



COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
COMMONWEALTH KEYSTONE BUILDING
400 NORTH STREET, HARRISBURG, PA 17120

BUREAU OF
INVESTIGATION
&
ENFORCEMENT

September 1, 2020

Via Electronic Filing

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

Re: Pennsylvania Public Utility Commission v.
Philadelphia Gas Works
Docket No. R-2020-3017206
I&E Pre-Served Testimony and Exhibits

Dear Secretary Chiavetta:

Enclosed for electronic filing please find the following **Pre-Served Testimony and Exhibits** of the Bureau of Investigation & Enforcement's (I&E) witnesses in the above-captioned proceeding:

Anthony Spadaccio:	I&E Statement No. 1 I&E Statement No. 1-SR	I&E Exhibit No. 1
Ethan H. Cline:	I&E Statement No. 2 I&E Statement No. 2-R I&E Statement No. 2-SR	I&E Exhibit No. 2-R
Scott Orr:	I&E Statement No. 3 I&E Statement No. 3-SR	I&E Exhibit No. 3

Copies of this letter are being served on parties of record as evidenced in the attached Certificate of Service. *Due to the temporary closing of the PUC's offices, I&E is only providing electronic service.* Should you have any questions, please do not hesitate to contact me.

Sincerely,

Carrie B. Wright
Prosecutor
Bureau of Investigation and Enforcement
PA Attorney ID No. 208185
(717) 783-6156
carwright@pa.gov

CBW/ac
Enclosures

cc: Honorable Marta Guhl (*Cover Letter and Certificate of Service only – via email*)
Honorable Darleen Heep (*Cover Letter and Certificate of Service only – via email*)
Per Certificate of Service (*Cover Letter, Certificate of Service and Attachments via e-file*)

Cassandra R. McCrae
Earthjustice
1617 John F. Kennedy Blvd, Suite 1130
Philadelphia, PA 19103
cmccrae@earthjustice.org
*Counsel for Clean Air Council
and Sierra Club*

Josie B. H. Pickens, Esq.
Joline R. Price, Esq.
Robert W. Ballenger, Esq.
Community Legal Services, Inc.
1410 West Erie Avenue
Philadelphia, PA 19140
jpickens@clsphila.org
jprice@clsphila.org
rballenger@clsphila.org
Counsel for TURN et al

John W. Sweet, Esq.
Elizabeth R. Marx, Esq.
Ria M. Pereira, Esq.
Pennsylvania Utility Law Project
118 Locust Street
Harrisburg, PA 17101
pulp@palegalaid.net
Counsel for CAUSE-PA

Sharon E. Webb, Esq.
Daniel G. Asmus, Esq.
Office of Small Business Advocate
Forum Building
555 Walnut Street, 1st Floor
Harrisburg, PA 17101
swebb@pa.gov
dasmus@pa.gov

Joseph Otis Minott, Esq.
Ernest Logan Welde, Esq.
Clean Air Council
135 S. 19th Street, Suite 300
Philadelphia, PA 19103
joe_minott@cleanair.org
lwelde@cleanair.org


David Habr
Habr Economics
213 Cornuta Way
Nipoma, CA 93444-5020
david.habr@habreconomics.com
Consultant for OCA

Robert D. Knecht
Industrial Economics Incorporated
2067 Massachusetts Avenue
Cambridge, MA 02140
rdk@indecon.com
Witness for OSBA

Harry S. Geller, Esq.
118 Locust Street
Harrisburg, PA 17101
hgellerpulp@palegalaid.net
Witness for TURN et al

Mr. Jeffrey Pollock
J. Pollock, Inc.
12647 Olive Blvd., Suite 585
St. Louis, MO 63141
jcp@jpollockinc.com
Witness for PICGUG

Mark E. Garrett
Garrett Group Consulting, Inc.
4028 Oakdale Farm Circle
Edmond, OK 73013
OCAPGW2020@paoca.org
Consultant for OCA



Carrie B. Wright
Prosecutor
Bureau of Investigation and Enforcement
PA Attorney ID No. 208185

I&E Statement No. 1
Witness: Anthony Spadaccio

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Direct Testimony

of

Anthony Spadaccio, CRRA

Bureau of Investigation & Enforcement

Concerning:

Revenue Requirement

Financial Metrics

Benchmarking

Rating Agencies

Days of Cash on Hand

Debt Service Coverage Ratio

TABLE OF CONTENTS

INTRODUCTION OF WITNESS 1

BACKGROUND 2

SUMMARY OF I&E OVERALL POSITION 4

FINANCIAL METRICS 4

BENCHMARKING TO OTHER COMPANIES..... 8

RATING AGENCIES 12

DAYS OF CASH ON HAND 15

DEBT SERVICE COVERAGE RATIO..... 18

1 **INTRODUCTION OF WITNESS**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Anthony Spadaccio. My business address is Pennsylvania Public
4 Utility Commission, Commonwealth Keystone Building, 400 North Street,
5 Harrisburg, PA 17120.

6

7 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

8 A. I am employed by the Pennsylvania Public Utility Commission (Commission) in
9 the Bureau of Investigation & Enforcement (I&E) as a Fixed Utility Financial
10 Analyst.

11

12 **Q. WHAT IS YOUR EDUCATIONAL AND PROFESSIONAL
13 BACKGROUND?**

14 A. My educational and professional background is set forth in Appendix A, which is
15 attached.

16

17 **Q. PLEASE DESCRIBE THE ROLE OF I&E IN RATE PROCEEDINGS.**

18 A. I&E is responsible for representing the public interest in rate and other
19 proceedings before the Commission. I&E's analysis in this proceeding is based on
20 its responsibility to represent the public interest. This responsibility requires
21 balancing the interests of ratepayers, the utility company, and the regulated
22 community as a whole.

1 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

2 A. The purpose of my direct testimony is to address the various financial metrics,
3 credit ratings, and debt service coverage ratios discussed in Philadelphia Gas
4 Works (PGW or Company) Statement No. 2, Direct Testimony of Joseph F.
5 Golden, Jr.; PGW Statement No. 3, Direct Testimony of Daniel J. Hartman; and
6 PGW Statement No. 4, Direct Testimony of Harold Walker, III and to present the
7 overall revenue requirement recommended by I&E.

8
9 **Q. DOES YOUR DIRECT TESTIMONY INCLUDE AN EXHIBIT?**

10 A. Yes. I&E Exhibit No. 1 contains schedules relating to my testimony.
11

12 **BACKGROUND**

13 **Q. WHAT DOES 52 PA. CODE §69.2701-2703 STATE REGARDING PGW?**

14 A. Commission regulations at 52 Pa. Code §69.2701-2703 contain the ratemaking
15 elements, procedures, and factors that the Commission will consider in
16 determining just and reasonable rates for PGW. Those regulations state that the
17 Commission is obligated under law to use the cash flow methodology and that in
18 the determination of a just and reasonable rate level for PGW, the Commission
19 considers, among other factors, projected levels of non-borrowed cash, internal
20 generation of funds for construction, debt to equity ratios, the level of operating
21 and other expenses compared to similarly situated utility enterprises, the level of
22 financial performance needed to maintain or improve PGW's bond rating,

1 management quality, efficiency and effectiveness, service quality and reliability,
2 and the effect on universal service.

3
4 **Q. WHAT IS PGW'S CASH FLOW METHOD?**

5 A. The Cash Flow Method is the ratemaking method used by PGW.¹ On
6 December 29, 1972, the Philadelphia City Council enacted an ordinance and
7 approved an agreement between the Philadelphia Facilities Management
8 Corporation (the entity set up to operate PGW) and the City of Philadelphia which
9 determined how PGW's rates would be set and how it would be operated. Section
10 VII of the Ordinance states that rates shall be set in order to provide sufficient
11 revenues for purposes including covering all of the costs and expenses of PGW,
12 making base payments to the City, providing appropriations for debt reduction,
13 and providing reasonable additions to working capital.²

14
15 **Q. WHAT HAS PGW REQUESTED IN THIS PROCEEDING?**

16 A. PGW has requested an increase to its base rate operating revenue of \$70 million,
17 which is 10.5% on a total revenue basis.³

¹ Other than PGW and Pittsburgh Water and Sewer Authority (PWSA), utilities under the jurisdiction of the Commission use the rate base/rate of return methodology to set rates.

² Action All. of Senior Citizens of Greater Philadelphia, Inc. v. Philadelphia Gas Comm'n, 45 Pa. Cmwlth. 234, 237, 406 A.2d 1155, 1156 (1979) overruled by Pub. Advocate v. Philadelphia Gas Comm'n, 161 Pa. Cmwlth. 428, 637 A.2d 676 (1994).

³ PGW Statement No. 1, p. 2, lines 1-2.

1 **SUMMARY OF I&E OVERALL POSITION**

2 **Q. WHAT IS I&E’S TOTAL RECOMMENDED REVENUE REQUIREMENT?**

3 A. I&E’s total recommended revenue requirement for PGW is \$707,137,000. This
4 recommended revenue requirement represents an increase of \$47,041,000 to the
5 I&E non-adjusted present rate total funds provided of \$660,096,000. A
6 calculation of the I&E recommended revenue requirement is included in I&E
7 Exhibit No. 1, Schedule 1.

8
9 **FINANCIAL METRICS**

10 **Q. WHAT IS PGW’S PROPOSED YEAR-END CASH BALANCE FOR THE**
11 **FULLY PROJECTED FUTURE TEST YEAR (FPFTY)?**

12 A. For the 2020-2021 FPFTY, PGW has included \$113,276,000.⁴

13
14 **Q. WHAT IS THE YEAR-END CASH BALANCE UNDER I&E**
15 **RECOMMENDED RATES?**

16 A. For the 2020-2021 FPFTY, the I&E recommendations result in a year-end cash
17 balance of \$90,086,000.⁵

⁴ PGW Statement No. 2, p. 22, line 25 and Exhibit JFG-2, p. 2.

⁵ I&E Exhibit No. 1, Schedule 1, p. 3.

1 **Q. BASED ON PGW'S PROPOSAL, WHAT IS THE INTERNAL**
2 **GENERATION OF FUNDS FOR THE FPFTY?**

3 A. Excluding \$35,000,000 of Distribution System Improvement Charge (DSIC)
4 spending, Mr. Golden projects internally generated funds under the Company's
5 proposed rates to be \$41,000,000.⁶

6
7 **Q. HAS I&E RECOMMENDED AN ADJUSTMENT TO THE LEVEL OF**
8 **INTERNALLY GENERATED FUNDS FOR THE FPFTY?**

9 A. No. However, it is important to note that although I&E is not disputing the level
10 of internally generated funds for the FPFTY, it does not indicate that it will
11 support ever increasing, unchecked levels. As discussed in greater detail below,
12 I&E supports PGW's financing strategy that works towards a debt to total capital
13 ratio of approximately, but no lower than, 70%.

14
15 **Q. WHAT IS THE FINANCING STRATEGY THE COMPANY HAS CHOSEN**
16 **FOR CAPITAL EXPENDITURES?**

17 A. Mr. Golden states that PGW has chosen a financing strategy of 50 percent from
18 internally generated funds and 50 percent from debt to fund its capital
19 expenditures⁷ which is supported by PGW's actual and estimated sources and uses
20 of cash for capital expenditures set out in its response to Filing Requirement

⁶ PGW Exhibit JFG-2, p. 2, lines 26-27.

⁷ PGW Statement No. 2, p. 19, lines 7-10.

1 II.A.5.⁸ Mr. Golden claims that debt service on a bond issuance of \$100 million at
2 a coupon rate of 4% would be approximately \$7 million in debt service per year.
3 He further asserts that the bond covenant that mandates debt service coverage of
4 1.5x would require \$10.5 million per year in additional revenues and expresses
5 concern that any additional increase in debt levels will drive PGW's debt to total
6 capitalization to unacceptable levels.⁹

7 Mr. Hartman echoes Mr. Golden's concerns regarding PGW's high debt to
8 total capitalization ratio. Ultimately, he argues that if a material amount of PGW's
9 requested rate increase isn't received, substantial additional leverage will be
10 forced back onto the system, reversing the favorable trend and any financial
11 flexibility PGW would have obtained going forward.¹⁰

12
13 **Q. WHAT CAPITALIZATION RATIO FOR CAPITAL EXPENDITURES**
14 **HAS THE COMMISSION DISCUSSED FOR PGW IN THE PAST?**

15 A. In 2015 the Commission released a Staff Report, that Mr. Golden also refers to,¹¹
16 that conducted an inquiry into the Company's pipeline replacement program,
17 which states, "As a municipally owned utility, it is Staff's opinion that PGW can
18 operate with a long-term debt-to-capital ratio perhaps as high as 70 percent."¹²

⁸ PGW Filing, Volume I (Part 2 of 3), Response to II.A.5.

⁹ PGW Statement No. 2, pp. 19-20.

¹⁰ PGW Statement No. 3, pp. 10-11.

¹¹ PGW Statement No. 2, pp. 18-19.

¹² Pennsylvania Public Utility Commission Staff Report: Inquiry into Philadelphia Gas Works' Pipeline Replacement Program, April 21, 2015, p. 6.

1 The Staff Report discusses PGW's opportunity to issue new debt because PGW's
2 long-term debt as a percentage of PGW's total capitalization was projected to fall
3 from 67.6 percent in 2015 to 56.4 percent in 2020. In addition, the Staff Report
4 comments that financing capital improvements with debt rather than with cash
5 matches the recovery of the capital expenditures with the useful life of the assets.
6 Matching the life of the asset with the life of the financing method allows the
7 recovery of the cost of the asset to be spread out over the life of the asset and
8 causes all of the ratepayers who benefit from the capital improvement to be
9 responsible for its financing, not just the ratepayers receiving service at the time
10 the asset is purchased.

11
12 **Q. WHAT FINANCING STRATEGY DO YOU RECOMMEND FOR**
13 **CAPITAL EXPENDITURES?**

14 A. I recommend that PGW work toward a debt to total capital ratio goal of
15 approximately, but no less than, 70%. My recommendation affords PGW a
16 reasonable opportunity to achieve a 77% debt to total capital ratio¹³ at the
17 conclusion of the FPFTY. I agree with the Staff Report that long-term debt better
18 matches the life of the assets. In addition, debt financing spreads the cost of
19 capital improvements out, causing less of an immediate burden for ratepayers. I
20 also, understand the need for PGW to avoid a potential credit downgrade due to

¹³ I&E Exhibit No. 1, Schedule 1, p. 6, line 47.

1 being over leveraged. A higher bond rating is typically synonymous with lower
2 borrowing costs, which would ultimately benefit ratepayers. Additionally, it is
3 important to note that the analysis of both Mr. Golden¹⁴ and Mr. Walker¹⁵
4 illustrate that even with no rate increase, the level of debt capitalization continues
5 to slowly trend downward through fiscal year (FY) 2025.

6 Finally, while I do not dispute PGW's current financing strategy through
7 the FPFTY, I believe it is essential that it be evaluated on a regular basis. It is
8 important that the Company not become so leveraged that it risks a potential credit
9 downgrade, and in turn, higher debt costs. However, a debt to total capital goal of
10 60%¹⁶ is unreasonable and too financially burdensome to ratepayers considering
11 PGW is municipally owned and has no investors to satisfy.

12 13 **BENCHMARKING TO OTHER COMPANIES**

14 **Q. WHAT IS PGW'S TESTIMONY REGARDING BENCHMARKING AND** 15 **THE COMPARISON OF PGW TO OTHER COMPANIES?**

16 A. Harold Walker, III, discusses the financial performance of PGW and compares the
17 Company to what he considers its peers. Mr. Walker contends that his study
18 benchmarks specific information of various financial performance measures
19 covering the five-year period from 2014 through 2018.¹⁷

¹⁴ PGW Exhibit JFG-1, p. 4, ln 47.

¹⁵ PGW Statement No. 4, p. 50, Table 6.

¹⁶ PGW Statement No. 2, pp. 18-19.

¹⁷ PGW Statement No. 4, pp. 1-3.

1 **Q. WHAT GROUPS OF UTILITY PEERS HAS MR. WALKER SELECTED?**

2 A. Mr. Walker has selected 23 peer utilities that were separated into three groups
3 collectively referred to as the “Peer Groups.” These Peer Groups are identified as
4 follows: (1) Municipally Owned Natural Gas Utilities (MUNI Group); (2) PUC
5 Jurisdictional Investor Owned Natural Gas Utilities (IOUPA Group); and (3) Non-
6 Jurisdictional Investor Owned Natural Gas Utilities (IOU Group).¹⁸ Mr. Walker
7 attempts to only consider U.S. natural gas local distribution companies (LDCs) for
8 inclusion in his peer groups. Next, he considers system density, amount of
9 revenue and volume of throughput, type of infrastructure (percentage cast iron
10 mains), location of operations, residential volumes as a percentage of total
11 volumes, ownership characteristics (IOU or MUNI), and availability of five-years
12 (2014 to 2018) of financial and operating statistics for the gas operations.¹⁹

13 Upon selection of the peer utilities, Mr. Walker segregates them into three
14 separate Peer Groups as listed above. The MUNI Group consists of *mainly* LDCs
15 from across the country, however, he acknowledges including two utilities in his
16 MUNI Group that have electric operations.²⁰ Next, the IOUPA Group is
17 comprised of investor-owned gas utilities operating in Pennsylvania. Originally,
18 Mr. Walker considers all 15 natural gas distribution companies under the PUC
19 jurisdiction, however, he excludes those utilities that were not comparable in size
20 or lacked five-years of financial and operating information. Finally, the IOU

¹⁸ PGW Statement No. 4, p. 8, lines 7-16 and Exhibit HW-1, Schedule 1, p. 1.
¹⁹ PGW Statement No. 4, pp. 8-9.
²⁰ PGW Statement No. 4, p. 10, lines 4-5.

1 Group consists of all investor-owned natural gas distribution companies that
2 operate in the North Atlantic region of the country.²¹

3
4 **Q. DO YOU AGREE THAT THE INVESTOR-OWNED PEER GROUPS MR.**
5 **WALKER HAS SELECTED ARE COMPARABLE TO PGW?**

6 A. No. Neither of Mr. Walker's investor-owned Peer Groups are similar to PGW.

7
8 **Q. WHY ARE THE IOUPA GROUP AND THE IOU GROUP NOT**
9 **SUFFICIENTLY SIMILAR TO PGW?**

10 A. Neither the IOUPA Group nor the IOU Group selected by Mr. Walker contains
11 municipal utilities. Even though there are some similarities in safety concerns,
12 PGW is not only under the jurisdiction of the Commission, but also operates under
13 the Philadelphia Facilities Management Corporation and the Philadelphia Gas
14 Commission. In addition, IOUs have a need to meet industry norms, including the
15 capital structure, in order to continue to meet investor expectations and continued
16 access to the capital markets. Although, to some extent, PGW still has to meet
17 some financial metric expectations such as debt service coverage ratio
18 requirements in order to satisfy debt covenants and maintain access to capital
19 markets, the differences are most clearly demonstrated in the capital structures of
20 Mr. Walker's IOUPA and IOU Groups and PGW. For example, as previously

²¹ PGW Statement No. 4, pp. 10-11.

1 discussed, the Commission has stated that, in its opinion, PGW could handle a
2 capitalization ratio with as high as 70 percent debt which far exceeds the IOUPA
3 Group's five-year average capital structure ranging from 34 percent to 50 percent
4 debt and the IOU Group's five-year average capital structure ranging from 27
5 percent to 54 percent debt.²²

6 Additionally, Mr. Walker identifies the differences between municipal and
7 investor-owned utilities that include differences in accounting, regulation,
8 ownership, and taxation.²³ He explains that the Governmental Accounting
9 Standards Board's motivations are to hold government entities, such as municipal
10 utilities, accountable for the money received from the public or taxpayers, while
11 the Financial Accounting Standards Board's focus is to assist investors and
12 creditors in their decision making.²⁴ He opines that municipalities are not focused
13 on the return of and return on investment, rather, they are concerned with
14 providing a public service, and therefore more attentive to having adequate cash
15 flow to service debt and satisfy financial obligations.²⁵

16
17 **Q. DO YOU AGREE WITH MR. WALKER'S USE OF A MUNICIPAL**
18 **UTILITY GROUP?**

19 **A.** Yes, but only because PGW's situation as a large, municipal gas distribution

²² PGW Exhibit HW-1, Schedule 4, p. 1.

²³ PGW Statement No. 4, p. 11, lines 25-26.

²⁴ PGW Statement No. 4, p. 12, lines 2-4.

²⁵ PGW Statement No. 4, p. 12, lines 5-8.

1 system, which is regulated by the Commission, is so unique that no better
2 comparison exists. PGW's position as both the largest municipally-owned gas
3 distribution utility in the nation²⁶ and a municipally-owned utility that has its rates
4 regulated by the Commission are factors that combined, make it difficult to find a
5 group of similar utilities.

6
7 **Q. HOW DOES PGW'S CREDIT RATING COMPARE TO OTHER**
8 **MUNICIPAL UTILITIES?**

9 A. Mr. Walker concludes that PGW and the Peer Groups have similar credit but
10 PGW's credit profile is generally lower than the Peer Groups.²⁷ Although many of
11 the individual financial metrics Mr. Walker evaluated may place PGW into the
12 lower low end of municipal utility rating distribution, the Company is in no danger
13 of a credit downgrade. In fact, the debt to total capital ratio trend discussed above,
14 along with the strong debt service coverage and days cash on hand which I address
15 below support PGW's current stable credit rating.

16
17 **RATING AGENCIES**

18 **Q. HOW DO THE RATING AGENCIES EVALUATE THE CREDIT**
19 **QUALITY OF MUNICIPAL REVENUE BONDS?**

20 A. Moody's has published rating methodology for U.S. municipal utility revenue debt

²⁶ PGW Exhibit JFG-3, Fitch Ratings, July 5, 2018.

²⁷ PGW Statement No. 4, p. 19, lines 16-17.

1 that states, “[t]he primary factors that drive our credit analysis for these types of
2 utilities are the size and health of the system and its service area, the financial
3 strength of its operations, the legal provisions governing its management, and the
4 strength of its rate management and regulatory compliance.”²⁸

5 S&P has published revised rating criteria in 2018 for U.S. public finance,
6 government operated, electric and gas utilities. S&P explains that it considers
7 “seven primary credit factors—four enterprise profile factors and three financial
8 profile factors.” The Enterprise factors include economic fundamentals, industry
9 risk, market position and operational management while the financial factors
10 include coverage metrics, liquidity and reserves, and debt and liabilities.²⁹

11 Fitch lists revenue defensibility, operating risk, financial profile, and
12 asymmetric additive risk factors as its key rating drivers, each of which have their
13 own subset of factors and metrics.³⁰

14
15 **Q. WHAT ARE THE MOST RECENT RATINGS AVAILABLE FOR PGW’S**
16 **BONDS?**

17 A. Moody’s Investors Service (Moody’s) has rated PGW’s outstanding bonds A3
18 with a stable outlook,³¹ which represents an upper-medium grade obligation with a

²⁸ I&E Exhibit No. 1, Schedule 2, p. 1.

²⁹ *Criteria | Governments | U.S. Public Finance: U.S. Municipal Retail Electric And Gas Utilities: Methodology And Assumptions*. Standard & Poor's Ratings Services, September 27, 2018.

³⁰ Public Finance; Public Sector, Revenue-Supported Entities Rating Criteria; Master Criteria. Fitch Ratings, March 27, 2020.

³¹ PGW Exhibit JFG-3, Part 1 of 3.

1 lower credit risk. S&P Global Ratings (S&P) has assigned a rating of A with a
2 stable outlook,³² which is investment grade and represents a strong capacity to
3 meet financial obligations but is somewhat susceptible to economic conditions.
4 Fitch Ratings (Fitch) has awarded PGW's bond an investment grade rating of
5 BBB+, again with a stable outlook,³³ which represents a low expectation of default
6 and adequate capacity to meet financial commitments.

7
8 **Q. WHAT ARE THE STRENGTHS AND WEAKNESS SPECIFIC TO PGW**
9 **THAT THE RATING AGENCIES DISCUSS IN THEIR CREDIT RATING**
10 **REPORTS?**

11 A. Collectively, the rating agencies cite PGW's regulatory environment, debt service
12 coverage, low natural gas prices, cost containment, and high collection rates as
13 credit strengths. Conversely, the rating agencies consider PGW's high debt
14 burden, large low-income population, modest customer base growth, and high
15 rates to be among the Company's credit weaknesses.³⁴

16
17 **Q. WHAT FINANCIAL METRICS DO THE RATING AGENCIES**
18 **CONSIDER?**

19 A. Although all three ratings agencies (Moody's, S&P, and Fitch) review much of the
20 same type of information and financial metrics, the common focus is largely on

³² PGW Exhibit JFG-3, Part 2 of 3.

