

I&E Statement No. 1
Witness: Amanda Gordon

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Direct Testimony

of

Amanda Gordon

Bureau of Investigation and Enforcement

Concerning:

Rate of Return

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PENNSYLVANIA PUBLIC UTILITY COMMISSION

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

2 A. My name is Amanda Gordon. My business address is Pennsylvania Public
3 Utility Commission, P.O. Box 3265, Harrisburg, PA 17105-3265.

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
7 Bureau of Investigation and Enforcement (I&E) as a Fixed Utility Financial
8 Analyst Supervisor.

9

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

12 A. My educational and professional background is set forth in Appendix A,
13 which is attached.

14

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

17 A. I&E is responsible for protecting the public interest in rate proceedings.
18 The I&E analysis in this proceeding is based on its responsibility to
19 represent the public interest. This responsibility requires the balancing of
20 the interests of ratepayers and the Company.

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

2 A. The purpose of my direct testimony is to address rate of return, including
3 capital structure, the cost of common equity, and the overall fair rate of
4 return for Audubon Water Company (Audubon or Company).

5

6 **BACKGROUND**

7 **Q. WHAT IS THE GENERAL DEFINITION OF RATE OF RETURN IN**
8 **THE CONTEXT OF A RATE CASE?**

9 A. Rate of return generally is the amount of revenue an investment generates
10 (in the form of net income), usually expressed as a percentage of the
11 amount of capital invested, over a given period of time. Rate of return is
12 one of the components of the revenue requirement formula.

13

14 **Q. WHAT IS THE REVENUE REQUIREMENT FORMULA?**

15 A. The revenue requirement formula used in base rate cases is as follows:

16
$$RR = E + D + T + (RB \times ROR)$$

17 Where:

18 RR = Revenue Requirement

19 E = Operating Expense

20 D = Depreciation Expense

21 T = Taxes

22 RB = Rate Base

23 ROR = Overall Rate of Return

1 In the above formula, the rate of return is expressed as a percentage. The
2 calculation of that rate is independent of the determination of the
3 appropriate rate base value for ratemaking purposes. As such, the
4 appropriate total dollar return is dependent upon the proper computation of
5 the rate of return and the proper valuation of the Company's rate base.
6

7 **Q. WHAT CONSTITUTES A FAIR AND REASONABLE OVERALL**
8 **RATE OF RETURN?**

9 A. A fair and reasonable overall rate of return is one which will allow the
10 utility the opportunity to recover those costs prudently incurred by all
11 classes of capital used to finance the rate base during the prospective period
12 in which its rates will be in effect.

13 *The Bluefield Water Works & Improvements Co. v. Public Service*
14 *Comm. of West Virginia*, 292 U.S. 679, 692-93 (1923), and the *FPC v.*
15 *Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944) cases set forth the
16 principles that are generally accepted by regulators throughout the country
17 as the appropriate criteria for measuring a fair rate of return:

- 18 1) A utility is entitled to a return similar to that being earned by other
19 enterprises with corresponding risks and uncertainties, but not as high as
20 those earned by highly profitable or speculative ventures;
21 2) A utility is entitled to a return level reasonably sufficient to assure
22 financial soundness;

- 1 3) A utility is entitled to a return sufficient to maintain and support its
2 credit and raise necessary capital;
- 3 4) A fair return can change (increase or decrease) along with economic
4 conditions and capital markets.

5

6 **Q. PLEASE EXPLAIN HOW YOU CALCULATED THE OVERALL**
7 **RATE OF RETURN.**

8 A. The overall rate of return in this rate proceeding is calculated using the
9 weighted average cost of capital method. To calculate the weighted average
10 cost of capital, the Company's capital structure must first be determined by
11 *calculating the percentage of each capitalization component which has*
12 *financed the rate base to total capital.* The capital components consist of
13 long-term debt and common equity. Next, the effective cost rate of each
14 capital structure component must be determined. The cost rates of debt and
15 preferred stock are fixed and can be computed accurately. The cost rate of
16 common equity is not fixed, and it is more difficult to measure; therefore a
17 proxy group is used as discussed later in this testimony. Next, each capital
18 structure component percentage is multiplied by its corresponding effective
19 cost rate to determine the weighted capital component cost rate. I&E
20 Exhibit No. 1, Schedule 1, page 1, demonstrates the interaction of each
21 capital structure component and its corresponding effective cost rates.
22 Lastly, the sum of the weighted cost rates produces the overall rate of

1 return. This overall rate of return is multiplied by the rate base to
2 determine the return portion of the Company's revenue requirement.

3

4 **I&E POSITION**

5 **Q. PLEASE SUMMARIZE YOUR RATE OF RETURN**

6 **RECOMMENDATION IN THIS CASE.**

7 A. I recommend the following rate of return for Audubon Water:

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00 %	6.70 %	3.35 %
Common Equity	<u>50.00 %</u>	9.68 %	<u>4.84 %</u>
Total	<u>100.00 %</u>		<u>8.19 %</u>

Source: I&E Exhibit No. 1, Schedule No. 1, Page 1.

8

9 **COMPANY POSITION**

10 **Q. PLEASE SUMMARIZE THE COMPANY'S RATE OF RETURN**

11 **CLAIM IN THIS CASE.**

12 A. Company witness Dennis M. Kalbarczyk recommended the following rate
13 of return for Audubon:

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	45.00 %	6.70 %	3.02%
Common Equity	<u>55.00 %</u>	10.98 %	<u>6.04%</u>
Total	<u>100.00 %</u>		<u>9.06 %</u>

Source: Audubon Schedule F-3, Page 1 of 2

1 The Company's claimed rate of return on equity is based upon the
2 following calculations:

Cost of Debt	6.70 %
<u>X Debt Ratio</u>	<u>45.00 %</u>
Weighted Cost of Debt	3.02 %
<u>X Interest Coverage</u>	<u>3.00</u>
<u>Overall ROR</u>	<u>9.06%</u>

Overall ROR	9.06 %
<u>Less Weighted Cost of Debt</u>	<u>3.02 %</u>
Weighted Cost of Equity	6.04 %
<u>÷ Equity Ratio</u>	<u>55.00 %</u>
<u>Cost of Equity</u>	<u>10.98 %</u>

Cost of Equity Claimed **10.98 %**

3

4 Source: Audubon Schedule F-3, Page 2 of 2

5 **PROXY (BAROMETER) GROUP**

6 **Q. WHAT IS A PROXY GROUP, AS USED IN BASE RATE CASES?**

7 A. A proxy group, also called a barometer group, is a group of companies
8 which act as a benchmark for determining the subject utility's rate of return
9 in a base rate case.

10

11 **Q. WHAT ARE THE REASONS FOR USING A BAROMETER**
12 **GROUP?**

13 A. A barometer group is typically utilized since the use of data exclusively
14 from one company may be less reliable than using a barometer group. The
15 lower reliability occurs because the data for one company may be subject to

1 events which can cause short-term anomalies in the marketplace. The rate
2 of return on common equity for a single company could become distorted
3 in these particular circumstances, and would therefore not be representative
4 of similarly situated companies. The use of a barometer group has the
5 effect of smoothing out potential anomalies associated with a single
6 company.

7 A barometer group cost of equity is also used as a benchmark to
8 satisfy the long established guideline of utility regulation that seeks to
9 provide the subject utility with the opportunity to earn a return equal to that
10 of similar risk enterprises.

11

12 **Q. ARE THERE ANY ADDITIONAL REASONS FOR USING A**
13 **BAROMETER GROUP IN THIS CASE?**

14 A. Yes. Many public utility companies are not publicly traded, and therefore
15 lack specific market data. A barometer group provides that industry
16 specific market data.

17

18 **Q. WHAT CRITERIA DID YOU USE IN SELECTING YOUR**
19 **BAROMETER GROUP COMPANIES?**

20 A. When selecting a barometer group, I used the following criteria: 1) 50% or
21 more of the company's revenues must be generated from the water
22 distribution industry; 2) the company's stock must be publicly traded; 3)

1 investment information for the company must be available from more than
2 one source; 4) the company must not be currently involved/targeted in an
3 announced merger or acquisition; and 5) the company must have at least 6
4 years of historic earnings data. These criteria are appropriate as they allow
5 for an analysis of companies that are most similar to Audubon.
6

7 **Q. WHAT BAROMETER GROUP DID YOU USE IN YOUR**
8 **ANALYSIS?**

9 A. I selected Aqua America, American States Water Company, California
10 Water Services Group, Middlesex Water Company, and SJW Company.
11 (I&E Exhibit No. 1, Schedule No 1, page 2 of 2).
12

13 **CAPITAL STRUCTURE**

14 **Q. WHAT IS THE COMPANY'S CLAIMED CAPITAL STRUCTURE?**

15 A. The Company has claimed a hypothetical capital structure of 45% long-
16 term debt and 55% equity for the future-test year ending September 30,
17 2012 (Audubon, Schedule F-3, page 1).
18

19 **Q. WHAT IS THE BASIS FOR THE COMPANY'S CLAIMED**
20 **HYPOTHETICAL CAPITAL STRUCTURE?**

21 A. Company witness, Mr. Kalbarczyk, states in Audubon Statement No.
22 DMK-1, page 16, line 20 – page 17, line 1, that a review of Audubon's

1 historical capital structure reflects 32% debt to 68% equity. A pro-forma
2 future test year shows 27% debt to 73% equity. Mr. Kalbarczyk further
3 claims that these levels of debt to equity are not typical within the utility
4 industry, which more closely approximates a 45% / 55% debt to equity
5 structure.

6
7 **Q. DO YOU AGREE WITH THE COMPANY'S USE OF A**
8 **HYPOTHETICAL CAPITAL STRUCTURE?**

9 A. No. I do not agree with the Company's use of a hypothetical capital
10 structure of 45% debt to 55% equity.

11
12 **Q. WHAT IS YOUR RECOMMENDATION?**

13 A. I recommend a hypothetical capital structure of 50% debt to 50% equity.

14
15 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION OF A**
16 **50/50 DEBT TO EQUITY HYPOTHETICAL CAPITAL**
17 **STRUCTURE?**

18 A. A capital structure should be representative of the industry norm. The use
19 of a capital structure that is significantly outside the range of the industry's
20 capital structure may result in an overstated overall rate of return.

21 Therefore, a hypothetical capital structure based upon an industry average
22 should be used for ratemaking purposes.

1 The current industry average is 49.74% debt, 50.04% equity and
2 .21% preferred stock (I&E Exhibit No. 1, Schedule No. 1, page 2).
3 Historically, the Commission has used a hypothetical capital structure that
4 is representative of the industry average. Therefore, using a hypothetical
5 capital structure of 50% debt and 50% equity for Audubon is appropriate.

6

7 **COST RATE OF LONG-TERM DEBT**

8 **Q. WHAT IS THE COMPANY’S CLAIMED COST RATE OF LONG-
9 TERM DEBT?**

10 A. The Company has claimed a cost rate of long-term debt of 6.70%, which
11 represents a weighted cost rate based on the Company’s long-term debt
12 issues expected to be outstanding at September 3, 2012. (Audubon
13 Statement No. DMK-1, page 18, lines 2-6).

14

15 **Q. WHAT IS THE BASIS FOR THE COMPANY’S CLAIMED COST
16 RATE OF LONG-TERM DEBT?**

17 A. The Company’s claimed cost rate of long-term debt of 6.70% represents a
18 weighted cost rate based on the Company’s long-term debt issues expected
19 to be outstanding at September 3, 2012 (Audubon Statement No. DMK-1,
20 page 18, lines 2-6).

1 **Q. DO YOU AGREE WITH THE COMPANY'S CLAIMED COST**
2 **RATE OF LONG-TERM DEBT?**

3 A. Yes.

4

5 **Q. WHAT IS THE BASIS FOR YOUR AGREEMENT?**

6 A. The basis for my agreement with the Company's 6.70% cost of debt is a
7 review of the estimated average cost of debt for the barometer group
8 companies. The estimated cost of debt for the barometer group companies
9 ranged from 4.82% to 6.96%, with an average of 6.01%. The Company's
10 claimed cost rate of long-term debt of 6.70% is within this range and is
11 therefore reasonable for this Company.

12

13 **COST OF COMMON EQUITY: COMMON METHODS**

14 **Q. WHAT METHODS ARE COMMONLY USED TO DETERMINE**
15 **THE COST OF COMMON EQUITY?**

16 A. There are four methods commonly used to determine the cost of common
17 equity. The four methods are the Discounted Cash Flow (DCF), the Capital
18 Asset Pricing Model (CAPM), the Risk Premium (RP), and Comparable
19 Earnings (CE) methods.

20

21 **Q. WHAT IS THE THEORETICAL BASIS FOR THE DCF METHOD?**

1 A. The theoretical basis for the DCF model is the “dividend discount model”
2 of financial theory, which maintains that the value (price) of any security or
3 commodity is the discounted present value of all future cash flows. The
4 DCF model assumes that investors evaluate stocks in the classical
5 economic framework, which maintains that the value of a financial asset is
6 determined by its earning power, or its ability to generate future cash flows.

7

8 **Q. WHAT IS THE THEORETICAL BASIS FOR THE CAPM?**

9 A. The Capital Asset Pricing Model describes the relationship of a stock’s
10 investment risk and its market rate of return. It identifies the rate of return
11 investors expect so that it is comparable with returns of other stocks of
12 similar risk. The method hypothesizes that the investor required return on a
13 company’s stock is equal to the return on a “risk free” asset plus an equity
14 premium reflecting that company’s investment risk. In the CAPM, two
15 types of risk are associated with a stock: (1) firm-specific risk
16 (unsystematic risk) and (2) market risk (systematic risk) which is measured
17 by a firm’s beta. The CAPM only allows for investors to receive a return
18 for bearing systematic risk. Unsystematic risk is assumed to be diversified
19 away. Therefore it does not earn a return.

20

21 **Q. WHAT IS THE THEORETICAL BASIS FOR THE RP MODEL?**

1 A. The theoretical basis for the RP method is a simplified version of the
2 CAPM. The RP method's theory is that common stocks are riskier than
3 debt, and, as a result, investors require a higher expected return on stocks
4 than bonds.

5
6 **Q. WHAT IS THE THEORETICAL BASIS FOR THE CE METHOD?**

7 A. The theoretical basis for the CE method is the economic concept of
8 "opportunity cost," or the probable return available to investors from
9 alternative investments of similar risk. Under this theory, when investors
10 believe that the probable return from a given investment is not equal to that
11 available from another investment of similar risk, the investor will shift its
12 resources to the alternative investment.

13
14 **Q. WHAT METHODS DO YOU RECOMMEND USING IN THIS CASE
15 TO DETERMINE THE COST OF COMMON EQUITY?**

16 A. I recommend using the DCF method as the primary method to determine
17 the cost of common equity, and using the CAPM as a comparison to the
18 DCF results.

19
20 **Q. PLEASE EXPLAIN WHY YOU CHOSE TO USE THE DCF AND
21 CAPM IN YOUR ANALYSIS.**

1 A. I have used the DCF as the primary method because: (1) it is based upon
2 the concept that the receipt of dividends plus expected appreciation is the
3 total return requirement determined by the market; (2) it uses the utilities'
4 own stock prices and growth rates which are directly employed in a
5 formalistic calculation;(3) it recognizes the time value of money and is
6 forward-looking; and (4) it has the most wide-spread regulatory acceptance.

7 I have further included a CAPM analysis as a comparison because of
8 the increased interest by the Commission in confirming the DCF results
9 submitted in base rate cases by the use of a second method. It is my
10 professional opinion that out of the three commonly used methods, other
11 than the DCF, the CAPM should be used as this second method. The
12 CAPM is based on the concept of risk and return, the betas of the
13 companies being analyzed allow the CAPM to be company-specific, it has
14 widespread use in the financial investment community, and it is forward-
15 looking. However, while the use of CAPM is acceptable as a check on the
16 DCF, there are several disadvantages to using the CAPM, which is why it is
17 not used as a primary method.

18

19 **Q. PLEASE EXPLAIN CAPM'S DISADVANTAGES.**

20 A. The relevancy of the CAPM (and, therefore, also the RP method) does not
21 carry over from the investment decision making process into the regulatory
22 process. The CAPM and RP methods give results that indicate to an

1 investor what the equity cost rate should be if current economic and
2 regulatory conditions are the same as those present during the historical
3 period in which the risk premiums were determined. Regulators can never
4 be certain that economic and regulatory conditions underlying the historical
5 period during which the risk premiums were calculated are the same today
6 or in the future. Also, the CAPM and the RP method are less reliable
7 indicators because they measure the cost of equity indirectly, and risk
8 premiums vary depending on the debt and equity being compared. The
9 DCF method is the superior method for determining the rate of return for
10 the current economic market and measuring the cost of equity directly.
11 By comparing CAPM and RP results with the current expected equity
12 returns (DCF results), an investor can make rational buy and sell decisions
13 within their portfolio.

14
15 **Q. GIVEN THE FACT THAT ECONOMIC AND REGULATORY**
16 **CONDITIONS TODAY CAN BE AND ARE OFTEN DIFFERENT**
17 **FROM THE HISTORIC PERIOD, HOW DOES THIS AFFECT THE**
18 **RESULTS FROM THE CAPM AND RP METHOD?**

19 **A.** AS, I have stated, the CAPM and the RP method do not measure the current
20 rate of return on common equity directly. Instead, the CAPM and the RP
21 methods determine the rate of return on common equity indirectly by
22 observing the cost of debt. An implicit assumption when using the CAPM

1 and the RP method is that the variables determining the equity cost rate and
2 debt cost rate are the same, which allows the analyst to apply a constant
3 risk premium (difference between risk free rate and the return on the
4 market). However, the variables determining the cost rates in the two
5 markets affect the cost rates differently, leading to a changing risk
6 premium. The use of a constant risk premium fails to capture the effect of
7 changing economic conditions on risk premiums over time. While the risk
8 premium is the result of a comparison of two factors over time, the DCF's
9 constant growth rate is derived directly from the stock, and is not a
10 comparative factor.

11
12 **Q. IS THERE ANY ACADEMIC EVIDENCE THAT QUESTIONS THE**
13 **CREDIBILITY OF THE CAPM MODEL?**

14 A. Yes. An article, which appeared in the *New York Times* on February 18,
15 1992, summarized a CAPM study conducted by professors Eugene F. Fama
16 and Kenneth R. French (I&E Exhibit No. 1, Schedule No. 2). Their study
17 examined the importance of beta, CAPM's risk factor, in explaining returns
18 on common stock. In CAPM theory, the higher a stock's beta, the higher
19 the expected return on that stock. They found that the model did not do
20 well in predicting actual returns, and suggested the use of more elaborate
21 multi-factor models. A more recent article in the *Journal of Economic*
22 *Perspectives* states that "the attraction of the CAPM is that it offers

1 powerful and intuitively pleasing predictions about how to measure risk and
2 the relation between expected return and risk. Unfortunately, the empirical
3 record of the model is poor, poor enough to invalidate the way it is used in
4 applications” (I&E Exhibit No. 1, Schedule No. 3). As a result of this
5 information, I believe investors will place less credibility on a model that is
6 academically proven not to accurately predict returns. Moreover, the
7 relevancy of the CAPM does not carry over from the investment decision
8 making process into the regulatory rate setting process.

9
10 **Q. PLEASE EXPLAIN WHY YOU HAVE CHOSEN TO EXCLUDE**
11 **THE RP AND CE MODELS IN YOUR ANALYSIS.**

12 A. As I stated, the RP method is excluded due to the fact that it is a simplified
13 version of the CAPM and is subjected to the faults listed above, and it does
14 not recognize company specific risk through beta. The CE method is
15 excluded because it is subjective as to what are comparable companies, it is
16 debatable whether historic accounting values are representative of the
17 future, and the Commission has long recognized the problem with this
18 method.

19
20 **Q. WHAT IS THE COMMISSION’S HISTORICAL TREATMENT OF**
21 **THE COMPARABLE EARNINGS APPROACH?**

1 A. Regarding the use of non-utility companies' historical book earnings in an
2 attempt to determine a cost of equity for a utility, the Commission stated:

3 The use of nonregulated companies as a comparable group for
4 regulated firms under the comparable earnings method of
5 computing a rate of return on common equity requires
6 numerous unsupported assumptions and results in a highly
7 speculative finding.

8
9 Pennsylvania Public Utility Commission v. Philadelphia Electric Co.

10 (1980) 33 Pur4th 319, 341.

11 The Commission's criticism of the CE was subsequently repeated:

12 NFGD employed comparable earnings as a check on
13 the common equity cost rates produced by its other
14 methodology. NFGD M.B. p. 170. NFGD did not use
15 comparable earnings as a common equity cost rate
16 determinant. Additionally, it was noted that
17 comparable earnings are not market related but
18 accounting related ratios.

19
20 Pa. PUC v. National Fuel Gas Distribution Corp., Docket No. R-00940021,
21 p. 199, Order entered December 1, 1994.

22

23 **SUMMARY OF COMPANY RESULTS:**

24 **Q. WHAT ARE THE RESULTS OF THE COMPANY'S COST OF**
25 **EQUITY ANALYSIS?**

26 A. Mr. Kalbarczyk has not completed any cost of equity analyses and has
27 based his cost of equity recommendation on an interest coverage ratio. The
28 Company's cost of equity claim is 10.98% (Audubon Schedule F-3).

1 **Q. WHAT IS THE BASIS FOR THE COMPANY'S CLAIMED COST**
2 **OF EQUITY?**

3 A. Mr. Kalbarczyk's testimony, Audubon Statement No. DMK-1, page 18,
4 lines 9-16, states that "the cost of equity, in theory, is compensation
5 associated with at risk capital to the investor." He continues, "One of the
6 primary tools a lender looks at is the company's ability to cover interest. In
7 that light, I utilized a 3.0x interest coverage ratio to determine the necessary
8 relative cost of equity." Mr. Kalbarczyk uses this 3.0x interest coverage to
9 determine an overall rate of return of 9.06%, using the 6.70% cost of debt
10 and a hypothetical 45% debt ratio. Mr. Kalbarczyk then uses his overall
11 ROR of 9.06%, weighted cost of debt of 3.02%, and hypothetical equity
12 ratio of 55% to determine a 10.98% cost of equity. Mr. Kalbarczyk also
13 states in his testimony, Audubon Statement No. DMK-1, page 19, lines 17-
14 20, that the 10.98% cost of equity rate is similar to that of the industry
15 standards requested by other regulated utilities.

16
17 **Q. WHAT IS THE BASIS FOR MR. KALBARCZYK'S 3.0X INTEREST**
18 **COVERAGE RATIO?**

19 A. In response to I&E-RR-5 (I&E Exhibit No. 1, Schedule No. 4), Mr.
20 Kalbarczyk provides a 1996 Financial Benchmark from Standard and
21 Poor's (S&P).

1 **Q. DO YOU AGREE WITH MR. KALBARCZYK'S USE OF AN**
2 **INTEREST COVERAGE RATIO OF 3.0X?**

3 A. No. Interest coverage is not a reliable methodology for determining an
4 appropriate cost of equity. A June 2, 2004 Standard & Poor's research
5 publication announced that while principal ratios such as funds from
6 operations (FFO) interest coverage, FFO to total debt, and total debt to
7 total capital were broadened, the pretax interest coverage ratio as a key
8 credit ratio was eliminated (I&E Exhibit No. 1, Schedule 5).

9
10 **Q. HAS S&P ARTICULATED FURTHER ON THE SUBJECT OF**
11 **INDICATORS OF CREDIT WORTHINESS?**

12 A. Yes. In its Corporate Ratings criteria publication, Standard & Poor's
13 further points out that " an enterprise's capacity to pay debts or any other
14 obligations, the core underlying concept of a credit ratings, is determined
15 by the ability to generate cash – not earnings...." Standard & Poor's
16 statement that earnings is not an indicator of creditworthiness, demonstrates
17 that a company's ability to pay debt is determined by cash flow and not an
18 interest coverage ratio. (I&E Exhibit No. 1, Schedule 6)

19
20 **Q. DO YOU AGREE WITH MR. KALBARCZYK'S PROPOSED COST**
21 **OF EQUITY?**

1 A. No. I have several criticisms regarding Mr. Kalbarczyk's methodology and
2 the reasonableness of his proposed cost of equity.

3

4 **Q. WHAT CRITICISMS DO YOU HAVE REGARDING MR.**
5 **KALBARCZYK'S METHODOLOGY?**

6 A. Mr. Kalbarczyk's cost of equity methodology is deficient for several
7 reasons. First, Mr. Kalbarczyk's methodology is not based on traditional
8 ratemaking principles. Second, Mr. Kalbarczyk has not shown how his
9 methodology satisfies the standards of what constitutes a fair and
10 reasonable rate of return mentioned previously. Although Audubon is not
11 publicly traded, that does not preclude it from having to prove that its cost
12 of equity request is commensurate with the return provided by investments
13 of similar risk. Third, Mr. Kalbarczyk has not provided an explanation as
14 to why the interest coverage ratio requirement should be the only method
15 used to determine a cost of equity.

16

17 **Q. WHAT CRITICISMS DO YOU HAVE REGARDING THE**
18 **REASONABLENESS OF MR. KALBARCZYK'S COST OF EQUITY**
19 **RECOMMENDATION?**

20 A. Mr. Kalbarczyk relied on requested rates of return from other regulated
21 water utilities as a check to determine a range of reasonableness for the
22 Company's rate of return. However, Commission approved rates of return

1 can vary significantly from companies' requested rates of return.
2 Requested rates of return from prior rate cases thus cannot be relied upon to
3 be an indicator of appropriate cost of equity. Therefore, Mr. Kalbarczyk's
4 range is inappropriate.

5 Furthermore, in the determination of recent approved rates of return,
6 such as Columbia Water Company, R-2008-2045157, page 78 (Order
7 entered June 10, 2009,) the Commission stated "In this case, we have relied
8 on the DCF methodology... We have also consulted the CAPM, CE and RP
9 analysis performed by the Parties." Mr. Kalbarczyk has not performed any
10 such analysis. Also, each case before the Commission is judged based on
11 its own merit, thus using the requested rate of return of other companies
12 ignores the uniqueness of each case.

13

14 **I&E RECOMMENDATION**

15 **Q. WHAT IS YOUR RECOMMENDATION FOR THE APPROPRIATE**
16 **COST OF COMMON EQUITY IN THIS PROCEEDING?**

17 A. Based upon my analysis, I recommend a cost of common equity of 9.68%.

18

19 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

20 A. I arrived at this equity return using the DCF method. I used the CAPM
21 method only as a comparison to my DCF results. My DCF analysis

1 employed a spot dividend yield, a 3-month dividend yield, a 6-month
2 dividend yield, a 52 week dividend yield, and a log-linear regression
3 analysis growth rate.

4

5 **DISCOUNTED CASH FLOW(DCF)**

6 **Q. PLEASE EXPLAIN YOUR DCF ANALYSIS.**

7 A. My analysis employs the standard discrete DCF model as portrayed in the
8 following formula:

9
$$k = D_1/P_0 + g$$

10 Where:

11 k = Cost of equity

12 D_1 = Dividend expected during the year

13 P_0 = Current price of the stock

14 g = Expected growth rate of dividends

15 When a forecast of D_1/P_0 is not available, D_0/P_0 (the current dividend
16 divided by the current price) must be adjusted by $\frac{1}{2}$ the expected growth
17 rate ¹ in order to account for changes in the dividend paid in period 1.

1 The adjustment of $\frac{1}{2}$ the growth rate is used when the timing of the dividend increase is not known for certain. It could occur next month, or in the twelfth month. On average, it is safe to assume that the increase will occur half way through the prospective year. Therefore, an adjustment by $\frac{1}{2}$ the expected growth rate is appropriate.

1 **Q. PLEASE EXPLAIN HOW YOU DEVELOPED THE DIVIDEND**
2 **YIELDS USED IN YOUR DCF ANALYSIS.**

3 A. A representative dividend yield must be calculated over a time frame that
4 avoids the problems of short-term anomalies and “stale” data series. For
5 purposes of my DCF analysis, the dividend yield calculation places equal
6 emphasis on the most recent spot, 52 week average dividend yield, a 3
7 month dividend yield and 6 month dividend yield. The following table
8 summarizes my dividend yield computations for the barometer group:

Five Company Barometer Group	Forward Dividend Yield
Spot	3.42%
52 week average	3.48%
3 month	3.38%
6 month	3.37%
Average	3.41%

9
10 Source I&E Exhibit No. 1, Schedule 7.

11
12 **Q. WHAT INFORMATION DID YOU RELY UPON TO DETERMINE**
13 **YOUR EXPECTED GROWTH RATE?**

1 A. I have used two approaches to arrive at a representative growth rate. I have
2 examined both earnings growth forecasts and log-linear regression analysis
3 data.

4

5 **Q. PLEASE EXPLAIN YOUR USE OF EARNINGS GROWTH**
6 **FORECASTS.**

7 A. I have used five year projected growth rate estimates from established
8 forecasting entities including Value Line, Yahoo Finance, MSN Money,
9 and Morningstar.

10

11 **Q. WHAT WERE THE RESULTS OF YOUR FORECASTED**
12 **EARNINGS GROWTH RATES?**

13 A. The expected growth rates for the five company barometer group are
14 presented in I&E Exhibit No. 1, Schedule No. 8. The growth rates are
15 8.56%, 7.43%, 8.11%, 4.10%, and 10.50%. The average of the five
16 companies' growth rate forecasts is 7.74%.

17

18 **Q. DO YOU HAVE ANY ADDITIONAL COMMENTS ON THE**
19 **RESULTS FOR THE 5 YEAR PROJECTED GROWTH RATES?**

20 A. Yes. While these 5 year projected growth rates can be used in analysis, one
21 must be aware that analysts' estimates may be biased. This bias has been
22 observed in literature.

1 Q. PLEASE EXPLAIN.

2 A. An article authored by Professors Ciciretti, Dwyer, and Hasan in 2009
3 observed strong support of earnings forecast being higher than actual
4 earnings.² In spring of 2010, McKinsey On Finance presented an article
5 reporting that after a decade stricter regulation analysts' forecasts are still
6 overly optimistic.³

7 Analysts' estimates are an attempt to forecast future cash flows and
8 thus expected earnings growth. However, it should be kept in mind that
9 prudent judgment must be exercised as to the sustainability of forecasted
10 growth rates with respect to the base earnings. If the base year earnings
11 are abnormally high, the growth rates from which they are calculated will
12 be biased downward. Similarly, if the base year earnings are abnormally
13 low, the growth rates from which they are calculated will be biased upward.
14 As a result, it is necessary to employ a methodology to smooth out the
15 abnormally high or low base year earnings.

2 Ciciretti, Rocco; Dwyer, Gerald R; and Iftekhan Hasan. "Investment Analysts' Forecasts of Earnings" Federal Reserve Bank of St. Louis Review, September/October 2009, 91 (5, part 2) pp. 545-67. I&E Exhibit No. 1. Schedule 9

3 Goedhart, Marc J; Raj, Rishi; and Abhishek Saxena. "Equity analyst: Still too bullish" McKinsey On Finance Number 35 Spring 2010, pp. 14-17. I&E Exhibit No. 1, Schedule 10

1 **Q. WHAT METHODOLOGY DO YOU RECOMMEND TO**
2 **DETERMINE A MORE APPROPRIATE LONG TERM GROWTH**
3 **RATE?**

4 A. I recommend using a log-linear regression analysis.

5
6 **Q. WHAT IS A LOG-LINEAR REGRESSION, FOR THE PURPOSES**
7 **OF DETERMINING A GROWTH RATE?**

8 A. A log-linear regression is a standard time-series linear regression in which
9 data points are plotted as natural logarithms.

10 Linear regression analysis assumes that a linear relationship exists
11 between two variables. This means that if the two variables were plotted on
12 a graph, a straight line would take shape, and a best fit line could be
13 calculated. However, in certain cases, raw growth data was plotted and
14 instead of a straight line being formed, a hyperbola was formed. In these
15 cases, the data must be transformed before a regression, or a best fit line,
16 can be calculated. To create a linear relationship with the growth data, the
17 earnings per share must be transformed by the natural log, or log with a
18 base e. The log transformation converts the compound growth pattern to a
19 linear growth pattern. The natural log data is then plotted and the slope of
20 the best fit line is determined; this slope is the growth rate, but in natural
21 log form. To make the slope meaningful, one calculates the antilog to
22 arrive at a meaningful growth rate.

1 **Q. HOW HAVE YOU USED THE LOG-LINEAR REGRESSION IN**
2 **DETERMINING AN APPROPRIATE LONG-TERM GROWTH**
3 **RATE?**

4 A. For my log-linear regression analysis, I calculated the natural log of the
5 earnings per share for each company for each year from 2006 to 2016. I
6 then calculated the slope of the linear regression (or best fit) line created by
7 the earnings per share data points. The slope coefficient is the continuous
8 growth rate that must be converted to an annual growth rate. To arrive at
9 an annual growth rate, I took the antilog of the continuous growth rate and
10 subtracted one.

11

12 **Q. DO OTHER FINANCIAL PUBLICATIONS EMPLOY LOG-**
13 **LINEAR REGRESSION ANALYSIS?**

14 A. Yes. I/B/E/S International, Inc. employs log-linear regression analysis
15 when calculating five year growth rates. Academic literature such as
16 *Intermediate Financial Management* by Eugene F. Brigham and Louis C.
17 Gapenski support the use of log-linear regression analysis when calculating
18 growth rates. (I&E Exhibit No. 1, Schedule No. 11).

19

20 **Q. WHAT WERE THE RESULTS OF YOUR LOG-LINEAR GROWTH**
21 **RATE ANALYSIS?**

1 A. The results of my log-linear regression analysis are growth rates of 9.20%,
2 9.06%, 5.10%, 2.01%, and 5.99%. These data results in an average growth
3 rate of 6.27%. (I&E Exhibit No. 1, Schedule No. 12).

4
5 **Q. WHAT ARE THE RESULTS OF YOUR DISCOUNTED CASH**
6 **FLOW ANALYSIS BASED ON YOUR RECOMMENDED**
7 **DIVIDEND YIELDS AND GROWTH RATES?**

8 A. Using a dividend yield of 3.41% and a growth rate of 6.27%, my DCF
9 result is 9.68% (I&E Exhibit No. 1, Schedule No. 13).

10
11 **Q. WHAT IS THE BASIS FOR YOUR SELECTION OF 9.68% FROM**
12 **THE DCF RANGE FOR THE BAROMETER GROUP?**

13 A. My selection of 9.68% is the average of the log-linear analysis, which
14 balances analysts' optimistic estimates with historic values. I have also
15 used the results of my CAPM analysis as a comparison.

16
17 **Q. HAVE YOU TAKEN INTO CONSIDERATION MARKET**
18 **PRESSURE AND SELLING AND ISSUANCE EXPENSES IN**
19 **MAKING YOUR RECOMMENDATIONS?**

20 A. Yes. I have considered these items, but have not made any adjustments to
21 account for them. I believe that market pressure, and selling and issuance
22 expenses are an additional cost of capital that are incurred at the time of

1 issuance. The efficient market hypothesis asserts that prices on traded
2 assets (e.g. stocks, bonds, or property) already reflect all known
3 information, and therefore are unbiased in the sense that they reflect the
4 collective beliefs of all investors about future prospects⁴. Therefore, the
5 current market price of common stock already reflects these selling and
6 issuance costs, as investors already capitalized market pressure and
7 issuance expenses in determining the value of the stock at the time of
8 purchase. Since my analysis is market based, these items have been taken
9 into consideration. As a result, I have made no additional adjustments to
10 account for market pressure, selling and issuance expenses.

11 **CAPITAL ASSET PRICING MODEL (CAPM)**

12 **Q. EXPLAIN YOUR LIMITED USE OF THE CAPM MODEL.**

13 A. I have included a CAPM analysis as a result of an increased interest by this
14 Commission in confirming the DCF results submitted in base rate cases by
15 the use of a second method. It is my professional opinion that the CAPM
16 should be presented as the second method to which to compare the DCF
17 results.
18

19
20 **Q. PLEASE EXPLAIN YOUR CAPM ANALYSIS.**

4 Fama, Eugene (1970). "Efficient Capital Markets: A Review of Theory and Empirical Work."
Journal of Finance 25: 383-417.

1 A. My analysis employs the standard CAPM model as portrayed in the
2 following formula:

3
$$K = R + \beta(R_m - R_f)$$

4 Where:

5 k = Cost of equity

6 R_f = Risk-free rate of return

7 R_m = Expected rate of return on the overall stock

8 β = Beta measures the systematic risk of an asset

9 The CAPM formula above is actually a form of the more general risk
10 premium approach and is based on modern portfolio theory.

11

12 **Q. WHAT IS BETA, AS EMPLOYED IN YOUR USE OF THE**
13 **STANDARD CAPM MODEL?**

14 A. Beta is a measure of the systematic risk of a stock in relation to the rest of
15 the stock market. A stock's beta is estimated by running a linear regression
16 of a stock's return against the return on the overall stock market. The beta
17 of a stock with an identical price pattern as the overall stock market will
18 have a beta of 1. A stock with a price movement that is greater than the
19 overall stock market will have a beta that is greater than 1, and would be
20 described as having more investment risk than the market. Conversely, a
21 stock with a price movement that is less than the overall stock market will

1 have a beta of less than 1, and would be described as having less
2 investment risk than the market.

3
4 **Q. WHAT BETA DID YOU CHOOSE FOR YOUR CAPM ANALYSIS?**

5 A. In estimating an equity cost rate for the group of five water distribution
6 companies, I am using the average of the betas for the companies as
7 provided in the Value Line Investment Survey. As shown on I&E Exhibit
8 No. 1, Schedule No. 14, the average beta for the five company barometer
9 group is 0.71.

10
11 **Q. WHAT RISK-FREE RATE OF RETURN HAVE YOU CHOSEN FOR
12 YOUR CAPM ANALYSIS?**

13 A. For my CAPM analysis, I have chosen to use the risk-free rate of return (R_f)
14 from the projected yield on 10-year Treasury Bonds. While the yield on
15 the short-term T-Bill is a more theoretically correct parameter to represent a
16 risk-free yield, this yield can be extremely volatile. The volatility of short-
17 term T-Bills is directly influenced by Federal Reserve policy. At the other
18 extreme, the 30-year Treasury Bond yield exhibits more stability, but is not
19 risk-free. Long-term Treasury Bonds have substantial maturity risk
20 associated with the market risk and the risk of unexpected inflation. Long-
21 term treasuries normally offer higher yields to compensate investors for
22 these risks. As a result, I chose to use the projected yield on the 10-year

1 Treasury Bond because it balances the shortcomings of the other two
2 alternatives. As shown on Schedule No. 15 of I&E Exhibit No. 1, the yield
3 on the 10-year Treasury Bond is expected to range between 2.04% and
4 4.30% over the next five-years. For my analysis, I chose 2.69%, which is
5 the average over the next five years.

6
7 **Q. PLEASE EXPLAIN HOW YOU DETERMINED THE RETURN ON**
8 **THE OVERALL STOCK MARKET, AS EMPLOYED IN YOUR**
9 **CAPM ANALYSIS.**

10 A. To arrive at a representative expected return on the overall stock market, I
11 surveyed three sources. As shown in I&E Exhibit No. 1, Schedule No. 16,
12 Value Line expects its universe of 1500 stocks to have an average yearly
13 return of 16.49% over the next 3 to 5 years, based on a forecasted dividend
14 yield of 2.30% and a yearly index appreciation of 70%. Morningstar
15 expects the S&P 500 index to have an average yearly return of 13.63% over
16 the next 5 years, based upon a forecasted dividend yield of 2.33% and an
17 expected increase in the S&P 500 index of 11.30%. A historical return for
18 the S&P Composite Index is routinely used as a benchmark for the
19 expected return on the overall stock market. This component can vary
20 widely depending on the historic period used.

1 **Q. EXPLAIN THE RANGE OF EXPECTED RETURN ON THE**
2 **OVERALL STOCK MARKET YOU CALCULATED USING THE**
3 **HISTORICAL RETURN FOR THE S&P COMPOSITE INDEX.**

4 A. Using the geometric mean of historic returns, I calculated the following
5 results:

<u>Time Period</u>	<u>Return</u>
85 Years	9.87%
40 Years	10.04%
20 Years	8.12%
10 Years	<u>3.01%</u>
Average	7.76%

Source: I&E Exhibit No. 1, Schedule No. 16, p. 2.

6 **Q. WHY HAVE YOU SELECTED THESE TIME PERIODS?**

7 A. I have selected the above time periods to represent a variety of investor
8 experiences and time horizons. Additionally, 85 years represents that
9 longest measurable time period available for the S&P Composite Index, the
10 40 and 20 time periods coincide with the average useful lives of a utility's
11 assets. The 10 year time period corresponds to the Treasury Bond I have
12 employed.

13
14 **Q. WHAT ARE THE EXPECTED RETURNS ON THE OVERALL**
15 **STOCK MARKET BASED ON YOUR FORECASTED AND**
16 **HISTORIC CAPM ANALYSIS?**

1 A. The results of these 2 return calculations are presented on I&E Ex. No. 1,
2 Sch. 17. These results are 15.06% for my forecasted CAPM analysis and
3 7.76% for my historical CAPM analysis.

4
5 **Q. WHAT ARE THE COST OF EQUITY RESULTS FROM YOUR**
6 **FORECASTED AND HISTORIC CAPM ANALYSIS?**

7 A. The results of these two analyses are as follows:

	<u>CAPM cost of equity</u>
Forecasted	11.47%
Historic	6.29%

8 Source: I&E Exhibit No. 1, Sch. 17.

9
10 **Q. HOW DID YOU INCORPORATE THESE RESULTS INTO YOUR**
11 **OVERALL COST OF EQUITY?**

12 A. I have included the results of this CAPM analysis in my overall cost of equity
13 calculation only as a comparison to my DCF result. The DCF model measures the
14 cost of equity directly by measuring the discounted present value of future cash
15 flows of the company and it is these cash flows that actually pay dividends to
16 shareholders. The Commission has expressed interest in seeing the results of
17 other models to confirm the results of DCF. The CAPM it is a commonplace cost
18 of equity measure.

1 **Q. WHY DID YOU NOT GIVE THESE RESULTS A SPECIFIC**
2 **WEIGHT IN DETERMINING YOUR COST OF COMMON**
3 **EQUITY?**

4 A. I have not given these results a specific weight in determining my cost of
5 common equity because of the flaws in the CAPM model that I have
6 expounded upon earlier in my testimony.

7

8 **OVERALL RATE OF RETURN**

9 **Q. WHAT IS THE COMPANY'S PROPOSED OVERALL RATE OF**
10 **RETURN?**

11 A. The Company's proposed overall rate of return is 9.06% (Audubon
12 Schedule F-3, Page 1 of 2).

13

14 **Q. WHAT IS I&E'S RECOMMENDED OVERALL RATE OF RETURN?**

15 A. I&E Exhibit No. 1, Schedule No. 1, page 1, shows the calculation of an
16 appropriate overall rate of return for Audubon to be 8.19%.

17

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

19 A. Yes.

APPENDIX A
PROFESSIONAL AND EDUCATIONAL EXPERIENCE
AMANDA L. GORDON

Professional Experience

November 2005 – Present: Office of Trial Staff, Pennsylvania Public Utility Commission, Harrisburg, Pennsylvania

Fixed Utility Financial Analyst (November 2006-Present) – Responsible for the analysis and review of revenues and expense claims in formal and informal base rate filings and 1307(f) proceedings.

Fixed Utility Financial Analyst Trainee (November 2005-October 2006) – Assisting in the analysis and review of revenues and expense claims in formal and informal base rate filings and 1307(f) proceedings.

August 2003 - October 2005: Commerce Bank, Harrisburg, Pennsylvania

Commercial Credit Analyst (September 2004 – October 2005) - Evaluate and assess company and individual financial statements, revenues, expenses, cash flow, and credit worthiness. Collect and compile financial data from clients. Aid in determining the most appropriate lending instrument for a variety of client types. Analyze the current and ongoing risks of different loan instruments. Research clients' previous loan performance.

Customer Service Representative (August 2003 – September 2004) - Open and close bank accounts and aid in personal loans applications and approvals. Perform account maintenance and compile customer information. Troubleshoot customer difficulties and advise customers.

Education

Robert E. Cook Honors College at Indiana University of Pennsylvania, Indiana, Pennsylvania
Bachelor of Science; Major in International Business, 2003

Society of Utility and Regulatory Financial Analysts, Certified Rate of Return Analyst
Attended IPU NARUC Utility Rate School
Attended IPU Annual Regulatory Policy Conference

Testimony submitted

Peoples Natural Gas Company 2063737		Docket A-2008-
West Penn Power Company 2176520		Docket A-2010-
T.W. Phillips Gas and Oil Co. 2210326		Docket A-2010-
Columbia Gas of Pennsylvania, Inc. 2038856		Docket C-2008-
Equitable Gas Company 00051923		Docket M-
PPL Electric Utilities Corporation 2179796		Docket P-00062240 Docket M-2010-
PECO Energy Company 00061945		Docket M-
PPL Electric Utilities Corporation 2060309		Docket P-2008-
PECO Energy Company 2062739		Docket P-2008-
National Fuel Gas Distribution Corporation, 1307(f)		Docket R-00072043
PPL Electric Utilities Corporation		Docket R-00072155
Columbia Gas of Pennsylvania, Inc., 1307(f)		Docket R-00072175
Pennsylvania-American Water Company		Docket R-00072229
Valley Energy, Inc.		Docket R-00072349
National Fuel Gas Distribution Corporation		Docket R-00072420
Aqua Pennsylvania, Inc.		Docket R-00072711
Columbia Gas of Pennsylvania, Inc. 2011621		Docket R-2008-
York Water Company 2023067		Docket R-2008-
Columbia Gas of Pennsylvania, Inc., 1307(f) 2028039		Docket R-2008-
PECO Energy Company 2028394		Docket R-2008-
Equitable Gas Company 2029325		Docket R-2008-
Pennsylvania-American Water Company Coatesville Wastewater Division 2032689		Docket R-2008-
Superior Water Company 2039261		Docket R-2008-

Newtown Artesian Water Company 2042293	Docket R-2008-
Columbia Water Company 2045157	Docket R-2008-
Pike County – Electric 2046518	Docket R-2008-
UGI Central Penn Gas, Inc. 2079675	Docket R-2008-
UGI Penn Natural Gas, Inc. 2079660	Docket R-2008-
Pennsylvania Utility Company – Water Division 2103937	Docket R-2009-
Pennsylvania Utility Company – Sewer Division 2103980	Docket R-2009-
Trigen-Philadelphia Energy Corporation 2111011	Docket R-2009-
Philadelphia Gas Works 2139884	Docket R-2009-
National Fuel Gas Distribution Corporation, 1307(f) 2150861	Docket R-2010-
Columbia Gas of Pennsylvania, Inc., 1307(f) 2161920	Docket R-2010-
PECO Energy Company 2161575	Docket R-2010-
Duquesne Light Company 2179522	Docket R-2010-
Peoples Natural Gas Company 2201702	Docket R-2010-
Columbia Gas of Pennsylvania, Inc. 2215623	Docket R-2010-
2201974	Docket R-2010-
UGI Central Penn Gas, Inc. 2214415	Docket R-2010-
National Fuel Gas Distribution Company, 1307(f) 2218386	Docket R-2011-
Newtown Artesian Water Company 2230259	Docket R-2011-
2213642	Docket P-2010-
United Water Pennsylvania, Inc. 2232985	Docket R-2011-

**I&E Exhibit No. 1
Witness: Amanda Gordon**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Exhibit to Accompany

the

Direct Testimony

of

Amanda Gordon

Bureau of Investigation and Enforcement

Concerning:

Rate of Return

REC'D
2012 JUL -6 PM 4:22
SECRETARY OF BUREAU

Summary of Cost of Capital

<u>Type of Capital</u>	<u>Ratio</u>	<u>Cost Rate</u>	<u>Weighted Cost</u>
Long term Debt	50.00%	6.70%	3.35%
Common Equity	50.00%	9.68%	4.84%
Total			<u>8.19%</u>

Summary of Cost of Capital

Type of Capital	2011		2010		2009		2008		2007	
	Amount	Ratio	Amount	Ratio	Amount	Ratio	Amount	Ratio	Amount	Ratio
Aqua America										
Long term Debt	\$ 1,395,457	52.71%	\$ 1,531,976	56.60%	\$ 1,386,557	55.55%	\$ 1,248,104	54.06%	\$ 1,215,053	55.40%
Common Equity	\$ 1,251,817	47.29%	\$ 1,174,826	43.40%	\$ 1,109,464	44.45%	\$ 1,060,627	45.94%	\$ 978,277	44.60%
Preferred Stock	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%
Total Cap	\$ 2,647,274	100.00%	\$ 2,706,802	100.00%	\$ 2,496,021	100.00%	\$ 2,308,731	100.00%	\$ 2,193,330	100.00%
Interest Charges	\$ 78,561									
Interest Rate	5.63%									
American States Water Company										
Long term Debt	\$ 340,395	45.44%	\$ 299,839	44.26%	\$ 305,866	45.97%	\$ 266,536	46.19%	\$ 267,226	46.93%
Common Equity	\$ 408,666	54.56%	\$ 377,541	55.74%	\$ 359,430	54.03%	\$ 310,503	53.81%	\$ 302,129	53.07%
Preferred Stock	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%
Total Cap	\$ 749,061	100.00%	\$ 677,380	100.00%	\$ 665,296	100.00%	\$ 577,039	100.00%	\$ 569,355	100.00%
Interest Charges	\$ 23,681									
Interest Rate	6.96%									
California Water Services Group										
Long term Debt	\$ 481,632	51.71%	\$ 479,181	52.39%	\$ 374,269	47.08%	\$ 287,498	41.64%	\$ 289,220	42.63%
Common Equity	\$ 449,829	48.29%	\$ 435,526	47.61%	\$ 420,634	52.92%	\$ 402,949	58.36%	\$ 385,466	56.82%
Preferred Stock	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ 3,718	0.55%
Total Cap	\$ 931,461	100.00%	\$ 914,707	100.00%	\$ 794,903	100.00%	\$ 690,447	100.00%	\$ 678,404	100.00%
Interest Charges	\$ 32,455									
Interest Rate	6.74%									
Middlesex Water company										
Long term Debt	\$ 132,167	42.29%	\$ 133,844	43.11%	\$ 124,910	46.62%	\$ 118,217	45.57%	\$ 131,615	48.97%
Common Equity	\$ 176,981	56.63%	\$ 173,279	55.81%	\$ 139,631	52.12%	\$ 137,803	53.12%	\$ 133,178	49.55%
Preferred Stock	\$ 3,353	1.07%	\$ 3,362	1.08%	\$ 3,373	1.26%	\$ 3,375	1.30%	\$ 3,958	1.47%
Total Cap	\$ 312,501	100.00%	\$ 310,485	100.00%	\$ 267,914	100.00%	\$ 259,395	100.00%	\$ 268,751	100.00%
Interest Charges	\$ 6,376									
Interest Rate	4.82%									
SJW Corporation										
Long term Debt	\$ 343,848	56.57%	\$ 295,704	53.69%	\$ 246,879	49.41%	\$ 216,613	46.00%	\$ 216,312	47.73%
Common Equity	\$ 264,004	43.43%	\$ 255,032	46.31%	\$ 252,756	50.59%	\$ 254,326	54.00%	\$ 236,934	52.27%
Preferred Stock	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%	\$ -	0.00%
Total Cap	\$ 607,852	100.00%	\$ 550,736	100.00%	\$ 499,635	100.00%	\$ 470,939	100.00%	\$ 453,246	100.00%
Interest Charges	\$ 20,374									
Interest Rate	5.93%									
Average										
Long term Debt		49.74%								
Common Equity		50.04%								
Preferred Stock		0.21%								

Source: Compustat

February 18, 1992

Market Place; A Study Shakes Confidence In the Volatile-Stock Theory

By ERIC N. BERG

One of the most enduring ideas of modern finance is facing its most serious challenge. Two scholars of finance say they have disproved the theory, common among investors, that stocks more volatile than the market as a whole are the best performers.

