENSE?

7   A.   Yes, I do; however, I do not agree with the normalization period proposed. There is

8   Commission precedent supporting the normalization of rate case expense over the

9   average time frame that the utility has historically filed rate cases. Based on the prior

10   three rate case filings, Hanover files its rate cases, on average, every 47 months, or

11   approximately four years.[5] If the Borough files its next rate case sooner than four years,

12   its historic average will change accordingly. Based on the historic filing frequency, I

13   recommend that the Commission normalize the rate case expense over 4 years, instead

14   of the 3-year period that Hanover utilized.

15   Q.   WHAT LEVEL OF EXPENSE DO YOU RECOMMEND BE

16   NORMALIZED FOR RATE CASE EXPENSE?

17   A.   Hanover based its rate case expense claim on its estimation of the cost of a fully

18   litigated case. I recommend that Hanover update its rate case expense to reflect actual

19   rate case expense to date and its projection for rate case expense through the end of

20   the proceeding as part of its rejoinder testimony, so that the final amount to be

21   normalized will reflect primarily actual expenses rather than projected expenses. Until

22   Hanover updates its rate case expense in its rejoinder, I normalized Hanover's total

23   projected rate case expense of $423,100 over 4 years to be an annual expense of

24         $105,775. This is a difference of $35,258 from the Borough's FPFTY claim. This is

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[5] Dates of historic rate case filings were provided by the Borough in response to I&E-RE-2.

1		reflected on Schedule SLS-3. The entire expense is properly allocated to Outside-
2		Borough customers as the rate case only pertains to Outside-Borough customers.
3		
4		**IV. ACCOUNT 392 LEGAL EXPENSES – PA PUC LEGAL FEES**
5	Q.	AS A RESULT OF YOUR RECOMMENDED TIMING FOR
6		NORMALIZATION OF RATE CASE EXPENSE, DO YOU PROPOSE
7		ANY OTHER ADJUSTMENTS?
8	A.	Yes, I do. The Borough normalized PA PUC Legal Fees over three years. I disagree
9		with the expense methodology and the period over which this expense should be
10		expensed. First, the Borough describes this as a "one-time expense". As such, this
11		expense should be amortized rather than normalized. Second, I recommend adjusting
12		the recovery period to reflect the same four-year period that I recommend for rate case
13		expense. That will align this irregular expense with the average frequency that the
14		Borough files rate cases. Therefore, the annual expense for PA PUC Legal Fees should
15		be $10,828, which is a difference of $3,609, of which $2,400 is allocated to Outside-
16		Borough ratepayers. This adjustment is reflected on Schedule SLS-4.
17		
18		**V. ACCOUNT 351 SOURCE OF SUPPLY – MISCELLANEOUS OPERATING**
19		**EXPENSE**
20	Q.	WHAT IS THE BOROUGH'S EXPECTED MISCELLANEOUS
21		OPERATING EXPENSE FOR THE SOURCE OF SUPPLY IN THE
22		FPFTY?
23	A.	Hanover is forecasting this expense to be $18,047 in the FPFTY, which is the same as
24		was experienced in the HTY.

1   Q.   DO YOU AGREE WITH THIS CONTINUED LEVEL OF EXPENSE IN

2   THE FPFTY?

3   A.   No, I do not. In the HTY, this expense account included a non-recurring expense of

4            $2,213 for a replaced transmitter for Slagle Run Flow.[6] As this is an irregular expense,

5   I recommend that it be amortized over a 4-year period, which coincides with the

6   average time between rate cases, and added to the ongoing expenses recognized in the

7   HTY.

8   Q.   WHAT IS YOUR RECOMMENDED ADJUSTMENT TO THE

9   MISCELLANEOUS OPERATING EXPENSE FOR THE FPFTY?

10   A.   I recommend an adjustment of $1,660 to Hanover's forecasted amount, of which

11            $1,104 is allocated to Outside-Borough ratepayers. This is calculated by subtracting

12            $2,213 from $18,047 (equaling $15,834) and adding $553 to account for the

13   normalization of the non-recurring expenses. As a result, the total FPFTY expense for

14   this account should be $16,387. This adjustment is reflected on Schedule SLS-5.

15

16   **VI. <u>ACCOUNT 353 SOURCE OF SUPPLY – MISCELLANEOUS MAINTENANCE</u>**

17   **<u>EXPENSE</u>**

18   Q.   WHAT IS THE BOROUGH'S EXPECTED MISCELLANEOUS

19   MAINTENANCE EXPENSE FOR THE SOURCE OF SUPPLY IN THE

20   FPFTY?

21   A.   Hanover is forecasting this expense to be $27,602 in the FPFTY, which is the same as

22   was experienced in the HTY.

23   Q.   DO YOU AGREE WITH THIS CONTINUED LEVEL OF EXPENSE IN

24   THE FPFTY?

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[6] Noted in the general ledger for Account 351 provided in Hanover's response to I&E-RE-7.

1	A.	No, I do not. In the HTY, this expense account recognized a non-recurring expense of
2		$10,780 for the roof replacement on the garage and home of the caretaker.[7] As this is
3		an irregular and infrequent expense, I recommend a conservative amortization period
4		of 25 years. This amortized expense should be added to the ongoing expenses
5		recognized in the HTY.
6	Q.	WHAT IS YOUR RECOMMENDED ADJUSTMENT TO THE
7		MISCELLANEOUS MAINTENANCE EXPENSE FOR THE FPFTY?
8	A.	I recommend an adjustment of $10,349 to Hanover's forecasted amount, of which,
9		$6,881 is allocated to Outside-Borough ratepayers. This is calculated by subtracting
10		$10,780 from $27,602 (equaling $16,822) and adding $431 to account for the
11		amortization of the non-recurring expenses. As a result, the total FPFTY expense for
12		this account should be $17,253. This adjustment is reflected on Schedule SLS-6.
13		
14		**VII. ACCOUNT 367 POWER AND PUMPING – SUPPLIES AND EQUIPMENT**
15	Q.	WHAT IS THE BOROUGH'S EXPECTED SUPPLIES AND EQUIPMENT
16		EXPENSE FOR POWER AND PUMPING IN THE FPFTY?
17	A.	Hanover is forecasting this expense to be $26,255 in the FPFTY, which is the same as
18		was experienced in the HTY.
19	Q.	DO YOU AGREE WITH THIS CONTINUED LEVEL OF EXPENSE IN
20		THE FPFTY?
21	A.	No, I do not. The expenses captured in this account can vary annually, depending on
22		repairs and projects. As such, I recommend that an average of the expenses captured
23		from 2018 through 2020 for this account be utilized to establish a reasonable expense
24		level for the FPFTY.[8]

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[7] Noted in the general ledger for Account 353 provided in Hanover's response to I&E-RE-7.
[8] Based on the general ledger for Account 367 provided in Hanover's response to I&E-RE-7.

1   Q.   WHAT IS YOUR RECOMMENDED ADJUSTMENT TO THE SUPPLIES

2   AND EQUIPMENT EXPENSE FOR THE FPFTY?

3   A.   I recommend an adjustment of $6,867 to Hanover's forecasted amount, of which,

4             $4,566 is allocated to Outside-Borough ratepayers. This is calculated by averaging the

5   expenses captured in this account for 2018 ($9,246), 2019 ($22,662), and the HTY

6   ($26,255). As a result, the total FPFTY expense for this account should be $19,388.

7   This adjustment is reflected on Schedule SLS-7.

8

VIII. ACCOUNT 134 PROFESSIONAL SERVICES – ENGINEERING SERVICES

10 Q.   WHAT IS THE BOROUGH'S EXPECTED ENGINEERING SERVICES

11   EXPENSE FOR THE FPFTY?

12 A.   Hanover forecasts that the $105,690 in engineering expenses experienced in the HTY

13   will continue annually, unadjusted, for both the FTY and FPFTY.

14 Q.   DO YOU AGREE WITH HANOVER'S PROJECTION FOR

15   ENGINEERING EXPENSE?

16 A.   No, I do not. After reviewing the general ledger provided in response to OCA-IV-19

17   for the years 2018 through 2020, it appears that 2020 includes studies and expenses

18   that will not occur annually and are irregular from prior years' expenses. As such,

19   these irregular expenses, identified below, should be amortized.

20   • Dowling Forestry, LLC – 75% of Initial Payment for Forest Management
21   Plan: $6,258.75

22   • Dowling Forestry, LLC – Final Payment (25%) for the Forest Management
23   Plan: $2,086.25

24   • Gannett Fleming Inc. – Water Mapping – Professional Service Rendered
25   through 7/3/2020: $132.98

26   • Gannett Fleming Inc. – Water Mapping – Professional Service Rendered
27   through 7/31/2020: $3,159.19

28   • Gannett Fleming Inc. – Water Mapping through 8/28/2020: $4,161.42

1   • Gannett Fleming Inc. – Water Mapping through 9/25/2020: $2,747.75

2   • Gannett Fleming Inc. – Water Mapping 2020 – General Engineering Service:
3            $797.88

4   • Gannett Fleming Inc. – Water Mapping through 11/27/2020: $5,307.61

5   • Gannett Fleming Inc. – Water Mapping through 01/01/2021: $2,014.83

6   • Gannett Fleming Inc. – Risk & Resilience Assessment: $12,831.88

7   • Gannett Fleming Inc. – Risk & Resilience Assessment Through 11/27/2020:
8            $3,847.06

9   • Gannet Fleming Inc. – Risk & Resilience Assessment & Emergency Response
10   Plan: $1,304.79

11   Per the 2021 Budget Proposal provided in Hanover's response to I&E-RE-21

12   Attachment, the mapping, risk and resilience assessments, and emergency response

13   plans are requirements under the 2018 America's Water Infrastructure Act ("AWIA")

14   and are not considered to be ongoing, annual expenses. Additionally, I removed the

15   following expense, as it was incurred in 2019, which is outside the HTY:

16   • Gannett Fleming Inc. – Long Arm Assessment Through 11/22/2019:
17           $5,813.70

18   In total, the expenses that I removed or amortized represent $50,464 of the total

19   $105,690 expenses recorded in the HTY. The irregular expenses ($44,650) should be

20   amortized over a specified period, which I recommend correlating to my recommended

21   rate case expense normalization of four years. Amortized over four years, this would

22   equate to $11,163 being recognized each year.

23   Q.   PLEASE EXPLAIN YOUR RECOMMENDED ADJUSTMENT TO THE

24   BOROUGH'S ENGINEERING SERVICES EXPENSE.

25   A.   I recommend using the normal expenses from the HTY ($105,690 less $5,814 for 2019

26   incurred expenses and subtracting the amortized amount of $44,650), then I added the

27   amortized portion of irregular expenses. As a result, the FPFTY should reflect $66,389

28   in Account 134 Professional Services – Engineering Services, which is a difference of

1    $33,488 from the Borough's claim. Of the total adjustment for Engineering Services,

2    $22,266 should be allocated to Outside-Borough ratepayers. This adjustment is

3   reflected on Schedule SLS-8.

4

5   **IX. ACCOUNT 608 BANK FEES**

6   Q.   WHAT IS THE BOROUGH'S REQUESTED BANK FEES FOR THE

7   FPFTY?

8   A.   Hanover projects that the $5,325 in bank fees experienced in the HTY will continue

9   annually, unadjusted, for both the FTY and FPFTY.

10   Q.   DO YOU AGREE WITH HANOVER'S FORECAST FOR BANK FEES?

11   A.   No, I do not. After reviewing the general ledgers for bank fees for the years 2018

12   through 2020 in the Borough's response to OCA-IV-20, I noted that in 2020 there were

13   irregular expenses related to bond issuance, in the amount of $3,440. As is evident

14   through the general ledger, the bond issuance expenses are irregular and infrequent;

15   therefore, the $3,440 should be amortized over a period of four years, to match the

16   recommended normalization of rate case expense, which would equal $860, collected

17   annually.

18   Q.   WHAT IS YOUR ADJUSTMENT TO THE BANK FEES?

19   A.   In 2020, when the bond issuance expenses are excluded, the bank fees were $1,885.

20   When the amortized bond issuance expenses of $860 are added to that total, the bank

21   fees equal $2,745. I recommend that this total represent the bank fees for the FPFTY,

22   which is a difference of $2,580 from the Borough's claim, as it more properly reflects

23   the expected reoccurring bank fees. Of this adjustment, $1,715 should be allocated to

24   Outside-Borough ratepayers. This adjustment is reflected on Schedule SLS-9.

25

1   **X. ACCOUNT 387 GENERAL OFFICE – COMPUTER SUPPORT**

2   Q.   WHAT IS THE BOROUGH'S FORECASTED COMPUTER SUPPORT

3   EXPENSE IN THE FPFTY?

4   A.   Hanover projects that the $10,679 in computer support expenses experienced in the

5   HTY will continue annually, unadjusted, for both the FTY and FPFTY.

6   Q.   DO YOU AGREE WITH THE BOROUGH'S PROJECTED COMPUTER

7   SUPPORT EXPENSE?

8   A.   No, I do not. There were several expenses recognized during the HTY that are not

9   ongoing, annual expenses. These expenses include replacement of a defective hard

10   drive and a security appliance and moving Office 365 onto various computers. When

11   these expenses are removed, a total amount of $3,405, the HTY expenses match levels

12   similarly experienced in 2018 and 2019.[9] As the identified expenses are not annually

13   recurring, they should not be included in the projected expenses for the FPFTY, as it

14   would result in the Borough over-collecting computer support expenses.

15   Q.   WHAT IS YOUR ADJUSTMENT TO THE COMPUTER SUPPORT

16   EXPENSE?

17   A.   I recommend that the recurring expenses recognized in the HTY ($7,461) be added to

18   an amortized amount of the non-recurring expenses. The non-recurring expenses

19   should be amortized over four years to match the rate case normalization

20   recommendation, which would result in an annual amount of $851. When the amortized

21   non-recurring and recurring HTY expenses are summed, the total is $8,125, which is

22   my recommendation for the level of computer support expenses in the FPFTY.

23   Utilizing this level of FPFTY expenses would result in a reduction of $2,554 from the

24   Borough's projected level of computer support expense, of which, $1,698 should be

---

[9] This statement is accurate when non-recurring expenses, such as the purchase of new computers and equipment are excluded in 2019.

1   allocated to Outside-Borough ratepayers. This adjustment is reflected on Schedule

2   SLS-10. Furthermore, it should be noted that the unamortized balances of these

3   proposed amortizations should not be included in rate base in future rate cases.

4

5   **XI. CASH WORKING CAPITAL**

6   Q.   PLEASE EXPLAIN YOUR ADJUSTMENT TO THE BOROUGH'S CLAIM

7   FOR CASH WORKING CAPITAL.

8   A.   Hanover calculated its cash working capital based upon 12.5 percent, or one-eighth of

9   the operations and maintenance ("O&M") expense, as it did not conduct a lead-lag

10   study. I adopt this methodology, except that, as shown on Schedule SLS-11, I have

11   adjusted the cash working capital to \$437,418 for Outside-Borough ratepayers, to

12   account for my recommended adjusted O&M expenses. This adjustment should be

13   modified to reflect the total adjustments to O&M and taxes as accepted by the

14   Commission.

15   Q.   DOES THIS COMPLETE YOUR DIRECT TESTIMONY?

16   A.   Yes, it does. I reserve the right to supplement this testimony as appropriate.

Resume of Stacy L. Sherwood

STACY L. SHERWOOD

Ms. Sherwood is an Economist at Exeter Associates, Inc. At Exeter, Ms. Sherwood develops utility service assessments, provides bill and rate analysis, and assesses and evaluates the effectiveness of energy conservation and efficiency programs and smart meter implementation plans. She also conducts analysis on renewable energy initiatives and life-cycle cost analysis of renewable energy projects. Prior to joining Exeter, Ms. Sherwood worked on energy efficiency with the State of Maryland.

Education

B.A. (Economics, Business, and Accounting) – McDaniel College, 2009

Previous Employment

2013-2015	Assistant Director Maryland Public Service Commission Baltimore, Maryland	
2011-2013	Regulatory Economist II Maryland Public Service Commission Baltimore, Maryland	
2009-2011	Regulatory Economist I Maryland Public Service Commission Baltimore, Maryland	

Professional Experience

Ms. Sherwood's work at Exeter is primarily related to energy efficiency, renewable energy, automated metering infrastructure, cost recovery, and revenue requirements. Ms. Sherwood has successfully worked with utilities, state energy offices, attorney general's offices, consumer advocates, and commission staffs. Ms. Sherwood provides ongoing support to the Arkansas Office of the Attorney General and the Pennsylvania Office of Consumer Advocates regarding their respective states' utility energy efficiency programs, including analysis of utility energy efficiency plans and proposed plan amendments; analysis of issues raised during stakeholder meetings; review of riders and surcharges related to cost-recovery; and provide recommendations on technical and policy-related matters. She has contributed to several publications issued by the Maryland Power Plant Research Program regarding electricity in Maryland, including load forecasting, analysis of policy impacts, and inclusion of renewable resources. Additionally, Ms. Sherwood has worked with the Department of Defense to study the demand response potential at various Army Garrisons throughout the United States by conducting on-site visits and performing analysis of electric bills.

At the Maryland Public Service Commission, Ms. Sherwood performed analysis on the EmPOWER Maryland energy efficiency and demand response programs, the Exelon Customer Investment Fund, and served as lead analyst for the EmPOWER Maryland limited income programs implemented by the Maryland Department of Housing and Community Development. For those initiatives, she developed reporting templates and guidelines; oversaw evaluation, measurement, and verification of program results; and recommended and ensured compliance with policies. Additionally, Ms. Sherwood assisted with the development of regulations proposed before the Commission to implement the 2013 Maryland Offshore Wind Energy Act.

Publications and Consulting Reports

Fort Riley Assessment of Utility Contracts and Costs, on behalf of the U.S. Army Installation Management Command and Army Commercial Utilities Program, April 2019 (with Steven Estomin of Exeter Associates, Inc.).

Sierra Army Depot Assessment of Utility Contracts and Costs, on behalf of the U.S. Army Installation Management Command and Army Commercial Utilities Program, March 2019 (with Steven Estomin of Exeter Associates, Inc.).

Fort Riley Assessment of Demand Response Opportunities, on behalf of the U.S. Army Office Chief of Staff for Installation Management, January 2018 (with Christina Mudd of Exeter Associates, Inc. and Jim Clark of Clark Energy, Inc.).

Fort Gordon Assessment of Demand Response Opportunities, on behalf of the U.S. Army Office Chief of Staff for Installation Management, June 2017 (with Christina Mudd of Exeter Associates, Inc. and Jim Clark of Clark Energy, Inc.).

Cumulative Environmental Impact Report, on behalf of the Power Plant Research Program, Maryland Department of Natural Resources, December 2016 (with Steven Estomin, Kevin Porter, Rebecca Widiss, and Nicholas DiSanti of Exeter Associates, Inc.; Environmental Resources Management, Inc.; Versar, Inc.; Metametrics, Inc.; Spectrum Environmental Services, Inc.; and RGM Incorporated).

Long-Term Electricity Report for Maryland, on behalf of the Power Plant Research Program, Maryland Department of Natural Resources, December 2016 (with Steven Estomin, Kevin Porter, Rebecca Widiss, Nicholas DiSanti, Cali Clark, and Laura Miller of Exeter Associates, Inc.).

Fort Stewart Assessment of Demand Response Opportunities, on behalf of the U.S. Army Office Chief of Staff for Installation Management, September 2016 (with Christina Mudd and Felipe Salcedo of Exeter Associates, Inc. and Jim Clark of Clark Energy, Inc.).

Edwards Air Force Base Feasibility of a Geothermal Project, on behalf of the U.S. Air Force Civil Engineer Center, April 2016 (with Christina Mudd and Kevin Porter of Exeter Associates, Inc.).

Expert Testimony

Before the Louisiana Public Service Commission, Docket No. U-35877 Pointe Coupee Electric Membership Corporation *Application to Acquire and Install an Automated Metering System and Request for Cost Recovery and Related Relief*, February 2021, for the Louisiana Public Service Commission Staff. Testified regarding the implementation of automated metering infrastructure to replace current meters. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. M-2020-3020818, *Petition of Duquesne Light Company for Approval of its Energy Efficiency and Conservation Phase IV Plan*, January 2021, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the proposed Plan and its compliance with Pennsylvania Act 129. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. M-2020-3020830, *Petition of PECO Energy Company for Approval of its Energy Efficiency and Conservation Phase IV Plan*, January 2021, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the proposed Plan and its compliance with Pennsylvania Act 129. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. M-2020-3020824, *Petition of PPL Electric Utilities for Approval of its Energy Efficiency and Conservation Phase IV Plan*, January 2021, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the proposed Plan and its compliance with Pennsylvania Act 129. (Case settled prior to cross-examination.)

Before the Louisiana Public Service Commission, Docket No. U-35707 Southwest Louisiana Electric Membership Corporation *Application for Approval to Acquire and Install an Automated Metering System and Request for Cost Recovery and Related Relief*, December 2020, for the Louisiana Public Service Commission Staff. Testified regarding the implementation of automated metering infrastructure to replace current meters. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2020-3020919 *Pennsylvania Public Utility Commission v. Audubon Water Company*, November 2020, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2020-3020256 *Pennsylvania Public Utility Commission v. City of Bethlehem – Water Department*, November 2020, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase. (Case settled prior to cross-examination.)

Before the Louisiana Public Service Commission, Docket No. U-35456 Concordia Electric Cooperative Inc. *Application for Certification of a Replacement Advanced Metering System and Approval of Related Financing*, November 2020, for the Louisiana Public Service Commission Staff. Testified regarding the implementation of automated metering infrastructure to replace current meters. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2020-3019612 *Pennsylvania Public Utility Commission v. Reynolds Disposal Company*, October 2020, for the Pennsylvania Office of Consumer Advocate. Participated in mediation regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3010955 *Pennsylvania Public Utility Commission v. City of Lancaster – Sewer Fund*, October 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3008208 *Pennsylvania Public Utility Commission v. Wellsboro Electric Company*, October 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3008209 *Pennsylvania Public Utility Commission v. Valley Energy, Inc*, October 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3008212, *Pennsylvania Public Utility Commission v. Citizens' Electric Company of Lewisburg, PA*, October 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3009559, *Pennsylvania Public Utility Commission v. Eaton Sewer & Water Company, Inc. – Wastewater Division*, August 2019, for the Pennsylvania Office of Consumer Advocate. Participate in mediation regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3009567, *Pennsylvania Public Utility Commission v. Eaton Sewer & Water Company, Inc. – Water Division*, August 2019, for the Pennsylvania Office of Consumer Advocate. Participate in mediation regarding reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3008947, *Pennsylvania Public Utility Commission v. Community Utilities of Pennsylvania Inc. Water Division*, July 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3008948, *Pennsylvania Public Utility Commission v. Community Utilities of Pennsylvania Inc. Wastewater Division*, July 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2019-3006904, *Pennsylvania Public Utility Commission v. The Newtown Artesian Water Company (Supplement No. 136 to Tariff Water – Pa. P.U.C. No. 9)*, March 2019, for the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the overall revenue increase. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2018-3006814, *Pennsylvania Public Utility Commission v. UGI Utilities, Inc – Gas Division (Utility Code 123100, Filed Tariff Gas- Pa. P.U.C. Nos. 7 and 7S)*, January 2019, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of its proposed consolidated natural gas energy efficiency plan. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. M-2018-3004144, *Petition of UGI Utilities, Inc. – Electric Division for Approval of Phase III of its Energy Efficiency and Conservation Plan*, August 2018, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of proposed Plan. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. R-2018-3001307, *Pennsylvania Public Utility Commission v. Hidden Valley Utility Services, L.P. – Wastewater (General Rate Increase Filed Pursuant to 66 PS. CS 1308, Including Answers to 52 PA. Code 53.52)*, April 2018, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding the reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. R-2018-3001306, *Pennsylvania Public Utility Commission v. Hidden Valley Utility Services, L.P. – Water (General Rate Increase Filed Pursuant to 66 PS. CS 1308, Including Answers to 52 PA. Code 53.52)*, April 2018, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding the reasonableness of the overall revenue increase.

Before the Pennsylvania Public Utilities Commission, Docket No. P-2015-2497267, *Petition of Duquesne Light Company for Approval of its Smart Meter Procurement and Installation Plan*, February 2016, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding the inclusion of additional costs related to the Plan's implementation.

Before the Pennsylvania Public Utilities Commission, Docket No. M-2015-2477174, *Petition of UGI Utilities, Inc. – Electric Division for Approval of Phase II of its Energy Efficiency and Conservation Plan*, February 2016, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of proposed Plan. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. M-2015-2515642, *Petition of PPL Electric Utilities for Approval of its Energy Efficiency and Conservation Phase II Plan*, January 2016, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the proposed Plan and its compliance with Pennsylvania Act 129. (Case settled prior to cross-examination.)

Before the Pennsylvania Public Utilities Commission, Docket No. M-2015-2515375, *Petition of Duquesne Light Company for Approval of its Energy Efficiency and Conservation Phase II Plan*, January 2016, on behalf of the Pennsylvania Office of Consumer Advocate. Testified regarding reasonableness of the proposed Plan and its compliance with Pennsylvania Act 129. (Case settled prior to cross-examination.)

Before the Public Utilities Commission of Rhode Island, Docket No. 4595, *Newport Water Division – Rate Application to Collect Additional Revenues of $1,304,595 for a Total Cost of Service of $20,151,440*, December 2015, on behalf of the Division of Public Utilities and Carriers. Testified regarding reasonableness of the overall rate revenue increase.

Before the Maryland Public Service Commission, Case No. 9311, *In the Matter of the Application of Potomac Electric Power Company for an Increase in its Retail Rates For the Distribution of Electric Energy*, April 2013, on behalf of the Maryland Public Service Commission Staff. Testified regarding the inclusion of advanced metering infrastructure meters and energy advisor and engineer positions in rates.

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC	)	
UTILITY COMMISSION	)	
	)	
v.	)	**Docket No. R-2021-3026116**
	)	
THE BOROUGH OF HANOVER	)	
– MUNICIPAL WATERWORKS	)	

SCHEDULES ACCOMPANYING THE

DIRECT TESTIMONY

OF

STACY L. SHERWOOD

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

September 30, 2021

The Borough of Hanover - Municipal Waterworks

Summary of Operating Income
For the Rate Year Ending December 31, 2022

Line No.		Outside-Borough Allocation	Pro Forma Changes in Outside-Borough Revenues	Outside-Borough Amounts After Change in Revenues
1	Outside-Borough Revenue Per Hanover	$ 5,550,978	$ 1,201,216	$ 6,752,194
2				
3	Outside-Borough Operations and Maintenance Expenses Per Hanover	$ 3,464,160		$ 3,464,160
4	OCA Adjustments:			
5	Adjust Rate Case Expense	$ (35,258)		$ (35,258)
6	Adjust Account 392 Legal Expenses - PA PUC Legal Fees	$ (2,400)		$ (2,400)
7	Adjust Account 351 Source of Supply - Miscellaneous Operating Expense	$ (1,104)		$ (1,104)
8	Adjust Account 353 Source of Supply - Miscellaneous Maintenance Expense	$ (6,881)		$ (6,881)
9	Account 367 Power and Pumping - Supplies and Equipment	$ (4,566)		$ (4,566)
10	Adjust Account 134 Professional Services - Engineering Services	$ (22,266)		$ (22,266)
11	Adjust Account 608 Bank Fees	$ (1,715)		$ (1,715)
	Adjust Account 387 General Office - Computer Support	$ (1,698)		$ (1,698)
12	Adjusted Outside-Borough Operations and Maintenance Expenses	$ 3,388,272		$ 3,388,272
13				
14	Outside-Borough Depreciation Expense	$ 1,386,991		$ 1,386,991
18				
19	Outside-Borough Taxes, Other Than Income	$ 111,071		$ 111,071
20				
21	Outside-Borough Net Operating Income Available for Return	$ 664,644		$ 1,865,860
22				
23	Outside-Borough Rate Base Per Hanover	$ 36,029,944	$ (9,486)	$ 36,020,458
24				
25	Outside-Borough Return on Rate Base	1.84%		5.18%

The Borough of Hanover - Municipal Waterworks

Summary of Operating Income
For the Rate Year Ending December 31, 2022

Line No.		Hanover Outside-Borough Amount	
1	Rate Base	$	36,020,458
2	Required Rate of Return		5.18%
3			
4	Net Operating Income Required	$	1,865,860
5	Net Operating Income at Present Rates		664,644
6			
7	Total Required Change in Outside-Borough Revenue	$	1,201,216

The Borough of Hanover - Municipal Waterworks

Summary of Adjustments
For the Rate Year Ending December 31, 2022

Line No.		Total System	Allocation Factor	Outside-Borough Allocation	
1	Rate Base Per Hanover	$ 53,560,839		$ 36,029,944	
2	Adjustments:				
3	Adjust Cash Working Capital			(9,486)	##
4	Adjusted Rate Base	53,560,839		36,020,458	
5					
6	OCA Adjustment to Total Rate Base			$ (9,486)	

Notes

(1) See Schedule SLS-11

The Borough of Hanover - Municipal Waterworks

Adjustment of Rate Case Expense
For the Rate Year Ending December 31, 2022

Line No.

1	Rate Case Expense	$	423,100
2	Years to Normalize		4
3	Annual Normalized Expense	$	105,775
4			
5	Hanover FPFTY Expense		141,033
6	OCA Adjustment	$	(35,258)

The Borough of Hanover - Municipal Waterworks

Adjustment of Adjustment of Account 392 Legal Expenses - PA PUC Legal Fees
For the Rate Year Ending December 31, 2022

Line No.			
1	Legal Expenses - PA PUC Legal Fees	$	43,311
2	Years to Amortize		4
3	Annual Amortized Expense	$	10,828
4			
5	Hanover FPFTY Expense		14,437
6	OCA Adjustment	$	(3,609)

Allocation of Adjustment					
	OCA Adjustment		Allocation Factor	Allocated Adjustment	
Expense for Inside-Borough	$	(3,609)	0.3351	$	(1,209)
Expense for Outside-Borough	$	(3,609)	0.6649	$	(2,400)

The Borough of Hanover - Municipal Waterworks

Adjustment of Account 351 Source of Supply - Miscellaneous Operating Expense
For the Rate Year Ending December 31, 2022

Line No.

Line	Description				
1	Miscellaneous Operating Expense HTY	$	18,047		
2	Less: Replaced Transmitter		2,213 (1)		
3	HTY Expense Less One Time Expenses			$	15,834
4					
5	Total One Time Expenses	$	2,213 (1)		
6	Years to Amortize Expense		4		
7	Amortized Expense			$	553
8	OCA Recommended FPFTY Expense				16,387
9	Hanover FPFTY Expense				18,047
10	Total OCA Expense Adjustment			$	(1,660)
11					

	Allocation of Adjustment					
13		OCA Adjustment		Allocation Factor	Allocated Adjustment	
14	Expense for Inside-Borough	$	(1,660)	0.3351	$	(556)
15	Expense for Outside-Borough	$	(1,660)	0.6649	$	(1,104)

Notes

(1) Hanover's Response to I&E-RE-7, Account Ledger for Account 351

The Borough of Hanover - Municipal Waterworks

Adjustment of Account 353 Source of Supply - Miscellaneous Maintenance Expense
For the Rate Year Ending December 31, 2022

Line No.					
1	Miscellaneous Operating Expense HTY	$	27,602		
2	Less: Roof Replacement		10,780	(1)	
3	HTY Expense Less One Time Expenses			$	16,822
4					
5	Total One Time Expenses	$	10,780	(1)	
6	Years to Amortize Expense		25		
7	Amortized Expense			$	431
8	OCA Recommended FPFTY Expense				17,253
9	Hanover FPFTY Expense				27,602
10	Total OCA Expense Adjustment			$	(10,349)
11					

	Allocation of Adjustment			
		OCA Adjustment	Allocation Factor	Allocated Adjustment
14	Expense for Inside-Borough	$ (10,349)	0.3351	$ (3,468)
15	Expense for Outside-Borough	$ (10,349)	0.6649	$ (6,881)

Notes
(1) Hanover's Response to I&E-RE-7, Account Ledger for Account 353

The Borough of Hanover - Municipal Waterworks

Adjustment of Account 367 Power and Pumping - Supplies and Equipment
For the Rate Year Ending December 31, 2022

Line No.

1	Supplies and Equipment			
2	2018	$	9,246	(1)
3	2019		22,662	(1)
4	2020		26,255	(1)
5	Normalize 3-Year Expense	$	19,388	
6				
7	Hanover FPFTY Expense		26,255	
8	Total OCA Expense Adjustment	$	(6,867)	
9				

10	**Allocation of Adjustment**			
11		OCA Adjustment	Allocation Factor	Allocated Adjustment
12	Expense for Inside-Borough	$ (6,867)	0.3351	$ (2,301)
13	Expense for Outside-Borough	$ (6,867)	0.6649	$ (4,566)

Notes
(1) Hanover's Response to I&E-RE-7, Account Ledger for Account 367

The Borough of Hanover - Municipal Waterworks

Adjustment of Account 134 Professional Services - Engineering Services
For the Rate Year Ending December 31, 2022

Line No.