³³ PGW Exhibit JFG-3, Part 3 of 3.

³⁴ PGW Exhibit JFG-3.

1 coverage, liquidity, and long-term debt. To address these metrics, Debt Service
2 Coverage and Days of Cash on Hand are discussed below, and the long-term debt
3 (debt to total capital) is included in the discussion regarding the financing strategy
4 above.

5
6 **DAYS OF CASH ON HAND**

7 **Q. WHAT IS PGW’S TESTIMONY REGARDING DAYS OF CASH ON HAND?**

8 A. Mr. Golden states that PGW projects to have about 33.9 days of cash on hand in
9 the FPFTY, and he states that the bond rating agencies indicate that a cash on hand
10 balance of 70 to 100 days is necessary to maintain its existing bond rating and not
11 be downgraded.³⁵ He further claims that the proposed rate increase would produce
12 about 85.1 day of cash on hand at the end of the FPFTY.³⁶

13 Mr. Hartman testifies that PGW had cash on hand equating to 96 days at
14 the end of fiscal year 2019, which increased from the 82 days cash on hand at the
15 end of fiscal year 2016. He argues that this is still well below the rating agency
16 medians for “A” to “AAA” rated municipal gas utilities. Additionally, Mr.
17 Hartman expresses his opinion that PGW needs to maintain 70 to 90 days of direct
18 cash on hand to bolster its case to maintain or improve its current bond rating.³⁷

³⁵ PGW Statement No. 2, p. 15.

³⁶ PGW Statement No. 2, p. 22, lines 25-26.

³⁷ PGW Statement No. 3, p. 12, lines 19-21.

1 **Q. DO THE RATING AGENCIES EXPRESS CONCERN ABOUT PGW'S**
2 **NUMBER OF DAYS CASH ON HAND?**

3 A. No. The Moody's Credit Opinion of June 10, 2019 states:³⁸

4 Days cash on hand increased in FY 2018 to 98 days from 69
5 days in FY 2017, as a result of an increase in the unrestricted
6 cash balance. The unrestricted cash balance for FY 2018 was
7 \$131 million a modest increase of 48% compared to FY 2017
8 which had an unrestricted cash balance of \$88 million. Days
9 cash on hand is forecast to remain in the 70-100 days range for
10 the next several years.
11

12 **Q. WHAT ARE THE RANGES OF DAYS OF CASH ON HAND DESCRIBED**
13 **BY MOODY'S IN ITS RATING METHODOLOGY?**

14 A. Moody's sets the following ranges for each rating categories:³⁹

Aaa	Greater than 250 days
Aa	Greater than 150 days but less than or equal to 250 days
A	Greater than 35 days but less than or equal to 150 days
Baa	Greater than 15 days but less than or equal to 35 days
Ba	Greater than 7 days but less than or equal to 15 days
B and Below	Equal to or less than 7 days

15

³⁸ PGW Exhibit JFG-3, Part 1 of 3.

³⁹ I&E Exhibit No. 1, Schedule 2, p. 10.

1 **Q. WHAT DO S&P AND FITCH SAY ABOUT PGW’S NUMBER OF DAYS**
2 **CASH ON HAND?**

3 A. The S&P Global Ratings May 8, 2019 credit profile states:⁴⁰

4 We consider PGW’s liquidity and reserves very strong,
5 reflecting about \$131 million in unrestricted cash and
6 investments, providing 106 day of operating expenses. A \$120
7 million CP program that can fund working capital purposes
8 supplements this. Management’s projections suggest that
9 liquidity should be fairly stable over the next five years.

10 Fitch’s July 5, 2018 report acknowledges PGW’s high leverage, but states,
11 “PGW’s liquidity is somewhat low but still adequate. In 2017, days cash on hand
12 was about 66, and day liquidity was a stronger 155.”⁴¹

13

14 **Q. WHAT WOULD PGW’S DAYS OF CASH ON HAND BE AT I&E’S**
15 **PROPOSED RATES?**

16 A. I&E’s proposed rates would result in approximately 68 days of cash on hand.⁴²

17 The overall average days of cash on hand will naturally decline as PGW increases
18 its utilization of internally generated funds to finance its capital expenditures. The
19 more cash used on capital expenditures, the less the ending cash balance will be to
20 cover the day to day operating expenses. Nonetheless, this is well within Moody’s
21 range for the ‘A’ rating category, therefore, any fear of a credit downgrade
22 regarding the level of cash on hand is misplaced.

⁴⁰ PGW Exhibit JFG-3, Part 2 of 3.

⁴¹ PGW Exhibit JFG-3, Part 3 of 3.

⁴² I&E Exhibit No. 1, Schedule 1, p. 7.

1 **DEBT SERVICE COVERAGE RATIO**

2 **Q. WHAT IS THE COMPANY’S CLAIMED DEBT SERVICE COVERAGE**
3 **RATIO?**

4 A. Mr. Golden claims that PGW needs coverage at 2.2x and above in order to meet
5 its obligations throughout the year including the City Payment, pensions, other
6 post-employment benefits (OPEBs), capital funding from internally generated
7 funds, and additional funds for working capital.⁴³ PGW’s proposed rates produce
8 a debt service coverage ratio of 2.34x before the \$18 million City payment and
9 2.17x after, or slightly over \$250 million for the FPFTY.⁴⁴ PGW claims that its
10 proposed debt service coverage ratio would cover \$18 million for the payment to
11 the City, \$18.5 million to the OPEB Trust Fund, \$2 to \$3 million to the pension
12 fund, \$5 million for retiree healthcare costs,⁴⁵ and \$35 million of cash for capital
13 improvements through the distribution system improvement charge and internally
14 generated funds.⁴⁶

15
16 **Q. DO THE RATING AGENCIES COMMUNICATE CONCERN ABOUT**
17 **PGW’S DEBT SERVICE COVERAGE RATIO?**

18 A. No. The Moody’s Credit Opinion of June 10, 2019 comments that the 1.5x debt

⁴³ PGW Statement No. 2, pp. 16-17.

⁴⁴ PGW Exhibit JFG-2.

⁴⁵ PGW Statement No. 2, p. 17, lines 10-12.

⁴⁶ PGW Exhibit JFG-2.

1 service coverage ratio required by bond ordinance requirements is a credit
2 strength.⁴⁷

3
4 **Q. WHAT ARE THE RANGES OF ANNUAL DEBT SERVICE COVERAGE**
5 **DESCRIBED BY MOODY’S IN ITS RATING METHODOLOGY?**

6 A. Moody’s sets the following ranges for each rating categories:⁴⁸

7

Aaa	Greater than 2.00x
Aa	Greater than 1.70x but less than or equal to 2.00x
A	Greater than 1.25x but less than or equal to 1.70x
Baa	Greater than 1.00x but less than or equal to 1.25x
Ba	Greater than 0.70x but less than or equal to 1.00x
B and Below	Equal to or less than 0.70x

8
9 **Q. WHAT DO S&P AND FITCH SAY ABOUT PGW’S DEBT SERVICE**
10 **COVERAGE RATIO?**

11 A. The S&P Global Ratings May 8, 2019 credit profile states:⁴⁹

12 Extremely strong coverage, evidenced by very robust coverage
13 of fixed costs (debt service payments after the annual transfer
14 to the City of Philadelphia’s general fund) averaging 1.9x over
15 fiscal years 2014 through 2018, reaching 2.1x in fiscal 2018
16 (management estimates fixed-cost coverage in fiscal years
17 2019 to 2024 in a range of 1.9x to 2.4x under what we view as
18 reasonable assumptions).

⁴⁷ PGW Exhibit JFG-3, Part 1 of 3.

⁴⁸ I&E Exhibit No. 1, Schedule 2, p. 10.

⁴⁹ PGW Exhibit JFG-3, Part 2 of 3.

1 Fitch’s July 5, 2018 report states:⁵⁰

2 Over the past few years there has been greater stability in
3 financial performance. Fitch calculated debt service coverage
4 (including unamortized premium amounts) has averaged a
5 solid 1.67x over the past five years, as compared against the
6 average 1.1x achieved during 2006 through 2009 period.
7

8 **Q. DO YOU AGREE WITH PGW’S CLAIMED DEBT SERVICE COVERAGE**
9 **ANALYSIS?**

10 A. No. PGW has set its net income available excessively high compared to what is
11 needed to cover debt service so as to be sufficient to cover its City payment,
12 OPEBs, capital funding from internally generated funds, additional funds for
13 working capital, and pensions.

14 Additionally, as presented above, the rating agencies make it clear that any
15 debt service coverage ratio above the required 1.5x is satisfactory and strong
16 enough maintain PGW’s current credit ratings.

17 Further, Moody’s Investors Service February 13, 2020 Periodic Review of
18 PGW states, “Current rates are sufficient to not only adequately cover annual debt
19 service but also provide excess cash flow to continue to increase the cash funded
20 share of capital expenditures.”⁵¹

⁵⁰ PGW Exhibit JFG-3, Part 3 of 3.

⁵¹ I&E Exhibit No. 1, Schedule 3, p. 1.

1 **Q. WHAT IS YOUR RECOMMENDATION FOR PGW'S DEBT SERVICE**
2 **COVERAGE RATIO?**

3 A. I recommend a debt service coverage ratio of 2.13x before the \$18 million City
4 payment or 1.96x after the payment.⁵² These ratios fall within Moody's highest
5 credit quality ratings levels of Aa and Aaa as illustrated in the chart above. This
6 allows PGW to at least maintain if not provide support for the consideration to
7 improve its credit rating.

8
9 **Q. WHAT IS THE BASIS OF YOUR RECOMMENDATION?**

10 A. PGW's bond covenant requires a debt service coverage ratio of 1.5x. I&E's
11 recommended coverage ratio of 2.13x exceeds what is required by PGW's bond
12 covenant and equates to a net income available for debt service of \$227,308,000,
13 which provides coverage for the following:

14

Debt Service	\$ 106,790,000
City Payment	\$ 18,000,000
OPEBs	\$ 18,500,000
Pension Fund	\$ 2,000,000
Retiree Health Care	\$ 5,000,000
Internally Generated Funds	\$ 41,000,000
DSIC	\$ 35,000,000
Working Capital	\$ 1,018,000

15 PGW's \$18 million City payment and its need to fund OPEBs, capital
16 improvements, and working capital are all obligations that are not recovered as

⁵² I&E Exhibit No. 1, Schedule 1, pp. 1 and 4.

1 operating and maintenance expenses but are required in order for PGW to serve its
2 customers. If the debt service coverage ratio were to be set at 1.00, PGW would
3 recover funds sufficient to cover its operating expenses and debt service
4 requirements but this would not enable PGW to recover funds for expenses it is
5 obligated to meet. A debt service coverage ratio of 2.13x provides the coverage
6 required to fund both operating expenses and PGW's other obligations.

7
8 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

9 A. Yes.

ANTHONY D. SPADACCIO, CRRA

PROFESSIONAL EXPERIENCE AND EDUCATION

EMPLOYMENT

Fixed Utility Financial Analyst 2014 – Present	PA Public Utility Commission Bureau of Investigation & Enforcement
Auditor 2012 – 2014	Public School Employee’s Retirement System Bureau of Benefits Administration
Tax Technician 2010 – 2012	PA Department of Labor and Industry Unemployment Compensation Tax Services
Staff Accountant 2006 – 2009	Boyer & Ritter Certified Public Accountants

EDUCATION & TRAINING

EDUCATION/CERTIFICATIONS:

Society of Utility and Regulatory Financial Analysts – 2018
Certified Rate of Return Analyst (CRRA)

Indiana University of Pennsylvania, A.A. Accounting - 2006

The Pennsylvania State University, B.S. Labor and Industrial Relations – 2003

The Pennsylvania State University - The Smeal College of Business - 2003

Certificates of Completion:

Business Management - 20 credits of instruction

General Business - 20 credits of instruction

UTILITY SPECIFIC TRAINING/CONFERENCES:

SURFA Annual Financial Forum – New Orleans, LA - 2018

SURFA Annual Financial Forum – Indianapolis, IN - 2016

Western NARUC Utility Rate School – San Diego, CA - 2015

Pennsylvania Public Utility Commission Rate School – Harrisburg, PA – 2014

ANTHONY D. SPADACCIO, CRRA

PROFESSIONAL EXPERIENCE AND EDUCATION

EXPERIENCE

I have submitted testimony or provided assistance in the following proceedings:

- Docket No. R-2019-3010955 – City of Lancaster – Sewer Fund*
- Docket No. R-2019-3008208 - Wellsboro Electric Company*
- Docket No. R-2019-3008212 - Citizens' Electric Company of Lewisburg, PA*
- Docket No. R-2019-3008948 – Community Utilities of PA, Inc. – Wastewater Division*
- Docket No. R-2019-3008947 – Community Utilities of PA, Inc. – Water Division*
- Docket No. A-2019-3006880 – Pennsylvania-American Water Company – Acquisition of the Water Treatment and Distribution System Assets of Steelton Borough Authority (§1329)*
- Docket No. R-2018-3006814 – UGI Utilities, Inc. – Gas Division*
- Docket Nos. M-2018-2640802 & 2640803 – Pittsburgh Water & Sewer Authority (Compliance Plan)*
- Docket Nos. R-2018-3002645 & 3002647 - Pittsburgh Water & Sewer Authority*
- Docket Nos. A-2018-3003517 & 3003519 - SUEZ Water Pennsylvania, Inc. – Acquisition of the Water and Wastewater Assets of Mahoning Township (§1329)*
- Docket No. R-2018-3000124 - Duquesne Light Company*
- Docket No. R-2018-3000164 - PECO Energy Company – Electric Division*
- Docket No. R-2018-2645296 - Peoples Gas Company LLC 1307(f)*
- Docket No. R-2018-3000236 - Peoples Natural Gas – Equitable Division 1307(f)*
- Docket No. R-2018-2645278 - Peoples Natural Gas Company, LLC 1307(f)*
- Docket No. R-2017-2640058 - UGI Utilities, Inc. – Electric Division*
- Docket No. R-2017-2595853 - Pennsylvania-American Water Company*
- Docket No. A-2017-2606103 - Pennsylvania-American Water Company – Acquisition of Assets of the Municipal Authority of the City of McKeesport (§1329)*

- Docket No. A-2016-2580061 - Aqua PA Wastewater, Inc. – Acquisition of the Wastewater System Assets of New Garden Township and the New Garden Township Sewer Authority (§1329)
- Docket No. R-2016-2531551 - Wellsboro Electric Company*
- Docket No. R-2016-2531550 - Citizens' Electric Company of Lewisburg, PA*
- Docket No. R-2016-2542923 - PNG, LLC – Equitable Division (Rate MLX)*
- Docket No. R-2016-2542918 - Peoples Natural Gas Company, LLC (Rate MLX)*
- Docket No. P-2016-2543140 - Duquesne Light Company (DSP VIII)*
- Docket No. R-2016-2529660 - Columbia Gas of PA, Inc.*
- Docket No. R-2016-2538660 - Community Utilities of PA, Inc.
- Docket No. P-2016-2521993 - Columbia Gas of PA, Inc. (DSIC)*
- Docket No. R-2015-2506337 - Twin Lakes Utilities, Inc.
- Docket No. R-2015-2479955 - Allied Utility Services, Inc.
- Docket No. R-2015-2479962 - Corner Water Supply & Service Corp.
- Docket No. R-2015-2470184 - Borough of Schuylkill Haven – Water Dept.
- Docket No. R-2014-2452705 - Delaware Sewer Company*
- Docket No. R-2014-2430945 - Plumer Water Company
- Docket No. R-2014-2427189 - B.E. Rhodes Sewer Company
- Docket No. R-2014-2427035 - Venango Water Company
- Docket No. R-2014-2428745 - Metropolitan Edison Company
- Docket No. R-2014-2428744 - Pennsylvania Power Company
- Docket No. R-2014-2428743 - Pennsylvania Electric Company
- Docket No. R-2014-2428742 - West Penn Power Company

*Testimony Submitted

I&E Exhibit No. 1
Witness: Anthony Spadaccio

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Exhibit to Accompany

the

Direct Testimony

of

Anthony Spadaccio, CRRA

Bureau of Investigation & Enforcement

Concerning:

Revenue Requirement

Financial Metrics

Benchmarking

Rating Agencies

Days of Cash on Hand

Debt Service Coverage Ratio

Philadelphia Gas Works R-2020-3017206
I&E Overall Position
(dollars in thousands)

	Proforma Present Rates	I&E			
		Adjustments	Present Rates	Allowances	Proposed
Funds Provided					
Operating Revenue	\$ 655,192	\$ -	\$ 655,192	\$ 47,041	\$ 702,233
Other Income	2,692		2,692		2,692
AFUDC	2,212		2,212		2,212
Total Funds Provided	660,096	-	660,096	47,041	707,137
Funds Applied					
Operating Expenses	546,868	-	546,868	2,117	548,985
Less: Non-Cash Expenses	69,157		69,157		69,157
Total Funds Applied	477,711	-	477,711	2,117	479,828
Income Available for Debt Service	\$ 182,385	\$ -	\$ 182,385	\$ 44,924	\$ 227,308
1998 Ordinance Debt Service	\$ 106,790		\$ 106,790		\$ 106,790
Debt Service Coverage	1.71		1.71		2.13
Payment to City	\$ 18,000		\$ 18,000		\$ 18,000
Debt Service Coverage After Payment	1.54		1.54		1.96
Days Cash on Hand	34.2		34.2		68.0
Uncollectibles	4.50%				

1) Exhibit JFG-1 (\$29,951 / \$666,051 = 4.5%)

2) Stated bad debt expense rate is 4% (PGW Statement No. 2, p. 23).

Philadelphia Gas Works R-2020-3017206
Income Statement
(in thousands)

I&E Exhibit No. 1 Schedule 1 Page 2 of 7
--

	FTY 2019-20	FPFTY 2020-21	I&E Adjustments	I&E Present Rates	I&E Allowances	I&E Proposed Rates
Total Operating Revenues	\$ 659,286	\$ 655,192		\$ 655,192	\$ 47,041	\$ 702,233
OPERATING EXPENSES						
Natural Gas	195,397	191,548		191,548		191,548
Other Raw Material	10	10		10		10
Sub-Total Fuel	195,407	191,558	-	191,558		191,558
CONTRIBUTION MARGINS	463,879	463,634	-	463,634		510,675
Sub-Total Other Operating & Maintenance	283,796	282,876		282,876	2,117	284,993
Depreciation	65,602	67,934		67,934		67,934
Cost of Removal	4,500	4,500		4,500		4,500
To Clearing Accounts	-	-		-		-
Net Depreciation	70,102	72,434	-	72,434		72,434
Sub-Total Other Operating Expenses	353,898	355,310	-	355,310	-	357,427
TOTAL OPERATING EXPENSES	549,305	546,868	-	546,868	2,117	548,985
OPERATING INCOME	109,981	108,324	-	108,324		153,248
Interest Gain / (Loss) and Other Income	4,369	7,400	-	7,400		7,400
INCOME BEFORE INTEREST	114,350	115,724	-	115,724		160,648
INTEREST						
Long-Term Debt	50,520	54,442	-	54,442		54,442
Other	(11,337)	(9,612)	-	(9,612)		(9,612)
AFUDC	(1,718)	(2,212)	-	(2,212)		(2,212)
Loss From Extinguishment of Debt	4,845	4,460	-	4,460		4,460
Total Interest	42,310	47,078	-	47,078		47,078
NET INCOME	72,040	68,646	-	68,646		113,570
City Payment	18,000	18,000		18,000		18,000
NET EARNINGS	\$ 54,040	\$ 50,646	-	\$ 50,646		\$ 95,570

*Financial statements are a modified version of PGW Exhibit JFG-1, original electronic copy provided as a response to I&E-RR-1-D.

Philadelphia Gas Works R-2020-3017206
Cash Flow Statement
(in thousands)

<u>LINE NO.</u>		FTY 2019-20	FPFTY 2020-21	I&E Adjustments	I&E Present Rates	I&E Allowances	I&E Proposed Rates
SOURCES							
1	Net Income	\$ 72,040	\$ 68,646	\$ -	\$ 68,646		\$ 113,570
2	Depreciation & Amortization	60,396	63,079	-	63,079		63,079
3	Earnings on Restricted Funds Withdrawal/(No Withdrawal)	(3,491)	(4,708)	-	(4,708)		(4,708)
4	Proceeds from Bond Refunding to Pay Cost of Issuance	2,600	-	-	-		-
5	Increased/(Decreased) Other Assets/Liabilities	(27,609)	(37,907)	-	(37,907)		(37,907)
6	Available From Operations	103,936	89,110	-	89,110		134,034
7	Drawdown of Bond Proceeds	65,009	78,084		78,084		78,084
8	Release of Restricted Fund Asset	-	-		-		-
9	Release of Bond Proceeds to Pay Temporary Financing	-	-		-		-
10	Temporary Financing	-	-		-		-
11	TOTAL SOURCES	<u>\$ 168,945</u>	<u>\$ 167,194</u>	<u>\$ -</u>	<u>\$ 167,194</u>		<u>\$ 212,118</u>
USES							
12	Net Construction Expenditures	119,673	154,084	-	154,084		154,084
13	Revenue Bonds	52,870	54,956	-	54,956		54,956
14	Temporary Financing Repayment	-	-	-	-		-
15	Changes in City Equity	-	-	-	-		-
16	Distribution of Earnings	18,000	18,000	-	18,000		18,000
17	Additions To (Reductions of) Non-Cash Working Capital	742	(3,202)	-	(3,202)		(3,202)
18	Cash Needs	191,285	223,838	-	223,838		223,838
19	Cash Surplus (Shortfall)	(22,340)	(56,644)	-	(56,644)		(11,720)
20	TOTAL USES	<u>\$ 168,945</u>	<u>\$ 167,194</u>	<u>\$ -</u>	<u>\$ 167,194</u>		<u>\$ 212,118</u>
21	Cash - Beginning of Period	124,146	101,806		101,806		101,806
22	Cash - Surplus (Shortfall)	(22,340)	(56,644)		(56,644)		(11,720)
23	ENDING CASH	<u>\$ 101,806</u>	<u>\$ 45,162</u>		<u>\$ 45,162</u>		<u>\$ 90,086</u>
24	Outstanding Commercial Paper	-	-	-	-		-
25	Outstanding Commercial Paper - Capital	-	-	-	-		-
26	DSIC Spending	33,000	35,000	-	35,000		35,000
27	Internally Generated Funds	21,664	41,000	-	41,000		41,000
28	TOTAL IGF + Incremental DSIC Revenue	54,664	76,000	-	76,000		76,000

*Financial statements are a modified version of PGW Exhibit JFG-1, original electronic copy provided as a response to I&E-RR-1-D.

Philadelphia Gas Works R-2020-3017206
Debt Service Coverage
(in thousands)

I&E Exhibit No. 1 Schedule 1 Page 4 of 7
--

	FTY 2019-20	FPFTY 2020-21	I&E Adjustments	I&E Present Rates	I&E Proposed Rates
FUNDS PROVIDED					
Total Operating Revenues	\$ 659,286	\$ 655,192	\$ -	\$ 655,192	\$ 702,233
Other Income Incr. / (Decr.) Restricted Funds	878	2,692	-	2,692	2,692
City Grant	-	-	-	-	-
AFUDC (Interest)	1,718	2,212	-	2,212	2,212
TOTAL FUNDS PROVIDED	661,882	660,096	-	660,096	707,137
FUNDS APPLIED					
Fuel Costs	195,407	191,558	-	191,558	191,558
Other Operating Costs	353,898	355,310	-	355,310	357,427
Total Operating Expenses	549,305	546,868	-	546,868	548,985
Less: Non-Cash Expenses	73,083	69,157	-	69,157	69,157
TOTAL FUNDS APPLIED	476,222	477,711	-	477,711	479,828
Funds Available to Cover Debt Service	185,660	182,385	-	182,385	227,309
1975 Ordinance Bonds Debt Service	-	-	-	-	-
Debt Service Coverage 1975 Bonds	-	-	-	-	-
Net Available after Prior Debt Service	185,660	182,385	-	182,385	227,309
Equipment Leasing Debt Service	-	(47,075)	-	(47,075)	(47,075)
Net Available after Prior Capital Leases	185,660	229,460	-	229,460	274,384
1998 Ordinance Bonds Debt Service	100,784	106,790	-	106,790	106,790
1999 Ordinance Subordinate Bonds Debt Service - (TXCP)	-	-	-	-	-
Total 1998 Ordinance Debt Service	\$ 100,784	\$ 106,790	-	\$ 106,790	\$ 106,790
Debt Service Coverage 1998 Bonds	1.84	2.15		2.15	2.57
Net Available after 1998 Debt Service	\$ 84,876	\$ 122,670	\$ -	\$ 122,670	\$ 167,594
1998 Ordinance Subordinate Bond Debt Service	-	-	-	-	-
Debt Service Coverage Subordinate Bonds	-	-	-	-	-
Aggregate Debt Service	\$ 100,784	\$ 106,790	-	\$ 106,790	\$ 106,790
Debt Service Coverage (Combined liens)	1.84	1.71		1.71	2.13
	\$ 18,000	\$ 18,000	-	\$ 18,000	\$ 18,000
Debt Service Coverage (Combined liens with \$18.0 City Fee)	1.66	1.54		1.54	1.96

*Financial statements are a modified version of PGW Exhibit JFG-1, original electronic copy provided as a response to I&E-RR-1-D.

