

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy Ohio, Inc., for the Establishment of a Charge Pursuant to Revised Code Section 4909.18.)	Case No. 12-2400-EL-UNC
)	
In the Matter of the Application of Duke Energy Ohio, Inc., for Approval to Change Accounting Methods.)	Case No. 12-2401-EL-AAM
)	
In the Matter of the Application of Duke Energy Ohio, Inc., for the Approval of a Tariff for a New Service.)	Case No. 12-2402-EL-ATA
)	

REBUTTAL TESTIMONY OF

JAMES H. VANDER WEIDE, PH.D.,

ON BEHALF OF

DUKE ENERGY OHIO, INC.

_____	Management policies, practices, and organization
_____	Operating income
_____	Rate Base
_____	Allocations
<u> X </u>	Rate of return
_____	Rates and tariffs
_____	Other: Drivers for rate request

May 13, 2013

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I. INTRODUCTION AND PURPOSE

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

2 A. My name is James H. Vander Weide. I am Research Professor of Finance and
3 Economics at Duke University, The Fuqua School of Business. I am also
4 President of Financial Strategy Associates, a firm that provides strategic and
5 financial consulting services to business clients. My business address is
6 3606 Stoneybrook Drive, Durham, North Carolina 27705.

7 **Q. ARE YOU THE SAME JAMES H. VANDER WEIDE WHO PROVIDED**
8 **DIRECT TESTIMONY IN THESE PROCEEDINGS?**

9 A. Yes, I am.

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

11 A. I have been asked by Duke Energy Ohio, Inc., (Duke Energy Ohio or Company)
12 to respond to the direct testimony and cost of equity recommendation of Dr. J.
13 Randall Woolridge presented on behalf of the Office of the Ohio Consumers'
14 Counsel (OCC).

15 **Q. WHAT IS DR. WOOLRIDGE'S RECOMMENDED RATE OF RETURN**
16 **ON EQUITY FOR DUKE ENERGY OHIO?**

17 A. Dr. Woolridge recommends that Duke Energy Ohio be allowed to earn a rate of
18 return on equity (ROE) in the range of 4.11 percent to 8.75 percent.

19 **Q. WHAT AREAS OF DR. WOOLRIDGE'S TESTIMONY WILL YOU**
20 **ADDRESS IN YOUR REBUTTAL TESTIMONY?**

21 A. I will address Dr. Woolridge's: (1) use of the Company's long-term debt cost rate
22 as the low end of his ROE range; (2) comparable companies; (3) discounted cash

1 flow (DCF) analysis; (4) comments on analysts' growth forecasts; (5) Capital
2 Asset Pricing Model (CAPM) analysis; and (6) comments on my direct testimony.

**II. USE OF THE COMPANY'S COST OF LONG-TERM DEBT AS THE
LOW END OF THE RECOMMENDED ROE RANGE**

3 **Q. WHAT IS DR. WOOLRIDGE'S RECOMMENDED RANGE FOR THE**
4 **COMPANY'S ROE IN THESE PROCEEDINGS?**

5 A. Dr. Woolridge uses the Company's 4.11 percent embedded cost of debt as the low
6 end of his recommended ROE range and his 8.75 percent estimate of the
7 Company's cost of equity as the high end of his recommended ROE range.

8 **Q. HOW DOES DR. WOOLRIDGE JUSTIFY HIS USE OF THE**
9 **COMPANY'S COST OF DEBT AS THE LOW END OF HIS ROE**
10 **RANGE?**

11 A. Dr. Woolridge claims that the Company's 4.11 percent cost of long-term debt is
12 an appropriate low end for his ROE range because: (1) "Duke Energy Ohio is
13 claiming deteriorating financial integrity based on projected ROEs in this
14 proceeding"; and (2) "if the Commission concludes that the financial integrity
15 claim (based on the projected ROE claimed by Duke) is in effect an emergency
16 rate increase, then there is a precedent for using the long-term debt cost rate as the
17 ROE." [Woolridge Direct at 14.]

18 **Q. IS THE COMPANY FILING THIS CASE AS AN EMERGENCY RATE**
19 **CASE?**

20 A. No. As described in its Application, the Company initiated this case to seek just
21 and reasonable cost-based compensation for its Fixed Resource Requirement
22 (FRR) capacity obligations in Ohio.

1 **Q. IS THERE AN APPROPRIATE STANDARD FOR DETERMINING A**
2 **JUST AND REASONABLE COST-BASED COMPENSATION FOR THE**
3 **COMPANY'S FRR CAPACITY OBLIGATIONS IN OHIO?**

4 **A.** Yes. As described in my direct testimony, the fair rate of return standard requires
5 that investors be allowed an opportunity to earn a return on the equity portion of
6 their investment in the generation assets that have been committed to Duke
7 Energy Ohio's provision of capacity services as an FRR entity that is
8 commensurate with returns on other equity investments of similar risk [Vander
9 Weide Direct at 6 – 10].

10 **Q. IS THE COMPANY'S 4.11 PERCENT COST OF DEBT JUST AND**
11 **REASONABLE COST-BASED COMPENSATION FOR THE EQUITY**
12 **COMPONENT OF THE COMPANY'S INVESTMENT IN THE**
13 **GENERATION ASSETS REQUIRED TO PROVIDE FRR CAPACITY**
14 **OBLIGATIONS IN OHIO?**

15 **A.** No. On the basis of the cost of equity studies described in my direct testimony,
16 4.11 percent is far below a reasonable range of cost of equity estimates. Based on
17 standard cost of equity estimating techniques, I find that the Company's required
18 rate of return on equity is in the range 10.7 percent to 12.6 percent. Furthermore,
19 the Company has informed me that the Public Utilities Commission of Ohio
20 (Commission) has approved a cost-based charge for the capacity services of Ohio
21 Power Company (AEP Ohio) that incorporates an ROE equal to 11.15 percent.
22 Both AEP Ohio and Duke Energy Ohio are FRR entities with similar obligations
23 to self-supply capacity for their Load Zones, and AEP Ohio and Duke Energy
24 Ohio co-own generating assets used to fulfill their capacity commitments. Thus,

1 the conclusion that Dr. Woolridge's 4.11 percent to 8.75 percent ROE range is
2 unreasonable is also supported by the Commission's prior decision for a similarly
3 situated Ohio utility.

III. COMPARABLE COMPANIES

4 **Q. YOU NOTE IN YOUR DIRECT TESTIMONY THAT YOU WERE ASKED**
5 **TO ASSESS THE REASONABLENESS OF DUKE ENERGY OHIO'S**
6 **11.15 PERCENT RATE OF RETURN ON EQUITY IN THESE**
7 **PROCEEDINGS. HOW DID YOU ASSESS THE REASONABLENESS OF**
8 **THE COMPANY'S REQUEST?**

9 A. I assessed the reasonableness of the Company's request by estimating the cost of
10 equity for: (1) a group of publicly traded electric utilities; and (2) a group of
11 publicly traded pipeline companies with regulated natural gas and/or oil pipeline
12 operations.

13 **Q. WHY DO YOU ESTIMATE THE COST OF EQUITY FOR TWO GROUPS**
14 **OF COMPANIES, RATHER THAN SIMPLY ESTIMATING THE COST**
15 **OF EQUITY FOR A GROUP OF ELECTRIC UTILITIES?**

16 A. As discussed in my direct testimony, I estimate the cost of equity for two groups
17 of companies because this case involves the appropriate ROE for the generation
18 assets Duke Energy Ohio has committed to fulfill its obligation as an FRR entity
19 in the PJM Interconnection, Inc. (PJM). Because an investment in Duke Energy
20 Ohio's generation assets is more risky than an investment in my group of publicly
21 traded regulated electric utilities, I also apply my cost of equity methods to a
22 group of publicly traded pipeline companies that operate in both competitive and
23 regulated markets. By estimating the cost of equity for both groups of companies,

1 I obtain a reasonable range of estimates for the cost of equity for Duke Energy
2 Ohio's investment in its generation assets.

3 **Q. DOES DR. WOOLRIDGE AGREE WITH YOUR STATEMENT THAT**
4 **THIS CASE INVOLVES THE APPROPRIATE ROE FOR THE**
5 **GENERATION ASSETS DUKE ENERGY OHIO HAS COMMITTED TO**
6 **FULFILL ITS OBLIGATIONS AS AN FRR ENTITY IN PJM?**

7 A. No. Dr. Woolridge argues that the cost of capital in these proceedings "must be
8 based on Duke Energy Ohio as a whole, and not just on the generation assets of
9 Duke Energy Ohio." [Woolridge Direct at 12.]

10 **Q. WHY DOES DR. WOOLRIDGE BELIEVE THAT THE COST OF**
11 **CAPITAL IN THESE PROCEEDINGS MUST BE BASED ON THE RISK**
12 **OF DUKE ENERGY OHIO AS A WHOLE, NOT ON THE RISK OF DUKE**
13 **ENERGY OHIO'S GENERATION ASSETS?**

14 A. Dr. Woolridge argues that: (1) the Company has not transferred its generation
15 assets into a legally separate entity; (2) the Company will not be subject to
16 competitive market pricing if its request in these proceedings is approved; and
17 (3) investors in Duke Energy Ohio are only interested in the risks of Duke Energy
18 Ohio as an integrated entity [Woolridge Direct at 12].

19 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S ARGUMENTS FOR**
20 **BASING THE COST OF CAPITAL ON THE RISK OF DUKE ENERGY**
21 **OHIO AS A WHOLE, RATHER THAN ON THE RISK OF DUKE**
22 **ENERGY OHIO'S GENERATION ASSETS?**

23 A. No. First, according to the principles of finance, the cost of equity depends on the
24 risk of the equity investment, not on the risk of the legal entity that owns the

1 investment. Because the cost-based charge in these proceedings is related to Duke
2 Energy Ohio's investment in the generation assets the Company has committed to
3 fulfill its FRR obligations, the cost of equity must be based on the risk of
4 investing in these generation assets.

5 Second, the Company's request in these proceedings relates only to its
6 investment in its generation assets over the three-year period ending May 31,
7 2015. However, the Company's generation assets have a physical life extending
8 well beyond 2015, and the risk of investing in these assets extends over the life of
9 the assets—not merely to the period ending May 31, 2015.

10 Third, in addition to serving its customers, Duke Energy Ohio has an
11 obligation to act in the best interests of its owners. Duke Energy Ohio will only
12 act in the best interests of its owners if the Company chooses projects with
13 expected returns that exceed the projects' costs of capital. Thus, Duke Energy
14 Ohio will have no incentive to invest in its generation assets if the expected return
15 on its generation assets is insufficient to compensate for the risk of investing in
16 these assets.

17 **Q. WHY IS THE LONG PHYSICAL LIFE OF THE COMPANY'S**
18 **GENERATION ASSETS RELEVANT IN THESE PROCEEDINGS?**

19 A. The long physical life of the Company's generation assets is relevant because it
20 affects the risk of investing in the generation assets required to provide capacity
21 services. Although the Company's cost-based charge requested in these
22 proceedings will extend only to May 31, 2015, the assets required to produce
23 capacity services until that time have a physical life that extends well beyond
24 2015. The Company cannot incur the risk of investing in its generation assets for

1 the period ending May 31, 2015, without also incurring the risk of investing in
2 these assets over their much longer useful life.