Line No.	Description				
1	Engineering Services Expense HTY	$	105,690		
2	Less: 75% of Initial Payment for Forest Management Plan		6,259	(1)	
3	Final Payment for Forest Management Plan		2,086	(1)	
4	Water Mapping through 7/3/2020		133	(1)	
5	Water Mapping through 7/31/2020		3,159	(1)	
6	Water Mapping through 8/38/2020		4,161	(1)	
7	Water Mapping through 9/25/2020		2,748	(1)	
8	Water Mapping 2020 - General Engineering Service		798	(1)	
9	Water Mapping through 11/27/2020		5,308	(1)	
10	Water Mapping through 01/01/2021		2,015	(1)	
11	Risk & Resilience Assessment		12,832	(1)	
12	Risk & Resilience Assessment Through 11/27/2020		3,847	(1)	
13	Risk & Resilience Assessment & Emergency Response Plan		1,305	(1)	
14	HTY Expense Less One Time Expenses			$	61,040
15					
16	Total One Time Expenses	$	44,650	(1)	
17	Years to Amortize Expense		4		
18	Amortized Expense			$	11,163
19	Total Adjusted HTY and Amortized Expense				72,202
20	Less: Long Arm Assessment Through 11/22/2019				5,814
21	OCA Recommended FPFTY Expense				66,389
22	Hanover FPFTY Expense				105,690
23	Total OCA Expense Adjustment			$	(33,488)
24					

Line No.	Allocation of Adjustment			
25	**Allocation of Adjustment**			
26		OCA Adjustment	Allocation Factor	Allocated Adjustment
27	Expense for Inside-Borough	$ (33,488)	0.3351	$ (11,222)
28	Expense for Outside-Borough	$ (33,488)	0.6649	$ (22,266)

Notes

(1) Hanover's Response to OCA-IV-19

The Borough of Hanover - Municipal Waterworks

Adjustment of Account 608 Bank Fees
For the Rate Year Ending December 31, 2022

Line No.							
1	Bank Fees Expense HTY	$	5,325				
2	Less: Bond Issuance		3,440	(1)			
3	HTY Expense Less One Time Expenses				$	1,885	
4							
5	Total One Time Expenses	$	3,440	(1)			
6	Years to Amortize Expense		4				
7	Amortized Expense				$	860	
8	OCA Recommended FPFTY Expense					2,745	
9	Hanover FPFTY Expense					5,325	
10	Total OCA Expense Adjustment				$	(2,580)	
11							

12	**Allocation of Adjustment**				
13		OCA Adjustment		Allocation Factor	Allocated Adjustment
14	Expense for Inside-Borough	$ (2,580)		0.3351	$ (865)
15	Expense for Outside-Borough	$ (2,580)		0.6649	$ (1,715)

Notes

(1) Hanover's Response to OCA-IV-20

The Borough of Hanover - Municipal Waterworks

Adjustment of Account 387 General Office - Computer Support
For the Rate Year Ending December 31, 2022

Line No.					
1	Computer Support Expense HTY	$	10,679		
2	Less: Microsoft Office 365 Moved Work Processing		2,060	(1)	
3	Replaced Defective Hard Drive #1 on Hanbor3		78.37	(1)	
4	Set up VNC Viewer on Guns PC for Remote Access		188	(1)	
5	Replace Security Appliance @ Office & Tanager Bldg.		1,079	(1)	
15	HTY Expense Less One Time Expenses			$	7,274
16					
17	Total One Time Expenses	$	3,405	(1)	
18	Years to Amortize Expense		4		
19	Amortized Expense			$	851
20	OCA Recommended FPFTY Expense				8,125
21	Hanover FPFTY Expense				10,679
22	Total OCA Expense Adjustment			$	(2,554)
23					

24	**Allocation of Adjustment**				
25		OCA Adjustment		Allocation Factor	Allocated Adjustment
26	Expense for Inside-Borough	$ (2,554)		0.3351	$ (856)
27	Expense for Outside-Borough	$ (2,554)		0.6649	$ (1,698)

Notes

(1) Hanover's Response to OCA-IV-19

The Borough of Hanover - Municipal Waterworks

Adjustment of Cash Working Capital
For the Rate Year Ending December 31, 2022

Line No.			
1	Hanover's Projected O&M	$	3,575,231
2	Less: OCA Adjustments to O&M		(75,888)
3	OCA Adjusted O&M		3,499,343
4	CWC Percentage		12.50%
5	Total Cash Working Capital	$	437,418
6			
7	Hanover's Cash Working Capital Expense		446,904
8	OCA Adjustment	$	(9,486)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility Commission　　:
　　　　　　　　　　　　　　　　　　　　　　　:
　　　　　　v.　　　　　　　　　　　　　　　　:　　　　Docket No. R-2021-3026116
　　　　　　　　　　　　　　　　　　　　　　　:
The Borough of Hanover --　　　　　　　　　:
Hanover Municipal Waterworks　　　　　　　　:

VERIFICATION

I, Stacy L. Sherwood, hereby state that the facts set forth in my Direct Testimony, OCA

Statement 1, are true and correct (or are true and correct to the best of my knowledge,

information, and belief) and that I expect to be able to prove the same at a hearing held in this

matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. §

4904 (relating to unsworn falsification to authorities).

DATED: September 30, 2021　　　　Signature:　_____
*317996　　　　　　　　　　　　　　　　　　Stacy L. Sherwood

　　　　　　　　　　　　Consultant Address:　Exeter Associates, Inc.
　　　　　　　　　　　　　　　　　　　　　　10480 Little Patuxent Parkway
　　　　　　　　　　　　　　　　　　　　　　Suite 300
　　　　　　　　　　　　　　　　　　　　　　Columbia, MD 21044-3575

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: Pennsylvania Public Utility Commission   **:**
                                                :
                  v.   **:**   Docket No. R-2021-3026116
                                                :
The Borough of Hanover –   **:**
Hanover Municipal Waterworks   **:**

DIRECT TESTIMONY

OF

DAVID J. GARRETT

ON BEHALF OF

THE PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

September 30, 2021

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

I. **INTRODUCTION**

1 **Q. Please state your name and business address.**

2 A. My name is David J. Garrett. My business address is 101 Park Avenue, Suite 1125,

3   Oklahoma Borough, Oklahoma 73102.

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

5 A. I am the managing member of Resolve Utility Consulting, LLC. I am an independent

6   consultant specializing in public utility regulation.

7 **Q. Please summarize your educational background and professional experience.**

8 A. I received a B.B.A. degree with a major in Finance, an M.B.A. degree, and a J.D. degree

9   from the University of Oklahoma. I worked in private legal practice for several years

10   before working as assistant general counsel at the Oklahoma Corporation Commission in

11   2011. At the commission, I worked in the Office of General Counsel in regulatory

12   proceedings. In 2012, I worked for the Public Utility Division as a regulatory analyst

13   providing testimony in regulatory proceedings. After leaving the Oklahoma commission I

14   formed Resolve Utility Consulting PLLC, where I have represented numerous consumer

15   groups and state agencies in utility regulatory proceedings, primarily in the areas of cost of

16   capital and depreciation. I am a Certified Depreciation Professional with the Society of

17   Depreciation Professionals. I am also a Certified Rate of Return Analyst with the Society

18   of Utility and Regulatory Financial Analysts. A more complete description of my

19   qualifications and regulatory experience is included in my curriculum vitae.[1]

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[1] Exhibit DJG-1.

1   **Q.**   **On whose behalf are you testifying in this proceeding?**

2   A.   I am testifying on behalf of the Pennsylvania Office of Consumer Advocate ("OCA").

3   **Q.**   **Describe the purpose and scope of your testimony in this proceeding.**

4   A.   The primary purpose of my testimony is to provide my opinion on the estimated cost of

5   capital and awarded rate of return recommendation for The Borough of Hanover – Hanover

6   Municipal Waterworks ("Hanover" or the "Borough"). I am responding to the direct

7   testimony of Hanover witness Harold Walker, III.

8   **Q.**   **Please describe the organization of your testimony.**

9   A.   In the executive summary below, I provide an overview of cost of capital issues, my

10   recommendations, and my response to the Borough's testimony on these issues. In the

11   sections that follow, I discuss the legal standards governing the awarded return issue as

12   well as the general concepts involved in estimating the cost of equity. I provide detailed

13   analysis of the Discounted Cash Flow ("DCF") Model, the Capital Asset Pricing Model

14   ("CAPM"), including my results for these models and my responses to Mr. Walker's

15   results. I also address capital structure, which is a key component to the cost of capital.

II. EXECUTIVE SUMMARY

16   **Q.**   **Please summarize your recommendation to the Commission.**

17   A.   My testimony can be distilled to the following recommendations:

1   • The Commission should reject the Borough's proposed return on equity
2   ("ROE") of 10.45% as excessive and unsupported. An objective cost of
3   equity analysis shows that Hanover's cost of equity is about 7.6%. This
4   estimate is the average result of the two well-established cost of equity
5   models I used in this case, the DCF Model and CAPM. Using reasonable
6   and objective inputs, the DCF Model indicates a cost of equity of 8.4% and
7   the CAPM indicates a cost of equity of 6.8%. Based on these findings, I
8   recommend the Commission adopt an awarded return on equity of 8.4% for
9   Hanover. Although 8.4% is very likely higher than Hanover's market-based
10   cost of equity when the CAPM results are considered, an awarded ROE of
11   8.4% would be reasonable, and it would represent a meaningful move
12   towards market-based cost of equity.

13   • I recommend the Commission reject Hanover's proposed capital structure
14   consisting of 48% debt and 52% equity. However, the average debt ratio of
15   the proxy group is 51%. Thus, I recommend an imputed capital structure
16   consisting of 51% debt and 49% equity.

17   • I do not recommend an adjustment to the Borough's proposed cost of debt
18   of 2.98%. Likewise, I do not propose an adjustment to Mr. Walker's 11%
19   tax adjustment to the cost of equity. Thus, my adjustments to the Borough's
20   proposed ROE and capital structure equate to an overall weighted average
21   rate of return of 5.18%.

22   My proposed adjustments are illustrated in the table below.[2]

Figure 1:
Weighted Average Rate of Return Proposal

Capital Component	Proposed Ratio	Cost Rate	11% Tax Adjusted	Weighted Cost
Debt	51.0%	2.98%		1.52%
Fund Equity	49.0%	8.40%	7.48%	3.66%
Total	100.0%			5.18%

23   The details supporting my proposed adjustments are discussed further in my testimony.

[2] *See also* Exhibit DJG-16.

A. Overview and Background

1 **Q.   Please explain the concept and significance of the Cost of Capital.**

2 A.   The term cost of capital, or WACC,[3] refers to the weighted average cost of the components

3   within a company's capital structure, including the costs of both debt and equity. The three

4   primary components of a company's WACC include the following:

5   1.   Cost of Debt

6   2.   Cost of Equity

7   3.   Capital Structure

8   Determining the cost of debt is relatively straight-forward. Interest payments on bonds are

9   contractual, embedded costs that are generally calculated by dividing total interest

10   payments by the book value of outstanding debt. Determining the cost of equity, on the

11   other hand, is more complex. Unlike the known, contractual and embedded cost of debt,

12   there is not any explicitly quantifiable "cost" of equity. Instead, the cost of equity must be

13   estimated through various financial models. Cost of capital is expressed as a weighted

14   average because it is based upon a company's relative levels of debt and equity, as defined

15   by the particular capital structure of that company. The basic WACC equation used in

16   regulatory proceedings is presented as follows:

---

[3] The terms cost of capital and WACC are synonymous and used interchangeably throughout this testimony.

Equation 1:
Weighted Average Cost of Capital

$$WACC = \left(\frac{D}{D+E}\right)C_D + \left(\frac{E}{D+E}\right)C_E$$

where:
WACC	=	*weighted average cost of capital*
D	=	*book value of debt*
C_D	=	*embedded cost of debt capital*
E	=	*book value of equity*
C_E	=	*market-based cost of equity capital*

Companies in the competitive market often use their WACC as the discount rate to determine the value of capital projects, so it is important that this figure be estimated accurately.

Q. How do experts and regulators typically assess the ROEs awarded to utilities and the corresponding opportunity for shareholders?

A. Investors, company managers, and academics around the world have used models, such as the CAPM and DCF to closely estimate cost of equity for many years, and weigh the results achieved against the results from proxy groups. Each of these concepts will be discussed in more detail later in my testimony.

B. Response to the Borough's Testimony

Q. Please provide an overview of the problems you have identified with the Borough's testimony regarding cost of equity, capital structure, and the resulting awarded ROE.

A. Mr. Walker proposes a return on equity of 10.45%.[4] Mr. Walker's recommendation is based on the CAPM, DCF Model, and other risk premium models. However, several of his key assumptions and inputs to these models violate fundamental, widely accepted tenets in finance and valuation. I find several aspects of Mr. Walker's approach and resulting

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[4] Direct Testimony of Harold Walker, III p. 6, lines 3-4.

1 recommendations to be problematic, including the leverage adjustment used in his DCF

2 Model and CAPM. In addition, Mr. Walker's own risk premium model overestimates the

3 market risk premium. These issues are further discussed in my testimony.

III. LEGAL STANDARDS AND THE AWARDED RETURN

4 **Q. Discuss the legal standards governing the awarded rate of return on capital**
5 **investments for regulated utilities.**

6 A. In *Wilcox v. Consolidated Gas Co. of New York*, the U.S. Supreme Court first addressed

7 the meaning of a fair rate of return for public utilities.[5] The Court found that "the amount

8 of risk in the business is a most important factor" in determining the appropriate allowed

9 rate of return.[6] As referenced earlier, in two subsequent landmark cases, the Court set forth

10 the standards by which public utilities are allowed to earn a return on capital investments.

11 First, in *Bluefield Water Works & Improvement Co. v. Public Service Commission of West*

12 *Virginia*, the Court held:

13 A public utility is entitled to such rates as will permit it to earn a return on
14 the value of the property which it employs for the convenience of the public.
15 . . but it has no constitutional right to profits such as are realized or
16 anticipated in highly profitable enterprises or speculative ventures. The
17 return should be reasonably sufficient to assure confidence in the financial
18 soundness of the utility and should be adequate, under efficient and
19 economical management, to maintain and support its credit and enable it to
20 raise the money necessary for the proper discharge of its public duties.[7]

---

[5] *Wilcox v. Consolidated Gas Co. of New York*, 212 U.S. 19 (1909).

[6] *Id.* at 48.

[7] *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679, 692–93 (1923).

9

1   Then, in *Federal Power Commission v. Hope Natural Gas Company*, the Court expanded

2   on the guidelines set forth in *Bluefield* and stated:

3   From the investor or company point of view it is important that there be
4   enough revenue not only for operating expenses but also for the capital costs
5   of the business. These include service on the debt and dividends on the
6   stock.   By that standard the return to the equity owner should be
7   commensurate with returns on investments in other enterprises having
8   corresponding risks. That return, moreover, should be sufficient to assure
9   confidence in the financial integrity of the enterprise, so as to maintain its
10   credit and to attract capital.[8]

11   The cost of capital models I have employed in this case are designed to be in accordance

12   with the foregoing legal standards.

13   **Q.   Is it important that the awarded rate of return be based on the Borough's actual cost**
14   **of capital?**

15   A.   Yes. The U.S. Supreme Court in *Hope* makes it clear that the allowed return should be

16   based on the actual cost of capital. Moreover, the awarded return must also be fair, just,

17   and reasonable under the circumstances of each case. Among the circumstances that must

18   be considered in each case are the broad economic and financial impacts to the cost of

19   equity and awarded return caused by market forces and other factors. Scholars agree that

20   the actual cost of capital must be considered:

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[8] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944) (emphasis added) (internal citations omitted).

10

1   Since by definition the cost of capital of a regulated firm represents
2   precisely the expected return that investors could anticipate from other
3   investments while bearing no more or less risk, and since investors will not
4   provide capital unless the investment is expected to yield its opportunity
5   cost of capital, the correspondence of the definition of the cost of capital
6   with the court's definition of legally required earnings appears clear.[9]

7   The models I have employed in this case closely estimate the Borough's true cost of equity.

8   If the Commission sets the awarded return based on my lower and more reasonable rate of

9   return, it will better comply with the U.S. Supreme Court's standards, allow the Borough

10   to maintain its financial integrity, and achieve reasonable returns for its investors. On the

11   other hand, if the Commission sets the allowed rate of return much higher than the true cost

12   of capital, as requested by Hanover, it will result in an inappropriate transfer of wealth from

13   ratepayers to the Borough.[10]

14 **Q.**   **What does this legal standard mean for determining the awarded return and the cost**
15   **of capital?**

16 A.   The awarded return and the cost of capital are different but related concepts. On the one

17   hand, the legal and technical standards encompassing this issue require that the awarded

18   return reflect the true cost of capital. Yet on the other hand, the two concepts differ in that

19   the legal standards do not mandate that awarded returns exactly match the cost of capital.

20   Instead, awarded returns are set through the regulatory process and may be influenced by

21   various factors other than objective market drivers. By contrast, the cost of capital should

22   be evaluated objectively and be closely tied to economic realities, such as stock prices,

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[9] A Lawrence Kolbe, James A. Read, Jr. & George R. Hall, *The Cost of Capital: Estimating the Rate of Return for Public Utilities* 21 (The MIT Press 1984).

[10] Roger A. Morin, *New Regulatory Finance* 23–24 (Public Utilities Reports, Inc. 2006) (1994) ("[I]f the allowed rate of return is greater than the cost of capital, capital investments are undertaken and investors' opportunity costs are more than achieved. Any excess earnings over and above those required to service debt capital accrue to the equity holders, and the stock price increases. In this case, the wealth transfer occurs from ratepayers to shareholders.").

11

1	dividends, growth rates, and, most importantly, risk. The cost of capital can be estimated
2	by financial models used by firms, investors, and academics around the world for decades.
3	The problem is, with respect to regulated utilities, there has been a trend in which awarded
4	returns fail to closely track with market-based cost of capital, as further discussed below.
5	To the extent this occurs, the results are detrimental to ratepayers and the state's economy.
6	**Q.**	**Describe the economic impact that occurs when the awarded return strays too far**
7		**from the U.S. Supreme Court's time-honored cost of equity standards.**
8	A.	When the awarded ROE is set far above the cost of equity, it runs the risk of violating the
9		U.S. Supreme Court's standards. This has the effect of diverting dollars from ratepayers
10		for their internal or business uses that would otherwise support the local or state economy.
11		Moreover, establishing an awarded return that far exceeds true cost of capital effectively
12		prevents the awarded returns from changing along with economic conditions. This is
13		especially true given the fact that regulators tend to be influenced by the awarded returns
14		in other jurisdictions, regardless of the various unknown factors influencing those awarded
15		returns. If regulators rely too heavily on the awarded returns from other jurisdictions, they
16		can create a cycle over time that bears little relation to the market-based cost of equity. In
17		fact, this is exactly what we have observed since 1990. This is yet another reason why it
18		is crucial for regulators to put more emphasis on the target utility's actual cost of equity
19		than on the awarded returns from other jurisdictions. Awarded returns may be influenced
20		by settlements and other political factors not based on true market conditions. In contrast,
21		the true cost of equity as estimated through objective models is not influenced by these
22		factors but is instead driven by market-based factors.

| 1 | **Q.** | **Can you illustrate and provide a comparison of the relationship between awarded** |
| 2 | | **utility returns and market cost of equity since 1990?** |

3   A.   Yes. As shown in the figure below, awarded returns for electric and gas utilities have been

4   above the average required market return since 1990.[11] Because utility stocks are

5   consistently far less risky than the average stock in the marketplace, the cost of equity for

6   utility companies is less than the market cost of equity.

7   To illustrate this fact, the graph in the figure below shows three trend lines. The

8   top two line are the average annual awarded returns since 1990 for U.S. regulated electric

9   and gas utilities. The bottom line is the required market return over the same period. As

10   discussed in more detail later in my testimony, the required market return is essentially the

11   return that investors would require if they invested in the entire market and, as such, the

12   required market return is essentially the cost of equity of the entire market. Since it is

13   undisputed that utility stocks are less risky than the average stock in the market, then the

14   utilities' cost of equity must be less than the market cost of equity.[12] Thus, awarded returns

15   (the solid line) should generally be below the market cost of equity, since awarded returns

16   are supposed to be based on true cost of equity.

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[11] Exhibit DJG-14.

[12] This fact can be objectively measured through a term called "beta," as discussed later in the testimony. Utility betas are less than one, which means utility stocks are less risky than the "average" stock in the market.

Figure 2:
Awarded ROEs vs. Market Cost of Equity
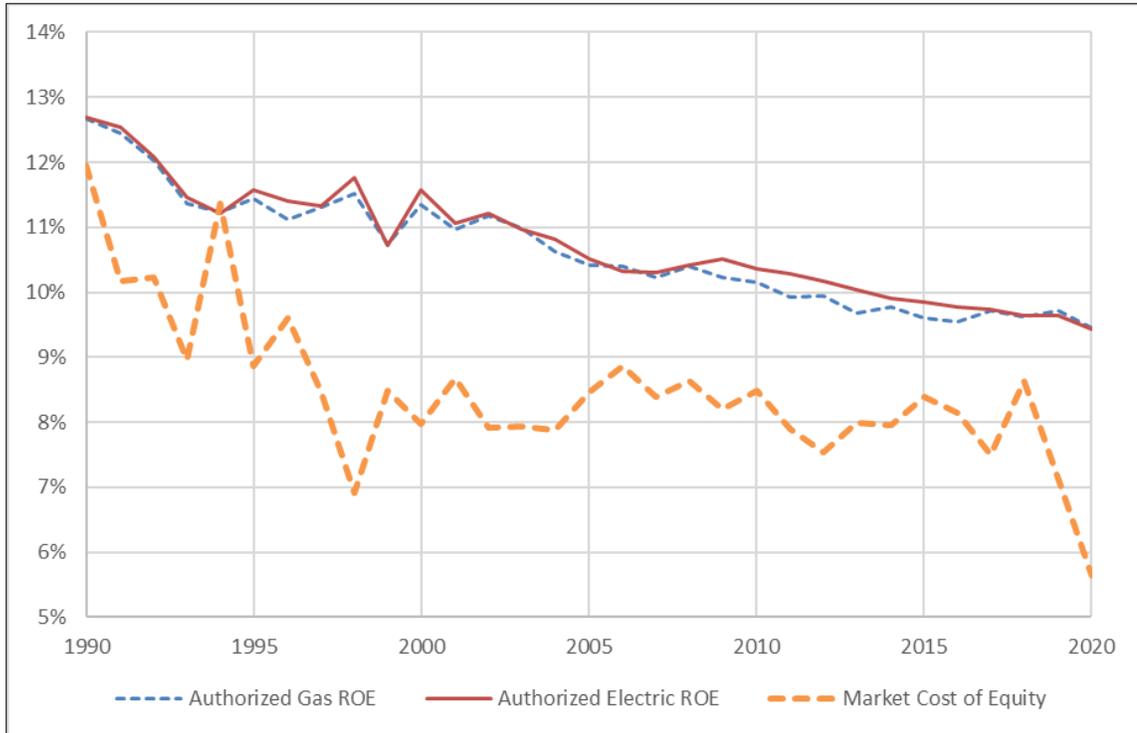
1	Notwithstanding the data in this graph, awarded ROEs have been consistently above the
2	market cost of equity for many years. Also as shown in this graph, since 1990, there was
3	only one year in which the average awarded ROE was below the market cost of equity. In
4	1994, regulators awarded ROEs that were the closest to utilities' market-based cost of
5	equity. In my opinion, when awarded ROEs for utilities are below the market cost of
6	equity, regulators more closely conform to the standards set forth by *Hope* and *Bluefield*
7	and minimize the excess wealth transfer from ratepayers to shareholders.
8	**Q.** **Does this concept also apply to regulated water utilities?**
9	A. Yes. Like regulated electric and gas utilities, water utilities are also less risky than the
10	average stock in the market portfolio. We can objectively measure this fact through water

1   utility betas.[13]   As shown in the graph below, the average authorized ROEs for water

2   utilities have generally tracked with those of gas utilities.

Figure 3:
Awarded ROEs vs. Market Cost of Equity

Average authorized ROEs — electric, gas and water rate decisions

As of May 31, 2017.

Note: Electric ROE includes general rate cases and limited rider proceedings.

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence
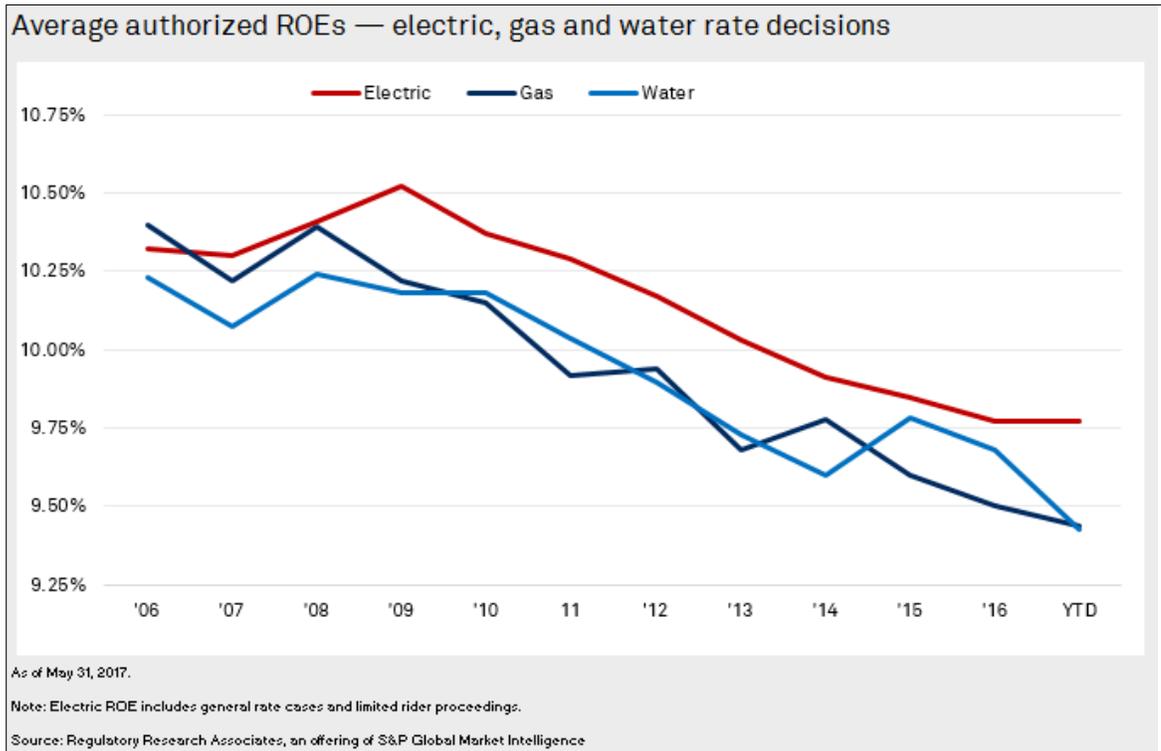
3   Comparing this figure with Figure 2 above, we can see that authorized ROEs for water

4   utilities have also exceeded the market cost of equity. Again, the cost of equity for a

5   regulated utility, including water utilities, should be <u>below</u> the market cost of equity. In

6   2017, the average authorized ROE for water utilities was about 9.4%.[14] As demonstrated

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[13] See Exhibit DJG-8. The concept of beta will be discussed further in my testimony; however, since the average beta of the proxy group is less than 1.0, we have an objective way to determine that if the Borough were publicly traded, the return required by its equity investors would be less than the return required on the market portfolio.

[14] S&P Global Market Intelligence, *Water Rate Case Activity: How It Ebbs and Flows*, June 23, 2017. https://www.spglobal.com/marketintelligence/en/news-insights/research/water-rate-case-activity-how-it-ebbs-and-flows

1   in my testimony, the highest reasonable estimate for the Borough's cost of equity is about

2   8.4%.

3 **Q.   Have other analysts commented on this national phenomenon of awarded ROEs**
4   **exceeding market-based cost equity for utilities?**

5 A.   Yes.   In his article published in Public Utilities Fortnightly in 2016, Steve Huntoon

6   observed that even though utility stocks are less risky than the stocks of competitive

7   industries, utility stocks have nonetheless outperformed the broader market.[15] Specifically,

8   Mr. Huntoon notes the following three points which lead to a problematic conclusion:

9   1.   Jack Bogle, the founder of Vanguard Group and a Wall Street
10   legend, provides rigorous analysis that the long-term total return for
11   the broader market will be around 7 percent going forward. Another
12   Wall Street legend, Professor Burton Malkiel, corroborates that 7
13   percent in the latest edition of his seminal work, A Random Walk
14   Down Wall Street.

15   2.   Institutions like pension funds are validating the first point by piling
16   on risky investments to try and get to a 7.5 percent total return, as
17   reported by the Wall Street Journal.

18   3.   Utilities are being granted returns on equity around 10 percent.[16]

19   Other scholars have also observed that awarded ROEs have not appropriately

20   tracked with declining interest rates over the years, and that excessive awarded ROEs have

21   negative economic impacts. In a white paper issued in 2017, Charles S. Griffey stated:

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[15] Steve Huntoon, "Nice Work If You Can Get It," Public Utilities Fortnightly (Aug. 2016).

[16] *Id*.

1	The "risk premium" being granted to utility shareholders is now higher than
2	it has ever been over the last 35 years. Excessive utility ROEs are
3	detrimental to utility customers and the economy as a whole. From a societal
4	standpoint, granting ROEs that are higher than necessary to attract
5	investment creates an inefficient allocation of capital, diverting available
6	funds away from more efficient investments. From the utility customer
7	perspective, if a utility's awarded and/or achieved ROE is higher than
8	necessary to attract capital, customers pay higher rates without receiving
9	any corresponding benefit.[17]

10   It is interesting that both Mr. Huntoon and Mr. Griffey use the word "sticky" in their articles

11   to describe the fact that awarded ROEs have declined at a much slower rate than interest

12   rates and other economic factors resulting in a decline in capital costs and expected returns

13   on the market. It is not hard to see why this phenomenon of "sticky" ROEs has occurred.

14   Because awarded ROEs are often based primarily on a comparison with other awarded

15   ROEs around the country, the average awarded returns effectively fail to adapt to true

16   market conditions, and regulators seem reluctant to deviate from the average. Once utilities

17   and regulatory commissions become accustomed to awarding rates of return higher than

18   market conditions actually require, this trend becomes difficult to reverse. The fact is,

19   utility stocks are less risky than the average stock in the market, and thus, awarded ROEs

20   should be less than the expected return on the market. However, that is rarely the case.

21   My proposal assists the Commission in "see[ing] the gap between allowed returns and cost

22   of capital,"[18] and reconciling this issue in an equitable manner.[19]

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[17] Charles S. Griffey, "When 'What Goes Up' Does Not Come Down: Recent Trends in Utility Returns," White Paper (February 2017).

[18] Leonard Hyman & William Tilles, "Don't Cry for Utility Shareholders, America," Public Utilities Fortnightly (October 2016).

[19] Although the articles cited in this section were not specifically discussing water utilities, as demonstrated in the figures and discussion preceding this section, the authorized ROEs for water utilities have also exceeded the cost of equity for the market portfolio.

1	**Q.**	**Summarize the legal standards governing the awarded ROE issue.**

2   A.   The Commission should strive to move the awarded return to a level more closely aligned

3   with the Borough's actual, market-derived cost of capital while keeping in mind the

4   following two legal principles outlined below.

5   **1.   Risk is the most important factor when determining the awarded return. The**
6   **awarded return should be commensurate with those returns on investments of**
7   **corresponding risk.**

8   The legal standards articulated in *Hope* and *Bluefield* demonstrate that the U.S. Supreme

9   Court understands one of the most basic, fundamental concepts in financial theory: the

10   more (or less) risk an investor assumes, the more (or less) return the investor requires.

11   Since utility stocks are low risk, the return required by equity investors should be relatively

12   low. I have used financial models to closely estimate the Borough's cost of equity, and

13   these financial models account for risk. The cost of equity models confirm the industry

14   experiences relatively low levels of risk by producing relatively low cost of equity results.

15   In turn, the awarded ROE in this case should reflect Hanover's relatively low market risk.

16   **2.   The awarded return should be sufficient to assure financial soundness and**
17   **integrity under efficient management.**

18   Because awarded returns in the regulatory environment have not closely tracked market-

19   based trends and commensurate risk, utility companies have been able to remain more than

20   financially sound, perhaps despite management inefficiencies. In fact, the transfer of

21   wealth from ratepayers to utilities has been so far removed from actual cost-based drivers

22   that a utility could remain financially sound even under relatively inefficient management.

23   Therefore, regulatory commissions should strive to set utilities' returns based on actual

24   market conditions to promote prudent and efficient management and minimize economic

25   waste.

IV. GENERAL CONCEPTS AND METHODOLOGY

1 **Q.** **Discuss your approach to estimating the cost of equity in this case.**

2 A. While a competitive firm must estimate its own cost of capital to assess the profitability of

3 competing capital projects, regulators determine a utility's cost of capital to establish a fair

4 rate of return. The legal standards set forth above do not include specific guidelines

5 regarding the models that must be used to estimate the cost of equity for utilities. Over the

6 years, however, regulatory commissions have consistently relied on several models. The

7 models I have employed in this case have been the two most widely used and accepted in

8 regulatory proceedings for many years. The specific inputs and calculations for these

9 models are described in more detail below.

10 **Q.** **Please explain why you used multiple models to estimate the cost of equity.**

11 A. These models attempt to measure the return on equity required by investors by estimating

12 several different inputs. It is preferable to use multiple models because the results of any

13 one model may contain a degree of imprecision, especially depending on the reliability of

14 the inputs used at the time of conducting the model. By using multiple models, the analyst

15 can compare the results of the models and look for outlying results and inconsistencies.

16 Likewise, if multiple models produce a similar result, it may indicate a narrower range for

17 the cost of equity estimate.

18 **Q.** **Please discuss the benefits of choosing a proxy group of companies in conducting cost**
19 **of capital analyses.**

20 A. The cost of equity models in this case can be used to estimate the cost of capital of any

21 individual, publicly traded company. There are advantages, however, to conducting cost

22 of capital analysis on a proxy group of companies that are comparable to the target

1   company. First, it is better to assess the financial soundness of a utility by comparing it to

2   a group of other financially sound utilities. Second, using a proxy group provides more

3   reliability and confidence in the overall results because there is a larger sample size.

4   Finally, the use of a proxy group is often a pure necessity when the target company is a

5   subsidiary that is not publicly traded. This is because the financial models used to estimate

6   the cost of equity require information from publicly traded firms, such as stock prices and

7   dividends.

8   **Q.   Describe the proxy group you selected in this case.**

9   A.   In this case, I chose to use the same proxy group used by Mr. Walker. There could be

10   reasonable arguments made for the inclusion or exclusion of a particular company in a

11   proxy group; however, the cost of equity results are influenced far more by the underlying

12   assumptions and inputs to the various financial models than the composition of the proxy

13   group.[20] By using the same proxy group, we can remove a relatively insignificant variable

14   from the equation and focus on the primary factors driving Hanover's cost of equity

15   estimate.