Eugene F. Fama and Kenneth R. French, business professors at the University of Chicago, traced the performance of thousands of stocks over 50 years but found no link between relative volatility and long-term returns. The many investors who try to beat the market by buying widely swinging issues are misguided, they say.

The importance of "beta," the investment community's term for a stock's volatility relative to the market, has long been under challenge. But it is still closely watched by analysts, and business students are still taught that they can earn higher returns by buying stocks whose swings are wider than the market's.

"The fact is," Professor Fama said in a recent telephone interview, "beta as the sole variable explaining returns on stocks is dead."

Some still favor relatively volatile stocks, among them William F. Sharpe, a retired Stanford University professor who won the 1990 Nobel Memorial Prize in Economic Science for theories based on beta. "It is a remarkable set of empirical results about what happened in the past," he said of the University of Chicago study. "But I am not willing to make investment decisions based on the theory that there is no relationship between beta, properly measured, and expected returns."

If Professors Fama and French are right, however, the impact could be far reaching. Some highly volatile groups of stocks that have enjoyed wide followings -- airlines, for example -- could lose a portion of their appeal if beta-believing investors side with the professors.

Additionally, many executives of publicly held companies have taken the view that if their own company's stock is more volatile than the market as a whole, any project they invest in -- from a lowly piece of new equipment to a huge joint venture -- must generate an extra high return to compensate investors for swings in the stock's price and earnings. The professors' work could force many companies to rethink the way they approach capital spending, finance scholars say.

Finally, many publicly held utilities have used beta to justify rate requests. They figure the returns that investors demand, given their companies' betas, and develop rate structures that allow them to earn these returns. But recognizing that their low betas tend to argue against large rate increases, a growing number of utilities had already turned to other approaches. More will probably do so if the research of Professors Fama and French gains currency.

And if investors decide to quit following betas, other theories of market behavior are likely to gain influence. "What we are really taking about is opening the floodgates to a whole new generation of research into what truly drives stock prices," said Anthony B. Sanders, an Ohio State University professor of finance who is currently a visiting professor at the University of Chicago. "Once you hammer a model like the old one closed, you generate all sorts of additional academic interest."

Professor Fama has already won worldwide recognition for his efficient-markets theory -- the notion that because investors all have essentially the same information it is impossible to consistently earn returns greater than those justified by the risks.

Professor Sharpe used Professor Fama's theory as an assumption to develop the capital-asset pricing model, which links returns

to risk, as measured by beta.

Professor Sharpe says that a diversified portfolio can reduce the risks peculiar to individual companies -- that General Motors stock, for example, will be hurt by a strike. Investors, therefore, earn no rewards for bearing this risk, according to the Sharpe theory.

But investors do earn higher returns for bearing the other type of risk, known as market risk, Professor Sharpe says. This risk, which remains even after an investor diversifies, depends on how much an individual stock is dragged up or down by the market as a whole. Stocks like that of the biotechnology company Genentech, which have betas of more than 1.0, are more volatile than the market, while stocks like that of the power company Consolidated Edison, which have betas of less than 1.0, are calmer than the market.

To calculate market risk, or beta, finance professionals compare changes in the prices of individual stocks with changes in market indicators like the Standard & Poor's 500- stock index. Professor Sharpe and his followers say that in general, the higher a stock's beta, or volatility relative to the market, the greater its long-term returns.

Professors Fama and French disagree. Their paper, just published by the University of Chicago's Center for Research in Security Prices, says that long-term returns depend not on beta, but on company size and price-to-book ratios. Smaller companies, as measured by the market value of their shares, and those with low prices relative to their book values have in fact outperformed the market, they say.

The professors theorize that investors view smaller companies as more vulnerable to economic downturns and therefore demand higher returns. They also say that low price-to-book ratios typically reflect financial problems, another reason for investors to demand higher returns.

Professors Fama and French are by no means the first to fire an intellectual salvo at the capital-asset pricing model. Since Professor Sharpe developed the model in the early 1960's, a broad array of rival theories has emerged to explain stock price movements: the January effect, which says that stocks usually gain at the beginning of the year, to the weekend effect, which says stocks generally perform poorly on Mondays. Most recently, the arbitrage pricing theory says that stocks are driven by powerful economywide forces like unanticipated inflation and spikes in interest rates.

But finance experts say that Professors Fama and French have presented the most conclusive evidence against beta.

"What they have proven fairly rigorously is what other academics have been talking about for some time," said Richard Roll, a finance professor at the University of California at Los Angeles, who with others developed the arbitrage pricing theory.

Graph: "Knocking Down a Popular Theory" shows the annual return on stock investments. (Source: Eugene F. Fama and Kenneth R. French, University of Chicago.) (pg. D6)

The Capital Asset Pricing Model: Theory and Evidence

Eugene F. Fama and Kenneth R. French

The capital asset pricing model (CAPM) of William Sharpe (1964) and John Lintner (1965) marks the birth of asset pricing theory (resulting in a Nobel Prize for Sharpe in 1990). Four decades later, the CAPM is still widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios. It is the centerpiece of MBA investment courses. Indeed, it is often the only asset pricing model taught in these courses.¹

The attraction of the CAPM is that it offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor—poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model. For example, the CAPM says that the risk of a stock should be measured relative to a comprehensive "market portfolio" that in principle can include not just traded financial assets, but also consumer durables, real estate and human capital. Even if we take a narrow view of the model and limit its purview to traded financial assets, is it

¹ Although every asset pricing model is a capital asset pricing model, the finance profession reserves the acronym CAPM for the specific model of Sharpe (1964), Lintner (1965) and Black (1972) discussed here. Thus, throughout the paper we refer to the Sharpe-Lintner-Black model as the CAPM.

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legitimate to limit further the market portfolio to U.S. common stocks (a typical choice), or should the market be expanded to include bonds, and other financial assets, perhaps around the world? In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid.

We begin by outlining the logic of the CAPM, focusing on its predictions about risk and expected return. We then review the history of empirical work and what it says about shortcomings of the CAPM that pose challenges to be explained by alternative models.

The Logic of the CAPM

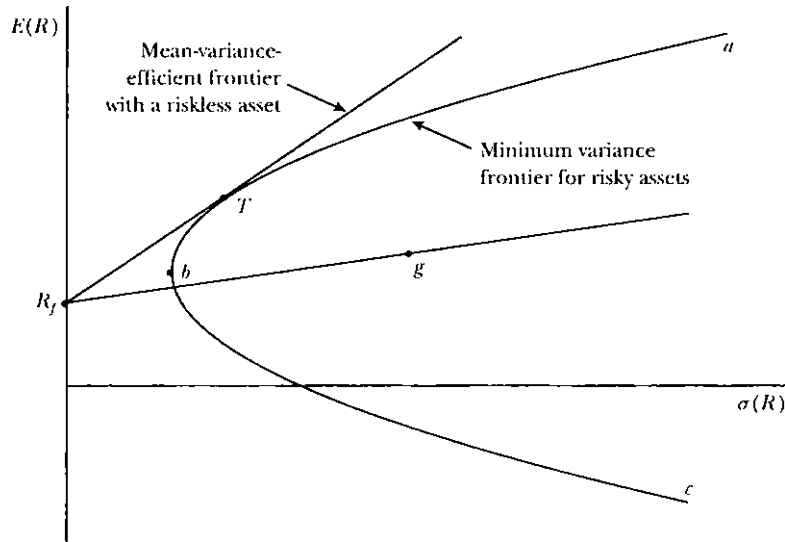
The CAPM builds on the model of portfolio choice developed by Harry Markowitz (1959). In Markowitz's model, an investor selects a portfolio at time $t - 1$ that produces a stochastic return at t . The model assumes investors are risk averse and, when choosing among portfolios, they care only about the mean and variance of their one-period investment return. As a result, investors choose "mean-variance-efficient" portfolios, in the sense that the portfolios 1) minimize the variance of portfolio return, given expected return, and 2) maximize expected return, given variance. Thus, the Markowitz approach is often called a "mean-variance model."

The portfolio model provides an algebraic condition on asset weights in mean-variance-efficient portfolios. The CAPM turns this algebraic statement into a testable prediction about the relation between risk and expected return by identifying a portfolio that must be efficient if asset prices are to clear the market of all assets.

Sharpe (1964) and Lintner (1965) add two key assumptions to the Markowitz model to identify a portfolio that must be mean-variance-efficient. The first assumption is *complete agreement*: given market clearing asset prices at $t - 1$, investors agree on the joint distribution of asset returns from $t - 1$ to t . And this distribution is the true one—that is, it is the distribution from which the returns we use to test the model are drawn. The second assumption is that there is *borrowing and lending at a risk-free rate*, which is the same for all investors and does not depend on the amount borrowed or lent.

Figure 1 describes portfolio opportunities and tells the CAPM story. The horizontal axis shows portfolio risk, measured by the standard deviation of portfolio return; the vertical axis shows expected return. The curve *abc*, which is called the minimum variance frontier, traces combinations of expected return and risk for portfolios of risky assets that minimize return variance at different levels of expected return. (These portfolios do not include risk-free borrowing and lending.) The tradeoff between risk and expected return for minimum variance portfolios is apparent. For example, an investor who wants a high expected return, perhaps at point *a*, must accept high volatility. At point *T*, the investor can have an interme-

Figure 1
Investment Opportunities



diate expected return with lower volatility. If there is no risk-free borrowing or lending, only portfolios above *b* along *abc* are mean-variance-efficient, since these portfolios also maximize expected return, given their return variances.

Adding risk-free borrowing and lending turns the efficient set into a straight line. Consider a portfolio that invests the proportion *x* of portfolio funds in a risk-free security and $1 - x$ in some portfolio *g*. If all funds are invested in the risk-free security—that is, they are loaned at the risk-free rate of interest—the result is the point *R_f* in Figure 1, a portfolio with zero variance and a risk-free rate of return. Combinations of risk-free lending and positive investment in *g* plot on the straight line between *R_f* and *g*. Points to the right of *g* on the line represent borrowing at the risk-free rate, with the proceeds from the borrowing used to increase investment in portfolio *g*. In short, portfolios that combine risk-free lending or borrowing with some risky portfolio *g* plot along a straight line from *R_f* through *g* in Figure 1.²

² Formally, the return, expected return and standard deviation of return on portfolios of the risk-free asset *f* and a risky portfolio *g* vary with *x*, the proportion of portfolio funds invested in *f*, as

$$R_p = xR_f + (1 - x)R_g,$$

$$E(R_p) = xR_f + (1 - x)E(R_g),$$

$$\sigma(R_p) = (1 - x)\sigma(R_g), \quad x \leq 1.0,$$

which together imply that the portfolios plot along the line from *R_f* through *g* in Figure 1.

To obtain the mean-variance-efficient portfolios available with risk-free borrowing and lending, one swings a line from R_f in Figure 1 up and to the left as far as possible, to the tangency portfolio T . We can then see that all efficient portfolios are combinations of the risk-free asset (either risk-free borrowing or lending) and a single risky tangency portfolio, T . This key result is Tobin's (1958) "separation theorem."

The punch line of the CAPM is now straightforward. With complete agreement about distributions of returns, all investors see the same opportunity set (Figure 1), and they combine the same risky tangency portfolio T with risk-free lending or borrowing. Since all investors hold the same portfolio T of risky assets, it must be the value-weight market portfolio of risky assets. Specifically, each risky asset's weight in the tangency portfolio, which we now call M (for the "market"), must be the total market value of all outstanding units of the asset divided by the total market value of all risky assets. In addition, the risk-free rate must be set (along with the prices of risky assets) to clear the market for risk-free borrowing and lending.

In short, the CAPM assumptions imply that the market portfolio M must be on the minimum variance frontier if the asset market is to clear. This means that the algebraic relation that holds for any minimum variance portfolio must hold for the market portfolio. Specifically, if there are N risky assets,

$$\begin{aligned} \text{(Minimum Variance Condition for } M) \quad E(R_i) &= E(R_{ZM}) \\ &+ [E(R_M) - E(R_{ZM})]\beta_{iM}, \quad i = 1, \dots, N. \end{aligned}$$

In this equation, $E(R_i)$ is the expected return on asset i , and β_{iM} , the market beta of asset i , is the covariance of its return with the market return divided by the variance of the market return,

$$\text{(Market Beta)} \quad \beta_{iM} = \frac{\text{cov}(R_i, R_M)}{\sigma^2(R_M)}.$$

The first term on the right-hand side of the minimum variance condition, $E(R_{ZM})$, is the expected return on assets that have market betas equal to zero, which means their returns are uncorrelated with the market return. The second term is a risk premium—the market beta of asset i , β_{iM} , times the premium per unit of beta, which is the expected market return, $E(R_M)$, minus $E(R_{ZM})$.

Since the market beta of asset i is also the slope in the regression of its return on the market return, a common (and correct) interpretation of beta is that it measures the sensitivity of the asset's return to variation in the market return. But there is another interpretation of beta more in line with the spirit of the portfolio model that underlies the CAPM. The risk of the market portfolio, as measured by the variance of its return (the denominator of β_{iM}), is a weighted average of the covariance risks of the assets in M (the numerators of β_{iM} for different assets).

Thus, β_{iM} is the covariance risk of asset i in M measured relative to the average covariance risk of assets, which is just the variance of the market return.³ In economic terms, β_{iM} is proportional to the risk each dollar invested in asset i contributes to the market portfolio.

The last step in the development of the Sharpe-Lintner model is to use the assumption of risk-free borrowing and lending to nail down $E(R_{ZM})$, the expected return on zero-beta assets. A risky asset's return is uncorrelated with the market return—its beta is zero—when the average of the asset's covariances with the returns on other assets just offsets the variance of the asset's return. Such a risky asset is riskless in the market portfolio in the sense that it contributes nothing to the variance of the market return.

When there is risk-free borrowing and lending, the expected return on assets that are uncorrelated with the market return, $E(R_{ZM})$, must equal the risk-free rate, R_f . The relation between expected return and beta then becomes the familiar Sharpe-Lintner CAPM equation,

$$\text{(Sharpe-Lintner CAPM)} \quad E(R_i) = R_f + [E(R_M) - R_f]\beta_{iM}, \quad i = 1, \dots, N.$$

In words, the expected return on any asset i is the risk-free interest rate, R_f , plus a risk premium, which is the asset's market beta, β_{iM} , times the premium per unit of beta risk, $E(R_M) - R_f$.

Unrestricted risk-free borrowing and lending is an unrealistic assumption. Fischer Black (1972) develops a version of the CAPM without risk-free borrowing or lending. He shows that the CAPM's key result—that the market portfolio is mean-variance-efficient—can be obtained by instead allowing unrestricted short sales of risky assets. In brief, back in Figure 1, if there is no risk-free asset, investors select portfolios from along the mean-variance-efficient frontier from a to b . Market clearing prices imply that when one weights the efficient portfolios chosen by investors by their (positive) shares of aggregate invested wealth, the resulting portfolio is the market portfolio. The market portfolio is thus a portfolio of the efficient portfolios chosen by investors. With unrestricted short selling of risky assets, portfolios made up of efficient portfolios are themselves efficient. Thus, the market portfolio is efficient, which means that the minimum variance condition for M given above holds, and it is the expected return-risk relation of the Black CAPM.

The relations between expected return and market beta of the Black and Sharpe-Lintner versions of the CAPM differ only in terms of what each says about $E(R_{ZM})$, the expected return on assets uncorrelated with the market. The Black version says only that $E(R_{ZM})$ must be less than the expected market return, so the

³ Formally, if x_{iM} is the weight of asset i in the market portfolio, then the variance of the portfolio's return is

$$\sigma^2(R_M) = \text{Cov}(R_M, R_M) = \text{Cov}\left(\sum_{i=1}^N x_{iM}R_i, R_M\right) = \sum_{i=1}^N x_{iM}\text{Cov}(R_i, R_M).$$

premium for beta is positive. In contrast, in the Sharpe-Lintner version of the model, $E(R_{ZM})$ must be the risk-free interest rate, R_f , and the premium per unit of beta risk is $E(R_M) - R_f$.

The assumption that short selling is unrestricted is as unrealistic as unrestricted risk-free borrowing and lending. If there is no risk-free asset and short sales of risky assets are not allowed, mean-variance investors still choose efficient portfolios—points above b on the abc curve in Figure 1. But when there is no short selling of risky assets and no risk-free asset, the algebra of portfolio efficiency says that portfolios made up of efficient portfolios are not typically efficient. This means that the market portfolio, which is a portfolio of the efficient portfolios chosen by investors, is not typically efficient. And the CAPM relation between expected return and market beta is lost. This does not rule out predictions about expected return and betas with respect to other efficient portfolios—if theory can specify portfolios that must be efficient if the market is to clear. But so far this has proven impossible.

In short, the familiar CAPM equation relating expected asset returns to their market betas is just an application to the market portfolio of the relation between expected return and portfolio beta that holds in any mean-variance-efficient portfolio. The efficiency of the market portfolio is based on many unrealistic assumptions, including complete agreement and either unrestricted risk-free borrowing and lending or unrestricted short selling of risky assets. But all interesting models involve unrealistic simplifications, which is why they must be tested against data.

Early Empirical Tests

Tests of the CAPM are based on three implications of the relation between expected return and market beta implied by the model. First, expected returns on all assets are linearly related to their betas, and no other variable has marginal explanatory power. Second, the beta premium is positive, meaning that the expected return on the market portfolio exceeds the expected return on assets whose returns are uncorrelated with the market return. Third, in the Sharpe-Lintner version of the model, assets uncorrelated with the market have expected returns equal to the risk-free interest rate, and the beta premium is the expected market return minus the risk-free rate. Most tests of these predictions use either cross-section or time-series regressions. Both approaches date to early tests of the model.

Tests on Risk Premiums

The early cross-section regression tests focus on the Sharpe-Lintner model's predictions about the intercept and slope in the relation between expected return and market beta. The approach is to regress a cross-section of average asset returns on estimates of asset betas. The model predicts that the intercept in these regressions is the risk-free interest rate, R_f , and the coefficient on beta is the expected return on the market in excess of the risk-free rate, $E(R_M) - R_f$.

Two problems in these tests quickly became apparent. First, estimates of beta

for individual assets are imprecise, creating a measurement error problem when they are used to explain average returns. Second, the regression residuals have common sources of variation, such as industry effects in average returns. Positive correlation in the residuals produces downward bias in the usual ordinary least squares estimates of the standard errors of the cross-section regression slopes.

To improve the precision of estimated betas, researchers such as Blume (1970), Friend and Blume (1970) and Black, Jensen and Scholes (1972) work with portfolios, rather than individual securities. Since expected returns and market betas combine in the same way in portfolios, if the CAPM explains security returns it also explains portfolio returns.⁴ Estimates of beta for diversified portfolios are more precise than estimates for individual securities. Thus, using portfolios in cross-section regressions of average returns on betas reduces the critical errors in variables problem. Grouping, however, shrinks the range of betas and reduces statistical power. To mitigate this problem, researchers sort securities on beta when forming portfolios; the first portfolio contains securities with the lowest betas, and so on, up to the last portfolio with the highest beta assets. This sorting procedure is now standard in empirical tests.

Fama and MacBeth (1973) propose a method for addressing the inference problem caused by correlation of the residuals in cross-section regressions. Instead of estimating a single cross-section regression of average monthly returns on betas, they estimate month-by-month cross-section regressions of monthly returns on betas. The times-series means of the monthly slopes and intercepts, along with the standard errors of the means, are then used to test whether the average premium for beta is positive and whether the average return on assets uncorrelated with the market is equal to the average risk-free interest rate. In this approach, the standard errors of the average intercept and slope are determined by the month-to-month variation in the regression coefficients, which fully captures the effects of residual correlation on variation in the regression coefficients, but sidesteps the problem of actually estimating the correlations. The residual correlations are, in effect, captured via repeated sampling of the regression coefficients. This approach also becomes standard in the literature.

Jensen (1968) was the first to note that the Sharpe-Lintner version of the

⁴ Formally, if x_{ip} , $i = 1, \dots, N$, are the weights for assets in some portfolio p , the expected return and market beta for the portfolio are related to the expected returns and betas of assets as

$$E(R_p) = \sum_{i=1}^N x_{ip} E(R_i), \text{ and } \beta_{pM} = \sum_{i=1}^N x_{ip} \beta_{iM}.$$

Thus, the CAPM relation between expected return and beta,

$$E(R_i) = E(R_f) + [E(R_M) - E(R_f)] \beta_{iM},$$

holds when asset i is a portfolio, as well as when i is an individual security.

relation between expected return and market beta also implies a time-series regression test. The Sharpe-Lintner CAPM says that the expected value of an asset's excess return (the asset's return minus the risk-free interest rate, $R_{it} - R_{ft}$) is completely explained by its expected CAPM risk premium (its beta times the expected value of $R_{Mt} - R_{ft}$). This implies that "Jensen's alpha," the intercept term in the time-series regression,

$$\text{(Time-Series Regression)} \quad R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \varepsilon_{it},$$

is zero for each asset.

The early tests firmly reject the Sharpe-Lintner version of the CAPM. There is a positive relation between beta and average return, but it is too "flat." Recall that, in cross-section regressions, the Sharpe-Lintner model predicts that the intercept is the risk-free rate and the coefficient on beta is the expected market return in excess of the risk-free rate, $E(R_M) - R_f$. The regressions consistently find that the intercept is greater than the average risk-free rate (typically proxied as the return on a one-month Treasury bill), and the coefficient on beta is less than the average excess market return (proxied as the average return on a portfolio of U.S. common stocks minus the Treasury bill rate). This is true in the early tests, such as Douglas (1968), Black, Jensen and Scholes (1972), Miller and Scholes (1972), Blume and Friend (1973) and Fama and MacBeth (1973), as well as in more recent cross-section regression tests, like Fama and French (1992).

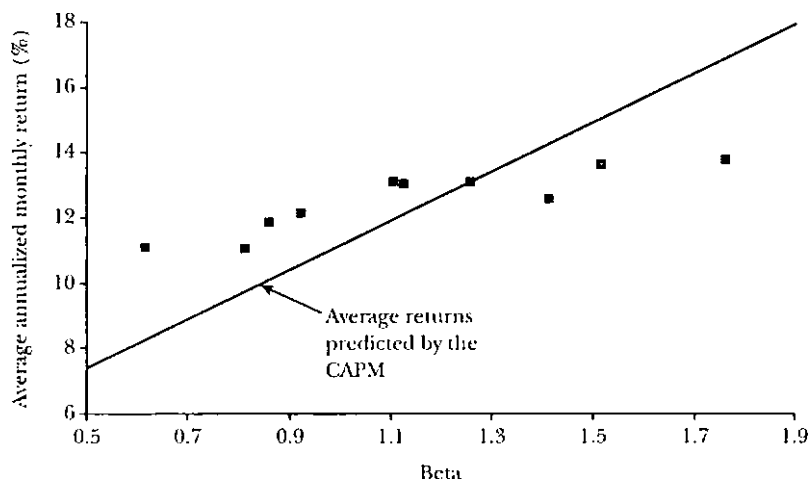
The evidence that the relation between beta and average return is too flat is confirmed in time-series tests, such as Friend and Blume (1970), Black, Jensen and Scholes (1972) and Stambaugh (1982). The intercepts in time-series regressions of excess asset returns on the excess market return are positive for assets with low betas and negative for assets with high betas.

Figure 2 provides an updated example of the evidence. In December of each year, we estimate a preranking beta for every NYSE (1928–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stock in the CRSP (Center for Research in Security Prices of the University of Chicago) database, using two to five years (as available) of prior monthly returns.⁵ We then form ten value-weight portfolios based on these preranking betas and compute their returns for the next twelve months. We repeat this process for each year from 1928 to 2003. The result is 912 monthly returns on ten beta-sorted portfolios. Figure 2 plots each portfolio's average return against its postranking beta, estimated by regressing its monthly returns for 1928–2003 on the return on the CRSP value-weight portfolio of U.S. common stocks.

The Sharpe-Lintner CAPM predicts that the portfolios plot along a straight

⁵ To be included in the sample for year t , a security must have market equity data (price times shares outstanding) for December of $t - 1$, and CRSP must classify it as ordinary common equity. Thus, we exclude securities such as American Depository Receipts (ADRs) and Real Estate Investment Trusts (REITs).

Figure 2
Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on Prior Beta, 1928–2003



line, with an intercept equal to the risk-free rate, R_f , and a slope equal to the expected excess return on the market, $E(R_M) - R_f$. We use the average one-month Treasury bill rate and the average excess CRSP market return for 1928–2003 to estimate the predicted line in Figure 2. Confirming earlier evidence, the relation between beta and average return for the ten portfolios is much flatter than the Sharpe-Lintner CAPM predicts. The returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low. For example, the predicted return on the portfolio with the lowest beta is 8.3 percent per year; the actual return is 11.1 percent. The predicted return on the portfolio with the highest beta is 16.8 percent per year; the actual is 13.7 percent.

Although the observed premium per unit of beta is lower than the Sharpe-Lintner model predicts, the relation between average return and beta in Figure 2 is roughly linear. This is consistent with the Black version of the CAPM, which predicts only that the beta premium is positive. Even this less restrictive model, however, eventually succumbs to the data.

Testing Whether Market Betas Explain Expected Returns

The Sharpe-Lintner and Black versions of the CAPM share the prediction that the market portfolio is mean-variance-efficient. This implies that differences in expected return across securities and portfolios are entirely explained by differences in market beta; other variables should add nothing to the explanation of expected return. This prediction plays a prominent role in tests of the CAPM. In the early work, the weapon of choice is cross-section regressions.

In the framework of Fama and MacBeth (1973), one simply adds predetermined explanatory variables to the month-by-month cross-section regressions of

returns on beta. If all differences in expected return are explained by beta, the average slopes on the additional variables should not be reliably different from zero. Clearly, the trick in the cross-section regression approach is to choose specific additional variables likely to expose any problems of the CAPM prediction that, because the market portfolio is efficient, market betas suffice to explain expected asset returns.

For example, in Fama and MacBeth (1973) the additional variables are squared market betas (to test the prediction that the relation between expected return and beta is linear) and residual variances from regressions of returns on the market return (to test the prediction that market beta is the only measure of risk needed to explain expected returns). These variables do not add to the explanation of average returns provided by beta. Thus, the results of Fama and MacBeth (1973) are consistent with the hypothesis that their market proxy—an equal-weight portfolio of NYSE stocks—is on the minimum variance frontier.

The hypothesis that market betas completely explain expected returns can also be tested using time-series regressions. In the time-series regression described above (the excess return on asset i regressed on the excess market return), the intercept is the difference between the asset's average excess return and the excess return predicted by the Sharpe-Lintner model, that is, beta times the average excess market return. If the model holds, there is no way to group assets into portfolios whose intercepts are reliably different from zero. For example, the intercepts for a portfolio of stocks with high ratios of earnings to price and a portfolio of stocks with low earning-price ratios should both be zero. Thus, to test the hypothesis that market betas suffice to explain expected returns, one estimates the time-series regression for a set of assets (or portfolios) and then jointly tests the vector of regression intercepts against zero. The trick in this approach is to choose the left-hand-side assets (or portfolios) in a way likely to expose any shortcoming of the CAPM prediction that market betas suffice to explain expected asset returns.

In early applications, researchers use a variety of tests to determine whether the intercepts in a set of time-series regressions are all zero. The tests have the same asymptotic properties, but there is controversy about which has the best small sample properties. Gibbons, Ross and Shanken (1989) settle the debate by providing an F -test on the intercepts that has exact small-sample properties. They also show that the test has a simple economic interpretation. In effect, the test constructs a candidate for the tangency portfolio T in Figure 1 by optimally combining the market proxy and the left-hand-side assets of the time-series regressions. The estimator then tests whether the efficient set provided by the combination of this tangency portfolio and the risk-free asset is reliably superior to the one obtained by combining the risk-free asset with the market proxy alone. In other words, the Gibbons, Ross and Shanken statistic tests whether the market proxy is the tangency portfolio in the set of portfolios that can be constructed by combining the market portfolio with the specific assets used as dependent variables in the time-series regressions.

Enlightened by this insight of Gibbons, Ross and Shanken (1989), one can see

a similar interpretation of the cross-section regression test of whether market betas suffice to explain expected returns. In this case, the test is whether the additional explanatory variables in a cross-section regression identify patterns in the returns on the left-hand-side assets that are not explained by the assets' market betas. This amounts to testing whether the market proxy is on the minimum variance frontier that can be constructed using the market proxy and the left-hand-side assets included in the tests.

An important lesson from this discussion is that time-series and cross-section regressions do not, strictly speaking, test the CAPM. What is literally tested is whether a specific proxy for the market portfolio (typically a portfolio of U.S. common stocks) is efficient in the set of portfolios that can be constructed from it and the left-hand-side assets used in the test. One might conclude from this that the CAPM has never been tested, and prospects for testing it are not good because 1) the set of left-hand-side assets does not include all marketable assets, and 2) data for the true market portfolio of all assets are likely beyond reach (Roll, 1977; more on this later). But this criticism can be leveled at tests of any economic model when the tests are less than exhaustive or when they use proxies for the variables called for by the model.

The bottom line from the early cross-section regression tests of the CAPM, such as Fama and MacBeth (1973), and the early time-series regression tests, like Gibbons (1982) and Stambaugh (1982), is that standard market proxies seem to be on the minimum variance frontier. That is, the central predictions of the Black version of the CAPM, that market betas suffice to explain expected returns and that the risk premium for beta is positive, seem to hold. But the more specific prediction of the Sharpe-Lintner CAPM that the premium per unit of beta is the expected market return minus the risk-free interest rate is consistently rejected.

The success of the Black version of the CAPM in early tests produced a consensus that the model is a good description of expected returns. These early results, coupled with the model's simplicity and intuitive appeal, pushed the CAPM to the forefront of finance.

Recent Tests

Starting in the late 1970s, empirical work appears that challenges even the Black version of the CAPM. Specifically, evidence mounts that much of the variation in expected return is unrelated to market beta.

The first blow is Basu's (1977) evidence that when common stocks are sorted on earnings-price ratios, future returns on high E/P stocks are higher than predicted by the CAPM. Banz (1981) documents a size effect: when stocks are sorted on market capitalization (price times shares outstanding), average returns on small stocks are higher than predicted by the CAPM. Bhandari (1988) finds that high debt-equity ratios (book value of debt over the market value of equity, a measure of leverage) are associated with returns that are too high relative to their market betas.

Finally, Statman (1980) and Rosenberg, Reid and Laustein (1985) document that stocks with high book-to-market equity ratios (B/M, the ratio of the book value of a common stock to its market value) have high average returns that are not captured by their betas.

There is a theme in the contradictions of the CAPM summarized above. Ratios involving stock prices have information about expected returns missed by market betas. On reflection, this is not surprising. A stock's price depends not only on the expected cash flows it will provide, but also on the expected returns that discount expected cash flows back to the present. Thus, in principle, the cross-section of prices has information about the cross-section of expected returns. (A high expected return implies a high discount rate and a low price.) The cross-section of stock prices is, however, arbitrarily affected by differences in scale (or units). But with a judicious choice of scaling variable X , the ratio X/P can reveal differences in the cross-section of expected stock returns. Such ratios are thus prime candidates to expose shortcomings of asset pricing models—in the case of the CAPM, shortcomings of the prediction that market betas suffice to explain expected returns (Ball, 1978). The contradictions of the CAPM summarized above suggest that earnings-price, debt-equity and book-to-market ratios indeed play this role.

Fama and French (1992) update and synthesize the evidence on the empirical failures of the CAPM. Using the cross-section regression approach, they confirm that size, earnings-price, debt-equity and book-to-market ratios add to the explanation of expected stock returns provided by market beta. Fama and French (1996) reach the same conclusion using the time-series regression approach applied to portfolios of stocks sorted on price ratios. They also find that different price ratios have much the same information about expected returns. This is not surprising given that price is the common driving force in the price ratios, and the numerators are just scaling variables used to extract the information in price about expected returns.

Fama and French (1992) also confirm the evidence (Reinganum, 1981; Stambaugh, 1982; Lakonishok and Shapiro, 1986) that the relation between average return and beta for common stocks is even flatter after the sample periods used in the early empirical work on the CAPM. The estimate of the beta premium is, however, clouded by statistical uncertainty (a large standard error). Kothari, Shanken and Sloan (1995) try to resuscitate the Sharpe-Lintner CAPM by arguing that the weak relation between average return and beta is just a chance result. But the strong evidence that other variables capture variation in expected return missed by beta makes this argument irrelevant. If betas do not suffice to explain expected returns, the market portfolio is not efficient, and the CAPM is dead in its tracks. Evidence on the size of the market premium can neither save the model nor further doom it.

The synthesis of the evidence on the empirical problems of the CAPM provided by Fama and French (1992) serves as a catalyst, marking the point when it is generally acknowledged that the CAPM has potentially fatal problems. Research then turns to explanations.

One possibility is that the CAPM's problems are spurious, the result of data dredging—publication-hungry researchers scouring the data and unearthing contradictions that occur in specific samples as a result of chance. A standard response to this concern is to test for similar findings in other samples. Chan, Hamao and Lakonishok (1991) find a strong relation between book-to-market equity (B/M) and average return for Japanese stocks. Capaul, Rowley and Sharpe (1993) observe a similar B/M effect in four European stock markets and in Japan. Fama and French (1998) find that the price ratios that produce problems for the CAPM in U.S. data show up in the same way in the stock returns of twelve non-U.S. major markets, and they are present in emerging market returns. This evidence suggests that the contradictions of the CAPM associated with price ratios are not sample specific.

Explanations: Irrational Pricing or Risk

Among those who conclude that the empirical failures of the CAPM are fatal, two stories emerge. On one side are the behavioralists. Their view is based on evidence that stocks with high ratios of book value to market price are typically firms that have fallen on bad times, while low B/M is associated with growth firms (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1995). The behavioralists argue that sorting firms on book-to-market ratios exposes investor overreaction to good and bad times. Investors overextrapolate past performance, resulting in stock prices that are too high for growth (low B/M) firms and too low for distressed (high B/M, so-called value) firms. When the overreaction is eventually corrected, the result is high returns for value stocks and low returns for growth stocks. Proponents of this view include DeBondt and Thaler (1987), Lakonishok, Shleifer and Vishny (1994) and Haugen (1995).

The second story for explaining the empirical contradictions of the CAPM is that they point to the need for a more complicated asset pricing model. The CAPM is based on many unrealistic assumptions. For example, the assumption that investors care only about the mean and variance of one-period portfolio returns is extreme. It is reasonable that investors also care about how their portfolio return covaries with labor income and future investment opportunities, so a portfolio's return variance misses important dimensions of risk. If so, market beta is not a complete description of an asset's risk, and we should not be surprised to find that differences in expected return are not completely explained by differences in beta. In this view, the search should turn to asset pricing models that do a better job explaining average returns.

Merton's (1973) intertemporal capital asset pricing model (ICAPM) is a natural extension of the CAPM. The ICAPM begins with a different assumption about investor objectives. In the CAPM, investors care only about the wealth their portfolio produces at the end of the current period. In the ICAPM, investors are concerned not only with their end-of-period payoff, but also with the opportunities

they will have to consume or invest the payoff. Thus, when choosing a portfolio at time $t - 1$, ICAPM investors consider how their wealth at t might vary with future *state variables*, including labor income, the prices of consumption goods and the nature of portfolio opportunities at t , and expectations about the labor income, consumption and investment opportunities to be available after t .

Like CAPM investors, ICAPM investors prefer high expected return and low return variance. But ICAPM investors are also concerned with the covariances of portfolio returns with state variables. As a result, optimal portfolios are “multifactor efficient,” which means they have the largest possible expected returns, given their return variances and the covariances of their returns with the relevant state variables.

Fama (1996) shows that the ICAPM generalizes the logic of the CAPM. That is, if there is risk-free borrowing and lending or if short sales of risky assets are allowed, market clearing prices imply that the market portfolio is multifactor efficient. Moreover, multifactor efficiency implies a relation between expected return and beta risks, but it requires additional betas, along with a market beta, to explain expected returns.

An ideal implementation of the ICAPM would specify the state variables that affect expected returns. Fama and French (1993) take a more indirect approach, perhaps more in the spirit of Ross’s (1976) arbitrage pricing theory. They argue that though size and book-to-market equity are not themselves state variables, the higher average returns on small stocks and high book-to-market stocks reflect unidentified state variables that produce undiversifiable risks (covariances) in returns that are not captured by the market return and are priced separately from market betas. In support of this claim, they show that the returns on the stocks of small firms covary more with one another than with returns on the stocks of large firms, and returns on high book-to-market (value) stocks covary more with one another than with returns on low book-to-market (growth) stocks. Fama and French (1995) show that there are similar size and book-to-market patterns in the covariation of fundamentals like earnings and sales.

Based on this evidence, Fama and French (1993, 1996) propose a three-factor model for expected returns,

$$\begin{aligned} \text{(Three-Factor Model)} \quad E(R_{it}) - R_{ft} = & \beta_{im}[E(R_{Mt}) - R_{ft}] \\ & + \beta_{is}E(SMB_t) + \beta_{ih}E(HML_t). \end{aligned}$$

In this equation, SMB_t (small minus big) is the difference between the returns on diversified portfolios of small and big stocks, HML_t (high minus low) is the difference between the returns on diversified portfolios of high and low B/M stocks, and the betas are slopes in the multiple regression of $R_{it} - R_{ft}$ on $R_{Mt} - R_{ft}$, SMB_t and HML_t .

For perspective, the average value of the market premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, which is 3.5 standard errors from zero. The

average values of SMB_t , and HML_t are 3.6 percent and 5.0 percent per year, and they are 2.1 and 3.1 standard errors from zero. All three premiums are volatile, with annual standard deviations of 21.0 percent ($R_{M_t} - R_{f_t}$), 14.6 percent (SMB_t) and 14.2 percent (HML_t) per year. Although the average values of the premiums are large, high volatility implies substantial uncertainty about the true expected premiums.

One implication of the expected return equation of the three-factor model is that the intercept α_i in the time-series regression,

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{iS}SMB_t + \beta_{iH}HML_t + \varepsilon_{it}$$

is zero for all assets i . Using this criterion, Fama and French (1993, 1996) find that the model captures much of the variation in average return for portfolios formed on size, book-to-market equity and other price ratios that cause problems for the CAPM. Fama and French (1998) show that an international version of the model performs better than an international CAPM in describing average returns on portfolios formed on scaled price variables for stocks in 13 major markets.

The three-factor model is now widely used in empirical research that requires a model of expected returns. Estimates of α_i from the time-series regression above are used to calibrate how rapidly stock prices respond to new information (for example, Loughran and Ritter, 1995; Mitchell and Stafford, 2000). They are also used to measure the special information of portfolio managers, for example, in Carhart's (1997) study of mutual fund performance. Among practitioners like Ibbotson Associates, the model is offered as an alternative to the CAPM for estimating the cost of equity capital.

From a theoretical perspective, the main shortcoming of the three-factor model is its empirical motivation. The small-minus-big (SMB) and high-minus-low (HML) explanatory returns are not motivated by predictions about state variables of concern to investors. Instead they are brute force constructs meant to capture the patterns uncovered by previous work on how average stock returns vary with size and the book-to-market equity ratio.

But this concern is not fatal. The ICAPM does not require that the additional portfolios used along with the market portfolio to explain expected returns "mimic" the relevant state variables. In both the ICAPM and the arbitrage pricing theory, it suffices that the additional portfolios are well diversified (in the terminology of Fama, 1996, they are multifactor minimum variance) and that they are sufficiently different from the market portfolio to capture covariation in returns and variation in expected returns missed by the market portfolio. Thus, adding diversified portfolios that capture covariation in returns and variation in average returns left unexplained by the market is in the spirit of both the ICAPM and the Ross's arbitrage pricing theory.

The behavioralists are not impressed by the evidence for a risk-based explanation of the failures of the CAPM. They typically concede that the three-factor model captures covariation in returns missed by the market return and that it picks

up much of the size and value effects in average returns left unexplained by the CAPM. But their view is that the average return premium associated with the model's book-to-market factor—which does the heavy lifting in the improvements to the CAPM—is itself the result of investor overreaction that happens to be correlated across firms in a way that just looks like a risk story. In short, in the behavioral view, the market tries to set CAPM prices, and violations of the CAPM are due to mispricing.

The conflict between the behavioral irrational pricing story and the rational risk story for the empirical failures of the CAPM leaves us at a timeworn impasse. Fama (1970) emphasizes that the hypothesis that prices properly reflect available information must be tested in the context of a model of expected returns, like the CAPM. Intuitively, to test whether prices are rational, one must take a stand on what the market is trying to do in setting prices—that is, what is risk and what is the relation between expected return and risk? When tests reject the CAPM, one cannot say whether the problem is its assumption that prices are rational (the behavioral view) or violations of other assumptions that are also necessary to produce the CAPM (our position).

Fortunately, for some applications, the way one uses the three-factor model does not depend on one's view about whether its average return premiums are the rational result of underlying state variable risks, the result of irrational investor behavior or sample specific results of chance. For example, when measuring the response of stock prices to new information or when evaluating the performance of managed portfolios, one wants to account for known patterns in returns and average returns for the period examined, whatever their source. Similarly, when estimating the cost of equity capital, one might be unconcerned with whether expected return premiums are rational or irrational since they are in either case part of the opportunity cost of equity capital (Stein, 1996). But the cost of capital is forward looking, so if the premiums are sample specific they are irrelevant.

The three-factor model is hardly a panacea. Its most serious problem is the momentum effect of Jegadeesh and Titman (1993). Stocks that do well relative to the market over the last three to twelve months tend to continue to do well for the next few months, and stocks that do poorly continue to do poorly. This momentum effect is distinct from the value effect captured by book-to-market equity and other price ratios. Moreover, the momentum effect is left unexplained by the three-factor model, as well as by the CAPM. Following Carhart (1997), one response is to add a momentum factor (the difference between the returns on diversified portfolios of short-term winners and losers) to the three-factor model. This step is again legitimate in applications where the goal is to abstract from known patterns in average returns to uncover information-specific or manager-specific effects. But since the momentum effect is short-lived, it is largely irrelevant for estimates of the cost of equity capital.

Another strand of research points to problems in both the three-factor model and the CAPM. Frankel and Lee (1998), Dechow, Hutton and Sloan (1999), Piotroski (2000) and others show that in portfolios formed on price ratios like

book-to-market equity, stocks with higher expected cash flows have higher average returns that are not captured by the three-factor model or the CAPM. The authors interpret their results as evidence that stock prices are irrational, in the sense that they do not reflect available information about expected profitability.

In truth, however, one can't tell whether the problem is bad pricing or a bad asset pricing model. A stock's price can always be expressed as the present value of expected future cash flows discounted at the expected return on the stock (Campbell and Shiller, 1989; Vuolteenaho, 2002). It follows that if two stocks have the same price, the one with higher expected cash flows must have a higher expected return. This holds true whether pricing is rational or irrational. Thus, when one observes a positive relation between expected cash flows and expected returns that is left unexplained by the CAPM or the three-factor model, one can't tell whether it is the result of irrational pricing or a misspecified asset pricing model.

The Market Proxy Problem

Roll (1977) argues that the CAPM has never been tested and probably never will be. The problem is that the market portfolio at the heart of the model is theoretically and empirically elusive. It is not theoretically clear which assets (for example, human capital) can legitimately be excluded from the market portfolio, and data availability substantially limits the assets that are included. As a result, tests of the CAPM are forced to use proxies for the market portfolio, in effect testing whether the proxies are on the minimum variance frontier. Roll argues that because the tests use proxies, not the true market portfolio, we learn nothing about the CAPM.

We are more pragmatic. The relation between expected return and market beta of the CAPM is just the minimum variance condition that holds in any efficient portfolio, applied to the market portfolio. Thus, if we can find a market proxy that is on the minimum variance frontier, it can be used to describe differences in expected returns, and we would be happy to use it for this purpose. The strong rejections of the CAPM described above, however, say that researchers have not uncovered a reasonable market proxy that is close to the minimum variance frontier. If researchers are constrained to reasonable proxies, we doubt they ever will.

Our pessimism is fueled by several empirical results. Stambaugh (1982) tests the CAPM using a range of market portfolios that include, in addition to U.S. common stocks, corporate and government bonds, preferred stocks, real estate and other consumer durables. He finds that tests of the CAPM are not sensitive to expanding the market proxy beyond common stocks, basically because the volatility of expanded market returns is dominated by the volatility of stock returns.

One need not be convinced by Stambaugh's (1982) results since his market proxies are limited to U.S. assets. If international capital markets are open and asset prices conform to an international version of the CAPM, the market portfolio

should include international assets. Fama and French (1998) find, however, that betas for a global stock market portfolio cannot explain the high average returns observed around the world on stocks with high book-to-market or high earnings-price ratios.

A major problem for the CAPM is that portfolios formed by sorting stocks on price ratios produce a wide range of average returns, but the average returns are not positively related to market betas (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1996, 1998). The problem is illustrated in Figure 3, which shows average returns and betas (calculated with respect to the CRSP value-weight portfolio of NYSE, AMEX and NASDAQ stocks) for July 1963 to December 2003 for ten portfolios of U.S. stocks formed annually on sorted values of the book-to-market equity ratio (B/M).⁶

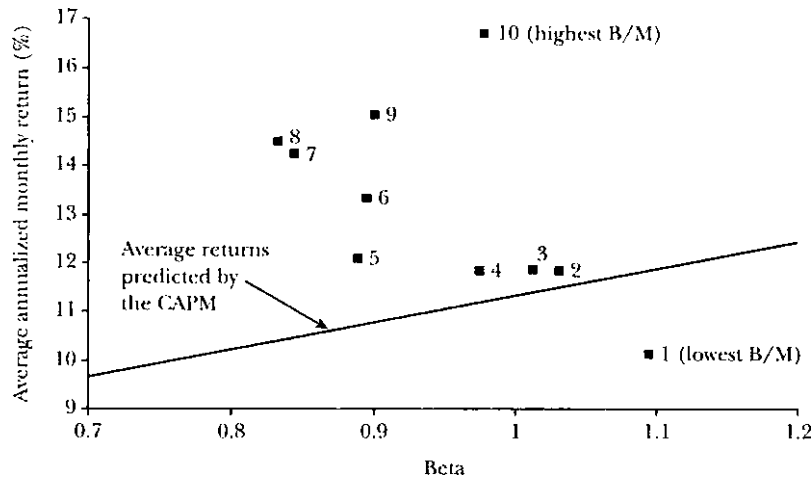
Average returns on the B/M portfolios increase almost monotonically, from 10.1 percent per year for the lowest B/M group (portfolio 1) to an impressive 16.7 percent for the highest (portfolio 10). But the positive relation between beta and average return predicted by the CAPM is notably absent. For example, the portfolio with the lowest book-to-market ratio has the highest beta but the lowest average return. The estimated beta for the portfolio with the highest book-to-market ratio and the highest average return is only 0.98. With an average annualized value of the riskfree interest rate, R_f , of 5.8 percent and an average annualized market premium, $R_M - R_f$, of 11.3 percent, the Sharpe-Lintner CAPM predicts an average return of 11.8 percent for the lowest B/M portfolio and 11.2 percent for the highest, far from the observed values, 10.1 and 16.7 percent. For the Sharpe-Lintner model to “work” on these portfolios, their market betas must change dramatically, from 1.09 to 0.78 for the lowest B/M portfolio and from 0.98 to 1.98 for the highest. We judge it unlikely that alternative proxies for the market portfolio will produce betas and a market premium that can explain the average returns on these portfolios.

It is always possible that researchers will redeem the CAPM by finding a reasonable proxy for the market portfolio that is on the minimum variance frontier. We emphasize, however, that this possibility cannot be used to justify the way the CAPM is currently applied. The problem is that applications typically use the same

⁶ Stock return data are from CRSP, and book equity data are from Compustat and the Moody's Industrials, Transportation, Utilities and Financials manuals. Stocks are allocated to ten portfolios at the end of June of each year t (1963 to 2003) using the ratio of book equity for the fiscal year ending in calendar year $t - 1$, divided by market equity at the end of December of $t - 1$. Book equity is the book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Depending on availability, we use the redemption, liquidation or par value (in that order) to estimate the book value of preferred stock. Stockholders' equity is the value reported by Moody's or Compustat, if it is available. If not, we measure stockholders' equity as the book value of common equity plus the par value of preferred stock or the book value of assets minus total liabilities (in that order). The portfolios for year t include NYSE (1963–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stocks with positive book equity in $t - 1$ and market equity (from CRSP) for December of $t - 1$ and June of t . The portfolios exclude securities CRSP does not classify as ordinary common equity. The breakpoints for year t use only securities that are on the NYSE in June of year t .