IV. DISCOUNTED CASH FLOW (DCF) MODEL

3 **Q. DOES DR. WOOLRIDGE USE THE DCF MODEL TO ESTIMATE DUKE**
4 **ENERGY OHIO'S COST OF EQUITY?**

5 A. Yes, he does.

6 **Q. WHAT COST OF EQUITY RESULT DOES DR. WOOLRIDGE OBTAIN**
7 **FROM HIS APPLICATION OF HIS DCF MODEL?**

8 A. Dr. Woolridge obtains a cost of equity result of 8.9 percent for his comparable
9 group [Woolridge Exhibit JRW-7, page 1].

10 **Q. WHAT DCF MODEL DOES DR. WOOLRIDGE USE TO ESTIMATE**
11 **DUKE ENERGY OHIO'S COST OF EQUITY?**

12 A. Dr. Woolridge uses an annual DCF model of the form, $k = D_0(1+.5g)/P_0 + g$,
13 where k is the cost of equity, D_0 is the first period dividend, P_0 is the current stock
14 price, and g is the average expected future growth in the company's earnings and
15 dividends.

16 **Q. WHAT ARE THE BASIC ASSUMPTIONS OF DR. WOOLRIDGE'S**
17 **ANNUAL DCF MODEL?**

18 A. Dr. Woolridge's annual DCF model is based on the assumptions that: (1) a
19 company's stock price is equal to the present value of the future dividends
20 investors expect to receive from their investment in the company; (2) dividends
21 are paid annually; (3) dividends, earnings, and book values are expected to grow
22 at the same constant rate forever; and (4) the first dividend is received one year
23 from the date of the analysis.

1 **Q. DO YOU AGREE WITH DR. WOOLRIDGE’S USE OF AN ANNUAL DCF**
2 **MODEL TO ESTIMATE DUKE ENERGY OHIO’S COST OF EQUITY?**

3 A. No. Dr. Woolridge’s annual DCF model is based on the assumption that
4 companies pay dividends only at the end of each year. Since Dr. Woolridge’s
5 comparable companies all pay dividends quarterly, Dr. Woolridge should have
6 used the quarterly DCF model to estimate Duke Energy Ohio’s cost of equity.

7 **Q. WHY IS IT UNREASONABLE TO USE AN ANNUAL DCF MODEL TO**
8 **ESTIMATE THE COST OF EQUITY FOR COMPANIES THAT PAY**
9 **DIVIDENDS QUARTERLY?**

10 A. It is unreasonable to apply an annual DCF model to companies that pay dividends
11 quarterly because: (1) the DCF model is based on the assumption that a
12 company’s stock price is equal to the present value of the expected future
13 dividends associated with investing in the company’s stock; and (2) the annual
14 DCF model cannot be derived from this assumption when dividends are paid
15 quarterly.

16 **Q. DOES DR. WOOLRIDGE ACKNOWLEDGE THAT ONE MUST**
17 **RECOGNIZE THE ASSUMPTIONS OF THE DCF MODEL WHEN**
18 **ESTIMATING THE MODEL’S INPUTS?**

19 A. Yes. Dr. Woolridge states, “In general, one must recognize the assumptions under
20 which the DCF model was developed in estimating its components (the dividend
21 yield and expected growth rate).” [Woolridge Direct at 37.]

1 **Q. RECOGNIZING YOUR DISAGREEMENT WITH DR. WOOLRIDGE'S**
2 **USE OF AN ANNUAL DCF MODEL, DID DR. WOOLRIDGE APPLY**
3 **THE ANNUAL DCF MODEL CORRECTLY?**

4 A. No. Dr. Woolridge's annual DCF model is based on the assumption that dividends
5 will grow at the same constant rate forever. Under the assumption that dividends
6 will grow at the same constant rate forever, the cost of equity is given by the
7 equation, $k = D_0 (1 + g) / P_0 + g$, where D_0 is the current annualized dividend, P_0
8 is the stock price, and g is the expected constant annual growth rate. Thus, the
9 correct first period dividend in the annual DCF model is the current annualized
10 dividend multiplied by the factor, $(1 + \text{growth rate})$. Instead, Dr. Woolridge uses
11 the current annualized dividend multiplied by the factor $(1 + 0.5 \text{ times growth}$
12 rate) as the first period dividend in his DCF model. This incorrect procedure,
13 apart from other errors in his methods, causes him to underestimate Duke Energy
14 Ohio's cost of equity.

15 **Q. HOW DOES DR. WOOLRIDGE ESTIMATE THE EXPECTED FUTURE**
16 **GROWTH COMPONENT OF THE DCF COST OF EQUITY?**

17 A. Dr. Woolridge considers Value Line data on historical growth rates in earnings,
18 dividends, and book value, as well as Value Line data on projected growth rates in
19 earnings, dividends, and book value. For most of his comparable companies,
20 Value Line's average historical growth rates are significantly less than its
21 projected growth rates. Dr. Woolridge also considers analysts' forecasts of future
22 growth provided by Yahoo, Reuters, and Zacks, and internal growth estimates
23 based on Value Line's estimates of retention ratios and rates of return on book
24 equity. Dr. Woolridge's final estimate of the growth rate that investors expect for

1 his proxy companies is based on his judgment of what he considers to be an
2 “appropriate” growth rate for electric utilities [Woolridge Direct at 47].

3 **Q. DO YOU AGREE WITH DR. WOOLRIDGE’S USE OF HISTORICAL**
4 **GROWTH RATES TO ESTIMATE INVESTORS’ EXPECTATION OF**
5 **FUTURE GROWTH IN THE DCF MODEL?**

6 A. No. Historical growth rates are inherently inferior to analysts’ forecasts because
7 analysts’ forecasts already incorporate all relevant information regarding
8 historical growth rates and also incorporate the analysts’ knowledge about current
9 conditions and expectations regarding the future. My studies, described in my
10 direct testimony at pp. 24 – 26, indicate that investors use analysts’ earnings
11 growth forecasts in making stock buy and sell decisions rather than historical or
12 internal growth rates such as those presented by Dr. Woolridge.

13 **Q. HOW DO VALUE LINE’S PROJECTED GROWTH RATES FOR DR.**
14 **WOOLRIDGE’S COMPARABLE GROUP OF ELECTRIC UTILITIES**
15 **COMPARE TO VALUE LINE’S HISTORICAL GROWTH RATES FOR**
16 **THESE COMPANIES?**

17 A. Value Line’s projected growth rates are approximately 140 basis points higher
18 than its historical growth rates for Dr. Woolridge’s comparable companies [
19 Woolridge Exhibit JRW-7, page 6].

20 **Q. WHAT IS THE INTERNAL GROWTH METHOD OF ESTIMATING THE**
21 **GROWTH COMPONENT FOR THE DCF METHOD?**

22 A. The internal growth method estimates expected future growth by multiplying a
23 company’s retention ratio, “b,” times its expected rate of return on equity, “r.”

1 Thus, “ $g = b \times r$,” where “b” is the percentage of earnings that are retained in the
2 business and “r” is the expected rate of return on equity.

3 **Q. DO YOU AGREE WITH THE USE OF THE INTERNAL GROWTH**
4 **METHOD TO ESTIMATE GROWTH IN THE DCF MODEL?**

5 A. No. The internal growth method is logically circular because it requires an
6 estimate of the expected rate of return on equity, “r,” in order to estimate the cost
7 of equity using the DCF model. Yet, for regulated companies such as Duke
8 Energy Ohio, the allowed rate of return on equity is set equal to the cost of equity.

9 **Q. HOW DOES DR. WOOLRIDGE ESTIMATE THE EXPECTED RATE OF**
10 **RETURN ON EQUITY FOR EACH PROXY COMPANY IN HIS**
11 **SUSTAINABLE GROWTH ANALYSIS?**

12 A. Dr. Woolridge uses Value Line’s forecast of each company’s rate of return on
13 equity for the period 2016 – 2018 as his estimate of the expected rate of return on
14 equity for each company.

15 **Q. WHAT AVERAGE RATE OF RETURN ON EQUITY DOES VALUE LINE**
16 **FORECAST FOR DR. WOOLRIDGE’S ELECTRIC UTILITIES?**

17 A. Value Line forecasts an average rate of return on equity equal to 10.5 percent for
18 Dr. Woolridge’s electric utilities [Woolridge at Exhibit JRW-7, page 4].

19 **Q. IS IT REASONABLE TO ASSUME THAT DR. WOOLRIDGE’S**
20 **COMPARABLE COMPANIES WILL EARN A RATE OF RETURN ON**
21 **EQUITY EQUAL TO 10.5 PERCENT WHEN HE IS RECOMMENDING**
22 **THAT THEY BE ALLOWED TO EARN ONLY A RETURN OF**
23 **8.75 PERCENT?**

1 A. No. Investors are well aware that electric utilities are regulated by rate of return
2 regulation. If investors truly believed that the utilities' cost of equity were equal to
3 Dr. Woolridge's recommended 8.75 percent, they would forecast that the utilities
4 would earn 8.75 percent on equity. Thus, Dr. Woolridge's recommended
5 8.75 percent rate of return on equity is inconsistent with an assumed 10.5 percent
6 earned rate of return on equity for his comparable companies.

7 **Q. DOES DR. WOOLRIDGE'S INTERNAL GROWTH METHOD TAKE IN**
8 **TO ACCOUNT THAT THE COMPANIES IN HIS COMPARABLE**
9 **GROUP CAN ALSO GROW BY ISSUING NEW EQUITY AT PRICES**
10 **ABOVE BOOK VALUE?**

11 A. No. Dr. Woolridge's internal growth method underestimates the expected future
12 growth of his comparable companies because it neglects the possibility that the
13 companies can also grow by issuing new equity at prices above book value. Since
14 many of the comparable companies are selling at prices in excess of book value,
15 and Value Line forecasts that many of them will issue new equity over the next
16 several years, Dr. Woolridge's failure to recognize the "external" component of
17 future growth causes to him to underestimate his comparable companies'
18 expected future growth even more.

19 **Q. DOES DR. WOOLRIDGE RECOGNIZE, IN HIS INTERNAL GROWTH**
20 **METHOD, THAT VALUE LINE'S REPORTED RATES OF RETURN ON**
21 **EQUITY GENERALLY UNDERSTATE EACH COMPANY'S AVERAGE**
22 **RATE OF RETURN ON EQUITY FOR THE YEAR?**

23 A. No. Dr. Woolridge fails to recognize that Value Line calculates its reported rates
24 of return on equity by dividing a company's net income by end of year equity,

1 whereas most financial analysts calculate a company's rate of return on equity by
2 dividing net income by the average equity for the year. In the general case where
3 a company's equity is increasing, Value Line's reported ROEs will understate the
4 average ROE for the year. Dr. Woolridge's failure to recognize that Value Line's
5 reported ROEs understate each company's average ROE for the year is an
6 additional factor causing him to underestimate Duke Energy Ohio's cost of
7 equity.

8 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S USE OF ANALYSTS'**
9 **GROWTH FORECASTS TO ESTIMATE THE EXPECTED GROWTH**
10 **COMPONENT OF HIS DCF MODEL?**

11 **A.** Yes. As discussed in my direct testimony, I recommend the use of analysts'
12 growth forecasts for the purpose of estimating the expected growth component of
13 the DCF model. I have conducted extensive studies that demonstrate that stock
14 prices are more highly correlated with analysts' growth rates than with either
15 historical growth rates or the internal growth rates considered by Dr. Woolridge.