V. RISK AND RETURN CONCEPTS

16   **Q.   Discuss the general relationship between risk and return.**

17   A.   Risk is among the most important factors for the Commission to consider when

18   determining the allowed return. Thus, it is necessary to understand the relationship

19   between risk and return. There is a direct relationship between risk and return: the more

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[20] Exhibit DJG-2.

1   (or less) risk an investor assumes, the larger (or smaller) return the investor will demand.

2   There are two primary types of risk: firm-specific risk and market risk. Firm-specific risk

3   affects individual companies, while market risk affects all companies in the market to

4   varying degrees.

5   **Q.   Discuss the differences between firm-specific risk and market risk.**

6   A.   Firm-specific risk affects individual companies, rather than the entire market. For example,

7   a competitive firm might overestimate customer demand for a new product, resulting in

8   reduced sales revenue. This is an example of a firm-specific risk called "project risk."[21]

9   There are several other types of firm-specific risks, including: (1) "financial risk" – the risk

10   that equity investors of leveraged firms face as residual claimants on earnings; (2) "default

11   risk" – the risk that a firm will default on its debt securities; and (3) "business risk" – which

12   encompasses all other operating and managerial factors that may result in investors

13   realizing less than their expected return in that particular company. While firm-specific

14   risk affects individual companies, market risk affects all companies in the market to

15   varying degrees. Examples of market risk include interest rate risk, inflation risk, and the

16   risk of major socio-economic events. When there are changes in these risk factors, they

17   affect all firms in the market to some extent.[22]

18   Analysis of the U.S. market in 2001 provides a good example for contrasting firm-

19   specific risk and market risk. During that year, Enron Corp.'s stock fell from $80 per share

20   to its low when the company filed bankruptcy at the end of the year. If an investor's

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[21] Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 62–63 (3rd ed., John Wiley & Sons, Inc. 2012).

[22] *See* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 149 (9th ed., McGraw-Hill/Irwin 2013).

1		portfolio had held only Enron stock at the beginning of 2001, this irrational investor would
2		have lost the entire investment by the end of the year due to assuming the full exposure of
3		Enron's firm-specific risk (in that case, imprudent management). On the other hand, a
4		rational, diversified investor who invested the same amount of capital in a portfolio holding
5		every stock in the S&P 500 would have had a much different result that year. The rational
6		investor would have been relatively unaffected by the fall of Enron because his or her
7		portfolio included about 499 other stocks. Each of those stocks, however, would have been
8		affected by various market risk factors that occurred that year. Thus, the rational investor
9		would have incurred a relatively minor loss due to market risk factors, while the irrational
10		investor would have lost everything due to firm-specific risk factors.
11	**Q.**	**Can equity investors reasonably minimize firm-specific risk?**
12	A.	Yes. A fundamental concept in finance is that firm-specific risk can be eliminated through
13		diversification.[23] If someone irrationally invested all his or her funds in one firm, he or she
14		would be exposed to all the firm-specific risk and the market risk inherent in that single
15		firm. Rational investors, however, are risk-averse and seek to eliminate risk they can
16		control. Investors can eliminate firm-specific risk by adding more stocks to their portfolio
17		through a process called "diversification." There are two reasons why diversification
18		eliminates firm-specific risk.
19		First, each stock in a diversified portfolio represents a much smaller percentage of
20		the overall portfolio than it would in a portfolio of just one or a few stocks. Thus, any firm-

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[23] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 179–80 (3rd ed., South Western Cengage Learning 2010).

1   specific action that changes the stock price of one stock in the diversified portfolio will

2   have only a small impact on the entire portfolio.[24]

3   The second reason why diversification eliminates firm-specific risk is that the

4   effects of firm-specific actions on stock prices can be either positive or negative for each

5   stock. Thus, in large diversified portfolios, the net effect of these positive and negative

6   firm-specific risk factors will be essentially zero and will not affect the value of the overall

7   portfolio.[25] Firm-specific risk is also called "diversifiable risk" because it can be easily

8   eliminated through diversification.

9   **Q.   Is it well-known and accepted that, because firm-specific risk can be easily eliminated**
10 **through diversification, the market does not reward such risk through higher**
11 **returns?**

12 A.   Yes. Because investors eliminate firm-specific risk through diversification, they know they

13   cannot expect a higher return for assuming the firm-specific risk in any one company.

14   Thus, the risks associated with an individual firm's operations are not rewarded by the

15   market. In fact, firm-specific risk is also called "unrewarded" risk for this reason. Market

16   risk, on the other hand, cannot be eliminated through diversification. Because market risk

17   cannot be eliminated through diversification, investors expect a return for assuming this

18   type of risk. Market risk is also called "systematic risk." Scholars recognize the fact that

19   market risk, or systematic risk, is the only type of risk for which investors expect a return

20   for bearing:

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[24] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 64 (3rd ed., John Wiley & Sons, Inc. 2012).

[25] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 64 (3rd ed., John Wiley & Sons, Inc. 2012).

1   If investors can cheaply eliminate some risks through diversification, then
2   we should not expect a security to earn higher returns for risks that can be
3   eliminated through diversification. Investors can expect compensation <u>only</u>
4   for bearing systematic risk (i.e., risk that cannot be diversified away).[26]

5
6   These important concepts are illustrated in the figure below. Some form of this figure is

7   found in many financial textbooks.

Figure 4:
Effects of Portfolio Diversification
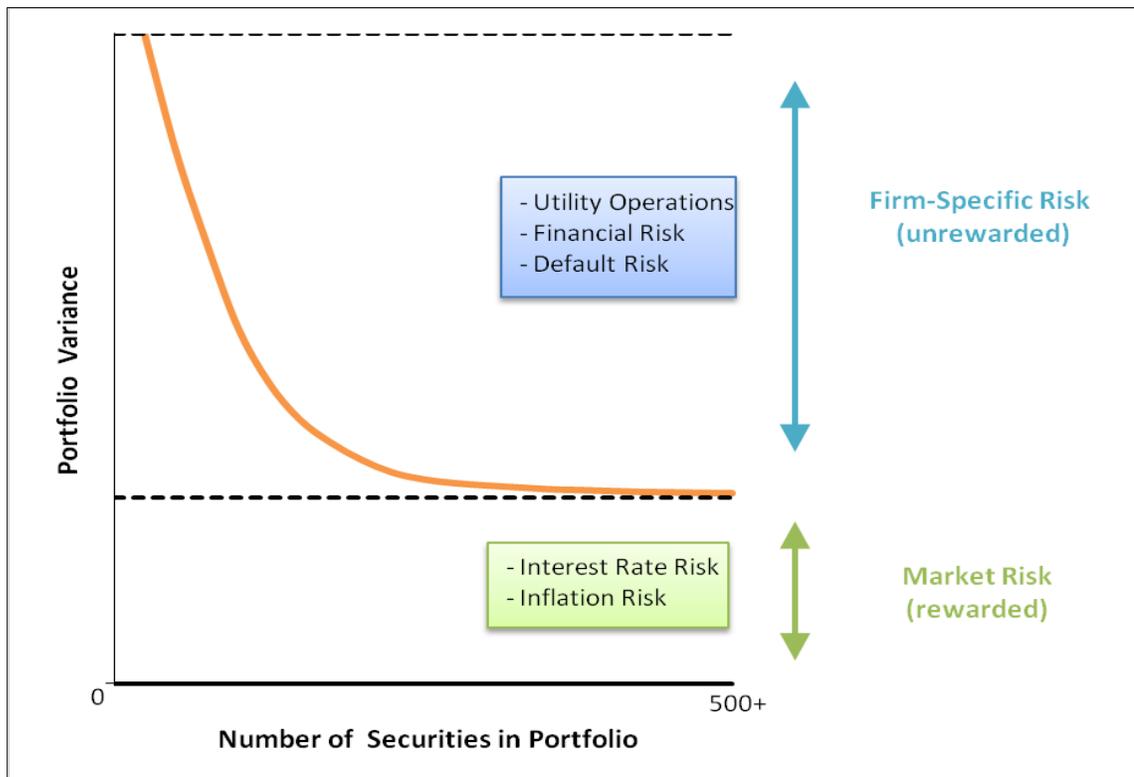
8   This figure shows that as stocks are added to a portfolio, the amount of firm-specific risk

9   is reduced until it is essentially eliminated. No matter how many stocks are added,

10   however, there remains a certain level of fixed market risk. The level of market risk will

---

[26] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 180 (3rd ed., South Western Cengage Learning 2010) (emphasis added).

1		vary from firm to firm. Market risk is the only type of risk that is rewarded by the market
2		and is thus the primary type of risk the Commission should consider when determining the
3		allowed return.
4	**Q.**	**Describe how market risk is measured.**
5	A.	Investors who want to eliminate firm-specific risk must hold a fully diversified portfolio.
6		To determine the amount of risk that a single stock adds to the overall market portfolio,
7		investors measure the covariance between a single stock and the market portfolio. The
8		result of this calculation is called "beta."[27] Beta represents the sensitivity of a given
9		security to the market as a whole. The market portfolio of all stocks has a beta equal to
10		one. Stocks with betas greater than 1.0 are relatively more sensitive to market risk than the
11		average stock. For example, if the market increases (or decreases) by 1.0%, a stock with a
12		beta of 1.5 will, on average, increase (or decrease) by 1.5%. In contrast, stocks with betas
13		of less than 1.0 are less sensitive to market risk, such that if the market increases (or
14		decreases) by 1.0%, a stock with a beta of 0.5 will, on average, only increase (or decrease)
15		by 0.5%. Thus, stocks with low betas are relatively insulated from market conditions. The
16		beta term is used in the CAPM to estimate the cost of equity, which is discussed in more
17		detail later.[28]

---

[27] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 180–81 (3rd ed., South Western Cengage Learning 2010).

[28] Though it will be discussed in more detail later, Exhibit DJG-8 shows that the average beta of the proxy group was less than 1.0. This confirms the well-known concept that utilities are relatively low-risk firms.

1 **Q. Are public utilities characterized as defensive firms that have low betas, have low**
2 **market risk, and are relatively insulated from overall market conditions?**

3 A.   Yes. Although market risk affects all firms in the market, it affects different firms to

4   varying degrees. Firms with high betas are affected more than firms with low betas, which

5   is why firms with high betas are riskier. Stocks with betas greater than one are generally

6   known as "cyclical stocks." Firms in cyclical industries are sensitive to recurring patterns

7   of recession and recovery known as the "business cycle."[29] Thus, cyclical firms are

8   exposed to a greater level of market risk. Securities with betas less than one, on the other

9   hand, are known as "defensive stocks." Companies in defensive industries, such as public

10   utility companies, "will have low betas and performance that is comparatively unaffected

11   by overall market conditions."[30] In fact, financial textbooks often use utility companies as

12   prime examples of low-risk, defensive firms.[31] The figure below compares the betas of

13   several industries and illustrates that the utility industry is one of the least risky industries

14   in the U.S. market.[32]

---

[29] *See* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 382 (9th ed., McGraw-Hill/Irwin 2013).

[30] Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 383 (9th ed., McGraw-Hill/Irwin 2013).

[31] *See e.g.,* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 382 (9th ed., McGraw-Hill/Irwin 2013); *see also* Aswath Damodaran, Investment Valuation: Tools and Techniques for Determining the Value of Any Asset 196 (3rd ed., John Wiley & Sons, Inc. 2012).

[32] *See* Betas by Sector (US) at http://pages.stern.nyu.edu/~adamodar/. The exact beta calculations are not as important as illustrating the well-known fact that utilities are low-risk companies. The fact that the utility industry is one of the lowest risk industries in the country should not change from year to year.

Figure 5:
Beta by Industry
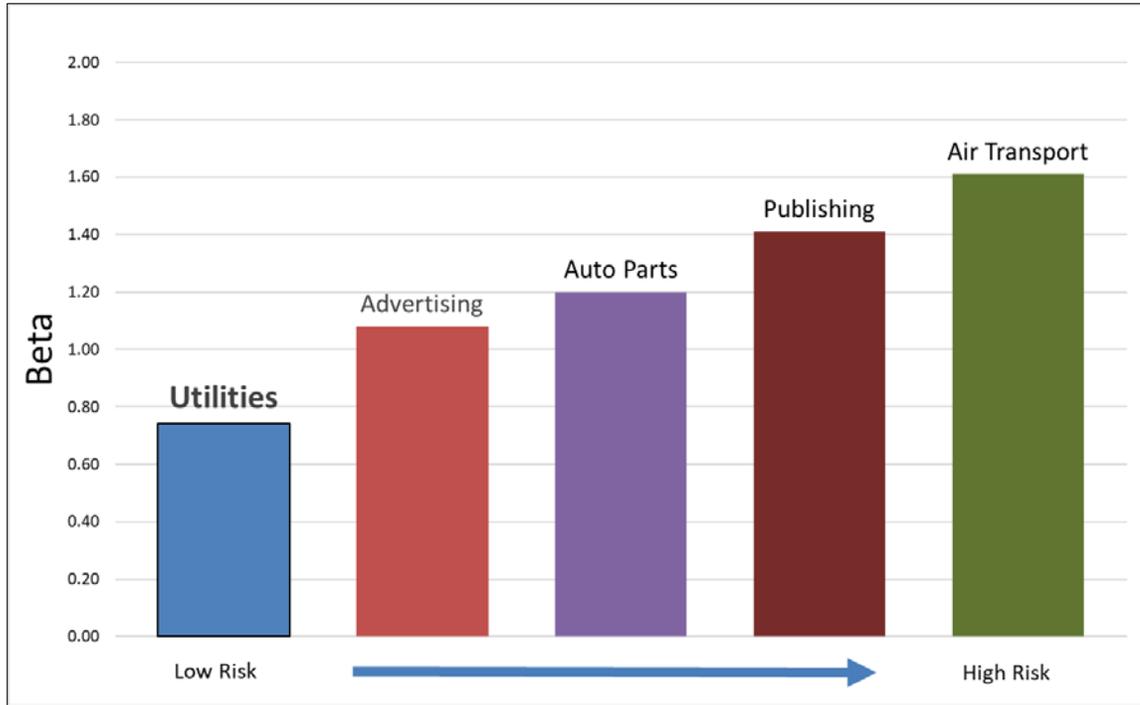
1   The fact that utilities are defensive firms that are exposed to little market risk is

2   beneficial to society. When the business cycle enters a recession, consumers can be assured

3   that their utility companies will be able to maintain normal business operations and provide

4   safe and reliable service under prudent management. Likewise, utility investors can be

5   confident that utility stock prices will not fluctuate widely. So, while it is preferable for

6   utilities to be defensive firms that experience little market risk and relatively insulated from

7   market conditions, this should also be appropriately reflected in Hanover's awarded return.

VI.   DCF ANALYSIS

8   **Q.**   **Describe the DCF Model.**

9   A.   The DCF Model is based on a fundamental financial model called the "dividend discount

10   model," which maintains that the value of a security is equal to the present value of the

1   future cash flows it generates. Cash flows from common stock are paid to investors in the

2   form of dividends. There are several variations of the DCF Model. These versions, along

3   with other formulas and theories related to the DCF Model are discussed in more detail in

4   Appendix A. For this case, I chose to use the Quarterly Approximation DCF Model

5   because it accounts for the quarterly growth of dividends (as opposed to annual growth). I

6   also used this variation of the DCF Model in the interest of reasonableness, as it produces

7   the highest cost of equity estimates compared with the other DCF Model variations.

8 **Q.**   **Describe the inputs to the DCF Model.**

9 A.   There are three primary inputs in the DCF Model: (1) stock price; (2) dividend; and (3) the

10   long-term growth rate. The stock prices and dividends are known inputs based on recorded

11   data, while the growth rate projection must be estimated. The formula is presented as

12   follows:

Equation 2:
Quarterly Approximation Discounted Cash Flow Model

13
$$K = \left[\frac{d_0(1+g)^{1/4}}{P_0} + (1+g)^{1/4} \right]^4 - 1$$

where: K =   discount rate / required return
         d_0 =   current quarterly dividend per share
         P_0 =   stock price
         g =   expected growth rate of future dividends

14

15   I discuss each of these inputs separately below.

A. Stock Price

Q. **How did you determine the stock price input of the DCF Model?**

A. For the stock price (P_0), I used a 30-day average of stock prices for each company in the proxy group.[33] Analysts sometimes rely on average stock prices for longer periods (e.g., 60, 90, or 180 days). According to the efficient market hypothesis, however, markets reflect all relevant information available at a particular time, and prices adjust instantaneously to the arrival of new information.[34] Past stock prices, in essence, reflect outdated information. The DCF Model used in utility rate cases is a derivation of the dividend discount model, which is used to determine the current value of an asset. Thus, according to the dividend discount model and the efficient market hypothesis, the value for the "P_0" term in the DCF Model should technically be the current stock price, rather than an average.

Q. **Why did you use a 30-day average for the current stock price input?**

A. Using a short-term average of stock prices for the current stock price input adheres to market efficiency principles while avoiding any irregularities that may arise from using a single current stock price. In the context of a utility rate proceeding there is a significant length of time from when an application is filed until testimony is due. Choosing a current stock price for one particular day could raise a separate issue concerning which day was chosen to be used in the analysis. In addition, a single stock price on a particular day may be unusually high or low. It is arguably ill-advised to use a single stock price in a model

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[33] Exhibit DJG-3.

[34] *See* Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, Vol. 25, No. 2 The Journal of Finance 383 (1970).

1	that is ultimately used to set rates for several years, especially if a stock is experiencing
2	some volatility. Thus, it is preferable to use a short-term average of stock prices, which
3	represents a good balance between adhering to well-established principles of market
4	efficiency while avoiding any unnecessary contentions that may arise from using a single
5	stock price on a given day. The stock prices I used in my DCF analysis are based on 30-
6	day averages of adjusted closing stock prices for each company in the proxy group.[35]

7   **B. Dividend**

8 **Q. Describe how you determined the dividend input of the DCF Model.**

9 A. The dividend term in the Quarterly Approximation DCF Model is the current quarterly

10 dividend per share (d_0). I obtained the most recent quarterly dividend paid for each proxy

11 company.[36]   The Quarterly Approximation DCF Model assumes that the company

12 increases its dividend payments each quarter. Thus, the model assumes that each quarterly

13 dividend is greater than the previous one by $(1 + g)^{0.25}$. This expression could be described

14 as the dividend quarterly growth rate, where the term "g" is the growth rate and the

15 exponential term "0.25" signifies one quarter of the year.

16 **Q. Does the Quarterly Approximation DCF Model result in the highest cost of equity in**
17 **this case relative to other DCF Models, all else held constant?**

18 A. Yes. The Quarterly Approximation DCF Model I employed in this case results in a higher

19 DCF cost of equity estimate than the annual or semi-annual DCF Models due to the

---

[35] Exhibit DJG-3. Adjusted closing prices, rather than actual closing prices, are ideal for analyzing historical stock prices. The adjusted price provides an accurate representation of the firm's equity value beyond the mere market price because it accounts for stock splits and dividends.

[36] Exhibit DJG-4. Nasdaq Dividend History, http://www.nasdaq.com/quotes/dividend-history.aspx.

1		quarterly compounding of dividends inherent in the model. In essence, the Quarterly
2		Approximation DCF Model I used results in the highest cost of equity estimate, all else
3		held constant.
4	**Q.**	**Are the stock price and dividend inputs for each proxy company a significant issue in**
5		**this case?**
6	A.	No. Although my stock price and dividend inputs are more recent than those used by Mr.
7		Walker, there is not a statistically significant difference between them because utility stock
8		prices and dividends are generally quite stable. This is another reason that cost of capital
9		models such as the CAPM and the DCF Model are well-suited to be used for utilities. The
10		differences between my DCF Model and Mr. Walker's DCF Model are primarily driven
11		by differences in our growth rate estimates, which are further discussed below.

12   **C. Growth Rate**

13   **Q.**   **Summarize the growth rate input in the DCF Model.**

14   A.   The most critical input in the DCF Model is the growth rate. Unlike the stock price and

15   dividend inputs, the growth rate input (g) must be estimated. As a result, the growth rate

16   is often the most contentious DCF input in utility rate cases. The DCF model used in this

17   case is based on the constant growth valuation model. Under this model, a stock is valued

18   by the present value of its future cash flows in the form of dividends. Before future cash

19   flows are discounted by the cost of equity, however, they must be "grown" into the future

20   by a long-term growth rate. As stated above, one of the inherent assumptions of this model

21   is that these cash flows in the form of dividends grow at a constant rate forever. Thus, the

22   growth rate term in the constant growth DCF model is often called the "constant," "stable,"

23   or "terminal" growth rate. For young, high-growth firms, estimating the growth rate to be

1	used in the model can be especially difficult, and may require the use of multi-stage growth
2	models. For mature, low-growth firms such as utilities, however, estimating the terminal
3	growth rate is more transparent. The growth term of the DCF Model is one of the most
4	important, yet apparently most misunderstood, aspects of cost of equity estimations in
5	utility regulatory proceedings. Therefore, I have devoted a more detailed explanation of
6	this issue in the following sections, which are organized as follows:

7   (1)   The Various Determinants of Growth

8   (2)   Reasonable Estimates for Long-Term Growth

9   (3)   Quantitative vs. Qualitative Determinants of Utility Growth:
10   Circular References, "Flatworm" Growth, and the Problem with
11   Analysts' Growth Rates

12   (4)   Growth Rate Recommendation

13 **Q.** **Describe the various determinants of growth that might be considered for the**
14 **terminal growth rate input in the DCF Model.**

15 A.   Although the DCF Model directly considers the growth of dividends, there are a variety of

16   growth determinants that should be considered when estimating growth rates. It should be

17   noted that these various growth determinants are used primarily to determine the short-

18   term growth rates in multi-stage DCF models. For utility companies, it is necessary to

19   focus primarily on long-term growth rates, which are discussed in the following section.

20   That is not to say that these growth determinants cannot be considered when estimating

21   long-term growth; however, as discussed below, long-term growth must be constrained

22   much more than short-term growth, especially for young firms with high growth

23   opportunities.

1	**Q.**	**Describe what is meant by long-term growth.**
2	A.	In order to make the DCF Model a viable, practical model, an infinite stream of future cash

1   **Q.**   **Describe what is meant by long-term growth.**

2   A.   In order to make the DCF Model a viable, practical model, an infinite stream of future cash

3   flows must be estimated and then discounted back to the present. Otherwise, each annual

4   cash flow would have to be estimated separately. Some analysts use "multi-stage" DCF

5   Models to estimate the value of high-growth firms through two or more stages of growth,

6   with the final stage of growth being constant. However, it is not necessary to use multi-

7   stage DCF Models to analyze the cost of equity of regulated utility companies. This is

8   because regulated utilities are already in their "terminal," low growth stage. Unlike most

9   competitive firms, the growth of regulated utilities is constrained by physical service

10   territories and limited primarily by ratepayer and load growth within those territories. The

11   figure below illustrates the well-known business/industry life-cycle pattern.

Figure 6:
Industry Life Cycle
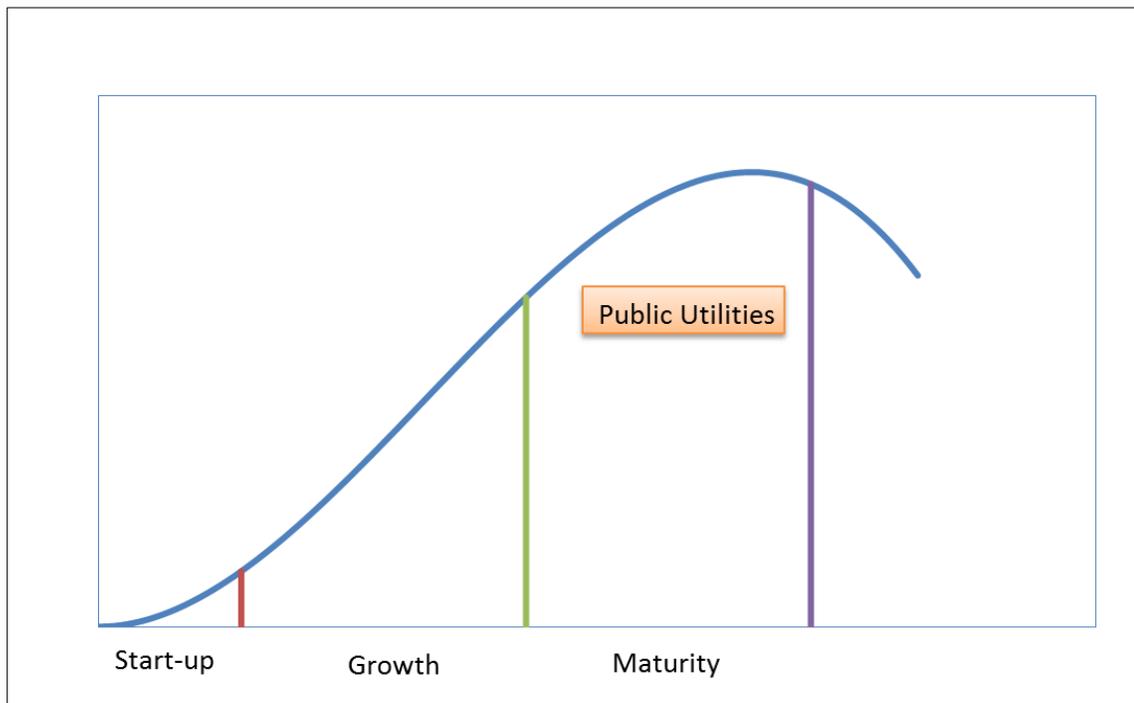
1		In an industry's early stages, there are ample opportunities for growth and profitable
2		reinvestment. In the maturity stage however, growth opportunities diminish, and firms
3		choose to pay out a larger portion of their earnings in the form of dividends instead of
4		reinvesting them in operations to pursue further growth opportunities. Once a firm is in
5		the maturity stage, it is not necessary to consider higher short-term growth metrics in multi-
6		stage DCF Models; rather, it is sufficient to analyze the cost of equity using a stable growth
7		DCF Model with one terminal, long-term growth rate.
8	**Q.**	**Is it true that the aggregate growth rate of the economy could be seen as a limiting**
9		**factor for the terminal growth rate in the DCF Model?**
10	A.	Yes. A fundamental concept in finance is that no firm can grow forever at a rate higher
11		than the growth rate of the economy in which it operates.[37] Thus, the terminal growth rate
12		used in the DCF Model should not exceed the aggregate economic growth rate. This is
13		especially true when the DCF Model is conducted on public utilities because these firms
14		have defined service territories. As stated by Dr. Damodaran: "[i]f a firm is a purely
15		domestic company, either because of internal constraints . . . or external constraints (such
16		as those imposed by a government), the growth rate in the domestic economy will be the
17		limiting value."[38]
18		In fact, it is reasonable to assume that a regulated utility would grow at a rate that
19		is <u>less</u> than the U.S. economic growth rate. Unlike competitive firms, which might increase
20		their growth by launching a new product line, franchising, or expanding into new and

---

[37] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 306 (3rd ed., John Wiley & Sons, Inc. 2012).

[38] Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 306 (3rd ed., John Wiley & Sons, Inc. 2012).

1		developing markets, utility operating companies with defined service territories cannot do
2		any of these things to grow. Gross Domestic Product ("GDP") is one of the most widely
3		used measures of economic production and is used to measure aggregate economic growth.
4		According to the Congressional Budget Office's Budget Outlook, the long-term forecast
5		for nominal U.S. GDP growth is about 4%, which includes an inflation rate of 2%.[39] For
6		mature companies in mature industries, such as utility companies, the terminal growth rate
7		will likely fall between the expected rate of inflation and the expected rate of nominal GDP
8		growth. Thus, Hanover's terminal growth rate is between 2% and 4%.

9 **Q.** **Do water utilities have unique growth opportunities that most electric and gas utilities**
10 **do not have?**

11 A. Yes. Water utilities are in a unique position to adopt growth strategies which include the

12 potential acquisition of many smaller water and wastewater systems from various

13 municipalities and other localized government entities. My analysis of the dividend yields

14 of the proxy group shows that these companies are likely retaining more capital in order to

15 pursue these types of growth strategies.

16 **Q.** **Given these unique growth opportunities, did you consider some of the projected**
17 **growth rates outlined in Mr. Walker's testimony when determining the growth rate**
18 **to use in your DCF Model?**

19 A. Yes. In this case, I considered some of the historical and projected growth rates outlined

20 in Mr. Walker's testimony. While these growth rates are higher than what should typically

21 be used for the terminal growth rate in the DCF Model, I considered them in this case given

22 the water proxy group's unique growth opportunities relative to electric and gas utilities.

---

[39] Congressional Budget Office Long-Term Budget Outlook, https://www.cbo.gov/publication/51580.

1 **Q.   Describe the growth rate input used in your DCF Model.**

2 A.   I considered various qualitative determinants of growth for Hanover, along with the

3   maximum allowed growth rate under basic principles of finance and economics.   The

4   following chart in the figure below shows three of the long-term growth determinants

5   discussed in this section.[40]

Figure 7:
Terminal Growth Rate Determinants

Terminal Growth Determinants	Rate
Nominal GDP	3.8%
Real GDP	1.8%
Inflation	2.0%
Projected Growth Rates	6.8%
Highest	**6.8%**

6   For the long-term growth rate in my DCF model, I selected the maximum, reasonable long-

7   term growth rate of 6.8%, which means my model assumes that Hanover's qualitative

8   growth in earnings will exceed the nominal growth rate of the entire U.S. economy over

9   the long run – a very charitable assumption. This growth rate is the actual five-year

10   historical growth rate in earnings per share, as outlined in Mr. Walker's testimony.[41]

---

[40] Exhibit DJG-5.

[41] *See* Direct Testimony of Harold Walker, III, p. 39, Table 7.

1	Q.	**Please describe the final results of your DCF Model.**

1   **Q.**   **Please describe the final results of your DCF Model.**

2   A.   I used the Quarterly Approximation DCF Model discussed above to estimate Hanover's

3   cost of equity capital. I obtained an average of reported dividends and stock prices from

4   the proxy group, and I used a reasonable terminal growth rate estimate for Hanover. My

5   DCF Model cost of equity estimate for Hanover is 8.4%.[42] This result is at the higher end

6   of a cost of equity range that could be considered reasonable, given the fact that it

7   incorporates terminal growth rates that are notably higher than U.S. GDP growth. It is also

8   relatively higher than the results of the market-based CAPM, which is further discussed

9   below. Nonetheless, an awarded ROE of 8.4% based on the results of my DCF Model

10   would be reasonable in this case.

11   **D. Response to Mr. Walker's DCF Model**

12   **Q.**   **Mr. Walker's DCF Model yielded a notably higher result. Did you find any problems**
13   **with his analysis?**

14   A.   Yes. Mr. Walker's market value DCF Model produced a base cost of equity result of 9.0%,

15   however, after adding an additional premium based on the Hamada Model, Mr. Walker

16   proposes a DCF result of 10.1%.[43]

17   **Q.**   **Do you agree with Mr. Walker's application of the DCF Model?**

18   A.   No. In this case, the most problematic part of Mr. Walker's DCF Model is his use of the

19   Hamada formula to develop a 1.1% premium added to his DCF results.

---

[42] Exhibit DJG-6.

[43] Direct Testimony of Harold Walker, III, p. 48, lines 12-18.

1	Q.	**What is the premise of the Hamada formula??**

2 A. The Hamada formula can be used to analyze changes in a firm's cost of capital as it adds

3   or reduces financial leverage, or debt, in its capital structure by starting with an "unlevered"

4   beta and then "relevering" the beta at different debt ratios. As leverage increases, equity

5   investors bear increasing amounts of risk, leading to higher betas. Before the effects of

6   financial leverage can be accounted for, however, the effects of leverage must first be

7   removed, which is accomplished through the Hamada formula. The Hamada formula for

8   unlevering beta is stated as follows:[44]

Equation 3:
Hamada Formula

$$\beta_U = \frac{\beta_L}{\left[1 + (1 - T_c)\left(\frac{D}{E}\right)\right]}$$

where: β_U =   *unlevered beta (or "asset" beta)*
          β_L =   *average levered beta of proxy group*
          T_C =   *corporate tax rate*
          D =   *book value of debt*
          E =   *book value of equity*

9   Using this equation, the beta for the firm can be unlevered, and then "relevered" based on

10   various debt ratios (by rearranging this equation to solve for β_L).

11 Q. **Did Mr. Walker apply the Hamada formula correctly?**

12 A. No. Mr. Walker's application of the Hamada formula is incorrect. I conducted the Hamada

13   Model and present my results in my exhibits.[45] Using the Company's proposed capital

14   structure and a tax rate of 28% (the same used by Mr. Walker), I calculate an unlevered

---

[44] Damodaran *supra* n. 18, at 197. This formula was originally developed by Hamada in 1972.

[45] Exhibit DJG-17.

