DR. ROGER A. MORIN

DELMARVA POWER & LIGHT COMPANY
REBUTTAL TESTIMONY OF ROGER A. MORIN
BEFORE THE DELAWARE PUBLIC SERVICE COMMISSION
CONCERNING AN INCREASE IN ELECTRIC BASE RATES
DOCKET NOS. 09-414/09-276T

INTRODUCTION

1. Q. PLEASE STATE YOUR NAME.

A. Dr. Roger A. Morin.

2. Q. ARE YOU THE SAME DR. ROGER A. MORIN WHO PROVIDED PRE-FILED DIRECT TESTIMONY IN THIS PROCEEDING ON BEHALF OF DELMARVA POWER & LIGHT ("DELMARVA" OR "THE COMPANY")?

A. Yes, I am.

3. Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. This rebuttal testimony responds to the direct rate of return testimonies of Mr. James Rothschild on behalf of the Staff of the Delaware Public Service Commission; Ms. Andrea Crane on behalf of the Division of the Public Advocate; and Mr. Michael P. Gorman on behalf of the Delaware Energy Users Group.

4. Q. CAN YOU DESCRIBE HOW YOUR REBUTTAL TESTIMONY IS ORGANIZED?

A. My rebuttal testimony is organized in three sections, corresponding to each of the aforementioned individuals.

5. Q. PLEASE SUMMARIZE THE RATE OF RETURN ON COMMON EQUITY ("ROE") RECOMMENDATIONS OF THE THREE WITNESSES YOU ARE REBUTTING IN THIS CASE.

A. The ROEs recommended by each witness in this case are as follows:

	Before SFV		After SFV
	Range	**Recommended ROE**	**Recommended ROE**
Mr. Rothschild	9.15% - 9.70%	9.50%	8.50%
Ms. Crane	8.44% - 9.90%	9.58%	7.52%
Mr. Gorman	9.7% - 10.1%	9.90%	9.90%

I would note at the outset that during the past two years, the average allowed ROEs for electric utilities by state commissions have stayed very consistent, as have the ranges:

2008-09 Range of Allowed ROEs	8.75% - 11.25%[1]
Average of Allowed ROEs	10.47%[2]

The average authorized ROE for electric utility as a whole is 10.6%, as published in AUS Utility Reports, February 2010.

I. REBUTTAL OF MR. ROTHSCHILD'S TESTIMONY

6. Q. PLEASE SUMMARIZE MR. ROTHSCHILD'S RATE OF RETURN RECOMMENDATION.

A. In determining Delmarva's cost of equity capital, Mr. Rothschild applies one particular variant of the Discounted Cash Flow (DCF) model, the "*sustainable growth DCF*", to three groups of electric utility companies, essentially the same

[1] Regulatory Research Associates ("RRA"), Regulatory Focus, January 8, 2010.
[2] *Id.*

1 groups on which I rely in my direct testimony. He also applies two Capital Asset
2 Pricing Model (CAPM) analyses, one labeled "traditional CAPM" and the other
3 labeled "market-based CAPM" to the same groups of companies. Based on the
4 results of his DCF and CAPM analyses, he recommends a return of only 9.5% on
5 Delmarva's common equity capital, without the Company's requested SFV
6 mechanism, and a remarkably low 8.5% with the SFV mechanism as the fair and
7 reasonable return on the Company's common equity investment (ROE).

8 I will address the very limited scope and the numerous flaws and errors of
9 logic in Mr. Rothschild's testimony.

10 **7. Q. DO YOU HAVE ANY GENERAL COMMENTS ON MR. ROTHSCHILD'S**
11 **TESTIMONY?**

12 A. Yes. Before I engage in specific criticisms of Mr. Rothschild's testimony, I should
13 set forth my general reaction to his testimony. My first reaction is that Mr.
14 Rothschild's recommended 9.5% ROE for Delmarva (8.5% without SFV), would
15 be among the lowest authorized rates of return for a major electric utility in the
16 United States. This is a clear indication that his ROE recommendation of 9.5%
17 for Delmarva is too low, let alone the outrageous 8.5% ROE recommendation
18 assuming the SFV mechanism is approved by the Commission.

19 My second general reaction is that Mr. Rothschild's testimony is
20 extremely narrow in scope, relying heavily on the fragile "sustainable growth"
21 version of the DCF methodology that requires him to assume the answer before he
22 begins to implement the methodology. This very narrow DCF approach stands in

sharp contrast with the practices of investment analysts, finance experts, corporate analysts, and finance professionals. It is dangerous and inappropriate to rely on the sustainable growth method because it is not only logically circular but also the least valid empirically.

My third reaction is that I found Mr. Rothschild's testimony difficult to follow and his exhibits to be very laborious to decipher. For example, he devotes some 10 pages to the determination of the risk-free rate in his CAPM analysis which really should be a relatively simple process. His testimony is ambiguous in places while he seemed to repeat the same points throughout his testimony. As for his exhibits, I found some of his analyses almost incomprehensible as the reader is continuously being buffeted from schedule to schedule in order to follow his figures, some of which I could not replicate. In short, I found Mr. Rothschild's computations and exhibits convoluted, and difficult to follow. There are inconsistencies in his calculations as well, as I show later in my testimony.

8. Q. WHAT ARE THE BASIC CONCLUSIONS OF YOUR REBUTTAL TO MR. ROTHSCHILD'S COST OF EQUITY TESTIMONY?

A. Mr. Rothschild's recommendation is highly unreliable as it relies heavily on the sustainable growth variation of the DCF method. The latter method is logically circular, empirically suspect, and replete with inconsistencies. His estimate of Delmarva's cost of equity capital is understated by 175 basis points from the DCF application and by 240 basis points from the CAPM application. A proper

application of cost of capital methodologies would give substantially higher results.

9. Q. PLEASE SUMMARIZE YOUR SPECIFIC CRITICISMS OF MR. ROTHSCHILD'S TESTIMONY.

A. I have the following specific criticisms:

1. Allowed returns. Mr. Rothschild's recommended return is well outside the zone of currently allowed rates of return for his sample companies and for the utility industry.

2. Understated Dividend Yield. It is inappropriate to increase the dividend yield by adding one-half the future growth rate to the spot dividend yield. The appropriate manner of computing the expected dividend yield when using the DCF model is to add the full growth rate rather than one-half the growth rate. This error understates the DCF results by some 15 basis points.

3. DCF Dividend Yield and Flotation Costs. Mr. Rothschild's dividend yield component is understated by 30 basis points because it does not allow for flotation costs, and, as a result, a legitimate stockholder expense is left unrecovered. Despite the fact that his sustainable growth method allows for growth through costly external stock issues, he nevertheless chooses not to make allowance for the costs of external common stock issues.

4. The use of an average 12-month stock price in the DCF model. One of Mr. Rothschild's two applications of the DCF model violates market efficiency principles and mismatches stock price and expected growth.

1 **5. DCF Sustainable Growth Method.** Mr. Rothschild's testimony rests heavily
2 on the sustainable growth DCF method, and there are serious logical
3 inconsistencies in this particular method because Mr. Rothschild is forced to
4 assume the answer to implement the method. This method is the least empirically
5 and theoretically valid. Moreover, there are contradictions and inconsistencies in
6 his implementation of the method.
7 **6. DCF Analysts' Growth Forecasts.** Mr. Rothschild fails to use analysts'
8 growth forecasts in his DCF analysis, even though the stock price he uses in his
9 DCF analysis is predicated on such forecasts and even though he relies in part on
10 analysts' forecasts for the determinants of such growth rates. Investors expect
11 substantially higher growth rates for utilities than what Mr. Rothschild employs in
12 his DCF analysis. The failure of Mr. Rothschild to rely on Value Line or analyst
13 consensus growth forecasts translates into a 1.1% downward bias of Delmarva's
14 cost of equity estimate from that source alone.
15 **7. CAPM Risk-Free Rate.** Mr. Rothschild's proxy for the risk-free rate
16 component of the CAPM is stale, quite unconventional, and relies on the wrong
17 input data. Use of the proper risk-free rate raises Mr. Rothschild's CAPM
18 estimates by 90 basis points.
19 **8. CAPM Market Risk Premium.** In deriving his CAPM estimates, Mr.
20 Rothschild erroneously employs geometric means instead of the correct arithmetic
21 means and, as a result, understates the cost of common equity by 150 basis points.
22 **9. CAPM Market Adjustments.** Mr. Rothschild's adjustments to his CAPM
23 results are unnecessary and result in double-counting.

1 **10. Market-Derived CAPM.** Mr. Rothschild's estimates derived from his
2 market-derived CAPM analyses are mis-specified for they rely on realized returns
3 instead of expected returns and are further distorted by the effect of company size
4 on returns.

5 **11. Effect of SFV Mechanism.** Mr. Rothschild's downward adjustment of return
6 to account for the risk-reducing effects of the company's proposed SFV
7 mechanism is grossly overstated and implies that an investment in the company's
8 common stock is equivalent to an investment in virtually risk-free bonds.

9 **12. Capital Structure Adjustment.** Mr. Rothschild's downward return
10 adjustment to allow for Delmarva's thicker common equity ratio is not only
11 arbitrary but erroneous. In fact, Delmarva's common equity ratio is slightly
12 weaker than its peers.

13 **13. Mr. Rothschild's criticisms of my testimony are unfounded.**

14 **1. ALLOWED RETURNS**

15 **10. Q. IS MR. ROTHSCHILD'S RATE OF RETURN RECOMMENDATION**
16 **COMPATIBLE WITH CURRENTLY ALLOWED RETURNS IN THE**
17 **UTILITY INDUSTRY?**

18 A. No, it is not. Allowed returns, while certainly not a precise indication of a
19 company's cost of equity capital, are nevertheless important determinants of
20 investor growth perceptions and investor expected returns. They also serve to
21 provide some perspective on the validity and reasonableness of Mr. Rothschild's
22 recommendation.

23 ROE awards in the industry exceed Mr. Rothschild's recommended ROE

of 9.5% (8.5% with SFV) for Delmarva. I have examined the ROEs currently allowed for the 21 electric utilities in Mr. Rothschild's comparable group as reported in AUS Utility Reports survey for February 2010. The currently authorized ROEs for Mr. Rothschild's sample of electric utilities, shown in Table 1 below, average 10.7%. The average allowed ROE in the electric utility industry is 10.6%. His ROE recommendation of 9.5% (8.5% with SFV) approved is clearly outside any limits of reasonableness while his recommended 8.5% with the SFV approved is so far outside any limits of reasonableness that it is impossible to take seriously.

Table 1 Authorized Returns
Mr. Rothschild's Comparable Group

Company	Allowed ROE
1 ALLETE	10.74
2 Alliant Energy	10.41
3 Ameren Corp.	10.64
4 Avista Corp.	10.33
5 CMS Energy Corp.	10.93
6 Consol. Edison	10.03
7 DTE Energy	11.00
8 Duke Energy	10.82
9 Empire Dist. Elec.	10.80
10 Entergy Corp.	10.76
11 Exelon Corp.	10.30
12 MGE Energy	10.40
13 Northeast Utilities	9.72
14 NSTAR	12.50
15 NV Energy Inc.	10.67
16 PG&E Corp.	11.35
17 Public Serv. Enterprise	9.88
18 TECO Energy	11.00
19 UniSource Energy	10.13
20 Wisconsin Energy	10.43
21 Xcel Energy Inc.	10.72
AVERAGE	**10.65**

Source: AUS Utility Reports 02/10

As noted earlier, the average allowed ROEs for electric utilities have stayed very consistent during the past two years, as have the ranges:

2008-09 Range of Allowed ROEs	8.75% - 11.25%[3]
Average of Allowed ROEs	10.47%[4]

2. UNDERSTATED DIVIDEND YIELD

11. Q. DO YOU HAVE ANY COMMENT ON MR. ROTHSCHILD'S DIVIDEND YIELD COMPONENT IN THE DCF ANALYSIS?

A. Yes. I disagree with Mr. Rothschild's dividend yield calculation in his DCF analysis shown on Schedule JAR-5 pages 1, 2, and 3 line 6 because he multiplied the spot dividend yield by one plus one half the expected growth rate (1 + 0.5g) rather than by one plus the expected growth rate (1 + g). Mr. Rothschild's erroneous procedure understates the return expected by the investor by approximately 15 basis points depending on the magnitude of the growth term (g).

The fundamental assumption of the annual DCF model used by Mr. Rothschild is that dividends are received annually at the end of each year and that the first dividend is to be received one year from now. Instead, Mr. Rothschild calculates the first dividend by multiplying the current dividend by only one plus one-half the growth rate instead of multiplying by one plus the growth rate. Since the appropriate dividend to use in a DCF model is the prospective dividend one year from now rather than the dividend one-half year from now, Mr. Rothschild's

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[3] Regulatory Research Associates ("RRA"), Regulatory Focus, January 8, 2010.

[4] *Id.*

approach understates the proper dividend yield. This concept creates a downward bias in his dividend yield component, and underestimates the cost of equity by approximately 10 basis points. For example, for a spot dividend yield of 5% and a growth rate of 5%, the correct expected dividend yield is 5% times (1 + 0.05), which equals 5.25%, and not 5% times (1 + 0.025) which equals 5.13%, as Mr. Rothschild has calculated. The correct dividend yield to employ is 5%(1 + .05) = 5.25%, yielding a cost of equity of 10.25% instead of 10.13%.

3. DCF DIVIDEND YIELD AND FLOTATION COSTS

12. Q. IN YOUR DIRECT TESTIMONY, YOU STATED THAT THE RETURN ON EQUITY SHOULD BE ADJUSTED TO INCLUDE AN ALLOWANCE FOR FLOTATION COSTS. PLEASE COMMENT ON FLOTATION COSTS.

A. Flotation costs are very similar to the closing costs on a home mortgage. In the case of issues of new equity, flotation costs represent the discounts that must be provided to place the new securities. Flotation costs have a direct and an indirect component. The direct component represents monetary compensation to the security underwriter for marketing/consulting services, for the risks involved in distributing the issue, and for any operating expenses associated with the issue (printing, legal, prospectus, etc.). The indirect component represents the downward pressure on the stock price as a result of the increased supply of stock from the new issue. The latter component is frequently referred to as "market pressure."

1 Flotation costs for common stock are analogous to the flotation costs
2 associated with past bond issues which, as a matter of routine regulatory policy,
3 continue to be amortized over the life of the bond, even though no new bond
4 issues are contemplated. In the case of common stock, which has no finite life,
5 flotation costs are not amortized. Therefore, the recovery of flotation cost requires
6 an upward adjustment to the allowed return on equity.