Figure 3

Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on B/M, 1963–2003



market proxies, like the value-weight portfolio of U.S. stocks, that lead to rejections of the model in empirical tests. The contradictions of the CAPM observed when such proxies are used in tests of the model show up as bad estimates of expected returns in applications; for example, estimates of the cost of equity capital that are too low (relative to historical average returns) for small stocks and for stocks with high book-to-market equity ratios. In short, if a market proxy does not work in tests of the CAPM, it does not work in applications.

Conclusions

The version of the CAPM developed by Sharpe (1964) and Lintner (1965) has never been an empirical success. In the early empirical work, the Black (1972) version of the model, which can accommodate a flatter tradeoff of average return for market beta, has some success. But in the late 1970s, research begins to uncover variables like size, various price ratios and momentum that add to the explanation of average returns provided by beta. The problems are serious enough to invalidate most applications of the CAPM.

For example, finance textbooks often recommend using the Sharpe-Lintner CAPM risk-return relation to estimate the cost of equity capital. The prescription is to estimate a stock's market beta and combine it with the risk-free interest rate and the average market risk premium to produce an estimate of the cost of equity. The typical market portfolio in these exercises includes just U.S. common stocks. But empirical work, old and new, tells us that the relation between beta and average return is flatter than predicted by the Sharpe-Lintner version of the CAPM. As a

result, CAPM estimates of the cost of equity for high beta stocks are too high (relative to historical average returns) and estimates for low beta stocks are too low (Friend and Blume, 1970). Similarly, if the high average returns on value stocks (with high book-to-market ratios) imply high expected returns, CAPM cost of equity estimates for such stocks are too low.⁷

The CAPM is also often used to measure the performance of mutual funds and other managed portfolios. The approach, dating to Jensen (1968), is to estimate the CAPM *time-series regression* for a portfolio and use the intercept (Jensen's alpha) to measure abnormal performance. The problem is that, because of the empirical failings of the CAPM, even passively managed stock portfolios produce abnormal returns if their investment strategies involve tilts toward CAPM problems (Eltou, Gruber, Das and Hlavka, 1993). For example, funds that concentrate on low beta stocks, small stocks or value stocks will tend to produce positive abnormal returns relative to the predictions of the Sharpe-Lintner CAPM, even when the fund managers have no special talent for picking winners.

The CAPM, like Markowitz's (1952, 1959) portfolio model on which it is built, is nevertheless a theoretical tour de force. We continue to teach the CAPM as an introduction to the fundamental concepts of portfolio theory and asset pricing, to be built on by more complicated models like Merton's (1973) ICAPM. But we also warn students that despite its seductive simplicity, the CAPM's empirical problems probably invalidate its use in applications.

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⁷ The problems are compounded by the large standard errors of estimates of the market premium and of betas for individual stocks, which probably suffice to make CAPM estimates of the cost of equity rather meaningless, even if the CAPM holds (Fama and French, 1997; Pastor and Stambaugh, 1999). For example, using the U.S. Treasury bill rate as the risk-free interest rate and the CRSP value-weight portfolio of publicly traded U.S. common stocks, the average value of the equity premium $R_{M_t} - R_{f_t}$ for 1927–2003 is 8.3 percent per year, with a standard error of 2.4 percent. The two standard error range thus runs from 3.5 percent to 13.1 percent, which is sufficient to make most projects appear either profitable or unprofitable. This problem is, however, hardly special to the CAPM. For example, expected returns in all versions of Merton's (1973) ICAPM include a market beta and the expected market premium. Also, as noted earlier the expected values of the size and book-to-market premiums in the Fama-French three-factor model are also estimated with substantial error.

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**Audubon Water Company
Docket No. R-2012-2286118**

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RR-5-D Reference Company Schedule F-3, page 2. Provide the calculation and basis for the Interest Coverage figure of 3.

RESPONSE: Dennis M. Kalbarczyk, Consultant, April 10, 2012.

The Company used an interest coverage claim as the basis of developing its as-filed claim so as to reflect a reasonable claim for return on equity while trying to minimize the rate case expense associated with a full blown rate of return study. Attached as "Response to I&E-RR-5-D" is a copy of a Standard & Poor's Utilities Rating Service financial benchmarks table, which provides a range of indices for water utilities as it relates to pretax interest coverage. The Company submits that the selection of a 3.0x interest coverage is a reasonable proxy for its rate case filing purposes and that the resultant return on equity claim is within the range utilized by other major water utilities in recent rate case filings. The Company reserves the right to retain a rate of return expert to supplement its as-filed rate of return claim, including the preparation of a detailed rate of return study and expert testimony should that be necessary, along with any supplemental information necessary to support the Company's overall rate of return claim.

Standard & Poor's Utilities Rating Service

FINANCIAL BENCHMARKS

WATER UTILITIES

Pretax Interest Coverage (x)

Business Position	AA	A	BBB	BB
1	2.75	2.25	1.25	0.75
2	2.92	2.50	1.50	0.80
3	3.08	2.75	1.75	0.92
4	3.25	3.00	2.00	1.00
5		3.25	2.25	1.17
6		3.50	2.50	1.33
7		3.75	2.75	1.50

Total Debt / Total Capital (%)

Business Position	AA	A	BBB	BB
1	52.0	58.0	64.0	70.0
2	51.0	55.0	62.0	68.0
3	49.0	53.0	61.0	67.0
4	48.0	52.0	58.0	65.0
5		51.0	57.0	63.0
6		49.0	56.0	62.0
7		48.0	54.0	60.0

Funds From Operations Interest Coverage (x)

Business Position	AA	A	BBB	BB
1	3.00	2.50	1.50	1.00
2	3.17	2.75	1.75	1.10
3	3.33	3.00	2.00	1.20
4	3.50	3.25	2.25	1.25
5		3.50	2.50	1.42
6		3.75	2.75	1.58
7		4.00	3.00	1.75

Funds From Operations to Total Debt (%)

Business Position	AA	A	BBB	BB
1	19.0	15.0	10.0	7.0
2	21.0	17.0	11.5	7.5
3	23.0	19.0	13.5	8.5
4	25.0	21.0	15.0	9.0
5		23.0	16.5	10.0
6		25.0	17.5	11.0
7		27.0	20.0	12.0

Net Cash Flow to Capital Spending (%)

Business Position	AA	A	BBB	BB
1	75.0	68.0	35.0	20.0
2	82.0	65.0	40.0	23.0
3	88.0	70.0	45.0	27.0
4	95.0	75.0	50.0	30.0
5		80.0	55.0	33.0
6		85.0	60.0	37.0
7		90.0	65.0	40.0

Business Positions: 1—Above average, 2—Somewhat above average, 3—High average, 4—Average, 5—Low average, 6—Somewhat below average, 7—Below average.

Source: Standard & Poor's Global Utilities Rating Service, Financial Statistics for the 12 months ending September 30, 1996, Copyright 1997

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June 2, 2004

New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised

Credit Analyst:

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Business Profile Score Methodology

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New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised

Standard & Poor's Ratings Services has assigned new business profile scores to U.S. utility and power companies to better reflect the relative business risk among companies in the sector. Standard & Poor's also has revised its published risk-adjusted financial guidelines. The new business scores and financial guidelines do not represent a change to Standard & Poor's ratings criteria or methodology, and no ratings changes are anticipated from the new business profile scores or revised financial guidelines.

New Business Profile Scores and Revised Financial Guidelines

Standard & Poor's has always monitored changes in the industry and altered its business risk assessments accordingly. This is the first time since the 10-point business profile scale for U.S. investor-owned utilities was implemented that a comprehensive assessment of the benefits and the application of the methodology has been made. The principal purpose was to determine if the methodology continues to provide meaningful differentiation of business risk. The review indicated that while business profile scoring continues to provide analytical benefits, the complete range of the 10-point scale was not being utilized to the fullest extent.

Standard & Poor's has also revised the key financial guidelines that it uses as an integral part of evaluating the credit quality of U.S. utility and power companies. These guidelines were last updated in June 1999. The financial guidelines for three principal ratios (funds from operations (FFO) interest coverage, FFO to total debt, and total debt to total capital) have been broadened so as to be more flexible. Pretax interest coverage as a key credit ratio was eliminated.

Finally, Standard & Poor's has segmented the utility and power industry into sub-sectors based on the dominant corporate strategy that a company is pursuing. Standard & Poor's has published a new U.S. utility and power company ranking list that reflects these sub-sectors.

There are numerous benefits to the reassessment. Fuller utilization of the entire 10-point scale provides a superior relative ranking of qualitative business risk. A simultaneous revision of the financial guidelines supports the goal of not causing rating changes from the recalibration of the business profiles. Classification of companies by sub-sectors will ensure greater comparability and consistency in ratings. The use of industry segmentation will also allow more in-depth statistical analysis of ratings distributions and rating changes.

The reassessment does not represent a change to Standard & Poor's criteria or methodology for determining ratings for utility and power companies. Each business profile score should be considered as the assignment of a new score; these scores do not represent improvement or deterioration in our assessment of an individual company's business risk relative to the previously assigned score. The financial guidelines continue to be risk-adjusted based on historical utility and industrial medians. Segmentation into industry sub-sectors does not imply that specific company characteristics will not weigh heavily into the assignment of a company's business profile score.

All this must be considered in the context of a company's individual characteristics, such as, where it is in its life cycle, how it generates cash is determined by a company's business prospects—competitiveness, market dynamics, economic conditions, and its need for cash is a consequence of the balance sheet structure, management's financial strategy, and strategy.

An enterprise's capacity to pay debts or any other obligation, the core underlying concept of a credit rating, is determined by cash—generate cash—not earnings, which is an accounting concept. Although there is generally a strong correlation between cash flow and profitability in the long run, many transactions and accounting entries may affect one and not the other. Aggressive accounting policies, for example, regarding revenue and expense recognition, asset write-downs, or depreciation schedules, can have a material impact on earnings and none whatsoever on actual cash generation.

Liquidity pressures can arise even when a company reports robust earnings—e.g., when gains not realizable in cash comprise a significant component of earnings or where the enterprise faces large capital expenditure requirements. Cash flow adequacy is typically the single most critical aspect of credit rating analysis.

Measuring cash flow

Discussions of cash flow often suffer from lack of a uniform definition of terms. Our analysts use numerous cash flow concepts in our credit decision process, and the terms we use to define specific cash flow concepts are summarized here.

We begin to measure an issuer's operating cash flow generation using its FFO, which is defined as net income from operations adjusted for depreciation and amortization (D&A) and other noncash and nonrecurring items such as asset sales, gains and losses on asset sales, foreign exchange gains and losses on financial instruments, and undistributed losses from joint ventures.

The availability of cash for debt service for companies on a high growth spurt is ordinarily better appreciated after changes in working capital, and arriving at the operating cash flow. The use of the FFO metric for some regulated companies can be misleading as it does not capture the variation in regulatory assets or liabilities. In Brazil, for example, there is an annual time gap between when the actual cash revenues or costs occur and the recognition in the income statement and might affect different fiscal years. Similarly for working capital-intensive industries such as retailing, operating cash flow is a better indicator of the firm's actual cash generation. Working capital, on the other hand, could be managed or managed differently depending on its liquidity or accounting needs. Accordingly, FFO has been frequently used as a proxy for cash from operations. Because operating cash flow tends to be more volatile, FFO is often used to smooth periodic working capital. It is used as a better proxy of recurring cash flow generation rather than the actual cash flow generated from working capital.

By deducting capital expenditures from operating cash flow, we arrive at free operating cash flow (FOCF), which is a company's cash generated from core operations. We sometimes exclude discretionary capital expenditures from the FOCF calculation, but in practice, it is often difficult to discriminate between expansion and replacement. And although companies have some flexibility to manage their capital budget to weather down cycles, such flexibility is generally temporary in light of intrinsic requirements of the business. For example, companies can be compelled to increase their investment in response to strong demand growth or technological changes. Regulated entities (e.g., telecommunication companies) may have investment requirements related to their concession contracts.

We calculate a company's discretionary cash flow by subtracting cash dividends (including to minority interests) from FOCF. Discretion in dividend pay-out will depend on a company's financial strategy. Companies with aggressive dividend

Dividend Yields of Five Company Barometer Group

		Aqua America	American States Water Company	California Water Services	Middlesex Water company	SJW Corporation
Symbol		WTR	AWR	CWT	MSEX	SJW
Div		0.67	1.16	0.64	0.74	0.74
Apr-12		21.79	35.22	17.51	18.03	23.02
Mar-12		22.29	36.14	18.21	18.89	24.12
Feb-12		22.21	36.86	19.21	18.42	23.89
Jan-12		22.06	36.17	18.45	18.89	23.69
Dec-11		22.05	34.9	18.26	18.66	23.64
Nov-11		21.9	35.28	18.43	18.5	24.69
3 month price		22.10	36.07	18.31	18.45	23.68
6 month price		22.05	35.76	18.35	18.57	23.84
Spot Price		22.09	35.49	17.85	18.17	23.64
52 wk low		19.28	30.53	16.65	16.51	20.87
52 wk high		23.28	38	19.37	19.6	25.32
3 month Div Yield	3.38%	3.03	3.22	3.50	4.01	3.13
6 month Div Yield	3.37%	3.04	3.24	3.49	3.99	3.10
Spot Div Yield	3.42%	3.03	3.27	3.59	4.07	3.13
52 wk Div Yield	3.48%	3.15	3.39	3.55	4.10	3.20
Average	<u>3.41%</u>					

Source: Barron's: April 20, 2012
Value Line: April 20, 2012
Yahoo: April 20, 2012

Five Year Growth Estimate Forecast for Five Company Barometer Group

<u>Company</u>	<u>Symbol</u>	<u>Yahoo</u>	<u>MSN</u>	<u>Morning star</u> <u>Source</u>	<u>Value Line</u>	<u>Average</u>
Aqua America	WTR	7.53%	8.30%	9.90%	8.50%	8.56%
American States Water Company	AWR	5.70%	12.00%	5.50%	6.50%	7.43%
California Water Services Group	CWT	9.93%	10.00%	6.50%	6.00%	8.11%
Middlesex Water company	MSEX	2.70%	N/A	N/A	5.50%	4.10%
SJW Corporation	SJW	14.00%	N/A	N/A	7.00%	10.50%
						7.74%

Source: Internet: April 20, 2012



Investment Analysts' Forecasts of Earnings

Rocco Ciciretti, Gerald P. Dwyer, and Iftekhar Hasan

The literature on investment analysts' forecasts of firms' earnings and their forecast errors is enormous. This paper summarizes the evidence on the distribution of analysts' forecasts and forecast errors using data for all U.S. firms from 1990 to 2004. The evidence indicates substantial asymmetry of earnings, earning forecasts, and forecast errors. There is strong support for average and median earning forecasts being higher than actual earnings a year before the earnings announcement. Such differences between earnings and forecasts also exist across time periods and industries. A month before the earnings announcement, the mean and median differences are small. (JEL G17, C53)

Federal Reserve Bank of St. Louis *Review*, September/October 2009, 91(5, Part 2), pp. 545-67.

Do stock analysts provide information on stocks, or are they merely salespeople issuing one-sided information about stocks? In addition to forecasting earnings that are used by some investors when they buy various firms' stocks, analysts at investment banks often have participated in other activities such as convincing the same firms to hire the investment bank to issue stock. These activities were the basis of suits by the New York attorney general against major investment banks. Rather than proceeding to trial, the charges were settled in April 2003. In the settlement, investment banks agreed to substantial changes in their business practices designed to provide less incentive for analysts to be influenced by the investment banks' other activities. The investment banks also agreed to make payments totaling \$1.4 billion, which covered fines, payments to

investors, funding of investor education, and funding of research by independent analysts. This settlement brings into question the informativeness of analysts' projections of earnings, suggesting that analysts' projections of earnings largely or substantially reflect analysts' interests rather than an assessment of a firm's prospects.

On the other hand, charges of an insider-trading scheme in 2007 suggest that analysts' forecasts do contain information and affect prices. This scheme involved an accomplice receiving advance information about analysts' forecasts and taking positions before the announcements (Smith, Scannell, and Davies, 2007). This scheme makes no sense if analysts' forecasts are uninformative and ignored. While indicating that at least some analysts' forecasts may be informative, such activities do not imply that forecasts cannot be improved. It is possible to take imperfect information and filter out predictable misinformation.

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Are there predictable differences between analysts' earnings forecasts and actual earnings? Many papers show that the analysts' forecast errors are predictably different from actual earnings.¹ The evidence indicates that analysts' forecasts of earnings well before the announcement are higher on average than actual earnings. Whatever earnings an analyst forecasts for a firm, a better prediction is a somewhat lower level of earnings. This predictable difference is called a "bias" in the forecasts.² Some papers also suggest that analysts' forecasts close to the earnings announcement decline to less than the actual earnings. The rationale for this reverse bias is a suggestion that earnings greater than recent forecasts are interpreted as a positive earnings surprise and the firm's stock price increases.

This paper provides an overview of analysts' forecasts and the forecasts' relationship to actual earnings. Our data are for U.S. analysts' forecasts of U.S. firms' earnings from 1990 through 2004. These data show the usual result that analysts' forecasts are greater than earnings on average. We look at the distribution in more detail and find that the distribution of earnings is asymmetric. The distribution of earnings forecasts also is asymmetric but not sufficiently asymmetric that forecast errors are symmetric; earnings forecast errors also are asymmetric. We also find that median forecasts are closer to actual forecasts than are mean forecasts. We examine differences between actual earnings and earnings forecasts over time and by industry. We find substantial differences in forecast accuracy across industries and larger forecast errors during recessions. Forecast errors at the 1-month horizon are small in magnitude.

ERRORS IN FORECASTING EARNINGS PER SHARE

Data

Analysts forecast companies' earnings per share, and the forecast error is the difference

between actual earnings and these forecasts of earnings. There is a scale problem with using the level of forecasts across firms and over time. A firm with the same total earnings as another but half as many shares outstanding will have earnings per share that are twice as large. One way to adjust for differences in the magnitude of earnings per share and forecast errors across firms is to divide the forecast error by the stock price. Dividing by the stock price assumes that errors in forecasting earnings per share relative to the stock price are relatively homogeneous across firms. Earnings per share relative to the stock price is the inverse of the price-to-earnings ratio, often used as part of the information used to evaluate companies.³

The forecast error relative to the stock price is indicated as follows:

$$(1) \quad e_{T,t}^{i,j} = \frac{a_T^i - f_{T,t}^{i,j}}{P_{T-1}^i},$$

where $e_{T,t}^{i,j}$ is the computed relative forecast error for company i by analyst j for year T made t months before the release date, a_T^i is actual earnings per share of company i in year T , $f_{T,t}^{i,j}$ is the forecasted earnings per share for company i by analyst j made for year T with the forecast being made t months before the release date, and P_{T-1}^i is the stock price for company i at the end of the previous year, $T-1$.

The forecast horizon, t , is calculated as the difference in months between the estimation date (I/B/E/S [Institutional Brokers' Estimate System] variable ESTDATX) and the report date (I/B/E/S variable REPDATX). We use the report date instead of forecast period end date (FPEDATX) because analysts can make forecasts between the fiscal year's end and the date earnings are reported.

The data on forecasts of earnings per share and actual earnings per share are from the I/B/E/S

³ Another way to scale earnings per share is to divide by the level of earnings to get the proportional error in forecasting earnings. Earnings close to zero and negative earnings create serious problems for this normalization. Dividing by earnings can generate a very large relative forecast error as earnings go to zero; dividing by negative earnings would change the sign of the forecast error. Stock prices cannot be negative and are strictly positive in our data. Although prices can approach zero, earnings generally approach zero at a related rate, which is another way of saying that earnings per share relative to the stock price are relatively homogeneous across firms.

¹ Stiri (2004) summarizes a few of these papers and provides references.

² Not all research agrees that analysts' forecasts are biased—for example, Keane and Runkle (1990, 1998).

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Detail History (with Actuals) database for 1990 through 2004. Any company with at least one forecast between 1990 and 2004 is included in the initial database.

The stock prices are from the Center for Research in Security Prices (CRSP) database from 1989 to 2003. The earnings in any year are divided by the stock price at the end of trading in the prior year. With this choice of stock price, the stock price does not reflect the changes in forecasts or the ensuing forecast errors made during the year.

The initial number of observations on forecasts is 1,835,642. To avoid nonsynchronized timing of forecasts by year, we restrict the analysis to companies with fiscal years ending in December.⁴ This reduces the number of observations to 1,207,445. We further restrict our analysis to forecasts by analysts located within the United States, which reduces the number of observations to 678,427 forecasts for 6,731 companies. In this paper, a company's stock is defined by the six-digit Committee on Uniform Securities Identification Procedures (CUSIP) number followed by an "01"; this indicates a common stock. We match U.S. companies from I/B/E/S and CRSP databases by CUSIP. We also associate an industry code according to the Global Industries Classification Standard from Standard & Poor's.

Finally, to eliminate possible transcription errors, we cut off the distributions of both actual and forecasted earnings per share relative to the stock price at the 1st and 99th percentiles for each year and forecast horizon.⁵ This results in a dataset with 662,016 observations for 6,574 companies. The number of firms included in the analysis increases over time. The number of U.S. companies with a fiscal year ending in December and an earnings' forecast by at least one U.S. analyst increased from 1,446 in 1990 to 2,569 in 2004. The analyses by industry use the industry classification, which is not available for 104,840 obser-

vations. As a result, the analyses by industry use 557,176 observations instead of the whole sample of 662,016 observations.

Distribution of Forecast Errors

Figure 1 shows the distributions of earnings and forecasted earnings. The graphs show the distribution of actual earnings and the distribution of forecasts by analysts made 1 month, 6 months, and 12 months before the earnings announcement. For example, the first graph (Figure 1A) shows actual earnings per share relative to the stock price and forecasts made 1 month before the announcement of earnings. The second graph (Figure 1B) shows the distribution of earnings and the distribution of the forecasts made 6 months before the earnings announcement, and the third graph (Figure 1C) shows the distribution of earnings and the distribution of the forecasts made 12 months before the earnings announcement.⁶ Deleting the top and bottom 1 percent of the distribution still leaves quite long tails to the distribution of earnings and, to a lesser but still easily discernible extent, the forecasts. To avoid obscuring detail, we also truncate these figures at $-\$0.50$ and $+\$0.50$ per dollar of share price. Table 1 shows the distribution of earnings, forecasts, and the forecast errors without the truncation. Relative to the total number of observations, the truncation excludes a small number of observations, mostly in the negative tail of the distributions.

The forecasts and actual earnings are strikingly similar, which is consistent with the forecasts being quite informative about actual earnings. The histograms for forecasts and actual earnings are distinguishable, but the overlap far outweighs the differences. The dashed vertical lines are drawn at the mean of actual earnings. The most common—modal—values of forecasted and actual earnings are similar. The solid curves in the figure represent normal distributions with the same

⁴ When looking at data by year, having the same end date means that the same events are occurring at the same horizon for all firms. Firms with fiscal years ending in December represent about 74 percent of all firms in the I/B/E/S database.

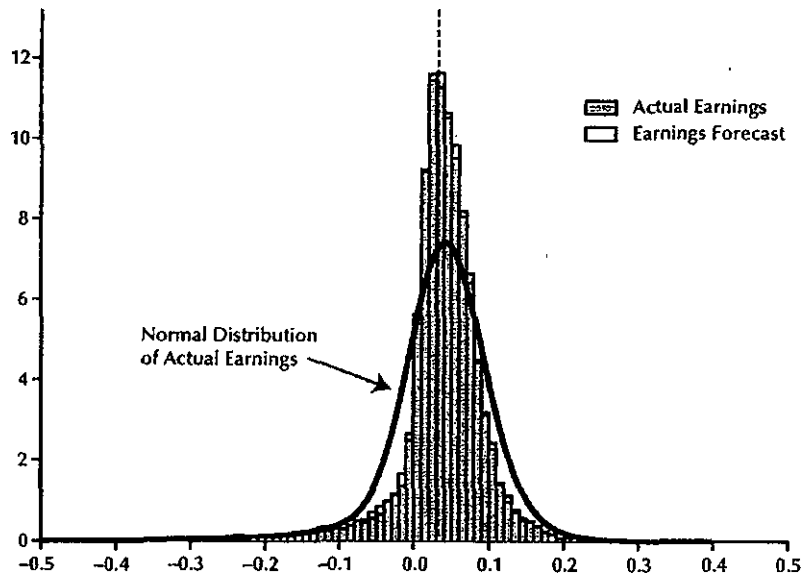
⁵ The results in Tables 2 through 4 were computed with the tails of the distribution of the data included. The results are broadly similar.

⁶ The distribution of earnings is not the same at each of the horizons. The figure shows the distribution of all forecasts and the distribution of the actual earnings that were predicted. Every firm with a forecast appears in the figure; every firm with no forecast does not appear in the figure. In addition, every firm with more than one forecast appears in the figure the same number of times as the number of its forecasts.

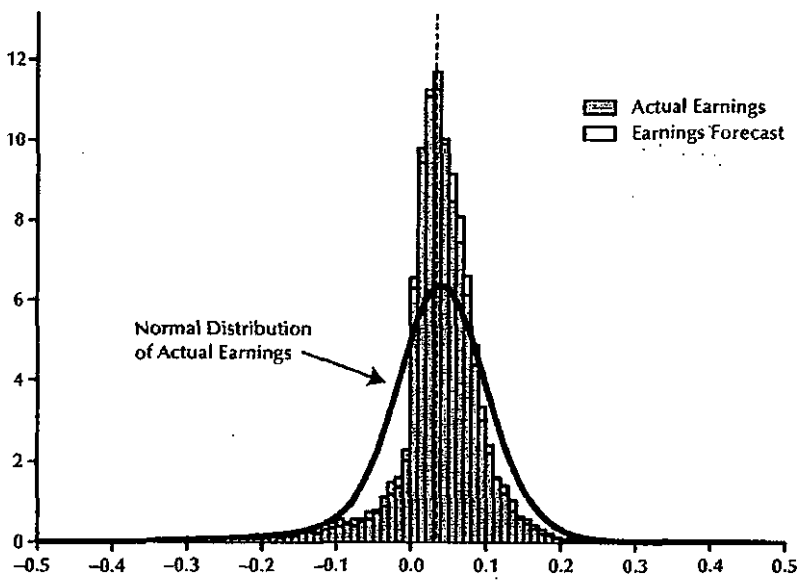
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Figure 1
Actual Earnings and Earnings Forecast

A. 1-Month Forecast Horizon



B. 6-Month Forecast Horizon



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Figure 1, cont'd
Actual Earnings and Earnings Forecast

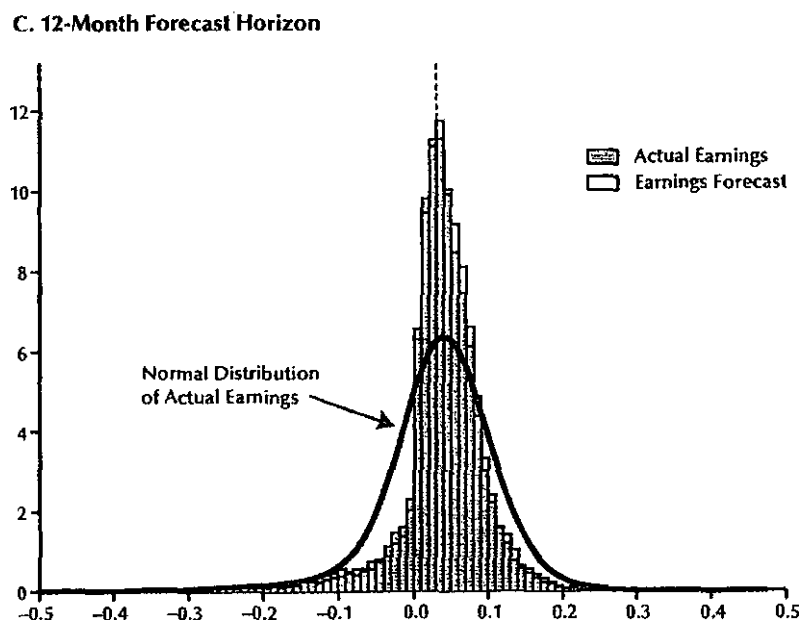


Table 1
Summary of Minimum and Maximum Values and Observations Suppressed in Figures 1 and 2

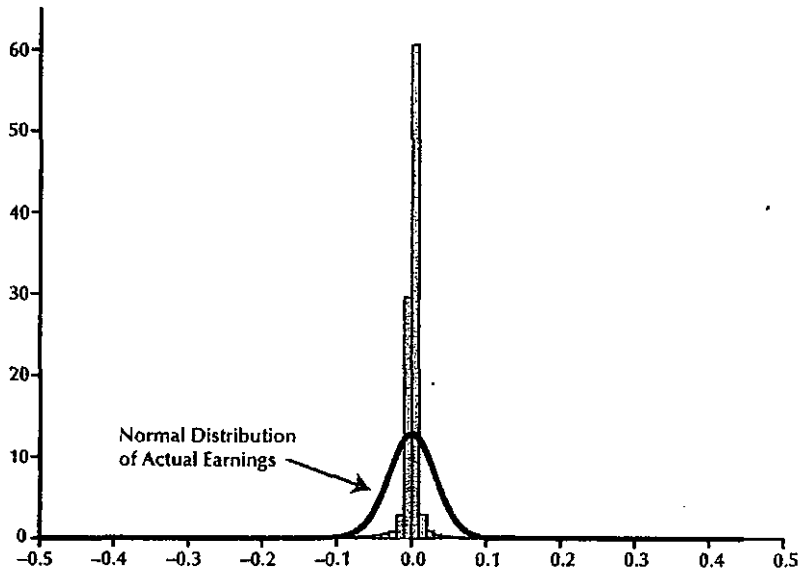
Variable	12-Month horizon			6-Month horizon			1-Month horizon		
	Minimum	Maximum	Number of suppressed observations	Minimum	Maximum	Number of suppressed observations	Minimum	Maximum	Number of suppressed observations
Actual earnings	-1.6137	0.2844	150	-1.1820	0.3350	58	-0.9026	0.2844	11
Earnings forecasts	-1.1532	0.2933	76	-0.7732	0.3267	21	-0.6487	0.2778	10
Forecast errors	-1.2442	0.7614	89	-1.1561	0.5533	15	-0.6085	0.3531	2

NOTE: For actual earnings and earnings forecasts there are no positive observations outside the -0.5 to +0.5 range. For forecast errors, there are 6, 2, and 0 excluded positive observations at the 12-, 6-, and 1-month forecast horizons, respectively; the remainder are negative observations.

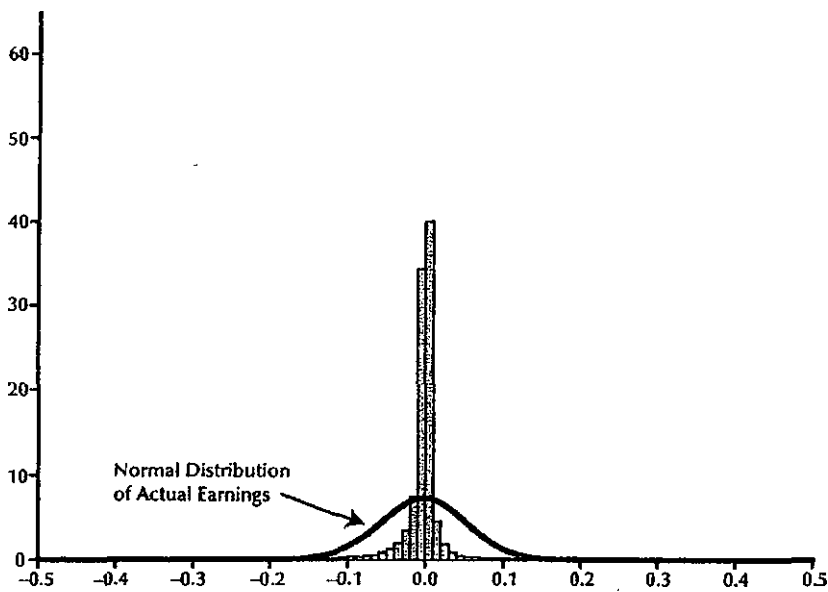
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Figure 2
Forecast Errors

A. 1-Month Forecast Horizon



B. 6-Month Forecast Horizon

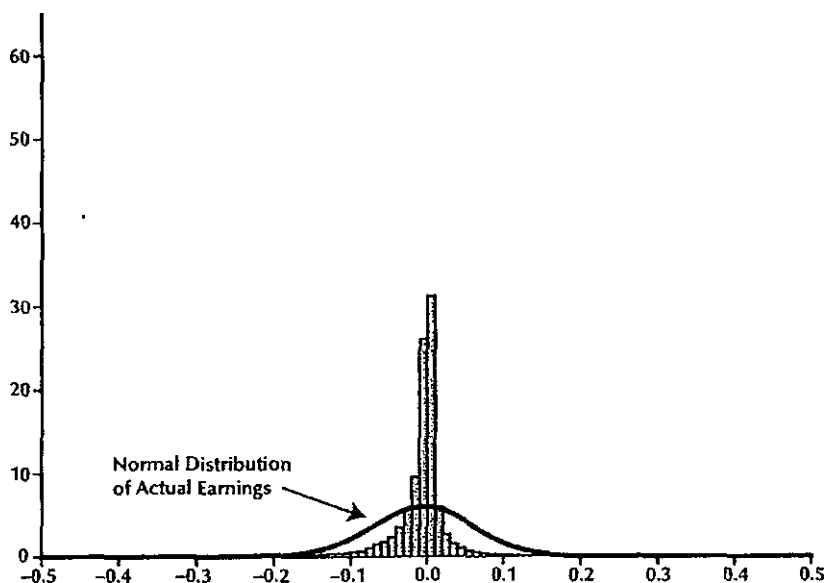


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Figure 2, cont'd

Forecast Errors

C. 12-Month Forecast Horizon



means and standard deviations as actual earnings. Actual and forecasted earnings have higher peaks at the mean value than the normal distribution and also have fatter tails. Because the total area must add up to 100 percent, this implies that the distributions of actual and forecasted earnings have fewer observations between the tails and the center of the distribution.

The graph of the 12-month-ahead forecasts shows the bias in longer-term forecasts. Although the distributions of actual and predicted earnings are quite similar, the histogram shows the tendency of more forecasts of above-average earnings and fewer forecasts of below-average earnings than actual earnings. The distribution of the 6-month-ahead forecasts shows less bias. The distribution of the 1-month-ahead forecasts is more similar to the actual earnings.

The literature focuses on the deviations between the earnings and the forecasts, which makes it easy to lose sight of how informative the

forecasts are about *actual* earnings. Analysts' earnings forecasts are quite informative about actual earnings.

Figure 2 shows the distributions of the forecast errors. A "positive forecast error" means that actual earnings exceed the forecasted earnings. A "negative forecast error" means that actual earnings fall short of the forecasted earnings. If all analysts forecasted earnings within a penny of earnings per dollar of share price, all the forecast errors would be within the two bars surrounding zero. Recall that the share price is the price before the start of the fiscal year, so this indicates that the analysts are coming very close to forecasting actual earnings. In fact, the forecast errors are quite peaked near zero, whether 12 months, 6 months, or 1 month before the announcement of actual earnings.

The earnings forecasts are closer to actual earnings 1 month before the earnings announcement than 12 months before the earnings announcement.

Table 2
Distribution of Forecast Errors by Year and Horizon

	Minimum	1%	5%	10%	25%	Median	75%	90%	95%	99%	Maximum	Mean	Standard deviation	Skewness coefficient	Kurtosis
12-Month horizon															
1990	-0.81	-0.4278	-0.1265	-0.0721	-0.0249	-0.0040	0.0003	0.0059	0.0121	0.0456	0.09	-0.0270	0.0754	-4.98	31.33
1991	-0.88	-0.3711	-0.1320	-0.0770	-0.0245	-0.0048	0.0002	0.0068	0.0177	0.0667	0.30	-0.0249	0.0711	-4.95	37.73
1992	-0.40	-0.2019	-0.0922	-0.0509	-0.0158	-0.0023	0.0012	0.0098	0.0193	0.0557	0.12	-0.0141	0.0418	-3.53	18.96
1993	-0.38	-0.1789	-0.0649	-0.0367	-0.0110	-0.0011	0.0022	0.0088	0.0185	0.0636	0.11	-0.0095	0.0368	-3.69	22.69
1994	-0.47	-0.1807	-0.0629	-0.0334	-0.0091	-0.0003	0.0024	0.0100	0.0194	0.0554	0.17	-0.0096	0.0431	-6.08	52.96
1995	-0.27	-0.1297	-0.0618	-0.0367	-0.0099	0.0000	0.0039	0.0118	0.0201	0.0633	0.18	-0.0071	0.0309	-2.50	16.08
1996	-0.29	-0.1455	-0.0697	-0.0379	-0.0100	-0.0001	0.0032	0.0134	0.0256	0.0593	0.20	-0.0078	0.0337	-2.20	13.34
1997	-0.45	-0.1566	-0.0608	-0.0329	-0.0093	-0.0008	0.0023	0.0085	0.0143	0.0400	0.11	-0.0094	0.0362	-5.56	49.00
1998	-0.49	-0.2378	-0.0704	-0.0495	-0.0198	-0.0035	0.0010	0.0060	0.0131	0.0419	0.27	-0.0154	0.0422	-4.19	29.79
1999	-0.76	-0.2484	-0.0743	-0.0391	-0.0119	0.0000	0.0050	0.0224	0.0430	0.1306	0.39	-0.0079	0.0576	-3.74	39.19
2000	-0.51	-0.2230	-0.0752	-0.0395	-0.0120	0.0003	0.0055	0.0276	0.0634	0.1277	0.31	-0.0054	0.0508	-2.41	17.01
2001	-1.24	-0.3840	-0.1364	-0.0785	-0.0335	-0.0086	0.0007	0.0091	0.0208	0.1803	0.76	-0.0265	0.0895	-4.00	50.19
2002	-0.74	-0.2228	-0.0656	-0.0370	-0.0114	-0.0002	0.0064	0.0234	0.0426	0.0976	0.32	-0.0067	0.0522	-5.09	53.33
2003	-0.71	-0.1839	-0.0617	-0.0339	-0.0104	0.0003	0.0092	0.0266	0.0443	0.0949	0.28	-0.0045	0.0464	-3.98	38.24
2004	-0.33	-0.1148	-0.0438	-0.0212	-0.0068	0.0010	0.0088	0.0264	0.0394	0.0812	0.14	-0.0003	0.0317	-3.10	26.77
6-Month horizon															
1990	-1.16	-0.2730	-0.0955	-0.0427	-0.0122	-0.0016	0.0008	0.0060	0.0142	0.0575	0.20	-0.0162	0.0669	-7.95	92.95
1991	-0.54	-0.2171	-0.0642	-0.0353	-0.0097	-0.0015	0.0009	0.0074	0.0176	0.0600	0.18	-0.0108	0.0441	-5.33	44.17
1992	-0.32	-0.1301	-0.0444	-0.0219	-0.0071	-0.0006	0.0013	0.0062	0.0122	0.0357	0.11	-0.0066	0.0276	-5.01	39.50
1993	-0.16	-0.0814	-0.0247	-0.0137	-0.0037	-0.0001	0.0018	0.0066	0.0142	0.0409	0.18	-0.0024	0.0181	-2.34	24.80
1994	-0.17	-0.0705	-0.0284	-0.0159	-0.0041	0.0000	0.0024	0.0076	0.0129	0.0400	0.16	-0.0025	0.0170	-1.96	20.70
1995	-0.30	-0.0828	-0.0330	-0.0169	-0.0044	0.0000	0.022	0.065	0.111	0.2930	0.10	-0.0038	0.0198	-5.37	52.00
1996	-0.32	-0.0969	-0.0287	-0.0152	-0.0038	0.0001	0.0024	0.0090	0.0151	0.0389	0.19	-0.0029	0.0227	-4.78	54.34
1997	-0.27	-0.0907	-0.0275	-0.0132	-0.0030	0.0001	0.0023	0.0079	0.0146	0.0422	0.17	-0.0021	0.0206	-2.77	38.07

NOTE: *This test statistic has a chi-square distribution with two degrees of freedom under the null hypothesis. The value of this chi-square at the 0.001 level of significance is 13.8. All of the values in the table have p -values less than 10^{-6} .

Table 2, cont'd

Distribution of Forecast Errors by Year and Horizon

	Minimum	1%	5%	10%	25%	Median	75%	90%	95%	99%	Maximum	Mean	Standard deviation	Skewness coefficient	Kurtosis
6-Month horizon, cont'd															
1998	-0.33	-0.0992	-0.0359	-0.0219	-0.0081	-0.0016	0.0008	0.0043	0.0094	0.0290	0.29	-0.0063	0.0226	-3.18	49.61
1999	-0.56	-0.1600	-0.0446	-0.0202	-0.0048	0.0001	0.0031	0.0109	0.0193	0.0533	0.55	-0.0052	0.0383	-3.74	78.39
2000	-0.36	-0.1101	-0.0447	-0.0221	-0.0059	0.0000	0.0022	0.0136	0.0261	0.0668	0.17	-0.0037	0.0273	-2.68	26.48
2001	-0.64	-0.1714	-0.0494	-0.0274	-0.0092	-0.0015	0.0012	0.0074	0.0141	0.0581	0.20	-0.0085	0.0391	-5.95	66.46
2002	-0.38	-0.0997	-0.0325	-0.0158	-0.0054	-0.0003	0.0027	0.0088	0.0159	0.0402	0.21	-0.0038	0.0269	-6.09	76.24
2003	-0.49	-0.0994	-0.0295	-0.0140	-0.0036	0.0004	0.0045	0.0125	0.0213	0.0667	0.38	-0.0011	0.0310	-2.52	68.31
2004	-0.29	-0.0617	-0.0284	-0.0184	-0.0045	0.0000	0.0032	0.0092	0.0164	0.0389	0.09	-0.0025	0.0195	-5.05	57.05
1-Month horizon															
1990	-0.61	-0.0970	-0.0286	-0.0146	-0.0031	-0.0001	0.0014	0.0054	0.0131	0.0526	0.22	-0.0035	0.0342	-11.40	204.59
1991	-0.24	-0.0659	-0.0231	-0.0111	-0.0024	0.0000	0.0020	0.0074	0.0141	0.0395	0.13	-0.0015	0.0188	-2.99	48.29
1992	-0.14	-0.0698	-0.0118	-0.0053	-0.0010	0.0002	0.0025	0.0073	0.0144	0.0402	0.24	0.0006	0.0220	4.09	61.43
1993	-0.26	-0.0659	-0.0127	-0.0064	-0.0012	0.0001	0.0020	0.0062	0.0112	0.0400	0.10	-0.0005	0.0154	-4.97	71.88
1994	-0.11	-0.0274	-0.0079	-0.0039	-0.0007	0.0002	0.0020	0.0057	0.0104	0.0289	0.09	0.0006	0.0102	-1.20	41.64
1995	-0.22	-0.0455	-0.0093	-0.0048	-0.0009	0.0002	0.0019	0.0057	0.0114	0.0390	0.31	0.0004	0.0188	1.28	104.42
1996	-0.20	-0.0277	-0.0078	-0.0036	-0.0005	0.0003	0.0017	0.0054	0.0097	0.0482	0.17	0.0008	0.0137	-0.90	89.84
1997	-0.36	-0.0375	-0.0114	-0.0047	-0.0006	0.0003	0.0019	0.0054	0.0096	0.0325	0.19	0.0002	0.0145	-6.48	217.27
1998	-0.16	-0.0256	-0.0089	-0.0044	-0.0006	0.0003	0.0017	0.0050	0.0089	0.0285	0.20	0.0004	0.0102	1.12	110.97
1999	-0.23	-0.0410	-0.0069	-0.0031	-0.0004	0.0004	0.0023	0.0062	0.0116	0.0457	0.28	0.0011	0.0158	1.31	118.62
2000	-0.24	-0.0673	-0.0141	-0.0057	-0.0007	0.0002	0.0013	0.0044	0.0088	0.0291	0.11	-0.0011	0.0147	-6.61	83.84
2001	-0.18	-0.0371	-0.0101	-0.0038	-0.0005	0.0002	0.0014	0.0038	0.0066	0.0211	0.08	-0.0004	0.0104	-6.24	94.52
2002	-0.26	-0.0340	-0.0079	-0.0036	-0.0005	0.0003	0.0013	0.0038	0.0067	0.0211	0.35	-0.0002	0.0135	-0.63	268.15
2003	-0.36	-0.0645	-0.0100	-0.0047	-0.0007	0.0003	0.0018	0.0054	0.0097	0.0373	0.15	-0.0003	0.0157	-7.81	145.27
2004	-0.15	-0.0333	-0.0078	-0.0037	-0.0007	0.0004	0.0022	0.0052	0.0087	0.0255	0.15	0.0006	0.0092	-0.89	77.55

NOTE: *This test statistic has a chi-square distribution with two degrees of freedom under the null hypothesis. The value of this chi-square at the 0.001 level of significance is 13.8. All of the values in the table have p-values less than 10^{-8} .

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This convergence is expected if the forecasts are informed predictions. More information becomes available as time goes on, and this information is substantial: Eleven-twelfths of the year is past when the 1-month-ahead forecast is made. Firms announce earnings quarterly; when the 1-month-ahead forecast is made, earnings for the first three quarters of the year have been announced and are known. Besides this relatively mechanical effect as time passes, other information becomes known about earnings as time passes and the magnitudes of forecast errors can be expected to decrease.

Over 90 percent of the forecasts made 1 month before the earnings announcement are within one penny of earnings per dollar of share price. There is a clear asymmetry in the distribution of these close forecast errors: 60 percent of the earnings are more than the forecasts and within a penny; 30 percent of the earnings are less than the forecasts and within a penny. The larger number of positive forecast errors can reflect analysts' forecasts that the analyst knows are too low; it also can occur for other reasons. For example, firms with actual earnings less than forecasted earnings may provide analysts with information before the announcement and forecasts are revised accordingly. The forecast errors 12 months ahead and 6 months ahead also show asymmetry, with many forecasts within a penny of actual earnings but more above zero than below.

Table 2 shows detailed information about the distributions of forecast errors by year at 12-month, 6-month, and 1-month horizons. The table shows the maximum and minimum values, the mean, standard deviation, measures of the skewness, and kurtosis of the distribution of forecast errors and selected percentiles of the distributions.

As Figure 2 suggests, the forecasts a month before the earnings announcement are much closer to actual earnings than are forecasts a year in advance. The standard deviation of forecast errors is a measure of the size of analysts' errors, independent of whether the forecast is above or below actual earnings. The standard deviation is substantially larger 12 months before earnings are announced than 1 month before the earnings announcement. For example, in 1990, the standard deviation is 0.0754 at a horizon of 12 months,

0.0669 at a horizon of 6 months, and 0.0342 at a horizon of 1 month. In 2004, the standard deviation is 0.0317 at a horizon of 12 months, 0.0195 at a horizon of 6 months, and 0.0092 at a horizon of 1 month.

The mean forecast errors in the table also decline as the announcement of earnings for the year approaches. The largest magnitudes of mean forecast errors in the table are for the 12-month horizon, -2.7 cents per dollar of share price in 1990 and 2001 and -2.5 cents per dollar of share price in 1991. The smallest magnitudes of mean forecast errors are for the 1-month horizon; the mean forecast error farthest from zero is -0.35 cents per dollar of share price in 1990. The mean forecast error has been hundredths of a penny per dollar of share price in most of the years since.

A large segment of the literature examines these mean forecast errors. The negative mean forecast errors are statistically significant and not trivial in magnitude at the 12-month horizon. Twelve months before earnings are announced, analysts' forecasts on average are overestimates of actual earnings. This overestimation is predictable, in an interesting and specific sense. If only the earnings forecasts are known a year in advance, it is predictable that actual earnings will be less on average. The difference is not large, but it is not zero and it is predictable. If analysts are attempting to forecast earnings well on average, their performance is not as good as it could be. In standard parlance, the forecasts are biased: The average forecast error is *not* zero.

Besides the arithmetic average, the median is another measure of the typical forecast. The median is the middle forecast, the forecast that divides the forecasts into two parts, with half the observations above the median and half below the median. The median forecast error is noticeably closer to zero than the average forecast error. This indicates that the typical negative forecast error is larger in magnitude than the typical positive forecast error. In other words, as Figure 2 shows, the distribution of forecast errors is not symmetric. The percentiles of the distribution clearly show this asymmetry of forecast errors. The consistently negative values of skewness in Table 2 also indicate what Figure 2 shows: Nega-

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tive forecast errors are larger in magnitude than the positive errors.⁷ Consistent with the figures, the measure of skewness indicates that forecast errors are skewed toward negative values.

Kurtosis measures how concentrated a distribution is around the mean compared with the number of observations in the tails of the distribution.⁸ The positive values for kurtosis indicate that the tails of the distribution have more observations than would be suggested by a normal distribution. Tests for normality of the distribution of forecast errors uniformly are inconsistent with a normal distribution.⁹

Figures 3 and 4 show aspects of the distributions of forecast errors for all horizons from 1990 to 2004. Figure 3 shows the mean and median forecast errors as the horizon—the length of time before the earnings announcement—approaches zero. It also shows the median in combination with the 25th and 75th percentiles of the distribution of forecast errors. The mean forecast errors are more strongly negative than the medians at long horizons and consequently show more convergence to zero. The median forecast errors are negative, with the largest magnitudes in 1990, 1991, 1998, and 2001 (see Figure 4). With the exception of 1998, these larger-magnitude median forecast errors are associated with recessions.¹⁰ The mean forecast errors are more strongly negative than the median forecast errors but decrease to quite close to zero by 1 month before the earnings announcement.

Figure 4 shows the distribution of forecast errors by year by graphing the median forecast error and the 25th and 75th percentiles of the

distribution for each horizon for each year from 1990 to 2004. The asymmetry of the distributions is quite apparent. It also is clear that actual earnings fall short of the longer horizon forecasts during recessions; this is indicated by the much more negative forecast errors during the recession years 1990, 1991, and 2001. Given the unpredictability of recessions, this is not especially surprising. The figure suggests that the distribution has become more symmetric over time, although the occurrence of recessions clearly is associated with greater asymmetry.