1		beta of 0.47. When that beta is relevered to my proposed debt ratio of 51%, I calculate a
2		cost of equity of 7.1%, which is close to my CAPM result of 6.8%.[46] In other words, while
3		the Hamada formula can be a valuable exercise in certain applications, it does not have any
4		meaningful impact on a fair awarded ROE in this case, especially since both I and Mr.
5		Walker are recommending capital structures for the Borough that are substantially similar
6		to those of the proxy group.
7	**Q.**	**How does your result compare to Mr. Walker's application of the Hamada formula?**
8	A.	As demonstrated above, the Hamada formula should have no significant impact in this case
9		if the proposed capital structure is somewhat reflective of the Borough's actual capital
10		structure. In this case, since the Borough does not raise its own capital, both Mr. Walker
11		and I are proposing imputed capital structures based on the capital structures of the proxy
12		group, consistent with 66 Pa. C.S. Section 1301(b). Mr. Walker proposes a debt ratio of
13		48%, while I propose a debt ratio of 51%. However, Mr. Walker's Hamada formula is
14		based on a debt ratio of only 25%, which effectively skews the results higher. It is unclear
15		whether this is a mathematical error or an upwardly biased decision on the part of Mr.
16		Walker. Either way, it causes the results to be inaccurate. If Mr. Walker had used the
17		correct debt ratio, he should have calculated an indicated cost of equity of about 7%, not
18		10.1%. Mr. Walker ultimately uses the Hamada formula to conclude that more than 100
19		basis points should be added to his base DCF Model results. The Commission should reject
20		Mr. Walker's application of the Hamada formula and its increasing effect on his cost of
21		equity results. Not only does Mr. Walker's Hamada formula use the incorrect debt ratio,

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[46] *See id.*

| 1 | but he also inappropriately uses the model to inexplicably add more than 100 basis points |
| 2 | to the DCF results. |

VII. CAPM ANALYSIS

3 **Q. Describe the CAPM.**

4 A. The CAPM is a market-based model founded on the principle that investors expect higher

5 returns for incurring additional risk.[47] The CAPM estimates this expected return. The

6 various assumptions, theories, and equations involved in the CAPM are discussed further

7 in Appendix B. Using the CAPM to estimate the cost of equity of a regulated utility is

8 consistent with the legal standards governing the fair rate of return. The U.S. Supreme

9 Court has recognized that "the amount of risk in the business is a most important factor"

10 in determining the allowed rate of return,[48] and that "the return to the equity owner should

11 be commensurate with returns on investments in other enterprises having corresponding

12 risks."[49] The CAPM is a useful model because it directly considers the amount of risk

13 inherent in a business. It is arguably the strongest of the models usually presented in rate

14 cases because, unlike the DCF Model, the CAPM directly measures the most important

15 component of a fair rate of return analysis – risk.

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[47] William F. Sharpe, *A Simplified Model for Portfolio Analysis* 277–93 (Management Science IX 1963).

[48] *Wilcox*, 212 U.S. at 48.

[49] *Hope Natural Gas Co.*, 320 U.S. at 603.

1   **Q.   Describe the inputs for the CAPM.**

2   A.   The basic CAPM equation requires only three inputs to estimate the cost of equity: (1) the

3   risk-free rate; (2) the beta coefficient; and (3) the equity risk premium. Here is the CAPM

4   formula:

Equation 4:
Basic CAPM

5   **Cost of Equity = Risk-free Rate + (Beta × Equity Risk Premium)**

6   Each input is discussed separately below.

7   **A. The Risk-Free Rate**

8   **Q.   Explain the risk-free rate.**

9   A.   The first term in the CAPM is the risk-free rate (R_F). The risk-free rate is simply the level

10   of return investors can achieve without assuming any risk. The risk-free rate represents the

11   bare minimum return that any investor would require on a risky asset. Even though no

12   investment is technically void of risk, investors often use U.S. Treasury securities to

13   represent the risk-free rate because they accept that those securities essentially contain no

14   default risk. The Treasury issues securities with different maturities, including short-term

15   Treasury Bills, intermediate-term Treasury Notes, and long-term Treasury Bonds.

16 **Q.   Is it preferable to use the yield on long-term Treasury bonds for the risk-free rate in**
17 **   the CAPM?**

18 A.   Yes. In valuing an asset, investors estimate cash flows over long periods of time. Common

19   stock is viewed as a long-term investment, and the cash flows from dividends are assumed

20   to last indefinitely. Thus, short-term Treasury Bill yields are rarely used in the CAPM to

21   represent the risk-free rate. Short-term rates are subject to greater volatility and thus can

22   lead to unreliable estimates.   Instead, long-term Treasury bonds are usually used to

41

1		represent the risk-free rate in the CAPM. I considered a 30-day average of daily Treasury
2		yield curve rates on 30-year Treasury Bonds in my risk-free rate estimate, which resulted
3		in a risk-free rate of 1.91%.[50]

<div align="center">

B. The Beta Coefficient

</div>

5	Q.	**How is the beta coefficient used in this model?**
6	A.	As discussed above, beta represents the sensitivity of a given security to movements in the
7		overall market. The CAPM states that in efficient capital markets, the expected risk
8		premium on each investment is proportional to its beta. Recall that a security with a beta
9		greater (or less) than one is more (or less) risky than the market portfolio. An index such
10		as the S&P 500 Index is used as a proxy for the market portfolio. The historical betas for
11		publicly traded firms are published by various institutional analysts. Beta may also be
12		calculated through a linear regression analysis, which provides additional statistical
13		information about the relationship between a single stock and the market portfolio. As
14		discussed above, beta also represents the sensitivity of a given security to the market as a
15		whole. The market portfolio of all stocks has a beta equal to one. Stocks with betas greater
16		than 1.0 are relatively more sensitive to market risk than the average stock. For example,
17		if the market increases (or decreases) by 1.0%, a stock with a beta of 1.5 will, on average,
18		increase (or decrease) by 1.5%. In contrast, stocks with betas of less than 1.0 are less
19		sensitive to market risk. For example, if the market increases (or decreases) by 1.0%, a
20		stock with a beta of 0.5 will, on average, only increase (or decrease) by 0.5%.

---

[50] Exhibit DJG-7.

1	**Q.	Describe the source for the betas you used in your CAPM analysis.**

2	A.	I used betas recently published by Value Line Investment Survey. The beta for each proxy

3		company used in Mr. Walker's proxy group is less than 1.0. Thus, we have an objective

4		measure to prove the well-known concept that utility stocks are less risky than the average

5		stock in the market. While there is evidence suggesting that betas published by sources

6		such as Value Line may actually overestimate the risk of utilities (and thus overestimate

7		the CAPM), I used the betas published by Value Line to be conservative.[51]

8	<center>**C. The ERP**</center>

9	**Q.	Describe the Equity Risk Premium ("ERP").**

10	A.	The final term of the CAPM is the ERP, which is the required return on the market portfolio

11		less the risk-free rate ($R_M - R_F$). In other words, the ERP is the level of return investors

12		expect above the risk-free rate in exchange for investing in risky securities. Many experts

13		would agree that "the single most important variable for making investment decisions is

14		the equity risk premium."[52] Likewise, the ERP is arguably the single most important factor

15		in estimating the cost of capital in this matter. There are three basic methods that can be

16		used to estimate the ERP: (1) calculating a historical average; (2) taking a survey of experts;

17		and (3) calculating the implied ERP. I will discuss each method in turn, noting advantages

18		and disadvantages of these methods.

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[51] Exhibit DJG-8; *see also* Appendix B for a more detailed discussion of raw beta calculations and adjustments.

[52] Elroy Dimson, Paul Marsh & Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns* 4 (Princeton University Press 2002).

1. Historical Average

1 **Q.   Describe the historical ERP.**

2 A.   The historical ERP may be calculated by simply taking the difference between returns on

3   stocks and returns on government bonds over a certain period of time. Many practitioners

4   rely on the historical ERP as an estimate for the forward-looking ERP because it is easy to

5   obtain. However, there are disadvantages to relying on the historical ERP.

6 **Q.   What are the limitations of relying solely on a historical average to estimate the**
7   **current or forward-looking ERP?**

8 A.   Many investors use the historic ERP because it is convenient and easy to calculate. What

9   matters in the CAPM model, however, is not the actual risk premium from the past, but

10   rather the current and forward-looking risk premium.[53] Some investors may think that a

11   historic ERP provides some indication of the prospective risk premium; however, there is

12   empirical evidence to suggest the prospective, forward-looking ERP is actually <u>lower</u> than

13   the historical ERP. In a landmark publication on risk premiums around the world, *Triumph*

14   *of the Optimists*, the authors suggest through extensive empirical research that the

15   prospective ERP is lower than the historical ERP.[54] This is due in large part to what is

16   known as "survivorship bias" or "success bias" – a tendency for failed companies to be

17   excluded from historical indices.[55] From their extensive analysis, the authors make the

18   following conclusion regarding the prospective ERP: "[t]he result is a forward-looking,

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[53] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 330 (3rd ed., South Western Cengage Learning 2010).

[54] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 194 (3rd ed., South Western Cengage Learning 2010).

[55] Elroy Dimson, Paul Marsh & Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns* 34 (Princeton University Press 2002).

1   geometric mean risk premium for the United States . . . of around 2½ to 4 percent and an

2   arithmetic mean risk premium . . . that falls within a range from a little below 4 to a little

3   above 5 percent."[56] Indeed, these results are lower than many reported historical risk

4   premiums. Other noted experts agree:

> 5   The historical risk premium obtained by looking at U.S. data is biased
> 6   upwards because of survivor bias. . . . The true premium, it is argued, is
> 7   much lower. This view is backed up by a study of large equity markets over
> 8   the twentieth century (*Triumph of the Optimists*), which concluded that the
> 9   historical risk premium is closer to 4%.[57]

10   Regardless of the variations in historic ERP estimates, many scholars and practitioners

11   agree that simply relying on a historic ERP to estimate the risk premium going forward is

12   not ideal. Fortunately, "a naïve reliance on long-run historical averages is not the only

13   approach for estimating the expected risk premium."[58]

14   **Q.   Did you rely on the historical ERP as part of your CAPM analysis in this case?**

15   A.   No. Due to the limitations of this approach, I relied on the ERP reported in expert surveys

16   and the implied ERP method discussed below.

2.   Expert Surveys

17   **Q.   Describe the expert survey approach to estimating the ERP.**

18   A.   As its name implies, the expert survey approach to estimating the ERP involves conducting

19   a survey of experts including professors, analysts, chief financial officers, and other

20   executives around the country and asking them what they think the ERP is. The IESE

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[56] Elroy Dimson, Paul Marsh & Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns* 194 (Princeton University Press 2002).

[57] Aswath Damodaran, *Equity Risk Premiums: Determinants, Estimation and Implications – The 2015 Edition* 17 (New York University 2015).

[58] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 330 (3rd ed., South Western Cengage Learning 2010).

1   Business School conducts a periodic survey that asks experts around the country about

2   their opinions on the ERP. Their 2020 expert survey reported an average ERP of 5.6%.[59]

3.   Implied ERP

3   **Q.   Describe the implied ERP approach.**

4   A.   The third method of estimating the ERP is arguably the best. The implied ERP relies on

5   the stable growth model proposed by Gordon, often called the "Gordon Growth Model,"

6   which is a basic stock valuation model widely used in finance for many years.[60] This model

7   is a mathematical derivation of the DCF Model. In fact, the underlying concept in both

8   models is the same: the current value of an asset is equal to the present value of its future

9   cash flows. Instead of using this model to determine the discount rate of one company, we

10   can use it to determine the discount rate for the entire market by substituting the inputs of

11   the model. Specifically, instead of using the current stock price (P_0), we will use the

12   current value of the S&P 500 (V_{500}). Similarly, instead of using the dividends of a single

13   firm, we will consider the dividends paid by the entire market. Additionally, we should

14   consider potential dividends. In other words, stock buybacks should be considered in

15   addition to paid dividends, as stock buybacks represent another way for the firm to transfer

16   free cash flow to shareholders. Focusing on dividends alone without considering stock

17   buybacks could understate the cash flow component of the model, and ultimately

---

[59] Pablo Fernandez, Eduardo de Apellaniz and Javier F. Acin, *Market Risk Premium and Risk-Free Rate used for 81 countries in 2020,* at 3 (IESE Business School 2015), copy available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3560869. IESE Business School is the graduate business school of the University of Navarra. IESE offers Master of Business Administration (MBA), Executive MBA and Executive Education programs. IESE is consistently ranked among the leading business schools in the world.

[60] Myron J. Gordon and Eli Shapiro, *Capital Equipment Analysis: The Required Rate of Profit* 102–10 (Management Science Vol. 3, No. 1 Oct. 1956).

1   understate the implied ERP. The market dividend yield plus the market buyback yield

2   gives us the gross cash yield to use as our cash flow in the numerator of the discount model.

3   This gross cash yield is increased each year over the next five years by the growth rate.

4   These cash flows must be discounted to determine their present value. The discount rate

5   in each denominator is the risk-free rate (R_F) plus the discount rate (K). The following

6   formula shows how the implied return is calculated. Since the current value of the S&P is

7   known, we can solve for K: the implied market return.[61]

Equation 5:
Implied Market Return

8
$$V_{500} = \frac{CY_1(1+g)^1}{(1+R_F+K)^1} + \frac{CY_2(1+g)^2}{(1+R_F+K)^2} + \cdots + \frac{CY_5(1+g)^5 + TV}{(1+R_F+K)^5}$$

where:	V_{500}	=	*current value of index (S&P 500)*
	CY_{1-5}	=	*average cash yield over last five years (includes dividends and buybacks)*
	g	=	*compound growth rate in earnings over last five years*
	R_F	=	*risk-free rate*
	K	=	*implied market return (this is what we are solving for)*
	TV	=	*terminal value* $= CY_5 (1+R_F) / K$

9   The discount rate is called the "implied" return here because it is based on the current value

10   of the index as well as the value of free cash flow to investors projected over the next five

11   years. Thus, based on these inputs, the market is "implying" the expected return; or in

12   other words, based on the current value of all stocks (the index price), and the projected

13   value of future cash flows, the market is telling us the return expected by investors for

14   investing in the market portfolio. After solving for the implied market return (K), we

15   simply subtract the risk-free rate from it to arrive at the implied ERP.

---

[61] *See* Exhibit DJG-9 for detailed calculation.

Equation 6:
Implied Equity Risk Premium

1           $$Implied\ Expected\ Market\ Return - R_F = Implied\ ERP$$

2 **Q.   Discuss the results of your implied ERP calculation.**

3 A.   After collecting data for the index value, operating earnings, dividends, and buybacks for

4   the S&P 500 over the past six years, I calculated the dividend yield, buyback yield, and

5   gross cash yield for each year. I also calculated the compound annual growth rate (g) from

6   operating earnings. I used these inputs, along with the risk-free rate and current value of

7   the index to calculate a current expected return on the entire market of 7.5%. I subtracted

8   the risk-free rate to arrive at the implied equity risk premium of 5.0%.[62] Dr. Damodaran,

9   one of the world's leading experts on the ERP, promotes the implied ERP method discussed

10   above. He calculates monthly and annual implied ERPs with this method and publishes

11   his results. Dr. Damodaran's highest ERP estimate for October 2020 using several implied

12   ERP variations was 4.8%.[63]

13 **Q.   What are the results of your final ERP estimate?**

14 A.   For the final ERP estimate I used in my CAPM analysis, I considered the results of the

15   ERP surveys along with the implied ERP calculations and the ERP reported by Duff &

16   Phelps.[64] The results are presented in the following figure:

---

[62] Exhibit DJG-9.

[63] Aswath Damodaran, *Implied Equity Risk Premium Update*, DAMODARAN ONLINE (last visited Nov. 2, 2020) http://pages.stern.nyu.edu/~adamodar/.

[64] Exhibit DJG-10.

Figure 8:
Equity Risk Premium Results

IESE Business School Survey	5.6%
Duff & Phelps Report	5.5%
Damodaran (average)	4.8%
Walker	6.3%
Garrett	5.0%
Average	**5.4%**
Highest	**6.3%**

1   Also shown in this table is an ERP result considered in Mr. Walker's testimony. While an

2   ERP of 6.3% is notably high given the other results shown in this table, I used an ERP of

3   6.3% in my CAPM. All else held constant, a higher ERP used in the CAPM will result in

4   a higher cost of equity estimate. I also selected this ERP to show that when we consider

5   betas published by Value Line (a respected an unbiased source for betas), the yield on 30-

6   year Treasury bonds for the risk free rate (the highest yield of all Treasury securities), and

7   Mr. Walker's notably high ERP estimate of 6.3%, we still arrive at a CAPM result that is

8   much lower than the Mr. Walker's ultimate cost of equity estimate, as further discussed

9   below.

10   **Q.   Please explain the final results of your CAPM analysis.**

11   A.   Using the inputs for the risk-free rate, beta coefficient, and ERP discussed above, I estimate

12   that Hanover's CAPM cost of equity is 6.8%.[65] The CAPM may be displayed graphically

---

[65] Exhibit DJG-11.

1   through what is known as the Security Market Line ("SML"). The following figure shows

2   the expected return (cost of equity) on the y-axis, and the average beta for the proxy group

3   on the x-axis. The SML intercepts the y-axis at the level of the risk-free rate. The slope

4   of the SML is the equity risk premium.

Figure 9:
CAPM Graph

$$K = R_F + \beta(ERP)$$
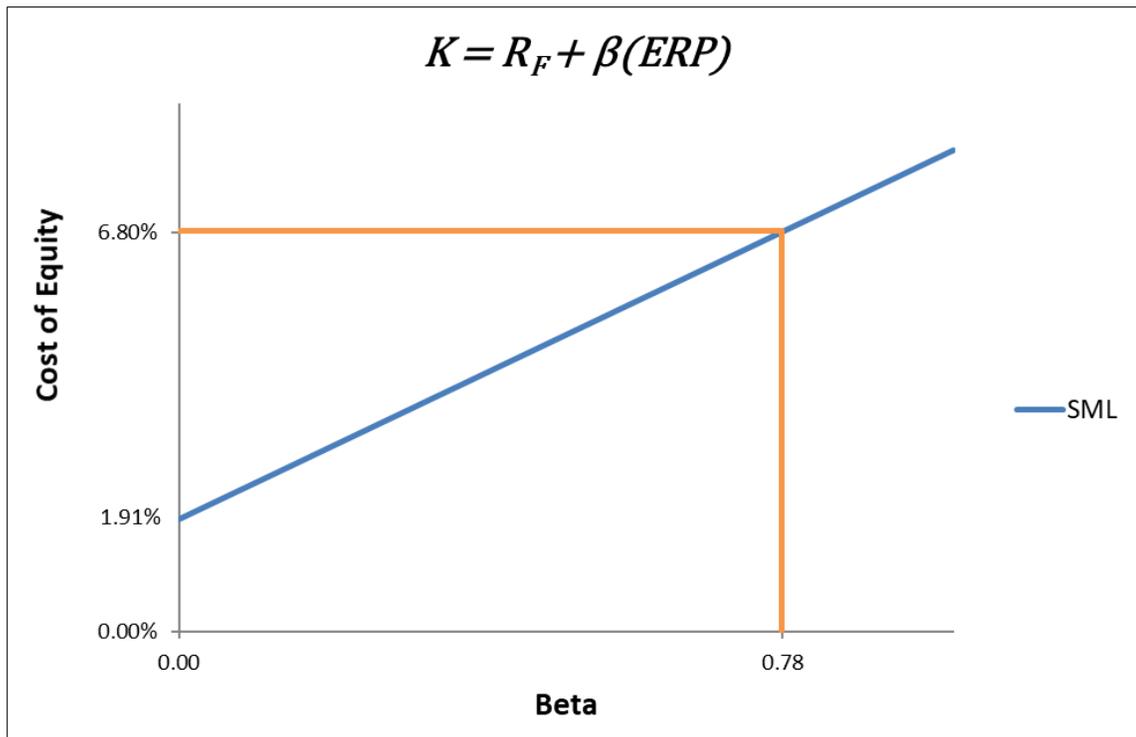
5   The SML provides the rate of return that will compensate investors for the beta risk of that

6   investment. Thus, at an average beta of 0.78 for the proxy group, the estimated CAPM

7   cost of equity for Hanover is 6.8%.

D. Response to Mr. Walker's CAPM Analysis

2 **Q.**   **Mr. Walker's CAPM analysis yields notably higher results. Did you find specific**
3   **problems with Mr. Walker's CAPM assumptions and inputs?**

4 A.   Yes, I did. Mr. Walker's base CAPM cost of equity result is 8.8%, which is considerably

5   higher than my estimate. Mr. Walker also adds the same 1.1% he did for the DCF Model

6   to account for the same Hamada adjustment, bringing his total CAPM cost of equity to

7   9.9%.[66] The primary problems with Mr. Walker's CAPM cost of equity result stems from

8   his estimate for the risk-free rate and the Hamada adjustment. I discussed my

9   disagreements with Mr. Walker's Hamada adjustment above, and those same

10   disagreements apply here. I will discuss the risk-free rate issue below.

11 **Q.**   **Describe Mr. Walker's estimate for the risk-free rate.**

12 A.   Mr. Walker uses an input of 2.4% for the risk-free rate in his CAPM analysis.[67]

13 **Q.**   **Do you agree with any of Mr. Walker's estimates for the risk-free rate?**

14 A.   No. The risk-free rate is best estimated by considering the current yields on 30-year

15   Treasury Bonds. A recent, 30-day average yield on Treasury Bonds provides a risk-free

16   rate of only 1.9%.[68] Moreover, I disagree with Mr. Walker's reliance on projected

17   information in estimating the risk-free rate. I have reviewed dozens of cost of capital

18   testimonies filed by utility witnesses dating back many years. I cannot recall a single

19   instance in which a utility ROE witness relied on a forward-looking projection that, all else

20   held constant, did not have an increasing effect on his or her ROE recommendation relative

---

[66] Direct Testimony of Harold Walker, III, p. 52, lines 7-17.

[67] *Id*. at p. 49, line 16.

[68] Exhibit DJG-7.

1		to then-current market conditions. After observing this tactic numerous times, I cannot
2		help but view Mr. Walker's projected bond yield estimates as upwardly biased. In this
3		case, since filing his testimony, the yields on 30-year Treasury bonds have generally
4		decreased; they have not increased as Mr. Walker projected.[69] Mr. Walker's overestimate
5		of the risk-free rate causes his CAPM result to be upwardly biased.

VIII.   CAPITAL STRUCTURE

6	**Q.**	**Describe in general the concept of a company's capital structure.**
7	A.	"Capital structure" refers to the way a company finances its overall operations through
8		external financing. The primary sources of long-term, external financing are debt capital
9		and equity capital. Debt capital usually comes in the form of contractual bond issues that
10		require the firm to make payments, while equity capital represents an ownership interest in
11		the form of stock. Because a firm cannot pay dividends on common stock until it satisfies
12		its debt obligations to bondholders, stockholders are referred to as "residual claimants."
13		The fact that stockholders have a lower priority to claims on company assets increases their
14		risk and the required return relative to bondholders. Thus, equity capital has a higher cost
15		than debt capital. Firms can reduce their WACC by recapitalizing and increasing their debt
16		financing. In addition, because interest expense is deductible, increasing debt also adds
17		value to the firm by reducing the firm's tax obligation.

---

[69] See U.S. Department of the Treasury, Daily Treasury Yield Curve Rates, 30-year bond yields during 2021, https://www.treasury.gov/resource-center/data-chart-center/interest-rates/pages/TextView.aspx?data=yieldYear&year=2021.

1 **Q.** **Is it true that, by increasing debt, competitive firms can add value and reduce their**
2 **WACC?**

3 A. Yes, it is. A competitive firm can add value by increasing debt. After a certain point,

4 however, the marginal cost of additional debt outweighs its marginal benefit. This is

5 because the more debt the firm uses, the higher interest expense it must pay, and the

6 likelihood of loss increases. This also increases the risk of non-recovery for both

7 bondholders and shareholders, causing both groups of investors to demand a greater return

8 on their investment. Thus, if debt financing is too high, the firm's WACC will increase

9 instead of decrease. The following figure illustrates these concepts.

Figure 10:
Optimal Debt Ratio
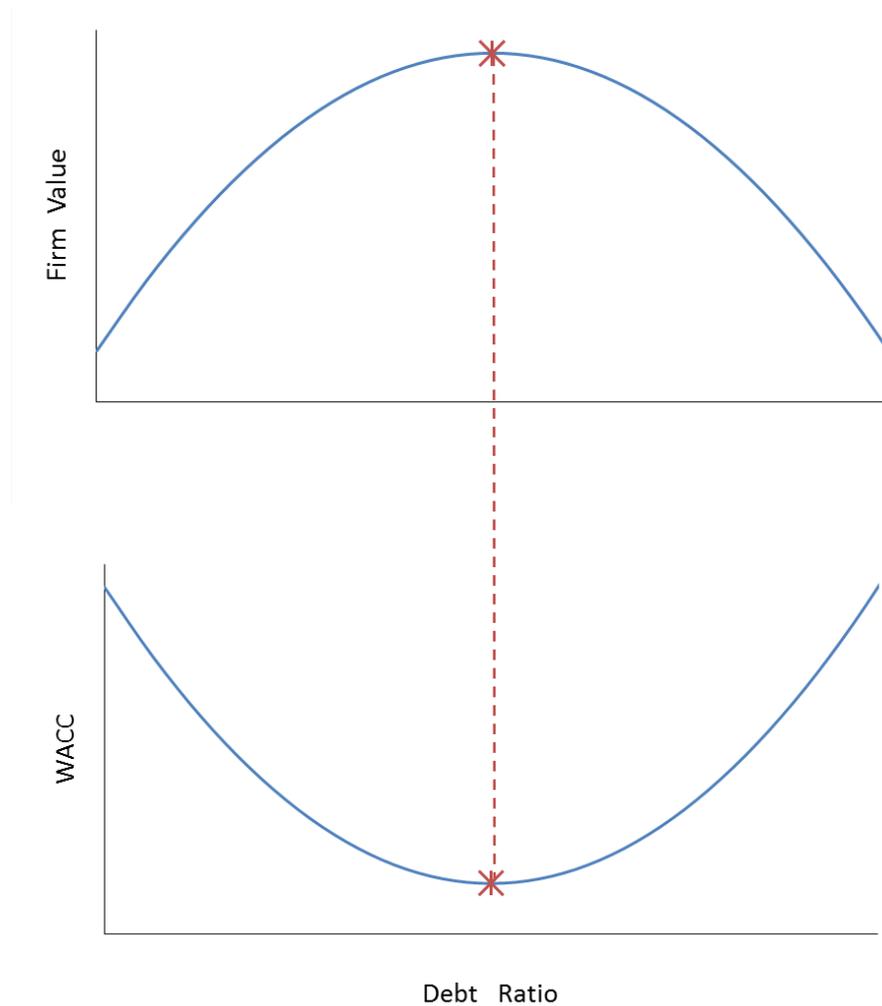
1   As shown in this figure, a competitive firm's value is maximized when the WACC is

2   minimized. In both graphs, the debt ratio is shown on the x-axis. By increasing its debt

3   ratio, a competitive firm can minimize its WACC and maximize its value. At a certain

4   point, however, the benefits of increasing debt do not outweigh the costs of the additional

| 1 | risks to both bondholders and shareholders, as each type of investor will demand higher |

1   risks to both bondholders and shareholders, as each type of investor will demand higher

2   returns for the additional risk they have assumed.[70]

3   **Q.**   **Does the rate base rate of return model effectively incentivize utilities to operate at**
4   **the optimal capital structure?**

5   A.   No. While it is true that competitive firms maximize their value by minimizing their

6   WACC, this is not the case for regulated utilities. Under the rate base rate of return model,

7   a higher WACC results in higher rates, all else held constant. The basic revenue

8   requirement equation is as follows:

Equation 7:
Revenue Requirement for Regulated Utilities

9

$$RR = O + d + T + \boldsymbol{r}(A - D)$$

where: *RR*   =   *revenue requirement*
            O   =   *operating expenses*
            d   =   *depreciation expense*
            T   =   *corporate tax*
            r   =   **weighted average cost of capital (WACC)**
            A   =   *plant investments*
            D   =   *accumulated depreciation*

10   As shown in this equation, utilities can increase their revenue requirement by <u>increasing</u>

11   their WACC, not by minimizing it. Thus, because there is no incentive for a regulated

12   utility to minimize its WACC, a commission standing in the place of competition must

13   ensure that the regulated utility is operating at the lowest reasonable WACC.

---

[70] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 440-41 (3rd ed., South Western Cengage Learning 2010).

1   Q.   **Can utilities generally afford to have higher debt levels than other industries?**

2   A.   Yes. Because regulated utilities have large amounts of fixed assets, stable earnings, and

3   low risk relative to other industries, they can afford to have relatively higher debt ratios (or

4   "leverage"). As aptly stated by Dr. Damodaran:

5   Since financial leverage multiplies the underlying business risk, it stands to
6   reason that firms that have high business risk should be reluctant to take on
7   financial leverage. It also stands to reason that firms that operate in stable
8   businesses should be much more willing to take on financial leverage.
9   Utilities, for instance, have historically had high debt ratios but have not
10   had high betas, mostly because their underlying businesses have been stable
11   and fairly predictable.[71]

12   Note that the author explicitly contrasts utilities with firms that have high underlying

13   business risk. Because utilities have low levels of risk and operate a stable business, they

14   should generally operate with relatively high levels of debt to achieve their optimal capital

15   structure.

16 Q.   **Are the capital structures of the proxy group a source that can be used to assess a**
17   **prudent capital structure?**

18 A.   Yes.   However, while the capital structures of the proxy group might provide some

19   indication of an appropriate capital structure for the utility being studied, it is preferable to

20   also consider additional types of analyses. The average debt ratios of a utility proxy group

21   will likely be lower than what would be observed in a pure competitive environment. As

22   I explain above, this is because utilities do not have a financial incentive to operate at the

23   optimal capital structure.

---

[71] Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 196 (3rd ed., John Wiley & Sons, Inc. 2012).

| 1 | Q. | **Does Pennsylvania law also provide further guidance on determining an imputed** |
| 2 | | **capital structure for the Borough?** |

3 A.   Yes, I believe it does.   According to 66 Pa. C.S. Section § 1301(b), for municipal

4   corporations such as Hanover, the Commission shall use an imputed capital structure of

5   comparable public utilities providing water or wastewater service.

6 **Q.   What capital structure does Mr. Walker propose for the Borough?**

7 A.   Mr. Walker proposes a capital structure consisting of 48% debt and 52% equity.[72]

8 **Q.   Do you agree with Mr. Walker's proposed imputed capital structure?**

9 A.   No. My analysis of the 2020 capital structures of the proxy group shows that the average

10   debt ratio of the proxy group is 51%.[73]

11 **Q.   What is your recommended equity ratio?**

12 A.   I recommend that the Commission impute a capital structure consisting of 51% debt and

13   49% equity, which is reflective of the capital structures of the proxy group.

14 **Q.   Does this conclude your testimony?**

15 A.   Yes. To the extent I have not addressed an issue or proposal raised by the Borough in this

16   proceeding, it should not be construed that I agree with the same.

---

[72] Direct Testimony of Harold Walker, III, p. 13, line 13.

[73] Exhibit DJG-14.

APPENDIX A:

DISCOUNTED CASH FLOW MODEL THEORY

The Discounted Cash Flow ("DCF") Model is based on a fundamental financial model called the "dividend discount model," which maintains that the value of a security is equal to the present value of the future cash flows it generates. Cash flows from common stock are paid to investors in the form of dividends. There are several variations of the DCF Model. In its most general form, the DCF Model is expressed as follows:[74]

Equation 8:
General Discounted Cash Flow Model

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n}{(1+k)^n}$$

where: P_0 =   *current stock price*
            $D_1 \dots D_n$ =   *expected future dividends*
            k =   *discount rate / required return*

The General DCF Model would require an estimation of an infinite stream of dividends. Because this would be impractical, analysts use more feasible variations of the General DCF Model, which are discussed further below.

The DCF Models rely on the following four assumptions:[75]

1. Investors evaluate common stocks in the classical valuation framework; that is, they trade securities rationally at prices reflecting their perceptions of value;

2. Investors discount the expected cash flows at the same rate (K) in every future period;

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[74] *See* Zvi Bodie, Alex Kane & Alan J. Marcus, *Essentials of Investments* 410 (9th ed., McGraw-Hill/Irwin 2013).

[75] *See* Roger A. Morin, *New Regulatory Finance* 252 (Public Utilities Reports, Inc. 2006) (1994).

3. The K obtained from the DCF equation corresponds to that specific stream of future cash flows alone; and

4. Dividends, rather than earnings, constitute the source of value.

The General DCF can be rearranged to make it more practical for estimating the cost of equity. Regulators typically rely on some variation of the Constant Growth DCF Model, which is expressed as follows:

Equation 9:
Constant Growth Discounted Cash Flow Model

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

where: K =   *discount rate / required return on equity*
         D_1 =   *expected dividend per share one year from now*
         P_0 =   *current stock price*
         g =   *expected growth rate of future dividends*

Unlike the General DCF Model, the Constant Growth DCF Model solves for the required return (K) directly. In addition, by assuming that dividends grow at a constant rate, the dividend stream from the General DCF Model may be substituted with a term representing the expected constant growth rate of future dividends (g). The Constant Growth DCF Model may be considered in two parts. The first part is the dividend yield (D_1/P_0), and the second part is the growth rate (g). In other words, the required return in the DCF Model is equivalent to the dividend yield plus the growth rate.

In addition to the four assumptions listed above, the Constant Growth DCF Model relies on the following four additional assumptions:[76]

---

[76] *See* Roger A. Morin, *New Regulatory Finance* 254–56 (Public Utilities Reports, Inc. 2006) (1994).

1.   The discount rate (K) must exceed the growth rate (g);

2.   The dividend growth rate (g) is constant in every year to infinity;

3.   Investors require the same return (K) in every year; and

4.   There is no external financing; that is, growth is provided only by the retention of earnings.

Because the growth rate in this model is assumed to be constant, it is important not to use growth rates that are unreasonably high. In fact, the constant growth rate estimate for a regulated utility with a defined service territory should not exceed the growth rate for the economy in which it operates.

The basic form of the Constant Growth DCF Model described above is sometimes referred to as the "Annual" DCF Model. This is because the model assumes an annual dividend payment to be paid at the end of every year, as well as an increase in dividends once each year. In reality, however, most utilities pay dividends on a quarterly basis. The Constant Growth DCF equation may be modified to reflect the assumption that investors receive successive quarterly dividends and reinvest them throughout the year at the discount rate. This variation is called the Quarterly Approximation DCF Model.[77]

Equation 10:
Quarterly Approximation Discounted Cash Flow Model

$$K = \left[\frac{d_0(1+g)^{1/4}}{P_0} + (1+g)^{1/4} \right]^4 - 1$$

where: K =   *discount rate / required return*
            d_0 =   *current quarterly dividend per share*
            P_0 =   *stock price*
            g =   *expected growth rate of future dividends*

---

[77] *See* Roger A. Morin, *New Regulatory Finance* 348 (Public Utilities Reports, Inc. 2006) (1994).