7 **13. Q. DO YOU HAVE ANY COMMENT ON MR. ROTHSCHILD'S DIVIDEND**
8 **YIELD COMPONENT IN HIS DCF APPROACH?**

9 A. Yes. I disagree with Mr. Rothschild's dividend yield calculation in his DCF
10 analyses because it ignores flotation costs. Flotation costs are fees legitimately
11 incurred as part of the securities issuance process.

12 **14. Q. WHAT FLOTATION COST TREATMENT DOES MR. ROTHSCHILD**
13 **RECOMMEND IN THIS CASE?**

14 A. Mr. Rothschild recommends no allowance for flotation costs and he believes that
15 such an adjustment is unwarranted because such costs are negligible. Mr.
16 Rothschild's testimony, however, contains a serious inconsistency in this regard.
17 As stated on page 18 lines 20-25 of his testimony, he employs a version of the
18 DCF model that explicitly accounts for continuous external common stock issues
19 over time and even quantifies the effect of such issues on company growth on
20 pages 1, 2, and 3 of his Schedule JAR-5 line 5. Yet, he completely ignores the
21 flotation costs associated with such common stock issues.

22 As demonstrated in my original testimony, the flotation adjustment is
23 made to the DCF analysis by dividing the expected dividend yield component of

the DCF by (1 - f), where f is the flotation cost allowance factor. This type of flotation cost allowance to the cost of common equity capital is routinely discussed and applied in most corporate finance textbooks. Total flotation costs amount to 5%, which in turn amounts to approximately 30 basis points for Delmarva. Mr. Rothschild has thus understated Delmarva's cost of equity by 30 basis points from this omission alone.

4. DCF STOCK PRICE

15. Q. PLEASE COMMENT ON MR. ROTHSCHILD'S STOCK PRICE IN THE DCF ANALYSIS.

A. In implementing one of his two DCF analyses, Mr. Rothschild uses the average stock price over the year 2009. I disagree with such a stale stock prices reaching back as far as early 2009 because it violates the notion of market efficiency.

The stock price to employ is the current price of the security at the time of estimating the cost of equity, rather than some historical average stock price reaching back more than one year. The reason is that the analyst is attempting to determine a utility's cost of equity in the future, and since current stock prices provide a better indication of expected future prices than any other price according to the basic tenets of the Efficient Market Hypothesis, the most relevant stock price is the most recent one. The Efficient Market Hypothesis, which is widely accepted, states that capital markets, at least as a practical matter, incorporate into security prices relevant publicly available data such that current security prices reflect the most recent information and thus are the best representation of investor expectations. Use of any other price violates market efficiency.

There is yet another justification for using current stock prices. In measuring the cost of equity as the sum of dividend yield and growth, the period used in measuring the dividend yield component must be consistent with the estimate of growth that is paired with it. Since the current stock price is caused by the growth foreseen by investors at the present time and not at any other time, it is clear that the use of spot prices is preferable.

5. DCF SUSTAINABLE GROWTH METHOD

16. Q. PLEASE COMMENT ON MR. ROTHSCHILD'S GROWTH ESTIMATES IN THE DCF MODEL.

A. There are four principal techniques to estimate expected growth in the DCF model: (1) historical growth rates in earnings per share, dividends per share, and book value per share, (2) analysts' growth forecasts, (3) growth implied in investors' required return, and (4) sustainable growth method, where the growth rate is based on the equation g = b x ROE, where b is the percentage of earnings retained (i.e. retention ratio) and ROE is the expected earned rate of return on book equity. In his DCF analysis, Mr. Rothschild estimates the growth component using only the last method, which is highly inappropriate for regulated utilities because of its inherent circularity. He rejects all the other customary alternatives, including analysts' growth forecasts.

A single technique to estimate investor growth expectations is likely to contain a high degree of measurement error and to be distorted by short-term aberrations. A regulatory authority's hands should not be bound to one single estimate of growth in the DCF determination of equity costs. The advantage of

using several different approaches in estimating growth is that the results of each one can be used to check the others. Moreover, the method chosen by Mr. Rothschild is inherently circular and empirically unfounded.

17. Q. PLEASE DESCRIBE MR. ROTHSCHILD'S IMPLEMENTATION OF THE SUSTAINABLE GROWTH METHOD.

A. To apply the sustainable growth method in his DCF analysis, Mr. Rothschild multiplies the utility's expected retention ratio ("b") by the expected return on equity, "ROE":

$$g = b \times ROE$$

Mr. Rothschild then assumes that investors obtain their input data from Value Line and from the Zacks Investment Research website. The investor's expected ROE in the above equation is proxied by Value Line's estimate of actual earned ROE in recent years, by Value Line's forecast of ROE for 2012-2014, and by an implied ROE based on the consensus growth rates reported by Zacks. He arbitrarily uses 11.0% and 11.5% as input ROEs[5] for his two samples of electric utilities, respectively.

To compute the retention ratio (b) in the above equation, in a strange turnabout, rather than simply take the actual retention ratio and the retention ratio forecast by Value Line as he did for the expected ROE, Mr. Rothschild computes the retention ratio indirectly, as one minus the book dividend yield divided by the ROE, that is:

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[5] Direct Testimony of Mr. Rothschild, Schedules JAR - 3 and 11, line 2 c.

$$b = (1 - D/rB)$$

where D = dividend per share,

B = book value per share,

r = expected return (ROE).

In other words, the two components of growth, ROE and retention ratio 'b', are determined simultaneously and are functionally interdependent. Thus, the slightest error in one component is inherently compounded when applied to the other component.

Mr. Rothschild recognizes and adds to his sustainable growth estimate any growth stemming from external financing through common stock issues. The final growth results are shown on Line 5 in his Schedule JAR-5 pages 1, 2, and 3 line 4. For the first comparable group, the average growth rate is 4.69% based on spot stock market prices and 5.05% based on average annual stock prices. The corresponding estimates for the second group are 4.52% and 4.91%.

18. Q. DO YOU HAVE ANY OBJECTIONS TO THE SUSTAINABLE GROWTH METHOD USED BY MR. ROTHSCHILD?

A. Yes, I have several. Given that the cornerstone of Mr. Rothschild's DCF estimates, which drives a large part of his ROE recommendation, is the sustainable growth approach, it is important to point out the dangers and flaws of this method. There are three fundamental problems with Mr. Rothschild's sustainable growth method.

19. Q. PLEASE DISCUSS THE FIRST PROBLEM WITH THE SUSTAINABLE GROWTH ESTIMATES.

1 A. The most damaging problem with Mr. Rothschild's sustainable growth method is
2 that it contains a fatal logical flaw: the method requires an estimate of ROE to be
3 implemented. In other words, his method requires him to assume the ROE answer
4 to start with. But if the ROE input required by the model differs from the
5 recommended ROE, a fundamental contradiction in logic follows. Mr.
6 Rothschild's recommended 9.5% ROE is far removed from the ROE's he uses in
7 the sustainable growth method. On Schedules JAR-5 pages 1, 2 and 3 line 2c, he
8 uses an expected ROE of 11.0% and 11.5% for his three groups of electric
9 utilities, respectively, which are all well above Mr. Rothschild's recommended
10 9.5% ROE.

11 Mr. Rothschild is assuming in effect that the companies will earn a ROE
12 exceeding his recommended cost of equity forever, but he is recommending that
13 the Commission grant a different ROE. While this scenario may be quite
14 imaginable for an unregulated company with substantial market power that can
15 earn more than its cost of capital, it is implausible for a regulated company whose
16 rates are set so that they will earn a return equal to their cost of capital. I consider
17 this logical flaw extremely damaging and sufficient to reject Mr. Rothschild's
18 results produced by the method, the crux of his DCF analysis and his
19 recommendation. In essence, Mr. Rothschild is using an ROE that differs from
20 his final recommended ROE, and is requesting the Commission to adopt two
21 different ROEs.

22 I am perplexed as to why Mr. Rothschild assumes that utilities are
23 expected to earn some 11.0% - 11.5% forever, but yet he recommends only 9.5%.

The only way that utilities can earn a ROE of 11.0% - 11.5% each and every year forever is that rates be set so that they will in fact earn 11.0% - 11.5%. So, how can his recommended cost of equity be any different from 11.0% -11.5%? What Mr. Rothschild has failed to realize is that in a regulated environment, the return on book equity is set equal to the cost of capital, by virtue of the regulatory process.

Finally, I note that the landmark Hope decision cautions against the use of circular logic:

> *"rates cannot be dependent upon "fair value" when the value of the going enterprise depends on earnings under whatever rates may be anticipated."*[6]

Yet, circular logic is exactly what Mr. Rothschild has used by employing an assumed ROE to recommend a different ROE.

20. Q. PLEASE DISCUSS THE SECOND PROBLEM WITH MR. ROTHSCHILD'S SUSTAINABLE GROWTH ESTIMATES.

A. The second problem is that the empirical finance literature demonstrates that the sustainable growth method is a poor explanatory variable of value, and is not significantly correlated to measures of value, such as stock price and price/earnings ratios. I discuss this point more fully below.

21. Q. PLEASE DISCUSS THE THIRD PROBLEM WITH MR. ROTHSCHILD'S SUSTAINABLE GROWTH ESTIMATES.

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[6] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591, 602.

A. The third difficulty with Mr. Rothschild's sustainable growth approach is that the forecasts of the expected return on equity published by Value Line are based on end of period book equity rather than on average book equity. The following formula, discussed and derived in Chapter 9 of my book, The New Regulatory Finance, adjusts the reported end-of-year values so that they are based on average common equity, which is the common regulatory practice:

$$r_a = r_t \frac{2B_t}{B_t + B_{t-1}}$$

Where: r_a = return on average equity
r_t = return on year-end equity as reported
B_t = reported year-end book equity of the current year
B_{t-1} = reported year-end book equity of the previous year

The result of this error is that Mr. Rothschild's DCF estimates are understated by some 10-20 basis points, depending on the magnitude of the book value growth rate.

22. Q. CAN YOU COMMENT ON THE MANNER IN WHICH MR. ROTHSCHILD COMPUTES THE SUSTAINABLE GROWTH RATE?

A. Mr. Rothschild points out the necessity of computing sustainable growth as the product of the expected retention ratio and the expected ROE.[7] Unfortunately, that is not what he does. Mr. Rothschild's laborious and convoluted procedure for measuring expected growth with the sustainable growth (g = b x ROE) method requires him to rely on several subjective input forecasts (See Schedule JAR-5):

1) market-to-book ratio,
2) dividend yield on book,
3) expected return on equity,
4) retention rate, and
5) new financing growth.

It would be far more appropriate and parsimonious to use growth forecasts that are directly available instead of relying on five individual forecasts of the determinants of such growth. It only seems logical that the measurement and forecasting errors inherent in using five different variables to predict growth far exceed the forecasting error inherent in a direct single forecast of growth itself.

Given Mr. Rothschild's substantial reliance on Value Line projected data, it eludes me as to why he did not simply take the growth rate forecasts directly from Value Line. The table below reproduces Mr. Rothschild's growth estimates for his three electric utility company samples along with Value Line's long-term earnings growth forecast as of February 2010 and analysts' consensus growth forecasts.

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[7] Direct Testimony of Mr. Rothschild (Exhibit OPC (B)), page 28, lines 7-8

GROWTH
ESTIMATES

	Rothschild (2009) (A)	Analysts Forecast (B)	Value Line Forecast (C)
Group 1	4.7	5.3	6.3
Group 2	4.5	5.7	5.6
Group 3	4.9	6.1	5.5
Average	4.7	5.7	5.8

For the three groups, Mr. Rothschild's average growth estimate is 4.7% versus an average forecast of 5.8% from Value Line and the analyst consensus forecast. The difference between the two estimates of 1.1% (5.8% - 4.7% = 1.1%) translates into an approximate 1.1% downward bias of Delmarva's cost of equity estimate from that source alone. That correction alone would raise Mr. Rothschild's ROE recommendation from 9.5% to approximately 10.6%. Mr. Rothschild's does not explain his reluctance to rely directly on Value Line's growth forecasts directly considering his position that investors obtain their data from Value Line.

23. Q. DID YOU DETECT ANY ADDITIONAL INCONSISTENCIES AND CONTRADICTIONS IN MR. ROTHSCHILD'S SUSTAINABLE GROWTH METHOD?

A. Yes, I noted a crucial "apples and oranges" inconsistency in Mr. Rothschild's sustainable growth analysis. Mr. Rothschild has used an erroneous formula to calculate the retention ratio. The conventional textbook and easy method of calculating the retention ratio is to subtract the dividend payout ratio from one,

that is, 1 – D/E, where the dividend payout ratio is simply dividends per share (D) divided by earnings per share (E). However, Mr. Rothschild calculates the retention ratio as one minus the ratio of the book dividend yield to the return on equity (r), that is, as [1 -(D/B)/r]. He in turn defines the return on equity (r) as earnings divided by book value, E/B, so that his retention ratio is calculated as (1-(D/B)/E/B). There is nothing wrong with this procedure as long as you are consistent and divide both dividends and earnings by the same book value. Mr. Rothschild did not use this procedure, however. As shown on his Schedule JAR - 3, Mr. Rothschild has mismatched the inputs utilized in computing his sustainable growth.

On column 10 of JAR-3 Page 1, he calculates the market-to-book ratio by dividing an average stock price for the entire year 2009 by the average book value for 2009. The M/B ratio is then multiplied by the year-end 2009 dividend yield to compute the dividend yield on book shown in JAR – 5 page 1, line 2(b). The return on equity shown on JAR - 5, line 2(c) is in turn an arbitrary mélange of various historical and forecast earned ROEs shown in footnote (A). These various elements are then combined to arrive at a growth estimate. The resulting growth estimate is a questionable smorgasbord of several inputs, some of which are historical, some of which are forecasts, each input measured in a different time frame.

In a nutshell, I do not believe that Mr. Rothschild's formula measures the sustainable growth correctly.

6. ANALYSTS' GROWTH FORECASTS

24. Q. IS THERE ANY EMPIRICAL EVIDENCE DOCUMENTING THE IMPORTANCE OF EARNINGS IN EVALUATING INVESTORS' EXPECTATIONS IN THE INVESTMENT COMMUNITY?