V. **COMMENTS ON ANALYSTS' GROWTH FORECASTS**

16 **Q. HOW DO YOU RECOMMEND ESTIMATING THE FUTURE GROWTH**
17 **COMPONENT IN THE DCF MODEL?**

18 **A.** As described in my direct testimony, I recommend using the analysts' forecasts
19 published by I/B/E/S Thomson Reuters.

20 **Q. WHY DO YOU BELIEVE THAT THE ANALYSTS' FORECASTS OF**
21 **EARNINGS GROWTH ARE MORE ACCURATE INDICATORS OF**
22 **INVESTORS' GROWTH EXPECTATIONS THAN THE HISTORICAL**
23 **AND INTERNAL GROWTH DATA PROVIDED BY DR. WOOLRIDGE?**

1 A. Security analysts analyze the prospects of companies and forecast earnings. They
2 take into account all available historical and current data plus any additional
3 information that is available, such as changes in projected capital expenditures,
4 regulatory climate, industry restructuring, regulatory rulings, or changes in the
5 competitive environment. The performance of security analysts is measured
6 against their ability to weigh the above factors, to predict earnings growth, and to
7 communicate their views to investors. Financial research indicates that securities
8 analysts are influential, and, most importantly, the consensus of their forecasts is
9 impounded in the current structure of market prices. This is a key result, since a
10 proper application of the DCF model requires the matching of stock prices and
11 investors' growth expectations.

12 **Q. ARE ANALYSTS' FORECASTS READILY AVAILABLE?**

13 A. Yes. An important part of the analysts' job is getting their views across to
14 investors. Major investment firms send out monthly reports with their earnings
15 forecasts, and institutional investors have direct access to analysts. Individual
16 investors can get the same forecasts through their investment advisors or online.
17 Studies reported in the academic literature indicate that recommendations based
18 on these forecasts are relied on by investors. Indeed, because analysts' forecasts
19 are perceived by investors as being useful, there are services which offer analysts'
20 forecasts on all major stocks. I/B/E/S and Zack's are some of the providers of
21 these data. I recommend use of the I/B/E/S growth rates because they have been:
22 (1) shown to be highly correlated with stock prices; (2) widely studied in the
23 finance literature; and (3) widely available to investors for many years.

1 **Q. IS IT YOUR CONTENTION THAT ANALYSTS MAKE PERFECTLY**
2 **ACCURATE PREDICTIONS OF FUTURE EARNINGS GROWTH?**

3 A. No. Forecasting earnings growth, for either the short-term or long-term, is very
4 difficult. This statement is consistent with the fact that stocks, unlike high-quality
5 bonds, are risky investments whose returns are highly uncertain. Though analysts'
6 forecasts are not perfectly accurate, they are better than either retention growth
7 rates or historical growth in predicting stock prices. One would expect this result,
8 given that analysts have all the past data plus current information. The important
9 consideration is: what growth rates do investors use to value a stock? Financial
10 research suggests that the analysts' growth forecasts are used by investors and
11 therefore are most related to stock prices.

12 **Q. DOES THE OBSERVATION THAT ANALYSTS' GROWTH FORECASTS**
13 **ARE INHERENTLY UNCERTAIN IMPLY THAT INVESTORS SHOULD**
14 **IGNORE ANALYSTS' GROWTH FORECASTS IN MAKING STOCK**
15 **BUY AND SELL DECISIONS?**

16 A. No. Because growth forecasts have a significant influence on a company's stock
17 price, investors have a great incentive to use the best available forecasts of a
18 company's growth prospects, even if these growth forecasts are inherently
19 uncertain. In this regard, the investor's situation is similar to the situation of a
20 pilot who is flying across the country. Although the pilot recognizes that weather
21 forecasts are inherently uncertain, he or she has a strong incentive to obtain the
22 best available forecasts of cross-country weather patterns before taking off.

1 **Q. HAVE YOU DONE RESEARCH ON THE APPROPRIATE USE OF**
2 **ANALYSTS' FORECASTS IN THE DCF MODEL?**

3 A. Yes. As described in my direct testimony, I prepared a study in conjunction with
4 Willard T. Carleton, Professor of Finance Emeritus at the University of Arizona,
5 on why analysts' forecasts are the best estimate of investors' expectations of
6 future long-term growth. This study is described in a paper entitled "Investor
7 Growth Expectations and Stock Prices: the Analysts versus History," published in
8 the Spring 1988 edition of The Journal of Portfolio Management. My studies
9 indicate that the analysts' forecasts of future growth are superior to historically
10 oriented growth measures and retention growth measures in predicting a firm's
11 stock price.

12 **Q. PLEASE SUMMARIZE THE RESULTS OF YOUR STUDY.**

13 A. First, we performed a correlation analysis to identify the historically oriented
14 growth rates which best described a firm's stock price. Then we did a regression
15 study comparing the historical and retention growth rates to the consensus
16 analysts' forecasts. In every case, the regression equations containing the average
17 of analysts' forecasts statistically outperformed the regression equations
18 containing the historical and retention growth estimates. These results are
19 consistent with those found by Cragg and Malkiel, the early major research in this
20 area (John G. Cragg and Burton G. Malkiel, Expectations and the Structure of
21 Share Prices, University of Chicago Press, 1982). These results are also consistent
22 with the hypothesis that investors use analysts' forecasts, rather than historically
23 oriented growth calculations, in making stock buy and sell decisions. They
24 provide overwhelming evidence that the analysts' forecasts of future growth are

1 superior to historically oriented growth measures in predicting a firm's stock
2 price.

3 **Q. HAS YOUR STUDY BEEN UPDATED TO INCLUDE MORE RECENT**
4 **DATA?**

5 A. Yes. Researchers at State Street Financial Advisors updated my study using data
6 through year-end 2003. Their results continue to confirm that analysts' growth
7 forecasts are superior to historical and retention growth measures in predicting a
8 firm's stock price.

9 **Q. DOES DR. WOOLRIDGE AGREE WITH YOUR ASSESSMENT THAT**
10 **ANALYSTS' GROWTH FORECASTS SHOULD BE USED TO**
11 **ESTIMATE THE FUTURE GROWTH COMPONENT OF THE DCF**
12 **MODEL?**

13 A. No. Dr. Woolridge argues that analysts' growth forecasts should not be used to
14 estimate the future growth component of the DCF model because, in his opinion,
15 it is well known that analysts' growth forecasts are overly optimistic [Woolridge
16 Direct at 44].

17 **Q. HAVE YOU REVIEWED THE RESEARCH LITERATURE ON THE**
18 **PROPERTIES OF ANALYSTS' GROWTH FORECASTS?**

19 A. Yes, I have reviewed the articles identified in Rebuttal Schedule 1.

20 **Q. WHAT BASIC QUESTIONS DOES THE RESEARCH LITERATURE ON**
21 **ANALYSTS' FORECASTS ADDRESS?**

22 A. The research literature on analysts' growth forecasts addresses three basic
23 questions: (1) Are analysts' forecasts superior to historical growth extrapolations
24 in their ability to forecast future earnings per share? (2) Is the correlation between

1 changes in analysts' earnings per share (EPS) growth forecasts and stock prices
2 greater than the correlation between historical earnings growth rates and stock
3 prices? and (3) Are analysts' growth forecasts overly optimistic?

4 **Q. HOW DO RESEARCHERS TEST WHETHER ANALYSTS' GROWTH**
5 **FORECASTS ARE MORE ACCURATE THAN FORECASTS BASED ON**
6 **HISTORICAL GROWTH EXTRAPOLATIONS?**

7 A. I have identified at least eight published research studies dating from 1972 to
8 2006 that compare the accuracy of analysts' growth forecasts to the accuracy of
9 forecasts based on historical extrapolations. Typically, these research studies
10 follow several basic steps: (1) gather data on historical earnings per share for a
11 large sample of firms over a reasonably long historical period of time; (2) gather
12 data on actual earnings per share growth rates for the same firms over a
13 subsequent future time period; (3) apply statistical forecasting techniques to
14 determine the best model for forecasting future earnings growth based on
15 historical growth data; (4) gather data on analysts' growth forecasts for the study
16 period; (5) calculate the difference between the actual growth rate and the
17 forecasted growth rate for both the best statistical forecasting model and the
18 analysts' forecasts; (6) determine whether there is a significant difference between
19 the forecasting errors of the statistical forecasting model and the forecasting errors
20 of analysts' EPS growth forecasts; and (7) if the errors from the analysts' EPS
21 growth forecasts are less than the errors from the statistical forecasting techniques
22 and the difference is statistically significant, conclude that analysts provide
23 superior forecasts to the forecasts obtained by statistical forecasting techniques.
24 The main differences between the studies reported in the literature relate to the

time period studied, the size of the database, and the statistical techniques used to forecast future earnings growth based on historical earnings data.

Q. WHAT ARE THE GENERAL CONCLUSIONS OF THE RESEARCH LITERATURE REGARDING THE ACCURACY OF ANALYSTS' GROWTH FORECASTS COMPARED TO THE ACCURACY OF GROWTH FORECASTS BASED ON HISTORICAL GROWTH EXTRAPOLATIONS?

A. Seven of the eight articles strongly support the hypothesis that analysts' forecasts provide better predictions of future earnings growth than statistical models based on historical earnings, and one of the articles neither supports nor rejects this hypothesis (see Table 1 below). These articles strongly support the conclusion that analysts' EPS growth forecasts are better proxies for investor growth expectations than historical growth rates.

**TABLE 1
ARTICLES THAT STUDY WHETHER ANALYSTS' FORECASTS
OR HISTORICAL GROWTH EXTRAPOLATIONS
ARE BETTER PREDICTORS OF EPS GROWTH**

<i>Author (Date)</i>	<i>Support Historical</i>	<i>Support Analysts</i>
Elton and Gruber (1972)	Neutral	Neutral
Brown and Rozeff (1978)	No	Yes
Crichfield, Dyckman, and Lakonishok (1978)	No	Yes
Givoly and Lakonishok (1984)	No	Yes
Brown, Hagerman, Griffin, and Zmijewski (1987)	No	Yes
Newbold, Zumwalt, and Kannan (1987)	No	Yes
Brown, Richardson, and Schwager (1987)	No	Yes
Banker and Chen (2006)	No	Yes

Q. WHY IS THE CORRELATION BETWEEN ANALYSTS' EPS GROWTH FORECASTS AND STOCK PRICES A SIGNIFICANT ISSUE IN THE RESEARCH LITERATURE ON ANALYSTS' GROWTH FORECASTS?

1 A. If analysts' EPS growth forecasts are good proxies for investor growth
2 expectations, one would expect that changes in analysts' growth forecasts would
3 have a significant impact on stock prices. The impact of changes in analysts'
4 growth expectations on stock prices can be estimated using standard statistical
5 regression techniques.

6 **Q. WHAT ARE THE GENERAL CONCLUSIONS OF THE RESEARCH**
7 **LITERATURE REGARDING THE CORRELATION BETWEEN**
8 **CHANGES IN ANALYSTS' EPS FORECASTS AND STOCK PRICES?**

9 A. I have identified at least seven published research studies that use regression
10 techniques to test whether the impact of changes in analysts' growth forecasts on
11 stock prices is sufficiently strong to justify the conclusion that analysts' EPS
12 growth forecasts are good proxies for investor growth expectations. All these
13 studies find that changes in analysts' growth forecasts have a large and
14 statistically significant impact on changes in stock prices. Five of these studies
15 also test whether the impact of analysts' growth forecasts on stock prices is
16 stronger than the impact of historical and/or retention growth rates on stock
17 prices. These studies find that changes in analysts' growth forecasts have a
18 significantly stronger impact on stock prices than changes in historical and/or
19 retention earnings growth rates. In summary, financial research strongly supports
20 the conclusion that analysts' growth forecasts are the best proxies for investor
21 growth expectations.