PHILADELPHIA GAS WORKS
 DETAIL OF NON-CASH EXPENSES
 (DOLLARS IN THOUSANDS)

LINE NO.	Actual 2018-19	ESTIMATE 2019-20	BUDGET 2020-21	FORECAST 2021-22	FORECAST 2022-23	FORECAST 2023-24	FORECAST 2024-25	LINE NO.
DETAIL OF NON-CASH EXPENSES								
1. Depreciation on Historical	\$ 63,686	\$ 65,602	\$ 67,934	\$ 73,264	\$ 76,516	\$ 71,157	\$ 71,142	1.
2. Cost of Removal	4,500	4,500	4,500	4,500	4,500	4,500	4,500	2.
3. Total Depreciation	68,186	70,102	72,434	77,764	81,016	75,657	75,642	3.
4. Gas Commission Expenses	867	977	997	1,017	1,037	1,058	1,079	4.
5. City Payments	1,668	1,378	1,376	1,403	1,431	1,460	1,489	5.
6. Sale Assessment Expenses	-	-	-	-	-	-	-	6.
7. Other Post Employment Benefits	-	-	-	-	-	-	-	7.
8. Pension Amortization of Unfunded Liability - GASB 68	1,471	(1,304)	(7,313)	(4,592)	289	(955)	(1,821)	8.
9. Pension Additional Contribution	2,360	1,930	1,663	1,173	771	383	23	9.
10. Swap Option / GIC Proceeds	-	-	-	-	-	-	-	10.
11. Total Non-Cash Expenses	<u>74,552</u>	<u>73,083</u>	<u>69,157</u>	<u>76,765</u>	<u>84,545</u>	<u>77,603</u>	<u>76,412</u>	11.

*Financial statements are a modified version of PGW Exhibit JFG-1, original electronic copy provided as a response to I&E-RE-1D. The Statement of Non-Cash Expenses was provided in response to I&E-RR-13.

Philadelphia Gas Works R-2020-3017206
Balance Sheet
(in thousands)

I&E Exhibit No. 1 Schedule 1 Page 6 of 7
--

<u>Line No.</u>	<u>FTY ESTIMATE 2019-20</u>	<u>FPFTY BUDGET 2020-21</u>	<u>I&E Adjustments</u>	<u>I&E Proposed FPFTY 8/31/21</u>
<u>ASSETS</u>				
1.	Utility Plant Net	\$ 1,505,541	\$ 1,591,691	\$ 1,591,691
2.	Leasehold Asset	-	852	\$ 852
3.	Sinking Fund Reserve	125,588	127,803	127,803
4.	Capital Improvement Fund - Current	78,084	88,177	88,177
5.	Capital Improvement Fund - Long-Term	167,333	81,621	81,621
6.	Workers' Compensation Fund			
7.	& Health Insurance Escrow	2,731	2,759	2,759
8.	Cash	101,806	45,162	90,086
9.	Accounts Receivable:			
10.	Gas	144,249	140,752	140,752
11.	Other	1,800	1,825	1,825
12.	Accrued Gas Revenues	5,564	5,528	5,528
13.	Reserve for Uncollectible	(67,015)	(65,657)	(65,657)
14.	Total Accounts Receivable:	84,598	82,448	82,448
15.	Materials & Supplies	51,546	50,851	50,851
16.	Other Current Assets	3,000	3,160	3,160
17.	Deferred Debits	12,867	12,940	12,940
18.	Unamortized Bond Issuance Expense	232	209	209
19.	Unamortized Loss on Reacquired Debt	31,931	27,471	27,471
20.	Deferred Environmental	48,168	47,108	47,108
21.	Deferred Pension Outflows	12,560	8,590	8,590
22.	Deferred OPEB Outflows	71,633	52,091	52,091
23.	Other Assets	29,174	28,934	28,934
24.	TOTAL ASSETS	\$ 2,326,792	\$ 2,251,867	\$ 2,296,791
<u>EQUITY & LIABILITIES</u>				
25.	City Equity	261,602	312,248	357,172
26.	Revenue Bonds	1,171,606	1,116,650	1,116,650
27.	Unamortized Discount	(52)	(48)	(48)
28.	Unamortized Premium	87,919	78,577	78,577
29.	Long Term Debt	1,259,473	1,195,179	1,195,179
30.	Lease Obligations	-	852	852
31.	Notes Payable	-	-	-
32.	Accounts Payable	68,792	68,769	68,769
33.	Customer Deposits	2,956	2,828	2,828
34.	Other Current Liabilities	3,733	4,647	4,647
35.	Pension Liability	244,136	244,675	244,675
36.	OPEB Liability	316,130	293,105	293,105
37.	Deferred Credits	3,844	4,013	4,013
38.	Deferred Pension Inflows	18,162	6,344	6,344
39.	Deferred OPEB Inflows	45,987	22,099	22,099
40.	Accrued Interest	7,601	7,076	7,076
41.	Accrued Taxes & Wages	4,042	4,222	4,222
42.	Accrued Distribution to City	3,000	3,000	3,000
43.	Other Liabilities	87,334	82,810	82,810
44.	TOTAL EQUITY & LIABILITIES	\$ 2,326,792	\$ 2,251,867	\$ 2,296,791
<u>CAPITALIZATION</u>				
45.	Total Capitalization	1,521,075	1,507,427	1,552,351
46.	Total Long Term Debt	1,259,473	1,195,179	1,195,179
47.	Debt to Total Capital Ratio	82.80%	79.29%	76.99%
48.	Capitalization Ratio	4.81	3.83	3.35
	Total Capitalization Excluding Leases	1,521,075	1,507,427	1,552,351
	Total Long Term Debt Excluding Leases	1,259,473	1,195,179	1,195,179
	Debt to Total Capital Ratio	0.828	0.793	0.770

*Financial statements are a modified version of PGW Exhibit JFG-1, original electronic copy provided as a response to I&E-RR-1-D.

	FTY	FPFTY	I&E		PGW Proposed
	2019-20	2020-21	Present Rates	Proposed Rates	PGW Ex. JFG-2
Cash Balance	\$ 101,806	\$ 45,162	\$ 45,162	\$ 90,086	\$ 113,276
Fuel Cost	195,407	191,558	191,558	191,558	191,558
Operating Costs	353,898	355,310	355,310	357,427	355,310
less Depreication	(70,102)	(72,434)	(72,434)	(72,434)	(72,434)
less Pension Amor	1,304	7,313	7,313	7,313	7,313
Total OpEx	\$ 480,507	\$ 481,747	\$ 481,747	\$ 483,864	\$ 481,747
OpEx/365	\$ 1,316	\$ 1,320	\$ 1,320	\$ 1,326	\$ 1,320
Days Cash on Hand	77.33	34.22	34.22	67.96	85.82

RATING METHODOLOGY US Municipal Utility Revenue Debt

This rating methodology replaces "US Municipal Utility Revenue Debt", last revised on December 15, 2014. We have updated some outdated links and removed certain issuer-specific information.

Table of Contents:

SUMMARY	1
FACTOR 1: SYSTEM CHARACTERISTICS (30%)	7
FACTOR 2: FINANCIAL STRENGTH (40%)	10
FACTOR 3: MANAGEMENT (20%)	13
FACTOR 4: LEGAL PROVISIONS (10%)	15
APPENDIX: MUNICIPAL UTILITY REVENUE BOND SCORECARD	19
MOODY'S RELATED PUBLICATIONS	22

Analyst Contacts:

NEW YORK +1.212.553.1653

Edward Damutz +1.212.553.6990
Vice President - Senior Credit Officer
edward.damutz@moodys.com

Timothy Blake +1.212.553.4524
Managing Director - Public Finance
timothy.blake@moodys.com

Alexandra Parker +1.212.553.4889
Managing Director - Public Finance
alexandra.parker@moodys.com

Leonard Jones +1.212.553.3806
Managing Director - Public Finance
leonard.jones@moodys.com

SAN FRANCISCO +1.415.274.1708

Matthew A. Jones +1.415.274.1735
Senior Vice President/Manager
matthew.jones@moodys.com

Summary

This methodology explains how we evaluate the credit quality of essential service US municipal utility revenue bonds. The approach described in this methodology applies to six basic categories of municipal utilities: water distribution, gas distribution, electric distribution, sanitary sewerage, stormwater disposal, and solid waste disposal.¹

The primary factors that drive our credit analysis for these types of utilities are the size and health of the system and its service area, the financial strength of its operations, the legal provisions governing its management, and the strength of its rate management and regulatory compliance.

We intend for this methodology to help investors, municipalities, utilities, and other interested market participants understand how key quantitative and qualitative risk factors are likely to affect ratings in the municipal utility sector. This document does not offer an exhaustive treatment of all factors that are reflected in our ratings, but should enable the reader to understand the considerations that are usually most important for ratings in this sector. While reflecting many of the same core principles that we have used in assigning ratings to this sector, this methodology uses a scorecard that quantifies several factors that we previously evaluated in qualitative ways.

The purpose of the scorecard is to provide a reference tool that market participants can use to approximate most credit profiles within the US municipal utility sector. The scorecard provides summarized guidance for the factors that we generally consider most important in assigning ratings to these issuers. However, the scorecard is a summary that does not include every rating consideration. The weights the scorecard shows for each factor represent an approximation of their importance for rating decisions. In addition, the scorecard was built based on historical results, while our ratings are based on forward-looking expectations. As a result, we would not expect the scorecard-indicated outcome to match the actual rating in every case.

THIS RATING METHODOLOGY WAS UPDATED ON OCTOBER 10, 2019. WE HAVE UPDATED SOME OUTDATED REFERENCES AND ALSO MADE SOME MINOR FORMATTING CHANGES.

¹ Different methodologies are used to assign ratings to municipal utility districts, global regulated water utilities, regulated electric and gas utilities, electric generation and transmission cooperatives, and waste to energy projects. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Introduction

This methodology covers debt secured by the revenues generated by US municipal utilities providing monopolistic services essential to public health and functional economies.

The security for a municipal utility revenue bond is typically defined in a bond resolution or a trust indenture, which acts as a contract between the utility and its bondholders. The resolution or indenture most often identifies the bond's security as a lien on the net revenues of the system after the payment of regular operating and maintenance expenses.

The sector is varied and fragmented. US municipal utilities provide many different services whose rates or fees can secure debt. The utilities mostly fall into one or more of six basic categories:

- 1) **Water utilities** take water from the ground, a river, a lake, or in special cases the ocean, treat it to a potable standard, and distribute it to customers for drinking, cleaning, and commercial, industrial, or agricultural uses. These utilities can be involved in any or all of the functions of water supply: water treatment, long-distance transmission, and retail water distribution. Some water utilities have no treatment capacity and purchase potable water wholesale.
- 2) **Gas utilities** take natural gas from a wholesale² pipeline, odorize it for safety detection, and pressurize it and deliver it to customers through a pipe network for uses such as heating, cooking, or commercial and industrial applications. Some municipal gas systems may encompass their own natural gas supplies.
- 3) **Electric utilities** purchase electricity³ from wholesale suppliers and deliver it to residential, commercial, and industrial customers for a wide range of power uses.
- 4) **Sanitary sewer** utilities collect and treat wastewater, discharging it into a waterway or injecting it underground, and landfilling or incinerating the residual sludge. Some sewer utilities with no treatment capacity gather wastewater and transmit it to another utility that treats it.
- 5) **Stormwater** utilities collect and treat rainwater before discharging it into a body of water such as an ocean or a river. While every city or county addresses stormwater drainage as an integral element of its streets and highways, the stormwater systems that require capital markets financing are typically large in scale and are necessary to avert flooding from heavy seasonal rainfall in hilly areas.
- 6) **Solid waste** utilities collect residential or commercial refuse and dispose of it through landfills, waste-to-energy plants, or other waste-disposal processes. A solid waste system can be complete or collection-only, relying on another municipal or private entity for long-haul removal and disposal through landfill or incineration.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moody.com for the most updated credit rating action information and rating history.

² This methodology covers gas distribution utilities. These utilities purchase their supply from providers covered under the regulated electric and gas utilities methodology, or other providers. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

³ Only those municipal electric utilities that generate less than 20% of their own power are covered by this methodology. We rate electric generation utilities under different methodologies. For information, see our methodology that describes general principles related to US public power electric utilities with generation ownership exposure and also our methodology that describes general principles related to US municipal joint action agencies. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Defining the municipal utility universe

This methodology covers essential-service utilities that operate as departments, boards, or independent authorities of US states or local governments.

States and subdivisions of states, such as counties and cities, often issue bonds secured by the net revenues generated by a system operated directly under their auspices, such as a city water department. Other times, states or state subdivisions create an independent authority or special purpose district that operates the system and issues the bonds. This distinction is usually unimportant for rating purposes, although in some cases a separate authority has beneficial management expertise.

This methodology focuses on revenue bonds for essential-service functions. Other types of public utilities issue bonds backed by revenues charged for services such as telephone, cable television, or parking. These services are typically competitive and subject to greater elasticity in pricing and utilization. Bonds secured by revenues generated by these services are not rated under this methodology. Also not rated under this methodology are utility revenue bonds whose rating is ultimately based on a General Obligation guaranty. Lastly, the electric utilities covered under this methodology are typically retail distributors of electricity mostly generated elsewhere. Electric generation utilities, municipal waste-to-energy facilities, and US municipal joint action agencies are rated under separate methodologies.⁴

The credit quality of essential-service utility revenue bonds is generally strong. Its numerous fundamental strengths include:

- 1) The provision of essential services, usually in a government-protected monopoly
- 2) Typically unregulated and independent rate-setting authority
- 3) The ability to discontinue service to delinquent accounts and in many cases to put a lien on the property for nonpayment
- 4) Utility cost burdens that are typically low relative to household income and to tax burdens
- 5) A generally strong federal and state regulatory framework that is designed to keep utilities functioning in order to protect public health and achieve environmental goals
- 6) A "special revenue" designation that may insulate a utility from a parent's bankruptcy

The Relationship Between General Obligation (GO) and Utility Revenue Bond Ratings

A municipality's GO credit quality may directly affect the strength of its associated utility systems. This section outlines the broad principles that apply when assessing the credit linkages between a municipality's GO and utility debt. These broad principles are meant to enhance transparency around our view of the relationship between related ratings and explain why, in most cases, the ratings of GO and associated utility revenue debt are and will remain relatively close.

Municipal utility debt is generally exposed to similar credit strengths and pressures as the GO and can thus expect to experience simultaneous credit improvement or deterioration. Examples of credit linkages between the GO and utility debt include:

- » Economy: Utility systems usually rely on a coterminous or overlapping economic base and service area.

⁴ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

- » Legal structure: Utility bond indentures sometimes contain events of default tied to the bankruptcy or insolvency of the general government.
- » Finances and Debt: Cash can often flow between the two entities, sometimes with a formal funding mechanism. Debt and other long-term liabilities are often paid by the same group of constituents. GO and utility issuers may also be exposed to the same pension plan.
- » Management and Governance: Management of the city and the utility may be the same or have close ties. For instance, city management may appoint the board of the utility or have the power to affect enterprise rates.
- » Capital Markets: The GO and the utility issuer may need to access the same capital markets for funding.

Because of these linkages, in most cases, ratings of a municipality's utility debt will typically be within two notches of its GO rating.

There are, however, cases where a utility's credit strength may be sufficiently independent from its associated GO rating to justify a larger notching difference. We expect these cases to be rare, and they would likely include several of the following characteristics:

- » An unusually weak GO rating which is driven by idiosyncratic factors less relevant to the utility's credit strength.
- » A non-coterminous service area, so that utility revenues are derived from a larger and more diversified base.
- » A closed loop flow of funds, wherein the GO issuer is unable to access utility revenues.
- » A strict separation of accounts and assets.
- » The absence of rating triggers tied to the GO credit quality in utility financings.
- » Separation of management and governance.

Conversely, a utility rating more than two notches below its associated GO generally has one or more of the following characteristics:

- » An unusually weak utility rating which is driven by factors less relevant to the general government's credit strength.
- » A utility service that is narrower and less diverse than the municipality as a whole.
- » A lack of expectation that the general government would transfer funds to assist a utility experiencing financial distress.
- » A strict separation of accounts and assets.
- » The absence of rating triggers tied to the utility credit quality in GO financings.
- » Separation of management and governance.

Essential service revenue bonds in bankruptcy

An important property of public utility revenue bonds is that they enjoy a potential moat from a general government's bankruptcy. Under Chapter 9 of the US bankruptcy code, a lien on "special revenue" bonds remains valid and enforceable even if the issuer is granted bankruptcy protection.

The potential survival through bankruptcy of a lien on the net revenues of a utility system is a key strength. When a debtor is granted bankruptcy protection, its unsecured assets are subject to an automatic stay, which freezes outflows unless approved by the bankruptcy judge. An asset secured by a lien that is not subject to the automatic stay enjoys a credit advantage over a related General Obligation credit that is subject to the stay.

Further, a special revenue bond is less susceptible to adjustment in bankruptcy if its lien leads to an interpretation of the bonds as enjoying secured status.

Although the bankruptcy code establishes these strengths of a special revenue bond, Chapter 9 remains largely untested. Case law offers few precedents, and only a handful of examples to support the assertion that a special revenue designation protects revenue bonds in bankruptcy.

The political reality is that utility systems are often major cash-generating assets that other stakeholders frequently would like to bring into bankruptcy negotiations. Moreover, bankruptcy judges in some cases have allowed the cash flows generated by special revenue systems to pay the legal costs of related parents in bankruptcy.

It is premature to conclude that utility revenue bonds are completely insulated from Chapter 9 bankruptcies, and the risks and costs of a general government bankruptcy remain considerable.

The Scorecard

The municipal utility scorecard (see Exhibit 1) is a tool providing a composite score of a utility's credit profile based on the weighted factors we consider most important, universal and measurable, as well as possible notching factors dependent on individual credit strengths and weaknesses. The scorecard is designed to enhance the transparency of our approach by identifying critical factors as a starting point for analysis, along with additional considerations that may affect the final rating assignment.

The scorecard is not a calculator. Its purpose is not to determine the final rating, but rather to provide a standard platform from which to begin viewing and comparing municipal utility credits. It, therefore, acts as a starting point for a more thorough and detailed analysis.

The scorecard-indicated outcome will not match the actual rating in every case, for a number of reasons including the following:

- » Our methodology considers forward-looking expectations that may not be captured in historical data.
- » The scorecard is a summary that does not include every rating consideration.
- » In some circumstances, the importance of one factor may escalate and transcend its prescribed weight in this methodology.

EXHIBIT 1

Municipal Utility Scorecard Factors

Broad Scorecard Factors	Factor Weighting	Subfactors	Subfactor Weighting
System Characteristics	30%	Asset Condition (Remaining Useful Life)	10%
		Service Area Wealth (Median Family Income)	12.5%
		System Size (O&M)	7.5%
Financial Strength	40%	Annual Debt Service Coverage	15%
		Days Cash on Hand	15%
		Debt to Operating Revenues	10%
Management	20%	Rate Management	10%
		Regulatory Compliance and Capital Planning	10%
Legal Provisions	10%	Rate Covenant	5%
		Debt Service Reserve Requirement	5%
Total	100%	Total	100%

We intentionally limited our scorecard metrics to major rating drivers that are common to most issuers. Outside of these drivers, we may adjust the scorecard score for a variety of "below-the-line" adjustments, which are more idiosyncratic factors that are likely not to apply to all issuers, but that can impact credit strength. The scorecard score is the result of the "above-the-line" score based quantitatively on the above-the-line factors, combined with any "below-the-line" notching adjustments. The scorecard score is a guideline for discussion, but does not determine the final rating. The rating is determined by a rating committee, which considers, but is not bound by, the scorecard score.

Discussion of Scorecard Factors

To arrive at a scorecard-indicated outcome, we begin by assigning a score for each subfactor. We have chosen measures that act as proxies for a variety of different service area characteristics, financial conditions, and governance behaviors that can otherwise be difficult to measure objectively and consistently. Based on the scores and weights for each subfactor, a preliminary score is produced that translates to a given rating level.

We may then move the score up or down a certain number of rating notches based on additional “below-the-line” factors that we believe impact a particular utility’s credit quality in ways not captured by the statistical portion of the scorecard. This is where analytical judgment comes into play. We may also choose to make adjustments to the historical inputs to reflect our forward-looking views of how these statistics may change.

The scorecard score, combined with below-the-line notching, then provides an adjusted score. This adjusted score is not necessarily the final rating. Because some utilities’ credit profiles are idiosyncratic, one factor, regardless of its scorecard weight, can overwhelm other factors, and other considerations may prompt us to consider final ratings that differ from the scorecard-indicated outcome.

Below, we discuss each factor and subfactor, as well as the below-the-line adjustments and other considerations that we analyze within each category of this methodology.

Factor 1: System Characteristics (30%)

EXHIBIT 2

System Characteristics (30%)

		Aaa	Aa	A	Baa	Ba	B and Below
Asset Condition (10%)	Net Fixed Assets/Annual Depreciation :	> 75 years	75 years ≥ n > 25 years	25 years ≥ n > 12 years	12 years ≥ n > 9 years	9 Years ≥ n > 6 Years	≤ 6 Years
System Size (7.5%)	Water and/or sewer / Solid Waste:	O&M > \$65M	\$65M ≥ O&M > \$30M	\$30M ≥ O&M > \$10M	\$10M ≥ O&M > \$3M	\$3M ≥ O&M > \$1M	O&M ≤ \$1M
	Stormwater:	O&M > \$30M	\$30M ≥ O&M > \$15M	\$15M ≥ O&M > \$8M	\$8M ≥ O&M > \$2M	\$2M ≥ O&M > \$750K	O&M ≤ \$750K
	Gas or Electric:	O&M > \$100M	\$100M ≥ O&M > \$50M	\$50M ≥ O&M > \$20M	\$20M ≥ O&M > \$8M	\$8M ≥ O&M > \$3M	O&M ≤ \$3M
Service Area Wealth (12.5%)		> 150% of US median	150% ≥ US median > 90%	90% ≥ US median > 75%	75% ≥ US median > 50%	50% ≥ US median > 40%	≤ 40% of US median

Why it matters

This factor on the scorecard measures a utility’s capacity to fund its operations and capital needs based on the health of its capital assets, the size and diversity of its operations, and the strength and resources of its service base.

The scope of this factor is broad. Each of the subfactors contributes to an analysis of what magnitude of expenditures is necessary to keep the system functioning, and how large, diverse, and flexible the available resources are to meet those expenditures.

Subfactor 1a: Asset condition (10%)

Input: Net fixed assets divided by most recent year's depreciation, expressed in years

The condition of a utility's capital assets determines its ability to comply with environmental regulations and continue delivering adequate service with existing resources.

Depreciation is an accounting concept that acts as a proxy for the rate at which a utility's plant and equipment are aging. Central to our analysis of capital adequacy is an assessment of how utilities "fund depreciation," meaning make capital replacements and repairs to address aging plant and equipment.

The consequences of failing to fund depreciation can be costly. Implicit in this measure is the concept of deferred capital investment. Utilities that delay investing in their systems, replacing aging plant and equipment, and modernizing their facilities often find it more expensive to do so later. Capital investments are ordinarily more expensive when deferred.

Further, systems whose facilities deteriorate often run afoul of environmental regulations. The failure to fund depreciation, which will manifest as a declining useful remaining life, can lead to sewage overflows, inflow and infiltration problems, or non-compliant wastewater discharges, resulting in civil fines, litigation, or regulatory consent decrees. These are usually more expensive than funding depreciation through a prudent multi-year capital plan that replaces assets as they deteriorate or break down.

The inherent differences between types of utilities are manifested in their component parts, which can have very different useful lives. Because a solid waste utility is largely automotive-based, with collection vehicles and earthmoving equipment at the landfill, the useful life of its assets will be well under 20 years, compared to a water utility whose distribution mains and reservoir have useful lives of 40 to 100 years. We generally acknowledge and address these differences below the line.