A. There is an abundance of evidence attesting to the importance of earnings in assessing investors' expectations. First, the sheer volume of earnings forecasts available from the investment community relative to the scarcity of dividend forecasts attests to their importance. To illustrate, Value Line, Zacks Investment, First Call Thompson, Yahoo Finance, and Multex provide comprehensive compilations of investors' earnings forecasts, to name some. The fact that these investment information providers focus on growth in earnings rather than growth in dividends indicates that the investment community regards earnings growth as a superior indicator of future long-term growth. Second, Value Line's principal investment rating assigned to individual stocks, Timeliness Rank, is based primarily on earnings, accounting for 65% of the ranking.

25. Q. PLEASE DISCUSS THE USE OF ANALYSTS' FORECASTS IN APPLYING THE DCF MODEL TO UTILITIES.

A. The best proxy for the growth component of the DCF model is analysts' long-term earnings growth forecasts. Mr. Rothschild should have relied on such forecasts in deriving the DCF growth component, specifically on the consensus long-term earnings growth forecast reported on column 4 of his Schedule JAR-3 pages 3, 6, and 9 for the three groups of comparable companies. These forecasts are made by

large reputable organizations, and the data are readily available to investors and are representative of the consensus view of investors.

26. Q. WHAT DOES THE PUBLISHED ACADEMIC LITERATURE SAY ON THE SUBJECT OF GROWTH RATES IN THE DCF MODEL?

A. Leaving aside the inherent circularity of the method, Mr. Rothschild's sustainable growth estimates fly in the face of the financial research on the relationship between growth rates and stock prices. Published studies in the academic literature demonstrate that growth forecasts made by security analysts are reasonable indicators of investor expectations, and that investors rely on analysts' forecasts. Cragg and Malkiel ["Expectations and the Structure of Share Prices", Chicago: University of Chicago Press, 1982] present detailed empirical evidence that the average analysts' expectation is more similar to expectations being reflected in the marketplace than are historical growth rates, and represents the best possible source of DCF growth rates. Cragg and Malkiel show that historical growth rates do not contain any information that is not already impounded in analysts' growth forecasts. A study by Professors Vander Weide and Carleton, "Investor Growth Expectations: Analysts vs. History" (The Journal of Portfolio Management, Spring 1988), also confirms the superiority of analysts' forecasts over historical growth extrapolations. Another study by Timme & Eiseman, "On the Use of Consensus Forecasts of Growth in the Constant Growth Model: The Case of Electric Utilities," Financial Management, Winter 1989, produces similar results.

27. Q. WHAT DCF RESULTS WOULD MR. ROTHSCHILD HAVE OBTAINED HAD HE SIMPLY USE THE CONSENSUS ANALYSTS' GROWTH FORECASTS OUTRIGHT?

A. It is paradoxical that Mr. Rothschild employs analysts' earnings forecasts from the Zacks website (see Schedule JAR-3 pages 3, 6 and 9, column 4) for his inputs in computing the expected ROE, but yet ignores the readily available earnings growth forecasts from the same source as proxies for DCF growth rates. Why not simply use the analysts' consensus growth forecast outright?

As shown earlier, the failure of Mr. Rothschild to rely on Value Line and analyst consensus growth forecasts translates into a 1.1% downward bias of Delmarva's cost of equity estimate from that source alone. That correction alone would raise Mr. Rothschild's ROE recommendation from 9.5% to approximately 10.6%.

28. Q. CAN YOU SUMMARIZE YOUR COMMENTS ON MR. ROTHSCHILD'S DCF GROWTH RATES?

A. In summary, Mr. Rothschild's sustainable growth rate method, which assumes the ROE answer to begin with, contains serious theoretical, conceptual, empirical, and methodological flaws, and should be disregarded. Given that his rate of return testimony hinges heavily on that one method, his recommendation must be viewed with extreme caution.

7. CAPM METHOD: RISK-FREE RATE

29. Q. DOES MR. ROTHSCHILD DEVELOP CAPM ESTIMATES?

A. Yes, he develops two CAPM analyses, one that he calls a "traditional" CAPM and the other a "market-derived" CAPM. He places equal weight on his CAPM results than he does on his DCF results. This is in sharp contrast to his testimony in a recent Pepco case in the District of Columbia where he placed no weight on the CAPM results and only used the CAPM results as checks.

30. Q. IS MR. ROTHSCHILD'S IMPLEMENTATION OF THE TRADITIONAL CAPM CORRECT?

A. No, it is not, there is very little "traditional" or conventional about Mr. Rothschild's implementation of the CAPM. The classic CAPM formula is as follows:

$$K_e = R_f + \beta (R_M - R_f)$$

Where: K_e = cost of equity
R_f = risk-free rate
β = Beta
R_M = overall market return

From the above expression, three inputs are required to implement the CAPM: the risk-free rate R_f, the beta risk measure β, and the market risk premium $(R_M - R_f)$. The latter bracketed expression is frequently denoted by the acronym MRP, or market risk premium.

31. Q. WHAT IS THE CONVENTIONAL WAY OF APPLYING THE CAPM?

A. The conventional manner of applying the CAPM is to simply insert values for the input variables in the above classic CAPM equation, namely, the risk-free rate, beta, and the MRP. The yield on long-term Treasury bonds serves as a proxy for

1 the risk-free rate R_f, betas are obtained directly from a source such as Value Line,
2 and the MRP is derived from historical/prospective estimates.

3 **32. Q. DO YOU AGREE WITH MR. ROTHSCHILD'S RISK-FREE RATE IN**
4 **THE CAPM?**

5 A. No, I do not. He devotes some ten pages (pages 45-54) of his testimony to the
6 risk-free rate issue. I found Mr. Rothschild's discussion of the risk-free rate
7 confusing, contradictory, erroneous, and his estimate stale. Let me explain my
8 plight and why Mr. Rothschild's testimony is quite confused on the risk-free rate
9 issue. On page 43 line 1, he cites 4.26% as the current yield on 30-year treasury
10 bonds, while on Schedule JAR-8 page 2 lines 2a and 2f, he cites 4.63%. On JAR-
11 8 page 2 lines 1a and 1b, he quotes the yield spreads on 20-year Treasury bonds.
12 Finally in his final implementation of the CAPM on Schedule JAR-8 page 3, he
13 ends up using 3.7% as risk-free rate, this time based on short-term Treasury bills.

14 **33. Q. DR. MORIN, WHAT IS THE APPROPRIATE PROXY FOR THE RISK-**
15 **FREE RATE IN A CAPM ANALYSIS?**

16 A. The appropriate proxy to use is the current yield on 30-year Treasury bonds which
17 is approximately 4.6% at this time, and not the yield on 90-day Treasury Bills of
18 3.7% used by Mr. Rothschild on Schedule JAR-8 page 3 line 2 and 6. In my
19 direct testimony, I discussed why it is appropriate to use the yield on long-term
20 Treasury securities rather than the yield on short-term Treasury Bills. I elaborate
21 on that same point later in my rebuttal. Thus, Mr. Rothschild's "traditional"
22 CAPM estimates are understated by 0.9% from this error alone (4.6% - 3.7% =
23 0.9%).

8. CAPM METHOD: MARKET RISK PREMIUM

34. Q. HOW DID MR. ROTHSCHILD ESTIMATE THE MRP COMPONENT OF THE CAPM?

A. He starts out with the 9.6% compounded annual (geometric) return earned by the overall equity market from 1926-2008 from the Ibbotson Associates 2009 Valuation Yearbook. He then subtracts the average return on short-term Treasury Bills from the 9.6% market return to arrive at a MRP of 5.9%.

35. Q. WHAT IS WRONG WITH THIS MRP ESTIMATE?

A. Two things are wrong. First, Mr. Rothschild should have subtracted the yield on long-term Treasury bonds from the market return in order to arrive at the MRP, and not he yield on short-term Treasury bills. Second, and this is the core of Mr. Rothschild's CAPM test, he relied on the 9.6% compound annual (geometric) return of the equity market over the 1926-2008 period published by Ibbotson instead of relying on the arithmetic average return over that period. Mr. Rothschild's CAPM produces a much lower estimate than the traditional CAPM because he employs the wrong market return estimate.

Arithmetic vs. Geometric returns

36. Q. PLEASE EXPLAIN HOW THE ISSUE OF WHAT IS THE PROPER "MEAN" ARISES IN THE CONTEXT OF ANALYZING THE COST OF EQUITY.

A. Mr. Rothschild has relied on geometric historical returns rather than on arithmetic historical returns. The 9.6% compounded annual return figure he uses is right out of the Ibbotson Associates Valuation Yearbook 2008 and refers to the geometric

mean return of 9.6% rather than to the arithmetic mean return of 11.7%, contrary to the Ibbotson recommendation from that very source.

Mr. Rothschild devotes some eleven pages of his testimony (pages 57-67) trying to justify the use of the geometric mean, and argues at page 84 that my own risk premium and CAPM analyses overstate Delmarva's cost of equity because I used arithmetic means rather than geometric means in applying those methods. In a nutshell, Mr. Rothschild claims that the geometric mean is the correct measure of what investors expect to earn in the future. That is incorrect.

Mr. Rothschild's arguments reflect a fundamental misunderstanding of how geometric and arithmetic means are used in financial analysis. Geometric means are properly used in evaluating historic performance of stocks or portfolios of stocks, whereas determining investor expectations, which define the cost of equity capital, requires use of arithmetic means. Appendix 4-A of Chapter 6 of my textbook The New Regulatory Finance explains this issue in detail, provides illustrative mathematical examples, and cites authoritative financial texts, all of which confirm the need to use arithmetic means, and not geometric means, to properly estimate a utility's cost of equity. I summarize key points of that Appendix in response to questions below.

37. Q. WHY IS THE ARITHMETIC MEAN APPROPRIATE WHEN ESTIMATING THE COST OF EQUITY?

A. The issue arises in applying methods that derive estimates of a utility's cost of equity from historical relationships between bond yields and earned returns on equity for individual companies or portfolios of several companies. Those

methods produce series of numbers representing the annual difference between bond yields and stock returns over long historical periods. The question is how to translate those series into a single number that can be added to a current bond yield to estimate the current cost of equity for a stock or a portfolio. Calculating geometric and arithmetic means are two ways of converting series of numbers to a single, representative figure.

38. Q. IF BOTH ARE "REPRESENTATIVE" OF THE SERIES, WHAT IS THE DIFFERENCE BETWEEN THE TWO?

A. Each represents different information about the series. The geometric mean of a series of numbers is the value that, if compounded over the period examined, would make the starting value to grow to the ending value. The arithmetic mean is simply the average of the numbers in the series. Where there is any annual variation (volatility) in a series of numbers, the arithmetic mean of the series, which reflects volatility, will always exceed the geometric mean, which ignores volatility. Because investors require higher expected returns to invest in a company whose earnings are volatile than one whose earnings are stable, the geometric mean is not useful in estimating the expected rate of return that investors require to make an investment.

39. Q. CAN YOU PROVIDE A NUMERICAL EXAMPLE TO ILLUSTRATE THIS DIFFERENCE BETWEEN GEOMETRIC AND ARITHMETIC MEANS?

A. Yes. The following table offers a simple numerical example comparing the geometric and arithmetic mean returns of a hypothetical Stock A, whose yearly

returns over a ten-year period are volatile, with those of a hypothetical Stock B, whose yearly returns are perfectly stable during that period. This example is similar in spirit to Mr. Rothschild's numerical example on pages 59-60 of his testimony, although it is considerably simpler and more tractable. Consistent with the point that geometric returns ignore volatility, the geometric mean returns for the two series are identical (11.6% in both cases), whereas the arithmetic mean return of the volatile stock (26.7%) is much higher than the arithmetic mean return of the stable stock (11.6%):

GEOMETRIC VS. ARITHMETIC RETURNS

YEAR	STOCK A	STOCK B
2000	50.0%	11.6%
2001	-54.7%	11.6%
2002	98.5%	11.6%
2003	42.2%	11.6%
2004	-32.3%	11.6%
2005	-39.2%	11.6%
2006	153.2%	11.6%
2007	-10.0%	11.6%
2008	38.9%	11.6%
2009	20.0%	11.6%
Arithmetic Mean Return	**26.7%**	**11.6%**
Geometric Mean Return	**11.6%**	**11.6%**

If Mr. Rothschild were correct in arguing for the use of geometric means, investors would require the same expected return to invest in both of these stocks, even though the volatility of returns in Stock A is very high while Stock B exhibits perfectly stable returns. That is clearly contrary to common sense and the most basic financial theory.

40. Q. YOU HAVE DEMONSTRATED THAT GEOMETRIC MEANS IGNORE VOLATILITY, WHICH IS RELEVANT TO INVESTOR EXPECTATIONS. CAN YOU PROVIDE ANOTHER EXAMPLE THAT SHOWS WHY ARITHMETIC MEANS ARE THE PROPER MEASURES OF VOLATILITY FOR ESTIMATING THE COST OF EQUITY?

A. Yes. The example that follows is a direct quote from the leading graduate textbook on corporate finance, Brealey, Myers, and Allen, Principles of Corporate Finance, 8th Ed. (New York: McGraw Hill, 2006), pp. 156-57:

> *"The proper uses of arithmetic and compound rates of return from past investments are often misunderstood. Therefore, we call a brief time-out for a clarifying example.*
>
> *Suppose that the price of Big Oil's common stock is $100. There is an equal chance that at the end of the year the stock will be worth $90, $110, or $130. Therefore, the return could be –10 percent, +10 percent or +30 percent (we assume that Big Oil does not pay a dividend). The expected return is 1/3(-10+10+30) = +10 percent.*
>
> *If we run the process in reverse and discount the expected cash flow by the expected rate of return, we obtain the value of Big Oil's stock:*

$$PV = \frac{110}{1.10} = \$100$$

> *The expected return of 10 percent is therefore the correct rate at which to discount the expected cash flow from Big Oil's stock. It is also the opportunity cost of capital for investments which have the same degree of risk as Big Oil.*
>
> *Now suppose that we observe the returns on Big Oil stock over a large number of years. If the odds are unchanged, the return will be –10 percent in a third of the years, +10 percent in a further third, and +30 percent in the remaining years. The arithmetic average of these yearly returns is*

$$\frac{-10 + 10 + 30}{3} = +10\%$$

Thus the arithmetic average of the returns correctly measures the opportunity cost of capital for investments of similar risk to Big Oil stock.

The average compound annual return on Big Oil stock would be

$$(.9 \times 1.1 \times 1.3)^{1/3} - 1 = .088, \text{ or } 8.8\%$$

less than the opportunity cost of capital. Investors would not be willing to invest in a project that offered an 8.8 percent expected return if they could get an expected return of 10 percent in the capital markets. The net present value of such a project would be

$$NPV = -100 + \frac{108.8}{1.1} = -1.1$$

Moral: If the cost of capital is estimated from historical returns or risk premiums, use arithmetic averages, not compound annual rates of return (geometric averages)."