Table 3 presents the results of tests to determine whether the apparent skewness in the figures is statistically significant and consistent across horizons and years.¹¹ The results of two tests are presented. The first is the sign test, which determines whether the median equals the mean. If a series' median exceeds its mean, the value of the statistic is positive. The *p*-value indicates the probability of that difference or a larger one if there really were no difference between the median and the mean. The second test determines whether the skewness coefficient is zero. If the skewness coefficient is zero and moments of the distribution up to the sixth are finite, then the skewness coefficient has an asymptotic normal distribution that can be used to construct a test.¹²

The sign tests indicate an asymmetry in forecast errors that persists from 1990 through 2004. Tests for the equality of the median and mean at all horizons are quite inconsistent with the equality of the two statistics. At the 12-month horizon, the median forecast error is closer to zero than the mean for all years from 1990 through 2004; all of the differences are statistically significant at any usual significance level. There is some suggestion that the difference between the mean and the median has been declining over time. The difference is far smaller in 2004 than in earlier years but the difference still is statistically

⁷ The measure of skewness is the third moment about the mean divided by the standard deviation cubed.

⁸ The measure of kurtosis is the fourth moment about the mean minus 3, all relative to the fourth power of the standard deviation.

⁹ The test for normality is the Bera-Jarque test (1980). The inconsistency with a normal distribution matches up with the figures and tables; a normal distribution is symmetric and does not have the relatively fat tails indicated by the kurtosis statistics. The Bera-Jarque test statistics are not included in the table because the *p*-values uniformly are inconsistent with a normal distribution with *p*-values of 10⁻⁴ or below.

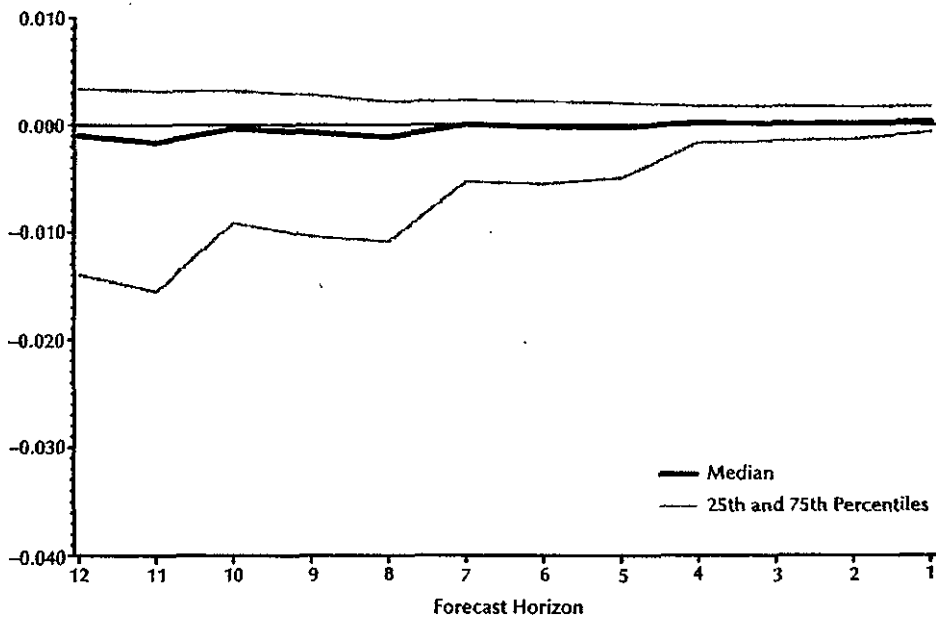
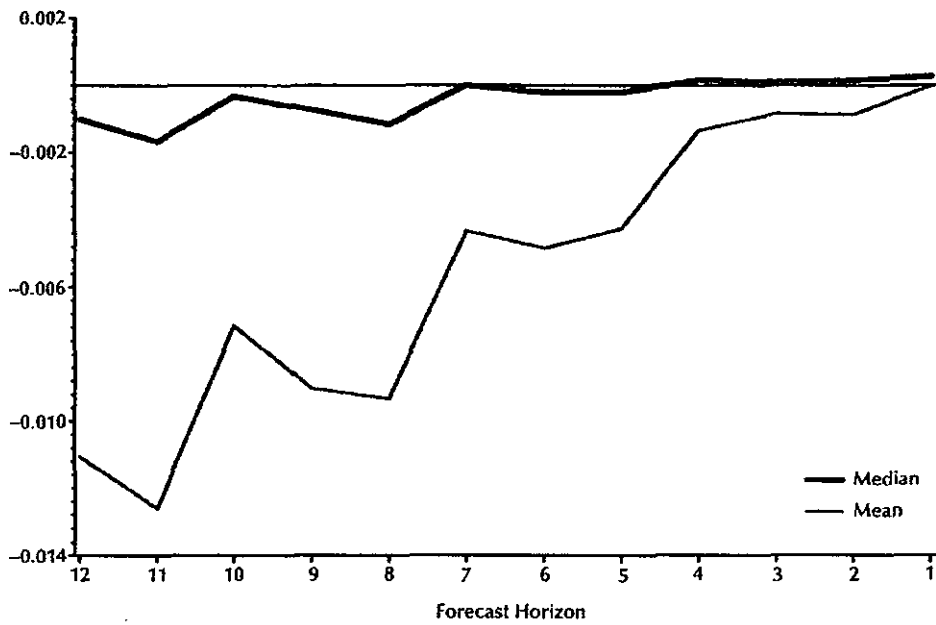
¹⁰ The National Bureau of Economic Research dates the recession in 1990 and 1991 from July 1990 to March 1991 and the recession in 2001 from March 2001 to November 2001.

¹¹ The observations are repeated measures of forecasts by the same analysts for the same industries. As Keane and Runkle (1998) argue, this can introduce dependence in the data, which results in overstating the statistical significance of test statistics.

¹² The mean of the asymptotic distribution of the skewness coefficient is zero under the null hypothesis and the variance is from Gupta (1967, pp. 850-51.)

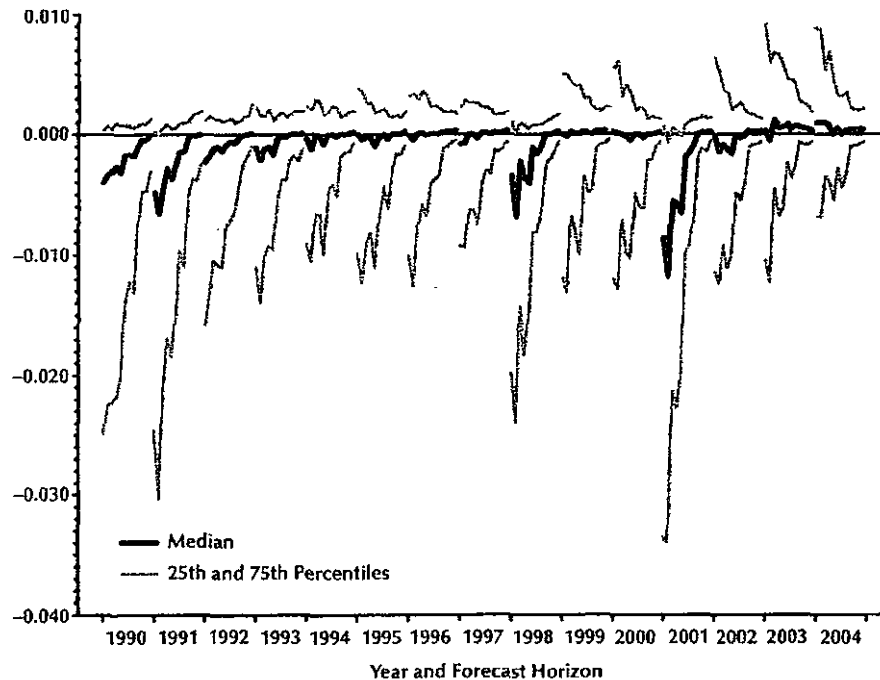
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Figure 3
Forecast Errors by Horizon



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Figure 4
Distribution of Forecast Errors by Year and Horizon



significant. The difference is one-tenth of a penny per dollar share price in 2004. Given a typical price-to-earnings ratio of 15 or 20, this implies a forecast error in earnings on the order of 2 cents per share per dollar of earnings 12 months ahead.

The tests using the skewness coefficient indicate that deviations from symmetry are persistent from 1990 through 2004 only at the 12-month horizon. The null hypothesis of symmetry for the 12-month horizon cannot be rejected in 2002 at the 5 percent significance level, a result most simply interpreted as due to chance rather than anything special about 2002. There is less evidence of overall skewness in any year at the 6-month horizon and scant evidence of asymmetry at the 1-month horizon. This is an interesting contrast to the results using the median and mean. While there are statistically significant differences between the mean and median, the overall skewness of the distribution is less pronounced based

on the third moment, which summarizes the asymmetry of the distribution.¹³

Forecasts Errors Across Industries

Forecast errors across firms and analysts are likely to differ for a variety of reasons, one being the likelihood that earnings are more predictable for some industries than others.

Figure 5 shows forecast errors by two-digit Global Industry Classification System categories. Forecast errors vary substantially by industry. All figures have the same scale to facilitate comparison of forecast errors across industries. Earnings in health care are predicted with relatively

¹³ Too many rejections of the null hypothesis are possible if data have high kurtosis (Premaratne and Bera, 2005), as ours do. This is an issue only at the 12-month horizon because only that horizon shows rejections. Given the results for the median and mean and the levels of significance, we are inclined to take the rejections as being real rather than an artifact of kurtosis.

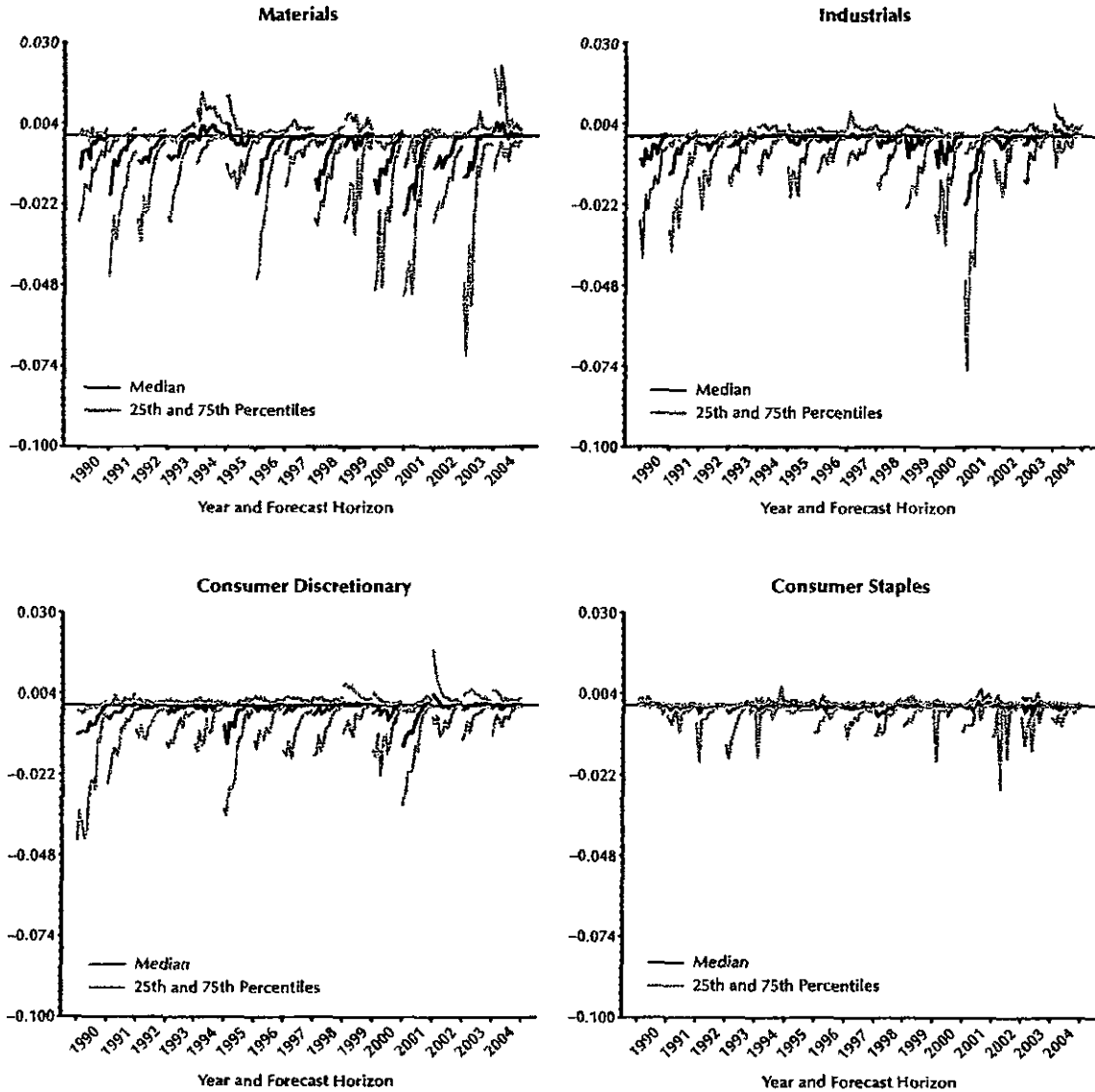
Table 3**Sign Test Statistics and Skewness Coefficients by Year and Horizon**

Year	Sign test						Skewness coefficient					
	12-month horizon		6-month horizon		1-month horizon		12-month horizon		6-month horizon		1-month horizon	
	Mean minus median	p-Value	Mean minus median	p-Value	Mean minus median	p-Value	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
1990	-0.0230	0.0000	-0.0146	0.0000	-0.0034	0.0000	-5.806	0.0000	-0.370	0.7116	-0.024	0.9807
1991	-0.0201	0.0000	-0.0094	0.0000	-0.0015	0.0000	-3.825	0.0001	-2.375	0.0176	-0.014	0.9885
1992	-0.0118	0.0000	-0.0060	0.0000	0.0004	0.0000	-16.085	0.0000	-2.999	0.0027	0.337	0.7360
1993	-0.0085	0.0000	-0.0023	0.0000	-0.0006	0.0000	-9.796	0.0000	-5.912	0.0000	-0.183	0.8546
1994	-0.0092	0.0000	-0.0025	0.0000	0.0004	0.0000	-2.374	0.0176	-1.901	0.0574	-0.009	0.9925
1995	-0.0071	0.0000	-0.0038	0.0000	0.0001	0.0007	-20.569	0.0000	-1.532	0.1256	0.046	0.9634
1996	-0.0077	0.0000	-0.0030	0.0000	0.0005	0.0000	-37.030	0.0000	-1.409	0.1588	-0.049	0.9611
1997	-0.0086	0.0000	-0.0022	0.0000	-0.0002	0.0000	-2.637	0.0084	-2.637	0.0084	-0.017	0.9867
1998	-0.0120	0.0000	-0.0047	0.0000	0.0002	0.0000	-14.384	0.0000	-2.011	0.0444	0.008	0.9933
1999	-0.0079	0.0000	-0.0053	0.0000	0.0007	0.0000	-3.588	0.0003	-0.552	0.5812	0.019	0.9849
2000	-0.0057	0.0000	-0.0037	0.0000	-0.0013	0.0000	-24.850	0.0000	-4.124	0.0000	-0.188	0.8507
2001	-0.0179	0.0000	-0.0070	0.0000	-0.0007	0.0000	-2.469	0.0136	-0.864	0.3877	0.000	0.9999
2002	-0.0065	0.0000	-0.0035	0.0000	-0.0004	0.0000	-1.841	0.0657	-0.721	0.4708	0.002	0.9987
2003	-0.0048	0.0000	-0.0015	0.0000	-0.0006	0.0000	-2.926	0.0034	-0.415	0.6780	-0.081	0.9358
2004	-0.0013	0.0000	-0.0025	0.0000	0.0002	0.0026	-7.336	0.0000	-1.362	0.1731	0.033	0.9739

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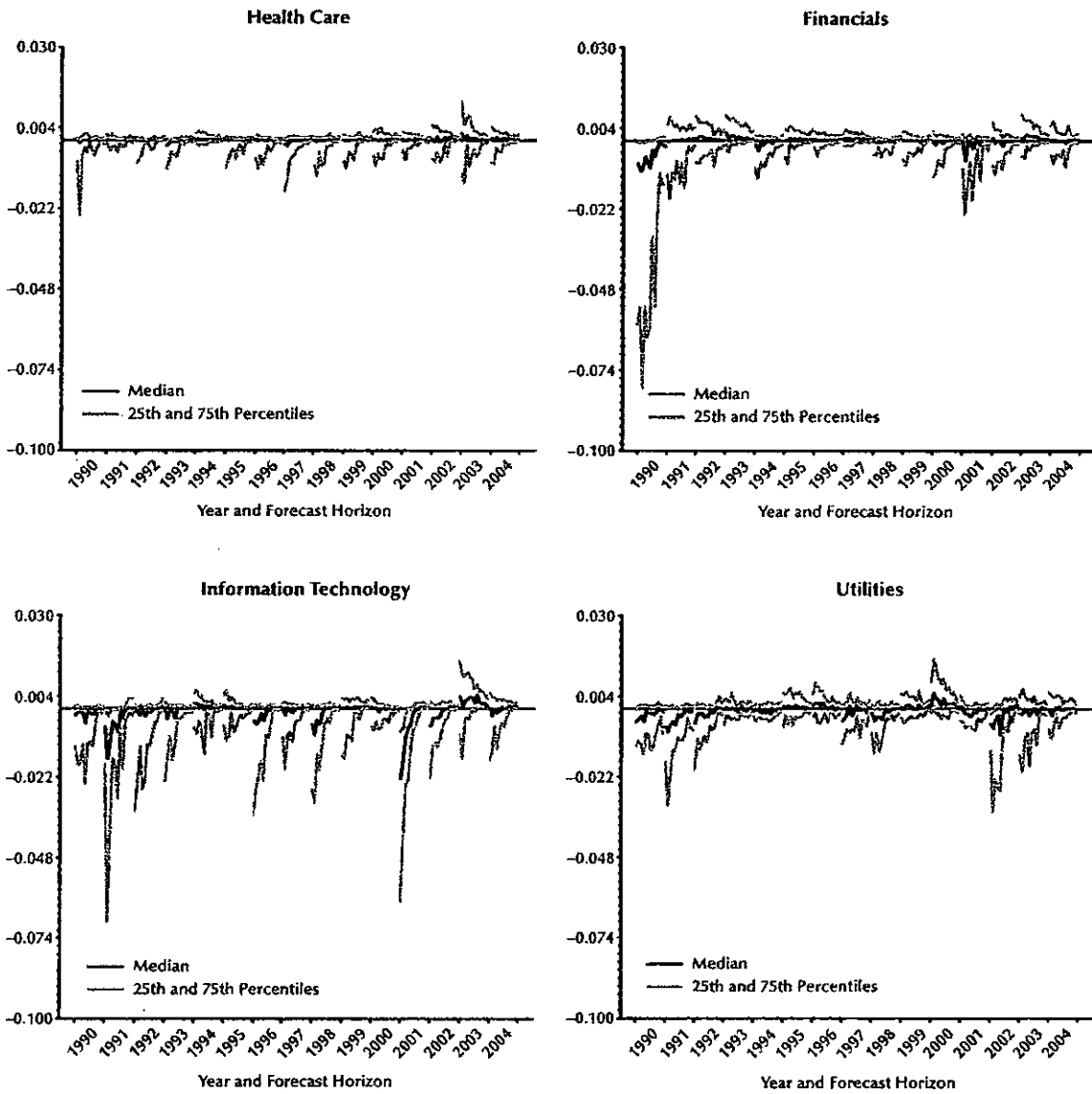
Figure 5A

Distribution of Forecast Errors by Year, Horizon, and Industry



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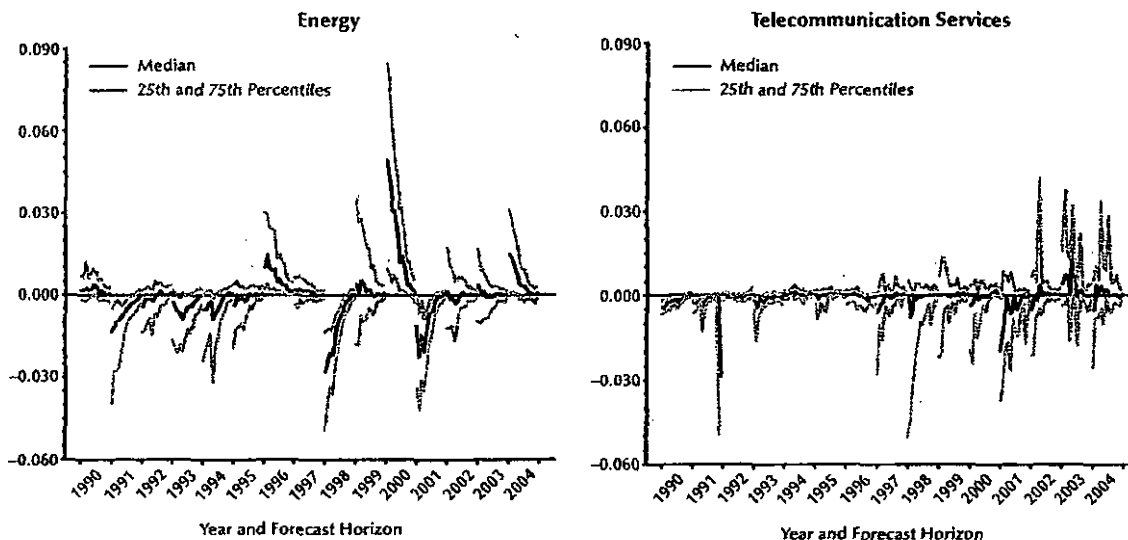
Figure 5B
Distribution of Forecast Errors by Year, Horizon, and Industry



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Figure 5C

Distribution of Forecast Errors by Year, Horizon, and Industry



small forecast errors, and earnings in energy firms are predicted particularly poorly. It is plausible that earnings forecasts in less-volatile industries are smaller. Energy prices are subject to large unpredictable price swings, which obviously affect earnings. Although health care prices have risen substantially in recent years, the increases have been relatively persistent and therefore predictable. Health care is virtually unaffected by recessions, while the demand for energy falls in recessions. Some other industries show low earnings around recessions as well, such as materials and consumer discretionary goods. If recessions are not predicted, there is little reason to think that these earnings decreases are predictable either.

Sign tests not reported in the text are consistent with persistent differences between the median and means of the forecast errors across industries but suggest variation in the asymmetry by industry. The evidence is noticeably weaker for telecommunications and utilities.

UNBIASEDNESS OF EARNINGS FORECASTS

Almost all of the existing literature on analysts' forecasts examines whether their forecasts are biased and, generally speaking, finds that analysts overestimate earnings. This overestimation falls as the earnings announcement approaches, as indicated in Table 2, but future earnings typically are noticeably less than the average forecast. Some evidence and analysis suggests that analysts' forecasts change from overestimates to underestimates just before the earnings announcement. Such near-term forecasts are intended to be helpful to a firm's management because the announcement of higher-than-forecasted earnings generates favorable publicity and a higher stock price after the announcement.¹⁴

Asking for forecasts that are neither too high nor low on average seems like a relatively simple

¹⁴ This is at least one reason to be dubious about this explanation if the near-term underestimation of earnings is persistent and predictable. Investors are likely to notice and discount the overestimation of earnings.

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request, especially compared with asking that forecasts be accurate. Even so, it is possible that analysts process the information available to them as best as possible, but some or all analysts do not have an incentive to produce forecasts that are correct on average.

Analysts' Incentives and Forecasts

At first glance, it seems obvious that unbiased forecasts are the best forecasts. A biased forecast is high or low on average. Such a bias suggests that the forecast can be improved by adjusting the forecast by the bias. There are many conditions in which an unbiased forecast is the best one. A common criterion for forecast errors is mean squared error. If a forecaster wants to minimize the expected mean squared error of a forecast, then an unbiased forecast is the best one.¹⁵ The expected squared forecast error applies an increasing penalty to forecasts farther from the average—a forecast twice as far from zero is four times as bad.

The unbiased forecast—the mean—is not necessarily the best forecast in all circumstances. Suppose that someone is trying to forecast the value shown when a fair die is thrown. The mean forecast is the average of 1, 2, 3, 4, 5, and 6, which is 3.5. If the forecaster's earnings depend on how close the forecast is to the actual value, the best forecast in fact is 3.5. On the other hand, if the forecaster gets paid only when the value shown is the same as the value forecasted, this unbiased forecast guarantees that the forecaster always loses. The die will never have the value 3.5. If the forecaster is paid when the forecast is the same as the value thrown and values from 1 to 6 are equally likely, any integer forecast from 1 to 6 is equally good and 3.5 never is predicted. While this is a simple example, the point is more general. The value forecasted depends on the forecaster's incentives and the distribution of the data. An unbiased forecast may not be the "best" forecast.

There also are objectives similar to minimizing the expected squared error that lead to forecasts being "biased." If a forecaster wants to minimize the expected absolute deviation of the forecast

error, then the median is the best forecast.¹⁶ The absolute forecast error applies an increasing penalty to forecast errors farther from zero—a forecast error twice as far from zero is twice as bad. The cost of forecast errors increases linearly with the size of the error. The forecast that minimizes the expected absolute forecast error is the median, not the mean (or more precisely, the arithmetic average). If the mean and the median are the same, this is a distinction that does not matter. On the other hand, if the distribution is not symmetric, as the earnings distribution is not, the median is a better forecast than the mean if a forecast error's cost increases linearly with the forecast error.¹⁷

Analysts do not make forecasts in isolation. Other analysts are making forecasts as well, and the existence of other forecasts can affect an analyst's forecasts in many ways. A simple, common forecasting game illustrates that an unbiased forecast may not be an analyst's best forecast. Consider a forecasting game in which the smallest forecast error wins and receives a prize; everyone else receives nothing. Analysts' situations may be closer to this game than to isolated forecasts. In this game, the incentive is to be the closest. If you are not the closest, then it matters not at all whether your forecast error is almost as good as the best or is far away. More generally, any analyst's forecast will depend on what he or she thinks other people will forecast or what others have already forecasted. A simple example is one in which two people guess someone else's pick of a number between 0 and 10. The unbiased forecast is 5. Suppose that the first person picks 5. If the second person picks 5, then he or she cannot win, only tie. A pick of either 4 or 6 can increase the expected winnings of the second person if there is no payoff from tying. Neither 4 nor 6 is unbiased, but that doesn't matter. Either number maximizes expected winnings, and it is winnings that matter. This suggests that, even if analysts' forecasts are biased, it is important to consider analysts' incentives before denouncing them as "irrational" or "ignoring information readily available to them."

¹⁵ A minimum expected squared error forecast minimizes the expected value of the squared forecast errors.

¹⁶ A minimum expected absolute error forecast minimizes the expected absolute value of the forecast errors.

¹⁷ Gu and Wu (2003) discuss this in more detail.

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Among others, Hong and Kubik (2003), Clarke and Subramanian (2006), Ottaviani and Sørensen (2006), and Ljungqvist et al. (2007) highlight factors that can explain a nonzero predictable forecast error. For example, Clarke and Subramanian (2006) suggest that an analyst who performs poorly and is at risk of being fired is more likely to make a “bold” forecast that is unlikely to be correct but will save the analyst’s job if it is correct.

Tests for Unbiasedness

The proposition that analysts’ forecasts are biased is simple to determine with a test of whether the average difference between actual earnings and forecasted earnings is zero.¹⁸ Given the evidence above that forecast errors are not symmetric, it is worthwhile to test whether the median forecast error is zero, in addition to testing whether the mean forecast error is zero. A simple *t*-test is used for the latter purpose. The test that analysts’ median forecast errors are zero is the sign test for deviations from zero.

Table 4 presents the mean and median forecast errors by industry at the various horizons and *p*-values for tests of whether the mean and median forecast errors are zero. The mean forecast errors are far smaller at the 1-month horizon than at longer horizons. At the 12-month horizon, the mean forecast error indicates that forecasted earnings are greater than actual earnings by about 1 cent per dollar of share price. At the 1-month horizon, the mean forecast errors indicate that forecasted earnings are greater than actual earnings by about one-hundredth of a cent per dollar of stock price.

How big are these forecast errors? Mean earnings for all firms in our data are 2 cents per dollar of share price; median earnings are 3.9 cents per dollar of share price. A forecast error of 1 cent per dollar of share price at the 12-month horizon is large relative to average earnings of 2 cents. A forecast error of one-hundredth of a cent at the 1-month horizon is relatively small and not obviously economically insignificant.

The median forecast error for all industries is minus nine-hundredths of a cent per dollar of

share price at the 12-month horizon. At the 6-month and 1-month horizons, the median forecast errors are minus two-hundredths of a cent per dollar of share price and three-hundredths of a dollar per dollar of share price. All these magnitudes based on the median are statistically significantly different from zero. Median forecast errors of hundredths of a cent per dollar of share price are not particularly large relative to median earnings of about 4 cents per dollar of share price.

The means and medians vary substantially by industry. The mean forecast errors by industry mirror the overall mean forecast errors, declining in magnitude as the horizon shortens. The median forecast errors show substantial variability across industries in terms of magnitude. At the 1-month horizon, all of the magnitudes are of the same small order as the overall median, with the largest being five-hundredths of a cent per dollar of share price.

Table 5 shows the results of tests to determine whether the average and median forecast errors are zero by year. With the exception of the last year in the table, 2004, all *p*-values for testing whether mean forecast errors are zero at the 12-month horizon are less than 10^{-4} . All mean forecast errors are negative, indicating that forecasts on average are greater than actual earnings. Mean forecasts 6 months ahead look much like the forecasts at the 12-month horizon. The forecasts at the 1-month horizon look quite a bit different. At the 1-month horizon, there is little evidence in our data of bias in the mean forecast: 8 of the 15 forecasts are positive and 7 are negative. Nine of the forecasts are statistically significant at the 5 percent level, but they are not uniformly positive or negative. There is little evidence to support a conclusion that mean forecasts at the 1-month horizon are uniformly above or below zero.

The median forecasts in Table 5 are closer to zero than the mean forecasts. The results of the statistical tests that the median forecasts equal zero indicate that they are not zero, but the magnitudes generally are hundredths of a cent per dollar of share price.

At the 12-month horizon, the overall median forecast error is negative, but this masks interesting variation by year. In five years—1995, 1999,

¹⁸ The test is a standard *t*-test of whether the mean forecast error equals zero using the asymptotic normal distribution.

Table 4
Forecast Errors by Industry and Horizon

Industry	12-month horizon				6-month horizon				1-month horizon			
	Mean	p-Value mean equals zero	Median	p-Value median equals zero	Mean	p-Value mean equals zero	Median	p-Value median equals zero	Mean	p-Value mean equals zero	Median	p-Value median equals zero
All industries	-0.0106	0.0000	-0.0009	0.0000	-0.0048	0.0000	-0.0002	0.0000	-0.0001	0.3456	0.0003	0.0000
Consumer discretionary	-0.0124	0.0000	-0.0017	0.0000	-0.0070	0.0000	-0.0009	0.0000	-0.0002	0.3400	0.0003	0.0000
Consumer staples	-0.0067	0.0000	-0.0003	0.0000	-0.0039	0.0000	-0.0001	0.0078	-0.0002	0.4837	0.0002	0.0000
Energy	-0.0002	0.8012	0.0002	0.1833	-0.0015	0.0001	-0.0003	0.0172	0.0003	0.4056	0.0005	0.0000
Financials	-0.0101	0.0000	0.0000	0.2480	-0.0050	0.0000	0.0001	0.0000	-0.0005	0.0410	0.0002	0.0000
Health care	-0.0043	0.0000	0.0000	0.6499	-0.0017	0.0001	0.0001	0.0000	0.0002	0.5447	0.0002	0.0000
Industrials	-0.0163	0.0000	-0.0025	0.0000	-0.0092	0.0000	-0.0012	0.0000	0.0007	0.0372	0.0003	0.0000
Information technology	-0.0159	0.0000	-0.0016	0.0000	-0.0043	0.0000	0.0000	0.5310	-0.0004	0.0890	0.0003	0.0000
Materials	-0.0208	0.0000	-0.0084	0.0000	-0.0078	0.0000	-0.0027	0.0000	0.0003	0.2840	0.0004	0.0000
Telecommunication services	-0.0099	0.0000	-0.0018	0.0000	-0.0043	0.0001	-0.0002	0.0131	-0.0009	0.2061	0.0002	0.0001
Utilities	-0.0050	0.0000	-0.0009	0.0000	-0.0021	0.0062	-0.0003	0.0220	-0.0006	0.0732	0.0001	0.0004

Table 5
Forecast Errors by Year and Horizon

Year	12-month horizon				6-month horizon				1-month horizon			
	Mean	p-Value mean equals zero	Median	p-Value median equals zero	Mean	p-Value mean equals zero	Median	p-Value median equals zero	Mean	p-Value mean equals zero	Median	p-Value median equals zero
1990-2004	-0.0111	0.0000	-0.0010	0.0000	-0.0048	0.0000	-0.0002	0.0000	-0.0000	0.7701	0.0003	0.0000
1990	-0.0270	0.0000	-0.0040	0.0000	-0.0162	0.0000	-0.0016	0.0000	-0.0035	0.0016	-0.0001	0.0253
1991	-0.0249	0.0000	-0.0048	0.0000	-0.0108	0.0000	-0.0015	0.0000	-0.0015	0.0286	0.0000	0.5331
1992	-0.0141	0.0000	-0.0023	0.0000	-0.0066	0.0000	-0.0006	0.0000	0.0006	0.4243	0.0002	0.0001
1993	-0.0095	0.0000	-0.0011	0.0000	-0.0024	0.0000	-0.0001	0.0012	-0.0005	0.1985	0.0001	0.0000
1994	-0.0096	0.0000	-0.0004	0.0000	-0.0025	0.0000	0.0000	0.6343	0.0006	0.0062	0.0002	0.0000
1995	-0.0071	0.0000	0.0000	0.6729	-0.0038	0.0000	0.0000	0.1360	0.0004	0.3581	0.0003	0.0000
1996	-0.0078	0.0000	-0.0001	0.2249	-0.0029	0.0000	0.0001	0.0117	0.0008	0.0069	0.0004	0.0000
1997	-0.0094	0.0000	-0.0008	0.0000	-0.0021	0.0000	0.0001	0.0019	0.0002	0.6129	0.0004	0.0000
1998	-0.0155	0.0000	-0.0035	0.0000	-0.0063	0.0000	-0.0016	0.0000	0.0004	0.0338	0.0003	0.0000
1999	-0.0079	0.0000	0.0000	0.8265	-0.0052	0.0000	0.0001	0.0015	0.0011	0.0008	0.0004	0.0000
2000	-0.0054	0.0000	0.0003	0.0024	-0.0037	0.0000	0.0000	0.0106	-0.0011	0.0002	0.0002	0.0000
2001	-0.0265	0.0000	-0.0086	0.0000	-0.0085	0.0000	-0.0015	0.0000	-0.0004	0.0297	0.0002	0.0000
2002	-0.0067	0.0000	-0.0002	0.1688	-0.0038	0.0000	-0.0003	0.0001	-0.0002	0.5212	0.0003	0.0000
2003	-0.0045	0.0000	0.0003	0.0289	-0.0011	0.0669	0.0004	0.0000	-0.0003	0.3086	0.0003	0.0000
2004	-0.0003	0.5223	0.0010	0.0000	-0.0025	0.0000	0.0000	0.2696	0.0006	0.0012	0.0004	0.0000

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2000, 2003, and 2004—the median forecast error at the 12-month horizon is positive, indicating that the median forecast is an underestimate of earnings. This is the opposite of the bias in the mean forecast. It is interesting that these years are toward the end of the period. For four years—1995, 1996, 1999, and 2002—the median forecast error is not statistically significantly different from zero at the 5 percent significance level. Two of these years have positive median forecast errors and two have negative ones. At this 12-month horizon, only 8 of the 15 years have median forecast errors that are negative and statistically significant. Moreover, of the medians at this 12-month horizon from 1999 to 2004, only the recession year 2001 has a negative median forecast error that is statistically significantly different than zero; 3 of the 5 years have positive median forecast errors that are statistically significant. These results are consistent with the median forecast errors not always being zero, but there is little support for the median forecasts uniformly being too high or too low.

At the 6-month horizon, median forecast errors also provide little support for typical overestimation of earnings throughout the period. The median forecast errors are negative in 8 of the 15 years, barely more than half the 15 years. The median forecast errors are positive and statistically significant at the 5 percent significance level in years 1996, 1997, 1999, 2000, and 2003.

At the 1-month horizon, the median forecast errors are positive in all years but 1990, a result consistent with the stylized view in the literature that forecast errors are underestimates close to the announcement. It is interesting that our data support such an inference using medians but provide much less support with means. All median forecast errors at the 1-month horizon are quite small, never larger in magnitude than four-hundredths of a cent per dollar of share price. Economically, this is not that far from zero.

CONCLUSION

Our data for U.S. analysts' forecasts of U.S. firms' earnings from 1990 through 2004 show

typical results: Analysts' forecasts are greater than earnings on average a year before earnings are announced. Six months before the earnings announcements, mean earnings forecasts also are greater than actual earnings. On the other hand, median earnings forecasts are about as likely to be above actual earnings as below them at both the 12-month and 6-month horizons. A month before the announcement, mean forecast errors provide little support for predictable differences between average earnings and forecasts. Median forecast errors at the 1-month horizon, though, generally are positive and statistically significant, indicating that the analysts' median forecast is less than earnings on average. These median forecast errors are relatively small in magnitude, though—on the order of hundredths of pennies of earnings relative to the share price—when average and median earnings are about 2 and 4 cents, respectively, relative to the share price.

Mean forecast errors and median forecast errors differ substantially. The distribution of forecast errors is asymmetric, with mean forecast errors substantially larger in magnitude than median forecast errors at the 6-month and 12-month horizons. The distribution of earnings is asymmetric. The distribution of earnings forecasts also is asymmetric but not sufficiently asymmetric that forecast errors are symmetric. There are substantial differences in mean and median forecast errors across industries. We also find substantial differences in mean and median forecast errors by year, with the largest forecast errors in recession years.

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Perspectives on
Corporate Finance
and Strategy

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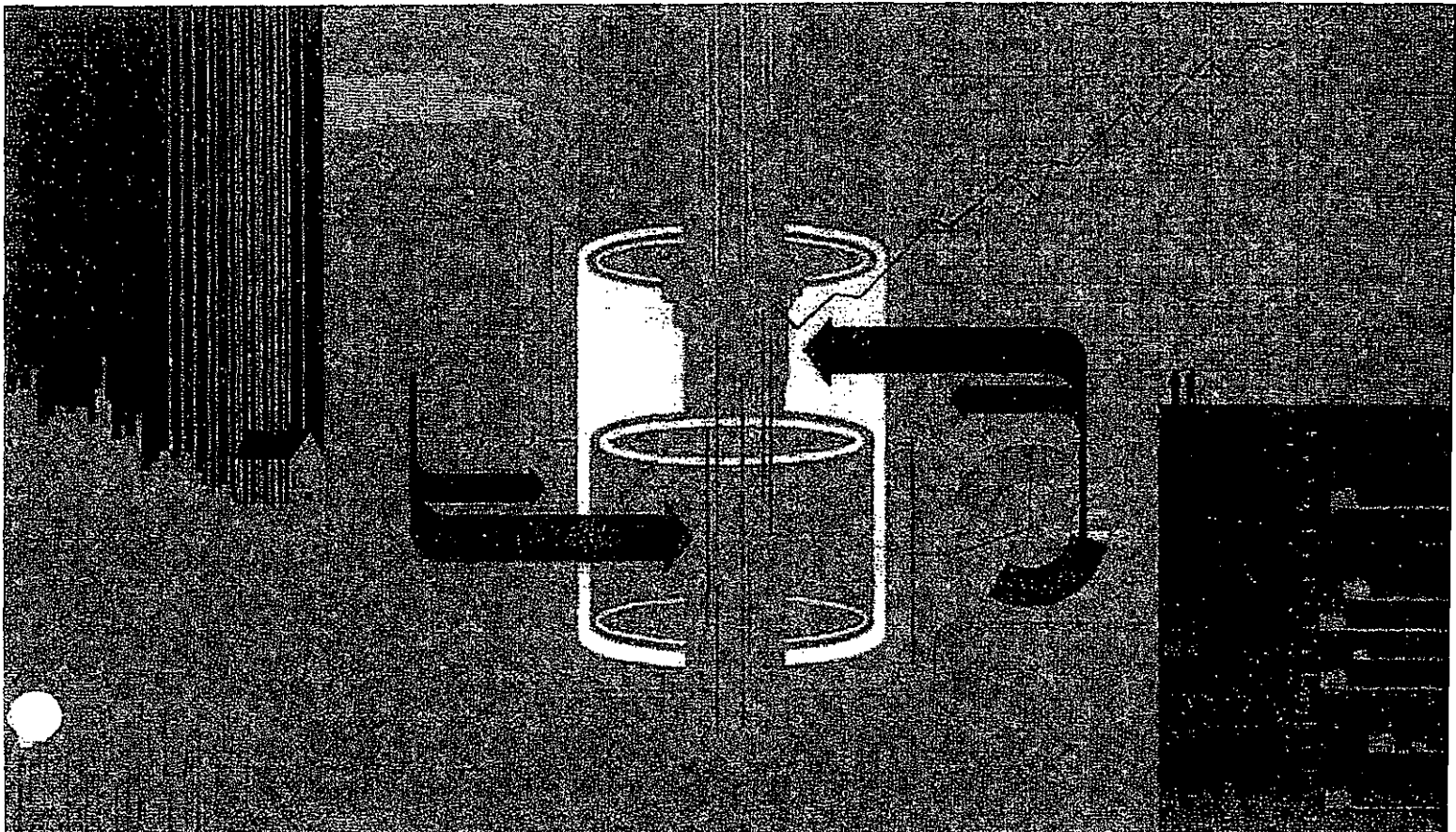
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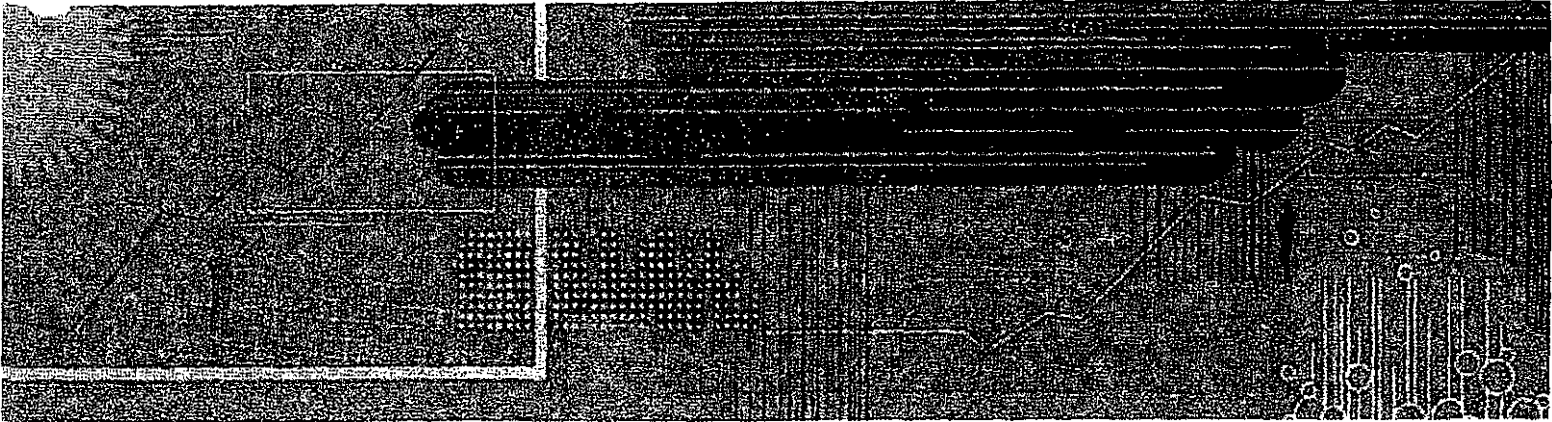
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Equity analysts: Still too bullish

After almost a decade of stricter regulation, analysts' earnings forecasts continue to be excessively optimistic.

**Marc H. Goedhart,
Rishi Raj, and
Abhishek Saxena**

No executive would dispute that analysts' forecasts serve as an important benchmark of the current and future health of companies. To better understand their accuracy, we undertook research nearly a decade ago that produced sobering results. Analysts, we found, were typically overoptimistic, slow to revise their forecasts to reflect new economic conditions, and prone to making increasingly inaccurate forecasts when economic growth declined.¹

Alas, a recently completed update of our work only reinforces this view—despite a series of rules and regulations, dating to the last decade, that were intended to improve the quality of the

analysts' long-term earnings forecasts, restore investor confidence in them, and prevent conflicts of interest.² For executives, many of whom go to great lengths to satisfy Wall Street's expectations in their financial reporting and long-term strategic moves, this is a cautionary tale worth remembering.

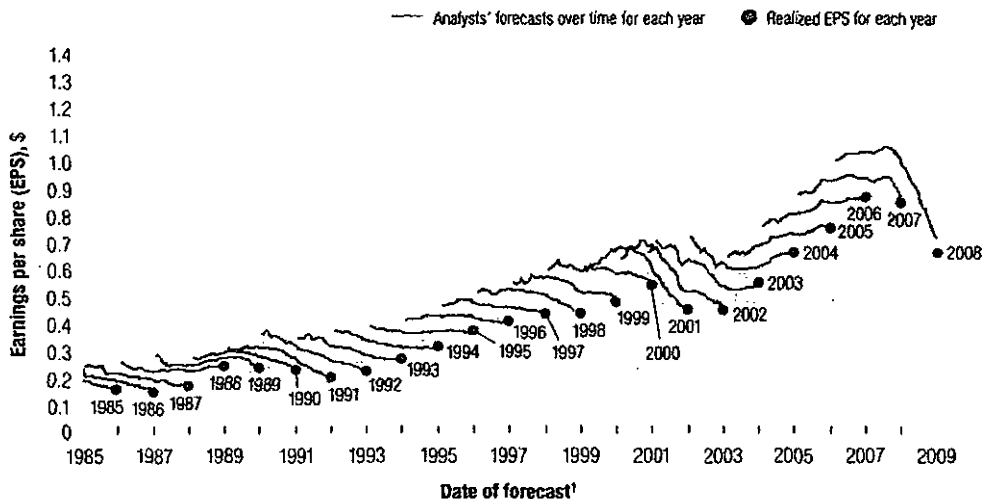
Exceptions to the long pattern of excessively optimistic forecasts are rare, as a progression of consensus earnings estimates for the S&P 500 shows (Exhibit 1). Only in years such as 2003 to 2006, when strong economic growth generated actual earnings that caught up with earlier predictions, do forecasts actually hit the mark.

Exhibit 1

S&P 500 companies

Off the mark

With few exceptions, aggregate earnings forecasts exceed realized earnings per share.



¹Monthly forecasts.

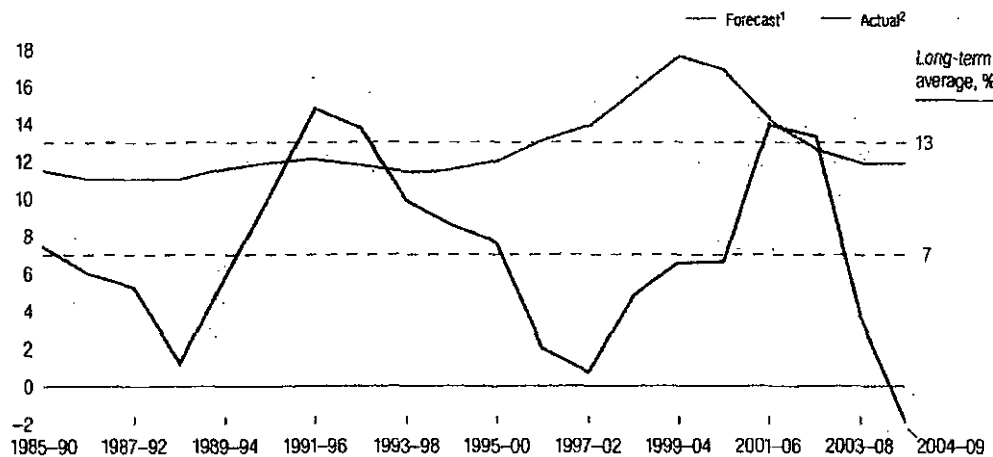
Source: Thomson Reuters I/B/E/S Global Aggregates; McKinsey analysis

Exhibit 2

Earnings growth for S&P 500 companies, 5-year rolling average, %

Overoptimistic

Actual growth surpassed forecasts only twice in 25 years—both times during the recovery following a recession.



¹Analysts' 5-year forecasts for long-term consensus earnings-per-share (EPS) growth rate. Our conclusions are same for growth based on year-over-year earnings estimates for 3 years.

²Actual compound annual growth rate (CAGR) of EPS; 2009 data are not yet available, figures represent consensus estimate as of Nov 2009.

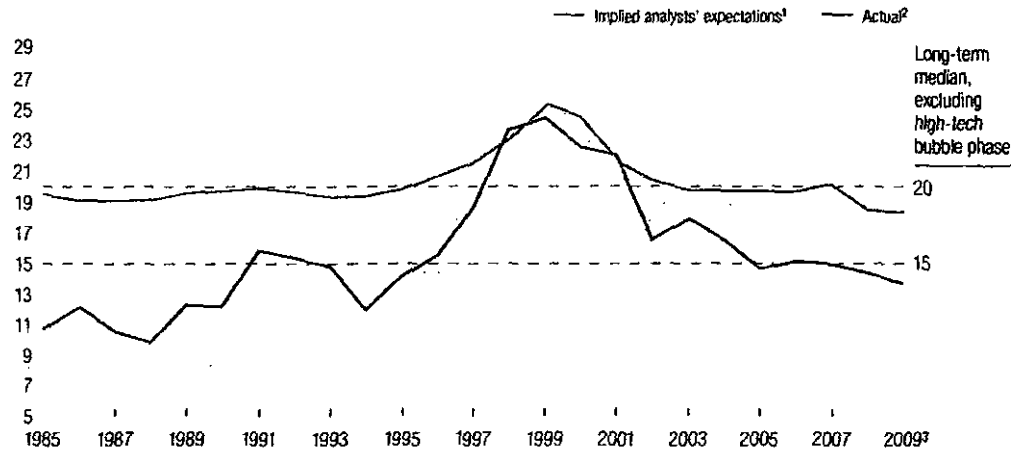
Source: Thomson Reuters I/B/E/S Global Aggregates; McKinsey analysis

Exhibit 3

Less giddy

Capital market expectations are more reasonable.