For utilities whose asset condition ratios are not determinable, such as utilities that utilize cash accounting and do not report net fixed assets or depreciation, we are likely to assess the sufficiency of capital assets based on other available information.

Subfactor 1b: Service area wealth (12.5%)

Input: Median family income of the service area, expressed as a percentage of the US median

Most of the costs of operating a utility and maintaining its capital assets are borne by ratepayers. The income of the residents of the service base conveys the capacity of its ratepayers to bear higher rates to fund operations and capital upgrades. The median family income breakpoints in this scorecard are aligned with the ones in our US local government general obligation debt methodology.⁵

Utilities that serve lower-income ratepayers may have more difficulty implementing higher rates, if utility costs consume a considerable share of residents' budgets. The US Environmental Protection Agency (EPA) considers wastewater costs exceeding 2% of median household income to be a heavy burden, for example, a threshold that would be reached more quickly for a utility serving lower-income ratepayers.

We believe MFI is the best proxy for the wealth of a service base, but other indicators such as the poverty rate, unemployment, home foreclosures, per capita income, and median home value supplement our analysis of ratepayer capacity.

⁵ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Subfactor 1c: System size (7.5%)

Input: Most recent year operations and maintenance expenditures, expressed in dollars

Larger systems tend to be more diverse and enjoy economies of scale. The size of a system implies the flexibility and resilience not only of its operations, but also of its service base.

Small systems present a number of risks. They are less likely to have redundancies, which allow a system to shut down some of its operations in an emergency or to make repairs without interrupting service. Small standalone water or sewer systems will typically depend upon a single supply of water or a single sewage treatment plant. They are more likely to be exposed to a concentrated customer base. They are more susceptible to the departure of a single large customer. An unexpected capital need is likely to be more costly relative to its annual budget. The collective engineering and scientific expertise is likely to be less robust than a larger system's.

We use different breakpoints for different types of systems in this subfactor, recognizing that not all types of utilities have the same cost structure. For instance, an electric distribution system is more expensive to run than a stormwater system. A distribution-only water system is likely to have a lower, more predictable cost base, but also depend on an external system for water supply and pay prices largely out of its control.

Utilities that are wholesalers to municipal government customers may exhibit operating stability not captured by size or service area wealth. Many of a utility's risks may be shifted to its municipal customers if their service contracts prevent these customers from switching providers or decreasing payments. If service contracts are so strongly worded and unconditional that municipal customers would have to pay the utility's debt service under any circumstances, then the utility's bonds may effectively represent a claim on the combined credit quality of the municipal governments.

For utilities that are exclusively wholesalers to municipal customers, we assess the customers' ("participants") credit quality, using our methodologies for general obligation bonds, lease revenue bonds, or other appropriate methodology determined by the nature of the participants' pledge to the utility.⁶ For bonds secured by a utility's net revenue pledge, we incorporate the strength of the municipal customers' credit quality as an important factor in the utility's revenue base. For utilities whose pledges are essentially a pass-through of the municipal customers' underlying pledges, we may rate their bonds using our public sector pool financings methodology, recognizing that bondholders enjoy a direct claim on the underlying municipalities' ability and willingness to pay.⁷

Below-the-line adjustments

Additional service area economic strength or diversity: We would use this adjustment, upward or downward, if the MFI statistic incompletely or inaccurately depicts that capacity of the service base to bear higher rates.

Significant customer concentration: A large exposure to a single user or industry, or a small number of users, poses substantial risks that might not be captured in MFI. We may adjust the scorecard score down if a large share of a utility's revenues comes from one or a small number of customers, or from a single industry. We would be more likely to use this adjustment for volatile, unpredictable, and mobile industries than for longer-standing, more stable ones. We are less likely to consider a wholesale customer as a factor contributing to concentration, as it is purchasing on behalf of end-users.

⁶ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

⁷ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Revenue per customer greatly over/under regional average: Revenue per customer conveys additional information about users' capacity for higher rates that might not be captured in MFI. We might adjust the above-the-line rating, upward or downward, if revenue per customer implies higher or lower ability to increase rates than MFI suggests.

Exposure to weather volatility, extreme conditions or market fluctuations: Large amounts of rain that infiltrate pipes or storms that destroy equipment are examples of credit risks that could result in below-the-line adjustments. Weather can also affect the prices that distribution systems pay third-party providers for electricity or natural gas.

Resource vulnerability: Water, gas, and electric distribution utilities sell a product whose availability can be limited or expensive in some cases. For instance, a water provider in a drought-stricken region may have to purchase expensive third-party water, and see declines in billable flow due to conservation efforts. We may adjust the scorecard score down if the availability of water, an adequate gas supply, or a dependable source of electricity is vulnerable or in doubt.

Sizeable or insufficient capacity margin: Our useful remaining life calculation is designed to assess the quality of existing capital assets, but it does not measure the adequacy of a system's capacity relative to demand. Areas that are growing need more water, gas, and electricity, and place greater demands on wastewater and trash disposal utilities. Systems that are close to capacity may face greater capital costs to expand in the future, suggesting larger debt burdens and posing additional risks that we may adjust the scorecard score downward for. Alternately, systems with ample capacity may be notched up, given the lack of capital spending requirements implied by the excess capacity. Further, excess capacity can sometimes imply a revenue-generating opportunity, since utilities can often sell their product or service to other parties. We are less likely to view excess capacity as a positive if it is caused by a declining user base.

Unusual depreciation practices relative to industry norms: Utilities typically have some flexibility to determine the depreciation schedules of their assets. Utilizing unreasonably long useful lives or employing other practices that distort depreciation schedules would also distort our remaining useful life calculation. We may notch a score down if an unreasonable depreciation schedule is inflating a utility's remaining useful life. Likewise, we may notch a score up if an unusually rapid depreciation schedule understates remaining useful life.

Factor 2: Financial Strength (40%)

EXHIBIT 3

Financial Strength (40%)	Aaa	Aa	A	Baa	Ba	B and Below
Annual Debt Service Coverage (15%)	> 2.00x	2.00x ≥ n > 1.70x	1.70x ≥ n > 1.25x	1.25x ≥ n > 1.00x	1.00x ≥ n > 0.70x	≤ 0.70x
Days Cash on Hand (15%)	> 250 Days	250 Days ≥ n > > 150 Days	150 Days ≥ n > > 35 Days	35 Days ≥ n > 15 Days	15 Days ≥ n > 7 Days	≤ 7 Days
Debt to Operating Revenues (10%)	< 2.00x	2.00x < n ≤ 4.00x	4.00x < n ≤ 7.00x	7.00x < n ≤ 8.00x	8.00x < n ≤ 9.00x	≥ 9.00x

Why it matters

The financial health of a utility determines its flexibility to respond to contingencies, resilience against potential short-term shocks, and cushion against a long-term unfavorable trend.

We measure utilities' financial health by looking at cash and other liquid reserves, the burden that debt places on operations, and the magnitude by which revenues are sufficient to meet expenditures.

Subfactor 2a: Annual debt service coverage (15%)

Input: Most recent year's net revenues divided by most recent year's debt service, expressed as a multiple

Debt service coverage is a core statistic assessing the financial health of a utility revenue system. The magnitude by which net revenues are sufficient to cover debt service shows a utility's margin to tolerate business risks or declines in demand while still assuring repayment of debt. Higher coverage levels indicate greater flexibility to withstand volatile revenues, unexpected outflows, or customer resistance to higher rates.

Utilities usually enter into a rate covenant under which they pledge to achieve a given level of debt service coverage each year. The covenant ensures that the utility utilizes its assets to generate sufficient income to pay bondholders.

The analysis of a utility system's debt service coverage demands ample context. If debt service escalates in future years, then the utility's current net revenues may be sufficient to cover debt service this year, but not in the future. Systems with greater revenue stability can operate comfortably at lower coverage levels. Systems with greater capital needs are likely to incur more debt, which will lead to increased debt service and decreased coverage. The debt service coverage calculation is the basis for a comprehensive analysis of a utility's financial flexibility and trend over the long term.

Rate covenants define a calculation method. These calculation methods vary, for example in the inclusion or exclusion of connection fees. Our coverage calculation will frequently differ from the coverage utilities report for purposes of complying with their rate covenants. Frequently, our analysis will consider several types of coverage, including maximum annual debt service (MADS) coverage, annual debt service coverage, coverage with and without connection fees, and coverage as calculated for the rate covenant. For entry on the scorecard, we include connection fees (when pledged) in revenues, recognizing that these are pledged revenues that are usually generated annually and are an important source of funding for expansion. If connection fees are particularly volatile, or if they represent an inordinate share of revenues, we may adjust below the line.

Subfactor 2b: Days cash on hand (15%)

Input: Unrestricted cash and liquid investments times 365 divided by operating and maintenance expenses, expressed in days

Cash is the paramount resource utilities have to meet expenses, cope with emergencies, and navigate business interruptions. Utilities with a lot of cash and cash equivalents are able to survive temporary disruptions and cash flow shortfalls without missing important payments. A large cash balance can also partially compensate for the lack of a debt service reserve fund. A low cash balance indicates poor flexibility to manage contingencies.

We include in this measure any cash or cash-equivalent that is both unrestricted and liquid. The measure does not include cash held in a debt service reserve fund, unspent bond proceeds, or cash that is restricted for capital.

Subfactor 2c: Debt to operating revenues (10%)

Input: Net debt divided by most recent year's operating revenues, expressed as a multiple

A utility's debt profile determines its leverage and fixed costs. Systems that carry a lot of debt have less ability to reduce costs if demand shrinks, and are generally more challenged to achieve higher debt service coverage.

A greater debt burden may also prohibit a utility from funding necessary capital upgrades, if a covenant prevents the issuer from incurring the debt necessary to fund those upgrades.

"Net debt" is a utility's long-term debt subtracted by debt service reserve funds.

Below-the-line adjustments

Debt service coverage (annual or MADS) below key thresholds: A debt service coverage ratio below 1 times is an important threshold, because coverage below 1 times indicates the utility is not fully covering debt service with income generated from operations. If a utility fails to achieve 1 times coverage, we may adjust the score down to reflect the financial imbalance of the utility's operations. Another key threshold that would likely prompt us to adjust the score down is if coverage were to fall below the utility's coverage covenant, even if that covenant is higher than 1 times. Management's willingness and ability to operate the system for bondholders' benefit is a crucial credit consideration, and a breach of covenant calls that willingness and ability into question. A coverage level that impedes the issuance of additional bonds under the utility's additional bonds covenant could also prompt us to adjust the score down, if we think it would prevent the utility from funding necessary capital upgrades.

Constrained liquidity position due to oversized transfers: It is common for utilities to transfer cash to their general governments regularly, either to share overhead costs, make payments in lieu of taxes for occupied property, or to help fund shared infrastructure. It is also common for parent governments to tap utilities' cash to fund General Fund operations. We may notch a utility's score down if these types of transfers are large and begin to strain its own liquidity. We are more likely to make this adjustment if the general government is operationally reliant on utility transfers and has the authority to increase them, particularly if the general government is struggling financially. Even if a utility has never transferred cash to its parent, such transfers remain a possibility⁸, one of the reasons for the relationship between a revenue rating and the GO rating of its general government.

Outsized capital needs: A utility with significant capital needs will likely need to incur additional debt not communicated in the existing debt metric. We may adjust the score downward for utilities under regulatory consent decree, or otherwise with great capital needs, that are likely to increase their debt levels.

Oversized adjusted net pension liability relative to debt, or significant actuarial required contribution underpayment: Employees of public utilities are usually members of a municipal pension plan. Most utilities either sponsor their own plan or participate in another entity's plan, and are responsible for funding their share of the plan's pension liabilities. We may adjust the score down if this liability is especially large, or if the utility has underfunded its contributions.

Significant exposure to puttable debt and/or swaps, or other unusual debt structure: The risks of a debt portfolio can be magnified if it is significantly composed of puttable debt. Utilities generally set rates with the intention of covering operating expenses and debt service in the current year. A debt put, accelerated amortization under a term-out, or other unexpected calls on a utility's resources can impose immediate and

⁸ Unless the utility's flow of funds is closed-loop. A closed-loop flow of funds is stronger than an open one for this reason.

substantial, unbudgeted cash outflows and upend that intention. We may notch a score down, potentially by several notches, if the composition of a debt portfolio, or cash-flow demands or unfavorable valuation of a swap, communicates a greater degree of risk than the existing debt metric.

Factor 3: Management (20%)

EXHIBIT 4

Management (20%)	Aaa	Aa	A	Baa	Ba	B and Below
Rate Management (10%)	Excellent rate-setting record; no material political, practical, or regulatory limits on rate increases	Strong rate-setting record; little political, practical, or regulatory limits on rate increases	Average rate-setting record; some political, practical, or regulatory limits on rate increases	Adequate rate-setting record; political, practical, or regulatory impediments place material limits on rate increases	Below average rate-setting record; political, practical, or regulatory impediments place substantial limits on rate increases	Record of insufficiently adjusting rates; political, practical, or regulatory obstacles prevent implementation of necessary rate increases
Regulatory compliance and capital planning (10%)	Fully compliant OR proactively addressing compliance issues; Maintains sophisticated and manageable Capital Improvement Plan that addresses more than a 10-year period	Actively addressing minor compliance issues; Maintains comprehensive and manageable 10-year Capital Improvement Plan	Moderate violations with adopted plan to address issues; Maintains manageable 5-year Capital Improvement Plan	Significant compliance violations with limited solutions adopted; Maintains single year Capital Improvement Plan	Not fully addressing compliance issues; Limited or weak capital planning	Not addressing compliance issues; No capital planning

Why it matters

If the legal provisions establish the minimum level of financial margin at which a utility must be run, the utility's management determines the actual level at which it is run.

Utility management refers to the dynamics of setting rates, planning for capital spending, budgeting for annual expenditures, and complying with environmental regulations. All of these factors interplay with one another to determine the credit strength of a utility system.

The scorecard captures two crucial aspects of management: rate-setting and capital planning. These two aspects encompass most of what is important in running a utility: keeping the system in good working order, and paying for it.

Subfactor 3a: Rate management (10%)

User rates are the primary, and sometimes only, mechanism utilities employ to pay for their operations.

Ideally, rates increase marginally and steadily, rather than choppily. It is common for utilities to split their rates into a “base” charge (flat rate charged to all users) plus a “volumetric” charge (per unit costs based on flow/usage). Utilities funded to a greater extent by the volumetric charge face greater risks, since volume can be economically sensitive or decline because of a shift in consumption patterns.

Management's track record at setting rates appropriately and increasing them when necessary drives this score. We tend to give higher scores to utilities that set rate structures under which increases are automatic, and do not require annual approval for implementation.

Embedded into this factor is the length of time required to implement a rate increase. Many public utilities enjoy the authority to set their own rates, and can enact a rate increase in short order by majority vote of the governing board. Some utilities must give the public a few weeks or months notice before increasing rates, or choose to do so by policy or practice. Some utilities require state approval to increase rates. Utilities that need state approval often have to file a rate case subject to public objection, and in some cases the state takes a long time to approve them or denies the full rate increase.

The longer it takes a utility to implement a rate increase, the less flexibility it has to quickly generate new revenues when faced with cash flow shortfalls.

Subfactor 3b: Regulatory compliance and capital planning (10%)

The public utility sector is heavily regulated. Most public utilities are regulated by federal as well as state agencies.

The EPA enforces the Safe Drinking Water Act for water distribution utilities, the Clean Water Act for sanitary sewer and stormwater utilities, the Resource Conservation and Recovery Act for solid waste disposal systems, and the Clean Air Act for electric utilities. These statutes, and the methods employed to enforce them, are continually evolving, often intensifying over time. Additionally, many states have passed their own environmental regulations and are active enforcers.

This scorecard factor assesses utilities' compliance with relevant regulations and their plans for the capital expenditures required to comply in the future.

In addition to achieving environmental compliance, proper capital planning ensures the continued delivery of the product or service and the ongoing generation of revenues.

During our reviews, we look for indications of potential compliance gaps, such as environmental litigation, a delay in renewing a permit, or a consent decree with a state or federal enforcement body.

Below-the-line adjustments

Unusually strong or weak capital planning: Continued violations of environmental laws and the associated litigation can impose extraordinary costs on utilities. We may notch the score down if these costs threaten to overwhelm a system's resources, in the form of a large consent decree, lawsuit, or other costs.

Alternately, we may notch the score up if a utility's capital planning is particularly sophisticated or forward-looking. More sophisticated and forward-looking capital management is more important for systems facing resource vulnerability or extreme weather volatility.

Factor 4: Legal provisions (10%)

EXHIBIT 5						
Legal Provisions (10%)	Aaa	Aa	A	Baa	Ba	B and Below
Rate Covenant (5%)	> 1.30x	≥ n 1.30x > 1.20x	≥ n 1.20x > 1.10x	≥ n 1.10x > 1.00x		≤ 1.00x
Debt Service Reserve Requirement (5%)	DSRF funded at MADS	DSRF funded at lesser of standard 3-prong test	DSRF funded at less than 3-prong test OR springing DSRF		NO explicit DSRF; OR funded with speculative grade surety	

Why it matters

The legal provisions of a public utility revenue bond form the backbone of its security.

When a municipality assigns its General Obligation pledge to a bond, it has promised to do whatever it has to do to cover debt service, in most cases from any revenues or resources at its disposal.

A utility revenue bond enjoys no such open-ended pledge, making the legal edifice of the bond critical to bondholder security. Most commonly, the legal security for municipal utility revenue bonds is a lien on the net revenues of the system. Occasionally, bondholders enjoy a lien on the gross revenues of a system. We ordinarily do not consider a gross revenue pledge as materially stronger than a net revenue pledge, because systems need to pay operating and maintenance costs in order to remain functional.

The linchpin of a bond's legal structure is its covenants: the legal compulsions the municipal utility agrees to when issuing the bonds.

Utilities abide by many different types of covenants. We consider three to be the most important: the rate covenant, the additional bonds test, and the debt service reserve fund. Also crucial in the analysis of a revenue bond's legal structure is whether the flow of funds is open-loop (accessible by another government entity) or closed.

Strong covenants bind the utility to utilize its assets to benefit bondholders by operating with a comfortable financial margin, not taking on too much debt, and maintaining adequate cash available to pay debt service. Weak or nonexistent covenants allow the utility to operate on a thin margin or even at a net loss, incur a lot of leverage, transfer its money to other government entities, or maintain inadequate cash, in ways that are detrimental to bondholders.

Covenants specify the minimum factors management must legally abide by. Utilities frequently exceed the minimum. Many of our ratings represent the expectation of performance at levels that exceed the covenants.

Subfactor 4a: Rate covenant (5%)

Input: Covenant governing net revenues (operating revenues minus operating expenditures net of depreciation) divided by annual debt service, expressed as a multiple

The rate covenant is a legal pledge to set rates such that net revenues will be sufficient to cover debt service at a prescribed level. For example, a covenant may bind a utility to ensure that net revenues cover debt service by 1.2 times. If net revenues fall short of this covenant in one year, the utility must raise rates to achieve a compliant coverage level the following year.

The rate covenant takes many forms. Some utilities pledge for net revenues to cover current year annual debt service by a given level. Others pledge to cover average annual debt service throughout the life of the bonds at that level. A strong coverage requirement would be for net revenues to cover maximum annual debt service (MADS) by a certain level.

Some rate covenant formats are materially weaker than this. Some utilities allow a "rolling" calculation, which includes outstanding cash from prior years' surpluses as part of the resources available to cover debt service. Many rate covenants allow connection fees to be included in available operating revenues.

The above-the-line coverage factor assumes the covenant is an annual debt service coverage calculation. We can adjust for any departures from this format below the line, upward or downward.

Subfactor 4b: Debt service reserve requirement (5%)

Input: Debt service reserve requirement

Many issuers agree to hold a specified amount of cash or other resources in a debt service reserve fund (DSRF), which the trustee can tap to pay debt service in the event that net revenues are inadequate. The DSRF covenant ordinarily requires the utility to replenish any draws from the DSRF.

The DSRF protects bondholders by assuring the payment of debt service even if net revenues fall short in one year.

DSRF funds can be funded with cash, or with surety policies from an insurer. We generally consider cash to be superior to a surety, although this is unlikely to materially affect the rating as long as the surety provider is rated investment grade.

One commonly used DSRF requirement is known as the "three-pronged test." Under tax law, the Internal Revenue Service limits the earning of interest on proceeds of a tax-exempt bond unless the invested proceeds comply with the three-pronged test. Under that test, the DSRF must be the lesser of 10% of principal, MADS, or 1.25 times average annual debt service. A DSRF set at the three-pronged test is usually weaker than one funded at MADS.

Revenue bonds have been issued without a DSRF in the past. This has resulted in a number of utilities with some bonds secured by a DSRF and other parity bonds secured by the same lien but no DSRF. We have rarely distinguished ratings between these parity bonds. The DSRF is a last-resort security measure, and most utilities comply with their coverage covenants and never have to tap their DSRF. We are most likely to distinguish between DSRF-secured bonds and bonds with no DSRF if the system holds narrow liquidity. A system operating with abundant liquidity can use its operating cash to meet debt service shortfalls, effectively executing a similar function to the DSRF. The combination of narrow liquidity and no DSRF exposes bondholders to greater risks of interrupted debt service payments, and is therefore more likely to be reflected in ratings.

For a utility whose debt is mostly, but not all, secured by a DSRF, we will still enter the DSRF requirement into the scorecard. For a utility whose debt is mostly not secured by a DSRF, we will adjust the DSRF entry downward⁹.

⁹ For example, if 1/3 of a utility's debt is secured by a DSRF funded at MADS and 2/3 is not secured by a DSRF at all, we may enter the DSRF requirement as a Baa.

Below-the-line adjustments

Coverage covenant other than annual debt service: Our input for the coverage covenant assumes the coverage refers to net revenue coverage of annual debt service. A “rolling” coverage covenant that includes outstanding cash, or some other modification that weakens the meaning of the covenant, may prompt us to notch the score down. Conversely, a MADS coverage covenant may prompt us to notch the score up.

Structural enhancements/complexities: The scorecard is designed to capture covenants as they are most commonly constituted, but cannot account for the myriad structures and complexities that arise in bond transactions throughout the sector. Enhancements such as a lock-box structure for debt service may lead us to notch the score up. Other shortcomings, such as a weak additional bonds test or the inclusion of cash in a coverage covenant, may lead us to notch the score down. Any characteristic of the legal provisions of a bond transaction may lead us to conclude that the scorecard does not adequately capture its risk profile.

Treatment of Different Liens on a US Municipal Utility's Net Revenues

It is common for utilities to issue debt secured by different liens on their net revenues. Senior bonds are secured by a first lien on net revenues, and subordinate bonds or loans secured by a subordinate, or junior, lien. Sometimes, utilities will issue debt secured by a third lien or lower.

Our practice is to evaluate the likelihood of default and the expected recovery in the event of default for each lien independently.

This will most commonly result in a rating distinction of one notch for each lien of subordination. In other words, if a municipal utility's senior lien is rated Aa3, its subordinate lien will most likely be rated A1 and the third lien will most likely be rated A2.

The reason for the typical one-notch-per-lien distinction is that subordinate liens are marginally more likely to default than senior liens, and subordinate liens' expected recovery in the event of default would be lower. Senior liens are typically afforded stronger legal protections under utilities' indentures, senior-lien debt service is usually paid earlier in the flow of funds, and the first lien would likely enjoy a better claim in bankruptcy.

For most investment grade municipal utilities, the probability of default for any lien is small, and so the notching distinction is driven primarily by a greater expected loss severity in the unlikely event of a default. This is comparable to our approach for ratings distinctions for different debt classes of investment grade corporations, where ratings distinctions are driven by differences in expected loss severities.¹⁰ In contrast to corporates, however, there often is not an explicit cross-default of senior municipal debt in the event of a subordinate payment default.

In some instances, we may conclude that an investment grade municipal utility's subordinate lien has a default probability and expected loss severity that is nearly as low or just as low as the senior lien (in which case we may not make a ratings distinction), or a default probability and expected loss severity that is materially higher than the senior lien (in which case we may make a ratings distinction of more than one notch).

Such a conclusion would be based on the municipal utility's management of its system with respect to its liens, and the characteristics of the legal framework governing the liens: rate covenants, additional debt provisions, and cross-default and acceleration provisions in a senior lien's variable rate debt resulting from a default on the subordinate lien, for example. If a utility has only a very small amount of senior lien debt, we may choose not to distinguish between liens.

The distinctions among a municipal utility's liens become starker when it faces a material likelihood of default or bankruptcy. For these situations, the different characteristics of the liens are likely to drive greater disparities in default probabilities and expected recoveries for disparate liens. Thus, we are more likely to employ ratings distinctions other than one notch for speculative grade municipal utilities' different liens as the Loss Given Default approach drives more of the analysis.