41. Q. MR. ROTHSCHILD RELIES HEAVILY ON THE IBBOTSON 2009 YEARBOOK FOR MOST OF HIS DATA THROUGHOUT HIS TESTIMONY. WHAT DOES THE IBBOTSON YEARBOOK HAVE TO SAY ABOUT THE USE OF THE GEOMETRIC VS ARITHMETIC MEAN?

A. Ibbotson Associates' Valuation 2009 Yearbook, could not be clearer in defending *arithmetic* means as the correct measure of the cost of equity, while *geometric* means are useful for reporting past performance:

"The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return.

"The argument for using the arithmetic average is quite straightforward. In looking at projected cash flows, the equity risk premium that should be employed is the equity risk premium that is expected to actually be incurred over the future time periods."[8]

I presume from Mr. Rothschild's statement on page 7 lines 13-17 that not only I but also Ibbotson Associates, the landmark Brealey-Myers-Allen textbook, and numerous other textbooks have also been making the same mistake for years in relying on the arithmetic mean.

42. Q. CAN YOU PROVIDE ANOTHER EXAMPLE THAT SHOWS THAT ARITHMETIC MEANS ARE THE PROPER WAY TO COMPUTE THE RETURN THAT AN INVESTOR MIGHT EXPECT FROM INVESTING IN A VOLATILE PORTFOLIO?

A. Yes. The example posits a scenario where the return on a portfolio declines by 50 percent in one year and doubles the next. The investor in that portfolio will realize a return equal to the geometric mean of the two returns, *i.e.,* zero percent. However, that example addresses *achieved* returns, not *expected* returns. Based on experience, an investor may expect returns to vary between -50 percent and +100 percent, but will be uncertain in any future year what the outcome will be. Assuming a 50 percent chance of either outcome, the investor's expected return in any single year will be the arithmetic mean, or average, of the two possible outcomes, *i.e.,* 25 percent ((-50 percent + 100 percent)/2). Thus, the required expected return, or cost of equity, is equal to the arithmetic mean return of 25

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[8] Ibbotson Associates, *Stocks, Bonds, Bills and Inflation, Valuation Edition 2009*, pp. 77-80.

percent, even though in hindsight, the achieved return could turn out to be zero percent. Stated in practical terms, its seems unlikely that an investor viewing the volatile returns on an investment of -50% in year one and +100% in year two would conclude that the expected return in year three is zero.

43. Q. DOES THE FACT THAT MAJOR BUSINESS JOURNALS CITE GEOMETRIC MEANS WHEN REPORTING ON INVESTMENT RETURNS SUPPORT THE USE OF GEOMETRIC RETURNS IN ESTIMATING THE COST OF EQUITY?

A. No. This ignores the different uses of geometric and arithmetic mean returns. The former are useful for comparing the historical performance of stocks or portfolios where volatility is not of concern, whereas the latter are useful in estimating the prospective cost of equity. The fact that the popular business press cites geometric mean returns does not support their use in estimating the cost of equity.

On page 65 of his testimony, Mr. Rothschild cites a half-page 2003 extract from the Wall Street Journal purporting that the arithmetic average technique is a "trick" and a one-page extract from Value Line explaining that the arithmetic average overstates returns. As stated above, the fact that the popular business press cites geometric mean returns does not support their use in estimating the cost of equity. To the extent that he relies on a half-page article from the Wall Street Journal and a one-page extract from a Value Line publication to support his contention that the arithmetic average technique is inappropriate, Mr. Rothschild does not provide the kind of solid analysis that would allow the Commission to make a reasonable determination of the cost of equity capital.

44. Q. WHAT IS THE NET EFFECT OF MR. ROTHSCHILD'S USE OF GEOMETRIC MEANS RATHER THAN ARITHMETIC MEANS?

A. The net effect of Mr. Rothschild's use of geometric means rather than arithmetic means is to decrease his estimates of Delmarva's required return by approximately 1.5% (150 basis points). The latter estimate is derived by assuming that Delmarva's beta is 0.72 from Mr. Rothschild's Schedule JAR-8 page 3, and multiplying that beta by 2%, the approximate difference between the arithmetic (11.7%) and geometric (9.6%) mean return for stocks reported in the Ibbotson Yearbook.

In short, Mr. Rothschild's CAPM estimates are understated by 150 basis points, that is, 1.5% from this error alone. There is no theoretical or empirical justification for the use of geometric mean rates of returns. I know of no textbook on finance or scientific journal article which advocates the use of the geometric mean as a measure of the appropriate discount rate <u>in computing the cost of capital for a regulated utility or in computing present values</u>.

9. MARKET ADJUSTMENTS

45. Q. WHAT ELSE IS WRONG WITH MR. ROTHSCHILD'S "TRADITIONAL" CAPM?

A. Again, there is nothing traditional or orthodox in Mr. Rothschild's "traditional CAPM." He adds 1.07% to his CAPM results in order to make the results applicable to current financial market conditions as shown on Schedule JAR-8 page 3 line 7. Part of the 1.07% adjustment is to allow for the "great recession" and the remaining part to allow for current interest rate levels.

I know of no cost of capital expert or financial analyst making such adjustments, nor am I aware of any finance textbook or academic literature espousing such adjustments. The reason is that there is no need to allow for the current interest rate environment if you have already done so by using the current level of interest rates as a proxy for the risk-free rate. Nor is there any need to adjust for the "great recession" not only because the financial crisis of 2008-2009 is largely over but also any such premium should already be included in a proper estimate of the MRP.

46. Q. HAS MR. ROTHSCHILD DEPARTED FROM HIS OWN PAST PRACTICE IN IMPLEMENTING THE CAPM?

A. Yes, he has. In previous testimonies, Mr. Rothschild began with an estimate of the historical long-run real rate of return on common stocks to which he added an estimate of expected inflation, and then adjusted this estimate for the average beta of a comparable group of utilities.

In the past, Mr. Rothschild obtained his estimate of the long-run real rate of return on common stocks from Jeremy Siegel's compilation of real historical returns on stocks that have averaged 6.6% to 7.2% over the period 1802-2001. Adding his estimate of expected inflation of 3% to the latter range, Mr. Rothschild concluded that investors expect a nominal return in the range of 9.6% to 10.0% for an equity investment of average risk. Mr. Rothschild then reduced this estimate by anywhere from 1.5% to 2.5% to reflect his view that the utility in question had less than average risk. That is not at all what he did in this testimony. No explanation is provided for the change in method.

10. MARKET-BASED CAPM

47. Q. DO YOU HAVE ANY COMMENT ON MR. ROTHSCHILD'S MARKET-BASED CAPM ESTIMATES?

A. Yes, I do. Mr. Rothschild's second CAPM test, which he labels "market-based CAPM," is based on the empirical relationship between realized returns and beta risk over the 1928-2008 period. The results are shown on Graphs 1 and 2 shown on pages 56 and 63 of his direct testimony.

48. Q. WHAT IS WRONG WITH THIS ANALYSIS?

A. There are two serious flaws in this analysis. First, it is based on geometric returns rather than on arithmetic returns. Earlier, I showed the fallacies inherent in such a procedure. Second, it is based on realized returns rather than on expected returns.

49. Q. IS THERE ANY OTHER EVIDENCE THAT MR. ROTHSCHILD'S MARKET-BASED CAPM ANALYSIS IS FLAWED?

A. Yes, there is. Graph 1 on page 56 of Mr. Rothschild's testimony summarizes visually the relationship between return and risk estimated by Mr. Rothschild, using geometric mean returns on the vertical axis and beta on the horizontal axis. The implied risk-free rate of 4.17% from Mr. Rothschild's analysis, that is, the intercept on the vertical axis, is less then the yield on U.S. Treasury securities which is currently close to 5%.

50. Q. ARE MR. ROTHSCHILD'S MARKET-BASED CAPM RESULTS INFLUENCED BY THE COMPANY SIZE EFFECT?

A. Yes, very much so. As a matter of fact, the entire chapter from which Mr. Rothschild has drawn his return/risk data in the Ibbotson Associates 2009

1 Yearbook is devoted to documenting and quantifying the well-known size effect
2 in finance.

3 It is clear from Graphs 1 and 2 on pages 56 and 63 that portfolio No. 10 is
4 an outlier and produces greater returns than the other nine portfolios for a given
5 risk level. Portfolio No. 10 is made up of the smallest capitalization companies
6 in the Ibbotson study. Inclusion of portfolio No. 10 skews the CAPM results
7 downward, that is, the two graphs are steeper with the inclusion of portfolio No.
8 10 than otherwise would be the case, and thus bias downward the return estimates
9 for the lower risk companies such as Delmarva.

10 **51. Q. WHAT DO YOU CONCLUDE FROM MR. ROTHSCHILD'S CAPM**
11 **METHODS?**

12 A. My specific conclusions on Mr. Rothschild's CAPM analysis are that: 1) it is not
13 a conventional implementation of the classic CAPM, 2) it erroneously relies on
14 geometric mean returns rather than arithmetic mean returns and as such
15 understates the cost of equity by 150 basis points, 3) it is stale and as such
16 understates the cost of equity by 90 basis points, and 4) it is biased downward by
17 the size effect.

18 **11. REVENUE DECOUPLING RISK ADJUSTMENT**

19 **52. Q. WHAT RETURN ADJUSTMENT DOES MR. ROTHSCHILD**
20 **RECOMMEND IF THE COMPANY'S PROPOSED SFV IS APPROVED?**

21 A. If the Company's proposed SFV is approved, Mr. Rothschild argues on page 6
22 lines 14-18 that Delmarva will become far less risky and recommends lowering
23 the allowed ROE by at least 0.5% to 1.5%.

1 **53. Q. WHAT IS THE BASIS FOR MR. ROTHSCHILD'S DOWNWARD ROE**
2 **ADJUSTMENT?**
3 A. This number is plucked out of thin air. No foundation, empirical support, studies,
4 or publications are offered to justify such an outlandish claim. I say outlandish
5 because if Mr. Rothschild's downward adjustment of 50-150 basis points was
6 ever adopted, Mr. Rothschild's recommended ROE of 9.5% would become 8.0% -
7 9.0% which is completely outside any reasonable limits of reasonableness.
8 **54. Q. DO YOU AGREE WITH MR. ROTHSCHILD'S 50 - 150 BASIS POINTS**
9 **DOWNWARD RETURN ADJUSTMENT TO ACCOUNT FOR THE SFV**
10 **MECHANISM?**
11 A. No, I do not. Most, if not all, electric utilities in the industry are under some form
12 of adjustment clause/cost recovery/rider mechanisms. The approval of adjustment
13 clauses, riders, and cost recovery mechanisms by regulatory commissions is
14 widespread in the utility business and is already largely embedded in financial
15 data, such as bond rating and business risk scores. While adjustment clauses,
16 riders, and cost tracking mechanisms may mitigate (on an absolute basis but not
17 on a relative basis) a portion of the risk and uncertainty related to the day-to-day
18 management of a regulated utility's operations, there are other significant factors
19 to consider that work in the reverse direction for Delmarva, for example,
20 construction-related risks, regulatory risk and weak financial metrics, that offset
21 the presence of the aforementioned mechanisms.
22 **55. Q. WHAT ELSE IS WRONG WITH THIS ADJUSTMENT?**

A. It is far too high and defies credulity. If we take Mr. Rothschild's adjustment of 50 – 150 basis points at face value and apply it to the Company's bonds, we end up with a logical impossibility. The yield on utility bonds rated Baa and on the company's long-term bonds is approximately 6.3% at this time. If we apply Mr. Rothschild's downward adjustment of 50 – 150 basis points to the yield on the company's bonds to account for the risk-reducing effects of the SFV, we end up with a yield of 4.8% - 5.8%. The bottom end of that range is less than the current yield on long-term Treasury bonds that are yielding 4.9%, an absurd situation. Moreover, the range would be less than the yield on utility bonds rated A, an unreasonable situation given that utility bonds are rated below A on average. Given the observed yield differentials between utility bonds in different bond rating classes, another way to look at it is that Delmarva's bonds would have to be upgraded by several notches from Baa2 to at least single A to account for the 50 – 150 basis points reduction in risk. This scenario is unlikely and quite outside the bounds of reasonableness.

In short, Mr. Rothschild's downward ROE adjustment of 50 - 150 basis points should be rejected by the Commission.

56. Q. MR. ROTHSCHILD CLAIMS THAT YOUR RECOGNITION OF THE RISK-REDUCTION EFFECTS OF THE SFV IS UNREALISTICALLY LOW. IS HE RIGHT?

A. On page 8 lines 14-19 of his testimony, Mr. Rothschild claims that my 25 basis points downward adjustment to account for the risk-reduction effects of the SFV, is unrealistic. I disagree. As fully discussed in my Direct Testimony, a far more

reasonable adjustment would be approximately 25 basis points, based on: 1) utility bond yield spread differentials between A-rated and Baa-rated bonds, and 2) observed beta differentials.

57. Q. DO YOU AGREE WITH MR. ROTHSCHILD THAT DELMARVA-SPECIFIC RISKS ARE IRRELEVANT IN DETERMINING A COMPANY'S FAIR AND REASONABLE RETURN?

A. No, I do not. On page 8 lines 17-19 and on pages 79-83 of his testimony, Mr. Rothschild argues that revenue decoupling will substantially minimize "non-diversifiable" risks and that most of the specific risks faced by Delmarva are diversifiable (unsystematic) and should not be compensated. In other words, company-specific business risks such as operating risks, regulatory risk, credit risk and financial positions are all diversifiable risks which do not matter to investors, according to Mr. Rothschild. In his view, only systematic risks, as measured by beta, are associated with a risk premium. I strongly disagree with the highly counter-intuitive notion that company-specific business risks are irrelevant to investors.

First, the idea that only beta matters is inconsistent with the empirical evidence. Both market risk (beta) and company-specific risk (standard deviation of return) matter. While it is true that in a large diversified portfolio, the volatility of the portfolio's return is much more closely related to the beta coefficients of the constituent stocks than to their standard deviations, for undiversified portfolios, and even for reasonably diversified portfolios, there is strong empirical evidence suggesting that investors' risk assessments depend also

on the standard deviation of return. The latter variability is strongly affected by financial position, credit risk, and demand variability.

Second, the empirical evidence supports the notion that company-specific risks matter. The positive relationship between return and both standard deviation and beta is well documented in both the academic and trade financial literature. The comprehensive study of historical returns on stocks and bonds published annually by Ibbotson Associates supports the conclusion that stocks are riskier than bonds in terms of standard deviations.