Actual P/E ratio vs P/E ratio implied by analysts' forecasts, S&P 500 composite index



¹P/E ratio based on 1-year-forward earnings-per-share (EPS) estimate and estimated value of S&P 500. Estimated value assumes: for first 5 years, EPS growth rate matches analysts' estimates then drops smoothly over next 10 years to long-term continuing-value growth rate; continuing value based on growth rate of 6%; return on equity is 13.5% (long-term historical median for S&P 500), and cost of equity is 9.5% in all periods.

²Observed P/E ratio based on S&P 500 value and 1-year-forward EPS estimate.

³Based on data as of Nov 2009.

Source: Thomson Reuters I/B/E/S Global Aggregates; McKinsey analysis

This pattern confirms our earlier findings that analysts typically lag behind events in revising their forecasts to reflect new economic conditions.

When economic growth accelerates, the size of the forecast error declines; when economic growth slows, it increases.³ So as economic growth cycles up and down, the actual earnings S&P 500 companies report occasionally coincide with the analysts' forecasts, as they did, for example, in 1988, from 1994 to 1997, and from 2003 to 2006.

Moreover, analysts have been persistently overoptimistic for the past 25 years, with estimates ranging from 10 to 12 percent a year,⁴ compared with actual earnings growth of 6 percent.⁵

Over this time frame, actual earnings growth surpassed forecasts in only two instances, both during the earnings recovery following a recession (Exhibit 2). On average, analysts' forecasts have been almost 100 percent too high.⁶

Capital markets, on the other hand, are notably less giddy in their predictions. Except during the market bubble of 1999–2001, actual price-to-earnings ratios have been 25 percent lower than implied P/E ratios based on analyst forecasts (Exhibit 3). What's more, an actual forward P/E ratio⁷ of the S&P 500 as of November 11, 2009—14—is consistent with long-term earnings growth of 5 percent.⁸ This assessment is more

reasonable, considering that long-term earnings growth for the market as a whole is unlikely to differ significantly from growth in GDP,⁹ as prior McKinsey research has shown.¹⁰ Executives, as the evidence indicates, ought to base their strategic decisions on what they see happening in their industries rather than respond to the pressures of forecasts, since even the market doesn't expect them to do so. o

- ¹ Marc H. Goedhart, Brendan Russell, and Zane D. Williams, "Prophets and profits." mckinseyquarterly.com, October 2001.
- ² US Securities and Exchange Commission (SEC) Regulation Fair Disclosure (FD), passed in 2000, prohibits the selective disclosure of material information to some people but not others. The Sarbanes-Oxley Act of 2002 includes provisions specifically intended to help restore investor confidence in the reporting of securities analysts, including a code of conduct for them and a requirement to disclose knowable conflicts of interest. The Global Settlement of 2003 between regulators and ten of the largest US investment firms aimed to prevent conflicts of interest between their analyst and investment businesses.
- ³ The correlation between the absolute size of the error in forecast earnings growth (S&P 500) and GDP growth is -0.55.
- ⁴ Our analysis of the distribution of five-year earnings growth (as of March 2005) suggests that analysts forecast growth of more than 10 percent for 70 percent of S&P 500 companies.
- ⁵ Except 1998-2001, when the growth outlook became excessively optimistic.
- ⁶ We also analyzed trends for three-year earnings-growth estimates based on year-on-year earnings estimates provided by the analysts, where the sample size of analysts' coverage is bigger. Our conclusions on the trend and the gap vis-à-vis actual earnings growth does not change.
- ⁷ Market-weighted and forward-looking earnings-per-share (EPS) estimate for 2010.
- ⁸ Assuming a return on equity (ROE) of 13.5 percent (the long-term historical average) and a cost of equity of 9.5 percent—the long-term real cost of equity (7 percent) and inflation (2.5 percent).
- ⁹ Real GDP has averaged 3 to 4 percent over past seven or eight decades, which would indeed be consistent with nominal growth of 5 to 7 percent given current inflation of 2 to 3 percent.
- ¹⁰ Timothy Koller and Zane D. Williams, "What happened to the bull market?" mckinseyquarterly.com, November 2001.

Log-Linear Regressions

The best method for finding historic growth rates is by *log-linear regression*, which is a standard time-series linear regression in which the data points are plotted as natural logarithms. This type of regression can be performed easily on a calculator with regression functions or on a computer using one of the many statistical software packages available. In this appendix, we illustrate the use of log-linear regression techniques on a financial calculator to find General Foods' annual growth rates.

Table 4A-1 contains General Foods' historic dividends per share (DPS) as presented in Figure 4-1. Additionally, we used the calculator's natural log function, LN, to find the log of each year's DPS, and we numbered the data points from 0 to 14 for the 1968-1982 regression and from 0 to 5 for the 1977-1982 regression.

Table 4A-1
 General Foods: Historic DPS

Year	DPS	Log DPS	1968-1982	1977-1982
1968	\$1.20	0.18	0	—
1969	1.30	0.26	1	—
1970	1.33	0.29	2	—
1971	1.40	0.34	3	—
1972	1.40	0.34	4	—
1973	1.40	0.34	5	—
1974	1.40	0.34	6	—
1975	1.43	0.36	7	—
1976	1.54	0.43	8	—
1977	1.64	0.49	9	0
1978	1.72	0.54	10	1
1979	1.95	0.67	11	2
1980	2.20	0.79	12	3
1981	2.20	0.79	13	4
1982	2.30	0.83	14	5

Now, to perform the regression using the 1968-1982 historic data, we enter the number of the data point (0 through 14), along with the corresponding log DPS, into the calculator's statistical storage registers. The effect is to enter the data point number as the X coordinate and the corresponding log DPS as the Y coordinate. (In practice, we would not actually show the log values. Rather, we would enter the DPS value, transform it to log DPS in the calculator, and then utilize log DPS in the regression.)

Once the data are entered, the calculator's statistical functions are used to determine the Y-intercept and slope of the regression line. The exact procedure varies slightly depending on the specific calculator; see the manual for yours. The resulting Y-intercept is 0.15, and the slope coefficient is 0.0448. The Y-intercept is not needed for our purposes here, but the value is included so that you may use it as a check when duplicating the regression.

The slope coefficient, 0.0448, is the instantaneous (or continuous) growth rate. Since we typically think in terms of effective annual rates, our final step is to convert the instantaneous growth rate of 0.0448 = 4.48% to an annual effective rate. The conversion of data points to natural logarithms in the original step of the log-linear regression resulted in the growth rate (slope of the regression line) being an instantaneous growth rate. To convert an instantaneous growth rate to an effective annual rate, we use the calculator's antilog function, e^x :

$$\begin{aligned}\text{Effective annual rate} &= e^{\text{instantaneous rate}} - 1.0 \\ &= e^{0.0448} - 1.0 \\ &= 1.046 - 1.0 \\ &= 0.046 = 4.6\%.\end{aligned}$$

The same procedure was followed to perform the log-linear regression on the 1977-1982 data. In this case, we obtained a Y-intercept of 0.50 and a slope of 0.0734. Thus, the effective annual growth rate over the period 1977-1982 is 7.6 percent:

$$e^{0.0734} - 1.0 = 0.076 = 7.6\%.$$

Predicted Log Linear Growth Rates for Five Company

<u>Company</u>	<u>Predicted Log Linear Growth Rate</u>
Aqua America	9.20
American States Water Company	9.06
California Water Services Group	5.10
Middlesex Water company	2.01
SJW Corporation	5.99
Average	<u>6.27</u>

Predicted Log Linear Growth Rates for Five Company Barometer Group

<u>WTR</u>	<u>Earnings</u>	<u>Natural</u>	<u>AWR</u>	<u>Earnings</u>	<u>Natural</u>	<u>CWT</u>	<u>Earnings</u>	<u>Natural</u>			
<u>Year</u>	<u>Per Share</u>	<u>Log</u>	<u>Year</u>	<u>Per Share</u>	<u>Log</u>	<u>Year</u>	<u>Per Share</u>	<u>Log</u>			
2006	1	0.70	(0.3567)	2006	1	1.33	0.2852	2006	1	0.67	(0.4005)
2007	2	0.71	(0.3425)	2007	2	1.62	0.4824	2007	2	0.75	(0.2877)
2008	3	0.73	(0.3147)	2008	3	1.55	0.4383	2008	3	0.95	(0.0513)
2009	4	0.77	(0.2614)	2009	4	1.62	0.4824	2009	4	0.98	(0.0202)
2010	5	0.90	(0.1054)	2010	5	2.22	0.7975	2010	5	0.91	(0.0943)
2011	6	1.03	0.0296	2011	6	2.23	0.8020	2011	6	0.86	(0.1508)
2012	7	1.12	0.1117	2012	7	2.40	0.8736	2012	7	0.93	(0.0729)
2013	8	1.21	0.1938	2013	8	2.57	0.9452	2013	8	1.01	0.0051
2014	9	1.32	0.2759	2014	9	2.76	1.0169	2014	9	1.09	0.0830
2015	10	1.43	0.3580	2015	10	2.97	1.0885	2015	10	1.17	0.1610
2016	11	1.55	0.4401	2016	11	3.19	1.1601	2016	11	1.27	0.2390

Slope	<u>0.0880</u>	<u>0.0867</u>	<u>0.0497</u>
Predicted growth rate	<u>9.2038</u>	<u>9.0565</u>	<u>5.0955</u>

<u>MSEX</u>	<u>Earnings</u>	<u>Natural</u>	<u>SJW</u>	<u>Earnings</u>	<u>Natural</u>		
<u>Year</u>	<u>Per Share</u>	<u>Log</u>	<u>Year</u>	<u>Per Share</u>	<u>Log</u>		
2006	1	0.82	(0.1985)	2006	1	1.19	0.1740
2007	2	0.87	(0.1393)	2007	2	1.04	0.0392
2008	3	0.89	(0.1165)	2008	3	1.08	0.0770
2009	4	0.72	(0.3285)	2009	4	0.81	(0.2107)
2010	5	0.96	(0.0408)	2010	5	0.84	(0.1744)
2011	6	0.84	(0.1744)	2011	6	1.11	0.1044
2012	7	0.87	(0.1342)	2012	7	1.23	0.2042
2013	8	0.91	(0.0940)	2013	8	1.36	0.3041
2014	9	0.95	(0.0538)	2014	9	1.50	0.4039
2015	10	0.99	(0.0136)	2015	10	1.65	0.5037
2016	11	1.03	0.0266	2016	11	1.83	0.6036

Slope	<u>0.0199</u>	<u>0.0581</u>
Predicted growth rate	<u>2.0122</u>	<u>5.9861</u>

Average of growth rates 6.2708

Source: Value Line
 Schedule 7, page 1

Expected Market Cost Rate of Equity
 Using Data for the Barometer Group of Five Water Distribution Companies
 Log Linear Regression Growth Rates

<u>Time Period</u>	<u>Adjusted Dividend Yield(1)</u> (1)	<u>Growth Rate</u> (2)	<u>Expected Rate of Return</u> (3=1+2)
3 month average	3.38%	6.27%	9.65%
6 month average	3.37%	6.27%	9.64%
52 Week Average	3.48%	6.27%	9.75%
Spot Price	<u>3.42%</u>	<u>6.27%</u>	<u>9.69%</u>
Average:	<u><u>3.41%</u></u>	<u><u>6.27%</u></u>	<u><u>9.68%</u></u>

Sources: Value Line April 20, 2012
 Barron's April 20, 2012

I&E Exhibit No. 1
Schedule 14

<u>Company</u>	<u>Beta</u>
Aqua America	0.65
American States Water Company	0.70
California Water Services Group	0.65
Middlesex Water company	0.70
SJW Corporation	0.85
Average beta for CAPM	<u>0.71</u>

Source: Value Line April 20, 2012

I&E Exhibit No. 1
Schedule 15

<u>Risk Free Rate</u> <u>Treasury note 10-yr Note</u>	<u>Yield</u>
1Q 2012	2.04
2Q 2012	2.20
3Q 2012	2.30
4Q 2012	2.50
1Q 2013	2.60
2Q 2013	2.70
3Q 2013	2.90
2013-2017	4.30
Average	<u>2.69</u>

Source: Blue Chip April/ December

Required Rate of Return on Market as a Whole Forecasted

	<u>Dividend</u> <u>Yield</u>	+	<u>Growth</u> <u>Rate</u>	=	<u>Expected</u> <u>Market</u> <u>Return</u>
Value Line Estimate	2.30%		14.19%	(a)	16.49%
S&P 500	2.33%	(b)	11.30%		13.63%
Average Expected Market Return				=	<u>15.06%</u>

(a) $(1.7^{.25} - 1)$ Value Line forecast for the 3 to 5 year index appreciation is 70%
(b) S&P 500 multiplied by half the growth rate

Required Rate of Return on Market as a Whole Historic

	<u>Expected Market Return</u>
10 yr S&P Composite Index Historical Return	3.01%
20 yr S&P Composite Index Historical Return	8.12%
40 yr S&P Composite Index Historical Return	10.04%
85 yr S&P Composite Index Historical Return	9.87%
Average Expected Market Return	<u><u>7.76%</u></u>

CAPM with forecasted return

Re Required return on individual equity security
Rf Risk-free rate
Rm Required return on the market as a whole
Be Beta on individual equity security

$$Re = Rf + Be(Rm - Rf)$$

$$Rf = 2.6925$$

$$Rm = 15.0603$$

$$Be = 0.7100$$

$$Re = \underline{\underline{11.47}}$$

Sources: Value Line April 20, 2012
Blue Chip April / December
I&E Exhibit No. 1, Sch 14

CAPM with historical return

Re Required return on individual equity security
Rf Risk-free rate
Rm Required return on the market as a whole
Be Beta on individual equity security

$$Re = Rf + Be(Rm - Rf)$$

$$Rf = 2.6925$$

$$Rm = 7.7572$$

$$Be = 0.7100$$

$$Re = \underline{\underline{6.29}}$$

Sources: Value Line April 20, 2012
Blue Chip April / December
I&E Exhibit No. 1, Sch 14

**I&E Statement No. 1-SR
Witness: Amanda Gordon**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Surrebuttal Testimony

of

Amanda Gordon

Investigation & Enforcement

Concerning:

Rate of Return

1 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

2 A. My name is Amanda Gordon. My business address is Pennsylvania Public
3 Utility Commission, P.O. Box 3265, Harrisburg, PA 17105-3265.

4

5 Q. ARE YOU THE SAME AMANDA GORDON WHO IS
6 RESPONSIBLE FOR THE DIRECT TESTIMONY CONTAINED IN
7 I&E STATEMENT NO. 1 AND I&E EXHIBIT NO. 1?

8 A. Yes.

9

10 Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL
11 TESTIMONY?

12 A. The purpose of my surrebuttal testimony is to address statements made by
13 the Audubon Water company (Audubon or Company) witness Mr. Dennis
14 Kalbarczyk in his rebuttal testimony regarding rate of return, including
15 capital structure, the cost of common equity, and the overall fair rate of
16 return that should be applied to the Company's rate base.

17

18 INTEREST COVERAGE RATIO

19 Q. SUMMARIZE MR. KALBARCZYK'S REBUTTAL TESTIMONY
20 REGARDING HIS USE OF AN INTEREST COVERAGE RATIO TO
21 DETERMINE A COST OF EQUITY RECOMMENDATION.

1 A. Mr. Kalbarczyk states, on pages 10 and 11, of Audubon Statement No.
2 DMK-1R, that he used an interest coverage ratio in lieu of a “detailed rate
3 of return study.” He opines that his methodology is a more “simplistic
4 approach” which balances the interest of the Company and customers
5 because it minimizes rate case expense.

6

7 **Q. WHAT COMMENTS DO YOU HAVE REGARDING MR.
8 KALBARCZYK’S REBUTTAL TESTIMONY CITED ABOVE?**

9 A. Mr. Kalbarczyk departs from traditional ratemaking by using an interest
10 coverage ratio (I&E Statement No. 1, pages 18-22). Further, as Mr.
11 Kalbarczyk points out, his method is deficient because it is not a detailed
12 rate of return study, which I have performed and explained in my direct
13 testimony I&E Statement No. 1. Mr. Kalbarczyk also points out that I&E
14 provides a relatively “classic” discussion of the model applications
15 (Audubon Statement No. DMK-1R, page 13). As a result, it is
16 inappropriate to use Mr. Kalbarczyk’s interest coverage ratio, in lieu of the
17 more detailed, traditional ratemaking study performed and presented by
18 I&E in this proceeding.

19

20 **CAPITAL STRUCTURE**

21 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATION
22 REGARDING THE COMPANY’S CAPITAL STRUCTURE.**

1 A. I recommend the use of a hypothetical structure of 50% long-term debt and
2 50% equity (I&E Statement No. 1, page 9-10).

3

4 **Q. SUMMARIZE THE BASIS FOR YOUR RECOMMENDATION TO**
5 **USE A CLAIMED HYPOTHETICAL CAPITAL STRUCTURE.**

6 A. When a utility's capital structure is outside the industry norm, as is the case
7 with Audubon, a hypothetical capital structure representative of the
8 industry norm should be used for ratemaking purposes. I have used the
9 industry average capital structure represented in my barometer group.

10

11 **Q. SUMMARIZE MR. KALBARCZYK'S REBUTTAL TESTIMONY**
12 **REGARDING YOUR HYPOTHETICAL CAPITAL STRUCTURE.**

13 A. Mr. Kalbarczyk does not rebut the basis of my hypothetical capital
14 structure, which is a capital structure should be representative of the
15 industry norm and the average of the barometer group capital structures was
16 employed. Instead Mr. Kalbarczyk opines that the 45%/55% capital
17 structure has been used in other cases and that if the Commission accepts
18 the lower cost rates proposed by I&E, then he would recommend a 47%
19 debt and 53% equity capital structure (Audubon Statement DMK-1R, page
20 12).

1 Q. WHAT COMMENTS DO YOU HAVE REGARDING MR.
2 KALBARCZYK'S CONTENTIONS?

3 A. First, each base rate proceeding before the Commission is judged on its
4 own merits therefore Mr. Kalbarczyk's reliance on previous capital ratios is
5 misplaced. Second, Mr. Kalbarczyk's recommendation to change his
6 capital structure recommendation if the Commission grants the cost rates
7 recommended by I&E is purely results driven. This means the capital
8 structure Mr. Kalbarczyk recommends is based upon the Commission's
9 determination of its debt and equity cost rates. This results oriented
10 approach is not sound, nor is it a part of traditional ratemaking principles,
11 and should be rejected.

12
13 Q. DO YOU CONTINUE TO SUPPORT YOUR RECOMMENDATION?

14 A. Yes. My hypothetical capital structure of 50% debt and 50% equity is
15 supported by barometer group evidence. Therefore, I continue to support
16 my recommended hypothetical capital structure (I&E Statement No. 1,
17 pages 9-10).

18
19 COST OF EQUITY

20 Q. SUMMARIZE MR. KALBARCZYK'S REBUTTAL TESTIMONY
21 REGARDING YOUR COST OF EQUITY STUDY?

1 A. Mr. Kalbarczyk comments that I “gave no weight or consideration to its
2 small size and increased level of financial risk compared to that of the
3 larger companies she analyzed” (Audubon Statement No. DMK-1R, page
4 14). Mr. Kalbarczyk also disagrees with my recommended growth rate.
5 These arguments are addressed below.

6
7 **Q. WHAT COMMENTS DO YOU HAVE REGARDING A COST OF**
8 **EQUITY ADJUSTMENT FOR AUDUBON’S SIZE?**

9 A. There is no technical literature specific to the utility industry supporting the
10 need for a size adjustment. There is, however, academic evidence that
11 supports the lack of validity of the business risk adjustment for utility
12 companies. I&E Exhibit No. 1-SR, Schedule No. 1, presents an article by
13 Annie Wong, “Utility Stocks and the Size Effect: An Empirical Analysis”,
14 from the *Journal of Midwest Finance Association* in 1993, pp. 95-101, that
15 concluded:

16 The objective of this study is to examine if the size effect
17 exists in the utility industry. After controlling for equity
18 values, there is some weak evidence that firm size is a
19 missing factor from the CAPM for the industrial but not
20 for utility stocks. This implies that although the size
21 phenomenon has been strongly documented for the
22 industrials, the findings suggest that there is no need to
23 adjust for the firm size in utility rate regulation.

24 While this article is older, until such time as an up-to-date article is
26 provided to refute Dr. Wong’s findings, the size adjustment is not needed in

1 the utility industry. Therefore, a size adjustment is not appropriate and Mr.
2 Kalbarczyk's unsupported size adder of 15 basis points should be denied.

3
4 **Q. WHAT COMMENTS DO YOU HAVE REGARDING FINANCIAL**
5 **RISK?**

6 A. Generally, financial risk is related to the amount of debt in the capital
7 structure and the ability of cash flow to service debt. I have established a
8 hypothetical capital structure that is more similar to the barometer group of
9 water to account for the dissimilar financial risk between Audubon Water
10 and the barometer group companies. This method of addressing differences
11 in financial risk is much more direct than proposing an adder to account for
12 it. Furthermore, Mr. Kalbarczyk's rebuttal testimony does not discuss debt,
13 but rather loss of rate of return on an asset, which is unrelated to financial
14 risk. Therefore, no financial risk adjustment is warranted.

15
16 **Q. PLEASE SUMMARIZE MR. KALBARCZYK'S REBUTTAL**
17 **TESTIMONY REGARDING I&E'S COMPUTED GROWTH**
18 **RATES.**

19 A. Mr. Kalbarczyk claims that my I&E direct testimony has given no weight
20 to its own analysis of five year projected growth rates, and asserts that the
21 log-linear growth rate was prepared for my own use and is not something
22 that is or should be used by investors in making market decisions (Audubon

1 Statement No. DMK-1R, p. 15). Thus, Mr. Kalbarczyk claims that the I&E
2 recommended growth rate is 147 basis points below the five year estimate
3 that should be utilized.

4
5 **Q. DO YOU AGREE WITH MR. KALBARCZYK'S CLAIMS?**

6 A. No. It is clear that Mr. Kalbarczyk does not understand the I&E log-linear
7 analysis, which is explained on page 27 through 28 of my I&E Statement
8 No. 1. When calculating the log-linear regression analysis, market data is
9 used and transformed to obtain a linear relationship in the data series. I
10 used the published Value Line earnings per share market data for each
11 company in the Comparable Group from 2006 to 2011. I also used the five
12 year projected growth rate estimates from established forecasting entities
13 (I&E Statement No. 1, page 25). These five year projected growth rate
14 estimates are used to forecast earnings per share data for each company in
15 the Comparable Group from 2012 to 2016. This serves to balance the
16 analysts' optimistic estimates with the log-linear regression analysis.

17 Also, as stated in my direct testimony, page 28 of I&E Statement
18 No. 1, the log-linear regression analysis is not a personal one, but one
19 shared by I/B/E/S International, Inc. which employs log-linear regression
20 analysis when calculating five year growth rates. Academic literature also
21 supports the use of log-linear regression analysis when calculating growth
22 rates. Many sophisticated investors use Value Line data in order to perform

1 their own analyses as well. The sophisticated investors are well aware of
2 the financial literature concerning biased analysts' estimates. To assume
3 that investors do not make some adjustment for this bias would be to
4 assume that investors are myopic.

5 Therefore, my analysis does include "Wall Street analysts" growth
6 rates, and is used by investors in making market decisions. Mr.
7 Kalbarczyk's comments are misguided, unsupported, and should be
8 disregarded. Further, Mr. Kalbarczyk's adjustment of the growth rates
9 should be rejected, as it is clearly unnecessary since the log-linear already
10 includes five year estimated growth rates.

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

13 **A. Yes, it does.**

**I&E Exhibit No. 1-SR
Witness: Amanda Gordon**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Exhibit to Accompany

the

Surrebuttal Testimony

of

Amanda Gordon

Bureau of Investigation and Enforcement

Concerning:

Rate of Return

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UTILITY STOCKS AND THE SIZE EFFECT: AN EMPIRICAL ANALYSIS

Annie Wong*

I. Introduction

The objective of this study is to examine whether the firm size effect exists in the public utility industry. Public utilities are regulated by federal, municipal, and state authorities. Every state has a public service commission with broad and varying powers. Often their task is to estimate a fair rate of return to a utility's stockholders in order to determine the rates charged by the utility. The legal principles underlying rate regulation are that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks," and that the return to a utility should be sufficient to "attract capital and maintain credit worthiness." However, difficulties arise from the ambiguous interpretation of the legal definition of *fair and reasonable rate of return* to an equity owner.

Some finance researchers have suggested that the Capital Asset Pricing Model (CAPM) should be used in rate regulation because the CAPM beta can serve as a risk measure, thus making risk comparisons possible. This approach is consistent with the spirit of a Supreme Court ruling that equity owners sharing similar level of risk should be compensated by similar rate of return.

The empirical studies of Banz (1981) and Reinganum (1981) showed that small firms tend to earn higher returns than large firms after adjusting for beta. This phenomenon leads to the proposition that firm size is a proxy for omitted risk factors in determining stock returns. Barry and Brown (1984) and Brauer (1986) suggested that the omitted risk factor could be the differential information environment between small and large firms. Their argument is based on the fact that investors often have less publicly available information to assess the future cash flows of small firms than that of large

firms. Therefore, an additional risk premium should be included to determine the appropriate rate of return to shareholders of small firms.

The samples used in prior studies are dominated by industrial firms, no one has examined the size effect in public utilities. The objective of this study is to extend the empirical findings of the existing studies by investigating whether the size effect is also present in the utility industry. The findings of this study have important implications for investors, public utility firms, and state regulatory agencies. If the size effect does exist in the utility industry, this would suggest that the size factor should be considered when the CAPM is being used to determine the fair rate of return for public utilities in regulatory proceedings.

II. Information Environment of Public Utilities

In general, utilities differ from industries in that utilities are heavily regulated and they follow similar accounting procedures. A public utility's financial reporting is mainly regulated by the Securities and Exchange Commission (SEC) and the Federal Energy Regulatory Commission (FERC). Under the Public Utility Holding Company Act of 1935, the SEC is empowered to regulate the holding company systems of electric and gas utilities. The Act requires registration of public utility holding companies with the SEC. Only under strict conditions would the purchase, sale or issuance of securities by these holding companies be permitted. The purpose of the Act is to keep the SEC and investors informed of the financial conditions of these firms. Moreover, the FERC is in charge of the interstate operations of electric and gas companies. It requires utilities to follow the accounting procedures set forth in its Uniform Systems of Accounts. In particular, electric and gas utilities must request their Certified Public Accountants to certify that certain schedules in the financial reports are in conformity with the Commission's accounting requirements. These detailed reports are submitted annually and are open to the public.

*Western Connecticut State University. The author thanks Phillip Perry, Robert Hagerman, Eric Press, the anonymous referee, and Clay Singleton for their helpful comments.

The FERC requires public utilities to keep accurate records of revenues, operating costs, depreciation expenses, and investment in plant and equipment. Specific financial accounting standards for these purposes are also issued by the Financial Accounting Standards Board (FASB). Uniformity is required so that utilities are not subject to different accounting regulations in each of the states in which they operate. The ultimate objective is to achieve comparability in financial reporting so that factual matters are not hidden from the public view by accounting flexibility.

Other regulatory reports tend to provide additional financial information about utilities. For example, utilities are required to file the FERC Form No. 1 with the state commission. This form is designed for state commissions to collect financial and operational information about utilities, and serves as a source for statistical reports published by state commissions.

Unlike industrials, a utility's earnings are predetermined to a certain extent. Before allowed earnings requests are approved, a utility's performance is analyzed in depth by the state commission, interest groups, and other witnesses. This process leads to the disclosure of substantial amount of information.

III. Hypothesis and Objective

Due to the Act of 1935, the Uniform Systems of Accounts, the uniform disclosure requirements, and the predetermined earnings, all utilities are reasonably homogeneous with respect to the information available to the public. Barry and Brown (1984) and Brauer (1986) suggested that the difference of risk-adjusted returns between small and large firms is due to their differential information environment. Assuming that the differential information hypothesis is true, then uniformity of information availability among utility firms would suggest that the size effect should not be observed in the public utility industry. The objective of this paper is to provide a test of the size effect in public utilities.

IV. Methodology

1. Sample and Data

To test for the size effect, a sample of public utilities and a sample of industrials matched by equity value are formed so that their results can be compared. Companies in both samples are listed on the Center for Research in Security Prices (CRSP)

Daily and Monthly Returns files. The utility sample includes 152 electric and gas companies. For each utility in the sample, two industrial firms with similar firm size (one is slightly larger and the other is slightly smaller than the utility) are selected. Thus, the industrial sample includes 304 non-regulated firms.

The size variable is defined as the natural logarithm of market value of equity at the beginning of each year. Both the equally-weighted and value-weighted CRSP indices are employed as proxies for the market returns. Daily, weekly and monthly returns are used. The Fama-MacBeth (1973) procedure is utilized to examine the relation between risk-adjusted returns and firm size.

2. Research Design

All utilities in the sample are ranked according to the equity size at the beginning of the year, and the distribution is broken down into deciles. Decile one contains the stocks with the lowest market values while decile ten contains those with the highest market values. These portfolios are denoted by $MV_1, MV_2, \dots, \text{ and } MV_{10}$, respectively.

The combinations of the ten portfolios are updated annually. In the year after a portfolio is formed, equally-weighted portfolio returns are computed by combining the returns of the component stocks within the portfolio. The betas for each portfolio at year t , β_p 's, are estimated by regressing the previous five years of portfolio returns on market returns:

$$\bar{R}_p = \alpha_p + \beta_p \bar{R}_m + \bar{U}_p \quad (1)$$

where

R_p = periodic return in year t on portfolio p

R_m = periodic market return in year t

U_p = disturbance term.

Hanz (1981) applied both the ordinary and generalized least squares regressions to estimate β ; and concluded that the results are essentially identical (p.8). Since adjusting for heteroscedasticity does not necessarily lead to more efficient estimators, the ordinary least squares procedures are used in this study to estimate β in equation (1).

The following cross-sectional regression is then run for the portfolios to estimate γ_i , $i = 0, 1, \text{ and } 2$:

Wong

Utility Stocks and the Size Effect: An Empirical Analysis

$$R_{pt} = \gamma_0 + \gamma_1 \hat{\beta}_{pt} + \gamma_2 \bar{S}_{pt} + U_{pt} \quad (2)$$

where

$\hat{\beta}_{pt}$ = estimated beta for portfolio p at year t ,
 $t=1968, \dots, 1987$

\bar{S}_{pt} = mean of the logarithm of firm size in
 portfolio p at the beginning of year t

U_{pt} = disturbance term.

Depending on whether daily, weekly or monthly returns are used, a portfolio's average return changes periodically while its beta and size only change once a year. The γ_1 and γ_2 coefficients are estimated over the following four subperiods: 1968-72, 1973-77, 1978-82 and 1983-1987. If portfolio betas can fully account for the differences in returns, one would expect the average coefficient for the beta variable to be positive and for the size variable to be zero. A t -statistic will be used to test the hypothesis. The coefficients of a matched sample are also examined so that the results between industrial and utility firms can be compared.

V. Analysis of Results

1. Equity Value of the Utility Portfolios

The mean equity values of the ten size-based utility portfolios are reported in Table 1. Panels A and B present the average firm size of these portfolios at the beginning and end of the test period, 1968-1987. The first interesting observation from Table 1 is that the difference in magnitude between the smallest and the largest market value utility portfolios is tremendous. In Panel A, the average size of MV_1 is about \$31 million while that of MV_{10} is over \$1.4 billion. In Panel B, that is twenty years later, they are \$62 million and \$5.2 billion, respectively. Another interesting finding is that there is a substantial increase in average firm size from MV_1 to MV_{10} . Since these two findings are consistent over the entire test period, the average portfolio market values for interim years are not reported. These results are similar to the empirical evidence provided by Reinganum (1981).

The utility sample in this study contains 152 firms whereas Reinganum's sample contains 535 firms that are mainly industrial companies. Two conclusions may be drawn from the results of the Reinganum study and this one. First, utilities and industrials are similar in the sense that their market

values vary over a wide spectrum. Second, the fact that there is a huge jump in firm size from MV_1 to MV_{10} indicates that the distribution of firm sizes is positively skewed. To correct for the skewness problem, the natural logarithm of the mean equity value of each portfolio is calculated. This variable is then used in later regressions instead of the actual mean equity value.

2. Betas of the Utility and Industrial Samples

The betas based on monthly, weekly and daily returns are reported for the utility and industrial samples. For simplicity, they will be referred to as monthly, weekly, and daily betas. In all cases, five years of returns are used to estimate the systematic risk. The betas estimated over the 1963-67 time period are used to proxy for the betas in 1968, which is the beginning of the test period. By the same token, the betas obtained from the time period 1982-86 are used as proxies for the betas in 1987, which is the end of the test period.

The betas from using the equally-weighted and value-weighted indices are calculated in order to check whether the results are affected by the choice of market index. Since the results are similar, only those obtained from the equally-weighted index are reported and analyzed.

Table 2 reports the monthly, weekly and daily betas of the two samples at the beginning and end of the test period. Panel A shows the various betas of the industrial portfolios. Two conclusions may be drawn. First, in the 1960's, smaller market value portfolios tend to have relatively larger betas. This is consistent with the empirical findings by Banz (1981) and Reinganum (1981). Second, this trend seems to vanish in the 1980's, especially when weekly and daily returns are used.

The betas of the utility portfolios are presented in Panel B. The table shows that none of the utility betas are greater than 0.71. A comparison between Panels A and B reveals that utility portfolios are relatively less risky than industrial portfolios after controlling for firm size. The comparison also reveals that, unlike industrial stocks, betas of the utility portfolios are not related to the market values of equity.

The negative correlation between firm size and beta in the industrial sample may introduce a multicollinearity problem in estimating equation (2). Banz (p.11) had addressed this issue and concluded that the test results are not sensitive to the

multicollinearity problem. For the utility sample, this problem does not exist.

3. Tests on the Coefficients of Beta and Size

The beta and firm size are used to estimate γ_1 and γ_2 in equation (2). A t-statistic is used to test if the mean values of the gammas are significantly different from zero. The tests were performed for four 5-year periods which are reported in Table 3. The mean of the gammas and their t-statistic are presented in Panel A for the utilities and in Panel B for the industrial firms.

The empirical results for the utility sample are reported in Panel A of Table 3. When monthly returns are used, 60 regressions were run to obtain 60 pairs of gammas for each of the 5-year periods. When daily returns are used, over 1200 regressions were run for each period to obtain the gammas. The results are similar; in all of the time periods tested, none of the average coefficients for beta and size are significantly different from zero. When weekly returns are used, 260 pairs of gammas were obtained. The average coefficients for beta are not significant in any test period, and the average coefficients for size are not significant in three of the test periods. For the test period of 1978-82, the average coefficient for size is significantly negative at a 5% level.

The test results for the industrial sample are reported in Panel B of Table 3. When monthly returns are used, the average coefficient estimates for size and beta are significant and have the expected sign only in the 1983-87 test period. When weekly returns are used, only the size variable is significantly negative in the 1978-82 period. When daily returns are used, the coefficient estimates for beta and size are not significant at any conventional level.

According to the CAPM, beta is the sole determinant of stock returns. It is expected that the coefficient for beta is significantly positive. However, the empirical findings reported in this study and in Fama and French (1992) only provide weak support for beta in explaining stock returns. The empirical findings in this study also suggest that the size effect varies over time. It is not unusual to document the firm size effect at certain time periods but not at others. Banz (1981) found that the size effect is not stable over time with substantial differences in the magnitude of the coefficient of the size factor (p.9, Table 1). Brown, Kleidon and Marsh (1983) not only have shown that size effect is not constant over time but also have reported a reversal of the size anomaly for certain years.

The research design of this study allows us to keep the sample, test period, and methodology the same with the holding-period being the only variable. The size effect is documented for the industrial sample in one of the four test periods when monthly returns are used and in another when weekly returns are used. When daily returns are used, no size effect is observed. For the utility sample, the size effect is significant in only one test period when weekly returns are used. When monthly and daily returns are used, no size effect is found. Therefore, this study concludes that the size effect is not only time-period specific but also holding-period specific.

VI. Concluding Remarks

The fact that the two samples show different, though weak, results indicates that utility and industrial stocks do not share the same characteristics. First, given firm size, utility stocks are consistently less risky than industrial stocks. Second, industrial betas tend to decrease with firm size but utility betas do not. These findings may be attributed to the fact that all public utilities operate in an environment with regional monopolistic power and regulated financial structure. As a result, the business and financial risks are very similar among the utilities regardless of their sizes. Therefore, utility betas would not necessarily be expected to be related to firm size.

The objective of this study is to examine if the size effect exists in the utility industry. After controlling for equity values, there is some weak evidence that firm size is a missing factor from the CAPM for the industrial but not for the utility stocks. This implies that although the size phenomenon has been strongly documented for the industrials, the findings suggest that there is no need to adjust for the firm size in utility rate regulations.

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Table 1

Average Equity Size of the Utility Portfolios at the Beginning and End of the Test Period
 (Dollar figures in millions)

	A: Beginning (1968)	B: End (1987)
MV ₁	\$31	\$62
MV ₂	\$77	\$177
MV ₃	\$113	\$334
MV ₄	\$161	\$475
MV ₅	\$220	\$715
MV ₆	\$334	\$957
MV ₇	\$437	\$1,279
MV ₈	\$505	\$1,805
MV ₉	\$791	\$2,665
MV ₁₀	\$1,447	\$5,399

Table 2

Betas of the Two Samples at the Beginning and End of the Test Period

	Monthly Betas		Weekly Betas		Daily Betas	
	1963-67	1982-86	1963-67	1982-86	1963-67	1982-86
Panel A: Industrial Firms						
MV ₁	0.89	1.00	1.15	0.95	1.11	0.92
MV ₂	0.94	0.87	1.07	1.01	1.14	1.01
MV ₃	0.88	0.82	1.12	0.86	1.14	1.04
MV ₄	0.69	0.74	1.00	0.83	1.03	0.86
MV ₅	0.73	0.80	1.05	0.96	1.13	1.01
MV ₆	0.66	0.82	1.03	1.01	1.05	1.04
MV ₇	0.64	0.81	0.97	1.04	0.98	1.09
MV ₈	0.62	0.75	0.97	1.11	1.00	1.20
MV ₉	0.52	0.78	0.84	1.06	0.94	1.16
MV ₁₀	0.43	0.65	0.78	1.01	0.86	1.22
Panel B: Public Utilities						
MV ₁	0.30	0.37	0.31	0.43	0.30	0.40
MV ₂	0.28	0.38	0.37	0.47	0.36	0.44
MV ₃	0.22	0.42	0.33	0.42	0.31	0.49
MV ₄	0.27	0.35	0.36	0.52	0.34	0.54
MV ₅	0.25	0.45	0.37	0.61	0.35	0.62
MV ₆	0.25	0.41	0.39	0.54	0.40	0.65
MV ₇	0.20	0.35	0.34	0.54	0.37	0.63
MV ₈	0.17	0.38	0.34	0.65	0.33	0.68
MV ₉	0.19	0.34	0.35	0.60	0.34	0.71
MV ₁₀	0.18	0.29	0.38	0.59	0.39	0.71

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Table 3

Tests on the Mean Coefficients of Beta (γ_1) and Size (γ_2)

$$R_{it} = \gamma_{it} + \gamma_{1i}\beta_{it} + \gamma_{2i}S_{it} + U_{it}$$

Returns Used:		Monthly (t-value)	Weekly (t-value)	Daily (t-value)
Panel A: Utility Sample				
1968-72	γ_1	-0.46% (-0.26)	-0.32% (-0.42)	-0.02% (-0.18)
	γ_2	-0.07% (-0.78)	-0.01% (-0.51)	-0.00% (-0.46)
1973-77	γ_1	-0.28% (-0.13)	0.14% (0.14)	-0.03% (-0.21)
	γ_2	-0.11% (-0.70)	-0.03% (-0.67)	-0.00% (-0.53)
1978-82	γ_1	0.55% (0.36)	0.54% (1.00)	0.05% (0.43)
	γ_2	-0.10% (-0.75)	-0.05% (-1.71)*	-0.01% (-1.60)
1983-87	γ_1	1.74% (1.28)	-0.24% (-0.51)	-0.02% (-0.18)
	γ_2	-0.16% (-1.54)	-0.03% (-0.86)	-0.01% (-0.63)
Panel B: Industrial Sample				
1968-72	γ_1	-0.36% (-0.27)	-0.28% (-0.55)	-0.02% (-0.32)
	γ_2	0.07% (0.43)	-0.01% (-0.19)	0.00% (0.51)
1973-77	γ_1	1.34% (0.64)	-0.23% (-0.31)	0.14% (1.45)
	γ_2	-0.01% (-0.06)	-0.04% (-0.85)	-0.00% (-0.64)
1978-82	γ_1	-0.84% (-0.28)	-0.56% (-0.91)	-0.09% (-0.81)
	γ_2	-0.29% (-0.75)	-0.01% (-1.72)*	-0.00% (-1.33)
1983-87	γ_1	2.51% (1.83)*	0.34% (0.64)	0.11% (1.40)
	γ_2	-0.25% (-1.90)*	-0.01% (-0.43)	0.00% (0.14)

* Significant at the 5% level based on a one-tailed test.

I&E Statement No. 2
Witness: Debra Backer

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Direct Testimony

of

Debra Backer

Bureau of Investigation and Enforcement

2012 JUL -6 PM 4:23
SECRETARY'S BUREAU

Concerning:

Operation & Maintenance Expenses
Cash Working Capital

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

3 A. My name is Debra Backer. I am a Fixed Utility Financial Analyst in the
4 Technical Division of the Pennsylvania Public Utility Commission's
5 (Commission) Bureau of Investigation and Enforcement (I&E). My
6 business address is P.O. Box 3265, Harrisburg, Pa. 17105-3265.

7

8 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**
9 **EXPERIENCE IN UTILITY REGULATION.**

10 A. My education and professional background are set forth in Appendix A,
11 which is attached.

12

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

15 A. I&E is responsible for protecting the public interest in rate proceedings.
16 I&E's analysis in this proceeding is based on its responsibility to represent
17 the public interest. This responsibility requires the balancing of the
18 interests of ratepayers and the Company.

19

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

1 A. The purpose of my direct testimony is to present and explain my
2 recommendations to the base rate filing submitted by Audubon Water
3 Company (AWC or Company).

4

5 **Q. CAN YOU SUMMARIZE THE COMPANY'S BASE RATE**
6 **INCREASE REQUEST?**

7 A. Yes. On January 27, 2012, AWC requested an increase in base rates of
8 \$540,686, or 27%, for total proposed revenues of \$2,596,924. If the entire
9 increase is approved, the total bill for the average residential customer
10 using 6,000 gallons per month would increase from \$44.35 to \$56.32 per
11 month, or 27%. This base rate filing was based upon a historic test year
12 ended September 30, 2011 and a future test year ending September 30,
13 2012.

14

15 **Q. DID THE COMPANY UPDATE ITS OVERALL REVENUE**
16 **INCREASE REQUEST?**

17 A. Yes. Company witness Dennis M. Kalbarczyk updated the Company's
18 overall proposed revenue increase in his Direct Testimony. There he states
19 that the Company proposes to reduce the overall revenue increase by
20 \$22,718, resulting in a \$517,968 (25.2%) adjusted increase. Under this
21 modification to the filing, the Company's proposed annual revenues are
22 \$2,547,206 (Statement DMK-1, p. 6).

1 Q. **DID COMPANY WITNESS KALBARCZYK STATE WHY THE**
2 **COMPANY ADJUSTED ITS PROPOSED REVENUE INCREASE?**

3 A. Yes. In response to interrogatories, Company witness Kalbarczyk stated
4 that he discovered errors in two expense categories in the filing. First, he
5 noted an error in the Transportation Repairs and Maintenance Expense
6 account that should have decreased the expense by \$7,970 and increased
7 the depreciation expense by \$1,594. Second, he stated that the Company's
8 accountants also had an error that misclassified \$16,223 of the Expense of
9 Officers and Employees Account and a contribution of \$380 that should
10 have been excluded for a decrease to that expense of \$16,603. These two
11 adjustments decreased the expenses by \$24,573 (Statement DMK-1, p. 28).

12
13 Q. **HAVE THERE BEEN ANY ADDITIONAL UPDATES SINCE**
14 **COMPANY WITNESS KALBARCZYK'S DIRECT TESTIMONY?**

15 A. Yes. In response to an interrogatory, Company Witness Kalbarczyk
16 reduced the revenue increase by another \$98,777 for a proposed annual
17 revenue claim of \$419,191, or 20.4%, for total proposed revenues of
18 \$2,475,429 (I&E Exhibit No. 3, Schedule 7).

19
20 Q. **DO YOU AGREE THAT THE COMPANY SHOULD UPDATE THE**
21 **PROPOSED REVENUE INCREASE AS A RESULT OF THE**
22 **DISCOVERY OF THOSE UPDATES?**

1 A. Yes.

2

3 **Q. EXPLAIN YOUR RECOMMENDATIONS TO THE BASE RATE**
4 **FILING.**

5 A. I am recommending the following adjustments to the Company's proposed
6 future test year (FTY) expenses ended September 30, 2012 in this base rate
7 filing: rate case expense, purchased power, payroll, administrative &
8 general - miscellaneous general, maintenance of mains, and insurance. I
9 am also adjusting the Company's cash working capital rate base claim and
10 the water storage tank amortization claim.

11

12 **RATE CASE EXPENSE**

13 **Q. IN THIS PROCEEDING, THE COMPANY HAS MADE A CLAIM**
14 **FOR RATE CASE EXPENSE. BRIEFLY EXPLAIN THE NATURE**
15 **AND TYPE OF EXPENSES CLASSIFIED AS RATE CASE**
16 **EXPENSE.**

17 A. The estimated costs that comprise a company's allowable claim for rate
18 case expense are those that are incurred to compile, present and defend a
19 request for a base rate increase before the Commission. The estimated
20 costs that are typically found in a rate case expense claim include legal fees
21 for outside counsel, outside consultants and the costs of printing, collating
22 and postal expenses.

1 **Q. HOW DOES THE COMMISSION TREAT RATE CASE EXPENSE**
2 **FOR RATEMAKING PURPOSES?**

3 A. The Commission views prudently incurred rate case expense as an ongoing,
4 although recurring at irregular intervals, expense related to the rendering of
5 utility service. A company's history regarding the frequency of rate case
6 filings is an essential element in determining the normalized level of rate
7 case expense for ratemaking purposes.

8
9 **Q. HOW IS THE FREQUENCY OF RATE CASE FILINGS**
10 **DETERMINED?**

11 A. The frequency is determined by computing the average number of months
12 that expire between the filing dates of the company's rate case filings.

13
14 **Q. WHAT IS THE COMPANY'S CLAIM FOR RATE CASE EXPENSE**
15 **IN THIS PROCEEDING?**

16 A. The Company's annual claim for rate case expense is \$115,000 (AWC
17 Schedule I-11).

18
19 **Q. WHAT IS THE BASIS FOR THE COMPANY'S CLAIM?**

20 A. The Company has estimated its rate case expense to be \$230,000
21 normalized over twenty-four months for an annual expense claim of
22 \$115,000 (AWC Schedule I-11).

1 AWC Schedule I-11 breaks down AWC's estimated \$230,000 cost of the
2 Rate Case Proceeding as follows:

	To File (\$)	Review & Litigation (\$)	Fully Litigated (\$)
Legal	15,000	80,000	95,000
Consulting	20,000	35,000	55,000
Engineering	2,500	15,000	17,500
Accounting	2,500	15,000	17,500
Rate of Return	-	30,000	30,000
Expenses	5,000	10,000	15,000
Total	45,000	185,000	230,000

3

4 **Q. DO YOU AGREE WITH THE COMPANY'S \$230,000 CLAIM FOR**
5 **RATE CASE EXPENSE?**

6 A. No.

7

8 **Q. WHAT IS YOUR RECOMMENDATION FOR THE COMPANY'S**
9 **ESTIMATED RATE CASE EXPENSE?**

10 A. I recommend a rate case allowance of \$125,000, or a reduction of \$105,000
11 to the Company's estimated total for rate case expense.

12

13 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

14 A. I am recommending using the Review & Litigation amounts presented in
15 the Company's filing excluding the consultant fees for engineering of

1 \$15,000, accounting for \$15,000, and rate of return for \$30,000. As stated
2 in the Company's filing, p. A-7, "the estimated rate case costs provide for
3 the services of consultants and the claim will be amended based upon the
4 level of services actually required to support its filing through the
5 regulatory rate increase process." The Company has provided invoices for
6 the rate case expense up through May 8, 2012, and the total spent so far is
7 \$84,088.02. The invoices provided by the Company are for its legal
8 counsel Hawke, McKeon & Sniscak, LLP totaling \$37,949 and Utility Rate
9 Resources for Company Witness Dennis Kalbarczyk totaling \$46,139 (I&E
10 Exhibit No. 2, Schedule 1). Since the Company has not hired consultants
11 for engineering, accounting or rate of return, I am recommending removing
12 these expenses that were part of the Company's estimated review &
13 litigation proposal for rate case expense. On behalf of I&E, I reserve the
14 right to amend our rate case expense recommendation as more invoices are
15 received in response to interrogatories to support this expense.

16
17 **Q. DO YOU AGREE WITH THE COMPANY'S PROPOSED TWENTY-**
18 **FOUR MONTHS NORMALIZATION PERIOD?**

19 **A.** No. The Company's claimed twenty-four months normalization period is
20 not supported by the Company's experienced filing frequency.

1 **Q. WHAT IS YOUR RECOMMENDATION FOR THE NORMALIZATION**
2 **PERIOD?**

3 A. I recommend a normalization period of fifty-three months.

4

5 **Q. WHY DO YOU RECOMMEND A FIFTY-THREE MONTH**
6 **NORMALIZATION PERIOD?**

7 A. I recommend a fifty-three month normalization period as it is more representative
8 of the Company's historic filing history. The following chart illustrates the
9 Company's filing history:

10

Docket	Filed Date	Elapsed Time
R-2012-2286118	January 27, 2012	58 months
R-00072100	March 5, 2007	61 months
R-00027104	January 16, 2002	41 months
R-00984425	July 29, 1998	

11

12 The Company's irregular filing of rate cases should be taken into consideration
13 when determining the normalization period. As shown above, the Company's
14 intervals for filing rate cases are 58 months, 61 months, and 41 months (I&E
15 Exhibit No. 2, Schedule 2). To normalize the frequency of the Company's filed
16 rate cases, the rate case intervals should be totaled and divided by the number of
17 intervals (3 in this case) for an average of 53 months $((58 + 61 + 41) / 3)$. The

1 Company's requested twenty-four month recovery period is unsupported by the
2 Company's historic filing tendencies and an adjustment is appropriate. My fifty-
3 three month normalization period would provide for a more appropriate and
4 reasonable ratemaking allowance for rate case expense.