In nearly all instances, the ratings on the different liens of the same utility will remain closely related. The reason for this is that municipal utilities are actively managed enterprises that continually need to generate net revenues sufficient not only to cover debt service but also to fund capital needs. Even if senior lien coverage is strong, a utility that is unable to pay its junior lien debt service is not generating excess funds for capital investment and does not have capacity for capital borrowing. Thus, while subordinate liens face greater default probability and higher loss expectations based on their first-loss positions, an increased likelihood of default on a subordinate lien implies an increased likelihood of insolvency for the utility as a whole.

For this reason, we enter the debt-oriented inputs into the scorecard on a consolidated basis. For the debt to revenues factor, we enter total debt (senior and junior). For the debt service coverage factor, we enter total debt service coverage. It is the municipal utility's ability to cover all of its debt service with net revenues that determines its viability as a going concern. Even for a senior lien with a large coverage factor by net revenues, a narrow coverage of all debt service implies pressure to maintain healthy operations and generate funds sufficient for capital reinvestment.

¹⁰ For more information, see our cross-sector methodology that describes the alignment of corporate instrument ratings based on differences in security and priority of claim. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Appendix: Municipal Utility Revenue Bond Scorecard

EXHIBIT 6

		Aaa	Aa	A	Baa	Ba	B and Below
Numerical score		0.5 to 1.5	1.5 to 2.5	2.5 to 3.5	3.5 to 4.5	4.5 to 5.5	5.5 to 6.5
System Characteristics (30%)							
Asset Condition (10%)	Net Fixed Assets/Annual Depreciation :	> 75 years	75 years ≥ n > 25 years	25 years ≥ n > 12 years	12 years ≥ n > 9 years	9 Years ≥ n > 6 Years	≤ 6 Years
Service Area Wealth (12.5%)		> 150% of US median	150% ≥ US median > 90%	90% ≥ US median > 75%	75% ≥ US median > 50%	50% ≥ US median > 40%	≤ 40% of US median
System Size (7.5%)	Water and/or Sewer/ Solid Waste:	O&M > \$65M	\$65M ≥ O&M > \$30M	\$30M ≥ O&M > \$10M	\$10M ≥ O&M > \$3M	\$3M ≥ O&M > \$1M	O&M ≤ \$1M
	Stormwater:	O&M > \$30M	\$30M ≥ O&M > \$15M	\$15M ≥ O&M > \$8M	\$8M ≥ O&M > \$2M	\$2M ≥ O&M > \$750K	O&M ≤ \$750K
	Gas or Electric:	O&M > \$100M	\$100M ≥ O&M > \$50M	\$50M ≥ O&M > \$20M	\$20M ≥ O&M > \$8M	\$8M ≥ O&M > \$3M	O&M ≤ \$3M
Financial Strength (40%)							
Annual Debt Service Coverage (15%)		> 2.00x	2.00x ≥ n > 1.70x	1.70x ≥ n > 1.25x	1.25x ≥ n > 1.00x	1.00x ≥ n > 0.70x	≤ 0.70x
Days Cash on Hand (15%)		> 250 Days	250 Days ≥ n > 150 Days	150 Days ≥ n > 35 Days	35 Days ≥ n > 15 Days	15 Days ≥ n > 7 Days	≤ 7 Days
Debt to Operating Revenues (10%)		< 2.00x	2.00x < n ≤ 4.00x	4.00x < n ≤ 7.00x	7.00x < n ≤ 8.00x	8.00x < n ≤ 9.00x	≥ 9.00x
Management (20%)							
Rate Management (10%)		Excellent rate-setting record; no material political, practical, or regulatory limits on rate increases	Strong rate-setting record; little political, practical, or regulatory limits on rate increases	Average rate-setting record; some political, practical, or regulatory limits on rate increases	Adequate rate-setting record; political, practical, or regulatory impediments place material limits on rate increases	Below average rate-setting record; political, practical, or regulatory impediments place substantial limits on rate increases	Record of insufficiently adjusting rates; political, practical, or regulatory obstacles prevent implementation of necessary rate increases
Regulatory Compliance and Capital Planning (10%)		Fully compliant OR proactively addressing compliance issues; Maintains sophisticated and manageable Capital Improvement Plan that addresses more than a 10-year period	Actively addressing minor compliance issues; Maintains comprehensive and manageable 10-year Capital Improvement Plan	Moderate violations with adopted plan to address issues; Maintains manageable 5-year Capital Improvement Plan	Significant compliance violations with limited solutions adopted; Maintains single year Capital Improvement Plan	Not fully addressing compliance issues; Limited or weak capital planning	Not addressing compliance issues; No capital planning
Legal Provisions (10%)							
Rate Covenant (5%)		> 1.30x	1.30x ≥ n > 1.20x	1.20x ≥ n > 1.10x	1.10x ≥ n > 1.00x		≤ 1.00x ¹¹
Debt Service Reserve Requirement (5%)		DSRF funded at MADS	DSRF funded at lesser of standard 3-prong test	DSRF funded at less than 3-prong test OR springing DSRF	NO explicit DSRF; OR funded with speculative grade surety ¹²		

¹¹ Scores as a Ba.¹² Scores as a Baa.

Adjustments/Notching Factors

Factor 1: System Characteristics

Additional service area economic strength or diversity

Significant customer concentration

Revenue-per-Customer greatly over/under regional average

Exposure to weather volatility or extreme conditions

Resource vulnerability (1/3 or greater)

Sizable or insufficient capacity margin

Weak depreciation/reinvestment practices relative to industry norms

Other analyst adjustment to System Characteristics (Specify)

Factor 2: Financial Strength

Debt Service Coverage (Annual or MADS) below key thresholds: Additional Bonds Test and 1.00x coverage

Constrained liquidity position due to oversized transfers

Oversized capital needs

Oversized ANPL relative to debt or significant under-payment of actuarial funding requirement

Significant exposure to puttable debt and/or swaps or other unusual debt structure

Other analyst adjustment to Financial Strength factor (Specify)

Factor 3: Legal Provisions

Structural Enhancements/Complexities

Other analyst adjustment to Legal Provisions factor (Specify)

Factor 4: Management

Unusually strong or weak operational or capital planning

Other analyst adjustment to Management factor (Specify)

Other

Credit Event/Trend not yet reflected in existing data set

Scorecard-Indicated Outcome	Overall Weighted Score
Aaa	0.5 to 1.5
Aa1	1.5 to 1.83
Aa2	1.83 to 2.17
Aa3	2.17 to 2.5
A1	2.5 to 2.83
A2	2.83 to 3.17
A3	3.17 to 3.5
Baa1	3.5 to 3.83
Baa2	3.83 to 4.17
Baa3	4.17 to 4.5
Ba1	4.5 to 4.83
Ba2	4.83 to 5.17
Ba3	5.17 to 5.5
B1	5.5 to 5.83
B2	5.83 to 6.17
B3	6.17 to 6.5

Moody's Related Publications

Credit ratings are primarily determined by sector credit rating methodologies. Certain broad methodological considerations (described in one or more cross-sector rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. An index of sector and cross-sector credit rating methodologies can be found [here](#).

For data summarizing the historical robustness and predictive power of credit ratings, please click [here](#).

For further information, please refer to *Rating Symbols and Definitions*, which is available [here](#).

Report Number: 1095545

Author
Dan Seymour, CFAProduction Specialist
Shubhra Bhatnagar

© 2017 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be reckless and inappropriate for retail investors to use MOODY'S credit ratings or publications when making an investment decision. If in doubt you should contact your financial or other professional adviser.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for appraisal and rating services rendered by it fees ranging from JPY200,000 to approximately JPY350,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.

Announcement of Periodic Review: **Moody's announces completion of a periodic review of ratings of Philadelphia (City of) PA Gas Works**

13 Feb 2020

New York, February 13, 2020 -- Moody's Investors Service ("Moody's") has completed a periodic review of the ratings of Philadelphia (City of) PA Gas Works and other ratings that are associated with the same analytical unit. The review was conducted through a portfolio review in which Moody's reassessed the appropriateness of the ratings in the context of the relevant principal methodology(ies), recent developments, and a comparison of the financial and operating profile to similarly rated peers. The review did not involve a rating committee. Since 1 January 2019, Moody's practice has been to issue a press release following each periodic review to announce its completion.

This publication does not announce a credit rating action and is not an indication of whether or not a credit rating action is likely in the near future. Credit ratings and outlook/review status cannot be changed in a portfolio review and hence are not impacted by this announcement. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

Key rating considerations are summarized below.

Philadelphia (City of) Gas Works' ("PGW") A3 senior lien revenue bond rating reflects a history of credit supportive rate decisions and sound operational and cost management that supports a more predictable and strengthened financial and operating profile. The stabilized financial profile stems from PGW's state-regulated rate increases along with the utility's decision not to finance, construct or take any volume risk exposure related to the LNG expansion project. Current rates are sufficient to not only adequately cover annual debt service but also provide excess cash flow to continue to increase the cash funded share of capital expenditures.

This document summarizes Moody's view as of the publication date and will not be updated until the next periodic review announcement, which will incorporate material changes in credit circumstances (if any) during the intervening period.

The principal methodology used for this review was US Municipal Utility Revenue Debt published in October 2017. Please see the Rating Methodologies page on www.moodys.com for a copy of this methodology.

This announcement applies only to EU rated and EU endorsed ratings. Non EU rated and non EU endorsed ratings may be referenced above to the extent necessary, if they are part of the same analytical unit.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

John Medina
Lead Analyst
Project Finance
Moody's Investors Service, Inc.
7 World Trade Center
250 Greenwich Street
New York 10007
US

JOURNALISTS: 1 212 553 0376
Client Service: 1 212 553 1653

Kurt Kruppenacker
MANAGING DIRECTOR
Project Finance
JOURNALISTS: 1 212 553 0376
Client Service: 1 212 553 1653

Releasing Office:
Moody's Investors Service, Inc.
250 Greenwich Street
New York, NY 10007
U.S.A
JOURNALISTS: 1 212 553 0376
Client Service: 1 212 553 1653



© 2020 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND/OR ITS CREDIT RATINGS AFFILIATES ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MATERIALS, PRODUCTS, SERVICES AND INFORMATION PUBLISHED BY MOODY'S (COLLECTIVELY, "PUBLICATIONS") MAY INCLUDE SUCH CURRENT OPINIONS. MOODY'S INVESTORS SERVICE DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S INVESTORS SERVICE CREDIT RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS, NON-CREDIT ASSESSMENTS ("ASSESSMENTS"), AND OTHER OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. AND/OR ITS AFFILIATES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS, ASSESSMENTS AND OTHER OPINIONS AND PUBLISHES ITS PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS, AND PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS OR PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing its Publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY CREDIT RATING, ASSESSMENT, OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any credit rating, agreed to pay to Moody's Investors Service, Inc. for credit ratings opinions and services rendered by it fees ranging from \$1,000 to approximately \$2,700,000. MCO and Moody's investors Service also maintain policies and procedures to address the independence of Moody's Investors Service credit ratings and credit rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold credit ratings from Moody's Investors Service and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moodys.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any credit rating, agreed to pay to MJKK or MSFJ (as applicable) for credit ratings opinions and services rendered by it fees ranging from JPY125,000 to approximately JPY250,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.

I&E Statement No. 2
Witness: Ethan H. Cline

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Direct Testimony

Of

Ethan H. Cline

Bureau of Investigation and Enforcement

Concerning:

Customer Charges
Scale Back of Rates

TABLE OF CONTENTS

INTRODUCTION..... 1

CUSTOMER CHARGES..... 2

SCALE BACK OF RATES..... 3

1 **INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Ethan H. Cline. My business address is 400 North Street, Harrisburg,
4 Pennsylvania 17105-3265.

5
6 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

7 A. I am employed by the Pennsylvania Public Utility Commission in the Bureau of
8 Investigation and Enforcement (“I&E”) as a Fixed Utility Valuation Engineer.

9
10 **Q. WHAT IS YOUR EDUCATIONAL AND EMPLOYMENT EXPERIENCE?**

11 A. Appendix A, which is attached to my testimony, describes my educational
12 background and professional experience.

13
14 **Q. PLEASE DESCRIBE THE ROLE OF I&E IN RATE PROCEEDINGS.**

15 A. I&E is responsible for protecting the public interest in proceedings before the
16 Commission. The I&E analysis in the proceeding is based on its responsibility to
17 represent the public interest. This responsibility requires balancing the interests of
18 the ratepayers, the company and the regulated community.

19
20 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

21 A. The purpose of my testimony is to present I&E's recommendations regarding
22 Philadelphia Gas Works (“PGW” or “Company”) request for \$70 million or 10.5%

1 in overall additional annual revenues for the fully projected future test year
2 (“FPFTY”) ending August 31, 2021 (PGW Statement No. 1, p. 2). Specifically,
3 my testimony will address the Company’s customer charges and a proposed scale
4 back of rates methodology should the Commission grant PGW less than the
5 requested \$70 million.
6

7 **Q. WHAT TEST YEAR HAS THE COMPANY BASED ITS REVENUE**
8 **REQUIREMENT UPON IN THIS PROCEEDING?**

9 A. PGW based its requested revenue requirement on the FPFTY ending
10 August 31, 2021. PGW also provided support using the twelve-month period
11 ended August 31, 2019 as the historic test year and the twelve-month period
12 ending August 31, 2020 as the future test year.
13

14 **CUSTOMER CHARGES**

15 **Q. PLEASE IDENTIFY THE INCREASE TO THE CUSTOMER CHARGES**
16 **PROPOSED BY THE COMPANY.**

17 A. Table 2 on page 7 of PGW Statement No. 6 presents the Company’s proposed
18 customer charge increases for all of its rate classes as well as the results of the
19 customer cost analysis, which was presented in PGW Exhibit CEH-1, Schedule G.
20 The Company is proposing a 40% increase to the customer charges to all of its rate
21 classes, except the Natural Gas Vehicle Service (“NGVS”) class.

1 **Q. DO YOU WISH TO MAKE ANY ADJUSTMENTS TO THE COMPANY'S**
2 **PROPOSED CUSTOMER CHARGES?**

3 A. No. While a 40% increase to the customer charge is significant, the proposed
4 customer charges are supported by the Company's customer cost analysis.
5 Therefore, I am not recommending an adjustment to the Company's proposed
6 customer charges if the Commission grants PGW its full requested increase of \$70
7 million. However, should the Commission grant less than the full \$70 million
8 increase, I recommend that the proposed customer charges be included in any
9 scale back of rates as discussed below.

10

11 **SCALE BACK OF RATES**

12 **Q. WHAT DO YOU RECOMMEND IF THE COMMISSION GRANTS AN**
13 **INCREASE LESS THAN THE \$70 MILLION REQUESTED?**

14 A. If the Commission grants PGW less than the full increase it has requested, I
15 recommend that the customer charges and usage rates for each customer class that
16 has an increase proposed be scaled back proportionately based upon the Cost of
17 Service Study presented in PGW Exhibit CEH-1.

18

19 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

20 A. Yes.

ETHAN H. CLINE

PROFESSIONAL EXPERIENCE AND EDUCATION

EXPERIENCE:

03/2009 - Present

Bureau of Investigation and Enforcement, Pennsylvania Public Utility Commission - Harrisburg, Pennsylvania

Fixed Utility Valuation Engineer – Assists in the performance of studies and analyses of the engineering-related areas including valuation, depreciation, cost of service, quality and reliability of service as they apply to fixed utilities. Assists in reviewing, comparing and performing analyses in specific areas of valuation engineering and rate structure including valuation concepts, original cost, rate base, fixed capital costs, inventory processing, excess capacity, cost of service, and rate design.

06/2008 – 09/2008

Akens Engineering, Inc. - Shiremanstown, Pennsylvania

Civil Engineer – Responsible, primarily, for assisting engineers and surveyors in the planning and design of residential development projects

10/2007 – 05/2008

J. Michael Brill and Associates - Mechanicsburg, Pennsylvania

Design Technician – Responsible, primarily, for assisting engineers in the permit application process for commercial development projects.

01/2006 – 10/2007

CABE Associates, Inc. - Dover, Delaware

Civil Engineer – Responsible, primarily, for assisting engineers in performing technical reviews of the sewer and sanitary sewer systems of Sussex County, Delaware residential development projects.

EDUCATION:

Pennsylvania State University, State College, Pennsylvania
Bachelor of Science; Major in Civil Engineering, 2005

- Attended NARUC Rate School, Clearwater, FL

TESTIMONY SUBMITTED:

I have testified and/or submitted testimony in the following proceedings:

1. Clean Treatment Sewage Company, Docket No. R-2009-2121928
2. Pennsylvania Utility Company – Water Division, Docket No. R-2009-2103937
3. Pennsylvania Utility Company – Sewer Division, Docket No. R-2009-2103980
4. UGI Central Penn Gas, Inc., 1307(f) proceeding, Docket No. R-2010-2172922
5. PAWC Clarion Wastewater Operations, Docket No. R-2010-2166208
6. PAWC Claysville Wastewater Operations, Docket No. R-2010-2166210
7. Citizens' Electric Company of Lewisburg, Pa, Docket No. R-2010-2172665
8. City of Lancaster – Bureau of Water, Docket No. R-2010-2179103
9. Peoples Natural Gas Company LLC, Docket No. R-2010-2201702
10. UGI Central Penn Gas, Inc., Docket No. R-2010-2214415
11. Pennsylvania-American Water Company, Docket No. R-2011-2232243
12. Pentex Pipeline Company, Docket No. A-2011-2230314
13. Peregrine Keystone Gas Pipeline, LLC, Docket No. A-2010-2200201
14. Philadelphia Gas Works 1307(f), Docket No. R-2012-2286447
15. Peoples Natural Gas Company LLC, Docket No. R-2012-2285985
16. Equitable Gas Company, Docket Nos. R-2012-2312577, G-2012-2312597
17. City of Lancaster – Sewer Fund, Docket No. R-2012-2310366
18. Peoples TWP, LLC 1307(f), Docket No. R-2013-2341604
19. UGI Penn Natural Gas, Inc. 1307(f), Docket No. R-2013-2361763
20. UGI Central Penn Gas, Inc. 1307(f), Docket No. R-2013-2361764
21. Joint Application, Docket Nos. A-2013-2353647, A-2013-2353649, A-2013-2353651
22. City of Dubois – Bureau of Water, Docket No. R-2013-2350509
23. The Columbia Water Company, Docket No. R-2013-2360798
24. Pennsylvania American Water Company, Docket No. R-2013-2355276
25. Generic Investigation Regarding Gas-on-Gas Competition, Docket Nos. P-2011-227868, I-2012-2320323
26. Philadelphia Gas Works 1307(f), Docket No. R-2014-2404355
27. Pike County Light and Power Company (Gas), Docket No. R-2013-2397353
28. Pike County Light and Power Company (Electric), Docket No. R-2013-2397237
29. Peoples Natural Gas Company LLC 1307(f), Docket No. R-2014-2403939
30. UGI Penn Natural Gas, Inc. 1307(f), Docket No. R-2014-2420273
31. UGI Utilities, Inc. – Gas Division 1307(f), Docket No. R-2014-2420276
32. UGI Central Penn Gas, Inc. 1307(f), Docket No. R-2014-2420279
33. Emporium Water Company, Docket No. R-2014-2402324
34. Borough of Hanover – Hanover Municipal Water, Docket No. R-2014-2428304
35. Philadelphia Gas Works 1307(f), Docket No. R-2015-2465656
36. Peoples Natural Gas Company LLC 1307(f), Docket No. R-2015-2465172
37. Peoples Natural Gas Company – Equitable Division 1307(f), Docket No. R-2015-2465181
38. PPL Electric Utilities Corporation, Docket No. R-2015-2469275
39. UGI Penn Natural Gas, Inc. 1307(f), Docket No. R-2015-2480934
40. UGI Central Penn Gas, Inc. 1307(f), Docket No. R-2015-2480937
41. UGI Utilities, Inc. – Gas Division 1307(f), Docket No. R-2015-2480950

42. UGI Utilities, Inc. – Gas Division, Docket No. R-2015-2518438
43. Joint Application of Pennsylvania American Water, et al., Docket No. A-2016-2537209
44. UGI Utilities, Inc. – Gas Division 1307(f), Docket No. R-2016-2543309
45. UGI Central Penn Gas, Inc. 1307(f), Docket No. R-2016-2543311
46. City of Dubois – Company, Docket No. R-2016-2554150
47. UGI Penn Natural Gas, Inc., Docket No. R-2016-2580030
48. UGI Central Penn Gas, Inc. 1307(f), Docket No. R-2017-2602627
49. UGI Penn Natural Gas, Inc. 1307(f), Docket No. R-2017-2602633
50. UGI Utilities, Inc. – Gas Division 1307(f), Docket No. R-2017-2602638
51. Application of Pennsylvania American Water Company Acquisition of the Municipal Authority of the City of McKeesport, Docket No. A-2017-2606103
52. Pennsylvania American Water Company, Docket No. R-2017-2595853
53. Pennsylvania American Water Company Lead Line Petition, Docket No. P-2017-2606100
54. UGI Utilities, Inc. – Electric Division, Docket No. R-2017-2640058
55. Peoples Natural Gas Company, LLC – Peoples and Equitable Division 1307(f), Docket Nos. R-2018-2645278 & R-2018-3000236
56. Peoples Gas Company, LLC 1307(f), Docket No. R-2018-2645296
57. Columbia Gas of Pennsylvania, Inc., Docket No. R-2018-2647577
58. Duquesne Light Company, Docket No. R-2018-3000124
59. Suez Water Pennsylvania, Inc., Docket No. R-2018-3000834
60. Application of Pennsylvania American Water Company Acquisition of the Municipal Authority of the Township of Sadsbury, Docket No. A-2018-3002437
61. The York Water Company, Docket No. R-2018-3000006
62. Application of SUEZ Water Pennsylvania, Inc. Acquisition of the Water and Wastewater Assets of Mahoning Township, Docket Nos. A-2018-3003517 and A-2018-3003519
63. Pittsburgh Water and Sewer Authority, Docket Nos. R-2018-3002645 and R-2018-3002647
64. Joint Application of Aqua America, Inc. et al., Acquisition of Peoples Natural Gas Company LLC, et al., Docket Nos. A-2018-3006061, A-2018-3006062, and A-2018-3006063
65. Implementation of Chapter 32 of the Public Utility Code Regarding Pittsburgh Water and Sewer Authority, Docket Nos. M-2018-2640802 and M-2018-2640803
66. Philadelphia Gas Works 1307(f), Docket No. R-2019-3007636
67. People Natural Gas Company, LLC, Docket No. R-2018-3006818
68. Application of Pennsylvania American Water Company Acquisition of the Steelton Borough Authority, Docket No. A-2019-3006880
69. Application of Aqua America, Inc. et al., Acquisition of the Wastewater System Assets of the Township of Cheltenham, Docket No. A-2019-3006880
70. Philadelphia Gas Works, Docket No. R-2019-3009016
71. Wellsboro Electric Company, Docket No. R-2019-3008208
72. Valley Energy, Inc., Docket No. R-2019-3008209
73. Citizens’ Electric Company of Lewisburg, Pa, Docket Non. R-2019-3008212
74. Application of Aqua America, Inc. et al., Acquisition of the Wastewater System Assets of the East Norriton Township, Docket No. A-2019-3009052
75. Peoples Natural Gas Company, LLC 1307(f), Docket No. R-2020-3017850
76. Peoples Gas Company, LLC 1307(f), Docket No. R-2020-3017846

**I&E Statement No. 3
Witness: Scott Orr**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

**PHILADELPHIA GAS WORKS
Docket No. R-2020-3017206**

Direct Testimony

of

Scott Orr

Bureau of Investigation & Enforcement

Concerning:

**Distribution Integrity Management Plan (DIMP)
Long Term Infrastructure Improvement Plan (LTIIIP)
Leaks/Risk Reduction
Pipeline Replacement Costs**

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

3 A. My name is Scott Orr. I am a Fixed Utility Valuation Engineer in the Pipeline
4 Safety Division of the Pennsylvania Public Utility Commission's (Commission)
5 Bureau of Investigation and Enforcement (I&E). My business address is
6 Pennsylvania Public Utility Commission, 400 North Street, Harrisburg, PA
7 17120.

8
9 **Q. WHAT IS YOUR EDUCATIONAL AND EMPLOYMENT EXPERIENCE?**

10 A. I attended the Fairleigh Dickenson University and earned a Bachelor of Science
11 Degree in Civil Engineering in 2007. I joined the Commission's Safety Division
12 in November of 2016.