TABLE 2
ARTICLES THAT STUDY THE RELATIONSHIP
BETWEEN ANALYSTS' GROWTH FORECASTS AND STOCK PRICES

<i>Author (Date)</i>	<i>Support Historical</i>	<i>Support Analysts</i>
Malkiel (1970)	No	Yes
Malkiel and Cragg (1970)	No	Yes
Elton, Gruber, and Gultekin (1981)		Yes
Fried and Givoly (1982)		Yes
Vander Weide and Carleton (1988)	No	Yes
Gordon, Gordon, and Gould (1989)	No	Yes
Timme and Eisemann (1989)	No	Yes

1 **Q. WHAT ARE THE GENERAL CONCLUSIONS OF THE RESEARCH**
2 **LITERATURE REGARDING THE CLAIM THAT ANALYSTS'**
3 **FORECASTS ARE OVERLY OPTIMISTIC?**

4 A. A review of available research evidence strongly supports the hypothesis that
5 analysts' growth forecasts are not optimistic. I have reviewed nine articles that
6 address whether analysts' growth forecasts are overly optimistic. At least seven of
7 the nine articles reviewed find no evidence that analysts' growth forecasts are
8 overly optimistic. Two articles find evidence of optimism, but also conclude that
9 optimism is declining significantly over time. Of these two studies, one finds that
10 analysts' forecasts for the Standard & Poor's 500 are pessimistic for the last four
11 years of the study.

TABLE 3
ARTICLES THAT STUDY WHETHER ANALYSTS' FORECASTS
ARE BIASED TOWARD OPTIMISM

<i>Author (Date)</i>	<i>Conclusion</i>
Crichfield, Dyckman, and Lakonishok (1978)	Unbiased
Elton, Gruber, and Gultekin (1984)	Unbiased
Givoly and Lakonishok (1984)	Unbiased
Brown (1997)	Declining optimism
Keane and Runkle (1998)	Unbiased
Abarbanell and Lehavy (2003)	Unbiased
Ciccone (2005)	Pessimistic
Clarke, Ferris, Jayaraman, and Lee (2006)	Unbiased
Yang and Mensah (2006)	Unbiased

1 **Q. WHAT IS THE MOST IMPORTANT CONTRIBUTION OF THE MORE**
2 **RECENT RESEARCH LITERATURE ON THE ACCURACY OF**
3 **ANALYSTS' FORECASTS?**

4 **A.** The most important contribution of more recent research is to identify substantial
5 statistical difficulties in earlier research studies that caused some of these studies
6 to unwittingly accept the hypothesis of optimism when no optimism was present.
7 For example, recent studies recognize that the results of earlier studies are heavily
8 influenced by the presence of large unexpected accounting write-offs and special
9 accounting charges at a small number of sample companies. Unexpected
10 accounting write-offs and special charges have a potentially dramatic impact on
11 conclusions concerning analysts' bias because analysts' forecasts intentionally
12 exclude the impact of accounting write-offs and special charges, whereas actual
13 earnings include these items. Thus, a comparison of analysts' forecasts premised
14 on normalized earnings (that is, earnings that exclude the impact of accounting
15 write-offs and special charges) to reported earnings that include the negative
16 effect of accounting write-offs and special charges will bias the results in favor of
17 concluding that analysts are optimistic. Recent studies demonstrate that, once the

1 distorting effect of unexpected accounting write-offs and special charges are
2 removed from the analysis, there is no evidence that analysts' EPS growth
3 forecasts are optimistic.

4 Recent research also highlights the potential impact of high correlation in
5 analysts' forecast errors on study conclusions. Analysts' forecast errors tend to be
6 highly correlated because unexpected industry and economy-wide shocks, such as
7 unexpected increases in oil prices or terrorist attacks, have similar effects on all
8 firms in the same industry. However, the relevant statistical tests of optimism are
9 based on the assumption that analysts' forecast errors are independent, that is, the
10 tests assume that the correlation of the analyst errors is zero. Once the statistical
11 tests of optimism are adjusted to account for the high correlation in forecast errors
12 that generally characterize the data, evidence supports the hypothesis that
13 analysts' EPS growth forecasts are unbiased, and hence not optimistic.

14 **Q. DR. WOOLRIDGE CLAIMS THAT HIS OWN STUDIES AND STUDIES**
15 **BY LACINA, LEE, AND XU SUPPORT HIS VIEW THAT ANALYSTS'**
16 **GROWTH FORECASTS ARE OVERLY OPTIMISTIC [WOOLRIDGE AT**
17 **APPENDIX B, PAGES 12 – 13, AND WOOLRIDGE DIRECT AT 44]. DO**
18 **THESE STUDIES SUFFER FROM THE SUBSTANTIAL STATISTICAL**
19 **DIFFICULTIES YOU DISCUSS IN YOUR PREVIOUS RESPONSE?**

20 **A.** Yes. Dr. Woolridge and Lacina, Lee, and Xu fail to recognize that their findings
21 are heavily influenced by: (1) the presence of large unexpected accounting write-
22 offs and special accounting charges; and (2) the impact of high correlation in
23 analysts' forecasts on their study conclusions.

1 **Q. DR. WOOLRIDGE ALSO ARGUES THAT ANALYSTS FACE**
2 **POTENTIAL CONFLICTS OF INTEREST BETWEEN THEIR**
3 **COMPANIES' RESEARCH OPERATIONS AND UNDERWRITING**
4 **OPERATIONS. HAVE THE NEW YORK STOCK EXCHANGE (NYSE)**
5 **AND THE NATIONAL ASSOCIATION OF SECURITIES DEALERS**
6 **(NASD) ADDRESSED THE ISSUE OF ANALYSTS' POTENTIAL**
7 **CONFLICTS OF INTEREST?**

8 **A. Yes. Beginning in the early 2000s, the NYSE and NASD implemented a series of**
9 **rule changes that address potential conflicts of interest. Specifically, they:**

- 10 • Imposed structural reforms to increase analyst
11 independence, including prohibiting investment banking
12 personnel from supervising analysts or approving research
13 reports;
- 14 • Prohibited offering favorable research to induce investment
15 banking business;
- 16 • Prohibited research analysts from receiving compensation
17 based on a specific investment banking transaction;
- 18 • Required disclosure of financial interests in covered
19 companies by the analyst and the firm;
- 20 • Imposed quiet periods for the issuance of research reports
21 after securities offerings managed or co-managed by a
22 member;
- 23 • Restricted personal trading by analysts;
- 24 • Required disclosure in research reports of data and price
25 charts that help investors track the correlation between an
26 analyst's rating and the stock's price movements; and
- 27 • Required disclosure in research reports of the distribution
28 of buy/hold/sell ratings and the percentage of investment
29 banking clients in each category. [See "Joint Report by
30 NASD and the NYSE on the Operation and Effectiveness
31 of the Research Analyst Conflict of Interest Rules,"
32 December 2005, p. 5.]

1 **Q. WHAT IS YOUR OVERALL CONCLUSION REGARDING THE USE OF**
2 **ANALYSTS' GROWTH FORECASTS AS PROXIES FOR INVESTORS'**
3 **GROWTH EXPECTATIONS?**

4 **A.** Contrary to Dr. Woolridge's assessment that analysts' growth forecasts should not
5 be used in the DCF model because they are well known to be optimistic, I find
6 that the research literature provides strong support for the conclusion that:
7 (1) analysts' EPS growth forecasts are not optimistic; and (2) analysts' EPS
8 growth forecasts are reasonable proxies for investor growth expectations, while
9 the historical growth extrapolations and retention growth rates used by Dr.
10 Woolridge are not. Furthermore, Dr. Woolridge's concerns regarding analysts'
11 potential conflicts of interest have been fully addressed by rule changes
12 implemented by the NYSE and NASD in the early 2000s. In addition, Dr.
13 Woolridge fails to recognize that the DCF model requires the growth forecasts of
14 investors, whether accurate or not. In this regard, it is helpful to keep in mind that
15 investors would not pay for analysts' growth forecasts if they did not find them to
16 be helpful in making stock buy and sell decisions. Similarly, the NYSE and
17 NASD would not have taken steps to address conflicts of interest if investors did
18 not rely on analysts' forecasts in making investment decisions.

VI. CAPITAL ASSET PRICING MODEL (CAPM)

19 **Q. WHAT IS THE CAPM?**

20 **A.** The CAPM is an equilibrium model of expected returns on risky securities in
21 which the expected or required return on a given risky security is equal to the
22 risk-free rate of interest plus the security's "beta" times the market risk premium:
23 Expected return = Risk-free rate + (Security beta x Market risk premium).

1 The risk-free rate in this equation is the expected rate of return on a risk-free
2 government security, the security beta is a measure of the company's risk relative
3 to the market as a whole, and the market risk premium is the premium investors
4 require to invest in the market basket of all securities compared to the risk-free
5 security.

6 **Q. HOW DOES DR. WOOLRIDGE USE THE CAPM TO ESTIMATE DUKE**
7 **ENERGY OHIO'S COST OF EQUITY?**

8 A. The CAPM requires estimates of the risk-free rate, the company-specific risk
9 factor, or beta, and either the required return on an investment in the market
10 portfolio, or the risk premium on the market portfolio compared to an investment
11 in risk-free government securities. For the risk-free rate, Dr. Woolridge uses an
12 average 4.0 percent yield on 30-year Treasury bonds [Woolridge Direct at 50]; for
13 the company-specific risk factor or beta, Dr. Woolridge uses the current Value
14 Line beta for each company [Woolridge Direct at 51]; and for the required return
15 or risk premium on the market portfolio, Dr. Woolridge employs an average
16 5.0 percent risk premium [Woolridge Direct at 56].

17 **Q. WHAT CAPM RESULT DOES DR. WOOLRIDGE OBTAIN FOR HIS**
18 **COMPARABLE COMPANIES?**

19 A. Dr. Woolridge obtains a CAPM result of 7.5 percent for his comparable group
20 [Woolridge Direct at 59].

21 **Q. DOES DR. WOOLRIDGE RECOGNIZE THAT THE RESULT OF HIS**
22 **CAPM ANALYSIS IS UNREASONABLY LOW?**

23 A. Yes. Dr. Woolridge reports a result equal to 8.9 percent for his DCF studies and a
24 result equal to 7.5 percent for his CAPM studies [Woolridge Direct at 59]. From

1 these results, Dr. Woolridge concludes that Duke Energy Ohio's cost of equity is
2 equal to 8.75 percent. Since Dr. Woolridge's CAPM result is 125 basis points
3 lower than his recommended cost of equity, Dr. Woolridge must agree that a
4 CAPM result of 7.5 percent is unreasonably low.

5 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S APPLICATION OF THE**
6 **CAPM?**

7 A. No, but I do agree with Dr. Woolridge that his CAPM results are below a
8 reasonable range of estimates of Duke Energy Ohio's cost of equity.