5
6 **Q. WHAT IS YOUR RECOMMENDATION FOR THE COMPANY'S**
7 **ANNUAL RATE CASE EXPENSE USING YOUR 53 MONTH**
8 **NORMALIZATION PERIOD?**

9 A. I recommend a total rate case expense of \$125,000 normalized over 53 months for
10 an annual rate case expense of \$28,302 ($\$125,000/53 \text{ months} \times 12$), or a reduction
11 of \$86,698 ($\$115,000 - \$28,302$) to the Company's annual claim.

12
13 **PURCHASED POWER**

14 **Q. WHAT IS THE COMPANY'S CLAIM FOR PURCHASED POWER?**

15 A. The Company's expense claim for purchased power is \$153,169 (AWC Schedule
16 I-8).

17
18 **Q. WHAT IS THE BASIS FOR THE COMPANY'S CLAIM?**

19 A. The Company used a 3% increase derived from the Company's experienced
20 increase from fiscal year September 30, 2010 to September 30, 2011 and the
21 estimated electricity needed for the addition of a new pump the Company is
22 considering (I&E Exhibit No. 2, Schedule 3).

1 **Q. DO YOU AGREE WITH THE COMPANY'S CLAIM?**

2 A. No.

3

4 **Q. WHAT IS YOUR RECOMMENDATION?**

5 A. I recommend a purchased power expense of \$148,708, or a reduction of \$4,461 to
6 the Company's claim.

7

8 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

9 A. I recommend the Company not receive an increase in the purchased power
10 expense over the historic test year expense for a number of reasons. First, the
11 Company does not shop for electricity to secure a lower rate and reduce this level
12 of expense (I&E Exhibit No. 2, Schedule 3). At the Commission website
13 www.puc.state.pa.us, business customers can click on a link for electric shopping
14 that will automatically link to www.PAPowerSwitch.com. Entering the
15 Company's zip code brings up the names of 55 suppliers for PECO business
16 customers. For example, if you click on Sperian Energy, the link advertises the
17 importance of cutting costs and all that is required from the business customer is to
18 fax Sperian a bill and Sperian guarantees to lower your current electricity costs
19 (I&E Exhibit No. 2, Schedule 4). In response to I&E-RE-11-D, the Company
20 respondent stated that due to a small staff, there is insufficient time for the
21 Company to shop for electricity (I&E Exhibit No. 2, Schedule 3). Such an excuse
22 is unacceptable and the Company should secure cheaper power by shopping.

1 The second reason for denying the Company's purchased power increase
2 claim relates to the Company representation that it is considering installing a new
3 pump that would increase electricity demand (I&E Exhibit No. 2, Schedule 3). It
4 is inappropriate to allow an expense for something that is only being considered,
5 the item must be used and useful for ratemaking purposes to be included in either
6 rate base or as contributing to an increase in a particular expense. Since the pump
7 is not installed, it is presently not used and useful and the Company's contention
8 that its purchased power expense claim would rise related to this pump must be
9 given no credence.

10 Finally, the purchase power expense increase should be denied because it is
11 too speculative. The Company has ongoing upgrades at its pumping stations
12 including the installation of Variable Frequency Drives (VFD's) that enable the
13 pumps to accommodate fluctuating demand, running pumps at lower speeds and
14 drawing less energy while still meeting pumping needs. The Company has
15 installed VFD's to help use less energy so my recommendation to keep the
16 expense at the same amount is reasonable considering the expense may even
17 decrease as explained above.

18
19 **PAYROLL**

20 **Q. WHAT IS THE COMPANY'S PAYROLL EXPENSE CLAIM?**

21 A. The Company's payroll expense is \$798,095 (AWC Schedule H-4, pp. 1-2).

1 **Q. WHAT IS THE BASIS FOR THE COMPANY'S PAYROLL**
2 **EXPENSE?**

3 A. The Company based the payroll expense claim on the historic test year,
4 while reflecting changes for the salary increase to the employees July 1,
5 2011 and by adding another 4% increase beginning July 1, 2012, for most
6 positions, except for the president receiving a 2% raise and one planned
7 new laborer (AWC Schedule H-3, p. 1, #4). The new part time laborer's
8 expected salary is identified as \$23,400 a year (AWC Schedule I-4, p. 2).

9

10 **Q. DO YOU AGREE WITH THE COMPANY'S PAYROLL EXPENSE?**

11 A. No.

12

13 **Q. WHAT DO YOU RECOMMEND?**

14 A. I recommend a payroll allowance of \$789,005, or a reduction of \$9,090 to
15 the Company's claim.

16

17 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

18 A. My recommendation is based on reducing the salary increase to 2.5%
19 instead of 4%.

20

21 **Q. COULD YOU EXPLAIN HOW YOU CALCULATED YOUR**
22 **ADJUSTMENT?**

1 A. Yes. I took the FTY salary of \$798,095 and subtracted the president's FTY
2 salary of \$144,462 (AWC Schedule H-4, p. 2) and the new part time
3 laborer's salary of \$23,400 for a FTY payroll expense for all other
4 employees of \$630,233. I then divided by the proposed raise of 1.04 to get
5 the base salary of \$605,993. I used the Blue Chip Financial Consumer
6 Price Index for May 1, 2012 and looked at the four quarters in the FTY
7 ending September 30, 2012 of 1.3%, 2.5%, 2.4% and 2.3% (I&E Exhibit
8 No. 2, Schedule 5). I chose the highest quarter and used that for my raise
9 recommendation for the FTY. My recommendation for all other employees
10 salary is the base salary of \$605,993 x 1.025 = \$621,143. I then added back
11 the president's FTY salary of \$144,462 and the new part time laborer's
12 salary of \$23,400 and arrived at my total payroll recommendation of
13 \$789,005.

14 The following chart illustrates my recommendation:

15	FTY total salary		\$798,095
16	Minus the president's FTY salary	(\$144,462)	
17	Minus the new part time labor's salary	(\$ 23,400)	
18	All other employee's FTY salary		\$630,233
19	Divide by the 4% (1.04) raise		\$605,993
20	Multiply the pre-raise salary by 2.5%	\$ 15,150	
21	Other employee's salary with raise		\$621,143
22	Add back the president's FTY salary	\$144,462	
23	Add back the new part time labor's salary	\$ 23,400	
24	I&E recommended FTY salary		<u>\$789,005</u>

1 Q. COULD YOU EXPLAIN WHY USING THE CONSUMER PRICE
2 INDEX OF 2.5% FOR A WAGE INCREASE IS MORE
3 APPROPRIATE THAN USING THE COMPANY'S PROPOSED 4%
4 WAGE INCREASE?

5 A. Yes. The Company proposed a 4% wage increase without sufficient
6 justification for its request. In the current tough economic times,
7 companies need to be mindful of increases to wages and adjust them
8 according to future predictions in the economy. Use of the CPI index is a
9 more appropriate salary increase given the current economic forecasts.
10 Such as adjustment is fair to both the ratepayers and the Company's
11 employees.

12

13 ADMINISTRATIVE AND GENERAL EXPENSES –
14 MISCELLANEOUS GENERAL EXPENSES

15

16 Q. WHAT ARE ADMINISTRATIVE AND GENERAL EXPENSES –
17 MISCELLANEOUS GENERAL EXPENSES?

18 A. Administrative and general expenses – miscellaneous general expenses
19 include dues & subscriptions, employee training, employee clothing, Xerox
20 copier expenses, bank service charges, and miscellaneous items.

1 **Q. WHAT IS THE COMPANY'S CLAIM FOR ADMINISTRATIVE**
2 **AND GENERAL EXPENSES – MISCELLANEOUS GENERAL**
3 **EXPENSES?**

4 A. The Company's claim for administrative and general expenses –
5 miscellaneous general expenses is \$16,223 (AWC Schedule H-4, p. 2).

6

7 **Q. WHAT IS THE IDENTIFIED BASIS FOR THE COMPANY'S**
8 **CLAIM?**

9 A. The Company's claim is broken down as follows (I&E Exhibit No. 2,
10 Schedule 6):

11	Dues & Subscriptions	\$ 5,499
12	Employee Training	545
13	Employee Clothing, etc.	749
14	Xerox copier expenses	1,035
15	Bank Service Charges	4,474
16	Small Misc. Items	<u>3,921</u>
17	Total	\$16,223

18 **Q. DO YOU AGREE WITH THE COMPANY'S CLAIM?**

19 A. No.

20

21 **Q. WHAT IS YOUR RECOMMENDATION?**

1 A. I recommend an administrative and general expenses – miscellaneous
2 general expense allowance of \$8,840, or a reduction of \$7,383 to the
3 Company’s claim.

4

5 **Q. WHAT IS THE BASIS FOR THE RECOMMENDATION?**

6 A. I have two recommendations to this expense. First, I recommend reducing
7 the dues and subscriptions portion of the claim to \$2,590, or a reduction of
8 \$2,909 to the Company’s claim. Second, I recommend eliminating the
9 bank charges of \$4,474 for a total recommendation of \$8,840, or a
10 reduction of \$7,383 to the administrative and general expenses –
11 miscellaneous general expense allowance.

12

13 **Q. WOULD YOU FURTHER EXPLAIN YOUR DUES AND**
14 **SUBSCRIPTIONS RECOMMENDATION OF \$2,590, OR A**
15 **REDUCTION OF \$2,909 TO THE COMPANY’S CLAIM?**

16 A. Yes. The Company provided a breakdown of the dues and subscriptions
17 portion of the claim as follows (I&E Exhibit No. 2, Schedule 7):

1	Brookside Country Club	\$2,410
2	Swiftreach Networks Inc. Customer Rapid Response	1,160
3	Rural Water Assoc. – Annual	547
4	AWWA – Annual	380
5	Newspapers, Local etc. – Annual	503
6	Greater Philadelphia News Subscription – Annual	200
7	Miscellaneous	<u>299</u>
8	Total	\$5,499

9

10 For ratemaking purposes the Brookside Country Club dues of \$2,410, the
 11 Greater Philadelphia News Subscription of \$200, and the miscellaneous
 12 subscriptions of \$299 are not necessary expenses in providing safe and
 13 reliable water service to ratepayers and should not be included in rates.

14 Upon removal of these claims totaling a reduction of \$2,909 (\$2,410 +
 15 \$200 + \$299), I recommend a dues and subscription allowance of \$2,590.

16

17 **Q. WOULD YOU FURTHER EXPLAIN YOUR RECOMMENDATION**
 18 **TO REMOVE THE ENTIRE BANK SERVICE CHARGES**
 19 **EXPENSE CLAIM, A REDUCTION OF \$4,474 TO THE**
 20 **COMPANY’S CLAIM?**

21 A. Yes. I recommend removing the bank service charges because the
 22 Company’s response to the interrogatory seeking details of the claim states
 23 that the fees are for check deposits, returned checks, etc. (I&E Exhibit No.
 24 2, Schedule 7). Returned check fees can either be for insufficient funds for

1 a check written by the Company or one received from a customer. Fees for
2 customer checks with insufficient funds should be recovered from the
3 offending customers, not included in this claim. The Company's Tariff,
4 Part 1, Section G states that a charge of \$35 will be assessed to the
5 customer any time a check is returned by the payer's bank for any reason
6 (Tariff Water – Pa PUC No. 4, p. 8). Company checks with insufficient
7 funds are the fault of the Company and should also not be recovered in this
8 expense claim. As a result, there is no sufficient justification provided by
9 the Company to warrant having this claim be a legitimate expense. Since
10 the Company did not provide a breakdown of the costs, it is unknown
11 which, if any, of the bank service charges should be permitted in a rate case
12 filing.

13
14 **Q. PLEASE SUMMARIZE YOUR ADJUSTMENTS TO**
15 **ADMINISTRATIVE AND GENERAL EXPENSES –**
16 **MISCELLANEOUS GENERAL.**

17 A. I adjusted the dues & subscriptions by \$2,909 and the bank service charges
18 by \$4,474 for a total adjustment of \$7,383. The Company's claim was
19 \$16,223 and my recommended expense allowance is \$8,840 (\$16,223 –
20 7,383).

1 **MAINTENANCE OF MAINS**

2 **Q. WHAT IS THE COMPANY'S CLAIM FOR MAINTENANCE OF**
3 **MAINS?**

4 A. The Company is claiming a maintenance of mains expense of \$30,405
5 (AWC Schedule H-4, p. 1).

6 **Q. WHAT IS THE COMPANY'S BASIS FOR THE MAINTENANCE**
7 **OF MAINS CLAIM?**

8 A. The Company is claiming \$15,000 for the new T&D preventative
9 maintenance projects (AWC Schedule H-3, p. 2, # 9) and the remaining
10 balance is for lawn maintenance, snowplowing, main welding and repairs
11 (I&E Exhibit No. 2, Schedule 8).

12
13 **Q. DO YOU AGREE WITH THE COMPANY'S CLAIM?**

14 A. No.
15

16 **Q. WHAT IS YOUR RECOMMENDATION?**

17 A. I recommend a maintenance of mains expense of \$28,304, or a reduction of
18 \$2,101 to the Company's claim.
19

20 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

21 A. My recommendation is based on the history of the expense to the
22 Company. The Company had maintenance of mains expenses of \$12,899,

1 \$11,608, and \$15,405 for September 30, 2009, September 30, 2010, and
2 September 30, 2011 respectively (I&E Exhibit No. 2, Schedule 9). I
3 recommend smoothing out the expense to account for the peaks and valleys
4 in levels of the expense to show a more accurate picture of the expense on a
5 going forward basis. I recommend use of the average of the last three years
6 expenses for a total \$13,304 $((\$12,899 + \$11,608 + \$15,405)/3)$ and then
7 add the new main maintenance project of \$15,000 for a total maintenance
8 main expense of \$28,304. This recommendation results in a reduction of
9 \$2,101 to the Company's claim.

10
11 **INSURANCE**

12 **Q. WHAT IS THE COMPANY'S CLAIM FOR INSURANCE?**

13 A. The Company's claim for insurance is \$75,236 (AWC Schedule H-4, p. 2).

14
15 **Q. WHAT IS THE BASIS FOR THE COMPANY'S CLAIM?**

16 A. The Company used the amount experienced in fiscal year September 30,
17 2011 to base their FTY claim.

18
19 **Q. DO YOU AGREE WITH THE COMPANY?**

20 A. No.

21
22 **Q. WHAT DO YOU RECOMMEND?**

1 A. I recommend an allowable insurance claim of \$73,844, or a reduction of
2 \$1,392 to the Company's claim.

3

4 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

5 A. I recommend an allowance that is more representative of the Company's
6 experienced insurance expenses. The Company experienced insurance
7 expenses of \$81,059, \$65,236, and \$75,236 for September 30, 2009,
8 September 30, 2010, and September 30, 2011 respectively (I&E Exhibit
9 No. 2, Schedule 9). I recommend the Company use an average of the
10 historical insurance expense to smooth out the peaks and valleys in the
11 range for this expense. I am basing my recommended allowance of
12 \$73,844 $((\$81,059 + \$65,236 + \$75,236)/3)$ on the historical average. My
13 recommendation results in a reduction of \$1,392 to the Company's claim.

14

15 **CASH WORKING CAPITAL**

16 **Q. WHAT IS A CASH WORKING CAPITAL (CWC) ALLOWANCE**
17 **FOR RATEMAKING PURPOSES?**

18 A. CWC is the amount of funds necessary to operate a utility during the
19 interim between the rendition of service, including the payment of related
20 expenses and the receipt of revenue in payment for services rendered.

1 **Q. WOULD YOU EXPLAIN THE DIFFERENCE BETWEEN THE**
2 **RATEMAKING AND ACCOUNTING CONCEPTS OF WORKING**
3 **CAPITAL?**

4 A. Yes. Outside the arena of utility ratemaking, accountants define working
5 capital as the difference between current assets and current liabilities, which
6 is a measure of a business' liquidity at a given point in time. On the other
7 hand, the ratemaking concept defines CWC as the amount of capital that a
8 utility requires to cover the gap/lag between the payment of operating
9 expenses and taxes and the receipt of revenue from utility ratepayers.

10

11 **Q. WHAT IS THE COMPANY'S CLAIM FOR CWC?**

12 A. The Company's claim for CWC is \$266,077 (AWC Schedule F-2).

13

14 **Q. DID THE COMPANY UPDATE THE CWC CLAIM?**

15 A. Yes. In Company Witness Kalbarczyk's Statement DMK-1, CWC was
16 reduced by \$3,071, thus revising the CWC claim to \$263,006 (Statement
17 DMK-1, p. 28).

18

19 **Q. WHAT METHOD DID THE COMPANY USE TO CALCULATE THE**
20 **CWC CLAIM?**

21 A. The Company calculated CWC utilizing the 1/8th method. As the name
22 implies, the formula is 1/8 (45/365 days) of operating expenses as the

1 estimate of cash working capital requirements.

2
3 **Q. WHAT IS THE COMPANY'S STATED BASIS FOR ITS CWC**
4 **CLAIM?**

5 A. The Company used the calculated operating expenses of \$2,128,620 and
6 divided that by 8 for a CWC claim of \$266,077($\$2,128,620/8$) (AWC
7 Schedule F-2). As mentioned previously here in my Direct Testimony, the
8 Company reduced expenses by \$24,573 in Statement DMK-1. The updated
9 calculation with the reduced operating expenses is \$2,104,047 ($\$2,128,620$
10 $- \$24,573$) divided by 8 for the 1/8th method for a CWC claim of \$263,006
11 ($\$2,104,047/8$).

12
13 **Q. HAS THERE BEEN ANY UPDATES SINCE COMPANY WITNESS**
14 **KALBARCZYK'S DIRECT TESTIMONY?**

15 A. Yes. In response to an interrogatory, Company Witness Kalbarczyk stated
16 the Company will update its filing to reflect a reduction of \$40,097 to
17 income taxes (I&E Exhibit No. 3, Schedule 7). This update reduces
18 operating expenses to \$2,060,950 ($\$2,104,047 - \$40,097$).

19
20 **Q. DO YOU AGREE WITH THE COMPANY'S CLAIM FOR CWC?**

21 A. No.

1 **Q. WHAT IS YOUR RECOMMENDATION?**

2 A. I recommend an allowable CWC claim of \$244,103, a reduction of \$18,903
3 to the Company's updated claim referenced in Statement DMK-1, p. 28.

4
5 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

6 A. As detailed earlier in this Direct Testimony, I have made adjustments to the
7 operating and maintenance expenses (O&M), including expenses for rate
8 case, purchased power, payroll, administrative & general expenses –
9 miscellaneous general, maintenance of mains, and insurance. The
10 following chart illustrates my CWC recommendation that reflects those
11 O&M adjustments:

12	Company's Operating Expenses	\$ 2,128,620
13	less adjustments in Statement DMK-1	(\$ 24,573)
14	less the Company's income tax correction	(\$ 40,097)
15	less I&E adjustments	(\$ 111,125)
16	TOTAL	\$ 1,952,825
17	I&E recommended CWC allowance (\$1,952,825/ 8)	\$ 244,103

18
19 **Q. DOES YOUR RECOMMENDED CWC ALLOWANCE OF \$244,103**
20 **REPRESENT A FINAL RECOMMENDED ALLOWANCE FOR**
21 **CWC?**

22 A. No. All adjustments to the Company's claims for revenues, expenses, taxes

1 and rate base must be consistently brought together in the ALJ's
2 Recommended Decision and, again, in the Commission's Final Order. This
3 process, known as "iteration", effectively prevents the determination of a
4 precise calculation until such time as all adjustments have been made to the
5 Company's claim.

6
7 **WATER STORAGE TANK PAINTING AMORTIZATION**

8 **Q. WHAT IS THE WATER STORAGE TANK PAINTING EXPENSE?**

9 A. The water storage tank painting amortization expense claim is for the
10 painting of the Arcola Road water storage tank and the Featherbed Lane
11 water storage tank (AWC Schedule I-12).

12
13 **Q. WHAT IS THE COMPANY'S CLAIM FOR WATER STORAGE
14 TANK PAINTING AMORTIZATION?**

15 A. The Company is claiming an amortization for water storage tank painting
16 of \$10,750 (AWC Schedule I-12).

17
18 **Q. WHAT IS THE BASIS FOR THE COMPANY'S CLAIM?**

19 A. The Company stated an intention to touch up paint on the Arcola Road tank
20 and to paint the Featherbed Lane tank. The Company provided expense
21 estimates of \$20,000 for the Arcola Road water storage tank and \$87,500
22 for the Featherbed Lane water storage tank. The Company's total water

1 storage tank painting estimate is \$107,500 amortized over 10 years, for an
2 annual \$10,750 amortized water storage tank painting claim (AWC
3 Schedule I-12).

4
5 **Q. DO YOU AGREE WITH THE COMPANY'S CLAIM?**

6 A. No.

7
8 **Q. WHAT IS YOUR RECOMMENDATION?**

9 A. I recommend an amortization of \$8,750 for the water storage tank painting,
10 or a reduction of \$2,000 to the Company's \$10,750 claim.

11
12 **Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?**

13 A. I recommend removing the Arcola Road water storage tank painting
14 because, as stated in I&E Statement No. 3, this tank has never been used
15 and useful and is being removed from rate base. As such, there is no
16 corresponding expense allowable. My removal of the Arcola Road water
17 storage tank painting expense reduces the Company's total water storage
18 tank painting expense to only \$87,500 for the Featherbed Lane water
19 storage tank. That amount amortized over 10 years produces an appropriate
20 annual amortized water storage tank painting claim of \$8,750.

21
22 **Q. WOULD YOU PLEASE SUMMARIZE YOUR ADJUSTMENTS?**

1 A. Yes. The following charts summarize my adjustments:

O&M	Company Claim	I&E Recommendation	Adjustment
Rate Case Expense	\$115,000	\$ 28,302	(\$ 86,698)
Purchased Power	\$153,169	\$148,708	(\$ 4,461)
Payroll	\$798,095	\$789,005	(\$ 9,090)
Miscellaneous General	\$ 16,223	\$ 8,840	(\$ 7,383)
Maintenance of Mains	\$ 30,405	\$ 28,304	(\$ 2,101)
Insurance	\$ 75,236	\$ 73,844	(\$ 1,392)
Total			(\$ 111,125)

2

Rate Base	Company Claim	I&E Recommendation	Adjustment
Cash Working Capital (CWC)	\$263,006	\$ 244,103	(\$ 18,903)

3

Amortizations	Company Claim	I&E Recommendation	Adjustment
Water Storage Tank Painting	\$ 10,750	\$ 8,750	(\$ 2,000)

4

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

6 A. Yes. However, I reserve the right to submit supplemental testimony as the
7 Company provides interrogatory responses and/or updates to responses
8 during the course of this proceeding.

APPENDIX A

PROFESSIONAL AND EDUCATION EXPERIENCE

DEBRA J. BACKER

Professional Experience

December 2005 to Present: Pennsylvania Public Utility Commission, Harrisburg, Pennsylvania.

Fixed Utility Financial Analyst – Responsible, primarily, for the review of operating and maintenance expense and cash working capital as part of the evaluation and recommendation process for utility base rate and purchase gas costs filings.

November 2004 to December 2005: Pennsylvania Department of Labor and Industry, Harrisburg, Pennsylvania.

Unemployment Compensation Tax Technician – Responsible, primarily, for reviewing and maintaining employer's accounts and ensuring the accounts were in compliance with the Pennsylvania Unemployment Compensation Law and making proper adjustments necessary to ensure compliance.

Education

Edinboro University of Pennsylvania, Edinboro, Pennsylvania
Bachelor of Science; Major in Business Administration, 1993

Attended NARUC Rate School, San Diego, CA

Testimony submitted

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

PPL Electric Utilities Corporation, Docket No. R-00072155
PPL Gas Utilities Corporation, 1307(f) proceeding, Docket No. R-00072333
Pennsylvania-American Water Company, Docket No. R-00072229
West Penn Power Company, Docket No. P-00072342

TESI, Treasure Lake Water Division, Docket No. R-00072493
TESI, Treasure Lake Wastewater Division, Docket No. R-00072495
Columbia Gas of Pennsylvania, Inc., Docket No. R-2008-2011621
Equitable Gas Company, Docket No. R-2008-2029325
Pike County Light & Power Company, Docket No. R-2008-2046520
UGI Central Penn Gas, Inc., Docket No. R-2008-2079675
UGI Penn Natural Gas, Inc., Docket No. R-2008-2079660
Pennsylvania American Water Company, Docket No. R-2009-2097323
Clean Treatment Sewage Company, Docket No. R-2009-2121928
United Water Pennsylvania, Inc., Docket No. R-2009-2122887
Columbia Gas of Pennsylvania, Inc., Docket No. R-2009-2149262
PECO Energy Company – Gas Operations, Docket No. R-2010-2161592
The York Water Company, Docket No. R-2010-2157140
TESI, Treasure Lake Water Division, Docket No. R-2010-2171918
TESI, Treasure Lake Wastewater Division, Docket No. R-2010-2171924
Deer Haven Water Company Petition, Docket No. P-2010-2204817
Deer Haven Sewer Company Petition, Docket No. P-2010-2204818
Deer Haven Water Company, Docket No. R-2010-2194499
Deer Haven Sewer Company, Docket No. R-2010-2194577
LWWC, Masthope Division, Docket No. R-2010-2207833
The Newtown Artesian Water Company, Docket No. R-2011-2230259
The Newtown Artesian Water Company, Docket No. P-2010-2216324
UGI Central Penn Gas, Inc., 1307(f) proceeding, Docket No. R-2011-2238949
Pennsylvania American Water Company, Docket No. R-2011-2232243

**I&E Exhibit No. 2
Witness: Debra Backer**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

**Exhibit to Accompany
the
Direct Testimony
of
Debra Backer
Bureau of Investigation and Enforcement**

2012 JUL -6 PM 4:23
RECEIVED
BUREAU OF INVESTIGATION AND ENFORCEMENT

**Concerning:
Operation & Maintenance Expenses
Cash Working Capital**

**Audubon Water Company
Docket No. R-2012-2286118**

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RE-16-D

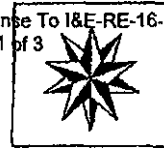
Reference Schedule H-3, p. 2, Pro Forma Adjustments #11, Rate Case Expense. Provide the following:

- A. Invoices and contracts to support the rate case expense claim of \$230,000 and provide updates during the duration of this proceeding;
- B. The estimate of rate case expense if the case is settled before hearings.
- C. The dollar amount the Company was charged for the Cost of Service Study provided in the filing.

RESPONSE:

Dennis M. Kalbarczyk, Consultant; March 8, 2012.

- A. Attached as "Response To I&E-RE-16-D" are copies of invoices received to date. There are no contracts related to the instant filing.
- B. The Company submits that it is unable to provide an estimate at this time of rate case expense if the case is settled before hearings. In brief, the Company does not know nor can it predict at this time the number of active parties, the extent of review and discovery, or the position(s) of others that may impact efforts to reach a reasonable settlement. The Company, of course, is open to discussions with all active parties in an effort to reach a settlement in this matter that would minimize discovery and rate case issues, if any, to include a reasonable level of rate increase that would, at the same time, minimize rate case expense.
- C. The approximate dollar amount related to the Cost of Service Study in support of the proposed rate design for residential, commercial, and fire protection rates was \$1,020.



Utility Rate Resources

Utility Rate and Economic Consulting

910 Piketown Road
Harrisburg PA 17112
Phone: (717) 469-7232

INVOICE

Audubon Water Company
Valley Forge Corp. Center
2650 Eisenhower Ave.
P.O. Box 7337
Norristown PA 19403

December 31, 2011

Invoice No. 20110039

Our Reference No. 195

RE: 2012 PaPUC General Rate Increase Filing

TO CONSULTING SERVICES: For services provided for the months of October and November 2011 related to 2012 PaPUC General Rate Increase Filing to include but not limited too: review of financial documents and prepare draft supporting schedules for rate case filing; and, discussion with Company and Counsel regarding same.

Professional Services:

	<u>Hrs/Rate</u>	<u>Amount</u>
D.M. Kalbarczyk	34.00 170.00/hr	5,780.00
For Professional Services Rendered	34.00	\$5,780.00
Balance Due		\$5,780.00



Utility Rate Resources

Utility Rate and Economic Consulting

910 Piketown Road
Harrisburg PA 17112
Phone: (717) 469-7232

INVOICE

Audubon Water Company
Valley Forge Corp. Center
2650 Eisenhower Ave.
P.O. Box 7337
Norristown PA 19403

February 12, 2012

Invoice No. 20110042

Our Reference No. 195

RE: 2012 PaPUC General Rate Increase Filing

TO CONSULTING SERVICES: For services provided for the months of December 2011 and January 2012 related to 2012 PaPUC General Rate Increase Filing to include but not limited too: review of financial documents; prepare draft and final supporting financial schedules for rate case filing to include but not limited to pro forma adjustments, bill analysis, cost of service study, rate design and proof of revenue schedules; prepare draft and final background section; travel to Company and return on January 5 and 19, 2012; and, discussion with Company and Counsel regarding same.

Professional Services:

	<u>Hrs/Rate</u>	<u>Amount</u>
D.M. Kalbarczyk	78.00 170.00/hr	13,260.00
For Professional Services Rendered	78.00	\$13,260.00
Additional Expense Charges:		
- Mileage		107.10
- Toll Travel Ch		11.94
- Mileage		107.10
- Toll Travel Ch		11.94
Total Expense Charges		\$238.08
Total Charges for this Billing Period		\$13,498.08
Previous Balance		\$5,780.00

Audubon Water Company
Invoice No. 20110042

February 12, 2012

Page 2

	<u>Amount</u>
2/6/12- Payment - Thank You	(\$5,780.00)
Balance Due	<u><u>\$13,498.08</u></u>

HAWKE McKEON & SNISCAK LLP

100 North Tenth Street
Harrisburg, PA 17101
Phone: 717-236-1300
Fax: 717-236-4841
EIN: 23-2194794

January 20, 2012
Invoice # 45219
Matter # 184-0000021

Audubon Water Company
ATTN: Martha M. Russell
Valley Forge Corporate Center
1650 Eisenhower Ave.
Norristown, Pa 19403

Re: 2012 Rate Case

For Services Rendered Through December 31, 2011

Current Fees	462.00
--------------	--------

Total Current Charges	462.00
------------------------------	---------------

Total Balance Due	462.00
--------------------------	---------------

Audubon Water Company
Re: 2012 Rate Case
I.D. 184-0000021 - TJS

January 20, 2012
Invoice 45219
Page 2

Fees

Description

Confer with client and rate consultant regarding preparation of rate case filing.

Total Fees 462.00

Total Current Charges 462.00

HAWKE McKEON & SNISCAK LLP

100 North Tenth Street
Harrisburg, PA 17101
Phone: 717-236-1300
Fax: 717-236-4841
EIN: 23-2194794

February 13, 2012
Invoice # 45332
Matter # 184-0000021

Audubon Water Company
ATTN: Martha M. Russell
Valley Forge Corporate Center
1650 Eisenhower Ave.
Norristown, Pa 19403

Re: 2012 Rate Case

For Services Rendered Through January 31, 2012

Balance Forward		462.00
Current Fees	14,762.00	
Current Disbursements	491.81	
Total Current Charges		15,253.81
	Total Balance Due	15,751.81

Audubon Water Company
Re: 2012 Rate Case
I.D. 184-000021 - TJS

February 13, 2012
Invoice 45332
Page 2

Fees

Description

Multiple conversations with client and rate consultant regarding rate case filing; prepare customer notices, press release and tariff revisions; compare existing tariff with PUC's sample; review finished rate filing and supporting documents; prepare, assemble and file same; make arrangements for mailing customer notices, publication and media announcements; prepare and transmit copy of filing for Company's records.

Total Fees 14,762.00

**Audubon Water Company
 Docket No. R-2012-2286118**

UPDATED Response to I&E-RE-16.A. and OCA Set I-4

I&E-RE-16.A. Reference Schedule H-3, p. 2, Pro Forma Adjustments #11, Rate Case Expense. Provide the following:

A. Invoices and contracts to support the rate case expense claim of \$230,000 and provide updates during the duration of this proceeding;

OCA Set I-4 Provide copies of all invoices that support rate case expense incurred to date for this case.

RESPONSE: Dennis M. Kalbarczyk, Consultant; March 8, 2012, ~~Updated May 7, 2012~~

A. Attached as "Response To I&E-RE-16-D" are copies of invoices received to date. There are no contracts related to the instant filing.

~~Additional invoice copies are attached to this response.~~

Date Served	HMS Invoices		URR Invoices	
	#	Amount	#	Amount
3/9/12	# 45219	462.00	20110039	5,780.00
3/9/12	# 45332	15,253.81	20110042	13,498.08
5/2/12	# 45433	1,099.17		
5/2/12	# 45498	20,233.40		
Subtotal		16,715.81		19,278.08
TOTAL				35,993.89

HAWKE McKEON & SNISCAK LLP

100 North Tenth Street
Harrisburg, PA 17101
Phone: 717-236-1300
Fax: 717-236-4841
EIN: 23-2194794

March 21, 2012
Invoice # 45433
Matter # 184-0000021

Audubon Water Company
ATTN: Martha M. Russell
Valley Forge Corporate Center
2650 Eisenhower Ave.
Norristown, Pa 19403

Re: 2012 Rate Case

For Services Rendered Through February 29, 2012

Previous Balance – PLEASE DISREGARD IF PAID	15,715.81
Payments	- 2,462.00
Balance Forward	13,253.81
Current Fees	1,703.00
Current Disbursements	296.57
Total Current Charges	1,999.57
Total Balance Due	15,253.38

Audubon Water Company
Re: 2012 Rate Case
I.D. 184-0000021 - TJS

March 21, 2012
Invoice 45433
Page 2

Fees

Description

Multiple conversations with client and rate consultant regarding information needed for discovery preparation, requirements of Order entered in connection with 2007 rate case and printer's Proof of Mailing; research PUC files for customer complaints (none found); review two customer protest letters; review and respond to I&E discovery requests; prepare and file Affidavit to show completion of customer notice requirements in PUC Regulations.

Total Fees

1,703.00

HAWKE McKEON & SNISCAK LLP

100 North Tenth Street
Harrisburg, PA 17101
Phone: 717-236-1300
Fax: 717-236-4841
EIN: 23-2194794

April 30, 2012
Invoice # 45493
Matter # 184-0000021

Audubon Water Company
ATTN: Martha M. Russell
Valley Forge Corporate Center
2650 Eisenhower Ave.
Norristown, Pa 19403

Re: 2012 Rate Case

For Services Rendered Through March 31, 2012

Previous Balance – PLEASE DISREGARD IF PAID		15,253.38
Payments		- 2,000.00
Balance Forward		13,253.38
Current Fees	20,130.00	
Current Disbursements	103.40	
Total Current Charges		20,233.40
Total Balance Due		33,486.78

Audubon Water Company
Re: 2012 Rate Case
I.D. 184-0000021 – TJS

April 30, 2012
Invoice 45493
Page 2

Fees

Description

Multiple conversations with client and rate consultant regarding rate case activities; review, prepare, assemble and serve numerous discovery responses; review Formal Complaint filed by OCA; conversations regarding and preparation and execution of Stipulated Protective Agreements with OCA and I&E; review Commission Order suspending rate case and Mediation Notice; conversation with OALJ regarding mediation; prepare and file Suspension Tariff; review PUC files for customer complaints (none found) and letters of protest (one found); review Notice of Prehearing Conference and ALJ Pell's Prehearing Order; prepare Prehearing Memorandum in compliance with same.

Total Fees

20,130.00

Audubon Water Company
Re: 2012 Rate Case
I.D. 184-0000021 - TJS

April 30, 2012
Invoice 45493
Page 3

Disbursements

Description	Amount
Outside Copy Service	25.44
Telephone Tolls	0.16
Delivery Expense	35.00
Supplies	42.80

Total Disbursements **103.40**

Total Current Charges **20,233.40**

Balance Forward 13,253.38

Total Amount Due **33,486.78**

Audubon Water Company
Docket No. R-2012-2286118

UPDATED Response to I&E-RE-16.A. and OCA Set I-4

I&E-RE-16.A. Reference Schedule H-3, p. 2, Pro Forma Adjustments #11, Rate Case Expense. Provide the following:

- A. Invoices and contracts to support the rate case expense claim of \$230,000 and provide updates during the duration of this proceeding;

OCA Set I-4 Provide copies of all invoices that support rate case expense incurred to date for this case.

RESPONSE: Dennis M. Kalbarczyk, Consultant; March 8, 2012, Updated May 2, 2012;
~~Updated May 8, 2012~~

- A. Attached as "Response To I&E-RE-16-D" are copies of invoices received to date. There are no contracts related to the instant filing.

~~Additional invoice copies are attached to this response.~~



Utility Rate Resources

Utility Rate and Economic Consulting

910 Picketown Road
Harrisburg PA 17112
Phone: (717) 469-7232

INVOICE

Audubon Water Company
Valley Forge Corp. Center
2650 Eisenhower Ave.
P.O. Box 7337
Norristown PA 19403

April 4, 2012

Invoice No. 20110045

Our Reference No. 195

RE: 2012 PaPUC General Rate Increase Filing

TO CONSULTING SERVICES: For services provided for the months of February 2012 related to 2012 PaPUC General Rate Increase Filing to include but not limited to: discussion with Company regarding rate case filing matters.

Professional Services:

	<u>Hrs/Rate</u>	<u>Amount</u>
D.M. Kalbarczyk	0.25 170.00/hr	42.50
For Professional Services Rendered	0.25	\$42.50
Previous Balance		\$13,498.08
3/16/12- Payment - Thank You (CK#18729)		- (\$2,000.00)
Balance Due		<u>\$11,540.58</u>



Utility Rate Resources

Utility Rate and Economic Consulting

910 Picketown Road
Harrisburg PA 17112
Phone: (717) 469-7232

INVOICE

Audubon Water Company
Valley Forge Corp. Center
2650 Eisenhower Ave.
P.O. Box 7337
Norristown PA 19403

May 4, 2012

Invoice No. 20110048

Our Reference No. 195

RE: 2012 PaPUC General Rate Increase Filing

TO CONSULTING SERVICES: For services provided for the month of March 2012 related to 2012 PaPUC General Rate Increase Filing to include but not limited to: review of PaPUC I&E and Office Of Consumer Advocate data request; preparation of draft and final responses to I&E and OCA data request; and, discussions with Company, Company's outside accountants, and regulatory counsel regarding same.

Professional Services:

	<u>Hrs/Rate</u>	<u>Amount</u>
D.M. Kalbarczyk	34.00 170.00/hr	5,780.00
For Professional Services Rendered	34.00	\$5,780.00
Previous Balance		\$11,540.58
4/18/12- Payment - Thank You (CK318878)		(\$2,000.00)
Balance Due		<u>\$15,320.58</u>

**Audubon Water Company
Docket No. R-2012-2286118**

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RE-15-D Provide the following information for the last three base rate proceedings filed with the Commission:

- A. Docket number, date of filing, and method of resolution, i.e. settlement or litigation;
- B. Requested rate case expense and the actual rate case expense;
- C. Effective date of the rate case increase.

RESPONSE: Dennis M. Kalbarczyk, Consultant; March 8, 2012.

The information requested is provided as follows:

- 1. Docket No. R-00072100
Filed March 5, 2007
Settled
Rate case expense requested \$230,000; \$160,129 actual.
Phase 1 rates were put into effect on October 16, 2007
(Supplement No. 11 to Tariff Water – Pa. P.U.C. No. 3)
Phase 2 rates were put into effect on January 1, 2009 (Supplement
No. 12 to Tariff Water – Pa. P.U.C. No. 3)
- 2. Docket No. R-00027104
Filed January 16, 2002
Settled
Rate case expense requested \$230,000; \$79,291 actual.
New rates were put into effect on September 27, 2002 (Supplement
No. 9 to Tariff Water – Pa. P.U.C. No. 3)
- 3. Docket No. R-00984425
Filed July 29, 1998
Settled
Rate case expense requested \$120,000; actual cost is not readily
available.
New rates were put into effect on March 8, 1999 (Supplement No.
5 to Tariff Water – Pa. P.U.C. No. 3)

**Audubon Water Company
Docket No. R-2012-2286118**

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RE-11-D Reference Schedule H-3, page 1, Pro Forma Adjustments #8, Purchased Power expense. Provide the following:

- A. The name of the Company's electric provider and the rate schedule the Company is on;
- B. Documentation supporting the 3% increase for purchased power for the future test year;
- C. An explanation if the Company shops for electricity and the results of any shopping efforts. If the Company does not shop, explain why not.

RESPONSE: Dennis M. Kalbarczyk, Consultant, and JH Russell, CFO/COO, Audubon Water Company; March 8, 2012.

- A. PECO, the Company's electric provider, is regulated by the Commission. The Company is on the GS or General Service Rate Schedule. PECO's rate schedules are on file with the Commission and rates vary based upon current Supplement No. to Tariff Electric Pa. P.U.C. No. 4 in effect. For example; in the currently effective Tariff Supplement, fixed distribution or customer charges and variable distribution service charges and energy efficiency charges are on Page No. 47; generation charges based on commodity consumed at declining block rates are on Page No. 31; transmission charges are on Page 40A; and, the State Tax Adjustment Surcharge is on Page 30.
- B. The Company's estimated increase was based upon \$148,708 and \$147,028 cost of electricity in fiscal years 9/30/2011 and 9/30/2010, respectively, an increase of approximately 1.1% or \$1,700 ($\$148,708 \times 1.2\%$). The increase also includes consideration of the addition of a new pump to the Company's system with an estimate of \$230/mth or \$2,760, resulting in a sum total pro forma adjustment of \$4,461 for the future test year.
- C. The Company has a considerable number of individual electric accounts (e.g., wells, etc.) and its small administrative staff does not provide sufficient time for monitoring and analysis of the market to shop for electric prices. When the Company previously explored alternative suppliers, it found that little or no savings would have resulted from switching.



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Commercial Services

Sperian Energy Commercial Services

Business ownership means always watching the bottom line. It's important to cut costs wherever you can, as often as possible. How about every month? Partner with Sperian and we'll help you manage your electricity cost so you can focus on growing your business.

We guarantee to lower your current electricity costs. Simply fax us a bill and let us tell you how much you'll save each month. The transition is seamless. No headache, no hassle, just paying less for the same reliable service.

Switch to Sperian Energy today and invest those savings back where it counts - into your business.

Need Help?

Call Sperian Energy:
1.888.682.8082
Monday through Friday
9AM - 6PM EST

Email Sperian Energy:

[Email](#)

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2 ■ BLUE CHIP FINANCIAL FORECASTS ■ MAY 1, 2012

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions¹

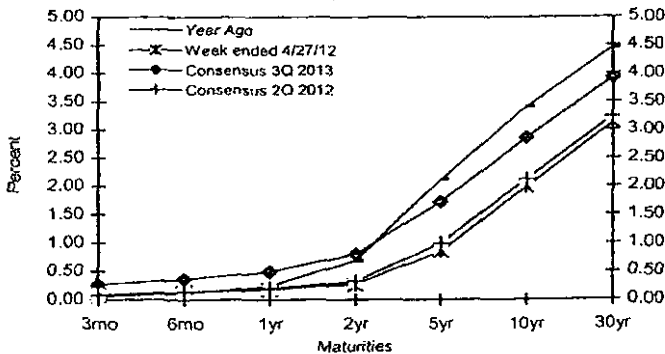
Interest Rates	History								Consensus Forecasts-Quarterly A					
	Average For Week Ending				Average For Month				Latest Q	2Q	3Q	4Q	1Q	2Q
	Apr. 27	Apr. 20	Apr. 13	Apr. 6	Mar.	Feb.	Jan.	1Q 2012	2012	2012	2012	2013	2013	2013
Federal Funds Rate	0.13	0.15	0.14	0.12	0.13	0.10	0.08	0.10	0.1	0.1	0.1	0.1	0.2	0.3
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.3	3.3	3.3	3.3	3.3	3.3
LIBOR, 3-mo.	0.47	0.47	0.47	0.47	0.47	0.50	0.57	0.51	0.5	0.4	0.4	0.5	0.5	0.6
Commercial Paper, 1-mo.	0.12	0.12	0.15	0.12	0.13	0.12	0.09	0.11	0.1	0.2	0.2	0.2	0.2	0.4
Treasury bill, 3-mo.	0.08	0.08	0.09	0.08	0.08	0.09	0.03	0.07	0.1	0.1	0.1	0.1	0.2	0.3
Treasury bill, 6-mo.	0.13	0.13	0.14	0.14	0.14	0.12	0.07	0.11	0.1	0.1	0.2	0.2	0.3	0.4
Treasury bill, 1 yr.	0.18	0.18	0.18	0.19	0.19	0.16	0.12	0.16	0.2	0.2	0.2	0.3	0.4	0.5
Treasury note, 2 yr.	0.27	0.27	0.29	0.34	0.34	0.28	0.24	0.29	0.3	0.4	0.4	0.5	0.7	0.8
Treasury note, 5 yr.	0.85	0.86	0.88	1.02	1.02	0.83	0.84	0.90	1.0	1.1	1.2	1.4	1.5	1.7
Treasury note, 10 yr.	1.99	2.00	2.04	2.21	2.17	1.97	1.97	2.04	2.1	2.3	2.4	2.6	2.7	2.9
Treasury note, 30 yr.	3.12	3.13	3.17	3.33	3.28	3.11	3.03	3.14	3.2	3.4	3.5	3.7	3.8	3.9
Corporate Aaa bond	3.95	3.93	3.94	4.03	3.99	3.85	3.85	3.90	4.0	4.1	4.2	4.3	4.4	4.5
Corporate Baa bond	5.15	5.15	5.19	5.29	5.23	5.14	5.23	5.20	5.2	5.3	5.4	5.5	5.6	5.7
State & Local bonds	3.86	3.90	3.97	4.08	3.91	3.66	3.68	3.75	3.9	4.0	4.1	4.2	4.3	4.4
Home mortgage rate	3.88	3.90	3.88	3.98	3.95	3.89	3.92	3.92	4.0	4.1	4.2	4.3	4.4	4.5

Key Assumptions	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
	2010	2010	2010	2011	2011	2011	2011	2012	2012	2012	2013	2013	2013	2013
Major Currency Index	77.6	75.9	73.0	71.9	69.6	69.9	72.4	72.9	73.2	73.2	73.3	73.3	73.3	73.3
Real GDP	3.8	2.5	2.3	0.4	1.3	1.8	3.0	2.2	2.3	2.5	2.7	2.5	2.6	2.9
GDP Price Index	1.5	1.4	1.9	2.5	2.5	2.6	0.9	1.5	1.9	2.0	2.0	2.1	2.0	2.1
Consumer Price Index	-0.3	1.4	3.0	4.5	4.4	3.1	1.3	2.5	2.4	2.3	2.2	2.3	2.3	2.4

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are the same as those in FRSR H.15. Treasury yields as reported on a constant maturity basis. Historical data for the Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).

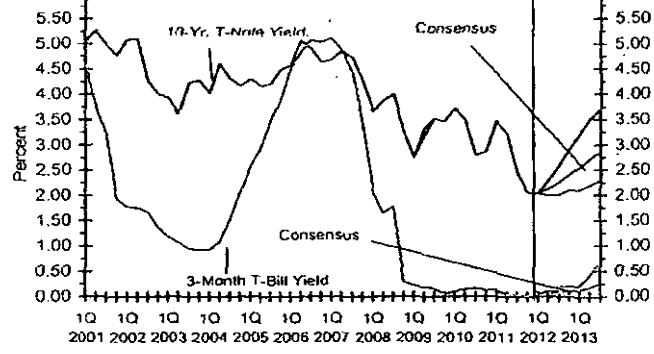
U.S. Treasury Yield Curve

Week ended April 27, 2012 and Year Ago vs. 2Q 2012 and 3Q 2013 Consensus Forecasts



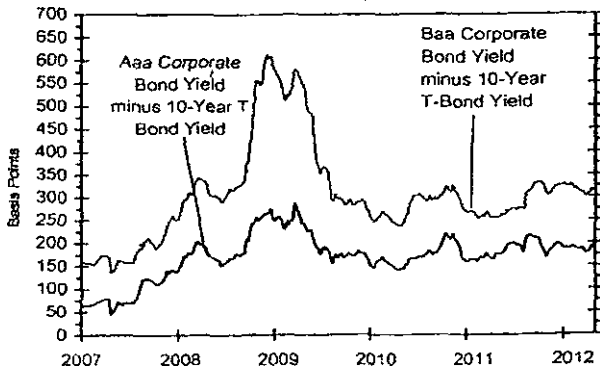
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average) History Forecast



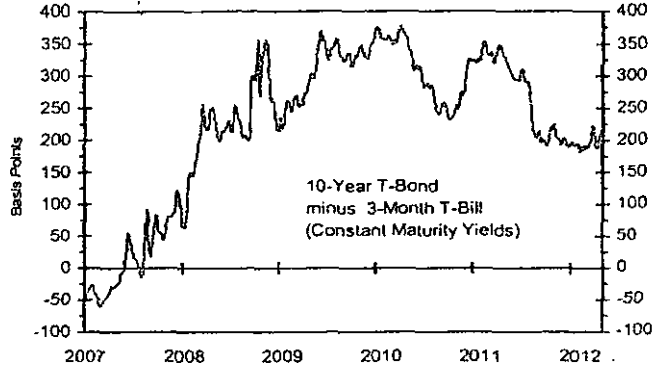
Corporate Bond Spreads

As of week ended April 27, 2012



U.S. Treasury Yield Curve

As of week ended April 27, 2012



**Audubon Water Company
Docket No. R-2012-2286118**

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RE-21-D

Reference Schedule H-4, p. 2, Statement of Water Income & Deductions by uniform system account code, category Administrative and General Expenses. Provide the following:

- A. A definition and breakdown of the expense Special Services in the amount of \$52,087;
- B. A definition and breakdown of the Misc. General Expenses in the amount of \$16,623.

RESPONSE:

Dennis M. Kalbarczyk, Consultant; April 10, 2012

- A. Please refer to the Company's response to OCA Set I-7.
- B. A breakdown of the Misc. General Expenses in the amount of \$16,623 is provided by general category on the table below.