There is also a rich empirical literature in finance on the determinants of beta. Variability of cash flows, the use of debt, and growth are perennial members of the family of variables that exert an upward influence on beta. Clearly, the variability of cash flows, and thus beta, increases with competition.

Several authors in the finance literature have shown that beta has three main components: demand risk, operating leverage, and financial leverage. Demand risk refers to the unanticipated variability in demand and prices, and to the unanticipated variability in operating and financing costs caused by macroeconomic conditions, regulation, and technological change. Leverage refers to the extent to which these demand and cost uncertainties are magnified by the operating cost and financial cost structures of the company.

In short, company-specific risks are highly relevant in determining a company's fair and reasonable return.

58. Q. ARE ELECTRIC UTILITIES' BUSINESS RISKS DIVERSIFIABLE?

1 A. The business risks of electric utilities are not diversifiable risks to the extent that
2 they affect all the companies in the energy industry and to the extent that they
3 affect all industries by virtue of all industries' common dependence on energy as
4 an input to the production process. Moreover, it is clear from the myriad
5 investment reports, company analyses, and bond rating agency reports dealing
6 with electric utility stocks in the past several years that investors are concerned
7 with company-specific risks, and especially with regulatory risks. In short, both
8 beta risk and company-specific risk matter to investors, and certainly matter to
9 bond rating agencies.

10 **12. CAPITAL STRUCTURE ADJUSTMENT**

11 **59. Q. DID MR. ROTHSCHILD ADJUST HIS RECOMMENDED ROE**
12 **DOWNWARD TO ACCOUNT FOR DELMARVA'S LOWER DEGREE OF**
13 **LEVERAGE?**

14 A. Yes, he did. Mr. Rothschild decreases his ROE estimates by 15 basis points to
15 reflect the lower financial risk associated with Delmarva's less leveraged (more
16 common equity) capital structure.

17 **60. Q. DO YOU AGREE WITH SUCH AN ADJUSTMENT?**

18 A. No, I do not. First, it is incorrect that Delmarva possesses a stronger capital
19 structure than its peers. The median common equity ratio for Mr. Rothschild's
20 group of comparable electric utilities is 48.0%, as reported by Value Line and as
21 computed from Mr. Rothschild's Schedule JAR-7 page 1 if we exclude short-term
22 debt from the computation, as Value Line does when it reports capital structure
23 ratios. This compares to 47.5% common equity ratio for Delmarva as shown on

Mr. Rothschild's Schedule 7 page 2. Therefore, Delmarva's common equity ratio of 47.5% is actually slightly weaker than its peers' ratio of 48.0%. Thus, no capital structure adjustment is warranted.

Second, even if the adjustment was warranted, the 15 basis point adjustment is plucked out of thin air. Nowhere in his 134 pages testimony does Mr. Rothschild explain the rationale, foundations, supportive literature for such an adjustment.

13 RESPONSES TO MR. ROTHSCHILD'S CRITICISMS

61. Q. WHAT ARE MR. ROTHSCHILD'S MAJOR CRITICISMS OF YOUR TESTIMONY

A. On page 84 lines 1-10, Mr. Rothschild summarizes his major criticisms of my testimony. The three major criticisms are: 1) I failed to use the sustainable growth approach in my DCF analysis, 2) I relied on analysts' short-term growth rates in my DCF analysis, and 3) I used arithmetic means instead of geometric means in my CAPM analysis. I have already addressed the limitations and circular logic inherent in the sustainable methodology earlier in my rebuttal. I have also addressed the fallacies of relying on geometric averages in a CAPM analysis.

62. Q. MR. ROTHSCHILD CLAIMS THAT YOU RELIED ON SHORT-TERM GROWTH RATES IN YOUR DCF ANALYSIS. HOW DO YOU RESPOND?

A. Mr. Rothschild is incorrect. The growth rates on which I relied from Value Line and Zacks Investment Research are long-term growth projections and not short-term (i.e. less than one year) growth projections.

1 I find it curious that Mr. Rothschild chastises my use of analysts' growth
2 rates for he relies on the very same growth rates on his Schedule JAR-3 pages 3,
3 6, and 9 column 4 to derive his estimates of expected return.

4 **63. Q. HOW DO YOU RESPOND TO MR. ROTHSCHILD'S CRITICISM OF**
5 **YOUR RISK-FREE RATE IN THE CAPM ANALYSIS?**

6 A. On pages 84-86 of his testimony, Mr. Rothschild argues that a the yield on long-
7 term Treasury bonds is inappropriate in a CAPM analysis because long-term
8 Treasury bonds are subject to interest rate risk and therefore not risk free. While
9 I agree with Mr. Rothschild that long-term Treasury bonds possess interest rate
10 risk, this notion is only true if the bonds are sold prior to maturity. A substantial
11 fraction of bond market participants, usually institutional investors with long-term
12 liabilities (pension funds, insurance companies), in fact hold bonds until they
13 mature, and therefore are not subject to interest rate risk. In any event,
14 institutional bondholders neutralize the impact of interest rate changes by
15 matching the maturity of a bond portfolio with the investment planning period, or
16 by engaging in hedging transactions in the financial futures markets. The merits
17 and mechanics of such immunization strategies are well documented by both
18 academicians and practitioners.

19 As I explained in my Direct Testimony, the ideal proxy for the risk-free
20 rate in the CAPM would have a term to maturity equal to the security being
21 analyzed. Because common equity has an infinite life span, the inflation
22 expectations embodied in its market-required rate of return will be equal to the
23 inflation rate anticipated to prevail over the long-term. Among U.S. Treasury

1 securities, 30-year U.S. Treasury bonds have the longest term to maturity.
2 Therefore, 30-year U.S. Treasury bonds will most closely incorporate within their
3 yield the inflation expectations that influence the prices of common stocks.

4 **64. Q. IS THERE A CONTRADICTION IN MR. ROTHSCHILD'S VIEW ON**
5 **THE PROPER PROXY FOR THE RISK-FREE RATE IN A CAPM**
6 **ANALYSIS?**

7 A. Yes, there is. On page 86 line 11, Mr. Rothschild states that I am "*...correct that*
8 *using spot short-term interest rates is not a good solution.*" Yet, this is exactly
9 what he does. As seen on Schedule JAR-8 page 3 line 2 in his implementation of
10 the CAPM, Mr. Rothschild relies on the "*Average Return on Short-Term U.S.*
11 *Treasury Bills.*"

12 **65. Q. PLEASE DISCUSS THE RELATIONSHIP BETWEEN THE LEVEL OF**
13 **INTEREST RATES AND UTILITY RISK PREMIUMS.**

14 A. Contrary to Mr. Rothschild's contention that the risk premium shrinks as interest
15 rates decline on page 73 lines 5-22 of his testimony, in fact the opposite is in true.
16 Published studies by Brigham, Shome, and Vinson (1985), Harris (1986), Harris and
17 Marston (1992), Carleton, Chambers, and Lakonishok (1983), Maddox, Pippert and
18 Sullivan (1995), and others demonstrate that, beginning in 1980, risk premiums
19 varied inversely with the level of interest rates, rising when rates fell and declining
20 when interest rates rose.

21 On page 74, Mr. Rothschild argues that there is not theoretical foundation
22 for an inverse relationship between the level of interest rates and the allowed risk
23 premium. Mr. Rothschild errs in this regard, for there is a theoretical basis for such a

relationship. The reason for this relationship is that when interest rates rise, bondholders, whose interest rates are fixed, often suffered a decrease in the market value of their bonds, experiencing a capital loss. This is referred to as interest rate risk. Stockholders, on the other hand, are more concerned with the firm's earning power. In order to avoid interest rate risk in an environment of rising interest rates, investors tend to become more willing to undertake equity investments which, although subject to some fear of loss of earning power, are less sensitive to the fear of interest rate risk. The resulting increase in the supply of funds available for such equity investments causes a downward pressure on the market price for equity. Therefore, generally it is observed that if bondholders' fear of interest rate risk exceeds shareholders' fear of loss of earning power, the risk differential will narrow and hence the risk premium will shrink. This is particularly true in high inflation environments. Interest rates rise as a result of accelerating inflation, and the interest rate risk of bonds intensifies more than the earnings risk of common stocks, which are partially hedged from the ravages of inflation. This phenomenon has been termed as a "lock-in" premium. Conversely in low interest rate environments, as is the case currently, when bondholders' interest rate fears subside and shareholders' loss of earning power dominate, the risk differential will widen and hence the risk premium will increase. This in fact occurred since 1998.

In short, the empirical evidence from the published academic literature demonstrates that the risk premium varies inversely with the level of interest rates, and not proportionately, as Mr. Rothschild contends.

1 **66. Q. DO AUTHORIZED ROE'S SUGGEST A NEGATIVE RELATIONSHIP**
2 **BETWEEN THE RISK PREMIUM AND THE LEVEL OF INTEREST**
3 **RATES?**
4 A. Yes, they most certainly do. Contrary to Mr. Rothschild's suggestion that the risk
5 premium has shrunk because interest rates are lower now than in the past,
6 regulators have systematically and correctly done the opposite by increasing the
7 authorized risk premium when interest rates decline, and conversely decreasing
8 the authorized risk premium when interest rates increase. I discuss this issue
9 further in my rebuttal.
10 **67. Q. IS THERE A PROBLEM WITH YOUR FIRST PROXY GROUP OF**
11 **UTILITIES?**
12 A. No, there is not. On page 87, Mr. Rothschild cites a problem with my first proxy
13 group of utilities because as much as 49% of unregulated activities could be
14 included in the group. First, I am surprised by this remark because Mr. Rothschild
15 unequivocally adopts my three proxy groups of companies throughout his DCF
16 and CAPM analyses. Second, Mr. Rothschild's criticism is moot for the actual
17 percentage of revenues derived from regulated electric utility operations in my
18 first proxy group is more than 70%.
19 **68. Q. MR. ROTHSCHILD CLAIMS THAT THE COMPANY'S COST OF DEBT**
20 **IS INFLATED BECAUSE THE COMPANY WOULD HAVE BORROWED**
21 **FUNDS AT A LOWER RATE HAD IT NOT BEEN PART OF THE**
22 **HOLDING COMPANY PEPCO HOLDINGS INC. ("PHI"). IS HE**
23 **RIGHT?**

A. No, he is not. On pages 10-11, Mr. Rothschild lowers the Company's cost of debt because he claims that Delmarva could have borrowed funds at a lower rate had it not been a subsidiary of PHI. Mr. Rothschild's argument ignores the fundamental concept of co-insurance. The diversification activities of a diversified parent like PHI reduce risk through a co-insurance effect stemming from its subsidiary activities. If the cash flows of individual operating units are less than perfectly correlated, the probability of default is reduced by their consolidation under one roof. To the extent that this co-insurance effect exists, the cost of debt is impacted directly and favorably. Delmarva's ratepayers enjoy the benefits of PHI's financial strength and lower cost of debt capital compared to what Delmarva's financial strength and cost of debt capital would be on a stand-alone basis. Given its smaller size, Delmarva would not enjoy the same creditworthiness and financial solidity as PHI as a whole.

CONCLUSIONS

69. Q. WHAT DO YOU CONCLUDE FROM MR. ROTHSCHILD'S COST OF CAPITAL TESTIMONY?

A. There are very serious problems with Mr. Rothschild's methods and concepts. My general conclusions are that his DCF analysis hinges solely on the "sustainable growth" method, only one of several methods traditionally used in regulatory proceedings, and certainly the most fragile method. His application of the method is questionable and contains a serious logical trap because it requires that its user assume the answer to begin with. It is not reasonable to accept Mr. Rothschild's

claim that investors are expecting 9.25% when his own ROE data indicate that investors are expecting 11.0% - 11.5%.

The evidence from both the DCF and CAPM frameworks, if implemented properly, is that investors expect substantially higher returns than what Mr. Rothschild has found.

The following table recapitulates the understatements of equity costs and the principal reasons why Mr. Rothschild's recommended ROE understates an appropriate ROE for Delmarva and should be rejected:

ROE Understatements

	Source of Error	Basis Points Impact
DCF Results:	Understate Dividend Yield	15
DCF Results:	Failure to Use Analysts Growth Forecasts	110
DCF Results:	Failure to Include Flotation Costs	30
	TOTAL DCF	**155**
CAPM:	Use of a Stale Risk-Free Rate	90
CAPM:	Failure to use the Arithmetic Mean MRP	150
	TOTAL CAPM	**240**

Correction of these errors would increase Mr. Rothschild's DCF results by 175 basis points, and Mr. Rothschild's CAPM results by 240 basis points. Moreover, his downward ROE capital structure adjustment of 15 basis points is unwarranted and unfounded, and his downward risk adjustment for the SFV mechanism is far too high.

70. Q. WOULD THE ADOPTION OF MR. ROTHSCHILD'S RECOMMENDED ROE ENDANGER DELMARVA'S CREDIT QUALITY?

A. Yes, it certainly increases the probability of a deterioration in Delmarva's credit quality. Extreme decreases in Delmarva's authorized ROE, such as the decreases recommended by Mr. Rothschild, could alarm the investment community and threaten Delmarva's credit ratings. A weakening of Delmarva's credit quality, and earnings power at a time when the Delmarva needs to attract significant external capital on reasonable terms is ill advised.

II. REBUTTAL OF MS. CRANE'S TESTIMONY

71. Q. PLEASE SUMMARIZE MS. CRANE'S ROE RECOMMENDATION.

A. Ms. Crane recommends a ROE allowance of only 9.58% without the adoption of the Company's proposed SFV and an astonishing 7.52% with the SFV mechanism. In determining the cost of equity, Ms. Crane applies a DCF analysis and a CAPM analysis to the same group of electric utilities used by the Company cost of capital witness. The DCF study, summarized on Page 19 of her testimony, produces a result of 9.93%. The CAPM study, summarized on Page 23 of her testimony, produces a result of 8.53%. No other tests and/or checks on her results are performed. Ms. Crane arbitrarily assigns a weight of 75% to her DCF results and 25% to her CAPM results, resulting in a cost of equity recommendation of only 9.58%. She then lowers her recommendation by 2.07% down to 7.52% assuming adoption of the SFV.