9 **Q. WHY DO YOU BELIEVE THAT THE CAPM PRODUCES**
10 **UNREASONABLY LOW COST OF EQUITY RESULTS FOR ELECTRIC**
11 **UTILITIES AT THIS TIME?**

12 A. I believe there are two reasons why the CAPM produces unreasonably low cost of
13 equity results for electric utilities at this time. First, as a result of the economic
14 crisis, the U.S. Treasury has kept interest rates on Treasury securities unusually
15 low as part of its effort to stimulate the economy. Economists are forecasting that
16 interest rates on Treasury securities will increase significantly once the economy
17 begins to recover. In addition, the betas of utilities are currently approximately
18 0.70, and the CAPM tends to underestimate the cost of equity for companies
19 whose equity beta is less than 1.0 and to overestimate the cost of equity for
20 companies whose equity beta is greater than 1.0.

21 **Q. CAN YOU BRIEFLY SUMMARIZE THE EVIDENCE THAT THE CAPM**
22 **UNDERESTIMATES THE REQUIRED RETURNS FOR SECURITIES OR**
23 **PORTFOLIOS WITH BETAS LESS THAN 1.0 AND OVERESTIMATES**

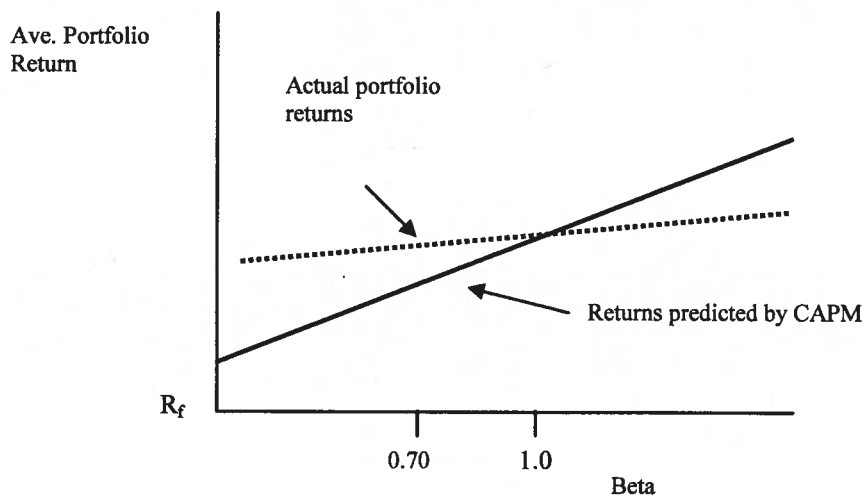
1 **REQUIRED RETURNS FOR SECURITIES OR PORTFOLIOS WITH**
2 **BETAS GREATER THAN 1.0?**

3 A. Yes. The CAPM conjectures that security returns increase with increases in
4 security betas in line with the equation

$$ER_i = R_f + \beta_i[ER_m - R_f],$$

6 where ER_i is the expected return on security or portfolio i , R_f is the risk-free rate,
7 $ER_m - R_f$ is the expected risk premium on the market portfolio, and β_i is a measure
8 of the risk of investing in security or portfolio i . If the CAPM correctly predicts
9 the relationship between risk and return in the marketplace, then the realized
10 returns on portfolios of securities and the corresponding portfolio betas should lie
11 on the solid straight line with intercept R_f and slope $[R_m - R_f]$ shown below.

FIGURE 1
AVERAGE RETURNS COMPARED TO BETA
FOR PORTFOLIOS FORMED ON PRIOR



1 Financial scholars have found that the relationship between realized returns and
2 betas is inconsistent with the relationship posited by the CAPM. As described in
3 Fama and French (1992) and Fama and French (2004), the actual relationship
4 between portfolio betas and returns is shown by the dotted line in the figure
5 above. Although financial scholars disagree on the reasons why the return/beta
6 relationship looks more like the dotted line in the figure than the solid line, they
7 generally agree that the dotted line lies above the solid line for portfolios with
8 betas less than 1.0 and below the solid line for portfolios with betas greater than
9 1.0. Thus, in practice, scholars generally agree that the CAPM underestimates
10 portfolio returns for companies with betas less than 1.0, and overestimates
11 portfolio returns for portfolios with betas greater than 1.0.

12 **Q. WHAT CONCLUSIONS DO YOU REACH FROM YOUR REVIEW OF**
13 **THE LITERATURE ABOUT THE ABILITY OF THE CAPM TO**
14 **PREDICT THE RELATIONSHIP BETWEEN RISK AND RETURN IN**
15 **THE MARKETPLACE?**

16 A. I conclude that the financial literature strongly supports the proposition that the
17 CAPM underestimates the cost of equity for companies such as public utilities
18 with betas less than 1.0. Since the CAPM significantly underestimates the cost of
19 equity for companies with betas less than 1.0, and both Dr. Woolridge's and my
20 comparable companies have betas that are significantly less than 1.0, I further
21 conclude that the Commission should give little or no weight to the results of the
22 CAPM at this time.

VII. REPLY TO DR. WOOLRIDGE'S REBUTTAL COMMENTS

1 **Q. WHAT ISSUES DOES DR. WOOLRIDGE HAVE REGARDING YOUR**
2 **ESTIMATE OF DUKE ENERGY OHIO'S COST OF EQUITY?**

3 A. Dr. Woolridge disagrees with my: (1) use of a Value Line pipeline group;
4 (2) quarterly DCF model; (3) use of analysts' growth forecasts; (4) excessive base
5 interest rates and market risk premiums in my risk premium and CAPM
6 approaches; and (5) allowance for flotation costs [Woolridge Direct at 64].

7 **Q. HAVE YOU RESPONDED TO DR. WOOLRIDGE'S CRITICISMS OF**
8 **YOUR USE OF THE VALUE LINE PIPELINE GROUP PREVIOUSLY IN**
9 **YOUR REBUTTAL TESTIMONY?**

10 A. Yes. I responded to Dr. Woolridge's comments in Section II of my rebuttal
11 testimony.

A. QUARTERLY DCF MODEL

12 **Q. WHAT ARE DR. WOOLRIDGE'S CRITICISMS OF YOUR DCF**
13 **STUDIES?**

14 A. Dr. Woolridge claims that I should: (1) use the annual rather than the quarterly
15 DCF model to estimate Duke Energy Ohio's cost of equity; (2) use a combination
16 of historical and analysts' growth rates to estimate the growth component of the
17 DCF model; and (3) include no adjustment for flotation costs.

18 **Q. WHAT IS THE MAJOR DIFFERENCE BETWEEN THE QUARTERLY**
19 **DCF MODEL WHICH YOU USE AND THE ANNUAL DCF MODEL**
20 **EMPLOYED BY DR. WOOLRIDGE?**

21 A. The major difference is that my quarterly DCF model is based on the realistic
22 assumption that dividends are paid quarterly, while Dr. Woolridge's annual DCF

1 model is based on the unrealistic assumption that dividends are paid once at the
2 end of each year.

3 **Q. WHY DO YOU USE THE QUARTERLY RATHER THAN THE ANNUAL**
4 **DCF MODEL TO ESTIMATE DUKE ENERGY OHIO'S COST OF**
5 **EQUITY?**

6 A. As I discuss in my direct testimony, the DCF model assumes that a company's
7 stock price is equal to the present discounted value of all expected future
8 dividends. Since the companies in my comparable group all pay dividends
9 quarterly, the current market price that investors are willing to pay reflects the
10 expected quarterly receipt of dividends. Therefore, a quarterly DCF model must
11 be used to estimate the cost of equity for these firms. The quarterly DCF model
12 differs from the annual DCF model in that it expresses a company's stock price as
13 the present discounted value of a quarterly stream of dividend payments. The
14 annual DCF model is only a correct expression for the present discounted value of
15 future dividends if dividends are paid once at the end of each year.

16 **Q. WHY DOES DR. WOOLRIDGE DISAGREE WITH YOUR**
17 **APPLICATION OF THE QUARTERLY DCF MODEL?**

18 A. Dr. Woolridge argues first that an early proponent of the DCF model, Dr. Myron
19 Gordon, stated that "the appropriate dividend yield adjustment for growth in the
20 DCF model is the expected dividend for the next quarter multiplied by four."
21 [Woolridge Direct at 38 and 67.] Second, Dr. Woolridge argues that my quarterly
22 DCF model allows investors to earn more than their required rate of return on
23 equity [Woolridge Direct at 67 - 68]. Third, Dr. Woolridge argues that Professor
24 Bower has stated that the conventional DCF calculation produces a downwardly

1 biased estimate of the cost of equity, but the annual DCF model provides the most
2 appropriate estimate of the utility's required return on equity for regulated utilities
3 [Woolridge Direct at 68].

4 **Q. IS DR. GORDON'S STATEMENT IN FAVOR OF AN ANNUAL DCF**
5 **MODEL A REASONABLE JUSTIFICATION FOR USE OF THE**
6 **ANNUAL DCF MODEL IN THIS PROCEEDING?**

7 A. No. Although Dr. Gordon was certainly a major early proponent of the DCF
8 model, this does not imply that Dr. Gordon is correct in his arguments regarding
9 the quarterly DCF model. As shown in Appendix 2 of my direct testimony, there
10 can be no doubt that when dividends are paid quarterly, the quarterly DCF model
11 must be used to estimate the cost of equity.

12 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S ASSERTION THAT THE**
13 **QUARTERLY DCF MODEL ALLOWS INVESTORS TO EARN MORE**
14 **THAN THEIR REQUIRED RETURN ON EQUITY?**

15 A. No. The quarterly DCF model does not allow investors to earn more than their
16 required return on equity; it simply offers a better estimate of investors' required
17 return on equity than an annual DCF model. Whether a company earns more than
18 its cost of equity depends on many factors, including the state of the economy and
19 the demand for electricity, factors which cannot be known at the time the cost of
20 equity is being estimated.

21 **Q. WITH REFERENCE TO DR. WOOLRIDGE'S ARGUMENTS**
22 **CONCERNING DR. BOWER, DO YOU AGREE WITH DR. BOWER'S**
23 **STATEMENT THAT THE ANNUAL DCF CALCULATION IS A**

1 **DOWNWARDLY BIASED ESTIMATE OF THE MARKET COST OF**
2 **EQUITY WHEN COMPANIES PAY DIVIDENDS QUARTERLY?**

3 A. Yes. Thus, I use the quarterly DCF model to estimate the cost of equity in this
4 proceeding.

5 **Q. DO YOU AGREE WITH DR. BOWER'S ARGUMENT THAT THE**
6 **ANNUAL DCF MODEL IS THE APPROPRIATE MEASURE OF THE**
7 **REQUIRED RETURN ON EQUITY, OR COST OF EQUITY, FOR**
8 **REGULATED UTILITIES?**

9 A. No. I believe that it is important to measure the cost of equity for the proxy
10 companies correctly. As discussed above and in my direct testimony, the quarterly
11 DCF provides the best estimate of the cost of equity for my proxy companies.

B. ANALYSTS' GROWTH FORECASTS

12 **Q. DR. WOOLRIDGE ALSO CRITICIZES YOUR USE OF ANALYSTS'**
13 **GROWTH RATES IN YOUR DCF MODEL. WHY DO YOU USE**
14 **ANALYSTS' GROWTH RATES TO ESTIMATE THE GROWTH**
15 **COMPONENT OF THE DCF MODEL?**

16 A. I use analysts' growth rates because my studies indicate that the analysts' growth
17 rates are highly correlated with stock prices. This evidence provides strong
18 support for the conclusion that investors use analysts' growth rates in making
19 stock buy and sell decisions, and thus the analysts' growth rates should be used to
20 estimate the growth component of the DCF model.