13
14 **Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY FOR THE**
15 **BUREAU OF INVESTIGATION AND ENFORCEMENT?**

16 A. Yes. I have previously testified in the Acquisition of the Peoples Natural Gas
17 Company by Aqua America, Inc. at Docket Nos. A-2018-3006061, A-2018-
18 3006062, and A-2018-3006063.

19
20 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

21 A. The purpose of my testimony is to address the proposed base rate filing by
22 Philadelphia Gas Works (PGW) specifically as it relates to the Distribution

1 Integrity Management Plan (DIMP) risk reduction, Long Term Infrastructure
2 Improvement Plans (LTIIP), leaks per mile, and pipeline replacement costs
3 associated with the replacement of mains.
4

5 **Q. PLEASE DESCRIBE THE ROLE OF I&E IN RATE PROCEEDINGS.**

6 A. I&E is responsible for protecting the public interest in proceedings before the
7 Commission. The I&E analysis in a rate proceeding is based on its responsibility
8 to represent the public interest. This responsibility requires the balancing of the
9 interests of ratepayers, the regulated utility, and the regulated community as a
10 whole.
11

12 **Q. HAVE YOU REVIEWED THE 2020 RATE FILING BY PGW INCLUDING**
13 **THE DIRECT TESTIMONY OF MR. MOSER?**

14 A. Yes. I have reviewed the PGW filing and the direct testimony of Mr. Douglas A.
15 Moser identified as PGW Statement No. 7. Mr. Moser addresses PGW's
16 replacement and betterment projects in its capital budget planning. According to
17 Mr. Moser, replacement and betterment projects improve or replace existing
18 infrastructure based on a risk prioritization process. The process prioritizes the
19 replacement of cast iron mains and bare steel services since these assets are more
20 susceptible to failure than other pipe materials. PGW uses a risk-based
21 prioritization program, in conjunction with a Distribution Integrity Management
22 Plan (DIMP) to decide which pipe assets should be replaced. Mr. Moser also

1 references PGW's LTIIIP prioritization of projects in the capital budget and the
2 Distribution System Improvement Charge (DSIC) cap that was increased in 2016
3 from 5% to 7.5%.

4
5 **Q. HAVE YOU REVIEWED STATEMENTS ABOUT THE LTIIIP IN PGW**
6 **WITNESS MOSER'S DIRECT TESTIMONY?**

7 A. Yes. PGW's first LTIIIP, approved on April 4, 2013, covered fiscal years 2013-
8 2017. The initial LTIIIP was modified and approved on June 9, 2016 and is
9 referred to as the modified LTIIIP. PGW's current projected time frame for
10 replacing all cast iron main inventory is 40.1 years.¹ In the modified LTIIIP, PGW
11 estimates it will remove cast iron main from its inventory at a rate of
12 approximately 31.7 miles per year.² PGW avers that modified LTIIIP is cost
13 effective by reducing PGW's maintenance costs over time, as the number of leaks
14 and breaks on mains is reduced by replacing the sections before they fail.

15
16 **Q. HAVE YOU REVIEWED THE DIRECT TESTIMONY OF PGW WITNESS**
17 **MR. MOSER AS IT RELATES TO IMPROVEMENTS TO PGW'S**
18 **SYSTEM RELIABILITY AND SAFETY?**

19 A. Yes. According to Mr. Moser, PGW's system reliability and safety are being
20 improved and enhanced through identifying its riskiest assets as well as repairing,

¹ PGW St. No. 7, p. 2, line 13.

² I&E Ex. No. 3, Sch. 1.

1 improving, or replacing the distribution infrastructure on an accelerated basis
2 through a Commission-approved LTIIIP. The modified LTIIIP targets the
3 replacement of over 158 miles of cast iron main, with all cast iron mains to be
4 replaced within 40.1 years. Mr. Moser states “When \$70 million in rate relief is
5 factored into the above assumptions, the associated increases in DSIC recovery as
6 pending levels will result in all cast iron main inventory being replaced in 34.6
7 years. This reduces the overall replacement time frame by 14%.”³

8
9 **Q. PLEASE COMMENT BRIEFLY ON PGW’S SECOND LTIIIP PETITION.**

10 A. PGW filed its Second LTIIIP on May 3, 2017, which covers the period beginning
11 September 1, 2017 to August 31, 2022. PGW’s second LTIIIP has identified and
12 prioritized cast iron main replacement on a risk basis in accordance with PGW’s
13 DIMP to provide improvements to system safety and reliability. According to
14 PGW, the second LTIIIP would result in more adequate, efficient, safe, reliable,
15 and reasonable natural gas distribution service.⁴ PGW also states that the
16 additional replacements would reduce both the risk and cost when compared to
17 that which PGW would experience if it did not accelerate its pipeline replacement
18 program.⁵ In the second LTIIIP, PGW stated that following a risk-based

³ PGW St. No. 7, p. 2, lines 19-22.

⁴ Petition of Philadelphia Gas Works for Approval of its Second Long-Term Infrastructure Improvement Plan for the Period Beginning September 1, 2017, and Ending August 31, 2022 at Docket P-2017-2602315, Petition at p. 5.

⁵ Petition of Philadelphia Gas Works for Approval of its Second Long-Term Infrastructure Improvement Plan for the Period Beginning September 1, 2017, and Ending August 31, 2022 at Docket P-2017-2602315, Petition at p. 5.

1 prioritization helps ensure the projects that deliver the most significant risk
2 reductions are addressed first.

3
4 **Q. HOW DOES THE AMOUNT OF CAST IRON IN PGW'S DISTRIBUTION**
5 **SYSTEM COMPARE TO OTHER SIMILARLY SIZED NATURAL GAS**
6 **DISTRIBUTION COMPANIES IN PENNSYLVANIA?**

7 A. The total number of miles of cast iron mains for natural gas distribution companies
8 in the entire Commonwealth reported in 2019 was approximately 2,374 miles.
9 PGW had 1,306 miles which represents 44.98% of the total miles of cast iron
10 remaining in the Commonwealth. Currently, PGW has the most cast iron
11 remaining in its system as compared to all other natural gas distribution systems in
12 the Commonwealth, and it also has the longest projected time to replace this risky
13 asset.

14
15 **Q. WHAT FEDERAL AND STATE REGULATIONS APPLY TO PGW'S**
16 **PIPELINE REPLACEMENT?**

17 A. PGW is mandated to implement a DIMP under Chapter 49 CFR 192 Subpart P –
18 Gas Distribution Pipeline Integrity Management (IM) of the Code of Federal
19 Regulations. Additionally, utilities, like PGW, that are seeking to continue a
20 previously approved DSIC mechanisms are required to submit an LTIIP pursuant
21 to 52 Pa Code §121.1 and §121.3.

1 **Q. WHY MUST A NATURAL GAS DISTRIBUTION COMPANY COMPLY**
2 **WITH DIMP REGULATIONS?**

3 A. The Pipeline and Hazardous Material Safety Administration (PHMSA) created
4 DIMP regulations to reduce the number of U.S. Department of Transportation
5 (U.S. DOT) Reportable Incidents⁶. DIMP is a performance based regulatory
6 program required of gas distribution operators driven by risk management.

7
8 **Q. WHAT ARE THE REQUIREMENTS OF A DIMP?**

9 A. A DIMP requires gas distribution pipeline operators to:

- 10 1. Demonstrate knowledge of the gas distribution system;
- 11 2. Identify threats;
- 12 3. Evaluate and rank risks;
- 13 4. Identify and implement measures to address risk;
- 14 5. Measure performance, monitor results and evaluate effectiveness;
- 15 6. Evaluate and improve the DIMP;
- 16 7. Report results.

17 DIMP regulations require, among other requirements, the identification of threats
18 to pipeline facilities and require operators to create plans to mitigate and reduce

⁶ A PHMSA Reportable Incident is defined by the following events: (1) An event that involves a release of gas from a pipeline, or of liquefied natural gas, liquefied petroleum gas, refrigerant gas, or gas from an LNG facility, and that results in one or more of the following consequences:(i) A death, or personal injury necessitating in-patient hospitalization;(ii) Estimated property damage of \$50,000 or more, including loss to the operator and others, or both, but excluding cost of gas lost;(iii) Unintentional estimated gas loss of three million cubic feet or more;(2) An event that results in an emergency shutdown of an LNG facility. Activation of an emergency shutdown system for reasons other than an actual emergency does not constitute an incident;(3) An event that is significant in the judgment of the operator, even though it did not meet the criteria of paragraphs (1) or (2) of this definition.

1 the risks caused by those threats. PGW uses a risk-based prioritization process to
2 select pipelines for replacement. This is called the Main Replacement Program
3 (MRP). PGW determines pipeline replacements by managing the risk ranking of
4 the different aspects of the pipeline and then replacing the appropriate pipeline
5 asset, based on the highest risk score.

6
7 **Q. WHAT ARE THE COMMON MITIGATION MEASURES FOR HIGH**
8 **RISK PIPELINE SEGMENTS?**

9 A. The industry's common mitigation measure to reduce pipeline risk is to replace the
10 highest risk pipelines first. As a company replaces these segments, the total
11 system risk should be reduced. The overall risk of the asset group will decrease as
12 the riskiest pipe is replaced.

13
14 **Q. HAVE YOU REVIEWED PGW'S EVALUATION AND RISK RANKING**
15 **IN ITS DIMP AS IT RELATES TO REPLACEMENT AND BETTERMENT**
16 **PROJECTS?**

17 A. Yes. PGW's DIMP is reviewed and evaluated annually by the Pipeline Safety
18 Division of I&E. PGW subject matter experts evaluate the DIMP and MRP data.
19 It appears, however, that PGW has miscalculated leaks per mile in the data
20 supplied in response to BIE-PS-24, attachment A⁷. For example, in the low

⁷ I&E Ex. No. 3, Sch. 2, p. 2.

1 pressure 3-inch diameter in 2015, PGW reported one leak repair. It listed mileage
2 as one mile. Leaks per mile was reported as 0.82 leaks per mile ⁸, when in fact it
3 should, mathematically, be 1.0 leaks per mile. There are numerous similar
4 calculation errors in this data.

5 According to 49 CFR 192.1007, the operator must determine the relative
6 importance of each threat to the pipeline system and then estimate and rank the
7 associated risks to the threat. This evaluation must consider each applicable
8 current and potential threat, the likelihood of failure associated with each threat,
9 and the potential consequences of such a failure. PGW reviews this data on a
10 continual basis, and it is ultimately reviewed by the RISK Council that meets in
11 first quarter of each year. The RISK council is comprised of PGW's subject
12 matter experts and experienced senior PGW staff, who review and assess the
13 DIMP utilizing all available data and other pertinent records.

14
15 **Q. HAS THE OVERALL RISK SCORE FOR PGW'S SYSTEM INCREASED**
16 **OR DECREASED BASED ON PIPELINE REPLACEMENT?**

17 A. PGW is showing a decrease in risk. However, data shows that the riskiest assets
18 are not necessarily being replaced first. Since 2016, PGW has replaced 130.77
19 miles of cast iron main. The leak data submitted annually to the Department of
20 Transportation from 2016-2019 shows the total number of hazardous leaks has

⁸ I&E Ex. No. 3, Sch. 2, p. 2.

1 increased. In 2016, PGW repaired 749 hazardous leaks on mains. In 2019, this
2 number jumped to 905, which represents a 17.23% increase. During the same
3 timeframe, miles of main replaced was reduced to 103.28 miles. PGW states that
4 the reduction of leaks is a goal in achieving improvements to system safety and
5 reliability. The number of leaks per main has increased from 2016 to 2019, thus
6 not reflecting the improvements to system safety and reliability claimed.

7
8 **Q. DESCRIBE HOW PGW CLASSIFIES LEAKS ON ITS SYSTEM.**

9 A. PGW has a leak management program to reduce risk per 49 CFR 192.1007(d).
10 PGW has implemented a leak classification procedure that classifies the severity
11 of leaks in its system. PGW classifies leaks in three separate categories: Work
12 Immediate, Work leak or leak Recheck, and Safe to Hold. This is all detailed in
13 its Bulletin #126 Leak Management Procedure.⁹

14
15 **Q. HOW HAVE PGW'S HAZARDOUS LEAKS ON CAST IRON BEEN**
16 **TRENDING FROM 2016 TO 2019?**

17 A. The number of breaks per mile for cast iron has increased. When PGW was asked
18 for leaks by material type and classification, PGW responded to question BIE-PS-
19 18 and provided this data for an overall category of cast iron. From the data
20 submitted by PGW to the U.S. DOT on its annual report (Form 70001), the leaks

⁹ I&E Ex. No. 3, Sch. 3, p. 2 showing the repair or recheck schedule as provided in response to this interrogatory.

1 per mile for the asset category cast iron have been increasing.¹⁰ In 2016, PGW
2 had 1,409.39 miles of cast iron main with 749 repaired leaks representing 0.53
3 leaks per mile. In 2018, PGW had 1,340.66 miles of cast iron main with 893
4 repaired leaks representing 0.66 leaks per mile.¹¹ In 2019, PGW had 1,306.02
5 miles of cast iron main with 905 repaired leaks for 0.69 leaks per mile. Although
6 PGW claims overall risk has decreased, the leaks per mile on cast iron has
7 increased in each year since 2017. PGW is either not replacing enough main or
8 not replacing the riskiest assets since PGW's leaks per mile on the cast iron mains
9 continues to increase annually.

10
11 **Q. HAVE THERE BEEN RECENT NATURAL GAS RELATED EVENTS IN**
12 **PHILADELPHIA?**

13 A. In December 2019, a gas pipeline explosion resulted in two fatalities and
14 destruction of multiple homes in Philadelphia. A cast iron main break was found
15 in front of this structure. This event is part of an active investigation.

16
17 **Q. HOW DOES PGW'S RISK RANKINGS COMPARE YEAR TO YEAR?**

18 A. Cast iron mains have historically been, and continue to be, one of PGW's highest
19 risk assets. There is little change in the risk rankings year to year within PGW's
20 DIMP.

¹⁰ I&E Ex. No. 3, Sch. 4, p. 2.

¹¹ DOT ANNUAL REPORTS 2016-2019

1 **Q. DURING THE 2019 DIMP INSPECTION, WHAT WAS DISCOVERED**
2 **REGARDING RISK CALCULATION AND LEAKS?**

3 A. PGW has identified 4- and 6-inch cast-iron low-pressure mains to be the riskiest
4 assets. Currently there is only one risk category for 10-inch and smaller cast iron
5 piping into which these two sizes are grouped.

6

7 **Q. IS THIS LEVEL OF DETAIL ADEQUATE?**

8 A. No. PGW should further break down the various sizes of smaller than 10-inch
9 mains into two separate categories. By separating these mains into two separate
10 categories, PGW will be better able to determine which size has the most risk and
11 rank it accordingly.

12

13 **Q. ARE THERE OTHER ISSUES WITH PGW'S RISK RANKING**
14 **METHODOLOGY?**

15 A. Yes. PGW did not normalize the ranking of risk in the current risk model. The
16 ranking should be distributed over the entire similar systems and by the most
17 abundant individual assets. By truncating the data, it could alter the overall risk
18 rankings.

1 **Q. HAVE YOU REVIEWED WHAT IS INCLUDED IN PGW’S PIPELINE**
2 **REPLACEMENT COSTS?**

3 A. Yes. PGW’s capital project costs for pipeline replacement are increasing. PGW’s
4 capital costs include Contractor, Material, Other, Restoration, Labor, and
5 Equipment.¹²

6
7 **Q. DOES THE RISK CALCULATED IN THE DIMP DECREASE AS PGW**
8 **INVESTS ADDITIONAL DOLLARS INTO RISK MITIGATION?**

9 A. Not necessarily. PGW ’s primary method of risk mitigation is pipeline
10 replacement. The overall risk of the system is driven down by replacement of the
11 riskiest assets throughout its system by ranking. PGW recalculated its DIMP, and
12 the risk ranking has not significantly changed. Risk reduction is not only a factor
13 of money spent but also a factor of correctly ranking and targeting the riskiest
14 assets in the DIMP.

15
16 **Q. ARE THE PIPELINE REPLACEMENT COSTS INCREASING?**

17 A. Yes. PGW’s capital replacement costs are increasing. In 2015, the cost was
18 \$1,204,801 per mile as compared to \$1,611,987 in 2019. This is approximately a
19 33.8 % increase in cost per mile over five years, or an average increase in cost of
20 6.9% per year.¹³

¹² I&E Ex. No. 3, Sch. 5, p. 2.

¹³ I&E Ex. No. 3, Sch. 5, p. 2.

1 **Q. ARE THE MILES OF CAST-IRON MAIN REPLACED SIMILAR FROM**
2 **2016 TO 2019?**

3 A. Yes. In 2016 PGW replaced 31.54 miles of cast iron main in 2016. In 2016 PGW
4 replaced 31.54 miles of cast iron main. In 2019 PGW replaced 32.56 miles of cast
5 iron main. This is a 6.7 % variation from low to high in miles replaced; however,
6 the cost per mile, as discussed previously, is significantly higher.¹⁴

7
8 **Q. WHAT IS THE MOST SIGNIFICANT DRIVING FORCE BEHIND PGW'S**
9 **INCREASING PIPELINE REPLACEMENT COSTS?**

10 A. Within the total pipeline replacement cost per mile, PGW's contractor costs
11 contain the largest increases. Contractor costs have significantly increased from
12 2015 to 2019 from \$26,470,959 per mile to \$46,217,261 per mile, which
13 represents a cost increase of approximately 48.3%.

14
15 **Q. IN YOUR OPINION, WILL PGW'S TOTAL COSTS PER MILE FOR**
16 **PIPELINE REPLACEMENT INCREASE IN 2020?**

17 A. Yes. PGW's gas main replacement cost per mile is showing no signs of declining.
18 Total costs per mile of pipe replaced from 2015 to 2019 has increased by 33.8 %.¹⁵

¹⁴ I&E Ex. No. 3, Sch. 7.

¹⁵ I&E Ex. No. 3, Sch. 5, p. 2.

1 **Q. WHEN FUNDING IS UTILIZED FOR MORE ANCILLARY SPENDING,**
2 **DOES THAT ADDITIONAL SPENDING REDUCE THE FUNDS**
3 **AVAILABLE FOR PIPELINE REPLACEMENT?**

4 A. Yes. The more money PGW spends on replacement costs per mile, the fewer
5 miles of pipeline it can replace annually. The increasing costs per mile of pipeline
6 replaced reduces the number of miles of risky pipe replaced annually.

7
8 **Q. WHAT IS YOUR FINAL CONCLUSION REGARDING PGW'S**
9 **ASSESSMENT IN RANKING OF RISKS IN ITS DIMP PLAN?**

10 A. PGW needs to determine, based on risk analysis and other data, the location of the
11 riskiest pipe segments, regardless of size, and replace these segments. Separating
12 the cast iron mains into smaller categories will help determine which mains need
13 replacing. Replacing the riskiest main at an increased rate will reduce the leaks on
14 PGW's distribution system. Integrating, the MRP into the DIMP will also
15 increase the accuracy of the risk rankings. Currently the MRP is a stand-alone
16 product and is not incorporated in the DIMP plan. Further, PGW needs to review
17 all data for inaccuracies.

18
19 **Q. DO YOU HAVE ANY RECCOMNEDATIONS REGARDING PGW'S**
20 **REPLACEMENT COSTS?**

21 A. PGW should work to reduce costs associated with pipeline replacement.
22 Particularly, PGW should focus on the contractor costs, since this is the category

1 with the largest increase. PGW should develop a plan that reduces replacement
2 costs and invest these savings into additional pipeline replacement projects. This
3 plan of action should be forwarded to the Commission within 60 days of this final
4 order in this proceeding that outlines PGW's measures to reduce costs.

5

6 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

7 A. Yes.

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

I&E Exhibit No. 3

Exhibits to Accompany

the

Direct Testimony

of

Scott Orr

Bureau of Investigation & Enforcement

Petition of Philadelphia Gas Works for Approval of its Second Long-Term Infrastructure

Improvement Plan for the Period Beginning September 1, 2017, and Ending August 31,

2022

Docket P-2017-2602315

Petition at p. 8, Table 3

Table 3: PGW's Schedule for Miles of Main Replacement, FY 2018-2022

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
8" and Smaller Low Pressure / Intermediate Pressure	25.00	25.00	25.00	25.00	25.00	125.00
12" and Larger Low Pressure	1.30	1.35	1.40	1.34	1.20	6.59
12" and Larger High Pressure	5.50	5.50	5.30	5.25	5.15	26.70
Abandonment for Non-Use	0.00	0.00	0.00	0.00	0.00	0.00
Total	31.80	31.85	31.70	31.59	31.35	158.29

Philadelphia Gas Works
Case Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: BIE-PS-05-BIE-PS-24
Date of Response: 5/5/2020
Response Provided By: Daniel M. Furtek

Question:

What metrics are used to evaluate cast iron and bare steel pipeline risk assessment? State how PGW evaluates the effectiveness of cast iron and bare steel removal program. Provide a 5-year history of the metrics reviewed for PGW's cast iron and bare steel removal.

Attachments: 1

BIE-PS-24 Attachment A.pdf

Response:

PGW utilizes leaks per mile of main and leaks per 1,000 services as the metrics to evaluate cast iron and bare steel risk assessments, respectively. Please see the attachment for the 5-year metric history for cast iron mains and bare steel services, BIE-PS-24 Attachment A.

Pressure	Diameter	Calendar Year	Number of Leak Repairs	Mileage	Leaks Per Mile
Low	3	2015	1	1	0.82
		2016	4	1	3.30
		2017	3	1	2.56
		2018	3	1	2.56
		2019	4	1	3.41
	4	2015	619	264	2.34
		2016	527	259	2.04
		2017	608	252	2.41
		2018	546	245	2.23
		2019	514	239	2.15
	6	2015	1,136	812	1.40
		2016	1,132	798	1.42
		2017	1,227	781	1.57
		2018	922	761	1.21
		2019	1,004	744	1.35
	8	2015	131	66	1.97
		2016	129	65	1.98
		2017	164	64	2.54
		2018	93	63	1.47
		2019	114	62	1.84
	10	2015	1	0	2.35
		2017	2	0	4.71
	12	2015	169	100	1.70
		2016	248	99	2.49
		2017	223	98	2.28
		2018	149	97	1.54
		2019	182	96	1.90
	14	2015	1		
	16	2015	70	45	1.54
		2016	102	45	2.25
		2017	61	45	1.35
		2018	42	45	0.93
		2019	78	45	1.73
	20	2015	95	36	2.61
		2016	107	36	2.95
		2017	86	35	2.44
		2018	41	35	1.16
		2019	67	35	1.90
	24	2015	7	2	3.01
		2016	7	2	4.50
		2017	12	2	7.71

Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: BIE-PS-05-BIE-PS-18
Date of Response: 4/29/2020
Response Provided By: Daniel M. Furtek

Question:

Reference Direct Testimony of Douglas A. Moser Statement No. 7. Explain PGW's leak classification criteria. Define the categories of PGW's leak classification. Additionally, provide a leak history for all leaks for years 2016-2019. Include breakdown by size and pipe materials and main or service lines.

Attachments: 2

BIE-PS-18 Attachment B - Leak Data.pdf
BIE-PS-18 Attachment A - Bulletin 126.pdf

Response:

Please see attachments:

BIE-PS-18 Attachment A - Bulletin 126 – Leak Management Procedure, explains PGW's leak classification criteria and leak categories.

BIE-PS-18 Attachment B - Leak Data.

(%LEL)	Non-Conduit Roadway	Conduit Roadway	Conduit Footway	Non-Conduit Footway Structures & all 10 psig and Higher Drip Boxes and Test Points
50 or less	Recheck 365 Days – Not to exceed 380 days	Pinpoint, repair or Recheck 180 days – Not to exceed 195 days	Repair or recheck 30 days – Not to exceed 45 days	Repair or recheck 30 days, – Not to exceed 45 days
51 to 75	Pinpoint, repair or recheck 365 Days – Not to exceed 380 days	Pinpoint, repair or Recheck 30 days – Not to exceed 45 days	Repair or recheck 30 days – Not to exceed 45 days	Repair or recheck 30 days – Not to exceed 45 days
76 or higher	Pinpoint, repair or recheck 180 days– Not to exceed 195 days	Work Immediate	Work Immediate	Repair or recheck 15 days – Not to exceed 25 days

Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: BIE-PS-05-BIE-PS-2
Date of Response: 4/27/2020 Response
Provided By: Daniel M. Furtek

Question:

Provide a copy of the PGW's completed 2019 US DOT Annual Transmission and Distribution Report.