72. Q. WHAT IS YOUR GENERAL REACTION TO MS. CRANE'S COST OF COMMON EQUITY RECOMMENDATION?

A. My first general reaction to her testimony, before I engage in a more technical critique, is that her recommended ROE of 7.52% is so radically low and far-

fetched that I initially thought it constituted a typographical error, or perhaps it applied to the Company's overall return (ROR) rather than to the ROE. Further reading, however, confirmed that 7.52% was indeed her recommended ROE. My next reaction was that Ms. Crane's implementation of both the DCF and CAPM analyses must be seriously flawed and I proceeded to investigate the specific details of her methodologies.

My second general reaction is that Ms. Crane's recommended 7.52% ROE for Delmarva lies completely outside the zone of reasonableness and well outside the zone of currently authorized rates of return for major electric utilities in the United States, and, as such, is very difficult to take seriously. Ms. Crane's recommended reduction in the Company's ROE down to only 7.52%, if ever adopted, would result in the lowest rate of return award for a major electric utility in the country, and by far. I hesitate to think of its adverse consequences on the Company's credit ratings, the stock of its parent company, the company's capital raising ability, and customers. Moreover, Ms. Crane's single-digit recommended ROE lies well outside the zone of her comparable companies' authorized ROEs which was 10.6% as discussed earlier in my rebuttal of Mr. Rothschild. These are clear indications that her ROE recommendation for Delmarva is too low.

73. Q. PLEASE SUMMARIZE YOUR SPECIFIC CRITICISMS OF MS. CRANE'S TESTIMONY.

A. I have ten (10) specific criticisms:

1. Return Recommendation Out of the Mainstream. Ms. Crane's recommended return is completely outside the zone of currently allowed rates of

return for major electric utilities in the United States and for her sample of companies. The currently authorized ROE for Ms. Crane's comparable companies is 10.6%, which is much higher than her recommended ROE of 7.52% for Delmarva. The average allowed ROE in the electric utility industry is 10.6%.

2. DCF Dividend Yield and Flotation Costs. Ms. Crane's dividend yield component is understated by 30 basis points because it does not allow for flotation costs, and, as a result, a legitimate expense is left unrecovered.

3. Understated Dividend Yield. Ms. Crane's dividend yield component is further understated because it is not consistent with the annual form of the DCF model. It is inappropriate to increase the dividend yield by adding one-half of the future growth rate (1 + 1/2 g) to the spot dividend yield. The appropriate manner of computing the expected dividend yield when using the plain vanilla annual DCF model is to add the full growth rate rather than one-half of the growth rate. This error understates the DCF results by some 15 basis points.

4. DCF Growth Rate. Ms. Crane's final choice of growth rate in the DCF analysis is arbitrary and unfounded.

5. DCF Historical Growth Rates. The historical growth rates that Ms. Crane examines in her DCF analysis are largely redundant.

6. DCF Dividend Growth Rates. The use of dividend growth projections is inappropriate in the DCF model. Earnings growth projections are far more relevant at this point at this time.

7. Analysts' Growth Forecasts. Investors expect substantially higher growth rates for utilities than what Ms. Crane employs in her DCF analysis.

8. CAPM Market Risk Premium. Ms. Crane's estimate of the market risk premium ("MRP") is too low because she has erroneously employed geometric means instead of the correct arithmetic means. Use of the correct MRP increases Ms. Crane's CAPM estimate of Delmarva's cost of equity by 80 basis points, from 9.8% to 10.6%.

9. CAPM and the Empirical CAPM (ECAPM). The plain vanilla version of the CAPM used by Ms. Crane understates the Company's cost of equity for low-beta securities.

10. Effect of SFV. Ms. Crane's downward return adjustment of 206 basis points to account for the risk-reducing effects of the company's proposed SFV is plucked out of thin air and vastly overstated.

11. Criticisms of my testimony. Ms. Crane's criticisms of my testimony are without foundation.

I have already addressed items 1, 2, 3 in my rebuttal of Mr. Rothschild and will not repeat those criticisms. I shall now discuss the remaining items in turn.

ITEM #4 DCF GROWTH RATES

74. Q. PLEASE DESCRIBE MS. CRANE'S GROWTH RATE ESTIMATE IN HER DCF ANALYSIS?

A. From page 18 of her testimony, the table below replicates Ms. Crane's growth rate estimates for her sample companies.

Growth Proxy	
Earnings - 5 Year Growth	3.3%
Dividends – 5 Year Growth	1.7%
Book Value - 5 Year Growth	4.2%
Earnings – 10 Year Growth	2.2%
Dividends - 10 Year Growth	-1.3%
Book Value - 10 Year Growth	3.3%
Value Line Projections – Earnings	5.9%
Value Line Projections - Dividends	6.3%
Value Line Projections – Book Value	4.8%
AVERAGE	**3.4%**

From the smorgasbord of growth rates shown in the above table, which range from -1.3% to + 6.3% and average 2.2%, Ms. Crane ends up picking 5.0% as her final estimate of the DCF growth rate without providing any foundation or justification for this arbitrary choice.

ITEM # 5 HISTORICAL GROWTH RATES

75. Q. PLEASE DISCUSS THE USE OF HISTORICAL GROWTH RATES IN APPLYING THE DCF MODEL TO ENERGY UTILITIES.

A. Historical growth rates have little relevance as proxies for long-term growth forecasts in a DCF analysis at this time because (1) such historical growth patterns are *already incorporated* in analysts' growth forecasts that should be used in the DCF model, and are therefore redundant, and (2) structural changes in the energy industry, including mergers, restructuring, and competition, have made these historical growth rates inappropriate.

ITEM # 6 DIVIDEND GROWTH RATES

76. Q. SHOULD THE VALUE LINE DIVIDEND GROWTH ESTIMATES BE CONSIDERED IN APPLYING THE DCF MODEL TO UTILITIES?

A. No. Value Line dividend growth estimates should not be considered in applying the DCF model to utilities at this time. First, heavy reliance on Value Line growth forecasts runs the risk that such forecasts are not representative of investors' consensus forecast. Second, it is inappropriate to use dividend growth estimates of utilities at this time in the DCF model. The Value Line dividend growth forecasts are largely dominated by the anticipated dividend performance over the next few years and higher business risk. The intermediate growth rate in dividends cannot equal the long-term growth rate when the dividend payout ratio is expected to change because projected dividend growth and earnings growth must adjust to the changing payout ratio. This "problem" is not unique to analysts' dividend growth forecasts and is also inherent in the use of historical growth rates to forecast growth rates.

First, reliance on "near-term" dividend growth is improper because it is expected that utilities will continue to lower their dividend payout ratios over the next several years in response to increasing capital expenditures. In the current environment where utilities are substantially increasing their capital expenditures, dividends cannot be expected to grow at the same rate that investors expect earnings to grow. Therefore, earnings and dividends are not expected to grow at the same rate in the future. This can be seen from Ms. Crane's own growth data. Value Line projects earnings growth at 5.9% compared to dividend growth of 4.3% from her Schedule ACC-5[9].

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[9] The outlying growth rates of 30% and 27.5% were removed from the growthcomputation.

1

2 **ITEM #7 ANALYSTS' GROWTH FORECASTS**

3 **77. Q. PLEASE DISCUSS THE USE OF ANALYSTS' FORECASTS IN**

4 **APPLYING THE DCF MODEL TO UTILITIES.**

5 **A.** As discussed earlier in my rebuttal of Mr. Rothschild, the best proxy for the

6 growth component of the DCF model is the analysts' long-term earnings growth

7 forecasts. Published studies in the academic literature demonstrate that

8 (i) analysts' growth rate forecasts are reasonable indicators of investor

9 expectations and (ii) investors rely on such forecasts.

10 **78. Q. HAS MS. CRANE RELIED ON ANALYSTS' GROWTH FORECASTS IN**

11 **PAST PROCEEDINGS?**

12 **A.** Yes, she has. In past proceedings, notably in a recent electric utility proceeding

13 regarding Delmarva Power & Light before the Delaware Commission (Docket

14 No. 05-304), Ms. Crane reported and relied on the analysts' consensus growth

15 forecast. She failed to rely on such forecasts in this proceeding.

16 **79. Q. DOES MS. CRANE OFFER ANY EXPLANATION FOR HER DEVIATION**

17 **FROM PAST PRACTICE OF ESTIMATING DCF GROWTH RATES?**

18 **A.** No, she does not.

19 **80. Q. WHAT WOULD MS. CRANE'S DCF ESTIMATES BE HAD SHE RELIED**

20 **UPON THE SAME GROWTH ESTIMATES AS IN THE PAST?**

21 A. As I showed earlier, the best proxy for the growth component of the DCF model is

22 analysts' long-term earnings growth forecasts. Ms. Crane should have relied on

23 such forecasts in deriving the DCF growth component.

The table above showed Value Line's growth forecast of 5.9% for the companies in Ms. Crane's sample compared to Ms. Crane's 5.0% estimate. Substituting the average consensus analysts' growth forecast of 5.9% instead of the 5.0% used by Ms. Crane in this proceeding raises her DCF estimates by 0.9%, the difference between 5.9% and 5.0%, which would in turn raise her DCF estimates from 9.93% to nearly 11.0% without flotation cost.

ITEM #8 CAPM MARKET RISK PREMIUM

81. Q. DOES MS. CRANE EMPLOY A CAPM ESTIMATE?

A. Yes, she does. Ms. Crane performs a CAPM analysis of the cost of common equity on pages 20-23 of her testimony.

82. Q. DO YOU AGREE WITH MS. CRANE'S CAPM ANALYSIS?

A. I agree with two of the three inputs into her CAPM analysis, namely the beta estimate and the risk-free rate. I seriously disagree with the third input, namely the MRP because she has erroneously relied on the geometric average of realized returns rather than on the arithmetic average. Moreover, the use of the plain vanilla CAPM understates the cost of capital.

83. Q. PLEASE COMMENT ON THE USE OF ARITHMETIC AVERAGES VERSUS GEOMETRIC AVERAGES IN MEASURING EXPECTED RETURN.

A. As discussed extensively earlier, there is no theoretical or empirical justification for the use of geometric mean rates of returns in estimating a utility's cost of capital. The net effect of Ms. Crane's use of the geometric mean MRP of 5.35%,

rather than the arithmetic mean of 6.5% is to decrease her estimates of the required market return by 1.2%, that is, the difference between the arithmetic and geometric mean reported in the Ibbotson Associates publication used by Ms. Crane. This, in turn, translates into an understatement of Delmarva's cost of equity by approximately 0.9%. The latter estimate is derived by assuming that Delmarva's beta is 0.74 from Ms. Crane's Page 23 and multiplying that beta by 1.2%. This correction would in turn raise Ms. Crane's CAPM estimate from 8.53% to 9.38% without flotation cost and about 9.7% with flotation cost.

84. Q. CAN YOU COMMENT ON MS. CRANE'S NUMERICAL EXAMPLE PURPORTING TO SHOW THE SUPERIORITY OF THE ARITHMETIC AVERAGE?

A. Yes. Ms. Crane offers the same numerical example I used earlier in my rebuttal that considers a stock that will either double in value (return = 100%) with a probability of 0.5, or halve in value (return = -50%) with probability of 0.5.

Outcome	Final value of $1 invested	1-yr return
Double	$2.00	100%
Halve	$0.50	-50%

Suppose that the stock's performance over a two-year period is representative of the probability distribution, doubling in one year (r_1 = 100%) and halving in the next (r_2 = -50%). The stock's price ends up exactly where it started, and the geometric average annual return over the two-year period, r_g, is zero:

$$1 + r_g = [(1 + r_1)(1 + r_2)]^{1/2}$$

$$= [(1 + 1)(1 - .50)]^{1/2} = 1$$

$$r_g = 0$$

confirming that a zero year-by-year return would have replicated the total return earned on the stock. The expected annual future rate of return on the stock is not zero, however. It is the arithmetic average of 100% and -50%, (100-50)/2 = 25%. There are two equally likely outcomes per dollar invested: either a gain of $1 when r = 100% or a loss of $0.50 when r = -50%. The expected profit is ($1-$.50)/2 = $.25 for a 25% expected rate of return. The profit in the good year more than offsets the loss in the bad year, despite the fact that the geometric return is zero. The arithmetic average return thus provides the best guide to expected future returns. Surely, an investor would not be so irrational as to require a return of 0% from a stock that can go either up 100% or down 50%. In conclusion, Ms. Crane commits a serious logical error by relying on geometric averages rather than on the conceptually correct arithmetic averages of historical returns.

ITEM #9 CAPM AND THE EMPIRICAL CAPM

85. Q. DO YOU AGREE WITH THE USE OF ONLY THE RAW FORM OF THE CAPM USED BY MS. CRANE TO ESTIMATE THE COST OF CAPITAL?

A. No, I do not. I believe that the plain vanilla version of the CAPM should be supplemented by the more refined version of the CAPM. There have been countless empirical tests of the CAPM to determine to what extent security returns and betas are related in the manner predicted by the CAPM. The results of the tests support the idea that beta is related to security returns, that the risk-return

tradeoff is positive, and that the relationship is linear. The contradictory finding is that the risk-return tradeoff is not as steeply sloped as the predicted CAPM. That is, low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted. A CAPM-based estimate of the cost of capital underestimates the return required from low-beta securities and overstates the return from high-beta securities, based on the empirical evidence.

The downward bias is particularly significant for low-beta securities, such as the electric utilities used by Ms. Crane. Ms. Crane's CAPM estimates of equity costs are understated by about 50 basis points from this bias alone.

ITEM #10 SFV RISK ADJUSTMENT

86. Q. WHAT RETURN ADJUSTMENT DOES MS. CRANE RECOMMEND IF THE SFV MECHANISM IS APPROVED?

A. On pages 24-25 of her testimony, Ms. Crane recommends that Delmarva's ROE be reduced by a whopping 206 basis points (2.06%) if the SFV is adopted. Ms. Crane bases her estimate on a yield differential between the Company's bonds and her understated ROE recommendation without the SFV, which she then arbitrarily cuts in half. No foundation, empirical support, publications, study, references, capital market data, or research article, are offered by Ms. Crane to justify such a draconian recommendation.

87. Q. DO YOU AGREE WITH MS. CRANE'S 206 BASIS POINTS DOWNWARD RETURN ADJUSTMENT TO ACCOUNT FOR THE SFV MECHANISM?

1 A. No, I do not agree with such a draconian stance. As discussed earlier, most, if not
2 all, electric utilities in the industry are under some form of adjustment clause/cost
3 recovery/rider mechanisms and the effect of these mechanisms is already largely
4 embedded in financial data, such as bond rating and business risk scores.