21 **Q. DOES DR. WOOLRIDGE AGREE WITH YOUR STATISTICAL**
22 **STUDIES OF THE RELATIONSHIP BETWEEN ANALYSTS' GROWTH**
23 **RATES AND STOCK PRICES?**

1 A. No. Dr. Woolridge has four criticisms of my statistical studies of the relationship
2 between analysts' growth rates and stock prices. First, he argues that my statistical
3 study is outdated. Second, he argues that my study is misspecified because I used
4 a "linear approximation" to the DCF model rather than a modified version of the
5 DCF model. Third, he argues that I did not use both historical and analysts'
6 forecasted growth rates in the same regression. Fourth, he argues that I did not
7 perform any tests to determine if the difference between historic and projected
8 growth measures is statistically significant [Woolridge Direct at 72 – 73].

9 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S ASSERTION THAT YOUR**
10 **STATISTICAL ANALYSIS OF THE RELATIONSHIP BETWEEN**
11 **ANALYSTS' GROWTH RATES AND STOCK PRICES IS OUTDATED?**

12 A. No. As discussed in my direct testimony, my study was updated in August 2004.
13 The updated study continues to support the conclusion that the analysts' growth
14 rates are more highly correlated with stock prices than historical measures such as
15 those employed by Dr. Woolridge. Furthermore, Dr. Woolridge ignores other
16 studies that have corroborated my results.

17 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S CRITICISM THAT YOUR**
18 **DCF MODEL IS MISSPECIFIED BECAUSE YOU USED A "LINEAR**
19 **APPROXIMATION" TO THE DCF MODEL RATHER THAN A**
20 **MODIFIED VERSION OF THE DCF MODEL?**

21 A. No. Most regression analyses are based on the assumption that the relationship
22 between the variables being studied is linear. As part of my studies, I tested
23 whether the linear assumption was sufficiently close to provide reliable estimates
24 of the model parameters. Applying a first order Taylor-series approximation to the

1 DCF equation, I found that the first order, or linear, approximation was
2 sufficiently close to the true equation to justify using linear regression analysis to
3 study the relationship between price/earnings ratios and growth rates.

4 **Q. WHY DID YOU NOT USE A COMBINATION OF HISTORICAL AND**
5 **ANALYSTS' GROWTH RATES IN THE SAME REGRESSION?**

6 A. I did not use a combination of historical and analysts' growth rates in the same
7 regression because there are an infinite number of such combinations which could
8 be tested. My studies indicate that the relationship between analysts' forecasts and
9 stock prices is so strong compared to the relationship between historical growth
10 rates and stock prices that there would be little advantage to combining historical
11 growth rates with analysts' forecasts to predict stock prices.

12 **Q. IS THERE A STATISTICALLY SIGNIFICANT DIFFERENCE**
13 **BETWEEN HISTORICAL AND PROJECTED GROWTH MEASURES IN**
14 **EXPLAINING STOCK PRICES IN YOUR STATISTICAL STUDY?**

15 A. Yes. The difference in performance of historical and projected growth rates is
16 both statistically significant and dramatic.

17 **Q. DR. WOOLRIDGE CLAIMS IN HIS TESTIMONY, "IT IS WELL**
18 **KNOWN THAT THE LONG-TERM EPS GROWTH RATE FORECASTS**
19 **OF WALL STREET SECURITIES ANALYSTS ARE OVERLY**
20 **OPTIMISTIC AND UPWARDLY BIASED." [WOOLRIDGE DIRECT AT**
21 **69 - 70.] IS HE CORRECT?**

22 A. No. Contrary to Dr. Woolridge's claim, the academic literature presents
23 compelling evidence that analysts' EPS forecasts are unbiased—that is, neither
24 optimistic nor pessimistic. As discussed above, I have reviewed nine articles that

1 address whether analysts' growth forecasts are overly optimistic. At least seven of
2 the nine articles reviewed find no evidence that analysts' growth forecasts are
3 overly optimistic. Two find evidence of optimism, but also conclude that
4 optimism is declining significantly over time. Of these two studies, one finds that
5 analysts' forecasts for the S&P 500 are pessimistic for the last four years of the
6 study.

7 **Q. DOES SOME OF THE LATER RESEARCH EXPLAIN WHY SOME**
8 **EARLIER STUDIES IN THE LITERATURE CONCLUDE THAT**
9 **ANALYSTS' EPS GROWTH FORECASTS ARE OPTIMISTIC?**

10 A. Yes. Articles by Abarbanell and Lehavy (2003) and Keane and Runkle (1998)
11 recognize that the results of earlier studies are heavily influenced by: (1) the
12 inclusion of large unexpected accounting write-offs and special accounting
13 charges in reported earnings; and (2) the impact of high correlation in analysts'
14 forecasts. As discussed above, these articles conclude that once the problems
15 associated with the inclusion of non-recurring earnings in reported earnings per
16 share and correlations in analysts' forecasts are corrected, the evidence supports
17 the conclusion that analysts' forecasts are unbiased, and hence, not optimistic.

18 **Q. DR. WOOLRIDGE DISCUSSES THE RESULTS OF HIS STUDY OF THE**
19 **RELATIONSHIP BETWEEN ANALYSTS' FORECASTS FOR UTILITIES**
20 **AND THE UTILITIES' SUBSEQUENT ACHIEVED EARNINGS**
21 **GROWTH RATES IN APPENDIX B OF HIS TESTIMONY. DO YOU**
22 **HAVE ANY COMMENTS ON HIS STUDY?**

23 A. Yes. First, Dr. Woolridge has misspecified the time frame of his analysts'
24 earnings growth forecasts. In his study, Dr. Woolridge claims that he compares

1 the analysts' forecast made in a particular quarter to the company's realized
2 earnings growth rate in the *same* quarter four years hence. In making this
3 comparison, Dr. Woolridge fails to recognize that: (1) the time frame of the
4 analysts' growth forecast is an indefinite, long-run period that may differ from
5 one analyst to another; (2) quarterly realized earnings are unaudited; and
6 (3) quarterly realized earnings are subject to seasonality. Dr. Woolridge has
7 provided no evidence that analysts' growth estimates were intended to forecast
8 actual results for exactly the same quarter four years hence.

9 Second, Dr. Woolridge has not distinguished between recurring (that is,
10 normalized) and non-recurring (that is, non-normalized) earnings. The analysts'
11 forecasts are intended to be applied only to growth in recurring earnings, meaning
12 that they are forecasts of earnings in the absence of extraordinary events and one-
13 time write-offs. It is likely that the forecast deviations in Dr. Woolridge's sample
14 are due primarily to the impact of extraordinary events and one-time write-offs
15 rather than to problems with the analysts' forecasts of recurring earnings.

16 Third, Dr. Woolridge fails to adjust for the high correlation in analysts'
17 forecasts across companies. Financial researchers have conclusively demonstrated
18 that there is no evidence of analysts' optimism in data sets that are properly
19 adjusted for the impact of one-time accounting write-offs and the correlation in
20 analysts' forecasts across companies. (See Jeffery Abarbanell and Reuven
21 Lehavy, "Biased Forecasts or Biased Earnings? The Role of Reported Earnings in
22 Explaining Apparent Bias and Over/underreaction in Analysts' Earnings
23 Forecasts," *Journal of Accounting and Economics*, 36 (2003) 105 – 146; Stephen

1 J. Ciccone, "Trends in Analyst Earnings Forecast Properties," International
2 Review of Financial Analysis, 14 (2005) 1 – 22.)

3 **Q. WHY DO ANALYSTS EXCLUDE NON-RECURRING EARNINGS FROM**
4 **EARNINGS GROWTH FORECASTS?**

5 A. Analysts exclude non-recurring earnings from earnings growth forecasts because
6 stock prices reflect the impact of expected future earnings and, by definition, non-
7 recurring earnings or losses are not expected to recur in the future. Since non-
8 recurring earnings do not, in theory, impact stock prices, analysts do not include
9 them in their earnings per share forecasts. In addition, because accounting
10 adjustments are somewhat discretionary, it is virtually impossible to forecast the
11 timing and magnitude of such adjustments, certainly when the long-term earnings
12 per share forecast is intended to apply to a period three to five years in the future.

13 **Q. DO YOU HAVE EVIDENCE THAT NON-RECURRING ITEMS CAN**
14 **HAVE A SIGNIFICANT IMPACT ON THE REPORTED EARNINGS PER**
15 **SHARE FOR ELECTRIC UTILITIES?**

16 A. Yes. The impact of non-recurring items on reported earnings per share for electric
17 utilities can be estimated from annual data on aggregate earnings per share for
18 electric utilities, including and excluding non-recurring items, published by The
19 Edison Electric Institute in its annual financial report on investor-owned electric
20 utilities. As shown in Table 4 below, aggregate EPS including non-recurring
21 items (that is, EPS as reported) is generally less than aggregate EPS excluding
22 non-recurring items; and, in many years, the difference is substantial. Thus, Dr.
23 Woolridge's use of EPS data that include non-recurring items could have had a
24 significant impact on his conclusion that analysts' forecasts are optimistic.

TABLE 4
EARNINGS PER SHARE (EPS) INCLUDING AND EXCLUDING
NON-RECURRING ITEMS
U.S. INVESTOR-OWNED ELECTRIC UTILITIES
1992 - 2007

YEAR	EPS INCLUDE NON- RECURRING	EPS EXCLUDE NON- RECURRING	DIFFERENCE (EXCLUDE – INCLUDE)
1992	1.66	1.85	0.19
1993	1.65	1.99	0.34
1994	1.92	1.96	0.04
1995	2.10	2.11	0.01
1996	2.14	2.21	0.07
1997	1.49	2.01	0.52
1998	1.52	1.79	0.27
1999	2.04	2.05	0.01
2000	1.59	2.47	0.88
2001	2.43	2.93	0.50
2002	(0.04)	2.40	2.44
2003	1.45	2.20	0.75
2004	2.23	2.00	(0.23)
2005	2.09	2.28	0.19
2006	2.42	2.37	(0.05)
2007	2.65	2.34	(0.31)

C. RISK PREMIUM

1 **Q. WHAT IS THE RISK PREMIUM APPROACH TO ESTIMATING THE**
2 **COST OF EQUITY?**

3 **A.** The risk premium approach is based on the principle that investors expect to earn
4 a return on an equity investment in Duke Energy Ohio that reflects a “premium”
5 over the return they expect to earn on an investment in a portfolio of long-term
6 bonds. This equity risk premium compensates equity investors for the additional
7 risk they bear in making equity investments versus bond investments. Using the
8 risk premium approach, the cost of equity is given by the following equation: cost
9 of equity = interest rate plus risk premium.

1 **Q. HOW DO YOU ESTIMATE THE INTEREST RATE COMPONENT OF**
2 **THE RISK PREMIUM APPROACH?**

3 A. I estimate the interest rate component of the risk premium approach using the
4 forecasted yield to maturity on A-rated utility bonds.

5 **Q. DOES DR. WOOLRIDGE HAVE ANY CRITICISMS OF YOUR USE OF**
6 **THE FORECASTED YIELD TO MATURITY ON A-RATED UTILITY**
7 **BONDS TO ESTIMATE THE INTEREST RATE COMPONENT OF THE**
8 **RISK PREMIUM APPROACH?**

9 A. Yes. Dr. Woolridge argues that my use of the forecasted yield to maturity on A-
10 rated utility bonds inflates the required return on equity because: (1) the
11 forecasted yield is above the current yield on A-rated utility bonds; and (2) long-
12 term utility bonds are not risk free, that is, they are subject to both interest rate
13 risk and credit risk [Woolridge Direct at 77 - 78].