The Quarterly Approximation DCF Model assumes that dividends are paid quarterly, and that each dividend is constant for four consecutive quarters. All else held constant, this model results in the <u>highest</u> cost of equity estimate for the utility in comparison to other DCF Models because it accounts for the quarterly compounding of dividends. There are several other variations of the Constant Growth (or Annual) DCF Model, including a Semi-Annual DCF Model, which is used by the Federal Energy Regulatory Commission ("FERC"). These models, along with the Quarterly Approximation DCF Model, have been accepted in regulatory proceedings as useful tools for estimating the cost of equity.

APPENDIX B:

CAPITAL ASSET PRICING MODEL THEORY

The Capital Asset Pricing Model ("CAPM") is a market-based model founded on the principle that investors demand higher returns for incurring additional risk.[78] The CAPM estimates this required return. The CAPM relies on the following assumptions:

1. Investors are rational, risk-adverse, and strive to maximize profit and terminal wealth;

2. Investors make choices based on risk and return. Return is measured by the mean returns expected from a portfolio of assets; risk is measured by the variance of these portfolio returns;

3. Investors have homogenous expectations of risk and return;

4. Investors have identical time horizons;

5. Information is freely and simultaneously available to investors;

6. There is a risk-free asset, and investors can borrow and lend unlimited amounts at the risk-free rate;

7. There are no taxes, transaction costs, restrictions on selling short, or other market imperfections; and

8. Total asset quality is fixed, and all assets are marketable and divisible.[79]

While some of these assumptions may appear to be restrictive, they do not outweigh the inherent value of the model. The CAPM has been widely used by firms, analysts, and regulators for decades to estimate the cost of equity capital.

The basic CAPM equation is expressed as follows:

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[78] William F. Sharpe, *A Simplified Model for Portfolio Analysis* 277-93 (Management Science IX 1963).

[79] *Id*.

Equation 11:
Capital Asset Pricing Model

$$K = R_F + \beta_i(R_M - R_F)$$

where: K = *required return*
R_F = *risk-free rate*
β = *beta coefficient of asset i*
R_M = *required return on the overall market*

There are essentially three terms within the CAPM equation that are required to calculate the required return (K): (1) the risk-free rate (R_F); (2) the beta coefficient (β); and (3) the equity risk premium ($R_M - R_F$), which is the required return on the overall market less the risk-free rate.

Raw Beta Calculations and Adjustments.

A stock's beta equals the covariance of the asset's returns with the returns on a market portfolio, divided by the portfolio's variance, as expressed in the following formula:[80]

Equation 12:
Beta

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$$

where: β_i = *beta of asset i*
σ_{im} = *covariance of asset i returns with market portfolio returns*
$\sigma^2{}_m$ = *variance of market portfolio*

Betas that are published by various research firms are typically calculated through a regression analysis that considers the movements in price of an individual stock and movements in the price of the overall market portfolio. The betas produced by this regression analysis are considered "raw" betas. There is empirical evidence that raw betas should be adjusted to account

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[80] *See* John R. Graham, Scott B. Smart & William L. Megginson, *Corporate Finance: Linking Theory to What Companies Do* 180–81 (3rd ed., South Western Cengage Learning 2010).

for beta's natural tendency to revert to an underlying mean.[81] Some analysts use an adjustment method proposed by Blume, which adjusts raw betas toward the market mean of one.[82] While the Blume adjustment method is popular due to its simplicity, it is arguably arbitrary, and some would say not useful at all. According to Dr. Damodaran: "While we agree with the notion that betas move toward 1.0 over time, the [Blume adjustment] strikes us as arbitrary and not particularly useful."[83] The Blume adjustment method is especially arbitrary when applied to industries with consistently low betas, such as the utility industry. For industries with consistently low betas, it is better to employ an adjustment method that adjusts raw betas toward an industry average, rather than the market average. Vasicek proposed such a method, which is preferable to the Blume adjustment method because it allows raw betas to be adjusted toward an industry average, and also accounts for the statistical accuracy of the raw beta calculation.[84] In other words, "[t]he Vasicek adjustment seeks to overcome one weakness of the Blume model by not applying the same adjustment to every security; rather, a security-specific adjustment is made depending on the statistical quality of the regression."[85] The Vasicek beta adjustment equation is expressed as follows:

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[81] *See* Michael J. Gombola and Douglas R. Kahl, *Time-Series Processes of Utility Betas: Implications for Forecasting Systematic Risk* 84–92 (Financial Management Autumn 1990).

[82] See Marshall Blume, *On the Assessment of Risk*, Vol. 26, No. 1 The Journal of Finance 1 (1971).

[83] *See* Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 187 (3rd ed., John Wiley & Sons, Inc. 2012).

[84] Oldrich A. Vasicek, *A Note on Using Cross-Sectional Information in Bayesian Estimation of Security Betas* 1233–1239 (Journal of Finance, Vol. 28, No. 5, December 1973).

[85] 2012 Ibbotson Stocks, Bonds, Bills, and Inflation Valuation Yearbook 77–78 (Morningstar 2012).

Equation 13:
Vasicek Beta Adjustment

$$\beta_{i1} = \frac{\sigma_{\beta_{i0}}^2}{\sigma_{\beta_0}^2 + \sigma_{\beta_{i0}}^2} \beta_0 + \frac{\sigma_{\beta_0}^2}{\sigma_{\beta_0}^2 + \sigma_{\beta_{i0}}^2} \beta_{i0}$$

where: β_{i1} = *Vasicek adjusted beta for security i*
β_{i0} = *historical beta for security i*
β_0 = *beta of industry or proxy group*
$\sigma^2_{\beta_0}$ = *variance of betas in the industry or proxy group*
$\sigma^2_{\beta_{i0}}$ = *square of standard error of the historical beta for security i*

The Vasicek beta adjustment is an improvement on the Blume model because the Vasicek model does not apply the same adjustment to every security. A higher standard error produced by the regression analysis indicates a lower statistical significance of the beta estimate. Thus, a beta with a high standard error should receive a greater adjustment than a beta with a low standard error. As stated in Ibbotson:

> While the Vasicek formula looks intimidating, it is really quite simple. The adjusted beta for a company is a weighted average of the company's historical beta and the beta of the market, industry, or peer group. How much weight is given to the company and historical beta depends on the statistical significance of the company beta statistic. If a company beta has a low standard error, then it will have a higher weighting in the Vasicek formula. If a company beta has a high standard error, then it will have lower weighting in the Vasicek formula. An advantage of this adjustment methodology is that it does not force an adjustment to the market as a whole. Instead, the adjustment can be toward an industry or some other peer group. <u>This is most useful in looking at companies in industries that on average have high or low betas.</u>[86]

Thus, the Vasicek adjustment method is statistically more accurate and is the preferred method to use when analyzing companies in an industry that has inherently low betas, such as the utility industry. The Vasicek method was also confirmed by Gombola, who conducted a study

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[86] 2012 Ibbotson Stocks, Bonds, Bills, and Inflation Valuation Yearbook 78 (Morningstar 2012).

specifically related to utility companies. Gombola concluded that "[t]he strong evidence of auto-regressive tendencies in <u>utility</u> betas lends support to the application of adjustment procedures such as the . . . adjustment procedure presented by Vasicek."[87] Gombola also concluded that adjusting raw betas toward the market mean of 1.0 is <u>too high</u>, and that "[i]nstead, they should be adjusted toward a value that is less than one."[88] In conducting the Vasicek adjustment on betas in previous cases, it reveals that utility betas are even lower than those published by Value Line.[89] Gombola's findings are particular important here, because his study was conducted specifically on utility companies. This evidence indicates that using Value Line's betas in a CAPM cost of equity estimate for a utility company may lead to overestimated results. Regardless, adjusting betas to a level that is <u>higher</u> than Value Line's betas is not reasonable, and it would produce CAPM cost of equity results that are too high.

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[87] Michael J. Gombola and Douglas R. Kahl, *Time-Series Processes of Utility Betas: Implications for Forecasting Systematic Risk* 92 (Financial Management Autumn 1990) (emphasis added).

[88] Michael J. Gombola and Douglas R. Kahl, *Time-Series Processes of Utility Betas: Implications for Forecasting Systematic Risk* 91–92 (Financial Management Autumn 1990) (emphasis added).

[89] *See e.g.* Responsive Testimony of David J. Garrett, filed March 21, 2016 in Cause No. PUD 201500273 before the Corporation Commission of Oklahoma (OG&E's 2015 rate case), at pp. 56–59.

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EDUCATION

University of Oklahoma

Norman, OK

Master of Business Administration

2014

Areas of Concentration: Finance, Energy

University of Oklahoma College of Law

Norman, OK

Juris Doctor

2007

Member, American Indian Law Review

University of Oklahoma

Norman, OK

Bachelor of Business Administration

2003

Major: Finance

PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

Society of Utility and Regulatory Financial Analysts
Certified Rate of Return Analyst (CRRA)

The Mediation Institute
Certified Civil / Commercial & Employment Mediator

WORK EXPERIENCE

Resolve Utility Consulting PLLC

Oklahoma City, OK

Managing Member

2016 – Present

Provide expert analysis and testimony specializing in depreciation and cost of capital issues for clients in utility regulatory proceedings.

Oklahoma Corporation Commission

Oklahoma City, OK

Public Utility Regulatory Analyst

2012 – 2016

Assistant General Counsel

2011 – 2012

Represented commission staff in utility regulatory proceedings and provided legal opinions to commissioners. Provided expert analysis and testimony in depreciation, cost of capital, incentive compensation, payroll and other issues.

Perebus Counsel, PLLC   Oklahoma City, OK
<u>Managing Member</u>   2009 – 2011
Represented clients in the areas of family law, estate planning,
debt negotiations, business organization, and utility regulation.

Moricoli & Schovanec, P.C.   Oklahoma City, OK
<u>Associate Attorney</u>   2007 – 2009
Represented clients in the areas of contracts, oil and gas, business
structures and estate administration.

<u>TEACHING EXPERIENCE</u>

University of Oklahoma   Norman, OK
Adjunct Instructor – "Conflict Resolution"   2014 – 2020
Adjunct Instructor – "Ethics in Leadership"

Rose State College   Midwest City, OK
Adjunct Instructor – "Legal Research"   2013 – 2015
Adjunct Instructor – "Oil & Gas Law"

<u>PUBLICATIONS</u>

American Indian Law Review   Norman, OK
"Vine of the Dead: Reviving Equal Protection Rites for Religious Drug Use"   2006
(31 Am. Indian L. Rev. 143)

<u>PROFESSIONAL ASSOCIATIONS</u>

Oklahoma Bar Association   2007 – Present

Society of Depreciation Professionals   2014 – Present
<u>Board Member – President</u>   2017
Participate in management of operations, attend meetings,
review performance, organize presentation agenda.

Society of Utility Regulatory Financial Analysts   2014 – Present

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Pennsylvania Public Utility Commission	PECO Energy Company	R-2021-3024601	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
New Mexico Public Regulation Commission	Southwestern Public Service Company	20-00238-UT	Cost of capital and authorized rate of return	The New Mexico Large Customer Group; Occidental Permian
Pennsylvania Public Utility Commission	Duquesne Light Company	R-2021-3024750	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Columbia Gas of Maryland	9664	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Southern Indiana Gas Company, d/b/a Vectren Energy Delivery of Indiana, Inc.	45447	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 51415	Depreciation rates, service lives, net salvage	Cities Advocating Reasonable Deregulation
New Mexico Public Regulatory Commission	Avangrid, Inc., Avangrid Networks, Inc., NM Green Holdings, Inc., PNM, and PNM Resources	20-00222-UT	Ring fencing and capital structure	The Albuquerque Bernalillo County Water Utility Authority
Indiana Utility Regulatory Commission	Indiana Gas Company, d/b/a Vectren Energy Delivery of Indiana, Inc.	45468	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utilities Commission of Nevada	Nevada Power Company and Sierra Pacific Power Company, d/b/a NV Energy	20-07023	Construction work in progress	MGM Resorts International, Caesars Enterprise Services, LLC, and the Southern Nevada Water Authority
Massachusetts Department of Public Utilities	Boston Gas Company, d/b/a National Grid	D.P.U. 20-120	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Public Service Commission of the State of Montana	ABACO Energy Services, LLC	D2020.07.082	Cost of capital and authorized rate of return	Montana Consumer Counsel
Maryland Public Service Commission	Washington Gas Light Company	9651	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Florida Public Service Commission	Utilities, Inc. of Florida	20200139-WS	Cost of capital and authorized rate of return	Florida Office of Public Counsel
New Mexico Public Regulatory Commission	El Paso Electric Company	20-00104-UT	Cost of capital, depreciation rates, net salvage	City of Las Cruces and Doña Ana County

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Public Utilities Commission of Nevada	Nevada Power Company	20-06003	Cost of capital, awarded rate of return, capital structure, earnings sharing	MGM Resorts International, Caesars Enterprise Services, LLC, Wynn Las Vegas, LLC, Smart Energy Alliance, and Circus Circus Las Vegas, LLC
Wyoming Public Service Commission	Rocky Mountain Power	20000-578-ER-20	Cost of capital and authorized rate of return	Wyoming Industrial Energy Consumers
Florida Public Service Commission	Peoples Gas System	20200051-GU 20200166-GU	Cost of capital, depreciation rates, net salvage	Florida Office of Public Counsel
Wyoming Public Service Commission	Rocky Mountain Power	20000-539-EA-18	Depreciation rates, service lives, net salvage	Wyoming Industrial Energy Consumers
Public Service Commission of South Carolina	Dominion Energy South Carolina	2020-125-E	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	The City of Bethlehem	2020-3020256	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Railroad Commission of Texas	Texas Gas Services Company	GUD 10928	Depreciation rates, service lives, net salvage	Gulf Coast Service Area Steering Committee
Public Utilities Commission of the State of California	Southern California Edison	A.19-08-013	Depreciation rates, service lives, net salvage	The Utility Reform Network
Massachusetts Department of Public Utilities	NSTAR Gas Company	D.P.U. 19-120	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Georgia Public Service Commission	Liberty Utilities (Peach State Natural Gas)	42959	Depreciation rates, service lives, net salvage	Public Interest Advocacy Staff
Florida Public Service Commission	Florida Public Utilities Company	20190155-El 20190156-El 20190174-El	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Illinois Commerce Commission	Commonwealth Edison Company	20-0393	Depreciation rates, service lives, net salvage	The Office of the Illinois Attorney General
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 49831	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
Public Service Commission of South Carolina	Blue Granite Water Company	2019-290-WS	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Railroad Commission of Texas	CenterPoint Energy Resources	GUD 10920	Depreciation rates and grouping procedure	Alliance of CenterPoint Municipalities
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater	A-2019-3009052	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate
New Mexico Public Regulation Commission	Southwestern Public Service Company	19-00170-UT	Cost of capital and authorized rate of return	The New Mexico Large Customer Group; Occidental Permian
Indiana Utility Regulatory Commission	Duke Energy Indiana	45253	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Maryland Public Service Commission	Columbia Gas of Maryland	9609	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Washington Utilities & Transportation Commission	Avista Corporation	UE-190334	Cost of capital, awarded rate of return, capital structure	Washington Office of Attorney General
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45235	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Public Utilities Commission of the State of California	Pacific Gas & Electric Company	18-12-009	Depreciation rates, service lives, net salvage	The Utility Reform Network
Oklahoma Corporation Commission	The Empire District Electric Company	PUD 201800133	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Arkansas Public Service Commission	Southwestern Electric Power Company	19-008-U	Cost of capital, depreciation rates, net salvage	Western Arkansas Large Energy Consumers
Public Utility Commission of Texas	CenterPoint Energy Houston Electric	PUC 49421	Depreciation rates, service lives, net salvage	Texas Coast Utilities Coalition
Massachusetts Department of Public Utilities	Massachusetts Electric Company and Nantucket Electric Company	D.P.U. 18-150	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201800140	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2018.9.60	Depreciation rates, service lives, net salvage	Montana Consumer Counsel and Denbury Onshore

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45159	Depreciation rates, grouping procedure, demolition costs	Indiana Office of Utility Consumer Counselor
Public Service Commission of the State of Montana	NorthWestern Energy	D2018.2.12	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 201800097	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Wal-Mart
Nevada Public Utilities Commission	Southwest Gas Corporation	18-05031	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	Texas-New Mexico Power Company	PUC 48401	Depreciation rates, service lives, net salvage	Alliance of Texas-New Mexico Power Municipalities
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201700496	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Maryland Public Service Commission	Washington Gas Light Company	9481	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Citizens Energy Group	45039	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Entergy Texas, Inc.	PUC 48371	Depreciation rates, decommissioning costs	Texas Municipal Group
Washington Utilities & Transportation Commission	Avista Corporation	UE-180167	Depreciation rates, service lives, net salvage	Washington Office of Attorney General
New Mexico Public Regulation Commission	Southwestern Public Service Company	17-00255-UT	Cost of capital and authorized rate of return	HollyFrontier Navajo Refining; Occidental Permian
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 47527	Depreciation rates, plant service lives	Alliance of Xcel Municipalities
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2017.9.79	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Florida Public Service Commission	Florida City Gas	20170179-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Washington Utilities & Transportation Commission	Avista Corporation	UE-170485	Cost of capital and authorized rate of return	Washington Office of Attorney General
Wyoming Public Service Commission	Powder River Energy Corporation	10014-182-CA-17	Credit analysis, cost of capital	Private customer
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201700151	Depreciation, terminal salvage, risk analysis	Oklahoma Industrial Energy Consumers
Public Utility Commission of Texas	Oncor Electric Delivery Company	PUC 46957	Depreciation rates, simulated analysis	Alliance of Oncor Cities
Nevada Public Utilities Commission	Nevada Power Company	17-06004	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	El Paso Electric Company	PUC 46831	Depreciation rates, interim retirements	City of El Paso
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-24	Accelerated depreciation of North Valmy plant	Micron Technology, Inc.
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-23	Depreciation rates, service lives, net salvage	Micron Technology, Inc.
Public Utility Commission of Texas	Southwestern Electric Power Company	PUC 46449	Depreciation rates, decommissioning costs	Cities Advocating Reasonable Deregulation
Massachusetts Department of Public Utilities	Eversource Energy	D.P.U. 17-05	Cost of capital, capital structure, and rate of return	Sunrun Inc.; Energy Freedom Coalition of America
Railroad Commission of Texas	Atmos Pipeline - Texas	GUD 10580	Depreciation rates, grouping procedure	City of Dallas
Public Utility Commission of Texas	Sharyland Utility Company	PUC 45414	Depreciation rates, simulated analysis	City of Mission
Oklahoma Corporation Commission	Empire District Electric Company	PUD 201600468	Cost of capital, depreciation rates	Oklahoma Industrial Energy Consumers
Railroad Commission of Texas	CenterPoint Energy Texas Gas	GUD 10567	Depreciation rates, simulated plant analysis	Texas Coast Utilities Coalition

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Arkansas Public Service Commission	Oklahoma Gas & Electric Company	160-159-GU	Cost of capital, depreciation rates, terminal salvage	Arkansas River Valley Energy Consumers; Wal-Mart
Florida Public Service Commission	Peoples Gas	160-159-GU	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Arizona Corporation Commission	Arizona Public Service Company	E-01345A-16-0036	Cost of capital, depreciation rates, terminal salvage	Energy Freedom Coalition of America
Nevada Public Utilities Commission	Sierra Pacific Power Company	16-06008	Depreciation rates, net salvage, theoretical reserve	Northern Nevada Utility Customers
Oklahoma Corporation Commission	Oklahoma Gas & Electric Co.	PUD 201500273	Cost of capital, depreciation rates, terminal salvage	Public Utility Division
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201500208	Cost of capital, depreciation rates, terminal salvage	Public Utility Division
Oklahoma Corporation Commission	Oklahoma Natural Gas Company	PUD 201500213	Cost of capital, depreciation rates, net salvage	Public Utility Division

Proxy Group Summary

Company	Ticker	Market Cap. ($ millions)	Market Category	Value Line Safety Rank	Financial Strength
American States Water Co	AWR	3,000	Mid Cap	2	A
American Water Works Co Inc	AWK	28,600	Large Cap	3	B++
California Water Service Gp	CWT	2,900	Mid Cap	3	B++
Essential Utilities, Inc.	WTRG	11,000	Large Cap	3	B+
Middlesex Water Co	MSEX	1,500	Small Cap	2	B++
SJW Corp	SJW	1,900	Small Cap	3	B+
York Water Co	YORW	600	Small Cap	3	B+

Value Line Investment Survey

DCF Stock and Index Prices

Ticker	^GSPC	AWR	AWK	CWT	WTRG	MSEX	SJW	YORW
30-day Average	4444	89.27	176.72	63.34	49.17	105.26	68.63	49.65
Standard Deviation	43.7	1.96	5.81	1.46	0.71	4.48	0.90	1.44
07/22/21	4367	84.77	163.86	59.40	47.15	94.86	65.93	47.26
07/23/21	4412	86.18	166.70	60.51	48.38	96.10	67.46	47.69
07/26/21	4422	86.04	165.62	60.71	48.51	96.21	67.54	47.56
07/27/21	4401	86.86	169.62	61.28	49.30	98.31	67.78	47.74
07/28/21	4401	87.21	169.77	61.35	49.46	99.03	67.51	48.00
07/29/21	4419	87.89	170.15	62.52	49.38	100.99	68.53	48.36
07/30/21	4395	87.96	169.53	62.46	48.85	101.48	68.60	48.26
08/02/21	4387	88.32	171.66	63.02	49.20	103.63	68.65	48.43
08/03/21	4423	88.76	174.70	64.03	49.38	106.05	69.02	48.70
08/04/21	4403	89.88	175.87	64.39	49.55	106.68	69.32	49.20
08/05/21	4429	91.10	179.06	65.59	50.87	109.80	70.54	49.93
08/06/21	4437	90.34	176.85	64.78	50.23	108.17	69.38	49.87
08/09/21	4432	89.42	177.12	64.16	49.75	105.71	68.75	49.20
08/10/21	4437	88.81	176.01	64.13	49.38	105.83	68.99	49.31
08/11/21	4442	87.91	175.56	63.78	48.85	105.30	68.12	49.27
08/12/21	4461	88.37	177.45	63.65	48.63	106.18	68.09	49.22
08/13/21	4468	89.49	178.92	64.43	49.27	108.86	68.67	49.34
08/16/21	4473	90.51	181.50	65.10	49.57	108.67	68.94	50.18
08/17/21	4448	90.21	181.39	64.74	49.34	106.68	69.03	49.77
08/18/21	4400	89.26	179.88	63.89	48.85	105.17	68.01	49.84
08/19/21	4406	90.09	181.77	63.84	48.80	106.26	68.66	50.29
08/20/21	4442	91.40	184.10	64.36	49.13	107.79	69.36	51.51
08/23/21	4480	90.59	182.20	63.79	48.44	107.99	68.93	51.75
08/24/21	4486	89.32	180.60	63.15	48.71	108.01	68.56	51.45
08/25/21	4496	89.09	180.88	63.16	48.76	107.93	68.59	51.17
08/26/21	4470	89.81	181.22	62.95	48.65	107.33	68.46	50.08
08/27/21	4509	90.44	180.31	63.00	48.71	107.11	68.51	50.61
08/30/21	4529	92.10	182.58	63.73	49.96	109.64	69.16	50.99
08/31/21	4523	92.21	182.25	63.55	49.63	109.41	69.33	51.57
09/01/21	4524	93.85	184.43	64.90	50.40	112.52	70.61	53.09

All prices are adjusted closing prices reported by Yahoo! Finance, http://finance.yahoo.com

DCF Dividend Yields

		[1]	[2]	[3]
			Stock	Dividend
Company	Ticker	Dividend	Price	Yield
American States Water Co	AWR	0.365	89.27	0.41%
American Water Works Co Inc	AWK	0.603	176.72	0.34%
California Water Service Gp	CWT	0.230	63.34	0.36%
Essential Utilities, Inc.	WTRG	0.268	49.17	0.55%
Middlesex Water Co	MSEX	0.273	105.26	0.26%
SJW Corp	SJW	0.340	68.63	0.50%
York Water Co	YORW	0.187	49.65	0.38%
Average		**$0.32**	**$86.01**	**0.40%**

[1] 2021 Q3 reported quarterly dividends per share. Nasdaq.com

[2] Average stock price from Exhibit DJG-3

[3] = [1] / [2] (quarterly dividend yield)

DCF Terminal Growth Rate Determinants

Terminal Growth Determinants	Rate	
Nominal GDP	3.8%	[1]
Real GDP	1.8%	[2]
Inflation	2.0%	[3]
Historical Growth Rates	6.8%	[4]
Highest	**6.8%**	

[1],[2] [3] CBO, The 2021 Long-Term Budget Outlook, p. 34

[4] *See* Testimony of Harold Walker, p. 39, Table 7

DCF Final Results

[1]	[2]	[3]	[4]
Dividend (d_0)	Stock Price (P_0)	Growth Rate (g)	**DCF Result**
$0.32	$86.01	6.80%	**8.4%**

[1] Average proxy dividend from Exhibit DJG-4

[2] Average proxy stock price from Exhibit DJG-3

[3] Highest growth determinant from Exhibit DJG-5

[4] Quarterly DCF Approximation = $[d_0(1 + g)^{0.25}/P_0 + (1 + g)^{0.25}]^4 - 1$

CAPM Risk-Free Rate

Date	Rate
07/22/21	1.90%
07/23/21	1.92%
07/26/21	1.93%
07/27/21	1.89%
07/28/21	1.90%
07/29/21	1.91%
07/30/21	1.89%
08/02/21	1.86%
08/03/21	1.85%
08/04/21	1.83%
08/05/21	1.86%
08/06/21	1.94%
08/09/21	1.96%
08/10/21	1.99%
08/11/21	1.99%
08/12/21	2.03%
08/13/21	1.94%
08/16/21	1.92%
08/17/21	1.92%
08/18/21	1.91%
08/19/21	1.88%
08/20/21	1.87%
08/23/21	1.87%
08/24/21	1.91%
08/25/21	1.96%
08/26/21	1.94%
08/27/21	1.91%
08/30/21	1.90%
08/31/21	1.92%
09/01/21	1.92%
Average	**1.91%**

*Daily Treasury Yield Curve Rates on 30-year T-bonds, http://www.treasury.gov/resources-center/data-chart-center/interest-rates/

CAPM Beta Coefficient

Company	Ticker	Beta
American States Water Co	AWR	0.65
American Water Works Co Inc	AWK	0.85
California Water Service Gp	CWT	0.65
Essential Utilities, Inc.	WTRG	0.95
Middlesex Water Co	MSEX	0.70
SJW Corp	SJW	0.80
York Water Co	YORW	0.85
Average		0.78

Betas from Value Line Investment Survey

CAPM Implied Equity Risk Premium Estimate

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Year	Market Value	Operating Earnings	Dividends	Buybacks	Earnings Yield	Dividend Yield	Buyback Yield	Gross Cash Yield
2015	17,900	885	382	572	4.95%	2.14%	3.20%	5.33%
2016	19,268	920	397	536	4.77%	2.06%	2.78%	4.85%
2017	22,821	1,066	420	519	4.67%	1.84%	2.28%	4.12%
2018	21,027	1,282	456	806	6.10%	2.17%	3.84%	6.01%
2019	26,760	1,305	485	729	4.88%	1.81%	2.72%	4.54%
2020	31,659	1,019	480	520	3.22%	1.52%	1.64%	3.16%

Cash Yield	4.67%	[9]
Growth Rate	2.85%	[10]
Risk-free Rate	1.91%	[11]
Current Index Value	4,444	[12]

	[13]	[14]	[15]	[16]	[17]
Year	1	2	3	4	5
Expected Dividends	213	219	226	232	239
Expected Terminal Value					4906
Present Value	200	192	185	178	3690

Intrinsic Index Value	4444	[18]
Required Return on Market	6.9%	[19]
Implied Equity Risk Premium	**5.0%**	[20]

[1-4] S&P Quarterly Press Releases, data found at https://us.spindices.com/indices/equity/sp-500, Q4 2018

[1] Market value of S&P 500

[5] = [2] / [1]

[6] = [3] / [1]

[7] = [4] / [1]

[8] = [6] + [7]

[9] = Average of [8]

[10] = Compound annual growth rate of [2] = (end value / beginning value)$^{1/4}$-1

[11] Risk-free rate from DJG-1-7

[12] 30-day average of closing index prices from DJG-1-3 (^GSPC column)

[13-16] Expected dividends = [9]*[12]*(1+[10])^n ; Present value = expected dividend / (1+[11]+[19])^n

[17] Expected terminal value = expected dividend * (1+[11]) / [19] ; Present value = (expected dividend + expected terminal value) / (1+[11]+[19])^n

[18] = Sum([13-17]) present values.

[19] = [20] + [11]

[20] Internal rate of return calculation setting [18] equal to [12] and solving for the discount rate

CAPM Equity Risk Premium Results

IESE Business School Survey	5.6%	[1]
Duff & Phelps Report	5.5%	[2]
Damodaran (average)	4.8%	[3]
Walker	6.3%	[4]
Garrett	5.0%	[5]
Average	**5.4%**	
Highest	**6.3%**	

CAPM Final Result

[1]	[2]	[3]	[4]
Risk-Free Rate	Proxy Beta	Risk Premium	**CAPM Result**
1.91%	0.779	6.3%	**6.8%**

[1] From DJG-7, risk-free rate exhibit

[2] From DJG-8, beta exhibit (avg. beta of proxy group)

[3] From DJG-10, equity risk premium exhibit

[4] = [1] + [2] * [3]

Cost of Equity Summary

Model	Cost of Equity
Discounted Cash Flow Model	8.4%
Capital Asset Pricing Model	6.8%
Average	**7.6%**

Market Cost of Equity vs. Awarded Returns

	[1]		[2]		[3]		[4]	[5]	[6]	[7]
	Electric Utilities		Gas Utilities		Total Utilities		S&P 500	T-Bond	Risk	Market
Year	ROE	#	ROE	#	ROE	#	Returns	Rate	Premium	COE
1990	12.70%	38	12.68%	33	12.69%	71	-3.06%	8.07%	3.89%	11.96%
1991	12.54%	42	12.45%	31	12.50%	73	30.23%	6.70%	3.48%	10.18%
1992	12.09%	45	12.02%	28	12.06%	73	7.49%	6.68%	3.55%	10.23%
1993	11.46%	28	11.37%	40	11.41%	68	9.97%	5.79%	3.17%	8.96%
1994	11.21%	28	11.24%	24	11.22%	52	1.33%	7.82%	3.55%	11.37%
1995	11.58%	28	11.44%	13	11.54%	41	37.20%	5.57%	3.29%	8.86%
1996	11.40%	18	11.12%	17	11.26%	35	22.68%	6.41%	3.20%	9.61%
1997	11.33%	10	11.30%	12	11.31%	22	33.10%	5.74%	2.73%	8.47%
1998	11.77%	10	11.51%	10	11.64%	20	28.34%	4.65%	2.26%	6.91%
1999	10.72%	6	10.74%	6	10.73%	12	20.89%	6.44%	2.05%	8.49%
2000	11.58%	9	11.34%	13	11.44%	22	-9.03%	5.11%	2.87%	7.98%
2001	11.07%	15	10.96%	5	11.04%	20	-11.85%	5.05%	3.62%	8.67%
2002	11.21%	14	11.17%	19	11.19%	33	-21.97%	3.81%	4.10%	7.91%
2003	10.96%	20	10.99%	25	10.98%	45	28.36%	4.25%	3.69%	7.94%
2004	10.81%	21	10.63%	22	10.72%	43	10.74%	4.22%	3.65%	7.87%
2005	10.51%	24	10.41%	26	10.46%	50	4.83%	4.39%	4.08%	8.47%
2006	10.32%	26	10.40%	15	10.35%	41	15.61%	4.70%	4.16%	8.86%
2007	10.30%	38	10.22%	35	10.26%	73	5.48%	4.02%	4.37%	8.39%
2008	10.41%	37	10.39%	32	10.40%	69	-36.55%	2.21%	6.43%	8.64%
2009	10.52%	40	10.22%	30	10.39%	70	25.94%	3.84%	4.36%	8.20%
2010	10.37%	61	10.15%	39	10.28%	100	14.82%	3.29%	5.20%	8.49%
2011	10.29%	42	9.92%	16	10.19%	58	2.10%	1.88%	6.01%	7.89%
2012	10.17%	58	9.94%	35	10.08%	93	15.89%	1.76%	5.78%	7.54%
2013	10.03%	49	9.68%	21	9.93%	70	32.15%	3.04%	4.96%	8.00%
2014	9.91%	38	9.78%	26	9.86%	64	13.52%	2.17%	5.78%	7.95%
2015	9.85%	30	9.60%	16	9.76%	46	1.38%	2.27%	6.12%	8.39%
2016	9.77%	42	9.54%	26	9.68%	68	11.77%	2.45%	5.69%	8.14%
2017	9.74%	53	9.72%	24	9.73%	77	21.61%	2.41%	5.08%	7.49%
2018	9.64%	37	9.62%	26	9.63%	63	-4.23%	2.68%	5.96%	8.64%
2019	9.64%	67	9.71%	32	9.66%	99	31.22%	1.92%	5.20%	7.12%
2020	9.43%	43	9.46%	34	9.44%	77	18.01%	0.93%	4.72%	5.65%

[1], [2], [3] Average annual authorized ROE for electric and gas utilities, RRA Regulatory Focus: Major Rate Case Decisions

[3] = [1] + [2]

[4], [5], [6] Annual S&P 500 return, 10-year T-bond Rate, and equity risk premium published by NYU Stern School of Business

[7] = [5] + [6] ; Market cost of equity represents the required return for investing in all stocks in the market for a given year

Proxy Company Debt Ratios

Company	Ticker	Debt Ratio
American States Water Co	AWR	47%
American Water Works Co Inc	AWK	59%
California Water Service Gp	CWT	46%
Essential Utilities, Inc.	WTRG	54%
Middlesex Water Co	MSEX	44%
SJW Corp	SJW	58%
York Water Co	YORW	46%
Average		51%

Debt ratios from Value Line Investment Survey

Competitive Industry Debt Ratios

Industry	# Firms	Debt Ratio
Financial Svcs. (Non-bank & Insurance)	235	95%
Retail (Building Supply)	15	88%
Hospitals/Healthcare Facilities	32	84%
Air Transport	17	84%
Advertising	61	81%
Hotel/Gaming	66	77%
Brokerage & Investment Banking	39	77%
Auto & Truck	19	75%
Retail (Automotive)	30	74%
Food Wholesalers	18	74%
Retail (Special Lines)	85	72%
Recreation	69	71%
Bank (Money Center)	7	68%
Retail (Grocery and Food)	14	68%
Transportation	21	68%
Computers/Peripherals	52	68%
Packaging & Container	26	67%
Broadcasting	29	65%
Rubber& Tires	3	64%
Beverage (Soft)	41	64%
Chemical (Basic)	48	62%
Oil/Gas Distribution	57	62%
Cable TV	13	61%
R.E.I.T.	238	61%
Apparel	51	61%
Trucking	35	61%
Computer Services	116	61%
Retail (Distributors)	85	60%
Telecom (Wireless)	16	60%
Power	55	60%
Farming/Agriculture	32	59%
Business & Consumer Services	169	59%
Aerospace/Defense	72	59%
Telecom. Services	58	59%
Retail (Online)	75	58%
Utility (General)	16	58%
Software (Internet)	36	57%
Household Products	140	57%
Construction Supplies	46	57%
Real Estate (Operations & Services)	61	56%
Building Materials	42	56%
Transportation (Railroads)	6	56%
Coal & Related Energy	29	56%
Chemical (Diversified)	5	56%
Office Equipment & Services	22	55%
Environmental & Waste Services	86	54%
Auto Parts	52	53%
Drugs (Biotechnology)	547	52%
Real Estate (Development)	25	52%
Publishing & Newspapers	29	52%
Green & Renewable Energy	25	52%
Retail (General)	17	52%
Shoe	11	50%
Total / Average	**3,194**	**64%**

http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/dbtfund.htm

Weighted Average Rate of Return Proposal

Capital Component	Proposed Ratio	Cost Rate	11% Tax Adjusted	Weighted Cost
Debt	51.0%	2.98%		1.52%
Fund Equity	49.0%	8.40%	7.48%	3.66%
Total	100.0%			5.18%

Hamada Model

Unlevering Beta

Proposed Debt Ratio	48%	[1]
Proposed Equity Ratio	52%	[2]
Debt / Equity Ratio	92%	[3]
Tax Rate	28%	[4]
Equity Risk Premium	6.3%	[5]
Risk-free Rate	1.9%	[6]
Proxy Group Beta	0.78	[7]
Unlevered Beta	0.47	[8]

[9]	[10]	[11]	[12]

Relevered Betas and Cost of Equity Estimates

Debt Ratio	D/E Ratio	Levered Beta	Cost of Equity
0%	0%	0.468	4.86%
20%	25%	0.552	5.39%
30%	43%	0.612	5.77%
40%	67%	0.692	6.28%
51%	104%	0.818	7.07%
55%	122%	0.879	7.45%
60%	150%	0.973	8.04%

[1] Company debt ratio

[2] Company equity ratio

[3] = [1] / [2]

[4] Tax rate

[5] Equity risk premium from Exhibit DJG-11

[6] Risk-free rate from Exhibit DJG-11

[7] Average proxy beta from Exhibit DJG-11

[8] = [7] / (1 + (1 - [4]) * [3])

[9] Various debt ratios for modeling

[10] = [9] / (1 - [9])

[11] = [8] * (1 + (1 - [4]) * [10])

[12] = [6] + [11] * [5]

<div align="center">BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION</div>

Pennsylvania Public Utility Commission   :
                                             :
               v.   :   Docket No. R-2021-3026116
                                             :
The Borough of Hanover --   :
Hanover Municipal Waterworks   :

<div align="center">**VERIFICATION**</div>

I, David J. Garrett, hereby state that the facts set forth in my Direct Testimony, OCA Statement 2, are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: September 30, 2021   Signature: _____
*317997   David J. Garrett

                                  Consultant Address: Resolve Utility Consulting, PLLC
                                                    101 Park Avenue
                                                    Suite 1125
                                                      Oklahoma City, OK 73102

BEFORE THE

PENNSYLVANIA PUBLIC UTILITIY COMMISSION

PENNSYLVANIA PUBLIC	)	
UTILITY COMMISSION	)	
	)	
v.	)	DOCKET NO. R-2021-3026116
	)	
THE BOROUGH OF HANOVER	)	
HANOVER MUNICIPAL	)	
WATERWORKS	)	

DIRECT TESTIMONY OF

JEROME D. MIERZWA

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

SEPTEMBER 30, 2021

_____

EXETER
ASSOCIATES, INC.