5 **88. Q. DOES THIS ADJUSTMENT MAKE ECONOMIC SENSE?**

6 A. No, it does not. It is far too high and makes no economic sense at all. If we take
7 Ms. Crane's adjustment of 206 basis points at face value and apply it to the
8 Company's bonds, we end up with a logical impossibility. The yield on utility
9 bonds rated Baa and on the company's long-term bonds is approximately 6.3% at
10 this time. If we apply Ms. Crane's downward adjustment of 206 basis points to
11 the yield on the company's bonds to account for the risk-reducing effects of the
12 SFV tracker, we end up with a bond yield of 4.3%. That would be less than the
13 yield on long-term Treasury bonds, an absurd situation given that Treasury bonds
14 are risk-free. Given the observed yield differentials between utility bonds in
15 different bond rating classes, another way to look at Ms. Crane's drastic return
16 adjustment it is that Delmarva's bonds would have to be upgraded by several
17 notches from Baa2 to AAA to account for the 206 basis points reduction in risk.
18 This scenario is unlikely and quite outside the bounds of reasonableness.

19 **89. Q. IS THIS ADJUSTMENT CONSISTENT WITH REGULATORY**
20 **DECISIONS?**

21 A. No, it is not. I am not aware of any adjustment of such outlandish magnitude by
22 any other regulatory commission. Ms. Crane's draconian downward ROE
23 adjustment of 206 basis points should be rejected by the Commission. As fully

discussed in my Direct Testimony, a far more reasonable adjustment would be approximately 25 basis points, based on: 1) utility bond yield spread differentials between A-rated and Baa-rated bonds, and 2) observed beta differentials.

CONCLUSIONS

90. Q. WHAT DO YOU CONCLUDE FROM MS. CRANE'S COST OF CAPITAL TESTIMONY?

A. My general conclusion is that there are many infirmities in Ms. Crane's methodology in arriving at her ROE recommendation. Her recommendation of 9.58% rests heavily (75% weight) on the questionable results of her DCF analysis. I also conclude that Ms. Crane's recommended 9.58% ROE for the Company is outside the zone of currently authorized ROEs for major energy utilities in the United States and for her own sample of comparable risk utilities, and would be among the lowest, if adopted. Her recommendation of 7.58% with SFV is so outrageous and unjustified that it cannot be taken seriously.

As shown in the summary table below, my specific conclusions on Ms. Crane's DCF analysis are that it is understated by: (i) 30 basis points from the omission of an appropriate flotation cost allowance; (ii) 15 basis points from the understatement of growth in the dividend yield component due to the use of an improper DCF functional form; and (iii) 90 basis points from failure to use analysts' consensus growth forecasts. Her total DCF understatement of the Company's ROE from these sources alone is approximately 135 basis points, increasing Ms. Crane's recommended DCF estimates from 9.93% to slightly above 11.0%.

DCF Errors

Source	Basis Points
DCF Dividend Yield	15
Flotation Cost Allowance	30
Analysts' Growth Forecast	90

With respect to the CAPM analysis on which she places 25% weight, Ms. Crane's CAPM result is understated by 0.9% from using the wrong MRP, raising her CAPM estimate from 8.53% to 9.7%.

Weighting the corrected DCF estimate of 11% and the corrected CAPM estimate of 9.7% by 75% and 25% respectively, her overall corrected results strongly suggest a ROE recommendation not so significantly different from the Company's requested ROE.

III. REBUTTAL OF MR. GORMAN'S TESTIMONY

91. Q. PLEASE SUMMARIZE THE RECOMMENDED ROE OF MR. GORMAN.

A. Mr. Gorman recommends an ROE for Delmarva of 9.9%, which is the midpoint of Mr. Gorman's range of 9.7% – 10.1%. Mr. Gorman performs three DCF analyses, the results of which are summarized in table form on page 27 of his direct testimony. First, he applies a standard constant growth DCF analysis to two groups of comparable investment-grade electric utilities. The standard DCF analysis for the proxy companies produces an ROE estimate of 10.23%. Second, he applies a sustainable growth DCF model to the same groups of companies, and derives an estimate of 10.24%. Third, Mr. Gorman implements a three-stage DCF analysis that produces an ROE estimate of 9.84% as shown in table form on page

27 of his testimony.

As summarized on page 31, lines 13-18, Mr. Gorman also applies a Risk Premium analysis based on the difference between the ROEs authorized by regulatory bodies and the contemporaneous level of interest rates. This analysis produces an authorized risk premium in the range of 4.40% to 6.08% over the yield on long-term Treasury bonds. Adding the forecast long-term bond yield of 5.2% to that risk premium range produces an ROE in the range of 9.60% – 11.28%, with a midpoint estimate of 10.44%. Repeating the same process using Moody's utility bond yields instead of Treasury bond yields, Mr. Gorman obtains an ROE in the range of 8.74% to 10.15%, with a midpoint of 9.45%.

Finally, Mr. Gorman applies a CAPM analysis to the same two groups of electric utilities and obtains an ROE in the range of 9.59% to 9.80%, with a midpoint of 9.70%. This is shown on page 37 lines 1-5 of his direct testimony.

92. Q. PLEASE SUMMARIZE YOUR SPECIFIC CRITICISMS OF THE ROE RECOMMENDED BY MR. GORMAN.

A. Although I agree with several of the procedures and methodologies employed by Mr. Gorman, I have the following criticisms:

1. Mr. Gorman understates its recommended return on equity by approximately 30 basis points because it does not allow for flotation costs and, as a result, leaves a legitimate expense unrecovered.

2. There are inconsistencies in Mr. Gorman's views on DCF methodologies

3. There are logical inconsistencies in the sustainable growth method used by Mr. Gorman in his second DCF analysis, and the method is the least empirically and theoretically valid.

4. Mr. Gorman inappropriately uses medium-term growth rate forecasts (the next five/ten years) instead of the long-term Gross Domestic Product ("GDP") growth rate in the DCF model, which is perpetual in nature and understates his DCF analysis by 90 basis points.

5. Mr. Gorman erroneously relies upon the plain vanilla version of the CAPM, a model known to understate return requirements for low beta firms, such as Delmarva.

6. Mr. Gorman improperly relies upon total returns on government bonds for his MRP. Mr. Gorman understates his CAPM analysis by approximately 60 basis points by improperly relying upon *total* returns on government bonds for the MRP in his CAPM analysis instead of relying upon the income component of returns.

7. Mr. Gorman's risk premium analysis fails to account for the inverse behavior between authorized risk premiums and interest rates, understating his Risk Premium estimates by 50 basis points.

ITEM #1 FLOTATION COSTS

93. Q. WHAT ALLOWANCE FOR FLOTATION COSTS DOES MR. GORMAN MAKE WITH RESPECT TO ITS RECOMMENDED RETURN ON EQUITY FOR DELMARVA?

A. Mr. Gorman Counsel fails to include any allowance whatsoever for flotation costs in its recommended return on equity for Delmarva. As previously discussed, all of Mr. Gorman's estimates are therefore downward-biased by approximately 30 basis points.

94. Q. WHY DOES MR. GORMAN FAIL TO INCLUDE ANY ALLOWANCE FOR FLOTATION COSTS IN ITS RECOMMENDED RETURN ON EQUITY FOR DELMARVA?

A. On page 52 lines 1-22 of his testimony, Mr. Gorman recognizes the legitimacy of

1 common stock issuance costs but objects to a flotation cost adjustment on the
2 grounds that that it should be based only on known and measurable common stock
3 expenses.

4 To base a flotation cost allowance on a one-company sample, although
5 company-specific, would not provide a sufficiently reliable statistical and economic
6 basis to infer a utility's appropriate flotation cost allowance. Although it may be
7 conceptually correct to rely on the particular company circumstances in quantifying
8 the flotation cost allowance, it is not a practical alternative. The flotation cost
9 allowance is a weighted average cost factor designed to capture the average cost of
10 various equity vintages and types of equity capital raised by the company.

11 As an additional practical matter, the market pressure effect is difficult to
12 measure accurately for a specific issue. This is because one must disentangle the
13 downward effect on stock price resulting from the increased supply of stock from
14 the effect of general movement in the stock market. One must also measure the
15 actual stock price following a common stock issue in relation to a hypothetical
16 benchmark price without the issue over some arbitrary period. This can be
17 performed more reliably and more rigorously using a sample of utility stock
18 offerings.

19 Mr. Gorman also argues that Delmarva is not a publicly-traded company and
20 infers that Delmarva's flotation costs are born by the parent, PHI, and not Delmarva
21 itself. This objection is unfounded because the parent-subsidiary relationship does
22 not eliminate the costs of a new issue, but merely transfers them to the parent. Fair

1 treatment must consider that if the utility subsidiary had gone to the capital
2 marketplace directly, flotation costs would have been incurred.

3 **ITEM #2 INCONSISTENCIES IN DCF ANALYSES.**
4
5 **95. Q. DID YOU DETECT ANY INCONSISTENCIES IN MR. GORMAN'S**
6 **VIEWS ON THE DCF MODEL?**
7 A. Yes, I did. On page 16 lines 17-21, Mr. Gorman states that he believes that his
8 constant growth DCF model based on analysts' growth is not reasonable because
9 such projections are not reasonable estimates of long-term sustainable growth.
10 Yet, Mr. Gorman uses those same growth rates in the first stage of his three-stage
11 DCF analysis. I note that Mr. Gorman's average growth estimate of 5.5% in his
12 conventional DCF analysis (page 19, line 9) is virtually identical to the long-term
13 growth rate of the overall U.S. economy as I discuss later, and therefore quite
14 consistent with Mr. Gorman's position that DCF growth rates should track those
15 of the U.S. economy. Therefore, Mr. Gorman is incorrect in his statement on page
16 20 lines 2 - 4 that his DCF growth rates based on analysts' forecasts overstate
17 DCF return estimates because they exceed the expected long-term growth of the
18 U.S. GDP.

19 **ITEM #3 SUSTAINABLE GROWTH METHODOLOGY**
20 **96. Q. DOES MR. GORMAN USE ANY SUSTAINABLE GROWTH RATE**
21 **CALCULATIONS?**
22 A. Yes. On pages 23-24 and on Schedules MPG-10 and MPG-11, Mr. Gorman
23 applies the sustainable growth approach to two comparable groups of companies
24 as the second of his three DCF methodologies.

1 **97. Q. WHAT IS THE SUSTAINABLE GROWTH RATE TECHNIQUE USED BY**
2 **MR. GORMAN TO IMPLEMENT THE DCF MODEL?**
3 A. In the sustainable growth method, the internal growth rate forecast is based on the
4 equation g = b(ROE), where b is the percentage of earnings retained and ROE is
5 the expected rate of return on book equity. Mr. Gorman also accounts for the
6 impact of external stock financing on growth by adding an external growth term
7 (g = sv) as shown on the last column of Schedules MPG-11.
8 **98. Q. IS THE SUSTAINABLE GROWTH METHODOLOGY AN**
9 **APPROPRIATE TECHNIQUE TO IMPLEMENT THE DCF MODEL IN**
10 **THIS PROCEEDING?**
11 A. No, it is not. As I discussed earlier in my rebuttal of Mr. Rothschild I disagree
12 with the sustainable growth technique for four reasons: 1) the method is logically
13 circular, 2) it is inconsistent with the empirical evidence as demonstrated in
14 academic research, 3) the potential lack of representativeness of Value Line's
15 forecasts as proxies for the market consensus, and 4) a technical error resulting
16 from Value Line's use of year end book values to compute forecasted ROE's.
17 The latter results in a 10 basis points understatement.
18 **ITEM #4 THREE-STAGE DCF AND LONG-TERM GROWTH**
19 **99. Q. DO YOU AGREE WITH MR. GORMAN'S THREE-STAGE DCF**
20 **ANALYSIS?**
21 A. Although I generally agree with the validity of the three-stage DCF methodology
22 when it is properly applied, and agree with Mr. Gorman's input data for the first
23 growth stage, I disagree with the key input data Mr. Gorman uses in the third

growth stage, the long-term growth estimate. Mr. Gorman bases the latter on the Blue Chip Economic Indicators consensus economic projections of GDP growth of 4.9% over the 2016-2020 period, a five-year period.

100.Q. WHAT IS THE BASIS FOR YOUR DISAGREEMENT WITH MR. GORMAN'S USE OF THOSE PROJECTIONS?

A. Mr. Gorman should have compared the utility growth rate forecasts with the historical long-term growth of the economy as a whole and/or the long-range growth forecasts in GDP projected for the very long-term. Mr. Gorman's comparison to a relatively short period -term growth rate forecast just five years -- 2016-2020 is inappropriate because the growth term of the DCF model is *perpetual* in nature.

A long-term forecast of nominal growth in GDP can be formulated by combining a long-term inflation estimate with a long-term real growth rate forecast, and the long-term expected GDP nominal growth is approximately 5.8% (3.3% + 2.5% = 5.8%). It should be noted that Morningstar's *Stocks, Bond, Bills and Inflation 2009 Yearbook Valuation Edition,* the same source used by Mr. Gorman to justify his claim that a company's earnings/dividends growth cannot exceed that of the U.S. GDP, uses 3.3% as its estimate of the U.S. economy's real long-term growth rate. Coupled with the 2.5% expected inflation over the long-term, the nominal growth rate of the U.S. economy is 5.8% and not the 4.9% used by Mr. Gorman.

101.Q. HOW WOULD MR. GORMAN'S DCF RESULTS CHANGE IF THE APPROPRIATE LONG-TERM GDP GROWTH FORECAST IS USED IN THE THREE-STAGE DCF ANALYSIS?

A. Use of the GDP long-term growth forecast of 5.8% in Mr. Gorman's second-stage DCF analysis instead of the medium-term forecast of 4.9% would raise Mr. Gorman's multi-stage DCF estimate by approximately 90 basis points, from 9.84% to 10.74%.

ITEM #5 CAPM UNDERSTATMENT

102.Q. DOES MR. GORMAN'S CAPM ANALYSIS UNDERSTATE A FAIR ROE FOR DELMARVA?

A. Yes. As discussed in my direct testimony and supporting exhibits, empirical evidence demonstrates that the plain vanilla CAPM understates the cost of capital for low-beta securities, such as electric utilities, and overstates the return from high-beta securities. Mr. Gorman's use of the plain vanilla CAPM understates the ROE for Delmarva by approximately 50 basis points.

103.Q. PLEASE COMMENT ON MR. GORMAN'S ASSESSMENT OF THE EMPIRICAL CAPM USED IN YOUR TESTIMONY.