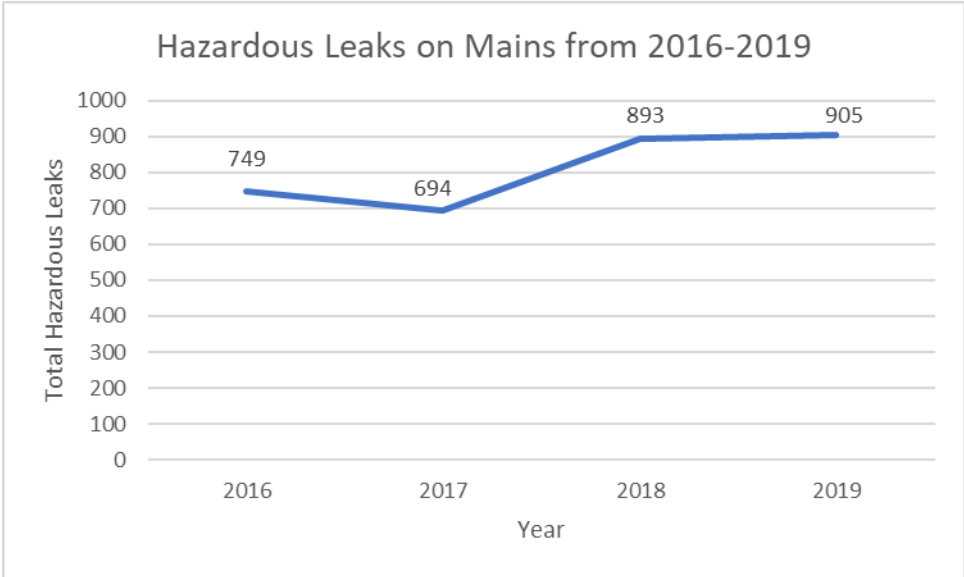
Attachments: 2

BIE-PS-2 Attachment B 2019 PHMSA Gas Distribution Annual Report.pdf
BIE-PS-2 Attachment A 2019 Gas Transmission Annual Report.pdf

Response:

Please refer to the attachments, BIE-PS-2 Attachment A 2019 Gas Transmission Annual Report, and BIE-PS-2 Attachment B PHMSA Gas Distribution Annual Report.

**ANNUAL REPORT FOR
CALENDAR YEAR 2016-2019
GAS DISTRIBUTION SYSTEM**



Response to BIE-PS-05-BIE-PS-PS_4 Total Cost of Pipeline Replacement on a per mile Basis
by Year and Component.

Philadelphia Gas Works
Case Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: BIE-PS-05-BIE-PS-16
Date of Response: 4/27/2020
Response Provided By: Daniel M. Furtek

Question:

Reference Direct Testimony of Douglas A. Moser Statement No. 7. Provide a detailed schedule for each of the last 5 calendar years showing the total cost of pipeline replacement on a per mile basis including the following: Each component of the total cost showing (i.e., pipeline cost, labor, paving) and all supporting documents that were utilized to determine the total cost per mile.

Attachments: 0

Response:

Total Cost of Pipeline Replacement on a per mile Basis by Year and Component

Fiscal Year	Labor	Material	Contractors	Other	Grand Total	Main Installed (miles)	Cost per mile
2015	\$5,443,656	\$4,618,823	\$26,470,959	\$2,225,291	\$38,758,729	32.2	\$1,204,810
2016	\$7,621,197	\$7,070,716	\$38,321,499	\$3,081,805	\$56,095,216	42.2	\$1,328,591
2017	\$6,149,012	\$6,869,398	\$41,586,160	\$3,104,808	\$57,709,378	39.9	\$1,447,439
2018	\$5,755,912	\$8,010,869	\$67,299,558	\$3,119,446	\$84,185,785	53.1	\$1,586,017
2019	\$5,379,833	\$7,012,156	\$46,217,261	\$2,485,047	\$61,094,297	37.9	\$1,611,987
Grand Total	\$30,349,610	\$33,581,962	\$219,895,437	\$14,016,397	\$297,843,405	205.2	\$1,451,184

Philadelphia Gas Works
Case Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: BIE-PS-05-BIE-PS-16
Date of Response: 4/27/2020
Response Provided By: Daniel M. Furtek

Question:

Reference Direct Testimony of Douglas A. Moser Statement No. 7. Provide a detailed schedule for each of the last 5 calendar years showing the total cost of pipeline replacement on a per mile basis including the following: Each component of the total cost showing (i.e., pipeline cost, labor, paving) and all supporting documents that were utilized to determine the total cost per mile.

Attachments: 0

Response:

Total Cost of Pipeline Replacement on a per mile Basis by Year and Component

Fiscal Year	Labor	Material	Contractors	Other	Grand Total	Main Installed (miles)	Cost per mile
2015	\$5,443,656	\$4,618,823	\$26,470,959	\$2,225,291	\$38,758,729	32.2	\$1,204,810
2016	\$7,621,197	\$7,070,716	\$38,321,499	\$3,081,805	\$56,095,216	42.2	\$1,328,591
2017	\$6,149,012	\$6,869,398	\$41,586,160	\$3,104,808	\$57,709,378	39.9	\$1,447,439
2018	\$5,755,912	\$8,010,869	\$67,299,558	\$3,119,446	\$84,185,785	53.1	\$1,586,017
2019	\$5,379,833	\$7,012,156	\$46,217,261	\$2,485,047	\$61,094,297	37.9	\$1,611,987
Grand Total	\$30,349,610	\$33,581,962	\$219,895,437	\$14,016,397	\$297,843,405	205.2	\$1,451,184

Philadelphia Gas Works
Case Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: BIE-PS-05-BIE-PS-4
Date of Response: 4/27/2020
Response Provided By: Daniel M. Furtek

Question:

For calendar years 2016-2019, provide the total miles of main and the number of services replaced by type (cast iron, steel, plastic, etc.).

Amount of Main Replaced (Miles)					
Year	Cast Iron	Ductile Iron	Steel	Plastic	Total
2016	31.54	1.31	0.78	1.25	34.89
2017	33.66	1.12	4.08	1.20	40.05
2018	33.00	1.52	3.77	1.10	39.39
2019	32.56	1.84	5.01	1.69	41.11
Total	130.77	5.79	13.64	5.24	155.44

**I&E Statement No. 2-R
Witness: Ethan H. Cline**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Rebuttal Testimony

Of

Ethan H. Cline

Bureau of Investigation and Enforcement

Concerning:

Cost of Service Study

TABLE OF CONTENTS

INTRODUCTION	1
COST OF SERVICE STUDY	2
CLASSIFICATION OF DISTRIBUTION MAINS	7

1 **INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Ethan H. Cline. My business address is 400 North Street, Harrisburg,
4 Pennsylvania 17120.

5
6 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

7 A. I am employed by the Pennsylvania Public Utility Commission in the Bureau of
8 Investigation and Enforcement (“I&E”) as a Fixed Utility Valuation Engineer.

9
10 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

11 A. The purpose of my rebuttal testimony is to address the direct testimony of Jeffrey
12 Pollock, submitted on behalf of Philadelphia Industrial and Commercial Gas
13 User’s Group’s (“PICGUG”). Specifically, my rebuttal testimony will address
14 two areas. The first is PICGUG’s claim that the Average and Excess methodology
15 used by PGW to allocate the cost of gas mains fails to account for the Interruptible
16 nature of the Interruptible Transportation (“IT”) service (PICGUG St. No. 1, p. 7).
17 The second is PICGUG’s proposal that 20% of the cost of mains be allocated
18 based upon the number of customers in each class (PICGUG St. No. 1, p. 18).

1 **COST OF SERVICE STUDY**

2 **Q. WHAT IS A COST OF SERVICE STUDY (“COSS”)?**

3 A. A COSS uses a variety of allocators to assign total Company operating costs
4 across its various customer classes based on demand and usage patterns. In other
5 words, a COSS is a formalized analysis of costs that attempts to assign to each
6 customer or rate class its proportionate share of the Company’s total cost of
7 serving its customers (i.e., the Company’s total revenue requirement) based on
8 customer class service differences. The results of such a study can be utilized to
9 determine the relative cost of service for each class and help determine the
10 individual class revenue requirements and, to the extent a particular class is above
11 or below the system average rate of return, show the additional revenues each
12 class utilizes or the additional revenues that each class contributes to the
13 Company’s overall revenues.

14
15 **Q. DID THE COMPANY PROVIDE A COSS IN THIS PROCEEDING?**

16 A. Yes. The Company’s COSS was presented and supported by PGW witness
17 Heppenstall in PGW Statement No. 5.

18
19 **Q. WHAT COSS METHODOLOGY DID THE COMPANY USE TO**
20 **ALLOCATE COSTS AND REVENUES IN THIS PROCEEDING?**

21 A. PGW used the Average and Extra Demand allocation methodology in its filing
22 (PGW St. No. 5, p. 3).

1 **Q. WHAT RECOMMENDATION DID PICGUG MAKE CONCERNING**
2 **THE ALLOCATION OF THE COST OF MAINS TO THE IT CLASS?**

3 A. PICGUG recommends that no peak demand costs be allocated to the IT class
4 (PICGUG St. No. 1, p. 10).

5
6 **Q. WHAT REASONS DID PICGUG GIVE FOR RECOMMENDING THAT**
7 **THE IT CLASS NOT BE ALLOCATED ANY PEAK DEMAND COSTS?**

8 A. PICGUG provided three reasons for its proposal to not allocate any peak demand
9 cost to the IT class. First, since service to IT customers can be curtailed, PGW's
10 proposal to allocate costs to both IT and firm customers using the same
11 methodology is not consistent with the terms and conditions of Rate IT (PICGUG
12 St. No. 1, p. 7). Second, since IT customers may incur additional cost to install
13 alternative fuel capabilities, they should not incur upstream demand costs of the
14 distribution system (PICGUG St. No. 1, p. 10). Third, PICGUG claims that
15 setting the IT demand costs at zero is consistent with what PGW stated should be
16 done (PICGUG St. No. 1, p. 11).

17
18 **Q. SHOULD THE COMMISSION ACCEPT PICGUG'S**
19 **RECOMMENDATION THAT NO PEAK DEMAND COSTS BE**
20 **ALLOCATED TO THE IT CLASS?**

21 A. No. PICGUG recommendation should be rejected. The methodology utilized by

1 PGW to allocate peak demand costs to all customer classes including the IT class
2 is valid.

3
4 **Q. WHY DO YOU BELIEVE THE COMPANY PROPERLY ALLOCATED**
5 **PEAK DEMAND COSTS?**

6 A. PGW's allocation of peak costs was based upon the volumes and demand put upon
7 the system by each class. In other words, the allocation is based upon how the
8 system is designed and utilized to serve each customer class. While the IT class
9 may have its service curtailed, PGW must nevertheless design and construct the
10 distribution system serving those customers based on the customers' peak and
11 average usage patterns. Therefore, the Average and Excess allocation
12 methodology is the most reasonable method to allocate the cost of providing
13 service to each class.

14
15 **Q. DOES THE INTERRUPTABLE NATURE OF IT SERVICE SUPPORT**
16 **PICGUG'S POSITION THAT NO PEAK DEMAND COSTS BE**
17 **ALLOCATED TO THE IT CLASS?**

18 A. No. PICGUG cited certain tariff provisions concerning PGW's ability to curtail
19 service to IT customers as basis for its position that IT customers should not be
20 allocated peak demand costs (PICGUG St. No. 1, pp. 7-9). However, as I stated
21 above, these provisions do not affect the design and construction of the
22 distribution system used to serve the IT customers during both average and peak

1 periods when service not being interrupted or curtailed. The tariff provisions that
2 allow PGW to curtail or interrupt service do not change the costs incurred by the
3 Company that are necessary to install and operate the distribution system to serve
4 IT customers during Peak periods when those customers are not interrupted.

5
6 **Q. HISTORICALLY, HAS THE IT RATE CLASS HAD ITS SERVICE**
7 **FREQUENTLY INTERRUPTED?**

8 A. No. As stated by witness Heppenstall on page 5 of PGW Statement No. 5, the
9 Interruptible class has only experienced one interruption of service (in 2004) in
10 over 22 years. The IT customers benefit from the lack of interruptions, and
11 therefore should share in the cost of the system. As described above, IT customers
12 are utilizing the system that was built to serve them. Therefore, IT customers
13 should be allocated a reasonable portion of both average and peak demand costs.
14 Therefore, PICGUG's position concerning the lack of interruptions should be
15 rejected.

16
17 **Q. IS PICGUG'S POSITION CONCERNING THE POTENTIAL COST OF**
18 **INSTALLING ALTERNATIVE FUEL EQUIPMENT OR STORAGE**
19 **VALID?**

20 A. No. PICGUG stated that customers may incur costs to install the alternative fuel
21 capability or storage in order to qualify for interruptible service (PICGUG St. No.
22 1, pp. 9-10). This is simply irrelevant to the determination of the costs that must

1 be assigned to the IT class because this determination is based on the fact that
2 PGW must design and construct the distribution system to serve these customers
3 based on their peak and average usage patterns.

4 Further, PICGUG has provided no identification or quantification of the
5 extra costs that the interruptible customers may incur. However, as noted above,
6 even if PICGUG provided this quantification of extra costs, it would ultimately be
7 irrelevant to the determination of the costs that should be assigned to this class.
8 Further, the tariff language also states that interruptible customers may curtail their
9 own usage rather than install alternative fuel capability or storage.

10 For these reasons PICGUG's claim should be rejected.

11
12 **Q. WHAT INTERROGATORY RESPONSE DID THE COMPANY**
13 **REFERENCE TO SUPPORT ITS POSITION REGARDING THE COST OF**
14 **SERVICE STUDY?**

15 A. On page 11 of PICGUG Statement No. 1, witness Pollock references the
16 Company's response to PICGUG-I-12, attached as PICGUG Exhibit JP-3. The
17 Company's response was an answer to a question using hypothetical condition of
18 "ignoring the frequency and duration of interruptions." The Company responded
19 that, under that hypothetical scenario, it would adjust Factor 2 in its COSS.

1 **Q. WHAT ADJUSTMENT DID PICGUG MAKE BASED ON THIS**
2 **RESPONSE?**

3 A. Based on this response, PICGUG adjusted Factor 3 to “recognize the interruptible
4 nature of the gas delivery service provided to Rate IT.” PICGUG St. No. 1, p. 11.

5
6 **Q. DO YOU AGREE WITH PICGUG’S PROPOSED ADJUSTMENT?**

7 A. No. I do not agree with PICGUG’s proposed adjustment to Factor 3. Witness
8 Pollock used the response to this hypothetical question as support for his position
9 that the interruptible class should be treated differently than the other rate classes
10 in terms of cost allocations. However, the conditions set forth in the question, as
11 described above, do not reflect the reality of PGW’s interruptible class. As stated
12 by witness Heppenstall on page 5 of PGW Statement No. 5, the Interruptible class
13 has only experienced one interruption of service (in 2004) in over 22 years. I
14 agree with witness Heppenstall’s position that, based on the lack of interruptions,
15 the interruptible class should be allocated capacity costs based on the system-wide
16 load factors.

17

18 **CLASSIFICATION OF DISTRIBUTION MAINS**

19 **Q. WHAT RECOMMENDATION DID PICGUG MAKE CONCERNING THE**
20 **CLASSIFICATION OF MAINS ON A CUSTOMER - RELATED BASIS?**

21 A. PICGUG recommends that 20% of the cost of mains be allocated to the various

1 classes based upon the number of customers in that class (PICGUG St. No. 1, p.
2 18).

3
4 **Q. WHAT RATIONALE DID PICGUG PROVIDE TO SUPPORT ITS**
5 **RECOMMENDATION THAT 20% OF MAINS BE ALLOCATED ON A**
6 **CUSTOMER - RELATED BASIS?**

7 A. PICGUG provided four arguments in support of its recommendation that 20% of
8 mains be allocated on a customer-related basis. First, PICGUG claims that
9 utilities make a minimal investment, that is independent of the level of peak
10 demand, to connect and serve customers (PICGUG St. No. 1, p. 14). Second,
11 PICGUG claims that the number of customers is a determining factor in the
12 footage of mains installed (PICGUG St. No. 1, p. 14). Third, PICGUG suggests that
13 such an allocation is suggested by NARUC Gas Rate Design (“GRD”) and Gas
14 Distribution Rate Design (“GDRD”) manuals as well as the Gas Rate
15 Fundamentals published by the American Gas Association Rate Committee
16 (PICGUG St. No. 1, pp. 14-15). Fourth, PICGUG suggests that this methodology
17 should be accepted by this Commission because it was accepted in other
18 jurisdictions (PICGUG St. No. 1, pp. 16-17).

1 **Q. DO YOU AGREE THAT UTILITIES MAKE A MINIMAL INVESTMENT,**
2 **INDEPENDENT OF THE LEVEL OF PEAK DEMAND, TO CONNECT**
3 **AND SERVE CUSTOMERS?**

4 A. No. Mains carry gas and historically the cost of mains has been allocated based on
5 flows. Arguably, the entire gas system was built to serve “customers,” and under
6 this argument, every cost should be “customer” based. However, that flawed
7 methodology would not be representative of how the system is utilized by classes
8 or individual customers. Furthermore, in its response to PICGUG-I-7, attached as
9 I&E Exhibit No. 2-R, Schedule 1, the Company identified the method it uses to
10 size distribution mains. Specifically, the Company uses software that models the
11 entire distribution system and that model includes factors such as “location,
12 pressure, length, pressure loss as a result of the new pipe size, system redundancy,
13 potential load growth in the area, project purpose, future infrastructure changes,
14 constructability, etc.” It should be noted that the factors listed in this response
15 does not include number of customers.

16
17 **Q. HAS THE COMMISSION PREVIOUSLY REJECTED ALLOCATING**
18 **THE COST OF DISTRIBUTION MAINS BASED ON NUMBER OF**
19 **CUSTOMERS?**

20 A. Yes. The Commission has previously rejected including the cost of distribution
21 mains as a customer cost in the Philadelphia Gas Works 2007 base rate proceeding
22 at Docket No. R-00061931. In the Order entered September 28, 2007, the

1 Commission stated that “PGW’s proposal to allocate a percentage of the cost of
2 the distribution mains as a customer cost not to be acceptable” and that
3 “[r]eviewing the record, we find that the allocation of distribution mains
4 investment costs should be done using both annual and peak demands.” Docket
5 No. R-00061931, p. 80. The Commission also reaffirmed that the cost of mains
6 should be allocated on a combination of throughput and demand, and therefore not
7 allocated to the customer function. In the PPL Gas Utilities case, Administrative
8 Law Judge Jones noted that “the Commission has rejected minimum and zero-
9 intercept system methods as inconsistent with causation.” (PPL Gas Utilities,
10 Docket No. R-00061398, Order entered February 8, 2007, p. 112).

11
12 **Q. DO YOU AGREE THAT THE NARUC GRD AND GDRD MANUALS**
13 **SPECIFICALLY RECOMMEND THE ALLOCATION OF**
14 **DISTRIBUTION MAINS BASED ON NUMBER OF CUSTOMERS?**

15 A. No. PICGUG admits on page 14 of PICGUG Statement No. 1 that NARUC GRD
16 and GDRD manuals discuss several methodologies and approaches to cost
17 allocations. Therefore, it is up to each Commission to determine the most
18 reasonable cost allocation methodology for its jurisdiction. As I have discussed
19 above, the Pennsylvania Public Utility Commission has determined that allocating
20 distribution main costs based on number of customers is not reasonable.

1 **Q. DO YOU AGREE THAT THE ALLOCATION METHODOLOGIES USED**
2 **BY COMMISSIONS IN OTHER JURISDICTIONS SHOULD BE APPLIED**
3 **TO PENNSYLVANIA?**

4 A. No. In the UGI Utilities, Inc. - Electric Division Order (Docket No. R-2017-
5 2640058, Order entered October 25, 2018) the Commission stated:

6 The ALJs also properly recognized that it is not persuasive to
7 cite to one provision of another jurisdiction's ratemaking
8 practice without looking at other issues and aspects of that
9 jurisdiction's overall ratemaking policy. Indeed, different
10 jurisdictions adopt different approaches and mechanisms to
11 various ratemaking issues, including capital structure, cost of
12 equity, normalization, annualization and amortization,
13 automatic adjustment clauses and post-test year adjustments.
14 Therefore, the ALJs found it inappropriate to select one
15 isolated element of the ratemaking formula from another
16 jurisdiction and apply it to Pennsylvania ratemaking policy.
17 We agree.

18 Therefore, based on the above Order, PICGUG's reliance on the methodologies
19 preferred by other jurisdictions should be rejected and the prior Pennsylvania
20 Commission decisions, discussed above, should take precedence.

21
22 **Q. WHAT DO YOU RECOMMEND REGARDING PICGUG'S PROPOSALS**
23 **REGARDING THE COST OF SERVICE STUDY AND ALLOCATION OF**
24 **DISTRIBUTION MAINS?**

25 A. I recommend that PIGUG's proposals should be rejected for the reasons discussed

1 above and the Commission base the cost allocations on the cost of service study
2 provided by the Company.

3

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

5 A. Yes.

**I&E Exhibit No. 2-R
Witness: Ethan H. Cline**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Exhibit to Accompany

the

Rebuttal Testimony

Of

Ethan H. Cline

Bureau of Investigation and Enforcement

Concerning:

Cost of Service Study

Philadelphia Gas Works
Case Name: R-2020 BRC Rate Case TBA
Docket No(s): BRC 2020 Rate Case

Response to Discovery Request: PICGUG-01-PICGUG-01-7
Date of Response: 4/29/2020
Response Provided By: Douglas A. Moser

Question:

Provide documents explaining how PGW sizes distribution mains.

Attachments: 0

Response:

PGW does not have “documents” explaining how PGW sizes distribution mains; rather, PGW uses Synergi Gas 4.9 from DNVGL, which is an industry wide leader in hydraulic modeling software for natural gas distribution systems. The Synergi Gas 4.9 software models the entire distribution system. The model utilizes an analysis engine with input from the user to simulate the expected conditions of the distribution system. All permanent main installations are modelled using a -5F Design Day. The models are updated weekly to reflect field changes and are validated annually based on conditions experienced on the coldest day of the year. The model includes additional factors such as: location, pressure, length, pressure loss as a result of the new pipe size, system redundancy, potential load growth in the area, project purpose, future infrastructure changes, constructability, etc. The main objective of the model is to ensure that the distribution system’s minimum operating pressures are maintained in ideal and abnormal operating conditions.

**I&E Statement No. 1-SR
Witness: Anthony Spadaccio**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Surrebuttal Testimony

of

Anthony Spadaccio, CRRA

Bureau of Investigation & Enforcement

Concerning:

Revenue Requirement

Debt to Total Capital

Days of Cash on Hand

Debt Service Coverage Ratio

Ratings Agencies

TABLE OF CONTENTS

INTRODUCTION OF WITNESS 1

DEBT TO TOTAL CAPITALIZATION 3

DAYS CASH ON HAND..... 6

DEBT SERVICE COVERAGE RATIO 7

RATING AGENCIES 10

SUMMARY OF YOUR OVERALL POSITION..... 11

1 **INTRODUCTION OF WITNESS**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Anthony Spadaccio. My business address is Pennsylvania Public
4 Utility Commission, Commonwealth Keystone Building, 400 North Street,
5 Harrisburg, PA 17120.

6

7 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

8 A. I am employed by the Pennsylvania Public Utility Commission (Commission) in
9 the Bureau of Investigation & Enforcement (I&E) as a Fixed Utility Financial
10 Analyst.

11

12 **Q. ARE YOU THE SAME ANTHONY SPADACCIO WHO IS RESPONSIBLE**
13 **FOR THE DIRECT TESTIMONY CONTAINED IN I&E STATEMENT**
14 **NO. 1 AND THE SCHEDULES IN I&E EXHIBIT NO. 1?**

15 A. Yes.

16

17 **Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?**

18 A. The purpose of my surrebuttal testimony is to address the rebuttal testimony of
19 Philadelphia Gas Works (PGW or Company) Statement No. 2-R, Rebuttal
20 Testimony of Joseph F. Golden, Jr.; PGW Statement No. 3-R, Rebuttal Testimony
21 of Daniel J. Hartman; and PGW Statement No. 4-R, Rebuttal Testimony of Harold
22 Walker, III regarding various financial metrics such as debt service coverage ratios

1 (DSCR), days cash on hand (DCOH), debt to total capitalization, and credit
2 ratings.

3
4 **Q. DO YOU HAVE ANY INITIAL COMMENTS REGARDING YOUR**
5 **REVENUE RECOMMENDATION?**

6 A. Yes. My overall revenue recommendation was based upon my analysis of debt
7 service coverage, credit worthiness, and days cash on hand. I&E did not submit
8 testimony or analysis of operating and maintenance (O&M) expenses; however,
9 my position does not necessarily assume the accuracy of the Company's O&M
10 claims. Any valid adjustments to O&M claims made by other parties would
11 necessarily impact the revenue recommendation presented in my testimony, which
12 was calculated with the Company's O&M claim as filed.