14 **Q. WHY DO YOU USE THE FORECASTED YIELD TO MATURITY**
15 **RATHER THAN THE CURRENT YIELD TO MATURITY ON A-RATED**
16 **UTILITY BONDS TO ESTIMATE THE INTEREST RATE COMPONENT**
17 **OF THE RISK PREMIUM APPROACH TO ESTIMATING THE COST**
18 **OF EQUITY?**

19 A. I use a forecasted yield to maturity on A-rated utility bonds rather than a current
20 yield to maturity because the fair rate of return standard requires that a company
21 have an opportunity to earn its required return on its investment during the
22 forward-looking period during which rates will be in effect. Because current
23 interest rates are depressed as a result of the Federal Reserve's extraordinary
24 efforts to keep interest rates low in an effort to stimulate the economy, current

1 interest rates at this time are likely a poor indicator of expected future interest
2 rates. Economists project that future interest rates will be higher than current
3 interest rates as the Federal Reserve allows interest rates to rise in order to prevent
4 inflation. Thus, the use of forecasted interest rates is consistent with the fair rate
5 of return standard, whereas the use of current interest rates at this time is not.

6 **Q. DR. WOOLRIDGE ALSO ARGUES THAT YOUR USE OF THE YIELD**
7 **TO MATURITY ON A-RATED UTILITY BONDS TO ESTIMATE THE**
8 **INTEREST RATE COMPONENT OF THE RISK PREMIUM APPROACH**
9 **INFLATES THE REQUIRED RETURN ON EQUITY BECAUSE UTILITY**
10 **BONDS ARE NOT RISK FREE, THAT IS, THEY ARE SUBJECT TO**
11 **BOTH INTEREST RATE RISK AND CREDIT RISK. DO YOU AGREE?**

12 **A.** No. Dr. Woolridge fails to recognize that the risk premium approach does not
13 require that the interest rate be "risk free." Indeed, the only requirement of the risk
14 premium approach is that the same interest rate be used to estimate the interest
15 rate component as is used to estimate the risk premium component. Since the risk
16 premium approach suggests that the cost of equity equals (the interest rate) plus
17 (the required return on equity minus the interest rate), the cost of equity should be
18 approximately the same in a risk premium analysis, no matter what interest rate is
19 used as the benchmark interest rate. Thus, use of the interest rate on A-rated
20 utility bonds in a risk premium analysis will produce a higher interest rate
21 component than use of a government bond interest rate, but this difference will be
22 offset by the correspondingly lower risk premium. The lower risk premium arises
23 because the difference between the return on equity and yield on A-rated utility

1 bonds is less than the difference between the return on equity and the yield on
2 long-term government bonds.

3 **Q. WHY DO YOU USE THE YIELD ON A-RATED UTILITY BONDS**
4 **RATHER THAN THE YIELD ON TREASURY BONDS IN YOUR RISK**
5 **PREMIUM STUDIES?**

6 A. I use the yield on A-rated utility bonds rather than the yield on Treasury bonds in
7 my risk premium studies because I believe that utility bond yields are better
8 indicators of utilities' cost of equity than Treasury bond yields. First, because the
9 U.S. dollar is the major currency for international trade, foreign governments tend
10 to hold their currency reserves in U.S. Treasury bonds. Thus, Treasury bond
11 yields are highly sensitive to changes in international economic conditions,
12 whereas the U.S. utilities' cost of equity is not.

13 Second, since U.S. Treasuries are considered to be the safest investment in
14 the world, investors across the world tend to flock to investments in U.S.
15 Treasuries at times of widespread global economic turmoil. In such periods of
16 turmoil, the required return on risky investments such as utility bonds and stocks
17 increases while the yield on U.S. Treasury bonds declines. Thus, changes to U.S.
18 Treasury bond yields are poor indicators of changes in a utility's cost of equity.

19 Third, as noted above, the yields on U.S. Treasury bonds are highly
20 sensitive to efforts by the Federal Reserve to stimulate the economy. Because
21 current interest rates are depressed as a result of the Federal Reserve's
22 extraordinary efforts to keep interest rates low in an effort to stimulate the
23 economy, current interest rates are likely a poor indicator of expected future
24 interest rates. Economists project that future interest rates will be higher than

1 current interest rates as the Federal Reserve allows interest rates to rise in order to
2 prevent inflation.

3 Fourth, to the extent that there are economic developments that are
4 specific to the utility industry, such as changes in environmental regulations and
5 energy policy, such factors will be reflected both in utility bond yields and the
6 utility cost of equity, but not in U.S. Treasury bond yields. Thus, that utility bond
7 yields reflect utility-specific risks is an argument for—not an argument against—
8 the use of utility bond yields to indicate changes in the utility cost of equity.

9 **Q. HOW DO YOU ESTIMATE THE RISK PREMIUM COMPONENT OF**
10 **THE RISK PREMIUM APPROACH?**

11 A. I estimate the risk premium component of the risk premium approach in two
12 ways. First, I estimate the difference between the DCF cost of equity for a
13 comparable group of companies over the previous 185 months and the concurrent
14 yield to maturity on A-rated utility bonds in those months, and then adjust the
15 average risk premium to account for changes in interest rates. This estimate is my
16 “ex ante risk premium approach.” Second, I estimate the risk premium from an
17 historical study of stock and bond returns over the period 1937 to the present.
18 This second risk premium approach is my “ex post risk premium approach.”

19 **Q. WHY DOES DR. WOOLRIDGE CRITICIZE YOUR EX ANTE RISK**
20 **PREMIUM APPROACH?**

21 A. Dr. Woolridge criticizes my ex ante risk premium approach because it relies on
22 analysts’ forecasts to estimate the required return on equity using the DCF model.

1 **Q. HAVE YOU ADDRESSED DR. WOOLRIDGE’S CRITICISMS OF YOUR**
2 **USE OF ANALYSTS’ GROWTH FORECASTS ELSEWHERE IN THIS**
3 **REBUTTAL TESTIMONY?**

4 A. Yes, I have addressed his criticisms in Section IV above.

5 **Q. DOES DR. WOOLRIDGE AGREE WITH YOUR USE OF HISTORICAL**
6 **STOCK AND BOND RETURNS TO ESTIMATE THE EQUITY RISK**
7 **PREMIUM?**

8 A. No. Dr. Woolridge states:

9 There are a number of flaws in using historic returns over long
10 time periods to estimate expected equity risk premiums. These
11 issues include: (a) biased historic bond returns; (b) use of the
12 arithmetic versus the geometric mean return; (c) the large error in
13 measuring the equity risk premium using historical returns;
14 (d) unattainable and biased historic stock returns; (e) company
15 survivorship bias; and (f) the “peso problem—U.S. stock market
16 survivorship bias.” [Woolridge Appendix D, page 1.]

17 **Q. WHY DOES DR. WOOLRIDGE BELIEVE THAT HISTORICAL BOND**
18 **RETURNS ARE BIASED?**

19 A. Dr. Woolridge states:

20 Historic bond returns are biased downward as a measure of
21 expectancy because of capital losses suffered by bondholders in
22 the past. As such, risk premiums derived from this data are biased
23 upwards. [Woolridge Appendix D, page 2.]

24 **Q. DO YOU AGREE WITH DR. WOOLRIDGE’S STATEMENT THAT**
25 **HISTORICAL BOND RETURNS ARE BIASED DOWNWARD BECAUSE**
26 **OF CAPITAL LOSSES SUFFERED BY PAST BOND INVESTORS?**

27 A. No. Because of capital gains and losses, historical bond returns may be higher or
28 lower than what investors expected at the time they purchased the bonds. During
29 the period since 1982, for example, historical bond returns have been biased

upward as a measure of expectancy because of the large capital gains achieved by bondholders over this period. However, over the entire period considered in my ex post risk premium study (from 1937 to the present), capital gains and losses on bonds have approximately offset each other, and consequently there is no significant bias as a result from either capital gains or losses.

Q. WHAT IS THE DIFFERENCE BETWEEN AN ARITHMETIC AND A GEOMETRIC MEAN RETURN?

A. An arithmetic mean return is an additive return that is calculated by summing the achieved return in each time period and dividing the total by the number of periods. In contrast, the geometric mean return is a multiplicative return that is calculated in two steps. First, one calculates the product of (1 plus the return) in each period of the study. Second, one calculates the n^{th} root of this product and subtracts 1 from the result. Thus, if there are two periods, and r_1 and r_2 are the returns in periods one and two, respectively, the arithmetic mean is calculated from the equation: $a_m = (r_1 + r_2) \div 2$. The geometric mean is calculated from the equation,

$$a_g = [(1 + r_1) \times (1 + r_2)]^{.5} - 1.$$

Q. PLEASE DESCRIBE DR. WOOLRIDGE'S CONCERN REGARDING THE USE OF GEOMETRIC VERSUS ARITHMETIC MEAN RETURNS.

A. Dr. Woolridge believes that my ex post risk premium study is biased because I calculate the expected risk premium using the arithmetic mean of past returns, whereas he believes I should have calculated the expected risk premium using the geometric mean of past returns.

1 **Q. IS DR. WOOLRIDGE’S CRITICISM VALID?**

2 A. No. As explained in Ibbotson® SBBI® Valuation Edition 2013 Yearbook (SBBI®),
3 the arithmetic mean return is the best approach for calculating the return investors
4 expect to receive in the future:

5 The equity risk premium data presented in this book are arithmetic
6 average risk premia as opposed to geometric average risk premia.
7 The arithmetic average equity risk premium can be demonstrated
8 to be most appropriate when discounting future cash flows. For use
9 as the expected equity risk premium in either the CAPM or the
10 building block approach, the arithmetic mean or the simple
11 difference of the arithmetic means of stock market returns and
12 riskless rates is the relevant number. This is because both the
13 CAPM and the building block approach are additive models, in
14 which the cost of capital is the sum of its parts. The geometric
15 average is more appropriate for reporting past performance, since it
16 represents the compound average return. [SBBI® at 56.]

17 A discussion of the importance of using arithmetic mean returns in the context of
18 CAPM or risk premium studies is contained in my direct testimony, Schedule 7,
19 “Using the Arithmetic Mean to Estimate the Cost of Equity Capital.”

20 **Q. DR. WOOLRIDGE ALSO CRITICIZES YOUR EX POST RISK**
21 **PREMIUM STUDY BECAUSE IT IS BASED ON “UNATTAINABLE AND**
22 **BIASED HISTORIC STOCK RETURNS.” [WOOLRIDGE APPENDIX D,**
23 **PAGES 4 – 5.] IS HE CORRECT?**

24 A. No. Dr. Woolridge bases his allegation on the assumption that stock index returns
25 such as those reported by Ibbotson® SBBI® are “unattainable to investors.” Dr.
26 Woolridge’s assumption is false: investors, in fact, can attain the returns achieved
27 by stock indices simply by purchasing the stock index.

1 **Q. DO YOU AGREE WITH DR. WOOLRIDGE’S CRITICISM THAT YOUR**
2 **EX POST RISK PREMIUM STUDY IS CHARACTERIZED BY**
3 **“SURVIVORSHIP BIAS”? [WOOLRIDGE APPENDIX D, PAGES 5 – 6.]**

4 A. No. Survivorship bias refers to problems that might arise when data for
5 companies that have failed are excluded from the sample. However, with regard
6 to the U.S. markets that I study, survivorship bias is not a major issue. First, over
7 the period 1937 to the present, there have been relatively few companies in the
8 S&P 500 and the S&P Utilities that have failed. Second, the S&P 500 includes the
9 return on a stock until the day it is dropped from the index, and the effect of a
10 company being dropped from the S&P 500 is generally anticipated by the market
11 well in advance of the delisting. Thus, survivorship is not a material issue with
12 respect to U.S. stocks.