10480 Little Patuxent Parkway
Suite 300
Columbia, Maryland 21044

I. <u>INTRODUCTION</u>

1

2 Q. WOULD YOU PLEASE STATE YOUR NAME AND BUSINESS ADDRESS?

3 A. My name is Jerome D. Mierzwa. I am Vice President of and a Principal with Exeter

4 Associates, Inc ("Exeter"). My business address is 10480 Little Patuxent Parkway, Suite

5 300, Columbia, Maryland 21044. Exeter specializes in providing public utility-related

6 consulting services.

7 Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND

8 EXPERIENCE.

9 A. I graduated from Canisius College in Buffalo, New York, in 1981 with a Bachelor of

10 Science Degree in Marketing. In 1985, I received a Master's Degree in Business

11 Administration with a concentration in finance, also from Canisius College. In July 1986,

12 I joined National Fuel Gas Distribution Corporation ("NFG Distribution") as a

13 Management Trainee in the Research and Statistical Services Department ("RSS"). I was

14 promoted to Supervisor RSS in January 1987. While employed with NFG Distribution, I

15 conducted various financial and statistical analyses related to the Company's market

16 research activity and state regulatory affairs. In April 1987, as part of a corporate

17 reorganization, I was transferred to National Fuel Gas Supply Corporation's ("NFG

18 Supply") rate department where my responsibilities included utility cost of service and

19 rate design analysis, expense and revenue requirement forecasting and activities related to

20 federal regulation. I was also responsible for preparing NFG Supply's Federal Energy

21 Regulatory Commission ("FERC") Purchase Gas Adjustment ("PGA") filings and

22 developing interstate pipeline and spot market supply gas price projections. These

23 forecasts were utilized for internal planning purposes as well as in NFG Distribution's

24 1307(f) purchased gas cost proceedings.

1   In April 1990, I accepted a position as a Utility Analyst with Exeter. In December

2   1992, I was promoted to Senior Regulatory Analyst. Effective April 1, 1996, I became a

3   Principal of Exeter. Since joining Exeter, my assignments have included water and

4   wastewater utility class cost of service and rate design analysis, evaluating the gas

5   purchasing practices and policies of natural gas utilities, sales and rate forecasting,

6   performance-based incentive regulation, revenue requirement analysis, the unbundling of

7   utility services and the evaluation of customer choice natural gas transportation programs.

8   Q.   HAVE YOU PREVIOUSLY TESTIFIED IN REGULATORY PROCEEDINGS

9   ON UTILITY RATES?

10   A.   Yes. I have provided testimony on approximately 400 occasions in proceedings before

11   FERC, utility regulatory commissions in Arkansas, Delaware, Georgia, Illinois, Indiana,

12   Louisiana, Maine, Maryland, Massachusetts, Montana, Nevada, New Hampshire, New

13   Jersey, Ohio, Rhode Island, Texas, South Carolina, Utah, and Virginia, as well as before

14   the Pennsylvania Public Utility Commission ("Commission").

15   Q.   WHAT IS THE PURPOSE OF YOUR TESTIMONY?

16   A.   On June 29, 2021, The Borough of Hanover ("Borough") filed an application with the

17   Commission to increase the rates for water utility service provided to the customers

18   which it serves that are located outside the corporate limits of the Borough ("Outside

19   Borough customers") by $1.563 million. The Borough also provides water service to

20   customers that are located inside the Borough's corporate limits ("Inside Borough

21   customers"). However, the rates of Inside Borough Customers are not regulated by the

22   Commission. Exeter was retained by the Pennsylvania Office of Consumer Advocate

23   ("OCA") to review and analyze the Borough's revenue requirement claim, class cost of

24   service study ("CCOSS"), and rate design proposals reflected in the Borough's

25   application. My colleague, Ms. Stacy L. Sherwood, addresses the Borough's revenue

1		requirement claim. My testimony addresses the Borough's CCOSS and rate design
2		proposals.
3	Q.	HAVE YOU PREPARED EXHIBITS TO ACCOMPANY YOUR
4		TESTIMONY?
5	A.	Yes, I have. Schedule JDM-1 is attached to my testimony.
6	Q.	PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS.
7	A.	Although I find the Borough's CCOSS to generally be reasonable and appropriate for
8		determining cost responsibility for the Outside Borough customers, several minor
9		modifications to the CCOSS are appropriate. I incorporate these modifications in a
10		revised CCOSS as discussed in my testimony. This revised CCOSS should serve as a
11		guide to establishing rates in this proceeding. My specific modifications to the Borough's
12		CCOSS are that source of supply operation and maintenance ("O&M") expenses should
13		be functionalized and allocated to class based on average demands, and water treatment
14		operating expenses should be functionalized and allocated based on average demands. I
15		agree with the Borough's rate design proposal to recover the entire increase authorized in
16		this proceeding through increased consumption changes and to maintain the existing
17		monthly customer charges.
18	Q.	HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?
19	A.	Following this introductory section, my testimony is divided into three additional
20		sections. The first section provides an overview of water utility cost of service
21		methodologies. Next, I address the Borough's CCOSS. In the final section, I present my
22		recommendations concerning rate design.
23		**II. <u>OVERVIEW OF COST OF SERVICE METHODOLOGIES</u>**
24	Q.	WHAT IS THE OBJECTIVE OF A COST OF SERVICE STUDY?

1   A.   A cost of service study is conducted to assist a utility or commission in determining the

2   level of costs properly recoverable through the rates applicable for the various services

3   provided by the utility from each of the classes to which the utility provides service.

4   Allocation of recoverable costs to each class of service is generally based on usage and

5   cost causation principles.

6   Q.   WHAT ARE THE PRIMARY COST OF SERVICE STUDY

7   METHODOLOGIES UTILIZED FOR WATER UTILITIES?

8   A.   The two most commonly used and widely recognized methods of allocating costs

9   to customer classes for water utilities are the base-extra capacity method and the

10   commodity-demand method. Both of these methods are set forth in the American Water

11   Works Association's ("AWWA") *Principles of Water Rates, Fees, and Charges*

12   ("AWWA M1 Manual").

13 Q.   WHAT METHODOLOGY HAS THE BOROUGH UTILIZED FOR ITS CLASS

14   CCOSS?

15 A.   The Borough has utilized the base-extra capacity method in preparing its CCOSS. Under

16   the base-extra capacity method, investment and costs are first classified into four primary

17   functional cost categories: base or average capacity, extra capacity, customer, and fire

18   protection. Once investment and costs are classified to these functional categories, they

19   are allocated to the various customer classes. The Borough's CCOSS is presented by Ms.

20   Constance E. Heppenstall of Gannet Fleming Valuation and Rate Consultants, LLC.

21 Q.   PLEASE DESCRIBE IN GREATER DETAIL THE FOUR PRIMARY

22   FUNCTIONAL COST CATEGORIES AND HOW THESE COSTS ARE

23   ALLOCATED TO THE VARIOUS CUSTOMER CLASSES UNDER THE

24   BASE-EXTRA CAPACITY METHOD.

1   A.   **Base Costs** are costs that tend to vary with the quantity of water used, plus costs associated with supplying, treating, pumping, and distributing water to customers under average load conditions. Base costs were allocated to customer class on the basis of average daily usage in the Borough's CCOSS.

5   **Extra Capacity Costs** are costs associated with meeting usage requirements in excess of average usage. This includes operating and capital costs for additional plant and system capacity beyond that required for average usage. Extra capacity costs in the Borough's study have been subdivided into costs necessary to meet maximum day extra demand and maximum hour extra demand. These extra capacity costs were allocated to customer classes on the basis of each class's maximum day and maximum hour usage in excess of average usage.

12   **Customer Costs** are costs associated with serving customers regardless of their usage or demand characteristics. Customer costs include the operating costs related to meters and services, meter reading costs, and billing and collection costs. Customer costs were allocated on the basis of capital cost of meters and services and the number of customer bills.

17   **Fire Protection Costs** are costs associated with providing the facilities to meet the potential peak demand of fire protection service. In the Borough's CCOSS, fire protection costs have been subdivided into the costs associated with meeting Public Fire Protection and Private Fire Protection demands. The extra capacity costs assigned to fire protection were allocated to Public and Private Fire Protection on the basis of the total relative demands of hydrants and fire service lines.

1		**III. EVALUATION OF THE BOROUGH'S CLASS COST OF**
2		**SERVICE STUDY**

1
2

3 Q. BEFORE ASSESSING AND EVALUATING THE BOROUGH'S CCOSS AND

4 RATE DESIGN PROPOSALS, DO YOU HAVE ANY PRELIMINARY

5 MATTERS TO ADDRESS?

6 A. Yes. My testimony and analysis are based on the Borough's proposed revenue

7 requirement. This is standard practice because it allows the cost of service and rate design

8 recommendations of different parties to be compared on a comparable basis. This should

9 not be taken, however, as an endorsement of the Borough's proposed revenue

10 requirement claim in this proceeding.

11 Q. PLEASE IDENTIFY THE CUSTOMER CLASSES INCLUDED IN THE

12 BOROUGH'S CCOSS.

13 A. The Borough provides service to five Inside and Outside Borough customer classes:

14 • Residential

15 • Commercial/Public

16 • Industrial

17 • Private Fire

18 • Public Fire

19 Each of these Inside and Outside Borough customer classes are included in the Borough's

20 CCOSS.

21 Q. DO YOU HAVE ANY CONCERNS WITH THE BOROUGH'S CCOSS?

22 A. Yes. While the Borough's CCOSS is generally reasonable, I have several minor concerns

23 with the CCOSS.

24 Q. PLEASE IDENTIFY THE CONCERNS YOU HAVE WITH THE BOROUGH'S

25 CCOSS.

1   A.   I have a concern with the Borough's functionalization and allocation of source of supply

2   O&M expenses and water treatment operating expenses.

3   Q.   PLEASE DESCRIBE YOUR CONCERN WITH THE BOROUGH'S

4   FUNCTIONALIZATION OF SOURCE OF SUPPLY O&M EXPENSES AND

5   WATER TREATMENT EXPENSES.

6   A.   The Borough has functionalized most source of supply O&M expenses based on Factor 2

7   which functionalizes and allocates costs partially based on average day demands and

8   partially based on maximum day demands. More specifically, the Borough has

9   functionalized source of supply labor, gas and diesel fuel, and miscellaneous O&M

10   expenses based on Factor 2, and has functionalized source of supply maintenance

11   expenses based on Factor 2. Source of supply labor expenses do not increase on the

12   maximum demand day, and so the costs should be functionalized based on average day

13   demands (Factor 1). Gas and diesel fuel expense increases vary directly in relation to

14   consumption and, therefore, should be functionalized and allocated based on average day

15   demand. Miscellaneous O&M expenses should be functionalized and allocated based on

16   the functionalization and allocation of all other source of supply O&M expenses. This

17   would result in miscellaneous O&M expenses also being allocated based on average day

18   demands.

19   With respect to water treatment operating expenses, labor, laboratory, and

20   miscellaneous expenses have been allocated based on Factor 2. Like source of supply

21   labor expenses, water treatment labor and laboratory testing expenses do not increase on

22   the maximum demand day and should be functionalized and allocated based on average

23   day demands. Miscellaneous water treatment operating expenses should be functionalized

24   and allocated based on all other water treatment operating expenses, which results in

25   these expenses also being functionalized and allocated based on average day demands.

1   Q.   HAVE YOU REVISED THE BOROUGH'S CCOSS TO ADDRESS YOUR

2   CONCERNS?

3   A.   Yes. I have revised the Borough's CCOSS to functionalize and allocate all source of

4   supply O&M expenses and water treatment operating expenses based on average day

5   demands (Factor 1). A summary of the results of the revised CCOSS is presented as

6   Schedule JDM-1 to my testimony. A comparison of the cost of service by customer class

7   for the Borough's filed CCOSS and the revised CCOSS which reflects my modifications

8   is provided in Table 1 (below). Table 1 also identifies the increases in rates that would be

9   required to move each Outside Borough customer class to the indicated cost of service.

10   As shown in Table 1, my modifications to the Borough's CCOSS result in a slight

11   decrease to the indicated cost of service for Residential customers and a slight increase

12   for all other classes.

Table 1.
Comparison of Borough and OCA Class Cost of Service Study Results

	Borough		OCA		CCOSS
	CCOSS	Increase	CCOSS	Increase	Variance
Inside the Borough					
Residential	$1,643,610	-	$1,615,810	-	($27,800)
Commercial/Public	446,205	-	446,402	-	197
Industrial	421,493	-	430,275	-	8,782
Private Fire	90,152	-	90,688	-	536
Public Fire Service	0	-	0	-	0
Total Inside the Borough	**$2,601,460**	**-**	**$2,583,175**	**-**	**($18,285)**
Outside the Borough					
Residential	$3,722,009	26.8%	$3,670,306	25.0%	($51,703)
Commercial/Public	581,923	26.0	582,142	26.1	219
Industrial	495,349	23.8	502,748	25.6	7,399
Large Industrial	1,759,361	37.9	1,820,675	42.7	61,314
Private Fire	279,148	38.9	280,316	39.5	1,168
Public Fire Service	131,772	0.0	131,772	0.0	(0)
Total Outside the Borough	**$6,969,562**	**28.9%**	**$6,987,958**	**29.3%**	**$18,396**
TOTAL COST OF SERVICE	**$9,571,022**		**$9,571,133**		**$111**

1   **IV. Rate Design**

2   Q.   WHAT ARE SOME THE PRINCIPLES OF A SOUND REVENUE

3   ALLOCATION AND RATE DESIGN?

4   A.   A sound revenue allocation should:

5   • Utilize class cost of service study results as a guide;

6   • Provide stability and predictability of the rates themselves, with a minimum of

7   unexpected changes seriously adverse to ratepayers or the utility (gradualism);

8   • Yield the total revenue requirement;

9   • Provide for simplicity, certainty, convenience of payment, understandability,

10   public acceptability, and feasibility of application; and

---

1   • Reflect fairness in the apportionment of the total cost of service among the

2   various customer classes.[1]

3 Q.   HOW IS THE BOROUGH PROPOSING TO RECOVER ITS REQUESTED

4   REVENUE INCREASE?

5 A.   Except for Private and Public Fire Protection Service, the Borough is proposing to

6   recover the requested revenue increase by adjusting the consumption charges for each

7   Outside Borough customer class to recover the indicated cost of service. No increase in

8   monthly customer charges is proposed by the Borough. Since there is no consumption

9   charge for Private Fire Service, the Borough is proposing to increase the current monthly

10   fixed charge to recover the indicated cost of service. As explained by Ms. Heppenstall in

11   her direct testimony, the Borough is proposing no changes to Public Fire Protection rates

12   due to the requirements of Section 1328 of the Public Utility Code.

13 Q.   ARE THE BOROUGH'S RATE DESIGN PROPOSALS REASONABLE?

14 A.   Yes. However, the consumption changes should be adjusted to reflect the results of the

15   revised CCOSS I have presented. The results of the revised CCOSS should be

16   proportionally scaled back to reflect the increase authorized by the Commission in this

17   proceeding.

18 Q.   DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

19 A.   Yes, it does.

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[1] *Principles of Public Utility Rates*, Second Edition, James C. Bonbright, Albert L. Danielsen, David R. Kamerschen; Public Utility Reports, Inc. 1988, pages 383-384.

BEFORE THE

PENNSYLVANIA PUBLIC UTILITIY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	)	
	)	
	)	
v.	)	DOCKET NO. R-2021-3026116
	)	
THE BOROUGH OF HANOVER	)	
HANOVER MUNICIPAL	)	
WATERWORKS	)	

SCHEDULES ACCOMPANYING THE

DIRECT TESTIMONY OF

JEROME D. MIERZWA

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

SEPTEMBER 30, 2021

_____

EXETER
ASSOCIATES, INC.

10480 Little Patuxent Parkway
Suite 300
Columbia, Maryland 21044

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022

ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE - BOROUGH					OUTSIDE - BOROUGH					
			RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
OPERATION AND MAINTENANCE EXPENSES													
Source of Supply													
Operating Expense:													
Labor	1	$ 197,640	34,251	12,115	15,218	237	178	59,094	11,681	12,451	51,624	494	296
Gas and Diesel	1	1,860	322	114	143	2	2	556	110	117	486	5	3
Miscellaneous Operating Expenses	1	18,047	3,128	1,106	1,390	22	16	5,396	1,067	1,137	4,714	45	27
Power	1	11,177	1,937	685	861	13	10	3,342	661	704	2,919	28	17
Total Operation Expense		228,723	39,638	14,021	17,612	274	206	68,388	13,518	14,410	59,742	572	343
Maintenance Expense:													
Labor	1	3,048	528	187	235	4	3	911	180	192	796	8	5
Miscellaneous Maintenance Expenses	1	27,602	4,783	1,692	2,125	33	25	8,253	1,631	1,739	7,210	69	41
Total Maintenance Expense		30,649	5,312	1,879	2,360	37	28	9,164	1,811	1,931	8,006	77	46
Total Source of Supply		259,373	44,949	15,900	19,972	311	233	77,552	15,329	16,340	67,748	648	389
Water Treatment													
Operating Expense:													
Labor	1	256,422	44,438	15,719	19,745	308	231	76,670	15,155	16,155	66,977	641	385
Lab - Water Testing	1	23,594	4,089	1,446	1,817	28	21	7,054	1,394	1,486	6,163	59	35
Diesel Fuel	1	-	0	0	0	0	0	0	0	0	0	0	0
Chemicals	1	257,420	44,611	15,780	19,821	309	232	76,969	15,214	16,217	67,238	644	386
Power	1	52,978	9,181	3,248	4,079	64	48	15,840	3,131	3,338	13,838	132	79
Sewer Bill	1	323,506	56,064	19,831	24,910	388	291	96,728	19,119	20,381	84,500	809	485
Stormwater Bill	1	950	165	58	73	1	1	284	56	60	248	2	1
Miscellaneous	1	55,691	9,651	3,414	4,288	67	50	16,652	3,291	3,509	14,547	139	84
Total Operating Expense		970,561	168,198	59,495	74,733	1,165	874	290,198	57,360	61,145	253,510	2,426	1,456
Maintenance Expense													
Labor	2	50,864	10,020	3,113	3,545	41	31	17,304	3,001	2,899	10,783	81	46
Miscellaneous Maintenance Expenses	2	16,963	3,342	1,038	1,162	14	10	5,771	1,001	967	3,596	27	15
Total Maintenance Expense		67,827	13,362	4,151	4,728	54	41	23,075	4,002	3,866	14,379	109	61
Total Water Treatment		1,038,388	181,560	63,646	79,461	1,219	914	313,272	61,362	65,011	267,890	2,535	1,517

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022

ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE - BOROUGH					OUTSIDE - BOROUGH					
			RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
Power and Pumping													
Operating Expense													
Labor	3	300,582	53,684	16,652	18,967	5,982	4,238	92,609	16,081	15,540	57,682	11,873	7,274
Supplies and Expenses	3	21,038	3,757	1,165	1,327	419	297	6,482	1,126	1,088	4,037	831	509
Power	1	173,179	30,012	10,616	13,335	208	156	51,781	10,235	10,910	45,234	433	260
Total Operating Expense		494,799	87,453	28,434	33,629	6,608	4,691	150,872	27,442	27,538	106,953	13,137	8,043
Maintenance Expense													
Pump Station - Labor	3	50,963	9,102	2,823	3,216	1,014	719	15,702	2,727	2,635	9,780	2,013	1,233
Supplies and Equipment	3	26,255	4,689	1,455	1,657	522	370	8,089	1,405	1,357	5,038	1,037	635
Misc Maintenance Expense	3	-	0	0	0	0	0	0	0	0	0	0	0
Total Maintenance Expense		77,218	13,791	4,278	4,872	1,537	1,089	23,791	4,131	3,992	14,818	3,050	1,869
Total Power and Pumping		572,017	101,244	32,711	38,501	8,145	5,779	174,662	31,573	31,530	121,771	16,187	9,912
Transmission and Distribution													
Operating Expense													
Labor	10	293,694	70,751	16,065	7,871	6,784	7,607	121,560	14,890	7,078	13,040	14,185	13,862
Meter - Labor	8	124,245	37,100	9,592	3,777	0	0	61,191	8,759	3,280	547	0	0
Streets Dept.	10	20,694	4,985	1,132	555	478	536	8,565	1,049	499	919	1,000	977
Streets Dept. - Misc Exp	10	3,653	880	200	98	84	95	1,512	185	88	162	176	172
Meter Dept.	8	1,144	342	88	35	0	0	563	81	30	5	0	0
Other Distribution Expense	10	9,219	2,221	504	247	213	239	3,816	467	222	409	445	435
Gratuitous Services	10	-	0	0	0	0	0	0	0	0	0	0	0
Total Operating Expense		462,650	116,278	27,581	12,582	7,560	8,476	197,207	25,432	11,197	15,082	15,807	15,447
Maintenance Expense													
Transmission Mains - Labor	3	-	0	0	0	0	0	0	0	0	0	0	0
Transmission Mains - Supplies	3	-	0	0	0	0	0	0	0	0	0	0	0
Labor - Cleaning mains	3	-	0	0	0	0	0	0	0	0	0	0	0
Distribution Mains - Labor	6	135,121	19,260	5,376	4,898	8,109	5,744	36,785	5,697	4,422	16,219	17,705	10,907
Distribution Mains - Supplies	6	58,327	8,314	2,320	2,114	3,500	2,480	15,879	2,459	1,909	7,001	7,642	4,708
Distribution Mains - Contract Cleaning	6	-	0	0	0	0	0	0	0	0	0	0	0
Service Lines - Labor	9	90,633	29,465	3,462	372	1,468	0	50,528	2,592	517	45	2,184	0
Service Lines	9	19,506	6,341	745	80	316	0	10,875	558	111	10	470	0
Tanks and Reservoirs - Labor	5	9,059	1,849	525	494	118	85	3,200	506	404	1,502	233	145
Tanks and Reservoirs	5	748	153	43	41	10	7	264	42	33	124	19	12
Tanks and Reservoirs - Tank Painting	5	-	0	0	0	0	0	0	0	0	0	0	0
Meters -Labor	8	114,523	34,197	8,841	3,482	0	0	56,403	8,074	3,023	504	0	0
Meters	8	13,285	3,967	1,026	404	0	0	6,543	937	351	58	0	0
Hydrants - Labor	7	11,317	0	0	0	4,153	0	0	0	0	0	0	7,164
Hydrants	7	7,400	0	0	0	2,716	0	0	0	0	0	0	4,684
Total Maintenance Expense		459,919	103,545	22,338	11,884	13,521	15,185	180,477	20,862	10,770	25,463	28,253	27,620
Total Transmission and Distribution		912,569	219,823	49,919	24,467	21,081	23,662	377,685	46,295	21,967	40,545	44,060	43,067

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022

ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE- BOROUGH					OUTSIDE - BOROUGH					
			RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
Administrative and General Expenses													
Wages and Salaries - Professional Staff	13	45,965	9,809	2,569	2,216	689	662	16,860	2,418	1,862	6,297	1,407	1,190
Wages - General Office	13	297,833	63,558	16,649	14,356	4,467	4,289	109,245	15,666	12,062	40,803	9,114	7,714
Wages - Billing and Collecting	11	74,735	24,924	2,638	336	852	7	42,180	1,943	456	0	1,383	15
Office Supplies	13	-	0	0	0	0	0	0	0	0	0	0	0
Misc Office Exp	13	2,706	577	151	130	41	39	993	142	110	371	83	70
General Office - Data Processing Maint.	13	-	0	0	0	0	0	0	0	0	0	0	0
General Office - Computer Support	11	10,679	3,562	377	48	122	1	6,027	278	65	0	198	2
General Office - Misc	13	8,635	1,843	483	416	130	124	3,167	454	350	1,183	264	224
General Office - Rent	13	93,199	19,889	5,210	4,492	1,398	1,342	34,185	4,902	3,775	12,768	2,852	2,414
General Office - Postage	11	35,620	11,879	1,257	160	406	4	20,104	926	217	0	659	7
General Office - Auditors	13	10,448	2,230	584	504	157	150	3,832	550	423	1,431	320	271
Rate Case Expense	18	141,033	0	0	0	0	0	72,895	11,582	10,085	36,742	5,656	4,073
General Property Expense - Labor	13	88,016	18,783	4,920	4,242	1,320	1,267	32,284	4,630	3,565	12,058	2,693	2,280
General Property Expense - Vehicle	13	14,117	3,013	789	680	212	203	5,178	743	572	1,934	432	366
General Property Expense - Misc	13	73,891	15,768	4,131	3,562	1,108	1,064	27,103	3,887	2,903	10,123	2,261	1,914
Legal Expenses	13	10,854	2,316	607	523	163	156	3,981	571	440	1,487	332	281
Legal Expenses - PA PUC Legal Fees	13A	14,437	0	0	0	0	0	8,105	1,162	895	3,027	676	572
Insurance - Health	14	1,007,795	216,978	56,940	48,374	14,714	13,706	372,481	53,514	40,715	135,649	30,133	24,691
Insurance - Workman's Comp	14	52,250	11,249	2,952	2,508	763	711	19,312	2,774	2,111	7,033	1,552	1,280
Insurance - Fire and Liability	14	38,000	8,181	2,147	1,824	555	517	14,045	2,018	1,535	5,115	1,136	931
Insurance -Life	14	5,675	1,222	321	272	83	77	2,097	301	229	764	170	139
Insurance -Prescriptions	14	0	0	0	0	0	0	0	0	0	0	0	0
Retirees Hospitalization and Health	14	48,210	10,380	2,724	2,314	704	656	17,819	2,560	1,948	6,489	1,441	1,181
Employee Pension	14	167,570	36,078	9,468	8,043	2,447	2,279	61,934	8,898	6,770	22,555	5,010	4,105
Unemployment Compensation	14	0	0	0	0	0	0	0	0	0	0	0	0
Professional Services - Engineering Services	13	105,690	22,554	5,908	5,094	1,585	1,522	38,767	5,559	4,280	14,460	3,234	2,737
General Prop. Labor Exp	13	15,337	3,273	857	739	230	221	5,626	807	621	2,101	469	397
Bank Fees	13	5,325	1,136	298	257	80	77	1,953	280	216	730	163	138
Total Administrative and General Expenses		2,368,020	489,201	121,980	101,092	32,225	29,074	920,175	126,564	96,293	323,140	71,647	56,992
Other Operating Expense													
Merchandising and Jobbing - Labor	13	18,503	3,949	1,034	892	278	266	6,787	973	749	2,535	566	479
Merchandising and Jobbing - Misc	13	41,225	8,797	2,304	1,987	618	594	15,121	2,168	1,670	5,648	1,261	1,068
Other Non-operating Expense	13	-	0	0	0	0	0	0	0	0	0	0	0
Total Other Operating Expense		59,728	12,746	3,339	2,879	896	860	21,908	3,142	2,419	8,183	1,828	1,547
Total Operation and Maintenance		5,210,095	1,049,524	287,496	266,371	63,876	60,523	1,885,255	284,264	233,561	829,277	136,905	113,424

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022

ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE-BOROUGH RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	OUTSIDE-BOROUGH INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
Depreciation Expense													
Collecting and Impounding Reservoirs - Imp	1	331,302	57,415	20,309	25,510	398	298	99,059	19,580	20,872	86,536	828	497
Springs and Wells	2	11,035	2,174	675	769	9	7	3,754	651	629	2,339	18	10
Collecting and Impounding Reservoirs - Coll	1	36,203	6,274	2,219	2,788	43	33	10,825	2,140	2,281	9,456	91	54
Aqueducts and Supply Mains	2	287,581	56,653	17,600	20,044	230	173	97,835	16,967	16,392	60,967	460	259
Sedimentation Basins	2	19,760	3,893	1,209	1,377	16	12	6,722	1,166	1,126	4,189	32	18
Filters	2	230,193	45,348	14,088	16,044	184	138	78,312	13,581	13,121	48,801	368	207
Clear Water Basin & Clearwell	2	25,178	4,960	1,541	1,755	20	15	8,566	1,486	1,435	5,338	40	23
Chemical Treatment Plant	2	411,660	81,097	25,194	28,693	329	247	140,047	24,288	23,465	87,272	659	370
Parr's Hill Chlorination Facility	2A	5,106	0	0	0	0	0	2,604	450	432	1,601	12	7
Laboratory Equipment	2	1,019	201	62	71	1	1	347	60	58	216	2	1
Structures and Improvements - Pumping	3	13,687	2,444	758	864	272	193	4,217	732	708	2,627	541	331
Parr's Hill Booster Station	3A	24,142	0	0	0	0	0	11,156	1,927	1,854	6,851	1,458	896
Kidd Lane Pump Station	3A	368	0	0	0	0	0	170	29	28	104	22	14
Slagle Run Pump Station	3	1,646	294	91	104	33	23	507	88	85	316	65	40
Pumps and Pumping Equipment	3	70,356	12,566	3,898	4,439	1,400	992	21,677	3,764	3,637	13,501	2,779	1,703
Electrical Equipment	3	75,451	13,476	4,180	4,761	1,501	1,064	23,246	4,037	3,901	14,479	2,980	1,826
Other Pump Station Equipment	3	699	125	39	44	14	10	215	37	36	134	28	17
Transmission Mains	3	35,658	6,369	1,975	2,250	710	503	10,986	1,908	1,844	6,843	1,408	863
Distribution Reservoirs and Standpipes	5	35,161	7,176	2,036	1,916	457	331	12,422	1,958	1,568	5,830	904	563
Distribution Mains	6	136,474	19,452	5,430	4,947	8,190	5,802	37,154	5,754	4,466	16,381	17,882	11,016
Services	9	32,364	10,522	1,236	133	524	0	18,043	926	184	16	780	0
Meters	8	81,809	24,428	6,316	2,487	0	0	40,291	5,768	2,160	360	0	0
Hydrants	7	450	0	0	0	0	165	0	0	0	0	0	285
Structures and Improvements - General	13	12,475	2,662	697	601	187	180	4,576	656	505	1,709	382	323
General Office Equipment	13	3,509	749	196	169	53	51	1,287	185	142	481	107	91
Other General Equipment	13	179,339	38,271	10,025	8,644	2,690	2,582	65,782	9,433	7,263	24,569	5,488	4,645
Depreciation Expense		2,062,625	396,548	119,775	128,412	17,262	12,818	699,799	117,570	108,193	400,917	37,333	24,058
Taxes Other Than Income - Social Security	14	3,325	716	188	160	49	45	1,229	177	134	448	99	81
Taxes Other Than Income - Payment in Lieu	15	161,837	30,037	8,998	9,613	2,492	1,764	53,164	8,853	8,092	30,150	5,357	3,301
Utility Operating Income Available for Return - Inside	16A	218,172	123,987	37,111	39,511	10,254	7,287	0	0	0	0	0	0
Utility Operating Income Available for Return - Outside	16B	2,260,092	0	0	0	0	0	1,105,185	183,746	167,473	623,785	110,971	68,707
TOTAL COST OF SERVICE		9,916,147	1,600,812	453,567	444,067	93,933	82,437	3,744,632	594,608	517,453	1,884,578	290,665	209,571
LESS: OTHER WATER REVENUES													####### 31.2% #######
PENALTIES	17	19,867	3,018	852	828	171	153	7,675	1,220	1,061	3,868	596	429
RENTS	17	96,927	14,723	4,168	4,042	834	746	37,443	5,951	5,176	18,872	2,908	2,094
MISCELLANEOUS REVENUE	17	16,566	2,516	711	691	142	128	6,399	1,017	885	3,225	497	358
RETIREES REIMBURSEMENT	14	46,151	9,936	2,608	2,215	674	628	17,057	2,451	1,864	6,212	1,380	1,131
UNMETERED SALES	17	41,964	6,374	1,800	1,750	361	323	16,211	2,577	2,241	8,170	1,259	906
MERCHANDISING AND JOBBING	17	123,650	18,782	5,305	5,156	1,063	952	47,766	7,592	6,603	24,075	3,710	2,671
TOTAL OTHER WATER REVENUES		345,125	55,350	15,434	14,682	3,245	2,930	132,551	20,808	17,830	64,422	10,349	7,589
REALLOCATION OF PUBLIC FIRE - OUTSIDE	19							58,226	8,341	3,124	520	-	(70,211)
REALLOCATION OF PUBLIC FIRE - INSIDE	20		70,348	8,269	890	-	(79,507)						
TOTAL COST OF SERVICE RELATED TO SALES OF WATER		9,571,021	1,615,810	446,402	430,275	90,688	0	3,670,306	582,142	502,748	1,820,675	280,316	131,772

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility Commission :
              :
     v.   : Docket No. R-2021-3026116
              :
The Borough of Hanover --   :
Hanover Municipal Waterworks :

VERIFICATION

I, Jerome D. Mierzwa, hereby state that the facts set forth in my Direct Testimony, OCA

Statement 3, are true and correct (or are true and correct to the best of my knowledge,

information, and belief) and that I expect to be able to prove the same at a hearing held in this

matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. §

4904 (relating to unsworn falsification to authorities).