13
14 **Q. SUMMARIZE THE COMPANY'S REBUTTAL TESTIMONY AS IT**
15 **RELATES TO YOUR RECOMMENDATIONS IN DIRECT TESTIMONY.**

16 A. Collectively, the Company witnesses mainly disagree with my recommended
17 percent of debt to total capitalization, my recommended debt service coverage
18 ratio of 2.13 times, my assessment of days cash on hand, and my comments
19 regarding credit rating agencies.

1 **DEBT TO TOTAL CAPITALIZATION**

2 **Q. WHAT FINANCING STRATEGY DID YOU RECOMMEND IN DIRECT**
3 **TESTIMONY FOR CAPITAL EXPENDITURES?**

4 A. I recommended that PGW work toward a debt to total capital ratio goal of
5 approximately, but no less than, 70%, and referred to a Commission Staff Report
6 to support my position. I explained that my recommendation affords PGW a
7 reasonable opportunity to achieve a 77% debt to total capital ratio at the
8 conclusion of the FPFTY.¹

9

10 **Q. WHAT WAS THE COMPANY'S RESPONSE TO YOUR**
11 **RECOMMENDED STRATEGY TO FINANCE CAPITAL**
12 **EXPENDITURES?**

13 A. Mr. Golden claims I recommended that PGW move toward a more burdensome
14 and debt-laden capital structure,² and that I do not recognize that the cost of long-
15 term debt to customers is greater than using internally generated funds (IGF) to
16 finance capital expenditures.³

17 Mr. Hartman asserts that the Company cannot keep borrowing an endless
18 amount of money if the support in the form of rates is not there.⁴ He claims that if
19 a material portion of PGW's request is not received, substantial additional

¹ I&E Statement No. 1, p. 5, ln. 15 through p. 8, ln. 11.

² PGW Statement No. 2-R, p. 17, lines 5-6.

³ PGW Statement No. 2-R, p. 20, lines 10-12.

⁴ PGW Statement No. 3-R, p. 7, lines 8-10.

1 leverage will be forced back onto the system, reversing any favorable trends
2 moving forward.⁵

3 Mr. Walker states that a higher debt ratio means higher risk and that my
4 recommendation is 23% higher than his MUNI Group's average debt ratio from
5 2014 to 2018.⁶

6
7 **Q. DO YOU AGREE WITH THE COMPANY'S CONCLUSIONS**
8 **REGARDING YOUR DEBT TO TOTAL CAPITALIZATION RATIO?**

9 A. No. Mr. Golden's claim that I suggested PGW move toward a more debt-heavy
10 and burdensome capital structure is simply incorrect. In fact, I recommended that
11 PGW move toward a *lower* debt to total capital ratio, specifically 77% in the
12 FPFTY with an ultimate goal nearing 70%.⁷

13 Further, both Mr. Golden and Mr. Walker have illustrated that even with a
14 0% rate increase, the debt to total capitalization ratio are projected to trend
15 downward in the foreseeable future.⁸ Therefore, any increase would naturally
16 help alleviate PGW's debt burden at a faster pace, and would certainly look
17 favorable to rating agencies. Also, to address Mr. Walker's concerns, if the
18 Company continues on its current trend, its debt ratio will continue to quickly
19 move toward that of its peers.

⁵ PGW Statement No. 3-R, p. 8, lines 6-9.

⁶ PGW Statement No. 4-R, p. 7, lines 13-17.

⁷ I&E Statement No. 1, p. 7, lines 14-17.

⁸ PGW Exhibit JFG-1, p. 4, ln 47 and PGW Statement No. 4, p. 50, Table 6.

1 **Q. DO YOU AGREE WITH PGW’S ASSERTION THAT LONG-TERM DEBT**
2 **FINANCING IS MORE EXPENSIVE THAN USING INTERNALLY**
3 **GENERATED FUNDS TO FINANCE CAPITAL EXPENDITURES?**

4 A. Yes. However, total cost should not be the only consideration when making
5 financing decisions. Financing PGW’s capital improvements with all cash would
6 be the cheapest method in terms of the total amount spent but would significantly
7 increase rates in the near future and would allow ratepayers who are on the system
8 after the assets have been added to benefit from previous ratepayers’ investments.
9 A balance must be struck between financing capital expenditures directly from
10 ratepayers through the use of cash and the use of debt financing. The use of
11 ratepayers as a funding source may be a cheaper way for PGW to fund its capital
12 expenditures, but it does not allow the cost of the assets to be recovered from the
13 ratepayers who benefit from those assets over the life of those assets. PGW has
14 chosen to fund its capital improvements with 50% debt and 50% internally
15 generated funds, but this capital structure does not fully recognize the ability of
16 PGW to match the cost of capital improvements to when the ratepayer will receive
17 its benefit.

1 **Q. BASED ON THE COMPANY'S REBUTTAL TESTIMONY, HAVE YOU**
2 **CHANGED YOUR RECOMMENDATION?**

3 A. No. I continue to recommend that PGW move towards a debt to total
4 capitalization goal of approximately, but no lower than 70%, which is supported
5 by a Commission Staff Report as discussed in my direct testimony.⁹
6

7 **DAYS CASH ON HAND**

8 **Q. WHAT WAS YOUR DCOH RECOMMENDATION IN DIRECT**
9 **TESTIMONY?**

10 A. My recommendation resulted in a year-end cash balance of slightly over \$90
11 million, which provides for approximately 68 days cash on hand for the FPFTY.¹⁰
12

13 **Q. WHAT WAS THE COMPANY'S RESPONSE TO YOUR**
14 **RECOMMENDED DAYS CASH ON HAND?**

15 A. Mr. Golden states that the levels of year-end cash and days cash on hand my
16 recommendation produce are more reasonable than that recommended by other
17 witnesses. However, he opines that my recommendation is moving in the wrong
18 direction and leaves PGW vulnerable to contingencies.¹¹

19 Mr. Hartman implies that my recommended DCOH of 68 days could have
20 an adverse impact on the Company's credit rating and reiterates his position that

⁹ I&E Statement No. 1, p. 6, ln 13 through p. 7, ln. 10.

¹⁰ I&E Exhibit No. 1, Schedule 1, p. 7.

¹¹ PGW Statement No. 2-R, p. 30, lines 3-5.

1 PGW needs to preserve a minimum of 70-90 DCOH to maintain its current bond
2 rating.¹²

3
4 **Q. DO YOU AGREE WITH THE COMPANY'S CONCLUSIONS**
5 **REGARDING YOUR DAYS CASH ON HAND ANALYSIS?**

6 A. No. My recommendation that provides for 68 days cash on hand very closely
7 aligns with Mr. Hartman's recommendation to maintain 70 to 90 DCOH. The 68
8 DCOH my recommendation produces places PGW solidly within Moody's 'A'
9 rating category¹³ for that specific financial metric, which also matches the
10 Company's overall bond rating from Moody's.¹⁴

11 Ultimately, the overall I&E position was not set to create a specific number
12 of days cash on hand, but the reasonableness of its position is confirmed by the 68
13 of days of cash on hand that result from I&E's overall revenue recommendation.

14
15 **DEBT SERVICE COVERAGE RATIO**

16 **Q. SUMMARIZE YOUR DSCR RECOMMENDATION IN DIRECT**
17 **TESTIMONY?**

18 A. I recommended a DSCR of 2.13x before the \$18 million City payment or 1.96x
19 after the payment.¹⁵

¹² PGW Statement No. 3-R, p. 8, ln. 10 through p. 9, ln 16.

¹³ I&E Exhibit No. 1, Schedule 2, p. 10.

¹⁴ PGW Exhibit JFG-3, Part 1 of 3.

¹⁵ I&E Exhibit No. 1, Schedule 1, pp. 1 and 4.

1 **Q. WHAT WAS THE COMPANY’S RESPONSE TO YOUR**
2 **RECOMMENDED DEBT SERVICE COVERAGE RATIOS?**

3 A. Mr. Golden acknowledges that my recommendation recognizes not only the
4 requirement of PGW to meet bond covenants, but also the necessary cash to pay
5 for items such as the City Fee, pension fund, distribution system improvement
6 charge (DSIC) costs, and the OPEB surcharge.¹⁶ However, he claims that my
7 recommendation would leave PGW with less ending free cash, which would
8 ultimately lead to increasing difficulty in keeping financial health above minimum
9 standards if unanticipated challenges arise.¹⁷

10 Mr. Hartman implies that my recommendation ignores PGW’s request for
11 IGF to fund non-DSIC necessary capital projects. Additionally, he claims that my
12 DSCR recommendation offers little cushion for bondholders and provides limited
13 debt coverage that ratings agencies will not view as positive.¹⁸

14 Mr. Walker states that a higher DSCR equates to lower risk and that his
15 MUNI Group’s average is 19% higher than my recommendation.¹⁹

¹⁶ PGW Statement No. 2-R, p. 23, lines 22-26.

¹⁷ PGW Statement No. 2-R, p. 25, lines 4-9.

¹⁸ PGW Statement No. 3-R, p. 6, lines 11-19.

¹⁹ PGW Statement No. 4-R, p. 6, ln. 17 through p. 7, ln 2.

1 **Q. DO YOU AGREE WITH PGW’S CONCLUSIONS REGARDING YOUR**
2 **DEBT SERVICE COVERAGE RATIO RECOMMENDATION?**

3 A. No. First, contrary to Mr. Hartman’s implication, I did not dispute PGW’s \$41
4 million IGF claim which would assist the Company to achieve a more favorable
5 debt to total capital ratio, provide funds to finance smaller capital projects, and
6 provide financial flexibility which would allow for a cushion to help pay debt
7 service should the need arise.

8 Next, it is noteworthy to recognize that my recommended DSCRs of 2.13x
9 and 1.96x fall firmly within Moody’s highest two rating categories of ‘Aaa’ and
10 ‘Aa’ for this financial metric. These ratings are both higher than Moody’s overall
11 ‘A’ category bond rating for PGW.²⁰

12 Finally, to reiterate my position in direct testimony, I&E’s recommended
13 coverage ratio of 2.13x exceeds the 1.5x required by PGW’s bond covenant and
14 equates to a net income available for debt service of \$227,308,000²¹ which
15 provides coverage for the following:

16

Debt Service	\$106,790,000
City Payment	\$18,000,000
OPEBs	\$18,500,000
Pension Fund	\$2,000,000
Retiree Health Care	\$5,000,000
Internally Generated Funds	\$41,000,000
DSIC	\$35,000,000
Working Capital	\$1,018,000

²⁰ PGW Exhibit JFG-3, Part 1 of 3.

²¹ I&E Exhibit No. 1, Schedule 1, p. 1.

1 **RATING AGENCIES**

2 **Q. PLEASE REAFFIRM THE MOST RECENT RATINGS AVAILABLE FOR**
3 **PGW’S BONDS.**

4 A. Moody’s Investors Service²² has rated PGW’s outstanding bonds A3 with a stable
5 outlook, which represents an upper-medium grade obligation with a
6 lower credit risk. S&P Global Ratings²³ has assigned a rating of A with a stable
7 outlook, which is investment grade and represents a strong capacity to meet
8 financial obligations but is somewhat susceptible to economic conditions. Fitch
9 Ratings²⁴ has awarded PGW’s bonds an investment grade rating of BBB+, again
10 with a stable outlook, which represents a low expectation of default and adequate
11 capacity to meet financial commitments.

12
13 **Q. CONSIDERING PGW’S REBUTTAL TESTIMONY, DO YOU HAVE ANY**
14 **CONCERNS THAT YOUR RECOMMENDATIONS WILL ADVERSELY**
15 **AFFECT THE COMPANY’S CREDIT RATINGS?**

16 A. No. I do not believe any of my recommendations move the Company toward
17 danger of a credit downgrade. In fact, the debt to total capital ratio trending
18 downward, along with the strong debt service coverage and days cash on hand
19 which I addressed above and in my direct testimony support PGW’s current stable
20 credit ratings.

²² PGW Exhibit JFG-3, Part 1 of 3.
²³ PGW Exhibit JFG-3, Part 2 of 3.
²⁴ PGW Exhibit JFG-3, Part 3 of 3.

1 **SUMMARY OF YOUR OVERALL POSITION**

2 **Q. HAS I&E'S OVERALL RECOMMENDED REVENUE REQUIREMENT**
3 **CHANGED FROM DIRECT TESTIMONY?**

4 A. No. PGW's witnesses have not provided any new information or arguments that
5 warrant changes to my recommendations made in direct testimony.

6

7 **Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?**

8 A. Yes.

**I&E Statement No. 2-SR
Witness: Ethan H. Cline**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA GAS WORKS

Docket No. R-2020-3017206

Surrebuttal Testimony

Of

Ethan H. Cline

Bureau of Investigation and Enforcement

Concerning:

Cost of Service Study

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Ethan H. Cline. My business address is 400 North Street, Harrisburg,
3 Pennsylvania 17120.

4
5 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

6 A. I am employed by the Pennsylvania Public Utility Commission in the Bureau of
7 Investigation and Enforcement (“I&E”) as a Fixed Utility Valuation Engineer.

8
9 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

10 A. The purpose of my rebuttal testimony is to address the rebuttal testimony
11 submitted on behalf of the Pennsylvania Office of Small Business Advocate
12 (“OSBA”) by witness Robert D. Knecht (OSBA St. No. 1-R) and the rebuttal
13 testimony submitted on behalf of the Pennsylvania Office of Consumer Advocate
14 (“OCA”) by witness Jerome D. Mierzwa (OCA St. No. 4-R).

15
16 **Q. WHAT DID YOU RECOMMEND IN YOUR DIRECT TESTIMONY?**

17 A. I recommended that the Company’s proposed customer charges be included in any
18 scale back of rates and that any scale back be proportional based on the Class Cost
19 of Service Study (“CCOSS”) presented in PGW Exhibit CEH-1 (I&E Statement
20 No. 2, p. 3).

1 **Q. DID THE COMPANY REVISE ITS CCOSS IN REBUTTAL TESTIMONY?**

2 A. Yes. Ms. Heppenstall provided a revised CCOSS in PGW Exhibit CEH-1R. As
3 stated on page 1 of PGW Statement No. 5-R, Ms. Heppenstall revised the CCOSS
4 in response to items that were uncovered during the discovery process.

5

6 **Q. DID OCA WITNESS MIERZWA ADDRESS YOUR RECOMMENDATION**
7 **IN REBUTTAL TESTIMONY?**

8 A. Yes. Mr. Mierzwa disagreed with my recommendation that the revenue
9 distribution proposed by the Company be scaled back proportionately based on the
10 Company's CCOSS (OCA Statement No. 4-R, pp. 2-3).

11

12 **Q. WHY DID MR. MIERZWA NOT AGREE WITH YOUR CUSTOMER**
13 **CHARGE RECOMMENDATION?**

14 A. Mr. Mierzwa did not agree with my recommendation because his belief, that he
15 explained in greater detail in his direct testimony, that the Company's proposal is
16 "out of line with the Residential customer charges of other NGDCs in the
17 Commonwealth, violates the principle of gradualism, and is inconsistent with the
18 Commission's general goal of fostering energy conservation." (OCA St. No. 4-R,
19 p. 2).

1 **Q. DO YOU AGREE WITH THE OCA REGARDING THE CUSTOMER**
2 **CHARGE PROPOSAL?**

3 A. No. A customer charge should be based on what is supported by the customer cost
4 analysis when it is available. The customer cost analysis, as approved by the
5 Commission, is limited to certain costs being recovered as fixed costs and
6 provides some guidance in the discussion of balance between fixed costs and
7 conservation. In this instance I found PGW’s customer cost analysis appropriate
8 and, therefore, the proposed customer charge appropriate if the requested rate
9 increase is approved in full. If less than a full increase be granted, I recommend
10 the customer charge be scaled back proportionally.

11
12 **Q. WHY DID THE OCA NOT AGREE WITH YOUR RECOMMENDED**
13 **PROPORTIONAL SCALE BACK BASED ON THE COMPANY’S CCOSS?**

14 A. On page 3 of OCA Statement No. 4-R, Mr. Mierzwa explained that in his direct
15 testimony, he disagreed with the Company’s CCOSS and provided a CCOSS that
16 “corrects the flaws in PGW’s CCOSS” and stated that “[i]f the Commission
17 determines that the revenue distribution should be based on a CCOSS,” it should
18 be based on the OCA’s CCOSS.

19
20 **Q. DID THE COMPANY ADDRESS SOME OF MR. MIERZWA’S CCOSS**
21 **ISSUES IN REBUTTAL TESTIMONY?**

22 A. Yes. On page 4 of PGW Statement No. 5-R, Ms. Heppenstall stated that the PGW

1 CCOSS was revised so that the mains investments are allocated based on
2 weighting allocation Factor 3, 0.50 for Average Daily Throughput and 0.50 for
3 Maximum Day Extra Demand. Ms. Heppenstall further clarifies that this change
4 in the weighting does not cause a substantial change in the results of the cost of
5 service study. I will further address the scale back of rates below.

6
7 **Q. DID THE OSBA ADDRESS YOUR RECOMMENDATIONS IN**
8 **REBUTTAL TESTIMONY?**

9 A. Yes. Mr. Knecht noted that my recommendations in direct testimony did not take
10 issue with the Company's proposals regarding cost allocation, revenue allocation,
11 and rate design and that I support a proportional scale back. He further stated that
12 his disagreement regarding revenue allocation were discussed in his direct
13 testimony (OSBA St. No. 1-R, pp. 1-2).

14
15 **Q. DO YOU WISH TO CHANGE YOUR POSITION BASED UPON THE**
16 **DIRECT TESTIMONY OF MR. KNECHT?**

17 A. No. As stated by OSBA witness Knecht on page 3 of OSBA Statement No. 1, and
18 acknowledged by PGW witness Heppenstall on page 2 of PGW Statement No. 5-
19 R, the CCOSS favored by witness Knecht is not "directionally different" from the
20 Company's results. Therefore, I continue to support the Company's CCOSS as it
21 was modified in rebuttal testimony.

1 **Q. DO YOU WISH TO CHANGE YOUR SCALE BACK**
2 **RECOMMENDATION?**

3 A. No. Ultimately, the Commission will determine the method for any scale back of
4 rates if the maximum requested revenue increase is not granted. A CCOSS
5 provides guidance in scale back methodology. The scale back of rates will follow
6 whichever methodology the Commission has determines is most reasonable. In
7 this case, I continue to support a proportional scale back based on the revised
8 CCOSS provided by the Company.

9

10 **Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?**

11 A. Yes.

**I&E Statement No. 3-SR
Witness: Scott S. Orr**

**PHILADELPHIA GAS WORKS
Docket No. R-2020-3017206**

Surrebuttal Testimony

of

Scott S. Orr

Bureau of Investigation & Enforcement

Concerning:

**Main Replacement Program
Pipeline Replacement Costs**

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

3 A. My name is Scott S. Orr. I am a Fixed Utility Valuation Engineer in the Safety
4 Division of the Pennsylvania Public Utility Commission's (PUC or
5 Commission) Bureau of Investigation and Enforcement (I&E). My business
6 address is Pennsylvania Public Utility Commission, 400 North Street, Harrisburg,
7 PA 17120.

8
9 **Q. DID YOU PROVIDE WRITTEN DIRECT TESTIMONY IN THIS**
10 **PROCEEDING?**

11 A. Yes. I am responsible for I&E Statement No. 3 regarding the proposed base rate
12 filing by Philadelphia Gas Works (PGW) specifically as it relates to the
13 Distribution Integrity Management Plan (DIMP) risk reduction, Long Term
14 Infrastructure Improvement Plans (LTIIP), leaks per mile, and pipeline
15 replacement costs associated with the replacement of mains.

16
17 **Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?**

18 A. The purpose of my surrebuttal testimony is to address the direct testimony of
19 Douglas A. Moser, submitted on behalf of PGW.

1 **Q. HAVE YOU REVIEWED PGW STATEMENT ST. NO. 7-R, THE**
2 **REBUTTAL TESTIMONY OF DOUGLAS MOSER?**

3 A. Yes.

4
5 **Q. PLEASE SUMMARIZE MR. MOSER’S TESTIMONY WITH RESPECT**
6 **TO YOUR DIRECT TESTIMONY?**

7 A. Mr. Moser discussed in his rebuttal testimony PGW’s Main Replacement
8 Program, Pipeline Replacement Costs, and the Distribution Integrity Management
9 Program (DIMP). He acknowledged, as I stated in my direct testimony, that
10 separating cast iron mains into smaller categories would help better identify which
11 mains need replacing. He then noted that PGW would break down the 10” and
12 smaller cast iron mains into a less than 8” category and an 8” and greater category.
13 He also accepted my recommendation that PGW integrate the Main Replacement
14 Prioritization (MRP) model into its DIMP. Mr. Moser also stated that PGW
15 utilizes the Advance Intelligent Mobile Solution (AIMS) V2 work management
16 system to capture all relevant leak locations, repairs, and causes along with asset
17 locations across the distribution system. Mr. Moser further stated in his response
18 that “PGW’s goal is to continue to reduce the trend of hazardous leaks on its
19 system.”

20 In addition, I had noted in my direct testimony that PGW had miscalculated

1 leaks per mile in the data supplied in response to BIE-PS-24, attachment A¹. Mr.
2 Moser clarified that this response inadvertently contained whole numbers in the
3 mileage of mains column which should have been shown to two decimal places
4 and provided the corrected data as an exhibit to his testimony. I have reviewed
5 this information and am satisfied with Mr. Moser's explanation of this
6 discrepancy.

7
8 **Q. IN RESPONSE TO YOUR STATEMENT THAT LEAKS PER MILE ON**
9 **CAST IRON HAVE BEEN INCREASING SINCE 2017 FOR PGW, MR.**
10 **MOSER STATED THAT A TREND OF MORE THAN TWO OR THREE**
11 **YEARS MUST BE REVIEWED. HOW DO YOU RESPOND?**

12 A. While I understand the need to look at a trend over a period of time, PGW's leaks
13 per mile, nevertheless, have increased since 2017. While the overall trend may be
14 downward, it still remains concerning that the recent trend is upward. This is
15 movement in the wrong direction and must be closely looked at to ensure the trend
16 does not continue. Anytime leaks per mile begin increasing, it is a major concern
17 for Pipeline Safety.

¹ I&E Ex. No. 3, Sch. 2, p. 2.

1 **Q. HOW DID MR. MOSER RESPOND TO YOUR RECOMMENDATION**
2 **THAT PGW BE REQUIRED TO SUBMIT A COST REDUCTION “PLAN**
3 **OF ACTION” TO THE PUC FOR APPROVAL 60 DAYS AFTER THE**
4 **ORDER IN THIS CASE?**

5 A. Mr. Moser disagrees with my recommendation. He stated in his response “I do
6 not believe that this would be a prudent expenditure of ratepayer funds. As noted,
7 PGW has undertaken several cost-reduction measures and all replacement work is
8 awarded pursuant to RFPs to the lowest responsible bidder.”² Furthermore, he
9 states “PGW has increased the project size to gain economies of scale from its
10 contractors. Less mobilizations of equipment and personnel has resulted in
11 increased production and has kept pricing competitive. Larger projects also result
12 in less transition work from the old main to the new.”³

13
14 **Q. DO YOU AGREE WITH MR. MOSER’S JUSTIFICATION FOR NOT**
15 **SUBMITTING A COST REDUCTION “PLAN OF ACTION” TO THE**
16 **PUC?**

17 A. No. As I stated in my direct testimony, pipeline replacement costs per mile, as
18 reported by PGW, have increased. In 2015, the cost was \$1,204,801 per mile as
19 compared to \$1,611,987 in 2019. This is approximately a 33.8 % increase in cost
20 over five years, or an average increase in cost of 6.9% per year. Therefore, PGW

² PGW St. No. 7-R, p. 6.

³ PGW St. No. 7-R, p. 5.

1 needs to, at minimum, submit an outline and proposed goals describing the
2 Company's plan to reduce costs for pipeline replacement within 60 days after the
3 order is entered in this case. This outline for replacement costs can be reviewed
4 yearly by the Pipeline Safety Division during a meeting or as part of an annual
5 inspection. It is my opinion that efforts by the Company to reduce and limit
6 pipeline replacement costs is in the best interest of the ratepayers and PGW itself.
7 An annual review would ensure that these costs are being kept to a minimum.
8 This periodic review and tracking of pipeline replacement costs will identify any
9 early indication of increases and should trigger a proactive review and remediation
10 action by the Company.

11
12 **Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?**

13 **A. Yes.**