Dues & Subscriptions	\$ 5,499
Employee Training	545
Employee Clothing, etc.	749
Xerox Copier Expenses	1,035
Bank Service Charges	4,474
Small Misc. Items to numerous to detail	3,921
Total	\$16,623

**Audubon Water Company
Docket No. R-2012-2286118**

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RE-28-D Refer to the Company's response to I&E-RE-21-D, part B. Identify each and every component comprising the referenced amount:

- A. \$5,499 for dues and subscriptions with the name of the particular entity, corresponding dollar amount, and start and end date for each;
- B. \$4,474 for bank service charges by category of charge.

RESPONSE: Dennis M. Kalbarczyk, Consultant, May 8, 2012

- A. A list of the associated dues and subscriptions are provided on the table below:

Brookside Country Club	\$2,410
Swiftreach Networks Inc. Customer Rapid Response - Annual	1,160
Rural Water Assoc. - Annual	547
AWWA - Annual	380
Newspapers, Local etc. - Annual	503
Greater Philadelphia News Subscription - Annual	200
Miscellaneous	299
Total	\$5,499

- B. The Company submits it would take considerable time, effort and expense to break down costs by category. In brief, the costs incurred reflect normal monthly bank transactions (e.g., number of check deposits, returned checks, etc.) based upon monthly activity along with normal monthly transaction charges.

Audubon Water Company
Docket No. R-2012-2286118

I&E Exhibit No. 2
Schedule 8

Responses to Interrogatories of
the Office of Consumer Advocate
Set I

OCA Set I-6

Refer to Schedule H-4. Provide a detail of the Maintenance of Mains expenses of \$11,608 at 9/30/10 and \$15,405 at 9/30/11. Include a description of each maintenance project completed in these years.

RESPONSE:

Dennis M. Kalbarczyk, Consultant, April 2, 2012

The \$11,608 in fiscal year September 30, 2010 was attributed to lawn maintenance and snow plowing. Similar work was performed in the amount of \$9,611 in the fiscal year September 30, 2011. The remaining \$5,794 relates to main welding and repairs.

AUDUBON WATER COMPANY

Statement of Water Income & Deductions by Uniform System Account Code
 Twelve Months Ended September 30, 2010, September 30, 2011 And Pro Forma September 30, 2012

Description	9/30/09	9/30/10	9/30/11	9/30/12	Ref.	9/30/12	Proposed	Ref.	Proposed
	Per Books	Per Books	Per Books	Pro Forma		Pro Forma	Base Rate		Adjusted
		(1)	(2)	Adjustments	(4)	Total	Increase	(7)	Total
				(3)		(5)	(6)		(8)
Residential	\$ 1,187,311	\$ 1,207,681	\$ 1,206,926	\$ (4,476)	(1)	\$ 1,202,450	\$ 324,746		\$ 1,527,196
Commercial	270,090	264,295	262,269	(1,878)	(1)	260,391	69,941		330,332
Multi-Family Dwelling	369,804	384,753	396,423	4,567	(1)	400,990	104,551		505,541
Public Authorities	20,994	19,500	25,411	(0)	(1)	25,411	6,750		32,161
Private Fire Protection	82,964	83,029	91,936	(10,521)	(1)	81,414	23,391		104,805
Public Fire Protection	34,272	34,377	34,377	4,909	(1)	39,286	11,307		50,593
Sub-Totals	\$ 1,965,434	\$ 1,993,535	\$ 2,017,341	\$ (7,399)		\$ 2,009,942	\$ 540,686		\$ 2,550,628
Late Payment Charges	3,772	3,816	4,786	24	(2)	4,810	-		4,810
Misc. Revenues	109,217	35,196	41,468	17	(3)	41,486	-		41,486
Total Revenues	\$ 2,078,423	\$ 2,032,548	\$ 2,063,596	\$ (7,358)		\$ 2,056,238	\$ 540,686		\$ 2,596,924
Source of Supply Expenses									
Operation Supervision - Labor	\$ 43,080	\$ 46,673	\$ 48,405	\$ 8,172	(4)	\$ 56,577			\$ 56,577
Operation Labor	60,996	66,082	68,535	11,570	(4)	80,105			80,105
Operation Supplies and Expenses	34,499	65,114	91,791	-		91,791			91,791
Maintenance Engineering	-	-	-	-		-			-
Maintenance Wells & Springs	9,203	40,125	63,460	54,150	(9)	117,610			117,610
Water Purchased	30,942	5,961	3,526	-		3,526			3,526
Total Source of Supply Expenses	\$ 178,720	\$ 223,955	\$ 275,717	\$ 73,893		\$ 349,610	\$ -		\$ 349,610
Power and Pumping Expenses									
Operation Supervision - Labor	\$ 17,952	\$ 19,449	\$ 20,170	\$ 3,405	(4)	\$ 23,576			\$ 23,576
Operation Labor	43,466	47,090	48,838	8,245	(4)	57,084			57,084
Operation Supplies and Expenses	-	1,246	420	-		420			420
Maintenance Engineering	-	-	-	-		-			-
Maint. of Structures & Imp.	9,715	9,903	8,198	-		8,198			8,198
Maint. of Power & Pump. Equip.	54,632	39,298	20,062	10,800	(9)	30,862			30,862
Power Purchases	139,870	147,028	148,708	4,461	(8)	153,169			153,169
Total Power and Pumping Expenses	\$ 265,634	\$ 264,013	\$ 246,397	\$ 26,912		\$ 273,308	\$ -		\$ 273,308
Purification and Laboratory Expenses									
Operation Supervision - Labor	\$ 17,952	\$ 19,449	\$ 20,170	\$ 3,405	(4)	\$ 23,576			\$ 23,576
Purification and Laboratory Labor	7,968	8,632	8,953	1,511	(4)	10,464			10,464
Operation Supplies and Expenses	57,145	43,490	61,624	-		61,624			61,624
Maint. of Purif. Structures	240	1,850	925	-		925			925
Maint. of Purif. & Lab. Equip.	612	993	118	14,200	(9)	14,318			14,318
Total Purif. and Lab. Expenses	\$ 83,917	\$ 74,414	\$ 91,790	\$ 19,117		\$ 110,907	\$ -		\$ 110,907
Transmission & Distribution Expenses									
Operation Supervision - Labor	\$ 17,952	\$ 19,449	\$ 20,170	\$ 3,405	(4)	\$ 23,576			\$ 23,576
T&D Labor	114,412	123,952	128,554	21,703	(4)	150,257			150,257
Meters Labor	9,778	17,478	17,459	2,948	(4)	20,407			20,407
Services Labor	23,904	25,897	26,859	4,534	(4)	31,393			31,393
Hydrants Labor	3,187	3,453	3,581	605	(4)	4,186			4,186
Maintenance Engineering	-	-	-	-		-			-
Maps & Reports	1,040	800	-	-		-			-
Operation Supplies and Expenses	5,481	3,462	1,800	-		1,800			1,800
Maint. of Mains	12,899	11,608	15,405	15,000	(9)	30,405			30,405
Maint. of Services	9,738	9,878	8,811	-		8,811			8,811
Maint. Of Meters	-	-	-	-		-			-
Maint. Of Hydrants	-	-	-	-		-			-
Rents	-	-	-	-		-			-
Total Trans. & Dist. Expenses	\$ 198,391	\$ 215,977	\$ 222,639	\$ 48,195		\$ 270,835	\$ -		\$ 270,835

AUDUBON WATER COMPANY

Statement of Water Income & Deductions by Uniform System Account Code
Twelve Months Ended September 30, 2010, September 30, 2011 And Pro Forma September 30, 2012

Description	9/30/09	9/30/10	9/30/11	9/30/12	Ref.	9/30/12	Proposed	Ref.	Proposed
	Per Books	Per Books	Per Books	Pro Forma		Pro Forma	Base Rate		Adjusted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Customers' Accounting & Coll. Exp.									
Supervision	\$ -	\$ -	\$ -	\$ -		\$ -		\$ -	
Meter Reading and Collecting - Labor	14,126	8,419	9,399	1,782	(4)	11,181		11,181	
Billing and Accounting - Labor	89,512	86,430	89,794	3,622	(4)	93,416		93,416	
Operation Supplies and Expenses	19,446	27,586	17,310			17,310		17,310	
Uncollectible Accounts	-	-	-	-		-		-	
Total Customers' Accounting & Coll. Exp.	\$ 123,083	\$ 122,434	\$ 116,503	\$ 5,404		\$ 121,907	\$ -	\$ 121,907	
Administrative and General Expenses									
Salaries Officers and Executives	\$ 133,532	\$ 140,510	\$ 141,630	\$ 2,832	(4)	\$ 144,462		\$ 144,462	
Other General Office Salaries	60,569	63,460	66,093	1,742	(4)	67,835		67,835	
Exp. of Officers & Office Employees	20,974	36,098	42,302			42,302		42,302	
General Office supplies & Expenses	63,015	66,136	61,707	-		61,707		61,707	
Special Services	70,106	76,768	52,087			52,087		52,087	
Regulatory Comm. Exp. - Rate Case	-	-	-	115,000	(11)	115,000		115,000	
Insurance	81,059	65,236	75,236			75,236		75,236	
Employee Welfare Exp.	123,631	148,422	158,391	12,671	(6)	171,062		171,062	
Pensions	14,697	15,801	16,183	334	(7)	16,517		16,517	
Employee Payroll Taxes	51,918	57,856	58,739	9,817	(5)	68,557		68,557	
Life Insurance	1,516	1,516	1,516			1,516		1,516	
Misc. General Exp.	16,338	19,186	18,223			18,223		18,223	
Maint. of General Property	-	-	-			-		-	
Rents	45,386	45,919	47,558	2,059	(10)	49,616		49,616	
Trans. Exp-R&M Other	24,864	13,357	32,297			32,297		32,297	
Trans. Exp-Fuel	31,582	39,664	54,392			54,392		54,392	
Total Admin. and General Expenses	\$ 739,187	\$ 789,928	\$ 824,352	\$ 144,456		\$ 968,807	\$ -	\$ 968,807	
Taxes									
Other-PaPUC Assessment	\$ 11,857	\$ 13,017	\$ 11,171	\$ -		\$ 11,171	\$ -	\$ 11,171	
Pa Utility Reality Tax	13,157	15,552	13,723			13,723		13,723	
Pa Capital Stock Tax	13,394	2,457	1,459			1,459		1,459	
Taxes Other	2,816	6,295	6,893			6,893		6,893	
Total Taxes	\$ 41,224	\$ 38,321	\$ 33,246	\$ -		\$ 33,246	\$ -	\$ 33,246	
Depreciation Expense									
Depreciation	\$ 189,423	\$ 154,623	\$ 161,666	\$ (5,782)	(12)	\$ 155,884		\$ 155,884	
Amortizations-Prior Rate Case	37,787	53,376	47,588	(47,588)	(11)	-		-	
Amortizations - Tank painting				10,750	(11)	10,750		10,750	
Total Depreciation/Amortization	\$ 227,210	\$ 207,999	\$ 209,254	\$ (42,620)		\$ 166,634	\$ -	\$ 166,634	
Total Operating Deductions	\$ 1,857,366	\$ 1,935,041	\$ 2,019,897	\$ 275,356		\$ 2,295,253	\$ -	\$ 2,295,253	
Net Income Before Income Taxes	\$ 221,057	\$ 97,507	\$ 43,699	\$ (282,714)		\$ (239,015)	\$ 540,686	\$ 301,671	
Pa Corp. Income Tax	\$ 64,201	\$ 50,435	\$ 3,278	\$ (3,278)	(13)	\$ -	\$ 17,466	\$ 17,466	
Fed. Income Tax	-	(7,280)	44,183	(44,183)	(13)	-	53,504	53,504	
	\$ 64,201	\$ 43,155	\$ 47,461	\$ (47,461)		\$ -	\$ 70,970	\$ 70,970	
Net Income After Taxes	\$ 156,856	\$ 54,352	\$ (3,762)	\$ (235,253)		\$ (239,015)	\$ 469,716	\$ 230,701	

**I&E Statement No. 2-SR
Witness: Debra Backer**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Surrebuttal Testimony

of

Debra Backer

Bureau of Investigation and Enforcement

Concerning:

**Operation & Maintenance Expenses
Cash Working Capital**

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SECRETARY OF ENVIRONMENT & NATURAL RESOURCES

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

3 A. My name is Debra Backer. I am a Fixed Utility Financial Analyst in the
4 Technical Division of the Pennsylvania Public Utility Commission's
5 (Commission) Bureau of Investigation and Enforcement (I&E). My
6 business address is P.O. Box 3265, Harrisburg, Pa. 17105-3265.

7

8 **Q. HAVE YOU PREVIOUSLY PRESENTED TESTIMONY IN THIS**
9 **PROCEEDING?**

10 A. Yes. I presented direct testimony which was submitted as I&E Statement
11 No. 2 with accompanying I&E Exhibit No. 2.

12

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

15 A. The purpose of my surrebuttal testimony is to respond to the rebuttal
16 testimony of Audubon Water Company (Audubon or the Company)'s
17 witnesses Dennis Kalbarczyk and J. H. Russell.

18

19 **Q. DOES YOUR SURREBUTTAL INCLUDE AN EXHIBIT?**

1 A. No. However, I will also refer to my direct testimony and its
2 accompanying exhibit (I&E St. No. 2 and I&E Ex. No. 2) throughout this
3 surrebuttal testimony.

4

5 **Q. CAN YOU SUMMARIZE THE COMPANY'S BASE RATE
6 INCREASE REQUEST?**

7 A. Yes. On January 27, 2012, Audubon requested an increase in base rates of
8 \$540,686, or 27%, for total proposed revenues of \$2,596,924.
9 Company witness Dennis M. Kalbarczyk updated the Company's overall
10 proposed revenue increase in his Direct Testimony. There he states that the
11 Company proposes to reduce the overall revenue increase by \$22,718,
12 resulting in a \$517,968 (25.2%) adjusted increase. Under this modification
13 to the original filing, the Company's proposed annual revenues are
14 \$2,547,206 (Company Statement DMK-1, p. 6). Since then, the Company
15 identified additional updates to its filing that result in a revenue
16 requirement of \$2,542,721, an increase of \$486,483 over current revenues
17 (Company Exhibit DMK-1R EXHIBIT 2, Revised 6/7/12 Schedule H-1).

18

19 **RATE CASE EXPENSE**

20 **Q. WHAT IS THE COMPANY'S CLAIM FOR RATE CASE EXPENSE
21 IN THIS PROCEEDING?**

1 A. The Company's total rate case expense is \$230,000 to be normalized over
2 twenty four months, for an annual claim of \$115,000 (Audubon Schedule I-
3 11).

4

5 **Q. WHAT ADJUSTMENT TO THE COMPANY'S CLAIM DID YOU**
6 **RECOMMEND IN YOUR DIRECT TESTIMONY?**

7 A. I recommended a total rate case allowance of \$125,000, or an annual rate
8 case expense of \$28,302. This is a reduction of \$86,698 (\$115,000 -
9 \$28,302) to the Company's annual claim. Furthermore, I recommended a
10 53 month normalization period instead of the company's twenty four month
11 normalization period (I&E Statement No. 2 pp. 6-9).

12

13 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
14 **FOR THE AMOUNT OF RATE CASE EXPENSE IN REBUTTAL**
15 **TESTIMONY?**

16 A. Yes. Audubon's witness Kalbarczyk disagreed, stating that I failed to
17 include the estimated cost of \$45,000 to file the case (Stmt. DMK-1R, p.
18 28).

19

20 **Q. HAS YOUR RECOMMENDATION FOR THE TOTAL RATE CASE**
21 **EXPENSE AMOUNT CHANGED FROM YOUR DIRECT**
22 **TESTIMONY?**

1 A. Yes. My total revised recommendation for rate case expense is \$165,000
 2 (\$230,000-(\$17,500+\$17,500+\$30,000)=\$165,000) or a \$65,000 reduction
 3 to the Company's estimated claim. Audubon's Schedule I-11 breaks down
 4 Audubon's estimated \$230,000 cost of the Rate Case Proceeding as
 5 follows:

	To File (\$)	Review & Litigation (\$)	Fully Litigated (\$)
Legal	15,000	80,000	95,000
Consulting	20,000	35,000	55,000
Engineering	2,500	15,000	17,500
Accounting	2,500	15,000	17,500
Rate of Return	-	30,000	30,000
Expenses	5,000	10,000	15,000
Total	45,000	185,000	230,000

6
 7 The basis of my recommendation remains that the consultant fees for the
 8 engineer, accountant and rate of return experts should be excluded since the
 9 Company has not hired these experts. The total rate case expense through
 10 May 8, 2012 is \$84,088 (I&E Statement No. 2, p. 7). If this proceeding
 11 goes to hearings, I reserve the right to amend our rate case expense
 12 recommendation.

1 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDED**
2 **NORMALIZATION PERIOD FOR RATE CASE EXPENSE IN**
3 **REBUTTAL TESTIMONY?**

4 A. Yes. Audubon Witness Kalbarczyk disagrees and continues to recommend
5 a two year normalization period. Witness Kalbarczyk argues that the
6 Commission has allowed a normalization period of two or three years in
7 other companies cases which he was involved (Audubon Statement DMK-
8 1R, p. 29).

9
10 **Q. DO YOU AGREE WITH THE COMPANY'S WITNESS?**

11 A. No.

12
13 **Q. WHAT IS THE BASIS FOR YOUR DISAGREEMENT WITH THE**
14 **COMPANY'S WITNESS?**

15 A. As detailed on page 8 of my direct testimony (I&E Statement No. 2), the
16 company's three most recent filing intervals are 58 months, 61 months and
17 41 months. The Company's past base rate case filing history is the best
18 indication of the Company's next filing. This best indicator demonstrates
19 that the Company's requested two year normalization period is not
20 historically representative and not appropriate for this case.

1 **Q. HAS YOUR RECOMMENDATION REGARDING THE**
2 **NORMALIZATION PERIOD FOR RATE CASE EXPENSE**
3 **CHANGED FROM YOUR DIRECT TESTIMONY?**

4 A. No. My recommendation remains that a normalization period of fifty three
5 months as supported by the Company's filing history should be used (I&E
6 Schedule No. 2, p. 8).

7
8 **Q. PLEASE SUMMARIZE YOUR REVISED RECOMMENDATION**
9 **FOR RATE CASE EXPENSE.**

10 A. I am recommending a total expense level of \$165,000 for rate case expense
11 normalized over 53 months resulting in an annual allowance of \$37,358
12 ($\$165,000 / (53 * 12)$) or a reduction of \$77,642 ($\$115,000 - \$37,358$) to the
13 Company's claim.

14
15 **PURCHASED POWER**

16 **Q. WHAT IS THE COMPANY'S CLAIM FOR PURCHASED POWER**
17 **IN THIS PROCEEDING?**

18 A. The Company's expense claim for purchased power is \$153,169 (Audubon
19 Schedule I-8).

20
21 **Q. WHAT ADJUSTMENT TO THE COMPANY'S CLAIM DID YOU**
22 **RECOMMEND IN YOUR DIRECT TESTIMONY?**

1 A. I recommended a purchased power expense of \$148,708, or a reduction of
2 \$4,461 to the Company's claim (I&E Schedule No. 2, p. 10). My
3 recommendation was based on the expense remaining at the historic test
4 year level since the increase in the expense was speculative and I also
5 recommended that the Company shop for electric (I&E Schedule No. 2, pp.
6 10-11).

7
8 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
9 **IN REBUTTAL TESTIMONY?**

10 A. Yes. Audubon's witness Kalbarczyk states that because of the Company's
11 small size shopping is not feasible and that the Company is installing a new
12 and more efficient pump station (Audubon Statement DMK-1R, p. 34).

13
14 **Q. DO YOU AGREE WITH THE COMPANY'S WITNESS?**

15 A. No.

16
17 **Q. WHAT IS THE BASIS FOR YOUR DISAGREEMENT WITH THE**
18 **COMPANY'S WITNESS?**

19 A. As stated in my direct testimony (I&E Statement. No. 2, pp. 10-11), there
20 are 55 electric suppliers in PECO's service territory and a simple search on
21 the internet can reduce the Company's purchase power expense. Also, the

1 Company has ongoing upgrades to its pumping stations including
2 installation of Variable Frequency Drives to reduce electric usage.

3

4 **Q. HAS YOUR RECOMMENDATION CHANGED FROM YOUR**
5 **DIRECT TESTIMONY?**

6 A. No. My recommendation remains that the purchase power expense should
7 remain at the historic test year level. This recommendation represents a
8 reduction of \$4,461 to the Company's claim (I&E Schedule No. 2, p. 10).

9

10 **PAYROLL**

11 **Q. WHAT IS THE COMPANY'S PAYROLL EXPENSE CLAIM?**

12 A. The Company's claimed payroll expense is \$798,095 (Audubon Schedule
13 H-4).

14

15 **Q. WHAT ADJUSTMENT TO THE COMPANY'S CLAIM DID YOU**
16 **RECOMMEND IN YOUR DIRECT TESTIMONY?**

17 A. I recommended a payroll allowance of \$789,005, or a reduction of \$9,090
18 to the Company's claim. My recommendation was based on reducing the
19 salary increase to 2.5% from the Company's proposed 4% (I&E Schedule
20 No. 2, p. 12).

21

1 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
2 **FOR THE PAYROLL EXPENSE?**

3 A. Yes. Audubon witness Kalbarczyk states that I&E failed to recognize the
4 \$4,733 merit increase and \$4,200 of longevity incentive payments to
5 general staff. Further, he explains that he believes that no payroll
6 adjustment is warranted (Audubon DMK-1R, pp. 30-33).

7

8 **Q. DO YOU AGREE WITH THE COMPANY'S WITNESS?**

9 A. No.

10

11 **Q. WHAT IS THE BASIS FOR YOUR DISAGREEMENT WITH THE**
12 **COMPANY'S WITNESS?**

13 A. Mr. Kalbarczyk does not appear to understand how I determined my
14 recommendation as I explained it on page 13 of my direct testimony (I&E
15 Statement No. 2). My recommendation only addresses the 4% raise, I have
16 excluded the new part-time laborer and the executive compensation from
17 my calculation. In the current tough economic times, companies must be
18 mindful of increases to payroll and adjust them accordingly as a result, the
19 4% annual raise in July, 2012 should be reevaluated further.

20

21 **Q. HAS YOUR RECOMMENDATION CHANGED FROM YOUR**
22 **DIRECT TESTIMONY?**

1 A. No. My recommendation remains that the payroll increase should be
2 reduced to 2.5% for a payroll expense of \$789,005 (I&E Schedule No. 2, p.
3 12).

4

5 **ADMINISTRATIVE AND GENERAL EXPENSES –**
6 **MISCELLANEOUS GENERAL EXPENSES**

7

8 **Q. WHAT IS THE COMPANY’S CLAIM FOR ADMINISTRATIVE**
9 **AND GENERAL EXPENSES – MISCELLANEOUS GENERAL**
10 **EXPENSES?**

11 A. The Company’s claim for administrative and general expenses –
12 miscellaneous general expenses is \$16,223 (Audubon Schedule H-4, p. 2).

13

14 **Q. WHAT WAS YOUR RECOMMENDATION TO THE COMPANY’S**
15 **ADMINISTRATIVE AND GENERAL EXPENSES –**
16 **MISCELLANEOUS GENERAL EXPENSE CLAIM?**

17 A. I recommended an administrative and general expenses – miscellaneous
18 general expense allowance of \$8,840, or a reduction of \$7,383 to the
19 Company’s claim. I recommended reducing the dues and subscriptions
20 portion of the claim by \$2,909 and eliminating the bank charges of \$4,474
21 for a total recommendation of \$8,840, or a reduction of \$7,383 to the
22 administrative and general expenses – miscellaneous general expense
23 allowance (I&E Statement No. 2, pp. 16-18).

1 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
2 **FOR THE AMOUNT OF ADMINISTRATIVE AND GENERAL**
3 **EXPENSES – MISCELLANEOUS GENERAL EXPENSES?**

4 A. Yes. Audubon witness Kalbarczyk further explained information absent
5 from a Company discovery response regarding bank service charges (I&E
6 Exhibit No. 2, Schedule 7). Mr. Kalbarczyk explains that the response was
7 intended to provide a general overview of the bank charges and will update
8 its earlier response to provide the bank statement (Audubon Statement
9 DMK-1R, p. 36). Also, on page 4 of his rebuttal testimony Mr. Kalbarczyk
10 accepts a \$2,410 downward adjustment to dues with an exception explained
11 on pages 37 to 38. There he explains the an item titled “The Greater
12 Philadelphia News Subscription” is paid to the Greater Philadelphia
13 Chamber of Commerce and is required to obtain health care benefits.

14
15 **Q. DO YOU AGREE WITH THE COMPANY’S WITNESS?**

16 A. Yes. I&E will accept the Company’s \$2,410 downward adjustment for
17 dues and subscriptions and withdraw the adjustment of \$4,474 for bank
18 charges.

19
20 **MAINTENANCE OF MAINS**

21 **Q. WHAT IS THE COMPANY’S CLAIM FOR MAINTENANCE OF**
22 **MAINS?**

1 A. The Company is claiming a FTY maintenance of mains expense of \$30,405
2 (Audubon Schedule H-4, p. 1).

3

4 **Q. WHAT WAS YOUR RECOMMENDATION TO THE**
5 **MAINTENANCE OF MAINS EXPENSE?**

6 A. I recommended a maintenance of mains expense of \$28,304, or a reduction
7 of \$2,101 to the Company's claim. I recommended using a three year
8 average and then adding the new main maintenance project of \$15,000 for a
9 total maintenance main expense of \$28,304. This recommendation resulted
10 in a reduction of \$2,101 to the Company's claim.

11

12 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
13 **FOR THE MAINTENANCE OF MAINS EXPENSE?**

14 A. Yes. Audubon witness Kalbarczyk states that it would be counter-intuitive
15 to reduce base maintenance work by \$2,101 and allow a \$15,000 addition
16 to expense for the new maintenance program (Audubon Statement DMK-
17 1R, p. 35).

18

19 **Q. DO YOU AGREE WITH THE COMPANY'S WITNESS?**

20 A. Yes. I&E agrees with the Company and withdraws its \$2,101 adjustment.

1 **INSURANCE**

2 **Q. WHAT IS THE COMPANY’S CLAIM FOR INSURANCE?**

3 A. The Company’s claim for insurance is \$75,236 (Audubon Schedule H-4, p.
4 2).

5
6 **Q. WHAT DID YOU RECOMMEND FOR THE INSURANCE
7 EXPENSE?**

8 A. I recommended an allowable insurance claim of \$73,844, or a reduction of
9 \$1,392 to the Company’s claim. I recommended using a three year average
10 of the expense for a more appropriate insurance expense claim (I&E
11 Statement No. 2, p. 21).

12
13 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION
14 FOR INSURANCE EXPENSE?**

15 A. Yes. Audubon witness Kalbarczyk states that the Company just received
16 its premium notices effective July 15, 2012 reflecting an increase of \$5,768
17 and will provide a copy of the insurance data (Audubon Statement DMK-
18 1R, p. 37).

19
20 **Q. DO YOU AGREE WITH THE COMPANY’S WITNESS?**

21 A. Yes. I&E will accept the actual amounts and withdraw its reduction of
22 \$1,392.

1 **CASH WORKING CAPITAL (CWC)**

2 **Q. WHAT IS THE COMPANY’S CLAIM FOR CWC IN THIS**
3 **PROCEEDING?**

4 A. The Company’s claim for CWC was \$266,077 (Audubon Schedule F-2).
5 Audubon Witness Kalbarczyk updated this claim in Statement DMK-1, and
6 reduced CWC by \$3,071, thus revising the CWC claim to \$263,006
7 (Audubon Statement DMK-1, p. 28).

8
9 **Q. HAS THERE BEEN ANY UPDATES SINCE COMPANY WITNESS**
10 **KALBARCZYK’S DIRECT TESTIMONY?**

11 A. Yes. In response to OCA I-6, Company Witness Kalbarczyk stated the
12 Company will update its filing to reflect a reduction of \$40,097 to income
13 taxes (I&E Exhibit No. 3, Schedule 7). This update reduced operating
14 expenses to \$2,060,950 (\$2,104,047 - \$40,097).

15
16 **Q. WHAT ADJUSTMENT TO THE COMPANY’S CLAIM DID YOU**
17 **RECOMMEND?**

18 A. I recommended an allowable CWC claim of \$244,103, a reduction of
19 \$18,903 to the Company’s updated claim referenced in Audubon Statement
20 DMK-1, p. 28. I proposed adjustments to the operating and maintenance
21 expenses for the items adjusted in my direct testimony, including expenses
22 for: rate case, purchased power, payroll, administrative and general

1 expenses -miscellaneous general, maintenance of mains and insurance (I&E
2 Statement No. 2, p. 24).

3

4 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
5 **IN REBUTTAL TESTIMONY?**

6 A. Yes. Audubon witness Kalbarczyk states that I&E with one exception
7 utilized the same methodology advanced by the Company and accepted by
8 OCA. That exception was an income tax reduction (Audubon Statement
9 DMK-1R, p. 24).

10
11 **Q. WAS IT YOUR INTENTION TO ADJUST THE 1/8 METHOD?**

12 A. No. The tax reduction was in error.

13
14 **Q. DID YOU REVISE YOUR CWC RECOMMENDATION?**

15 A. No. My recommendation remains the same to reduce CWC for expenses I
16 adjusted. All adjustments to the Company's O&M expense claims must be
17 brought together in the ALJ's Recommended Decision and, again, in the
18 Commission's Final Order. This process, known as "iteration", effectively
19 prevents the determination of a precise CWC calculation until such time as
20 all adjustments have been made to the Company's claim.

1 **WATER STORAGE TANK PAINTING AMORTIZATION**

2 **Q. WHAT IS THE COMPANY’S CLAIM FOR WATER STORAGE**
3 **TANK PAINTING AMORTIZATION?**

4 A. The Company is claiming an amortization for water storage tank painting
5 of \$10,750 (Audubon Schedule I-12).

6
7 **Q. WHAT WAS YOUR RECOMMENDATION FOR THE WATER**
8 **STORAGE TANK PAINTING AMORTIZATION?**

9 A. I recommended an amortization of \$8,750 for the water storage tank
10 painting, or a reduction of \$2,000 to the Company’s \$10,750 claim.
11 I recommend removing the Arcola Road water storage tank painting
12 because, as stated in I&E Statement No. 3, this tank has never been used
13 and useful and is being removed from rate base.

14
15 **Q. DID THE COMPANY RESPOND TO YOUR RECOMMENDATION**
16 **FOR THE WATER STORAGE TANK PAINTING**
17 **AMORTIZATION?**

18 A. Yes. Audubon’s Witness Kalbarczyk states that the Arcola Road water
19 storage tank is a contributed facility (Audubon Statement DMK-1R, p.39).
20 Mr. Russell states that this storage tank will be in service before August 31,
21 2012 (Audubon Statement JHR-1R, p. 12).

Q. DO YOU AGREE WITH THE COMPANY'S WITNESS?

A. No.

Q. WHAT IS YOUR DISAGREEMENT WITH THE COMPANY'S WITNESS?

A. The Arcola Road water storage tank has not been used as part of the system since being contributed in 2000. In addition, a claim that the facility will be placed in service in the near future is speculative and does not explain that the facility is needed.

Q. HAS YOUR RECOMMENDATION CHANGED FROM YOUR DIRECT TESTIMONY?

A. No. The Company's amortization claim should be reduced by \$2,000.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes.

I&E Statement No. 3
Witness: Jeremy B. Hubert

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Direct Testimony

of

Jeremy B. Hubert

Bureau of Investigation and Enforcement

Concerning:

Rate Base
Annual Depreciation Expense
Rate Design

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1 **Q. WOULD YOU PLEASE STATE YOUR NAME AND BUSINESS**
2 **ADDRESS?**

3 A. My name is Jeremy B. Hubert. My business address is Pennsylvania Public
4 Utility Commission, P.O. Box 3265, Harrisburg, PA 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. An outline of my education and employment experience is attached as Appendix
12 A.

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

15 A. I&E is responsible for representing the public interest in rate and other
16 proceedings before the Commission. I&E's analysis in this proceeding is based on
17 its responsibility to represent the public interest. This responsibility requires the
18 balancing of the interests of ratepayers and the Company.

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

21 A. The purpose of my testimony is to present I&E's recommendations concerning
22 Audubon Water Company's ("Audubon" or "Company") requested \$540,686 base

1 revenue increase and specifically rate base, annual depreciation expense and rate
2 design.

3
4 **RATE BASE**

5 **Q. WHAT IS MEASURE OF VALUE, ALSO REFERRED TO AS RATE**
6 **BASE?**

7 A. The measure of value, or rate base, is the depreciated original cost of a utility's
8 investment in plant determined to be used and useful in the public service at the
9 end of the test year plus other additions and deductions that the Commission
10 determines to be necessary in order to keep the utility operating and providing safe
11 and reliable service to its customers.

12
13 **Q. HOW IS THE DEPRECIATED ORIGINAL COST PLANT IN SERVICE**
14 **AT THE END OF THE FUTURE TEST YEAR DETERMINED?**

15 A. The depreciated original cost is determined by subtracting the book reserve, which
16 is the accumulation of all prior annual depreciation expense, and other items such
17 as salvage value from the original cost of the plant in service that is used and
18 useful in the public service at the end of the future test year. The depreciated
19 original cost of the plant in service is determined by taking a "snapshot" look at
20 the depreciated original cost value of used and useful utility plant in service at a
21 specific point in time. That point in time in this case is the end of the future test
22 year.

1 **Q. WHAT OTHER ADDITIONS AND/OR DEDUCTIONS TO THE**
2 **DEPRECIATED ORIGINAL COST OF UTILITY PLANT USED AND**
3 **USEFUL IN THE PUBLIC SERVICE ARE ALLOWED?**

4 A. Some of the additions to the depreciated original cost of a company's investment
5 in utility plant used and useful in the public service include materials and supplies,
6 gas in storage, prepayments, and cash working capital. Some of the deductions
7 include deferred income taxes and customer deposits. Some additions are
8 applicable to a specific utility or utility type. The depreciated original cost
9 claimed by Audubon in its original filing is \$5,066,216, shown on Schedule F-1 of
10 the Company's filing. The claimed additions to the Company's depreciated
11 original cost are as follows:

- 12 1. Inventory;
- 13 2. Cash Working Capital.

14 The deductions to the depreciated original cost are:

- 15 1. Contributions in Aid of Construction;
- 16 2. Customer Advances for Construction.

17
18 **Q. HOW IS THE MEASURE OF VALUE USED WITHIN THE**
19 **RATEMAKING FORMULA?**

20 A. The measure of value is one part of the financial equation used by the
21 Commission, along with allowable expenses and rate of return to determine the
22 level of income a utility is granted an opportunity to earn and the revenue level

1 needed to achieve that return. The equation used to determine the proper revenue
2 requirement level is:

$$\text{Revenue Requirement} = (\text{Measure of Value} \times \text{Rate of Return}) + \text{Allowable Expenses.}$$

5 Each item in the revenue requirement equation is synchronized to the test year
6 period. If the date of any of the items in this equation is changed, all the other
7 necessary data that a utility must file in a rate proceeding including the test year
8 income statement, actual and projected customer levels and usage, cost of service
9 study to determine expense responsibility among the various customer classes, and
10 other financial information used to determine the utility's rate of return, must also
11 be changed.

12
13 **Q. WHAT IS THE TOTAL MEASURE OF VALUE CLAIMED BY THE**
14 **COMPANY FOR THE FUTURE TEST YEAR ENDING SEPTEMBER 30,**
15 **2012?**

16 A. The Company's claimed measure of value for the future test year ending
17 September 30, 2012 is \$2,546,370 (Audubon Schedule F-1).

18
19 **Q. DID THE COMPANY REVISE ITS FUTURE TEST YEAR RATE BASE**
20 **CLAIM OF \$2,546,370 IN DIRECT TESTIMONY?**

1 A. Yes. As a result of small revisions to cash working capital and the claimed capital
2 assets, the Company increased the rate base by \$1,711 to \$2,548,081 as of
3 September 30, 2012, in this proceeding (Audubon St. No. DMK-1, p. 28).

4

5 **Q. WHAT IS REFLECTED IN THE COMPANY'S UPDATED PROPOSAL**
6 **FOR A \$1,711 INCREASE TO THE FUTURE TEST YEAR RATE BASE**
7 **CLAIM?**

8 A. The \$1,711(\$4,782 - \$3,071) increase to the future test year rate base claimed by
9 the Company reflects a decrease to cash working capital of \$3,071 and an increase
10 to net plant of \$4,782. The \$4,782 increase to net plant reflects a correction to an
11 error previously made. The Company states that it erroneously expensed a utility
12 storage service body mounted on one of its older pickups at a cost of \$7,970.
13 They acknowledge that the amount should have been capitalized and reflected
14 with a 5-year service life. To correct this error, the Company increased plant in
15 service by \$7,970 along with two years of accumulated depreciation in the amount
16 of \$3,188. Additionally the Company will reflect a pro forma increase in
17 depreciation expense of \$1,594 (Audubon St. DMK-1, p. 27).

18

19 **Q. WHAT IS A FUTURE TEST YEAR AND HOW IS IT USED BY A**
20 **COMPANY IN A RATE PROCEEDING?**

21 A. A future test year is a twelve-month period selected by a utility to utilize both
22 historic and projected annualized and normalized financial information. A future

1 test year is used in order to allow for the time it takes to adjudicate a rate
2 proceeding by permitting a company to select a future time period upon which to
3 base its financial information. This is necessary so that the rates set by the
4 Commission reflect current and synchronized financial information. By using a
5 future test year, a utility makes a projected annualized and normalized estimate of
6 future revenues and expenses and a corresponding measure of value at the end of
7 the future test year.

8
9 **Q. WHAT TEST YEAR HAS THE COMPANY SELECTED FOR USE IN**
10 **THIS PROCEEDING?**

11 A. The Company has selected a future test year ending September 30, 2012.

12
13 **Q. DOES THE \$5,066,216 DEPRECIATED ORIGINAL COST PLANT IN**
14 **SERVICE DESCRIBED ABOVE INCLUDE THE COST OF PROJECTS**
15 **THAT THE COMPANY CLAIMS WILL BE IN SERVICE BY**
16 **SEPTEMBER 30, 2012?**

17 A. Yes. The \$5,066,216 includes \$631,079 of projects that the Company claims will
18 be in service by September 30, 2012 (Audubon Sch. J-2-1, p. 1 of 19).

19
20 **Q. DID I&E CONDUCT DISCOVERY SEEKING FURTHER INFORMATION**
21 **TO SUPPORT SPECIFIC FUTURE TEST YEAR PLANT ADDITIONS?**

1 A. Yes. I&E Interrogatories sought more details concerning the \$95,000 associated
2 with the New Pump Station at Valley Forge Crossing, the \$85,000 associated with
3 the New 60,000 gallon Water Storage Tank at Valley Forge Crossing Mobile
4 Home Park, the \$24,000 associated with Server and Backup Computers to be
5 installed, and the \$28,000 associated with the New Customer Billing Program.

6
7 **Q. WHAT INFORMATION DID THE COMPANY PROVIDE SEEKING TO**
8 **SUPPORT THESE FUTURE TEST YEAR PLANT ADDITIONS?**

9 A. The Company's responses to I&E-RB-7-D and I&E-RB-8-D addressing the New
10 Pump Station and New Water Storage Tank at Valley Forge Crossing Mobile
11 Home Park, totaling \$180,000 (\$95,000 + \$85,000), indicates that there is
12 currently no anticipated in service date for either project, which are tied to the
13 issuance of a DEP Permit (I&E Ex. No. 3, Sch. 1, pp. 1-2). Likewise, the
14 Company's responses to I&E-RB-12-D and I&E-RB-13-D addressing the Server
15 and Backup Computers and the New Customer Billing Program, totaling \$52,000
16 (\$24,000 + \$28,000), indicates that the Company is in the process of soliciting
17 proposals for these additions, and therefore, no expected in service date was
18 known or provided (I&E Ex. No. 3, Sch. 1, pp. 3-4).

19
20 **Q. DID THE COMPANY PROVIDE AN UPDATE TO THE STATUS OF THE**
21 **PROJECTS WITH IN-SERVICE DATES CONTINGENT UPON RECEIPT**
22 **OF A DEP PERMIT FOR EACH?**

1 A. Yes. The Company's response to I&E-RE-30-D indicates that the Company's
2 application is administratively complete, but has not yet been processed for
3 technical review, which includes an analysis of the proposal for potentially
4 adverse environmental impacts; completeness, clarity, and soundness of
5 engineering proposals; conformity with applicable statutes and regulations; and
6 analysis of comments submitted by the public (I&E Ex. No. 3, Sch. 2). Therefore,
7 the Company has not yet provided an in-service date for any project.

8

9 **Q. HAS THE COMPANY PROVIDED AN UPDATE AS TO THE STATUS OF**
10 **ANY OF THE PROJECTS FOR WHICH IT WAS IN THE PROCESS OF**
11 **SOLICITING PROPOSALS?**

12 A. Yes. The Company's updated response to I&E-RB-13-D, received on May 10,
13 2012, (current as of May 8, 2012), provides a copy of a confidential proposal for
14 the New Utility Billing System. The estimated cost of the billing system
15 approximates the amount that was reflected in the Company's filing, but the
16 Company has not indicated that any money has been spent to date nor has the
17 Company provided an in-service date for this plant.

18

19 **Q. WHAT DO YOU RECOMMEND REGARDING THE \$631,079 IN FUTURE**
20 **TEST YEAR PLANT ADDITIONS?**

21 A. Per standard ratemaking requirements, plant must be "used and useful" in order to
22 be properly included in a public utility's rate base; therefore, I recommend that the

1 Commission disallow \$232,000 (\$180,000 + \$52,000) of this claim from the
2 Company's total plant in service for the above identified projects, all of which lack
3 a clearly defined service date.

4 If the Company is permitted to include the original cost of this plant and the
5 corresponding annual depreciation expense, the Company will improperly receive
6 a return on and a return of the cost of these projects from customers through rates
7 prior to the plant being "used and useful." Customer rates should not recover the
8 cost of projects that have not been placed into service.

9
10 **Q. WHAT ACCRUED DEPRECIATION DID THE COMPANY CLAIM IN**
11 **THIS PROCEEDING?**

12 A. The Company claimed accrued depreciation of \$4,144,410 at September 30, 2012
13 (Audubon Sch. F-1).

14
15 **Q. DOES YOUR RECOMMENDATION TO DISALLOW \$232,000 OF COST**
16 **ASSOCIATED WITH FUTURE TEST YEAR ADDITIONS WITH NO**
17 **CLEARLY DEFINED IN SERVICE DATE RESULT IN AN**
18 **ADJUSTMENT TO ACCRUED DEPRECIATION?**

19 A. Yes. I recommend that the accrued depreciation at September 30, 2012 be
20 decreased by \$7,450 to reflect the corresponding accrued depreciation associated
21 with the disallowance of those future test year additions with no clearly defined in-
22 service date (I&E Ex. No. 3, Sch. 3).

1 **Q. DO YOU RECOMMEND ANY ADDITIONAL ADJUSTMENTS TO THE**
2 **COMPANY'S CLAIMED DEPRECIATED ORIGINAL COST PLANT IN**
3 **SERVICE FOR THE TEST YEAR ENDING SEPTEMBER 30, 2012?**

4 A. Yes. I recommend that an additional \$133,615 (\$194,349 - \$60,734) of net plant
5 be removed from the depreciated original cost plant in service for the test year
6 ending September 30, 2012 (I&E Ex No. 3, Sch. 3).

7

8 **Q. WHAT COMPANY CLAIM IS REPRESENTED BY THIS \$194,349 PORTION**
9 **OF ORIGINAL COST PLANT IN SERVICE AND THE ASSOCIATED \$60,734**
10 **OF ACCRUED DEPRECIATION?**

11 A. This amount represents \$194,349 of Distribution Reservoirs & Standpipes acquired in
12 2000 along with 12.5 years of accumulated depreciation in the amount of \$60,734
13 (Audubon Sch. J-2-1, p. 6 of 19). This \$194,349 of plant installed in 2000 either
14 partially or in whole is due to the Arcola Road Storage Tank which the Company
15 claims was installed in 2000-2001 (I&E Ex. No. 3, Sch. 4). Per the Company's
16 response to I&E-RB-1-D, the Arcola Road Storage Tank is not currently one of the
17 five storage tanks utilized by the Company (I&E Ex. No. 3, Sch. 5). I reserve the right
18 to amend my testimony when and if the Company provides additional information
19 concerning the portion of rate base that is attributable to the Arcola Road Storage
20 Tank, given that it is currently not in use.

1 **Q. HAS THE COMPANY PROVIDED A DATE WHEN THIS PROPERTY IS**
2 **EXPECTED TO BE PLACED INTO SERVICE?**

3 A. No. It is undetermined at present when this property will be placed into Utility
4 Plant and be considered “used and useful”.

5
6 **Q. WHY DO YOU RECOMMEND THAT THE PLANT ASSOCIATED WITH**
7 **THE ARCOLA ROAD STORAGE TANK NOT BE INCLUDED IN RATE**
8 **BASE?**

9 A. It is a fundamental principle of ratemaking that utilities can only earn a return of
10 and a return on plant that is “used and useful” in the provision of utility service.
11 The plant associated with the Arcola Road Storage Tank is currently not providing
12 service to customers, and therefore, does not meet the criteria of a “used and
13 useful” asset in this proceeding. Ratepayers should only be expected to pay for
14 plant investments that are presently used to provide service.

15
16 **Q. DO YOU RECOMMEND ANY ADDITIONAL REVISIONS TO THE**
17 **COMPANY’S CLAIMED MEASURE OF VALUE?**

18 A. Yes. I recommend that an additional \$647,685 associated with deferred income
19 taxes be removed from the Company’s as filed Measure of Value claim of
20 \$2,546,370.

1 **Q. WHY ARE YOU RECOMMENDING AN ADDITIONAL \$647,685**
2 **REDUCTION TO THE COMPANY'S AS FILED CLAIMED MEASURE**
3 **OF VALUE OF \$2,546,370?**

4 A. The Company's response to OCA-Set I-9 states that the deferred income taxes
5 shown on Schedule E-2 should have reflected an amount of \$647,685 and that this
6 entire amount is related to tax versus book depreciation. An amount associated
7 with deferred income taxes is usually deducted from rate base which appropriately
8 recognizes that these are interest free funds for which the utility should not earn a
9 return. The Company appropriately acknowledges that the \$647,685 of deferred
10 income taxes should be reflected as a reduction to rate base (I&E Ex. No. 3, Sch.
11 7).

12
13 **Q. PLEASE SUMMARIZE YOUR RECOMMENDED ADJUSTMENTS TO**
14 **THE COMPANY'S CLAIMED MEASURE OF VALUE.**

15 A. In conjunction with the Company's update to increase rate base by \$4,782 (\$7,970
16 - \$3,188), my recommendations to disallow \$224,550 (\$232,000 - \$7,450) of net
17 plant associated with future test year additions for projects that have no clearly
18 defined in service date, to remove \$133,615 (\$194,349 - \$60,734) of net plant
19 associated with the Arcola Road Storage Tank, and to deduct \$647,685 for deferred
20 income taxes, reduces the Company as filed Measure of Value of \$2,546,370 by
21 \$1,001,069 to \$1,545,301 (I&E Ex. No. 3, Sch. 3, ln. 17).

22

1 **ANNUAL DEPRECIATION EXPENSE**

2 **Q. WHAT IS ANNUAL DEPRECIATION EXPENSE?**

3 A. Annual depreciation expense is an operating expense. It represents the loss of
4 service value of plant in service that is not restored by current maintenance,
5 incurred in connection with consumption and use of such plant that is not covered
6 by off-setting insurance payments.

7
8 **Q. WHAT ANNUAL DEPRECIATION DID THE COMPANY ORIGINALLY**
9 **CLAIM IN THIS FILING?**

10 A. The Company originally claimed \$155,884 of annual depreciation expense for the
11 year ending September 30, 2012. (Audubon Sch. H-1).

12
13 **Q. DID THE COMPANY REVISE ITS FUTURE TEST YEAR ANNUAL**
14 **DEPRECIATION EXPENSE CLAIM IN CONJUNCTION WITH THE**
15 **COMPANY'S PREVIOUSLY MENTIONED \$4,782 REVISION TO THE**
16 **COMPANY'S FUTURE TEST YEAR RATE BASE?**

17 A. Yes. The Company increased the claimed depreciation expense of \$155,884 by
18 \$1,594 to \$157,478 (Audubon St. DMK-1, p. 27).

19
20 **Q. DO YOU RECOMMEND ANY ADDITIONAL REVISIONS TO THE**
21 **COMPANY'S CLAIMED ANNUAL DEPRECIATION EXPENSE?**

1 A. Yes, if the Commission disallows the \$224,550 (\$232,000 - \$7,450) of future test
2 year additions for projects that have no clearly defined in service date and the
3 \$133,615 (\$194,349 - \$60,734) of plant associated with the Arcola Road Storage
4 claimed by the Company, there should be a corresponding decrease in the annual
5 depreciation expense of \$19,759 (\$14,900 + \$4,859) (I&E Ex. No. 3, Sch. 6).

6

7 **Q. WHY DO YOU RECOMMEND THAT THE ANNUAL DEPRECIATION**
8 **EXPENSE BE REDUCED BY \$19,759?**

9 A. As described above, annual depreciation expense represents that loss of service
10 value of plant in service. This \$19,759 is the annual depreciation expense on plant
11 that has no specified in-service date and may not be in service at the end of the
12 future test year. If this amount is included in the annual depreciation expense
13 total, the Company will be improperly recovering annual depreciation expense on
14 plant that is not in service at the end of the future test year. It is, therefore, my
15 opinion that the Company should not be permitted to include this annual
16 depreciation expense in the ratemaking formula that determines the appropriate
17 amount of revenue the Company is given the opportunity to recover through rates.

18

19 **Q. PLEASE SUMMARIZE YOUR RECOMMENDED ADJUSTMENTS TO**
20 **THE COMPANY'S CLAIMED ANNUAL DEPRECIATION EXPENSE.**

21 A. In conjunction with the Company's update to increase the as filed annual
22 depreciation expense by \$1,594, my recommendation to reduce the annual

1 depreciation expense by \$19,759 (\$14,900 + \$4,859) associated with plant that has
2 no specified in-service date, reduces the Company as filed annual depreciation
3 expense of \$155,884 by \$18,165 to \$137,719 (I&E Ex. No. 3, Sch. 6, ln. 12).