DATED: September 30, 2021   Signature: _____
*317998   Jerome D. Mierzwa

        Consultant Address: Exeter Associates, Inc.
                10480 Little Patuxent Parkway
                Suite 300
                Columbia, MD 21044-3575

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	: : : :	
v.	: : :	Docket No. R-2021-3026116
BOROUGH OF HANOVER – WATER	:	

DIRECT TESTIMONY

OF

TERRY L. FOUGHT

ON BEHALF OF

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

SEPTEMBER 30, 2021

INTRODUCTION

Q. **PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.**

A. Terry L. Fought, 780 Cardinal Drive, Harrisburg, Pennsylvania, 17111.

Q **BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

A. I am a self-employed consulting engineer retained by the Office of Consumer Advocate (OCA) for the purposes of providing testimony in this proceeding.

Q. **PLEASE DESCRIBE YOUR BACKGROUND AND QUALIFICATIONS.**

A. Appendix A, which is attached to this testimony, describes my educational background and applicable experience.

Q. **WHAT ISSUES HAVE YOU BEEN ASKED TO INVESTIGATE REGARDING THIS BOROUGH OF HANOVER – WATER (BOROUGH) RATE CASE?**

A. The OCA requested that I investigate issues related to the quality of service provided by the Borough.

Q. **WHAT DID YOUR INVESTIGATION CONSIST OF?**

A. My investigation included: (1) reviewing portions of the Borough's filing applicable to Quality of Service; (2) reviewing the direct testimony of Edward J. Boscola, Borough of Hanover Statement No. 1; (3) reviewing the Borough's responses to OCA and I&E interrogatories regarding quality of service issues; and (4) an inspection of some of the Borough's facilities on September 16, 2021. A public

1   input hearing (PIH) is scheduled for October 14, 2021. I will respond to any

2   information provided at the PIH about quality of service in subsequent testimony.

3

4   **Q.   BRIEFLY DESCRIBE THE BOROUGH'S WATER SYSTEM.**

5   A.   Hanover Borough provides water service to approximately 7,011 customers in

6   Hanover Borough and 10,969 customers in the PUC-jurisdictional areas of

7   McSherrystown Borough and Conewago Township in Adams County and

8   Heidelberg and Penn Townships in York County.[1]

9   The Borough's primary water supply sources are reservoirs formed by

10   Sheppard Myers Dam and the Lawrence Baker Sheppard Myers Dam on

11   tributaries to Conewago Creek. A secondary source is provided by the Slagle Run

12   Intake and Pump Station when an adjacent quarry is in operation.[2]

13   Treated water from the Borough's Water Treatment is pumped into the

14   distribution system via high service pump station located at the Treatment Plant.[3]

15   The Water Treatment Plant has a permitted capacity of 11.6 million gallons per

16   day (MGD).[4]

17   The Borough's distribution system contains 88,992 feet of transmission

18   mains and approximately 205 miles of distribution mains, four distribution storage

19   facilities McSherrystown Tower (250,000 gallons), Terrace Tank (500,000

20   gallons), and two Parr's Hill Reservoirs (total of 13,020,000 gallons) with floating

21   covers. The Parr's Hill Pumping Station increases pressure to the southeast

---

[1] 2020 Chapter 110 Report submitted to PADEP.
[2] Borough of Hanover – Hanover Municipal Water Works Long Term Infrastructure Improvement Plan, p. 1.
[3] Ibid.
[4] PA DEP Public Water Supply Permit NO. 0115512, April 6, 2018.

1   section of the distribution system and the Kidd Lane Pumping Station is on standby

2   to increase pressures on Young's Road in Penn Township near Kidd Lane.[5]

3

4   **Q.   WHAT QUALITY OF SERVICE ITEMS IS YOUR TESTIMONY GOING TO**

5   **ADDRESS?**

6   A.   My testimony is going to address three items: (1) isolation valves, (2) fire hydrants

7   and (3) customer complaints.

8

9   **ISOLATION VALVES**

10   **Q.   WHAT ARE ISOLATION VALVES?**

11   A.   Isolation valves are installed on water mains so that the water can be shut off in

12   sections of the distribution system in case of a water main break or for main repairs

13   and replacements. Isolation valves are also used to separate different pressure

14   zones.

15

16   **Q.   WHY IS IT IMPORTANT TO EXERCISE ISOLATION VALVES?**

17   A.   It is important to exercise isolation valves to prevent the valves from seizing up

18   and getting stuck from corrosion or other deposits adjacent to the valve. An

19   isolation valve that cannot be fully closed will increase the water loss during a water

20   main break and increase the number of customers affected.

21

22   **Q.   WHAT HAPPENS IF AN ISOLATION VALVE BECOMES INOPERABLE DUE TO**

23   **LACK OF BEING EXERCISED?**

---

[5] Borough of Hanover Statement No. 1, pp. 6-7.

1   A.   The valve either has to be repaired or replaced. Isolation valves are generally in

2   pavement and that makes it very expensive to repair or replace. Even repairing

3   the valve requires that the valve be exposed so that interior parts can be removed

4   and replaced.

5

6   **Q.   WHAT DOES IT MEAN TO EXERCISE ISOLATION VALVES?**

7   A.   Exercising an isolation valve is operating the valve through complete full

8   open/close cycles until it operates with little resistance. This requires some effort

9   even for a well-maintained valve because the number of turns to fully open or close

10   an isolation valve can vary from 12 turns for a 3-inch valve to 38 turns for a 12-

11   inch valve.

12

13   **Q.   HOW OFTEN SHOULD AN ISOLATION VALVE BE EXERCISED?**

14   A.   According to The National Environmental Services Center at West Virginia

15   University, experts recommend exercising the valves annually, if possible, or at

16   least once every two years.[6]

17   According to American Water Works Association (AWWA), "[e]ach valve should

18   be operated through a full cycle and returned to its normal position on a schedule

19   that is designed to prevent a buildup of tuberculation [rust formation in pipes as a

20   result of corrosion] or other deposits that could render the valve inoperable or

21   prevent a tight shutoff. The interval of time between operations of valves in critical

22   locations or valves subjected to severe operating conditions should be shorter than

---

[6] Tech Brief, Valve Exercising, 2007, Vol. 7, Issue 2, The National Environmental Services Center of West Virginia University, Morgantown, WV.

1		for other less important installations but can be whatever time period is found to
2		be satisfactory based on local experience."[7]
3		
4	**Q.**	**WHAT INFORMATION DID THE BOROUGH PROVIDE REGARDING**
5		**EXERCISING ISOLATION VALVES?**
6	A.	In response to OCA-III-35 and 36, the Borough indicates that (1) there are 2,047
7		isolation valves in the jurisdictional areas and (2) it has only exercised 283 of these
8		valves during the past five years. See Exhibit TLF-1.
9		
10	**Q.**	**DID ANY TERMS OF THE SETTLEMENT OF THE BOROUGH'S LAST RATE**
11		**CASE ADDRESS ISOLATION VALVES?**
12	A.	Yes. The Settlement of the 2014 rate case stated "Hanover also agrees that it will
13		develop an exercising and replacement schedule and tabulate information on its
14		isolation valves as follows:

<div style="margin-left: 2em;">

15   The Borough will operate all transmission and main line
16   valves starting with the largest lines first. The Borough will
17   keep record of the size and location of the valve, when the
18   valve was installed, date the valve is turned, number of turns
19   it takes to open and close the valve, and any problems
20   incurred in operating the valve. Non-operational valves will
21   be replaced as needed."[8]

</div>

22		
23	**Q.**	**WHAT IS YOUR RECOMMENDATION CONCERNING BOROUGH'S**
24		**MAINTENANCE OF ISOLATION VALVES?**

---

[7] American Water Works Association, 1996, Manual of Water Supply Practices, Denver: AWWA.
[8] Docket No. R-2014-2428304, Settlement paragraph 11.e.

A. The Borough has a responsibility to properly maintain all of its water facilities, including exercising isolation valves on a routine basis. I recommend that the Borough exercise (or attempt to exercise) approximately 400 different isolation valves per year in the PUC-jurisdictional areas until all the valves have been exercised in a 5-year period. Upon completion of this procedure, the Borough should be able to develop a reasonable schedule going forward for exercising its isolation valves.

While it is exercising its isolation valves, if there are isolation valves that are found to be inoperable, they should be repaired. If they are not repaired at the time they are identified, then the Borough should submit a schedule to the OCA and other parties by April 15 of each year for replacing or repairing those isolation valves that could not be properly exercised.

Also, as part of its next rate case filing, the Borough should furnish the OCA and other parties a copy of its exercising records from 2022 forward. The records should include all of the information that the Borough agreed to in the 2014 Settlement: "the size and location of the valve, when the valve was installed, date the valve is turned, number of turns it takes to open and close the valve, and any problems incurred in operating the valve."

FIRE HYDRANTS

Q. **HOW MANY FIRE HYDRANTS ARE LOCATED IN THE BOROUGH'S JURISDICTIONAL AREAS?**

1   A.   According to the Borough's response to OCA-III-22 and 24, there are 476 public

2   fire hydrants in the jurisdictional areas. Sixteen of these hydrants cannot provide

3   the minimum fire flow of 500 gallons per minute at 20 pounds per square inch. See

4   Exhibit TLF-2.

5   The 16 fire hydrants that cannot provide the minimum fire flow should be marked

6   as such so that they will only be used for flushing and blow-offs.

7

8   **CUSTOMER COMPLAINTS**

9   **Q.   WHAT ARE THE PUC'S REQUIREMENTS FOR CUSTOMER COMPLAINTS?**

10 A.   According to 52 Pa. Code § 65.3. Complaints.

11   (a) *Investigations.* A public utility shall make a full and prompt investigation of
12   complaints made by the Commission or by others, including customers,
13   relating to service or facilities.
14   (b) *Records of complaints.* A public utility shall preserve for a period of at least 5
15   years, written service complaints showing the name and address of the
16   complainant, the date and character of the complaint and the final
17   disposition of the complaint.
18
19

20 **Q.   WHAT INFORMATION HAVE YOU BEEN PROVIDED BY THE BOROUGH**

21   **REGARDING CUSTOMER COMPLAINTS?**

22 A.   In response to OCA-III-16, the Borough submitted (1) a Complaint Log for the

23   period of January 1, 2018 through February 23, 2021 that contained 114

24   complaints concerning 123 items regarding the water system and (2) a blank 2-

25   page new template for recording future complaints. In the Filing, Exhibit D IX-4,

26   the Borough submitted a portion of its Customer Complaint Log and Laboratory

27   Test Results regarding some additional complaints. See Exhibit TLF-3 for an

1   excerpt from one page of the Complaint Log[9] with customer-identifying information

2   redacted and the blank new template.

3

4 **Q.   PLEASE DISCUSS YOUR REVIEW OF THE COMPLAINT LOG.**

5 A.   The Complaint Log registered complaints from both Borough and Jurisdictional

6   customers. The Log contained 56% [66÷123] complaints regarding cloudy, rusty,

7   dirty, or discolored water; 29% [36÷123] regarding stained laundry and plumbing

8   fixtures; 15% [16÷123] regarding taste and odor; with the remaining 2% concerning

9   two requests for testing the water and one damaged hair complaint.

10

11 **Q.   WHAT SHOULD THE BOROUGH DO TO REDUCE THE NUMBER OF**

12   **COMPLAINTS?**

13 A.   In order to reduce the number of rusty water and stained laundry complaints, the

14   Borough should continue to: (1) line or replace the unlined cast-iron pipe that is

15   causing the rusty water problems; (2) flush the distribution system at least twice

16   annually; and (3) provide Red-B-Gone to its customers as needed. The number

17   of complaints regarding cloudy, dirty, or discolored water complaints during a

18   three-year period is not unreasonable for a system with 17,000 customers.

19

20 **Q.   PLEASE DISCUSS YOUR REVIEW OF THE LABORATORY TEST RESULTS.**

21 A.   All ten of Laboratory Tests Results that were provided indicated that the Borough

22   water was within acceptable limits. There was one case where Borough's water

---

[9] I summarize the information in the complete Complaint Log below without including any customer-identifying
information.

1   was within acceptable limits, but the customer's purification system reduced the

2   chlorine below acceptable limits and raised the pH above the acceptable limits.

3

4   **Q.   DO YOU HAVE ANY RECOMMENDATIONS CONCERNING THE WAY THE**

5   **BOROUGH SUBMITTED CUSTOMER COMPLAINTS?**

6   A.   Yes. The Borough should submit a single complaint log that satisfies 52 Pa. Code

7   § 65.3. Complaints in a live Excel format. If the complaint log includes both

8   Borough and jurisdictional customers, it should note which type of customer made

9   the complaint. I suggest that the following categories be included so that the data

10   can be sorted: date; location; dirty water; rusty water; water taste, odor, or color;

11   staining (of laundry or plumbing fixtures); request for water testing; customer

12   property damage; incomplete surface restoration; and health issues.   The log

13   should include the final disposition of the complaint.

14

15   **Q.   DOES THIS COMPLETE YOUR WRITTEN DIRECT TESTIMONY?**

16   A.   Yes, at this time. I reserve the right to supplement this testimony either in writing

17   or orally if additional relevant information is received.

BACKGROUND AND QUALIFICATIONS

TERRY L. FOUGHT, P.E.

<u>Education</u>

Cleveland State University, Cleveland, Ohio, Bachelor of Civil Engineering, 1967

<u>Professional Registrations</u>

Professional Engineer, Pennsylvania, PE-023343-E, 1975

Professional Engineer, New Jersey, GE 25392, 1978 (Inactive)

Professional Engineer, Virginia, 10850, 1979 (Inactive)

Professional Land Surveyor, Pennsylvania, SU-000194-A, 1980 (Inactive)

<u>Employment</u>

From March 1983 to date, I have been a self-employed consulting engineer engaged in providing consulting engineering services to water and wastewater utilities, both private and municipal.

From May 1969 to March 1983, I was employed be E. H. Bourquard & Associates, Inc. as a project engineer to water and wastewater clients. At the time I left the firm I was a vice-president.

From 1962 to 1969, I was employed by the State of Ohio, Department of Highways and the Geauga County Ohio Sanitary Engineers Office as an engineer's assistant to assistant sanitary engineer with breaks in employment to attend college and 1½ years active duty military service.

<u>Experience</u>

I have prepared studies related to and designed water supply, treatment, transmission, distribution and storage facilities. I have provided services to the following private and municipal water suppliers: Amber Hill Mobile Home Park, Brockway Borough Municipal Authority, Dallas Water Company, Eastern Gas and Water Investment Company, Haddonfield Hills Development, Halifax Borough, Langhorne Spring Water Company, Mifflintown Municipal Authority, Neshaminy Water Resources Authority, Newberry Water Company, Pleasant View Mobil Home Park, H. B. Reese Candy Company, Shavertown Water Company, Smethport Water Company, Tunkhannock Water Company, and Watts Business Center.

I have prepared studies related to and designed wastewater collection and interceptor sewers, pumping stations and force mains, and treatment plants. I have provided services to the following private and municipal sewerage utilities: Brockway Glass Company, Central Dauphin School District, Clean Waste Technologies, Inc., Dauphin Borough, Dauphin Borough Municipal Authority, Halifax Area School District, Halifax Municipal Authority, Mercersburg Borough, Middle Paxton Township, Newberry Sewer Company, Newberry Township Municipal Authority, Park-a-way Park Family Campground, Reading Township Municipal Authority, Reynoldsville Borough, Saint Thomas Township, and Watts Business Center.

I have prepared over 100 stormwater management and drainage plans for land development and subdivision plans in Cumberland, Dauphin, and York Counties. Most of these plans included the design of storm sewer collection systems.

List of Public Utility cases which I have testified or provided substantial assistance:

NEW JERSEY BUREAU OF PUBLIC UTILITIES

Docket Number	Company Name
7712-1140	City of Trenton
787-847	Hackensack Water Company
814-119	City of Trenton
8310-862	City of Trenton

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Docket Number	Company Name
C-2010-2175673	Pennsylvania-American Water Company
C-2011-2259004	Endsley v PAWC
C-2012-2332951	Tschachler v UGI
C-2014-2447138	Hidden Valley Utility Services - Water
C-2014-2447169	Hidden Valley Utility Services - Wastewater
C-2018-2644592	Winola Water Company
C-2020-3022354	McKercher v Borough of Hanover (Water)
F-2011-2280415	Lynette Lugo Lopez v PGW
F-2012-2311590	Belinda Lyles v Aqua
F-2012-2330753	Scott v PGW
I-840377	Pennsylvania Gas and Water Company
I-00050109	PAWC High Fluoride Incident
I-00072313	WP Water & Sewer Co.
I-2009-2109324	Clean Treatment Sewer Company
I-2016-2526085	Delaware Sewer Company
P-2008-2075142	Pennsylvania-American Water Company
P-2014-2404341	Delaware Sewer Company
P-2017-2584953	Aqua Pennsylvania, Inc.
P-2017-2594725	Newtown Artesian Water Company
P-2017-2585707	Pennsylvania-American Water Company
P-2017-2589724	Suez Water Pennsylvania, Inc.
P-2020-3020914	Twin Lakes Utilities, Inc.
R-00850174	Philadelphia Suburban Water Company
R-00932785	Meadows Water Company
R-00963708 (Sewer)	Wynnewood Water & Sewer Corporation
R-00963709 (Water)	Wynnewood Water & Sewer Corporation
R-00984257	Consumers Pa. Water Company
R-00984334	National Utilities, Inc.
R-00984375	City of Bethlehem
R-00994672	Superior Water Company
R-00005031	Penn Estates Utilities, Inc.
R-00005050	Emporium Water Company
R-00005212 (Sewer)	Pennsylvania-American Water Company
R-00005997	Jackson Sewer Corporation
R-00027982 (Sewer)	Pennsylvania-American Water Company
R-00049862	City of Lancaster – Sewer Fund
R-00050607	Glendale Yearound Sewer Co.
R-00050659	Wonderview Water Co.
R-00050673	Pocono Water Co.
R-00050678	Mesco, Inc.

PENNSYLVANIA PUBLIC UTILITY COMMISSION (Continued)

Docket Number	Company Name
R-00050814	Marietta Gravity Water Co.
R-00051030	Aqua Pennsylvania, Inc.
R-00051167	City of Lancaster – Water Fund
R-00061297	Emporium Water Co.
R-00061492	Reynolds Disposal Co.
R-00061496	Columbia Water Co.
R-00061617	Allied Utilities Services
R-00061618	Imperial Point Water Co.
R-00061625	Phoenixville Sewer Fund
R-00061645	Eaton Water Co.
R-00062017	Borough of Ambler Water Department
R-00072074 (Sewer)	Aqua PA, Little Washington Division
R-00072075 (Sewer)	Aqua PA, Chesterdale/Williamstown Division
R-00072351	Village Water Company
R-00072491	Clarendon Water Company
R-00072492	City of Bethlehem, Bureau of Water
R-00072493 (Water)	Total Environmental Solutions, Inc., Treasure Lake
R-00072711	Aqua PA
R-2008-2020729	Blue Knob Water Company
R-2008-2020873	Warwick Drainage Company
R-2008-2020885	Warwick Water Works, Inc.
R-2008-2032689	PAWC Coatesville Wastewater Operations
R-2008-2039261	Superior Water Company
R-2008-2045157	Columbia Water Company
R-2008-2047291	Rock Spring Water Company
R-2008-2079310	AQUA, PA
R-2008-2081738	Little Washington Wastewater Company
R-09-2097323	Pennsylvania-American Water Company
R-2009-2102464	Reynoldsville Water Company
R-2009-2103937	PA Utility Company, Inc (Water)
R-2009-2103980	PA Utility Company, Inc (Sewer)
R-2009-2105601	Fryburg Water Company
R-2009-2110093	Birch Acres Water Company
R-2009-2115743	Lake Spangerberg Water Company
R-2009-2116908	Hanover Borough Water
R-2009-2117289	Utilities Inc, Westgate (Water)
R-2009-2117532	Penn Estates Utilities Inc (Water)
R-2009-2117750	Newtown Artesian Water Company
R-2009-2121928	Clean Treatment Sewage Company
R-2009-2122887	United Water Pennsylvania, Inc
R-2009-2132019	AQUA, PA
R-2010-2157062	Tri-Valley Water Supply Company, Inc
R-2010-2166208	Pennsylvania American Water Company (Wastewater)
R-2010-2171339	Reynolds Disposal Company
R-2010-2171918	TESI, Treasure Lake, Water Division
R-2010-2171924	TESI, Treasure Lake, Sewer Division
R-2010-2174643	City of Lock Haven
R-2010-2179103	City of Lancaster Water Department
R-2010-2191376	Superior Water Company
R-2010-2194499	Dear Haven Water Company
R-2010-2194577	Dear Haven Sewer Company

PENNSYLVANIA PUBLIC UTILITY COMMISSION (Continued)

Docket Number	Company Name
R-2010-2207833	Little Washington Waste Water, Masthope Division
R-2010-2207853	Little Washington Waste Water, SE Consolidated Division
R-2011-2218562	CMV Sewage Company, Inc.
R-2011-2232243	Pennsylvania-American Water Company
R-2011-2232985	United Water Company
R-2011-2244756	City of Bethlehem- Bureau of Water
R-2011-2246415	Twin Lakes Utilities, Inc.
R-2011-2248531	Wonderview Sanitary Facilities
R-2011-2248937	Fairview Sanitation Company
R-2011-2251181	Borough of Quakertown, Water
R-2011-2255159	Penn Estates Utility Inc - Water
R-2012-2286118	Audubon Water Company
R-2012-2330887	North Heidelberg Sewer Company
R-2012-2310366	City of Lancaster Sewer Fund
R-2012-2311725	Borough of Hanover - Sewer
R-2012-2315536	Imperial Point Water Company
R-2012-2336662	Rock Springs Water Company
R-2013-2350509	City of DuBois, Bureau of Water
R-2013-2355276	Pennsylvania-American Water Company
R-2013-2360798	Columbia Water Company
R-2013-2370455	Penn Estates Utilities, Inc. - Sewer Division
R-2013-2367108	Fryburg Water Company
R-2013-2367125	Cooperstown Water Company
R-2013-2390244	City of Bethlehem – Bureau of Water
R-2014-2400003	Borough of Ambler – Water Department
R-2014-2420204	Pocono Waterworks Company, Inc. (Water)
R-2014-2420211	Pocono Waterworks Company, Inc. (Sewer)
R-2014-2402324	Emporium Water Company
R-2014-2430945	Plumer Water Company
R-2014-2428304	Borough of Hanover Water Department
R-2014-2410003	City of Lancaster-Bureau of Water
R-2014-2427035	Venango Water Company
R-2014-2427189	B E Rhodes Sewer Company
R-2014-2447138	Hidden Valley Utilities Services - Water
R-2014-2447169	Hidden Valley Utilities Services – Sewer
R-2014-2452705	Delaware Sewer Company
R-2015-2462723	United Water Pennsylvania
R-2015-2470184	Borough of Schuylkill Haven Water Department
R-2015-2479962	Corner Water Supply
R-2015-2506337	Twin Lakes Utilities, Inc.
R-2016-2538600	Community Utilities of Pennsylvania, Inc.
R-2016-2554150	City of DuBois – Bureau of Water
R-2017-2595853	Pennsylvania-American Water Company
R-2017-2598203	Columbia Water Company
R-2017-2631441	Reynolds Water Company
R-2018-3000022	York Water Company
R-2018-3000834	Suez Water Company
R-2018-3002645 (Water)	Pittsburgh Water & Sewer Authority
R-2018-3002647 (Sewer)	Pittsburgh Water & Sewer Authority
R-2018-3001306 (Water)	Hidden Valley Utility Services
R-2018-3001307 (Sewer)	Hidden Valley Utility Services

PENNSYLVANIA PUBLIC UTILITY COMMISSION (Continued)

R-2019-3008947 (Water)	Community Utilities of PA
R-2019-3008948 (Sewer)	Community Utilities of PA
R-2020-3017951 (Water)	Pittsburgh Water & Sewer Authority
R-2020-3017970 (Sewer)	Pittsburgh Water & Sewer Authority
R-2020-3019369	Pennsylvania American Water Company
R-2020-3019612	Reynolds Disposal Company
R-2020-3020256	City of Bethlehem -Water
R-2020-3020917	Audubon Water Company
R-2021-3024773 (Water)	Pittsburgh Water & Sewer Authority
R-2020-3024779 (Sewer)	Pittsburgh Water & Sewer Authority
R-2021-3025206 (Water)	Community Utilities of PA
R-2021-3025207 (Sewer)	Community Utilities of PA

OCA Exhibit TLF-1

Hanover Response to OCA-III-35 and 36

Isolation Valves

Pennsylvania Public Utility Commission
v. The Borough of Hanover –
Hanover Municipal Waterworks

Docket No. R-2021-3026116

Interrogatories of the Office of Consumer Advocate
Set III

Witness: M. Mehaffey

35.   In the jurisdictional areas, how many isolation valves are in the distribution system?

Response:

Per the Borough's GIS model, there are 2,047 isolation valves found in the jurisdictional area.

**Pennsylvania Public Utility Commission
v. The Borough of Hanover –
Hanover Municipal Waterworks**

Docket No. R-2021-3026116

**Interrogatories of the Office of Consumer Advocate
Set III**

Witness: M. Mehaffey

36. In the jurisdictional areas, identify the location of every isolation valves that has not been exercised during the past five years.

Response:

The Borough does not have a map that tracks this information by location. See 'OCA III-36 Attachment' for a summary of the isolation valves that have been exercised during the past 5 years, including inside and outside-Borough service areas. Out of the 2,047 isolation valves in jurisdictional areas, 283 isolation valves have been exercised in the last 5 years. Therefore, 1,765 isolation valves in the jurisdictional areas have not been exercised in the past 5 years. See chart below.

Year	Number of Valves Exercised (See OCA III-36 Attachment)
2016	46
2017	24
2018	21
2019	51
2020	117
2021	24
Total	283

**Pennsylvania Public Utility Commission
v. The Borough of Hanover –
Hanover Municipal Waterworks**

Docket No. R-2021-3026116

**Interrogatories of the Office of Consumer Advocate
Set III**

Witness: M. Mehaffey

22.   How many public fire hydrants are located within that part of the distribution system serving jurisdictional customers?

Response:

There are 476 public fire hydrants located within that part of the distribution system serving jurisdictional customers.

**Pennsylvania Public Utility Commission
v. The Borough of Hanover –
Hanover Municipal Waterworks**

Docket No. R-2021-3026116

**Interrogatories of the Office of Consumer Advocate
Set III**

Witness: M. Mehaffey

24.   How many public fire hydrants in that part of the distribution system serving jurisdictional customers have a fire flow of less than 500 gallons per minute at 20 pounds per square inch?

Response:

There are sixteen public hydrants outside the Borough in McSherrystown, Penn Twp. and Conewago Twp., based on our GIS model, that have a fire flow of less than 500 gallons per minute at 20 pounds per square inch.

**Pennsylvania Public Utility Commission
v. The Borough of Hanover –
Hanover Municipal Waterworks**

Docket No. R-2021-3026116

**Interrogatories of the Office of Consumer Advocate
Set III**

Witness: M. Mehaffey

16.   Please provide in a live Excel spreadsheet a record of all jurisdictional customer complaints (excluding Formal and Informal Complaints filed with the Public Utility commission) regarding the water system for the calendar years 2018, 2019, 2020 and 2021 to date. The response should identify the date of the complaint, the location of the complaint, the nature of the complaint and the action taken by the Borough in response to the complaint.

RESPONSE:

See 'OCA III-16 Attachment A' of PDF scanned documents of the complaint log for inside-Borough and outside-Borough serviced customers from 2018 through 2021 to date. The Borough currently does not maintain a master log electronically; however, based on request, the Borough will work to establish a summary electronic register to complement our documentation.

The Borough has recently evaluated the written documentation for complaints and built a new template to manage and document these instances -- see attached 'OCA III-16 Attachment B'.

Date: 2-11-2020	**Complaint:** Said around the beginning of every month he has brown water
Name: ███████████	
Address: ███ Sherwood St	
	Action Taken: Called Tom
Phone #: ███████████	
Employee:	Work Order #: Completed:

Date: 4-6-2020	**Complaint:** dirty water
Name: ███████████	
Address: ███ York St	
	Action Taken: per Dale he told them to run the water
Phone #:	
Employee: gh	Work Order #: Completed:

Date: 5/4/20	**Complaint:** Dirty water. Sheets are stained
Name: ███████████	
Address: ███ Fulton St	
	Action Taken: Gave Red-B-Gone
Phone #: ███████████	
Employee: D.S.	Work Order #: Completed:

Date: 6/3/2020	**Complaint:** Really rusty water
Name: ███████████	
Address: ███ Locust Street	
	Action Taken: Contacted Dale – Stated may be possible it is from the draw of a hydrant
██ #: ███████████	
Employee: BC	Work Order #: Completed:

BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS
44 FREDERICK STREET   HANOVER, PA 17331   717-637-3877
AN EQUAL OPPORTUNITY BOROUGH

WATER SERVICE OR FACILITIES COMPLAINT INVESTIGATION

Investigation report to be prepared by individual first contacted regarding the complaint and coordinated with the Water Meter Department for water sample and Water Filtration Department for sample testing and report. Water Billing Clerk to receive all final prepared investigation documents and perform final communication with complainant.

INITIAL COMPLAINT DOCUMENTATION

Date of Complaint: _____

Name of Individual Submitting Complaint: _____

Address/Location Relative to Complaint:

_____

Telephone Number(s):   _____ (Home / Work)   _____ (Cell)

Email Address(es):   _____

Complainant's Desired Method of Communication for Final Results: _____

Nature of Complaint: ___   Odor (Characteristics*:   _____)

                              ___   Taste (Characteristics*:   _____)

                              ___   Color Concerns (Characteristics: _____)

                              ___   Damage to Personal Property (*Sampling not required: document resolve*)

                              ___   Other (_____)

> * *Examples of odor and taste characteristics: chlorine, medicinal, sulfur (eggs), rusty, metallic, musty, oily, solvent, after-taste, earthy, fish, paper, plastic, chemical, septic/sewer, grassy, and bitter*

Description of How Identified and Where? Isolated or Throughout Home? When First Noticed and Has It Continued?