A. On page 46 lines 1-3, Mr. Gorman asserts, without support, that the Empirical CAPM "analysis significantly overstates a utility company-specific risk premium for use in a risk premium analysis." Mr. Gorman offers no argument, foundation, or literature references to buttress this claim.

Mr. Gorman further asserts on page 46 lines 21-24 that use of Value Line's "adjusted" betas with an Empirical CAPM analysis double-counts the

effect of changing the slope of the capital market line. This is incorrect. Contrary to such a suggestion, the Empirical CAPM is not an adjustment (increase or decrease) in beta. Instead, the Empirical CAPM is a formal recognition empirical evidence demonstrates that the observed risk-return tradeoff is flatter than predicted by the CAPM.

The Empirical CAPM and the use of adjusted betas comprise two separate features of asset pricing. Assuming *arguendo* a company's beta is estimated accurately, the CAPM will still understate the return for low-beta stocks. Furthermore, if a company's beta is understated, the Empirical CAPM will also understate the return for low-beta stocks. Both adjustments are necessary.

The graph on page 31 of my pre-filed direct testimony demonstrates that the Empirical CAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment.

Moreover, Mr. Gorman is incorrect when he states that the use of adjusted betas in the plain CAPM is equivalent to the use of raw unadjusted betas in the Empirical CAPM. This is because the use of adjusted betas compensates for interest rate sensitivity of utility stocks not captured by raw unadjusted betas.

With respect to the validity of the plain vanilla CAPM, empirical studies of the CAPM to determine to what extent security returns and betas are related in the manner predicted by the CAPM have supported the conclusion that (i) beta is related to security returns, (ii) the risk-return tradeoff is positive, and (iii) the relationship is linear. The contradictory finding is that the risk-return tradeoff is not as steeply sloped as predicted by CAPM. In other words, low-beta securities

earn returns somewhat higher than the CAPM would predict, and high-beta securities earn returns somewhat less the CAPM would predict.

In sum, a plain vanilla CAPM will understate the return required for low-beta securities and overstate the return required for high-beta securities. The Empirical CAPM refines the plain vanilla CAPM to account for this phenomenon.

ITEM # 6 MARKET RISK PREMIUM ESTIMATE

104.Q. IS MR. GORMAN'S USE OF A HISTORICAL MRP OF 5.7% FOR THE CAPM APPROPRIATE?

A. No. The historical MRP of 5.7% cited by Mr. Gorman on page 35 lines 5-10 is based on the difference between stock returns and total bond returns. The more accurate way to estimate the MRP from historic data is to use the *income* return, not *total* returns, on government bonds. The long-term (1926-2008) MRP based on *income* returns is 6.5%, rather than 5.7%. Correction of this error alone increases Mr. Gorman's low CAPM estimates by 57 and 60 basis points, that is, the product of (i) the difference between 6.5% and 5.6% and (ii) Mr. Gorman's betas of 0.72 and 0.75. As a result of this correction, the low end of Mr. Gorman's range CAPM estimates increases from 9.59% - 9.80% to 9.88% - 10.10%. His midpoint of 9.70% becomes 9.99%.

ITEM #7 RISK PREMIUM ANALYSIS

105.Q. PLEASE DESCRIBE MR. GORMAN'S AUTHORIZED RISK PREMIUM ANALYSIS.

A. Mr. Gorman on page 28 lines 10-25 examines the historical risk premiums implied in the returns on equity authorized by regulatory commissions for electric

1 utilities over the period 1986-2009, relative to the contemporaneous level of long-
2 term Treasury bond yields and relative to the level of "A" rated utility bond
3 yields. As shown on page 29 of his testimony, Mr. Gorman then derives an
4 authorized risk premium in the range of 4.40% – 6.08% over long-term Treasury
5 yields by cherry picking 18 of the 24 observations, and in the range of 3.03% –
6 4.44% over Moody's utility bond yield.

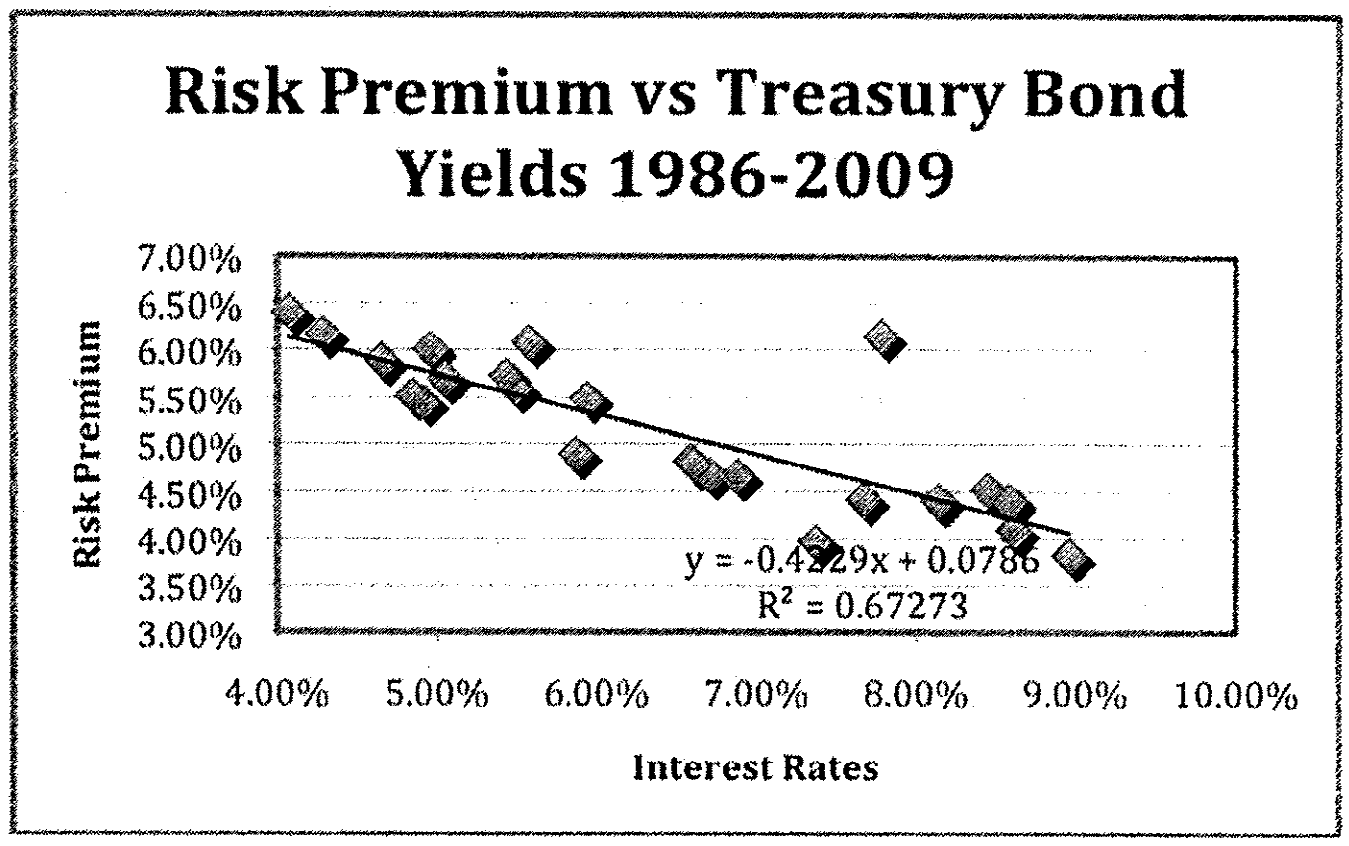
7 Use of the projected long-term Treasury bond yield of 5.2% and a
8 Treasury bond risk premium of 4.40% to 6.08% produces an estimated common
9 equity return in the range of 9.60% to 11.28%, with a midpoint estimate of
10 10.44%. The addition of the utility bond yield of 5.71% to the utility equity risk
11 premium of 3.03% – 4.44% produces an estimated range of ROE of 8.74% –
12 10.15%, with a midpoint estimate of 9.45%. *See* Pages 31-32 of Mr. Gorman's
13 direct testimony.

14 In summary, Mr. Gorman's risk premium analyses produce an ROE
15 estimate in the range of 9.45% – 10.44% with a midpoint estimate of 9.95%
16 (page 32, lines 3-4.)

17 **106.Q. DO YOU AGREE WITH MR. GORMAN'S AUTHORIZED RISK**
18 **PREMIUM ANALYSIS?**

19 A. No, I disagree. A careful review of ROE decisions relative to interest rates
20 reported in Schedules MPG-14 and MPG-15 reveals an inverse relationship
21 between authorized risk premiums and interest rates for which Mr. Gorman fails
22 to account. In other words, the authorized risk premium decreases when interest

rates are high and increases when interest rates are low, as displayed on the graph below:



The following statistical relationship between the risk premium and Treasury bond yields emerges over the 1986-2009 period:

$$RP = 7.86 - 0.4229\ YIELD \qquad R^2 = 0.67$$

The relationship is statistically significant as indicated by the high R^2. Inserting Mr. Gorman's long-term Treasury bond yield of 5.2% in the above equation suggests an authorized risk premium estimate of 5.7%, and not the 5.16% which Mr. Gorman reports on page 29 line 5 and on Schedule MPG-14. Use of the proper allowed risk premium of 5.7% would result in an authorized ROE of 10.9% (5.2% + 5.7%) for Delmarva instead of Mr. Gorman's 10.44% estimate. In short, Mr. Gorman's result from this method is understated by approximately 50 basis points. The same result prevails when using utility bond yields instead of Treasury bond yields.

1 **107.Q. DO YOU HAVE A COMMENT ON MR. GORMAN'S LACK OF**

2 **CONSISTENCY FROM TESTIMONY TO TESTIMONY?**

3 A. Yes, I do. In Mr. Gorman's CAPM analysis, I found it curious that Mr. Gorman

4 in Schedule MPG-18 reports only current betas for the electric utilities in his

5 samples whereas in past testimonies, at a time when betas were increasing (which

6 would have the effect of lowering his ROE estimates), Mr. Gorman reported a five

7 year history of beta estimates and used the increase in betas to argue that his use

8 of current betas were conservative.[10] In this case, however, Mr. Gorman only

9 reports current betas at a time when betas are decreasing (which would have the

10 effect of raising his ROE estimates). As shown in the table below, betas for the

11 sample utilities have fallen in recent times due to the turmoil in financial markets

12 rather than due to a change in the inherent risk in electric utilities. Therefore, to

13 be consistent with Mr. Gorman's past testimony, reliance on current betas is

14 anything but conservative. Instead, reliance on current betas alone is aggressive;

15 that is, it artificially lowers Mr. Gorman's ROE estimates. Mr. Gorman is silent

16 on this issue. The change in betas is further evidence that the CAPM results

17 currently should be viewed with some degree of skepticism, and are likely to be

18 downward biased as I indicated in my direct testimony.

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[10] See, for example, Schedule MPG-14 in Direct Testimony and Schedules of Michael P. Gorman in Case No. ER-2008-0093, Empire District Electric Company, Missouri.

	2005	2006	2007	2008	Gorman
ALLETE		0.9	0.95	0.85	0.7
Allegheny Energy	1.75	1.95	2.1	1.1	0.95
Alliant Energy	0.85	0.9	0.9	0.8	0.7
Amer. Elec. Power	1.2	1.25	1.15	0.85	0.7
Ameren Corp.	0.75	0.75	0.8	0.8	0.8
CMS Energy Corp.	1.4	1.55	1.55	0.95	0.8
Cleco Corp.	1.15	1.25	1.35	0.9	0.65
DPL Inc.	0.95	0.95	0.9	0.75	0.6
DTE Energy	0.7	0.75	0.8	0.75	0.75
Duke Energy				0.6	0.65
Edison Int'l	1.05	1.15	1.05	0.85	0.8
Empire Dist. Elec.	0.7	0.8	0.85	0.8	0.75
Entergy Corp.	0.75	0.85	0.85	0.8	0.7
Exelon Corp.	0.75	0.8	0.9	0.85	0.85
FPL Group	0.75	0.85	0.8	0.8	0.75
FirstEnergy Corp.	0.75	0.8	0.9	0.75	0.8
G't Plains Energy	0.85	0.9	0.85	0.75	0.75
Hawaiian Elec.	0.7	0.7	0.7	0.75	0.7
IDACORP Inc.	0.95	1	1	0.85	0.7
PG&E Corp.	1.1	1.15	0.95	0.85	0.55
Pepco Holdings	0.9	0.85	0.9	0.9	0.8
Portland General				0.7	0.7
Progress Energy	0.85	0.85	0.95	0.75	0.65
Public Serv. Enterprise	0.85	0.95	0.95	0.85	0.8
Southern Co.	0.65	0.65	0.75	0.65	0.55
TECO Energy	0.95	1.05	1.1	0.85	0.85
Westar Energy	0.85	0.9	0.9	0.85	0.75
Wisconsin Energy	0.7	0.8	0.8	0.75	0.65
Xcel Energy Inc.	0.8	0.9	1.05	0.75	0.65
Average	0.91	0.97	0.99	0.81	0.73

Source: Value Line, January 2010 and Gorman Schedule MPG-18.

108.Q. WHAT DO YOU CONCLUDE FROM MR. GORMAN'S TESTIMONY?

A. Mr. Gorman understates Delmarva's cost of common equity by nearly 100 basis points. The first column of the table below shows Mr. Gorman's original results from various methodologies along with the corrected results in the last column.

Method	Original Estimates (1)	Corrected Estimates (2)	Flotation Cost Adj't (3)	Final Correct Estimate (4)
Constant DCF	10.23	10.23	0.30	10.53
Sustn'ble DCF	10.24	10.34	0.30	10.64
3-Stage DCF	9.84	10.74	0.30	11.04
RP	10.44	10.94	0.30	11.24
RP	9.45	10.24	0.30	10.54
CAPM	9.70	10.30	0.30	10.60
AVERAGE	**9.98**	**10.46**	**0.30**	**10.76**

The original results average 9.98%. The sustainable DCF results have been augmented by 10 basis points for a minor technical error, while the 3-Stage Results are increased by 90 basis points in order to correct for the choice of the wrong long-term GDP growth rate. The Risk Premium results are increased by 50 basis points in order to account for the inverse relationship between interest rates and risk premiums. The CAPM result is increased by 29 basis points because of the wrong choice of historical MRP, and by 50 basis points to account for the empirical relationship between risk and return. All the results are increased by 30 basis points to account for flotation costs. The correct overall result is 10.76% versus Mr. Gorman's original average of 9.98%. In short, Mr. Gorman should have recommended an ROE of 10.76%.

109.Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.