4
5 **RATE DESIGN**

6 **Q. DESCRIBE THE COMPANY'S PRESENT RATE STRUCTURE.**

7 A. The Company currently has a rate structure consisting of a customer charge and
8 the same consumption charge (\$5.5776 per thousand gallons) for both Residential
9 and Non-Residential customers for the first 100,000 gallons per month.

10 Residential customers are charged the same \$5.5776 per thousand gallons for all
11 usage over 100,000 gallons per month, although, Non-Residential customers are
12 charged \$3.7304 per thousand gallons for all usage over 100,000 gallons per
13 month. The customer charges are based on the various meter sizes which range
14 from 5/8 inch to 12 inches. The Company also has flat rates for Public and Private
15 Fire service (Audubon Sch. M-1).

16
17 **Q. BRIEFLY DESCRIBE THE COMPANY'S AS FILED PROPOSED RATE
18 STRUCTURE.**

19 A. The Company's as filed proposed revenue increase is \$540,686 for the future test
20 year ending September 30, 2012, representing an approximate 27% increase in
21 annual revenues. The Company is proposing to increase public and private fire

1 protection rates by 29%, while all other customer class rates are proposed to be
2 increased by approximately 27% (Audubon Sch. M-1).

3
4 **Q. HAS THE COMPANY REVISED ITS PROPOSED REVENUE INCREASE**
5 **IN DIRECT TESTIMONY?**

6 A. Yes. The Company currently proposes to reduce the overall revenue increase by
7 \$22,718, resulting in a \$517,968 adjusted increase (25.2%) (Audubon St. DMK-1,
8 pp. 27-28).

9
10 **Q. HAS THE COMPANY MADE ANY FURTHER REVISIONS TO ITS**
11 **PROPOSED REVENUE INCREASE SINCE ITS DIRECT TESTIMONY**
12 **WAS FILED?**

13 A. Yes. The Company's response to OCA-Set I-9, received on May 18, 2012,
14 indicates that the Company plans to further reduce its requested increase by an
15 additional \$98,777, resulting in a \$419,191 adjusted increase (20.4%) (I&E Ex.
16 No. 3, Sch. 7).

17
18 **Q. DID THE COMPANY PROPOSE ANY REVISIONS TO PROPOSED**
19 **RATES AS A RESULT OF ITS REDUCED OVERALL REVENUE**
20 **INCREASE?**

21 A. No. As stated on page 28 of Audubon Statement DMK-1, the Company has not
22 calculated any changes to customer rates, but indicates that the traditional method

1 would be based upon a proportional reduction to each customer class when such a
2 minor adjustment is made.

3
4 **Q. DO YOU HAVE ANY RECOMMENDED CHANGES TO THE**
5 **COMPANY'S RATE STRUCTURE PROPOSALS?**

6 A. No. The only exception would apply to the annual Public Fire hydrant rate of
7 \$252.98. Since this rate is limited to the 25% cost of providing service to that
8 class, it should not be scaled-back.

9
10 **Q. HOW SHOULD RATES BE SCALED-BACK IF THE COMMISSION**
11 **GRANTS LESS THAN THE FULL INCREASE REQUESTED BY THE**
12 **COMPANY?**

13 A. I recommend that proposed rates be scaled back proportional to the percentage
14 increase originally proposed by the Company. The only exception would apply to
15 the annual Public Fire hydrant rate of \$252.98, as described above.

16
17 **Q. WHY DO YOU RECOMMEND A PROPORTIONAL SCALE-BACK?**

18 A. As noted, I have no recommended changes to the Company's proposed rate design.
19 As such, a proportional scale-back is the most reasonable approach if the
20 Commission grants less than the full increase.

21
22 **Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?**

23 A. Yes.

JEREMY B. HUBERT

PROFESSIONAL EXPERIENCE AND EDUCATION

EDUCATION:

Pennsylvania State University, State College, Pennsylvania
Bachelor of Science; Major in Mechanical Engineering, 2003

- Attended EUCI Introduction to Rate Design for Electric Utilities, Philadelphia, PA
- Attended EUCI Introduction to Cost of Service Concepts and Techniques for Electric Utilities, Philadelphia, PA
- Attended NARUC Rate School, San Diego, CA

EXPERIENCE:

11/2006 - Present

Office of Trial Staff, 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.

10/2005 – 11/2006

Pennsylvania Department of Transportation - Harrisburg, Pennsylvania

Materials Technician – Responsible, primarily, for performing a variety of technical duties associated with the routine testing of coarse aggregates according to AASHTO and PTMs.

05/2005 – 10/2005

Gatter & Diehl, Inc. Consulting Engineers - Harrisburg, Pennsylvania

Mechanical Designer – Responsible, primarily, for assisting engineers and CADD technicians in the design aspects of HVAC, plumbing, and fire protection systems.

TESTIMONY SUBMITTED:

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

- Village Water Company, Docket No. R-00072351
- United Water of Pennsylvania, Inc., Docket No. A-210013F0017
- Total Environmental Solutions, Inc.
Treasure Lake Division, Docket No. R-00072493
- National Fuel Gas Distribution Corporation, 1307(f) proceeding,
Docket No. R-2008-2012502
- PECO Energy Company, Docket No. R-2008-2028394
- PPL Gas Utility Corporation, 1307(f) proceeding,
Docket No. R-2008-2039634
- Newtown Artesian Water Company, Docket No. R-2008-2042293
- Equitable Gas Company, Docket No. R-2008-2029325
- National Fuel Gas Distribution Corporation, 1307(f) proceeding,
Docket No. R-2009-2083181
- Columbia Gas of Pennsylvania, 1307(f) proceeding,
Docket No. R-2009-2093219
- UGI Central Penn Gas, Inc., 1307(f) proceeding,
Docket No. R-2009-2105909
- Pennsylvania American Water Company, Docket No. R-2009-2097323
- PPL Electric, Energy Efficiency and Conservation Plan,
Docket No. M-2009-2093216
- Utilities, Inc. of Pennsylvania, Docket No. R-2009-2117402
- Aqua Pennsylvania, Inc., Docket No. R-2009-2132019
- Newtown Artesian Water Company, Docket No. R-2009-2117550
- Columbia Gas of Pennsylvania, Inc., Docket No. R-2009-2149262
- National Fuel Gas Distribution Corporation, 1307(f) proceeding,
Docket No. R-2010-2150861
- T.W. Phillips Gas and Oil Company, Docket No. R-2010-2167797
- Columbia Gas of Pennsylvania, 1307(f) proceeding,
Docket No. R-2010-2161920
- UGI Central Penn Gas, Inc., 1307(f) proceeding,
Docket No. R-2010-2172922
- Total Environmental Solutions, Inc.
Treasure Lake Water Division, Docket No. R-2010-2171918

- Total Environmental Solutions, Inc.
Treasure Lake Sewer Division, Docket No. R-2010-2171924
- Wellsboro Electric Company, Docket No. R-2010-2172662
- Columbia Gas of Pennsylvania, Inc., Docket Nos. R-2010-2215623
R-2010-2201974
- Columbia Gas of Pennsylvania, 1307(f) Proceeding
Docket No. R-2011-2228696
- The Newtown Artesian Water Company, Docket Nos. R-2010-2215623
R-2010-2201974

I&E Exhibit No. 3
Witness: Jeremy B. Hubert

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Exhibit to Accompany
the
Direct Testimony
of
Jeremy B. Hubert
Bureau of Investigation and Enforcement

NON-PROPRIETARY VERSION
[Redacts Schedule 5, page 2 of 2]

Concerning:

Rate Base
Annual Depreciation Expense
Rate Design

REC'D MFD
2012 JUL -6 PM 4:23
SECRETARY'S OFFICE

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RB-7-D

In reference to the proposed \$95,000 New Pump Station at Valley Forge Crossing project shown on Schedule J-2-1, page 5, provide the following information:

- A. Description of the project;
- B. Amount expended to date;
- C. Expected in-service date;
- D. Expected final cost;
- E. Original cost and installation date of any corresponding retirements.

RESPONSE:

Dennis M. Kalbarczyk, Consultant, and JH Russell, CFO/COO, Audubon Water Company; March 8, 2012

- A. Pump station for new well.
- B. \$2,500 has been spent to date on the foundation for the pump station.
- C. The in service date will be tied to issuance of the DEP Permit, the application for which currently is being prepared.
- D. \$95,000.
- E. None.

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RB-8-D

In reference to the proposed \$85,000 New 60,000 gallon Water Storage Tank project shown on Schedule J-2-1, page 6, provide the following information:

- A. Description of the project;
- B. Amount expended to date;
- C. Expected in-service date;
- D. Expected final cost;
- E. Original cost and installation date of any corresponding retirements.

RESPONSE:

Dennis M. Kalbarczyk, Consultant, and JH Russell, CFO/COO, Audubon Water Company; March 8, 2012

- A. Installation of water storage tank at Valley Forge Crossing Mobile Home Park.
- B. No money has been spent to date.
- C. The in service date will be tied to issuance of the DEP Permit, the application for which currently is being prepared.
- D. \$85,000.
- E. None.

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RB-12-D

In reference to the proposed \$24,000 of Server and Backup Computers to be installed shown on Schedule J-2-1, page 15, provide the following information:

- A. Amount expended to date;
- B. Expected in-service date;
- C. Expected final cost;
- D. Original cost and installation date of any corresponding retirements.

RESPONSE:

Dennis M. Kalbarczyk, Consultant, and JH Russell, CFO/COO, Audubon Water Company; March 8, 2012

- A. No money has been spent to date.
- B. The Company is in the process of soliciting proposals for the server and backup computer infrastructure.
- C. Approximately \$24,000.
- D. None.

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RB-13-D

In reference to the proposed \$28,000 New Customer Billing Program projected to be installed by the end of the future test year and shown on Schedule J-2-1, page 15, provide the following information:

- A. Expected in-service date;
- B. Expected final cost;
- C. Original cost and installation date of any corresponding retirements.

RESPONSE:

Dennis M. Kalbarczyk, Consultant, and JH Russell, CFO/COG, Audubon Water Company; March 8, 2012

- A. The Company is in the process of soliciting proposals for the customer billing program.
- B. Approximately \$28,000.
- C. None.

Audubon Water Company
Docket No. R-2012-2286118

I&E Exhibit No. 3
Schedule 2
page 1 of 8

*** Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RE-30-D

For each Company scheduled project awaiting DEP approval, provide copies of all correspondence, including notes, letters or e-mails, between DEP and the Company relating to and confirming DEP's acceptance of the applications for each such project.

RESPONSE:

JH Russell, CFO/COO, Audubon Water Company, May 8, 2012

See the documents attached to this response.



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE

I&E Exhibit No. 3
Schedule 2
page 2 of 8

February 29, 2012

Mr. J.H. Russell, Jr., CFO
Audubon Water Company
2650 Eisenhower Drive
Suite 104-A
Norristown, PA 19403

Re: Audubon Water Company – Valley Forge Terrace MHP
Application No. 4612502
APS No. 772911, AUTH No. 914717
Lower Providence Township
Montgomery County

Dear Mr. Russell:

On January 25, 2012, the Department of Environmental Protection (Department) received the above-referenced application for upgrades to the existing public water supply, including a new drilled well, a 60,000-gallon aboveground storage tank, booster pumps, sequestration for manganese control, and sodium hypochlorite for disinfection.

Permit applications undergo a series of reviews before a final decision is rendered by the Department. We have reviewed your application in order to determine whether it contains the information, plans, fees, and other documents necessary for administrative completeness. Your application is **administratively complete** and will be processed for technical review. You will be notified in writing or by phone if additional information is required before a technical decision can be reached.

Your permit application is eligible for the Department's Money Back Guarantee Program. The program establishes that your application must be acted on within 180 days or your application fee will be returned. The program is explained in more detail in the enclosed fact sheet.

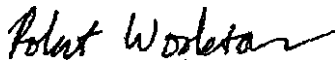
Mr. J.H. Russell, Jr., CFO

- 2 -

February 29, 2012

You will be contacted in the near future if any other permits or approvals are needed in conjunction with the above application. Please refer to the enclosed permit process information sheet for questions about the permitting process. For questions about your application, please call me at 484.250.5128.

Sincerely,



Rob Woolston
Technical Services Section
Safe Drinking Water

Enclosures: Permit Process Information
Money Back Guarantee Information

cc: Mr. Hudson, P.E. – Evans Mill Environmental, LLC
Lower Providence Township
Mr. Johnson – SDW
Ms. Lashley
Re 30 (dh12sdw) 059-6



MIT PROCESS INFORMATION

June 2004

Interagency Coordination:

Your permit application will be sent to other regulatory programs within DEP for a preliminary review to determine if other permits are required for the activity you are proposing. If it appears other permits are necessary, you will be sent applications for those regulated activities. The coordination of the permit application reviews will be the responsibility of the Assistant Regional Director, John J. Kennedy, P.E., who can be reached at 484-250-5940.

Administrative Review:

Administrative reviews vary slightly by program, but generally include checking for the appropriate filing fees, notarizations, maps, and application forms. The purpose of the administrative completeness review is to determine whether information and forms are provided. It is not to evaluate the accuracy or content of the information. Administrative reviews are generally conducted within 20 days of the receipt of the application.

If your application is administratively deficient, you will be notified by phone or letter. You will be given a reasonable time frame in which to submit the required information. If the information is not submitted within that time frame, the application will be returned to you without action by DEP.

When an application is determined to be administratively complete, it will be accepted for technical review by the Department. This means that the Department will initiate the technical review of the application. You will be notified by letter that your application has been accepted. At that time, you will be given the name and phone number of the person to whom your application has been referred for review.

Technical Reviews:

Technical reviews begin once an application is deemed administratively complete and are performed by one or more of DEP's professional staff. The technical review includes an analysis of the proposal for potential adverse environmental impacts; the completeness, clarity, and soundness of engineering proposals; conformance with applicable statutes and regulations; and analysis of comments submitted by the public. Please note, applications containing major technical errors will not be reviewed by the agency. Rather, they will be returned with a request that the applicant take more care in preparing the application.

A critical part of the technical review process is the review of comments from the general public and other governmental agencies. Comments may be solicited as a result of publishing a notice of the permit request or draft permit in the Pennsylvania Bulletin and newspapers of general circulation, circulating the application to other governmental agencies, or through public meetings or hearings. Unsolicited comments in the form of letters and petitions are also given consideration.



DEP staff will review the application and all other relevant information and you will be notified by phone or letter if there are deficiencies in your application. You will be given a reasonable period of time in which to address the deficiencies. If you fail to do so within the allotted time, your application will be denied. If the material you submit in response to the deficiency letter still fails to meet the Department's requirements, you will be issued a pre-denial letter. This letter will state that the Department is prepared to deny your application if the ongoing deficiencies are not corrected within a stated time frame. You will have one final opportunity to address those deficiencies; otherwise, the permit will be denied.

When DEP has completed the technical review of your application, a decision will be rendered. If all applicable requirements are met, your permit will be issued. If multiple permits are involved, they will be issued simultaneously from the Assistant Regional Director's office. Permits may be denied for a number of reasons, including failure to supply the required information needed for a complete and comprehensive technical review (as described in the paragraph above); failure to show that the activity will not have an adverse impact on the environment; failure to satisfy all applicable legal requirements; or, in some cases, a negative compliance history of the applicant.

If you believe the stated deficiencies in either the deficiency letter or pre-denial letter are not significant, you have the option of declining and asking the Department to make a decision based on the information you have already made available.

Public Input and Participation:

Permit applications may be subject to any or all of the following: notice in the Pennsylvania Bulletin or other publication of general circulation; a public meeting; a public hearing. These opportunities for public input are often required by regulation or statute, but may also occur at the discretion of the Department.

Appeal Process:

Any person aggrieved by this action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. Section 7514, and the Administrative Agency Law, 2 Pa.C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, P.O. Box 8457, Harrisburg, PA 17105-8457, 717-787-3483. TDD users may contact the Board through the Pennsylvania Relay Service, 800-654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in braille or on audiotape from the Secretary to the Board at 717-787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

IF YOU WANT TO CHALLENGE THIS ACTION, YOUR APPEAL MUST REACH THE BOARD WITHIN 30 DAYS. YOU DO NOT NEED A LAWYER TO FILE AN APPEAL WITH THE BOARD.

IMPORTANT LEGAL RIGHTS ARE AT STAKE, HOWEVER, SO YOU SHOULD SHOW THIS DOCUMENT TO A LAWYER AT ONCE. IF YOU CANNOT AFFORD A LAWYER, YOU MAY QUALIFY FOR FREE PRO BONO REPRESENTATION. CALL THE SECRETARY TO THE BOARD (717-787-3483) FOR MORE INFORMATION.

We hope you find this information helpful in understanding the application review process.

DEP MONEY-BACK GUARANTEE PERMIT REVIEW PROGRAM

Introduction

The purpose of the DEP Money-Back Guarantee Permit Review Program is to demonstrate DEP's commitment to providing timely permit decisions without sacrificing public review. It also recognizes the responsibility of the applicant to provide DEP with a complete application that meets agency requirements. Applicants who fail to get an answer from DEP within the deadline will automatically have their permit application processing fees returned.

The DEP Permit Review Process is a standardized process that is followed by all DEP permitting programs. The process encourages quality submissions by applicants and is the basis for the DEP Money-Back Guarantee Permit Review Program. The permit review process includes four key decision points:

- 1) Is the application administratively complete;
- 2) Is the application technically complete;
- 3) Is the application technically sound; and
- 4) Should the permit be issued?

Permit Coordination

Permit applications are sent to various regulatory programs within DEP for a preliminary review to determine if other permits are required for the proposed activity. If it appears other permits are necessary, DEP will send the applicant applications for those regulated activities. DEP's Assistant Regional Directors (ARD) are responsible for coordination of the permit application reviews. It is highly recommended that permit applicants schedule pre-application conferences with the appropriate regional ARDs if their proposed projects may require permits from multiple DEP programs.

DEP Region	ARD	Phone
Southeast	John Kennedy	484-250-5940
Northeast	Gary Greenfield	570-826-2511
Southcentral	Lynn Langer	717-705-4929
Northcentral	Mike Welch	570-327-3320
Southwest	Ron Schwartz	412-442-4181
Northwest	James Rozakis	814-332-6816

Administrative Review

Administrative reviews vary slightly by program, but generally include checking for the appropriate signatures, filing fees, notarizations, maps and application forms. The purpose of the administrative completeness review is to determine whether the applicant provided the required forms, fees and signatures. DEP will not, at this time, evaluate the quality or content of the information. Administrative reviews are generally conducted within 20 days of the receipt of the application.

If an application is administratively deficient, DEP will notify the applicant by phone or letter. DEP will provide a reasonable time frame in which to submit the required information. If the information is not submitted within that time frame, DEP will return the application to the applicant without action.

When an application is determined to be administratively complete, DEP will accept it and will initiate the technical review. Applicants are notified by letter that their application has been accepted. The acceptance letter will include the name and contact information of the person to whom the application has been assigned for review.

Technical Review

Technical reviews begin once an application is deemed administratively complete and are performed by one or more of DEP's professional staff. The technical review includes an analysis of the proposal for potentially adverse environmental impacts; completeness, clarity and soundness of engineering proposals; conformity with

applicable statutes and regulations; and analysis of comments submitted by the public. Please note, DEP will not review applications containing major technical errors. DEP will return technically deficient applications with a request that the applicant take more care in preparing the application.

A critical part of the technical review process is the review of comments from the general public and other governmental agencies. Comments may be solicited as a result of publishing a notice of the permit request or draft permit in the *Pennsylvania Bulletin* and/or newspapers of general circulation, circulating the application to other governmental agencies or through public meetings or hearings. Unsolicited comments in the form of letters and petitions are also given consideration.

After DEP staff review the application and all other relevant information, the applicant will be notified by phone or mail if there are deficiencies in the application. Applicants are given a reasonable period of time in which to address the deficiencies. If applicants fail to do so within the allotted time, the application may be denied and returned and any Money-Back Guarantee becomes void. If the material submitted in response to the deficiency letter still fails to meet DEP's requirements, DEP will issue a pre-denial letter. This letter will state that DEP is prepared to deny the application if the on-going deficiencies are not corrected within a stated time frame. The applicant will have one final opportunity to address those deficiencies; otherwise, DEP will deny the permit.

If all applicable requirements are met, DEP will issue the permit. When multiple permits are involved, the Assistant Regional Director's office will coordinate the issuance of the permits. DEP may deny a permit for any number of reasons, including: failure to supply the required information needed for a complete and comprehensive technical review (as described in the paragraph above); failure to show that the activity will not have an adverse impact on the environment; failure to satisfy all applicable legal requirements; or, in some cases, a negative compliance history of the applicant.

If an applicant believes the stated deficiencies in either the deficiency letter or pre-denial letter are not significant, the applicant has the option of asking DEP to make a decision based on the information already made available.

Public Input and Participation

Permit applications may be subject to any or all of the following: notice in the *Pennsylvania Bulletin* or other publication of general circulation; a public meeting; and a public hearing. These opportunities for public input are often required by regulation or statute, but may also occur at the discretion of DEP.

Appeal Process

Any person aggrieved by a DEP action may appeal to the Environmental Hearing Board. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of an action unless the appropriate statute provides a different time period. Copies of the appeal form and the board's rules of practice and procedure may be obtained from the board. The appeal form and the board's rules of practice and procedure are also available in Braille or on audio tape from the Secretary to the Board at 717-787-3483.

What additional information related to permits and processing timeframes is available?

The *Guide to DEP Permits & Other Authorizations* is available on the DEP Web site at: www.depweb.state.pa.us, keyword: Permits. This guide provides detailed information on the processing of applications and provides information related to individual types of authorizations.

Permit/Authorization application packages are available on the DEP Web site at: www.depweb.state.pa.us, keyword: Permits. These packages include instructions, forms, checklists, and other related documentation needed to apply for a permit or other authorization from DEP.

eNotice is available on the DEP Web site at: www.depweb.state.pa.us, keyword: eNotice. eNotice is DEP's electronic notification system. Web site users can subscribe to eNotice, select items they wish to receive email notices on (or 'eNotices') when changes occur in the status of a particular item or when new items are available for viewing. eNotices covering permit applications are processed daily.

For more information, visit www.depweb.state.pa.us, keyword: Money-Back Guarantee.



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST REGIONAL OFFICE

April 24, 2012

Mr. William Muszynski
Coordinator of Special Projects and Programs
The Operations Branch
Delaware River Basin Commission
P.O. Box 7360
West Trenton, NJ 08628

Re: Audubon Water Company – Valley Forge Terrace MHP
Application No. 4612502
APS No. 772911, AUTH No. 914717
Lower Providence Township
Montgomery County

Dear Mr. Muszynski:

The above project has been approved and a permit will be issued by the Department of Environmental Protection.

Enclosed is a copy of our Internal Review and Recommendations.

The issuance of the permit is being withheld until the Delaware River Basin Commission has approved the project.

Sincerely,

Nancy R. Roncetti
Regional Manager
Safe Drinking Water

Enclosure

cc: Mr. Russell – Audubon Water Company
Mr. Hudson, P.E. – Evans Mill Environmental, LLC
Mr. Woolston – SDW (w/enclosure)
Mr. Johnson – SDW
Lower Providence Township
Ms. Lashley
Re 30 (dh12sdw) 109-4c

Audubon Water Company

Docket No. R-2012-2286118

Rate Base for Test Year Ending September 30, 2012

	(A)	Company As Filed (B)	Adjustment (C)	I&E (D)
1	Total Utility Plant in Service	\$9,210,626	(\$232,000) (1)	\$8,978,626
2	Company Revision		\$7,970 (2)	\$7,970
3			(\$194,349) (3)	(\$194,349)
4	Less: Reserve for Depreciation	\$4,144,410	(\$7,450) (1)	\$4,136,960
5	Company Revision		\$3,188 (2)	\$3,188
6			(\$60,734) (3)	(\$60,734)
7	Total Depreciated Plant in Service	\$5,066,216	(\$353,383)	\$4,712,833
8	Add: Materials and Supplies	\$65,000	\$0	\$65,000
9	Cash Working Capital	\$266,077	\$0	\$266,077
10	Deduct: Contributions in Aid of Construct	\$4,117,107	\$0	\$4,117,107
11	Less: Accumulated Depreciation	\$1,275,372	\$0	\$1,275,372
12		\$2,841,735	\$0	\$2,841,735
13	Customer Advances	\$10,700	\$0	\$10,700
14	Less: Accumulated Depreciation	\$1,511	\$0	\$1,511
15		\$9,189	\$0	\$9,189
16	Deferred Income Taxes	\$0	\$647,685 (4)	\$647,685
17	Original Cost Measure of Value	\$2,546,370	(\$1,001,069)	\$1,545,301

(1) Adjustment to remove Company claimed plant additions which have no in-service data
(Company responses to I&E-RB-7, 8, 12, 13-D)

(2) Per the Company's response to OCA-I-8, the Company, in error, expensed a utility sto
service body which should have been capitalized with a 5-year life.

(3) Adjustment to remove the Arcola Rd. Storage Tank which is not yet in-service.

(4) Per the Company response to OCA-I-9, the Company acknowledges the \$647,685
reduction to rate base for deferred income taxes.

Responses to Interrogatories of
the Office of Consumer Advocate
Set I

OCA Set 1-5 Refer to Schedule I-12. For each storage tank that the Company is claiming amortization of painting costs, identify the last date on which the tank was painted and the actual cost.

RESPONSE: Dennis M. Kalbarczyk, Consultant, and JH Russell, CFO/COO, Audubon Water Company, April 2, 2012

Arcola Road The tank has not been painted since it was installed in 2000-2001.

Featherbed 188 The exterior of the tank was touched up in 1999. The cost to perform the work is at \$15,000.

Featherbed 500 The tank has not been painted since it was installed in 1986.

**Responses to Data Requests of the
Bureau of Investigation and Enforcement**

I&E-RB-1-D

In reference to the five storage tanks utilized by the Company referenced on page A-12 of the filing, provide a schedule that shows the following:

- A. Name and location;
- B. Date installed;
- C. Capacity;
- D. Copy of the DEP permit.

The attached "Response to I&E-RB-1-D" contains Proprietary Information that is considered to be Highly Confidential and is protected from public disclosure pursuant to the Public Utility Confidential Security Information Disclosure Protection Act at 35 P.S. §§ 2141.1 – 2141.6 and by the Public Utility Commission's Regulations at 52 Pa. Code §§ 102.1 – 102.4, as well as the Stipulated Proprietary Agreement entered into by Audubon Water Company and the Bureau of Investigation and Enforcement.

PROPRIETARY INFORMATION

Audubon Water Company

Docket No. R-2012-2286118

Annual Depreciation Expense for Test Year Ending September 30, 2012

1	I&E	\$228,454
2		(1) (\$14,900)
3		(2) \$1,594
4		(3) (\$4,859)
5	Less: CIAC	\$72,392
6	Customer Advances	\$178
7	Total I&E Annual	<u>\$137,719</u>
8	Company Claimed	\$228,454
9	Less: CIAC	\$72,392
10	Customer Advances	\$178
11	Total Company Annual	<u>\$155,884</u>
12	I&E ADJUSTMENT	<u>(\$18,165)</u>

- 13 (1) Adjustment to remove Company claimed plant additions which have no in-service date.
14 (Company responses to I&E-RB-7, 8, 12, 13-D)
- 15 (2) Per the Company's response to OCA-I-8, the Company, in error, expensed a utility storage
16 service body which should have been capitalized with a 5-year life.
- 17 (3) Adjustment to remove the Arcola Rd. Storage Tank which is not yet in-service.

Responses to Interrogatories of
the Office of Consumer Advocate
Set I

OCA Set I-9

Refer to the balance sheets shown on Schedules E-1 and E-2. Both balance sheets show deferred income taxes of \$642,889. Indicate what portion of the deferred tax balance is related to tax versus book depreciation and why such deferred taxes are not reflected in the filing.

RESPONSE:

Dennis M. Kalbarczyk, Consultant, May 18, 2012

The Company has re-evaluated the overall impact of income taxes on the requested revenue increase to include the ratemaking treatment for deferred income taxes. By way of discussion, the deferred income taxes on Schedule E-2 should have reflected an amount of \$647,685 and not the same \$642,889 as shown on Schedule E-1. All of the deferred income taxes are related to tax versus book depreciation. The Company will update its filing accordingly to reflect the correct value as a reduction to rate base, which will result in a \$58,680 reduction to its net income claim ($\$647,685 \times 9.06\%$ overall rate of return) along with a \$40,097 reduction to income taxes ($\$58,680 \times 68.331\%$ Income Tax Gross Up Rate) resulting in a \$98,777 reduction to the Company's revenue increase claim ($\$58,680 + \$40,097$).

**I&E Statement No. 3-SR
Witness: Jeremy B. Hubert**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Surrebuttal Testimony

of

Jeremy B. Hubert

Bureau of Investigation and Enforcement

PROCESSED
2012 JUL -6 PM 4:23
SECRETARY'S OFFICE

Concerning:

**Rate Base
Depreciation Expense**

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

2 A. My name is Jeremy B. Hubert. My business address is Pennsylvania Public
3 Utility Commission, P.O. Box 3265, Harrisburg, PA 17105-3265.

4
5 **Q. ARE YOU THE SAME JEREMY B. HUBERT WHO SUBMITTED I&E**
6 **STATEMENT NO. 3 AND I&E EXHIBIT NO. 3 ON MAY 23, 2012?**

7 A. Yes.

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

10 A. The purpose of my surrebuttal testimony is to present a response to the rebuttal
11 testimonies of Audubon Water Company's ("Audubon" or "Company") witnesses
12 J.H. Russell and Dennis M. Kalbarczyk.

13
14 **Q. DID THE COMPANY REVISE ITS RATE BASE CLAIM IN REBUTTAL**
15 **TESTIMONY?**

16 A. Yes. The Company's revised rate base claim is \$1,899,974 (DMK-1R Ex. 2,
17 Revised Sch. F-1).

18
19 **Q. DID YOU ADDRESS THE COMPANY'S CLAIMED FUTURE TEST YEAR**
20 **PLANT ADDITIONS OF \$631,079 IN YOUR DIRECT TESTIMONY?**

21 A. Yes. As shown on Schedule 3 of I&E Exhibit No. 3, I recommended that the
22 Commission disallow \$232,000 of the Company's claimed future test year plant

1 additions, the corresponding accrued (\$7,450) and annual depreciation expense
2 (\$14,900) because the plant will not be used and useful at the end of the test year
3 which the Company has chosen, September 30, 2012 (I&E St. No. 3, pp. 8-9).

4
5 **Q. DOES YOUR \$224,550 (\$232,000 - \$7,450) RECOMMENDED REDUCTION**
6 **TO THE COMPANY'S CLAIMED NET PLANT ADDITIONS INCLUDE**
7 **COSTS ASSOCIATED WITH PROPOSED PROJECTS AT THE VALLEY**
8 **FORGE CROSSING MOBILE HOME PARK?**

9 A. Yes. I recommended the Commission disallow \$93,812 (\$95,000 - \$1,188) of
10 claimed net plant associated with the new pump station and \$83,937 (\$85,000-
11 \$1,063) of claimed net plant associated with the proposed water storage facility at
12 the Valley Forge Mobile Home Park due to the Company's inability to provide an
13 in-service date for either project. Initiation of the projects is currently uncertain
14 and is contingent upon receipt of a DEP Permit (I&E St. No. 3, pp. 7-9).

15
16 **Q. DID THE COMPANY ADDRESS YOUR RECOMMENDATION**
17 **CONCERNING THE REMOVAL OF THE TWO VALLEY FORGE**
18 **MOBILE HOME PARK PROJECTS TOTALING \$180,000 (\$95,000 +**
19 **\$85,000)?**

20 A. Yes. The Company does not agree with my recommendation and claims that my
21 statements regarding the status of the Company's DEP application are incorrect.
22 The Company claims that I failed to realize that the Company's projects at the

1 Valley Forge Mobile Home Park have been approved by DEP and a permit will be
2 issued by DEP once the Delaware River Basin Commission (“DRBC”) has given
3 its approval to the project (Audubon St. JHR-1R, pp. 9-10).

4
5 **Q. IS DEP’S ANTICIPATION OF THE DRBC’S POSSIBLE APPROVAL OF**
6 **THE PROJECT AT THE MOBILE HOME PARK A VALID REASON FOR**
7 **ALLOWING THESE PROJECTS IN RATE BASE?**

8 A. No. Page 10 of Audubon Statement JHR-1R indicates that the projects were
9 approved by DEP, pending the approval of the DRBC. However, assuming the
10 DRBC does give its approval of the project, DEP has not given the Company a
11 specific date when it will issue the permit required to even begin the Valley Forge
12 Mobile Home Park projects. Therefore, since the Company is still unable to
13 provide an in-service date for either of these two projects, with a combined original
14 cost of \$180,000, neither should be included in rate base.

15
16 **Q. DESCRIBE WHAT REMAINING PLANT IS INCLUDED IN YOUR**
17 **\$224,550 (\$232,000 - \$7,450) RECOMMENDED REDUCTION TO THE**
18 **COMPANY’S CLAIMED NET PLANT ADDITIONS.**

19 A. In addition to those projects with in-service dates contingent upon receipt of a DEP
20 permit, I recommended the Commission disallow \$21,600 (\$24,000 - \$2,400) of
21 net plant associated with Server and Backup Computers and \$25,200 (\$28,000-
22 \$2,800) of net plant associated with the New Customer Billing Program, due to the

1 Company's inability to provide an in service date for either of these plant additions
2 (I&E St. No. 3, pp. 7-9).

3
4 **Q. DID THE COMPANY ADDRESS YOUR RECOMMENDATION TO**
5 **REMOVE COSTS ASSOCIATED WITH THE BILLING AND**
6 **COMPUTER EQUIPMENT?**

7 A. Yes. The Company does not agree with my recommendation. Mr. Kalbarczyk
8 refers to his rebuttal testimony addressing the Office of Consumer Advocate's
9 proposal to eliminate the computer system upgrades and billing system and injects
10 the same argument in response to my recommendation. Mr. Kalbarczyk simply
11 states that the new billing system, computers and backup server are necessary to
12 provide for and maintain business continuity and emergency preparedness
13 requirements consistent with Commission policy and claims that the orderly
14 progression of the addition of the IT hardware and software items reflects a logical
15 plan with little, if any, impact on the end of the future test year requirements
16 (Audubon St. DMK-1R, pp. 19-21).

17
18 **Q. HAS THE COMPANY PROVIDED AN UPDATE AS TO THE STATUS OF**
19 **THE BILLING AND COMPUTER EQUIPMENT FOR WHICH IT WAS IN**
20 **THE PROCESS OF SOLICITING PROPOSALS?**

21 A. Yes. The Company's updated response to I&E-RB-13-D, received on June 11,
22 2012, (current as of June 8, 2012), provides a copy of the Company's second

1 confidential proposal for the New Billing System. The updated response indicates
2 that the Company is still in the process of evaluating proposals and has not
3 indicated that any money has been spent to date nor has the Company provided an
4 in-service date for this plant. Therefore, the computer software and hardware
5 projects with a combined original cost of \$52,000 should not be included in rate
6 base.

7
8 **Q. DOES MR. KALBARCZYK PRESENT ANY GENERAL ARGUMENTS TO**
9 **JUSTIFY INCLUDING FUTURE TEST YEAR ADDITIONS WITH NO**
10 **CLEARLY DEFINED IN SERVICE DATE IN RATE BASE?**

11 A. The Company claims that my recommendation to disallow the net plant and
12 depreciation expense associated with future test year plant additions which lack a
13 clearly defined in service date is a disincentive for utilities to invest in
14 infrastructure (Audubon St. DMK-1R, p. 21).

15
16 **Q. IS YOUR RECOMMENDATION A DISINCENTIVE FOR UTILITIES TO**
17 **INVEST IN INFRASTRUCTURE?**

18 A. No. In reality, utilities regulated under rate base / rate of return regulation actually
19 have an incentive to invest in plant, file a rate case and be granted the opportunity
20 to earn a reasonable return on prudent investment after the plant is determined
21 “used and useful.”

1 **Q. HAS MR. KALBARCZYK PRESENTED ANY OTHER GENERAL**
2 **ARGUMENTS FOR REJECTING YOUR RECOMMENDATION?**

3 A. Yes. Mr. Kalbarczyk claims that my position is not consistent with the
4 Commission policy concerning Construction Work in Progress (“CWIP”), which
5 allows for up to six months after the new base rates go into effect for recognition of
6 future test year additions in rates (Audubon St. DMK-1R, pp. 7-9). Mr.
7 Kalbarczyk further attempts to strengthen his argument by referencing the
8 Commission’s recently adopted statutory amendments set forth in Act 11 and states
9 that had Act 11 been in effect at the time of the Company’s filing, Audubon could
10 have used a fully projected future test year of October 1, 2012 through September
11 30, 2013 (Audubon St. DMK-1R, p. 8).

12
13 **Q. IS YOUR RECOMMENDATION CONSISTENT WITH THE**
14 **COMMISSION POLICY STATEMENT CONCERNING CWIP AT 52 PA**
15 **CODE § 69.371 ENTITLED RATEMAKING TREATMENT OF**
16 **CONSTRUCTION WORK IN PROGRESS?**

17 A. Yes. The Company incorrectly claims that the Policy Statement allows all plant
18 started and included after the end of the test year, but within six months of the end
19 of the test year without any conditions or restriction. This overly broad and
20 simply incorrect interpretation ignores the definition of CWIP that includes the
21 words “in progress.” Clearly, the Commission’s policy on CWIP is restricted to
22 projects that are “in progress” at the end of the test year, and is not applicable to

1 the above plant additions claimed by the Company, none of which are “in
2 progress.”

3
4 **Q. DOES THE RECENTLY ADOPTED STATUTORY AMENDMENTS SET**
5 **FORTH IN ACT 11, REFERENCED BY MR. KALBARCZYK, HAVE ANY**
6 **IMPACT ON THIS PROCEEDING?**

7 A. No. Act 11 (Act of February 14, 2012 P.L. 72, No. 11, effective 60 days from
8 signing), which contains a provision to allow utilities to use a fully projected future
9 test year in base rate proceedings, has no impact on this case. Additionally the
10 Commission itself has not yet developed the procedures and requirements for the
11 use of a fully projected future test year. For that reason, the new legislation
12 referenced by Mr. Kalbarczyk is completely irrelevant to the issue of my exclusion
13 of the \$232,000 original cost of future test year plant additions claimed by the
14 Company, which lack any clearly defined in-service dates.

15
16 **Q. DO YOU BELIEVE IT IS APPROPRIATE TO REACH BEYOND THE**
17 **TEST YEAR TO INCLUDE PLANT ADDITIONS THROUGH MARCH 31,**
18 **2013, AS THE COMPANY PROPOSES IN ITS REBUTTAL TESTIMONY?**

19 A. No. The test year end is the point where the rate base, revenues, and expenses are
20 determined, and an appropriate rate of return is applied to the measure of value to
21 determine a level of income that the Company is provided the opportunity to
22 recover through rates. However, reaching beyond the test year to include

1 additional plant, without also recognizing other post test year events, produces a
2 mismatch between the various elements of the rate making model. It could have
3 chosen any date it wanted and filed the information necessary to support its case at
4 that date. The Company chose September 30, 2012 as the end of its test year.

5 Based on the test year concept, the information provided for revenues, expenses,
6 rate of return and rate based are to be based on the same date, in this case it is a
7 test year ended September 30, 2012.

8
9 **Q. DID YOU RECOMMEND ANY ADDITIONAL ADJUSTMENTS TO THE**
10 **COMPANY'S CLAIMED DEPRECIATED ORIGINAL COST PLANT IN**
11 **SERVICE FOR THE TEST YEAR ENDING SEPTEMBER 30, 2012?**

12 A. Yes. I recommended the removal of an additional \$133,615 (\$194,349 - \$60,734)
13 of net plant from the depreciated original cost plant in service associated with the
14 Arcola Road storage facility, which is currently not one of the five storage tanks
15 utilized by the Company, and the removal of the corresponding annual depreciation
16 expense of \$4,859 (I&E St. No. 3, p. 10).

17
18 **Q. DID THE COMPANY ADDRESS YOUR RECOMMENDATION**
19 **CONCERNING THE REMOVAL OF PLANT ASSOCIATED WITH THE**
20 **ARCOLA ROAD STORAGE FACILITY?**

21 A. Yes. The Company does not agree with my recommendation and claims that the
22 disallowance of net plant and the corresponding annual depreciation expense

1 associated with the Arcola Road storage facility would be inaccurate and would
2 result in a double count since the as-filed rate case already excluded this plant from
3 ratemaking consideration as a contribution in aid of construction (“CIAC”)
4 deduction from rate base (Audubon St. DMK-1R, p. 22).

5
6 **Q. DO YOU AGREE WITH THE COMPANY THAT YOUR**
7 **RECOMMENDATION TO REMOVE PLANT ASSOCIATED WITH THE**
8 **ARCOLA ROAD STORAGE FACILITY WOULD RESULT IN A DOUBLE**
9 **COUNT?**

10 A. Yes.

11
12 **Q. HAVE YOU REVISED THE RATE BASE AND ANNUAL**
13 **DEPRECIATION EXPENSE SCHEDULES ORIGINALLY PRESENTED**
14 **AS SCHEDULES 3 AND 6 OF I&E EXHIBIT NO. 3?**

15 A. As the Company’s rebuttal testimony indicates, the Arcola Road storage facility is
16 part of CIAC provided by a developer and consequently has already been
17 incorporated as a deduction from rate base and not reflected has a ratemaking
18 item. The revised schedules are contained in I&E Exhibit No. 3-SR as Schedules
19 1 and 2.

1 **Q. WHAT IS YOUR OVERALL RECOMMENDATION CONCERNING THE**
2 **COMPANY'S FUTURE TEST YEAR ADDITIONS WHICH LACK A**
3 **CLEARLY DEFINED IN SERVICE DATE?**

4 A. Excluding my revised adjustment for the Arcola Road storage facility, the
5 Company has not presented any valid arguments for the inclusion of \$224,550
6 (\$232,000 - \$7,450) of net plant associated with projects lacking a clearly defined
7 in service date in rate base or the inclusion of the associated \$14,900 annual
8 depreciation expense, they should not be included in the Company's claims.

9

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

11 A. Yes.

**I&E Exhibit No. 3-SR
Witness: Jeremy B. Hubert**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

AUDUBON WATER COMPANY

Docket No. R-2012-2286118

Exhibit to Accompany

the

Surrebuttal Testimony

of

Jeremy B. Hubert

Bureau of Investigation and Enforcement

REC-11570
2012 JUL -6 PM 4:23
SECRETARY OF COMMONWEALTH

Concerning:

**Rate Base
Depreciation Expense**

Audubon Water Company

Docket No. R-2012-2286118

Rate Base for Test Year Ending September 30, 2012

	(A)	Company As Filed (B)	Adjustment (C)	I&E (D)
1	Total Utility Plant in Service	\$9,210,626	(\$232,000) (1)	\$8,978,626
2	Company Revision	(\$232,000)	\$7,970 (2)	\$7,970
3			\$0 (3)	\$0
4	Less: Reserve for Depreciation	\$4,144,410	(\$7,450) (1)	\$4,136,960
5	Company Revision	(\$7,450)	\$3,188 (2)	\$3,188
6			\$0 (3)	\$0
7	Total Depreciated Plant in Service	\$5,066,216	(\$219,768)	\$4,846,448
8	Add: Materials and Supplies	\$65,000	\$0	\$65,000
9	Cash Working Capital	\$266,077	\$0	\$266,077
10	Deduct: Contributions in Aid of Construc	\$4,117,107	\$0	\$4,117,107
11	Less: Accumulated Depreciation	\$1,275,372	\$0	\$1,275,372
12		\$2,841,735	\$0	\$2,841,735
13	Customer Advances	\$10,700	\$0	\$10,700
14	Less: Accumulated Depreciation	\$1,511	\$0	\$1,511
15		\$9,189	\$0	\$9,189
16	Deferred Income Taxes	\$0	\$647,685 (4)	\$647,685
17	Original Cost Measure of Value	\$2,546,370	(\$867,454)	\$1,678,916

(1) Adjustment to remove Company claimed plant additions which have no in-service date.
(Company responses to I&E-RB-7, 8, 12, 13-D)

(2) Per the Company's response to OCA-I-8, the Company, in error, expensed a utility storage service body which should have been capitalized with a 5-year life.

(3) Adjustment to remove the Arcola Rd. Storage Tank which is not yet in-service.

(4) Per the Company response to OCA-I-9, the Company acknowledges the \$647,685 reduction to rate base for deferred income taxes.

Audubon Water Company

Docket No. R-2012-2286118

Annual Depreciation Expense for Test Year Ending September 30, 2012

1	I&E	\$228,454
2		(1) (\$14,900)
3		(2) \$1,594
4		(3) \$0
5	Less: CIAC	\$72,392
6	Customer Advances	\$178
7	Total I&E Annual	<u>\$142,578</u>
8	Company Claimed	\$228,454
9	Less: CIAC	\$72,392
10	Customer Advances	\$178
11	Total Company Annual	<u>\$155,884</u>
12	I&E ADJUSTMENT	<u>(\$13,306)</u>

13 **(1) Adjustment to remove Company claimed plant additions which have no in-service date.**
14 **(Company responses to I&E-RB-7, 8, 12, 13-D)**

15 **(2) Per the Company's response to OCA-I-8, the Company, in error, expensed a utility storage**
16 **service body which should have been capitalized with a 5-year life.**

17 **(3) Adjustment to remove the Arcola Rd. Storage Tank which is not yet in-service.**

ORIGINAL

Verification of Jeremy B. Hubert
Fixed Utility Valuation Engineer
Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission

2012 JUL -6 PM 4: 23
SECRETARY'S BUREAU

I hereby attest, affirm and verify that the testimonies and exhibits identified below were prepared by me or under my supervision and previously distributed to the presiding Administrative Law Judge and the active parties in the present proceeding, *Pennsylvania Public Utility Commission v. Audubon Water Company* at Docket No.

~~R-2011-2286118:~~ **R-2012-2286118**

Direct Testimony of Jeremy B. Hubert
I&E Statement No. 3
*I&E Exhibit No. 3, Schedules 1-7 (Non-Proprietary)*¹

Surrebuttal Testimony of Jeremy B. Hubert
I&E Statement No. 3-SR
I&E Exhibit No. 3-SR, Schedules 1-2

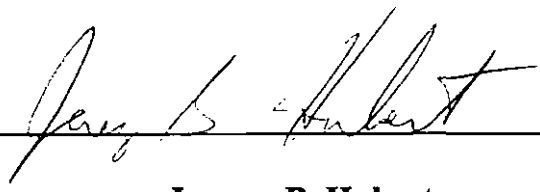
The questions and answers and facts and figures provided in these documents are true and correct to the best of my knowledge, information and belief.

Said testimony and exhibits were produced in the normal course of business while performing my duties as a Fixed Utility Valuation Engineer assigned to this proceeding as an expert witness on behalf of the Pennsylvania Public Utility Commission's Bureau of Investigation and Enforcement.

By agreement of the parties, it is not necessary for me to personally appear and this instant Verification signed by me serves to authenticate all of the above identified documents.

Signed in Harrisburg, Pennsylvania, this 28th day of June, 2012.

2012 JUL -6 PM 4: 23
SECRETARY'S BUREAU



Jeremy B. Hubert
Fixed Utility Valuation Engineer

¹ I&E had distributed both Proprietary and Non-Proprietary versions of I&E Exhibit No. 3, Schedule 5, but is only offering the Non-Proprietary version into the evidentiary record. This Non-Proprietary version removes the second page of Schedule 5, which contains the information deemed Proprietary.

93611

**Verification of Debra Backer
Fixed Utility Financial Analyst**

Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission

I hereby attest, affirm and verify that the testimonies and exhibits identified below were prepared by me or under my supervision and previously distributed to the presiding Administrative Law Judge and the active parties in the present proceeding, *Pennsylvania Public Utility Commission v. Audubon Water Company* at Docket No. R-2011- 2286118;

Direct Testimony of Debra Backer
I&E Statement No. 2
I&E Exhibit No. 2, Schedules 1-9

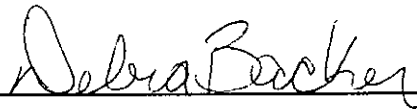
Surrebuttal Testimony of Debra Backer
I&E Statement No. 2-SR

The questions and answers and facts and figures provided in these documents are true and correct to the best of my knowledge, information and belief.

Said testimony and exhibits were produced in the normal course of business while performing my duties as a Fixed Utility Financial Analyst assigned to this proceeding as an expert witness on behalf of the Pennsylvania Public Utility Commission's Bureau of Investigation and Enforcement.

By agreement of the parties, it is not necessary for me to personally appear and this instant Verification signed by me serves to authenticate all of the above identified documents.

Signed in Harrisburg, Pennsylvania, this 28th day of June, 2012.

A handwritten signature in cursive script, reading "Debra Backer", is written over a horizontal line.

**Debra Backer
Fixed Utility Financial Analyst**

Verification of Amanda Gordon
Fixed Utility Financial Analyst Supervisor

Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission

I hereby attest, affirm and verify that the testimonies and exhibits identified below were prepared by me or under my supervision and previously distributed to the presiding Administrative Law Judge and the active parties in the present proceeding, Pennsylvania Public Utility Commission v. Audubon Water Company at Docket No. R-2011- 2286118:

Direct Testimony of Amanda Gordon
I&E Statement No. 1
I&E Exhibit No. 1, Schedules 1-17

Surrebuttal Testimony of Amanda Gordon
I&E Statement No. 1-SR
I&E Exhibit No. 1-SR, Schedule 1

REC'D
2012 JUL -6 PM 4:21
SECRETARY'S BUREAU

The questions and answers and facts and figures provided in these documents are true and correct to the best of my knowledge, information and belief.

Said testimony and exhibits were produced in the normal course of business while performing my duties as a Fixed Utility Financial Analyst Supervisor assigned to this proceeding as an expert witness on behalf of the Pennsylvania Public Utility Commission's Bureau of Investigation and Enforcement.

By agreement of the parties, it is not necessary for me to personally appear and this instant Verification signed by me serves to authenticate all of the above identified documents.

Signed in Harrisburg, Pennsylvania, this 28th day of June, 2012.



Amanda Gordon
Fixed Utility Financial Analyst Supervisor