_____

_____

(If Resolved Without Sampling Need) Documentation of Resolve, Date Resolved, and How Communicated

_____

Name of Borough Employee Taking Complaint: _____

\\HANBOR4\Data\Treasurer\Documents\ADMINISTRATIVE FILES\BORO DOCUMENTS AND TEMPLATES\BORO FORMS AND RETURNS\Water Service or Facility Complaint Investigations - 4-20-2021.docx

Page 1 of 2

BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS

44 FREDERICK STREET   HANOVER, PA 17331   717-637-3877

AN EQUAL OPPORTUNITY BOROUGH

WATER SAMPLE DOCUMENTATION - OBTAINING/TRANSPORTING SAMPLE

Water Sample Taken: _____ Date   _____ Time

Were the Conditions Noted on Page 1 Present at Sample: ___YES   ___NO

Was the Individual Submitting the Complaint Present at Time of Sample?:   ___YES   ___NO

Any Observations Noted at Time of Sample:

_____

_____

Water Sample Provided for Testing: _____ Date   _____ Time

          Name of Borough Employee(s) Collecting Sample: _____

WATER SAMPLE DOCUMENTATION - TEST RESULTS

Water Sample Received for Testing: _____ Date   _____ Time

          Name of Borough Employee(s) Receiving Sample: _____

          Attach copy of Water Filtration Department "Chemical and Physical Drinking Water Analysis Results"

FINAL CLOSURE OF COMPLAINT INCIDENT

Date Sample Result Received: _____

Date When Complainant Notified Regarding Results: _____

Method of Communication to Notify Complainant: ____   Email
                                                        ____   Mail
                                                        ____   Telephone Call (Number:_____)

   Name of Borough Employee Finalizing Complaint: _____

\\HANBOR4\Data\Treasurer\Documents\ADMINISTRATIVE FILES\BORO DOCUMENTS AND TEMPLATES\BORO FORMS AND RETURNS\Water Service or Facility
Complaint Investigations - 4-20-2021.docx

Page 2 of 2

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility Commission	:	
	:	
v.	:	Docket No. R-2021-3026116
	:	
The Borough of Hanover --	:	
Hanover Municipal Waterworks	:	

VERIFICATION

I, Terry L. Fought, hereby state that the facts set forth in my Direct Testimony, OCA Statement 4, are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: September 30, 2021   Signature: _____
*317999   Terry L. Fought
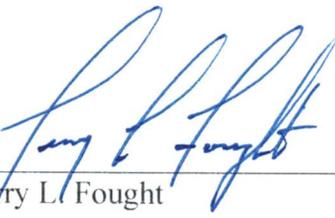
Consultant Address: 780 Cardinal Drive
                                   Harrisburg, PA 17111

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	)	
	)	
	)	
v.	)	**Docket No. R-2021-3026116**
	)	
THE BOROUGH OF HANOVER –	)	
MUNICIPAL WATERWORKS	)	

SURREBUTTAL TESTIMONY

OF

STACY L. SHERWOOD

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

October 29, 2021

EXETER

ASSOCIATES, INC.

I. **INTRODUCTION**

1

2   Q.   WOULD YOU PLEASE STATE YOUR NAME AND BUSINESS

3   ADDRESS?

4   A.   My name is Stacy L. Sherwood. I am serving as a subcontractor to Exeter Associates,

5   Inc. ("Exeter"). Their offices are located at 10480 Little Patuxent Parkway, Suite 300,

6   Columbia, Maryland 21044. Exeter is a firm of consulting economists specializing in

7   issues pertaining to public utilities.

8   Q.   HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN THIS

9   PROCEEDING?

10 A.   Yes. I previously submitted direct testimony on behalf of the Pennsylvania Office of

11   Consumer Advocate ("OCA"). My qualifications and experience are set forth in that

12   testimony.

13 Q.   WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

14 A.   The purpose of my surrebuttal testimony is to correct an error identified in my direct

15   testimony schedules and respond to certain arguments presented in the rebuttal

16   testimony submitted by Borough Witness Gregory R. Herbert related to my direct

17   testimony filed in this case.

18 Q.   PLEASE DISCUSS THE OCA'S REVISED POSITION FOR THIS CASE.

19 A.   As stated below in this testimony, the Borough accepted some of my adjustments and

20   I have provided my detailed objections or recommendations to counter the Borough's

21   rebuttal testimony. As a result of the recommendations outlined in this testimony,

22   accompanied by the recommendations of the other OCA witnesses, my revised

23   position is to recommend that the overall revenue requirement increase be $1,077,534.

24   My surrebuttal position is reflected in Schedule SLS-1SR. In addition, I have included

1   Schedules SLS-2SR and SLS-11SR to reflect changes as a result of these corrections

2   from the direct testimony schedules.

3   II. **<u>SCHEDULE CORRECTION</u>**

4 Q.   DO YOU HAVE ANY CORRECTIONS TO YOUR DIRECT TESTIMONY

5   SCHEDULES?

6 A.   Yes. After reviewing Schedule SLS-1, I noted that the dollar amount on line no. 1

7   labeled "Outside-Borough Revenue Per Hanover" is incorrect. The correct value

8   should have been $5,659,214. Additionally, I agree with the correction noted in

9   Witness Herbert's rebuttal testimony regarding cash working capital ("CWC"). When

10   these two inadvertent errors are corrected, my direct testimony position regarding the

11   revenue increase decreases from $1,201,216 to $1,092,825.

12

13   III. **<u>ACCEPTED ADJUSTMENTS</u>**

14 Q.   DID HANOVER ACCEPT ANY OF YOUR RECOMMENDED

15   ADJUSTMENTS?

16   Yes. Witness Herbert accepted the following adjustments:
17   • Amortize PA PUC Fees expense;
18   • Remove engineering expenses occurred in 2019; and,
19   • Amortize bond issuance expenses.

20   It should be noted that although Witness Herbert agreed with my amortization

21   of the PA PUC Fees expense, he did not agree with the number of years over which the

22   expense should be amortized. Witness Herbert supports amortizing the PA PUC Fees

23   expense over three years instead of four years, which corresponds with his position on

24   the period to normalize rate case expenses.

1   Q.   DO YOU AGREE WITH WITNESS HERBERT'S USE OF THREE

2   YEARS FOR THE AMORTIZATION RATE?

3   A.   No, I do not. I maintain the use of a four-year amortization period, as discussed further

4   in the next section of this testimony.

5   Q.   WERE THERE ANY ADJUSTMENTS THAT WITNESS HERBERT

6   ACCEPTED FROM OTHER PARTIES?

7   A.   Yes. Witness Herbert corrected an error, noted by I&E, made under revenue

8   adjustment R-9 which added $12,344 to revenue. Additionally, Witness Herbert

9   accepted I&E's recommendation and made an adjustment of $4,280 to late payment

10   revenue to properly reflect the amount of the proposed rate increase. I have also made

11   this adjustment, but to reflect my recommended level of revenue increase based on my

12   surrebuttal position. My recommended adjustment to late payment revenue is $2,947,

13   determined by using the same methodology outlined in I&E Witness Sakaya's direct

14   testimony.[1] The level of late payment revenue plus the adjustment for R-9 results in

15   an increase in revenue of $15,291 ($12,344 + $2,947) and is included on Line No. 1

16   under Outside-Borough Allocation on Schedule SLS-1SR.

17

18   **IV. RATE CASE EXPENSE**

19 Q.   DID HANOVER ACCEPT YOUR PROPOSED ADJUSTMENT TO

20   NORMALIZE THE RATE CASE EXPENSE OVER 4 YEARS?

21 A.   No. Witness Herbert argued against my recommendation of 4 years, as well as the PA

22   Bureau of Investigation and Enforcement's ("I&E's") recommendation of 47 months,

23   and instead maintained the Borough's original recommendation of 3 years. Hanover

---

[1] The calculation for the increase in late payment revenue is my proposed increase in revenue before increasing lost revenue ($1,080,481) divided by Hanover's current revenue ($5,406,462) to determine that it is a 19.9% increase in revenue. Then, I multiplied the increase in revenue (19.9%) by the current level of late payment revenue ($14,809) to determine the late payment revenue.

1   argues that prior to the current rate case, that the other rate cases were filed on a 2.5-

2   year pattern between 2009 and 2014.

3 Q.   DO YOU AGREE WITH HANOVER'S POSITION?

4 A.   No, I do not. As noted in my direct testimony, there is Commission precedent to utilize

5   the average period between rate cases to determine the normalization of the rate case

6   expense, as I have done to calculate the normalization period in this case. This method

7   is not to penalize or discourage the Borough from filing a rate case as needed, rather

8   it is a way to match the expense recovery over the average period of time of when

9   cases are filed. Therefore, I maintain my recommendation to utilize a 4-year

10   normalization period. Additionally, as with the Borough's concern regarding under-

11   recovery, there is concern for over-recovery of rate case expense if the Borough does

12   not file within the time period utilized for the normalization. The timing of its rate

13   case filings is within Hanover's control.

14

15 **V. SOURCE OF SUPPLY – MISCELLANEOUS OPERATING EXPENSE AND**

16   **MAINTENANCE EXPENSE**

17 Q.   DID THE BOROUGH ACCEPT YOUR ADJUSTMENTS TO THE

18   OUTSIDE-BOROUGH'S PORTION OF THE MISCELLANEOUS

19   OPERATING EXPENSE IN THE AMOUNT OF $1,104 AND THE

20   MISCELLANEOUS MAINTENANCE EXPENSE IN THE AMOUNT OF

21     $6,881?

22 A.   No. The Borough states that these expenses were necessary to maintain and operate

23   its source of supply operations safely and that they are similar to repairs made annually

24   to operate the plant.

25 Q.   DO YOU AGREE WITH THE BOROUGH'S POSITION?

1   A.   No, I do not. While I do agree that the expenses identified above are necessary to

2   maintain and operate its plant, these particular expenses are irregular. Furthermore,

3   based on my review of expenses in the years prior to the HTY, these levels of expense

4   are not recognized on an annual basis and the Borough has not proven otherwise. For

5   example, Account 3535 Miscellaneous Maintenance Expenses in 2018, 2019, and the

6   HTY was $19,252, $16,258, and $27,602 respectively. My proposed amount for

7   account 353 expense in the FPFTY is $17,253 after adjusted it downward to amortize

8   the one-time expense for the roof replacement. As one can see, my recommended

9   FPFTY falls between the expense levels recognized in 2018 and 2019, all of which

10   are significantly lower than the Borough's proposed expense level of $27,602.

11   Therefore, I maintain my direct testimony position on these adjustments.

12

13   **VI. <u>ACCOUNT 134 PROFESSIONAL SERVICES – ENGINEERING SERVICES</u>**

14   Q.   DID THE BOROUGH ACCEPT YOUR ADJUSTMENTS TO

15   ENGINEERING EXPENSES BEYOND THAT OF THE 2019 EXPENSE

16   RECORDED IN THE HTY?

17   A.   No. The Borough indicates that the services provided by Forest Management and

18   Gannett Fleming are necessary for the performance of the water system and that

19   similar levels of services provided by Gannett Fleming are expected to continue in the

20   future.

21   Q.   DO YOU AGREE WITH THE BOROUGH'S ARGUMENT?

22   A.   No, I do not. While the Borough may receive services from Gannett Fleming in the

23   future, these particular expenses are related to one-time studies required under the

24   2018 America's Water Infrastructure Act. Furthermore, based on my review of

25   expenses in the years prior to the HTY, the Borough's proposed FPFTY expense level

1	is not recognized on an annual basis and the Borough has not proven otherwise. As is
2	noted in the Borough's response to OCA-IV-19, 2018 and 2019 engineering expenses
3	were $63,219 and $75,119, respectively, which is considerably below the level of
4	expense recognized in HTY of $105,690. My recommended level of engineering
5	expense for the FPFTY of $66,389 is between both the 2018 and 219 levels of expense.
6	The removal of non-recurring expenses, such as those that are identified for Gannett
7	Fleming, is the proper methodology for forecasting costs when utilizing the FPFTY
8	method for ratemaking. I maintain my direct testimony position for adjusting the
9	engineering services.
10	

11 **VII. ACCOUNT 387 GENERAL OFFICE – COMPUTER SUPPORT**

12 Q.   DID THE BOROUGH ACCEPT YOUR CHANGES TO REMOVE ONE-

13   TIME AND NON-RECURRING EXPENSES IDENTIFED IN YOUR

14   DIRECT TESTIMONY IN THE COMPUTER SUPPORT ACCOUNT?

15 A.   No, it did not. The Borough argues that the 2019 expenses were higher in 2020,

16   therefore, an unadjusted HTY is reasonable to project the FTY and FPFTY.

17 Q.   DO YOU AGREE WITH THE BOROUGH'S POSITION?

18 A.   No, I do not. The Borough's witness fails to acknowledge that in 2019, the Borough

19   incurred an expense of $6,549.90 for computer systems, an irregular expense.[2] When

20   this irregular expense is accounted for, the adjusted expenses for 2019 would be

21        $7,208. Comparatively, my adjusted expenses for the HTY equated to $8,125, as

22   shown in my direct testimony Schedule SLS-10. As such, my recommended level of

23   expense for the FPFTY is $8,125, which is higher than the adjusted amount for 2019.

24   I maintain my recommended level of adjustment for computer support expense.

---

[2] Borough's response to OCA-IV-21 and was noted in my direct testimony, footnote 9.

1   Q.   DOES THIS COMPLETE YOUR SURREBUTTAL TESTIMONY?

2   A.   Yes, it does.

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC	)	
UTILITY COMMISSION	)	
	)	
v.	)	**Docket No. R-2021-3026116**
	)	
THE BOROUGH OF HANOVER	)	
– MUNICIPAL WATERWORKS	)	

SCHEDULES ACCOMPANYING THE

SURREBUTTAL TESTIMONY

OF

STACY L. SHERWOOD

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

October 29, 2021

The Borough of Hanover - Municipal Waterworks

Summary of Operating Income
For the Rate Year Ending December 31, 2022

Line No.		Outside-Borough Allocation		Pro Forma Changes in Outside-Borough Revenues	Outside-Borough Amounts After Change in Revenues
1	Outside-Borough Revenue Per Hanover	$ 5,674,505	(1) $	1,077,534	$ 6,752,039
2					
3	Outside-Borough Operations and Maintenance Expenses Per Hanover	$ 3,464,160			$ 3,464,160
4	OCA Adjustments:				
5	Adjust Rate Case Expense	$ (35,258)			$ (35,258)
6	Adjust Account 392 Legal Expenses - PA PUC Legal Fees	$ (2,400)			$ (2,400)
7	Adjust Account 351 Source of Supply - Miscellaneous Operating Expense	$ (1,104)			$ (1,104)
8	Adjust Account 353 Source of Supply - Miscellaneous Maintenance Expense	$ (6,881)			$ (6,881)
9	Account 367 Power and Pumping - Supplies and Equipment	$ (4,566)			$ (4,566)
10	Adjust Account 134 Professional Services - Engineering Services	$ (22,266)			$ (22,266)
11	Adjust Account 608 Bank Fees	$ (1,715)			$ (1,715)
	Adjust Account 387 General Office - Computer Support	$ (1,698)			$ (1,698)
12	Adjusted Outside-Borough Operations and Maintenance Expenses	$ 3,388,272			$ 3,388,272
13					
14	Outside-Borough Depreciation Expense	$ 1,386,991			$ 1,386,991
18					
19	Outside-Borough Taxes, Other Than Income	$ 111,071			$ 111,071
20					
21	Outside-Borough Net Operating Income Available for Return	$ 788,171			$ 1,865,705
22					
23	Outside-Borough Rate Base Per Hanover	$ 36,029,944	$	(12,467)	$ 36,017,477
24					
25	Outside-Borough Return on Rate Base	2.19%			5.18%

The Borough of Hanover - Municipal Waterworks

Summary of Operating Income
For the Rate Year Ending December 31, 2022

Line No.		Hanover Outside-Borough Amount
1	Rate Base	$ 36,017,477
2	Required Rate of Return	5.18%
3		
4	Net Operating Income Required	$ 1,865,705
5	Net Operating Income at Present Rates	788,171
6		
7	Total Required Change in Outside-Borough Revenue	$ 1,077,534

The Borough of Hanover - Municipal Waterworks

Summary of Adjustments
For the Rate Year Ending December 31, 2022

Line No.		Total System	Allocation Factor	Outside-Borough Allocation
1	Rate Base Per Hanover	$ 53,560,839		$ 36,029,944
2	Adjustments:			
3	Adjust Cash Working Capital			(12,467) (1)
4	Adjusted Rate Base	53,560,839		36,017,477
5				
6	OCA Adjustment to Total Rate Base			$ (12,467)

Notes

(1) See Schedule SLS-11SR

The Borough of Hanover - Municipal Waterworks

Adjustment of Cash Working Capital
For the Rate Year Ending December 31, 2022

Line No.

1	Hanover's Projected O&M	$	3,464,160
2	Less: OCA Adjustments to O&M		(75,888)
3	OCA Adjusted O&M		3,388,272
4	CWC Percentage		12.50%
5	Total Cash Working Capital	$	423,534
6			
7	Hanover's Cash Working Capital Expense		436,001
8	OCA Adjustment	$	(12,467)

Pennsylvania Public Utility Commission :
             :
     v.   :   Docket No. R-2021-3026116
             :
The Borough of Hanover --   :
Hanover Municipal Waterworks   :

VERIFICATION

I, Stacy L. Sherwood, hereby state that the facts set forth in my Surrebuttal Testimony, OCA Statement 1SR, are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: October 29, 2021   Signature: _____
*319219   Stacy L. Sherwood

        Consultant Address: Exeter Associates, Inc.
                10480 Little Patuxent Parkway
                Suite 300
                Columbia, MD 21044-3575

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

RE:	Pennsylvania Public Utility Commission	**:**	
		:	
	v.	**:**	Docket No. R-2021-3026116
		:	
	The Borough of Hanover –	**:**	
	Hanover Municipal Waterworks	**:**	

SURREBUTTAL TESTIMONY

OF

DAVID J. GARRETT

ON BEHALF OF

THE PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

October 29, 2021

I. **INTRODUCTION**

1 **Q.   Please state your name and business address.**

2 A.   My name is David J. Garrett. My business address is 101 Park Avenue, Suite 1125,

3   Oklahoma Borough, Oklahoma 73102.

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

5 A.   I am the managing member of Resolve Utility Consulting, LLC. I am an independent

6   consultant specializing in public utility regulation.

7 **Q.   Have you previously filed testimony in this proceeding?**

8 A.   Yes. I filed direct testimony in OCA Statement 2 on September 30, 2021, on behalf of the

9   Pennsylvania Office of Consumer Advocate ("OCA"). A summary of my qualifications is

10   included in my direct testimony.

11 **Q.   What is the purpose of your surrebuttal testimony?**

12 A.   My surrebuttal testimony responds to the rebuttal testimony of Borough of Hanover

13   ("Hanover" or the "Borough") witness Harold Walker, III.

14 **Q.   Did any of the rebuttal testimony you reviewed cause you to change your positions**
15   **and recommendations as stated in your direct testimony?**

16 A.   No. To the extent I do not specifically address a statement made in the rebuttal testimony

17   filed in this case, it should not constitute my agreement with such rebuttal testimony.

18 **Q.   In his rebuttal testimony, did Mr. Walker raise any new, significant issues related to**
19   **your cost of equity and rate of return testimony and analysis?**

20 A.   No. In Mr. Walker's rebuttal testimony, it is clear that he disagrees with my opinions

21   related to the City's cost of equity estimate, and my return on equity ("ROE") and capital

22   structure recommendations. However, I do not believe he raised any new, significant

1		issues regarding the same. Thus, in my surrebuttal testimony, I will not repeat all the
2		arguments and points raised in my direct testimony; rather, I will reiterate a few important
3		points in my response to Mr. Walker's rebuttal testimony.
4	**Q.**	**Please summarize Mr. Walker's rebuttal testimony regarding your cost of equity**
5		**estimates.**
6	A.	Mr. Walker criticizes my Capital Asset Pricing Model ("CAPM") and Discounted Cash
7		Flow ("DCF") Model. Specifically, he argues that my use of a 30-day stock price average
8		is too short to be used in the DCF Model.[1] He also disagrees with my long-term growth
9		rate input in the DCF Model. In addition, Mr. Walker criticizes my equity risk premium
10		("ERP") used in my CAPM.[2]
11	**Q.**	**Would using longer or shorter periods of time for stock price averages have made a**
12		**material difference in your DCF cost of equity input?**
13	A.	No. In my direct testimony, I discuss my opinions regarding why I believe a 30-day
14		average of stock prices is advisable when estimating utility cost of equity in rate
15		proceedings. Some analysts choose longer periods of time, which is not necessarily
16		unreasonable. Because utility stocks are relatively less influenced by market risk (as
17		observed in their low betas), their stock prices do not fluctuate widely relative to the
18		market. The primary factor driving the discrepancy in Mr. Walker's and my DCF Models
19		is not the length of time for our stock price averages, but rather our long-term growth rate
20		inputs.

---

[1] Borough of Hanover Statement No. 5-R, Rebuttal Testimony of Harold Walker, III, p. 21.

[2] *Id*. at pp. 30-31.

| 1 | Q. | **Mr. Walker also criticizes the long-term growth rate input used in your DCF Model.** |
| 2 | | **Do you have a response to his criticisms?** |

3 A. Yes. Mr. Walker discusses his disagreements with my consideration of nominal GDP as a

4 typical limiting factor to the terminal growth rate input in the DCF model. Regardless of

5 our differing opinions on this subject from a conceptual standpoint, in this case I ultimately

6 used a growth rate cited by Mr. Walker himself as part of my DCF calculation. While I

7 understand Mr. Walker ultimately relied upon a higher growth rate, I believe the use of a

8 lower, historical earnings per share (EPS) is more reasonable in this case and balances the

9 unique opportunities for growth of the water utilities in the proxy group with concepts of

10 limiting the terminal growth rate in the DCF model based on overall economic growth. In

11 my opinion, the growth rate I used in my DCF model is the highest reasonable growth rate

12 that should be considered in this case. This idea is furthered by the fact that the CAPM

13 results are notably lower than the DCF results. The CAPM is a model specifically designed

14 to measure cost of equity, whereas the DCF is not.

15	Q.	**Mr. Walker also highlights the actual earned returns of the proxy group as an**
16		**indication of Hanover's cost of equity and fair authorized return. Do you agree with**
17		**these arguments?**

18 A. No. Mr. Walker notes the earned returns on common equity for the proxy group and

19 suggests that an authorized ROE of 8.4% would put the Borough at a disadvantage.[3] Mr.

20 Walker's reasoning ignores the difference between cost of equity and earned returns on

21 equity. They are completely different concepts. The best example to show this is any

22 period in which a company earns a negative return on equity. This does not mean this

---

[3] *See id.* at p. 3, lines 7-9.

1   company's investors required a negative return at that time. Instead, the cost of equity is a

2   forward-looking concept that primarily considers market risks and its relative impacts on

3   individual firms in the marketplace. In addition, if awarded ROEs were set based on earned

4   ROEs, it would inevitably create a circular reference or feedback loop that would be

5   disconnected from capital costs. When setting a fair awarded ROE, the Commission should

6   focus on cost of equity (as estimated through the CAPM and DCF Model) and not on earned

7   returns.

8 **Q.** **Mr. Walker also criticizes your equity risk premium estimate in your CAPM. Do you**
9   **have a response to his testimony?**

10 A.   Yes. As discussed in my direct testimony, the ERP is probably the single most important

11   figure in estimating the cost of equity. Because this number is so critical in financial and

12   investment evaluations, many experts, scholars, academics, managers, and investors

13   around the country are concerned with finding an accurate estimate for the ERP. Mr.

14   Walker refers to the ERP estimates used in my testimony as "unique" and claim they have

15   "substantially underestimated market performance."[4]   I find Mr. Walker's rebuttal

16   testimony on this issue puzzling, since I used the same ERP estimate that Mr. Walker used

17   in this case – 6.3%. Although I present evidence in my direct testimony showing that 6.3%

18   is a relatively high estimate for the ERP, I used 6.3% in this case in the interest of

19   reasonableness.

---

[4] *Id*. at p. 30, line 1.

1   **Q.**   **Mr. Walker disagrees with your CAPM result of 6.8%. What is your response?**

2   A.   The CAPM is a relatively straight-forward model with three inputs: (1) the risk-free rate;

3   (2) beta; and (3) the equity risk premium. For the risk-free rate, I used the yield on 30-year

4   Treasury bonds, which is a standard approach to estimate the risk-free rate. For beta, I

5   used the betas published by Value Line – another common approach. For the ERP, I used

6   the same ERP used by Mr. Walker. Those inputs result in a CAPM cost of equity estimate

7   of 6.8%, which is perfectly reasonable.

8   **Q.**   **Does this conclude your surrebuttal testimony?**

9   A.   Yes.

Pennsylvania Public Utility Commission	:	
	:	
v.	:	Docket No. R-2021-3026116
	:	
The Borough of Hanover --	:	
Hanover Municipal Waterworks	:	

VERIFICATION

I, David J. Garrett, hereby state that the facts set forth in my Surrebuttal Testimony, OCA Statement 2SR, are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: October 29, 2021   Signature: _____
*319221   David J. Garrett

Consultant Address: Resolve Utility Consulting, PLLC
                    101 Park Avenue
                    Suite 1125
                    Oklahoma City, OK 73102

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	)	
	)	
	)	
v.	)	DOCKET NO. R-2021-3026116
	)	
THE BOROUGH OF HANOVER	)	
HANOVER MUNICIPAL	)	
WATERWORKS	)	

SURREBUTTAL TESTIMONY OF

JEROME D. MIERZWA

ON BEHALF OF THE

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

OCTOBER 29, 2021

| 1 | Q. | WOULD YOU PLEASE STATE YOUR NAME AND BUSINESS ADDRESS? |

2 A. My name is Jerome D. Mierzwa. I am Vice President of and a Principal with Exeter Associates, Inc ("Exeter"). My business address is 10480 Little Patuxent Parkway, Suite 300, Columbia, Maryland 21044. Exeter specializes in providing public utility-related consulting services.

6 Q. HAVE YOU PREVIOUSLY PRESENTED TESTIMONY IN THIS PROCEEDING?

8 A. Yes. My Direct Testimony was filed as OCA Statement 3 on September 30, 2021.

9 Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

10 A. The purpose of my Surrebuttal Testimony is to respond to the Rebuttal Testimony of Borough of Hanover ("Borough") witness Constance E. Heppenstall. Ms. Heppenstall presented the Borough's cost of service study in this proceeding.

13 Q. IN YOUR DIRECT TESTIMONY DID YOU FIND THE BOROUGH'S COST OF SERVICE TO BE REASONABLE?

15 A. In my Direct Testimony, I generally found the Borough's cost of service to be reasonable, but found that several minor modifications were appropriate. My specific modifications were that source of supply operation and maintenance expenses should be functionalized and allocated to class based on average demands, and water treatment operating expenses should be functionalized and allocated based on average demands.

20 Q. DID MS. HEPPENSTALL AGREE WITH THESE MODIFICATIONS?

21 A. No. Ms. Heppenstall found that since source of supply and water treatment plants are designed to supply water to meet maximum day demands, the operation and maintenance expenses associated with those facilities should be allocated in the same manner. In addition, she contends that a source of supply asset or treatment plant sized to meet average day demands would be much smaller than one designed to meet maximum day demands

1   and larger facilities would have larger operation and maintenance expenses associated with

2   it. See Hanover Statement 3-R, pgs. 1-2.

3   Q.   WHAT IS YOUR RESPONSE TO MS. HEPPENSTALL?

4   A.   My recommendation concerning the functionalization and allocation of source of supply

5   and water treatment operation and maintenance expenses is based on my finding that these

6   expenses are base costs under the base-extra capacity method. As described on page 3 of

7   the Introduction of the cost service study provided by Ms. Heppenstall in Hanover

8   Statement 3 and in my Direct Testimony, base costs are costs that tend to vary within the

9   quantity of water used plus costs associated with supplying, treating, pumping, and

10   distributing water to customers under average load conditions. The source of supply

11   operation and maintenance expenses reflect in the Borough's cost of service study includes

12   labor expenses. Source of supply labor expenses remain fairly constant and do not increase

13   on the maximum day. Since these costs do not vary based on demand, the costs reflected

14   in the Borough's cost of service study reflect those that would be experienced under

15   average load conditions and, therefore, should be considered base cost under the base-extra

16   capacity method and should be allocated accordingly. The source of supply expenses

17   reflected in the cost of service study also includes gas and diesel fuel. These costs vary

18   directly in relation to consumption and, therefore, are base costs and should be allocated as

19   such.

20   With respect to water treatment expenses, these costs include labor, laboratory, and

21   miscellaneous expenses. Like source of supply labor expenses, water treatment labor and

22   laboratory testing expenses do not proportionately increase as demand increases.

23   Therefore, these costs should also be considered base costs and functionalized and

24   allocated based on average day demands.

25

1   Q.   DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?
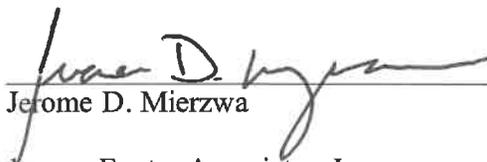
2   A.   Yes, it does.

Pennsylvania Public Utility Commission :
              :

     v.   : Docket No. R-2021-3026116
                :

The Borough of Hanover --   :
Hanover Municipal Waterworks   :

VERIFICATION

I, Jerome D. Mierzwa, hereby state that the facts set forth in my Surrebuttal Testimony,

OCA Statement 3SR, are true and correct (or are true and correct to the best of my knowledge,

information, and belief) and that I expect to be able to prove the same at a hearing held in this

matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. §

4904 (relating to unsworn falsification to authorities).

DATED: October 29, 2021   Signature: _____
*319222   Jerome D. Mierzwa

          Consultant Address: Exeter Associates, Inc.
                   10480 Little Patuxent Parkway
                   Suite 300
                   Columbia, MD 21044-3575

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNNSYLVANIA PUBLIC UTILITY COMMISSION	: : : :	
v.	: : :	Docket No. R-2021-3026116
BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER	: :	

SURREBUTTAL TESTIMONY

OF

TERRY L. FOUGHT

ON BEHALF OF

PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

OCTOBER 29, 2021

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.**

2 A. Terry L. Fought, 780 Cardinal Drive, Harrisburg, Pennsylvania, 17111.

3

4 **Q. MR. FOUGHT, DID YOU ALSO SUBMIT DIRECT TESTIMONY IN THIS**

5 **PROCEEDING ON BEHALF OF THE OFFICE OF CONSUMER ADVOCATE?**

6 A. Yes.

7

8 **Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?**

9 A. The purpose of my surrebuttal testimony is to respond to portions of the rebuttal

10 testimony by Michael J. Mehaffey, Borough of Hanover Statement No. 1-R

11 regarding isolation valves, fire hydrants and customer complaints. I am also

12 responding to other issues in my direct testimony that were not addressed in the

13 Borough's Rebuttal Testimony.

14

15 **Q. WHAT IS THE BOROUGH'S POSITION ON EXERCISING ISOLATION**

16 **VALVES?**

17 A. Mr. Mehaffey testified that the Borough accepts my recommendations for

18 exercising isolation valves modified, however, to provide that the schedule for

19 repair or replacing of valves be submitted by November 15, for the following

20 calendar year and that the schedule and rate case filing requirement be provided

21 to the OCA, I&E and OSBA.

22

Q. **IS THE MODIFICATION ABOVE REGARDING ISOLATION VALVES ACCEPTABLE TO THE OCA?**

A. Yes.

Q. **WHAT IS THE BOROUGH'S POSITION ON MARKING ITS SIXTEEN FIRE HYDRANTS THAT CANNOT PROVIDE A MINIMUM FIRE FLOW OF 500 GALLONS PER MINUTE AT 20 POUNDS PER SQUARE INCH SUCH SO THAT THEY WILL ONLY BE USED FOR FLUSHING AND BLOW-OFFS?**

A. Mr. Mehaffey testified that the Borough agrees to mark those sixteen valves so that they will only be used for flushing and blow-offs. I also recommend that the Borough provide confirmation to the OCA, I&E and OSBA upon completion.

Q. **WHAT IS THE BOROUGH'S POSITION ON KEEPING A SINGLE COMPLAINT LOG IN A LIVE EXCEL FORMAT THAT INCLUDE WHICH TYPE OF CUSTOMER (JURISDICTIONAL OR NON-JURISDICTIONAL) MADE THE COMPLAINT WITH THE FOLLOWING DETAIL: DATE; LOCATION; DIRTY WATER; RUSTY WATER; WATER TASTE, ODOR OR COLOR; STAINING (OF LAUNDRY OR PLUMBING FIXTURES); REQUEST FOR WATER TESTING; CUSTOMER PROPERTY DAMAGE; INCOMPLETE SURFACE RESTORATION; AND HEALTH ISSUES; AND THE FINAL DISPOSITION OF THE COMPLAINT?**

A. Mr. Mehaffey testified that the Borough agrees to keep a single complaint log as specified above.

1 **Q. FOR WHAT OTHER ISSUES DID YOU PROVIDE RECOMMENDATIONS THAT**

2 **WERE NOT ADDRESSED IN THE BOROUGH'S REBUTTAL TESTIMONY?**

3 A. In order to reduce the number of rusty water and stained laundry complaints, the

4 Borough should continue to: (1) line or replace the unlined cast-iron pipe that is

5 causing the rusty water problems; (2) flush the distribution system at least twice

6 annually; and (3) provide Red-B-Gone to its customers as needed.

7

8 **Q. DID THE BOROUGH OBJECT TO ANY OF THE ABOVE**

9 **RECOMMENDATIONS?**

10 A. No.

11

12 **Q. DOES THIS COMPLETE YOUR WRITTEN SURREBUTTAL TESTIMONY?**

13 A. Yes, at this time. I reserve the right to supplement this testimony either in writing

14 or orally if additional relevant information is received.

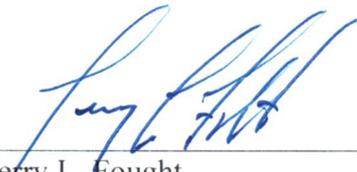Pennsylvania Public Utility Commission   :
    :
            v.   :   Docket No. R-2021-3026116
    :
The Borough of Hanover --   :
Hanover Municipal Waterworks   :

VERIFICATION

I, Terry L. Fought, hereby state that the facts set forth in my Surrebuttal Testimony, OCA Statement 4SR, are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: October 29, 2021   Signature: _____
*319223   Terry L. Fought

                              Consultant Address: 780 Cardinal Drive
                                               Harrisburg, PA 17111