13 **Q. WHAT DOES DR. WOOLRIDGE MEAN WHEN HE REFERS TO THE**
14 **“PESO PROBLEM”? [WOOLRIDGE APPENDIX D, PAGE 6.]**

15 A. Dr. Woolridge uses the term “peso problem” to refer to the fact that U.S. investors
16 have earned higher returns on stock investments than investors in other countries
17 because the U.S. economy has not suffered many of the same economic calamities
18 as the economies of other countries. This criticism of the use of U. S. stock
19 returns in risk premium studies might be appropriate if one were attempting to
20 estimate the expected rates of return on non-U. S. stocks. However, for U. S.
21 stocks, since there is no indication that the U. S. will suffer the economic
22 calamities of other countries, such as hyper-inflation or military invasion, there is
23 no reason why the returns on U. S. stocks would be biased upward. As Ibbotson®

1 SBBI® states with respect to “survivorship bias” and the closely related “peso
2 problem”:

3 While the survivorship bias evidence may be compelling on a
4 worldwide basis, one can question its relevance to a purely U.S.
5 analysis. If the entity being valued is a U.S. company, then the
6 relevant data set should be the performance of equities in the U.S.
7 market. [Ibbotson®SBBI® at 62.]

8 **Q. DR. WOOLRIDGE CLAIMS THAT HIS MARKET RISK PREMIUM**
9 **ESTIMATE IS REASONABLE BECAUSE IT IS CONSISTENT WITH**
10 **THE 6.13 PERCENT LONG-TERM FORECASTED RETURN ON THE**
11 **S&P 500 PUBLISHED BY THE FEDERAL RESERVE BANK OF**
12 **PHILADELPHIA’S SURVEY OF PROFESSIONAL FORECASTERS**
13 **[WOOLRIDGE DIRECT AT 57]. IS THE SURVEY OF PROFESSIONAL**
14 **FORECASTERS A RELIABLE SOURCE OF COST OF EQUITY**
15 **ESTIMATES?**

16 **A.** No. The economists included in the survey are macro economists who are
17 primarily concerned with forecasting factors such as GDP growth, inflation rates,
18 unemployment rates, job growth, and other macro-economic indicators. They are
19 not experts in forecasting the rate of return on the S&P 500.

20 **Q. DR. WOOLRIDGE ALSO CLAIMS THAT HIS RISK PREMIUM**
21 **ESTIMATE IS REASONABLE BECAUSE IT IS CONSISTENT WITH**
22 **THE RISK PREMIUM ESTIMATE FOUND IN THE GRAHAM HARVEY**
23 **SURVEY OF CHIEF FINANCIAL OFFICERS, MARCH 2013**
24 **[WOOLRIDGE DIRECT AT 56]. DO YOU AGREE THAT SURVEYS OF**
25 **BUSINESS MANAGERS PROVIDE USEFUL INFORMATION ON THE**
26 **EXPECTED OR REQUIRED RETURN ON EQUITY?**

1 A. No. Surveys of business managers provide little or no information on the expected
2 or required return on equity because: (1) managers have no incentive to take the
3 survey seriously; (2) their responses are not typically based on market
4 transactions or actual investment decisions; (3) their responses may reflect what
5 they think the investigator wants to hear; and (4) the response rate is frequently
6 low.

7 Furthermore, Dr. Woolridge fails to note that the authors of the CFO
8 survey report that managers responding to their survey typically use a cost of
9 equity or “hurdle rate” in making investment decisions that exceeds the cost of
10 equity estimate implied by their views of the expected return on the S&P 500. As
11 Graham and Harvey state, “Often their [the CFO’s] 10-year risk premium is
12 supplemented so that the company’s hurdle rate exceeds their expected excess
13 return on the S&P 500.” [John Graham and Campbell Harvey, “The Equity Risk
14 Premium in 2013,” pp. 8 – 9.]

D. FLOTATION COSTS

15 **Q. WHY DO YOU INCLUDE AN ADJUSTMENT FOR FLOTATION COSTS**
16 **IN YOUR DCF ANALYSIS?**

17 A. I include an adjustment for flotation costs because, without such an adjustment,
18 Duke Energy Ohio would not be able to recover all the costs it incurs to finance
19 its investments in electric plant and equipment.

20 **Q. DOES DUKE ENERGY OHIO ISSUE EQUITY IN THE CAPITAL**
21 **MARKETS?**

22 A. No. Although Duke Energy Ohio does not issue equity in the capital markets, its
23 parent must issue equity to provide Duke Energy Ohio the necessary financing to

1 make investments in its electric utility operations. If the parent is not able to
2 recover its flotation costs through Duke Energy Ohio's rates, it will not be able to
3 recover the full cost of issuing equity required to invest in Duke Energy Ohio.

4 **Q. DOES DR. WOOLRIDGE AGREE WITH YOUR FLOTATION COST**
5 **ADJUSTMENT?**

6 A. No. Dr. Woolridge claims that a flotation cost adjustment is inappropriate
7 because: (1) the company has not presented any evidence that it actually incurs
8 flotation costs when it issues new equity; and (2) it is frequently asserted that a
9 flotation cost adjustment is required to prevent dilution of the company's existing
10 shareholders, but existing shareholders cannot suffer dilution as long as the
11 company's stock price is above book value.

12 **Q. DO YOU AGREE WITH DR. WOOLRIDGE'S ASSERTION THAT THE**
13 **COMPANY DID NOT PROVIDE ANY EVIDENCE THAT IT INCURS**
14 **FLOTATION COSTS WHEN IT ISSUES NEW EQUITY?**

15 A. No. In Appendix 3 of my direct testimony, I present evidence that all companies
16 incur flotation costs when they issue new equity securities, that flotation costs
17 represent approximately five percent of the company's pre-issue stock price, and
18 that the company will not be able to earn a fair rate of return on its investment if it
19 does not recover its flotation costs.

20 **Q. DO YOU JUSTIFY FLOTATION COSTS ON THE GROUNDS THAT**
21 **FLOTATION COSTS ARE REQUIRED TO PREVENT DILUTION OF**
22 **EXISTING SHAREHOLDERS?**

23 A. No. I justify flotation costs on the grounds that a company will not be able to earn
24 a fair rate of return if it does not recover the flotation costs it incurs when it issues

1 new equity. My flotation cost adjustment is unrelated to a company's market-to-
2 book ratio.

VIII. CONCLUSION

3 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THESE**
4 **PROCEEDINGS.**

5 A. I recommend that the Commission accept my conclusion that the Company's
6 11.15 percent requested ROE is fair and reasonable and reject Dr. Woolridge's
7 recommendation that the Company be allowed to earn an ROE in the range
8 4.11 percent to 8.75 percent. For the reasons I set forth in my Rebuttal Testimony,
9 Dr. Woolridge has significantly underestimated Duke Energy Ohio's risk and cost
10 of equity.

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

12 A. Yes, it does.

REBUTTAL SCHEDULE 1
RESEARCH LITERATURE THAT STUDIES
THE EFFICACY OF ANALYSTS' EARNINGS FORECASTS

Abarbanell, J., and Reuven Lehavy (2003). "Biased forecasts or biased earnings? The role of reported earnings in explaining apparent bias and over/underreaction in analysts' earnings forecasts." Journal of Accounting & Economics 36: 105-146.

Banker, R. D., and Lei Chen (2006). "Predicting earnings using a model based on cost variability and cost stickiness." The Accounting Review 81(2): 285-307.

Brown, L. D., and Michael S. Rozeff (1978). "The superiority of analyst forecasts as measures of expectations: evidence from earnings." The Journal of Finance 33(1): 1-16.

Brown, L. D., Gordon D. Richardson, and Steven J. Schwager (1987). "An information interpretation of financial analyst superiority in forecasting earnings." Journal of Accounting Research 25(1): 49-67.

Brown, L. D., Robert L. Hagerman, Paul A. Griffin, Mark E. Zmijewski (1987). "Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings." Journal of Accounting & Economics 9: 61-87.

Brown, L. D. (1997). "Analyst forecasting errors: additional evidence." Financial Analysts Journal November/December: 81-88.

Ciccone, S. J. (2005). "Trends in analyst earnings forecast properties." International Review of Financial Analysis 14: 1-22.

Clarke, J., Stephen P. Ferris, Narayanan Jayaraman, and Jinsoo Lee (2006). "Are analyst recommendations biased? Evidence from corporate bankruptcies." Journal of Financial and Quantitative Analysis 41(1): 169-196.

Crichfield, T., Thomas Dyckman and Josef Lakonishok (1978). "An evaluation of security analysts' forecasts." The Accounting Review 53(3): 651-668.

Elton, E. J., and Martin J. Gruber (1972). "Earnings estimates and the accuracy of expectational data." Management Science 18(8): B-409 - B-424.

Elton, E. J., Martin J. Gruber, and Mustafa Gultekin (1981). "Expectations and share prices." Management Science 27(9): 975-987.

Elton, E. J., Martin J. Gruber and Mustafa N. Gultekin (1984). "Professional expectations: accuracy and diagnosis of errors." Journal of Financial and Quantitative Analysis 19(4): 351-363.

Fried, D. and D. Givoly (1982). "Financial analysts' forecasts of earnings : A better surrogate for market expectations." Journal of Accounting and Economics 4(2): 85-107.

Givoly, D., and Josef Lakonishok (1984). "Properties of analysts' forecasts of earnings: a review and analysis of the research." Journal of Accounting Literature 3: 119-148.

Gordon, D. A., Myron J. Gordon, and Lawrence I. Gould (1989). "Choice among methods of estimating share yield." Journal of Portfolio Management Spring: 50-55.

**RESEARCH LITERATURE THAT STUDIES
THE EFFICACY OF ANALYSTS' EARNINGS FORECASTS**

Keane, M. P., and David E. Runkle (1998). "Are financial analysts' forecasts of corporate profits rational." The Journal of Political Economy **106**(4): 768-805.

Malkiel, B. G., and John G. Cragg (1970). "Expectations and the structure of share prices." The American Economic Review **60**(4): 601-617.

Malkiel, B. G. (1970). "The valuation of public utility equities." The Bell Journal of Economics **1**(1): 143-160.

Newbold, P., J. Kenton Zumwalt, and Srinivasan Kannan (1987). "Combining forecasts to improve earnings per share prediction: an examination of electric utilities." International Journal of Forecasting **3**: 229-238.

Timme, S. G., and Peter C. Eisemann (1989). "On the use of consensus forecasts of growth in the constant growth model: the case of electric utilities." Financial Management **18**(4): 23-35.

Vander Weide, J. H., and Willard T. Carleton (1988). "Investor growth expectations: analysts vs. history." Journal of Portfolio Management **Spring**: 78-82.

Yang, R., and Yaw M. Mensah (2006). "The effect of the SEC's regulation fair disclosure on analyst forecast attributes." Journal of Financial Regulation and Compliance **14**(2): 192-209.

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Summary: Testimony Rebuttal of James H. Vander Weide, Ph.D on behalf of Duke Energy Ohio, Inc. electronically filed by Dianne Kuhnell on behalf of Duke Energy Ohio, Inc. and Kingery, Jeanne W. and Rocco D'Ascenzo