Appendix A to Rebuttal Testimony of Robert B. Hevert

(1) Interpretation of the Earnings Growth Rate Regression Analysis

Dr. Wilson criticizes the earnings growth regression analysis presented in Mr. Hevert's Direct Testimony as revealing "hardly anything about what causes P/E ratios to vary over time and between companies." Dr. Wilson also observes that "while forecasted earnings are 'statistically significant' in his regressions, they explain only 3.3% of the variation in the gas utility P/E ratios over the 52 month period considered, leaving 97% of the variation unexplained."[1]

(a) Clarification of the interpretation of the Earnings Growth Regression Results

First, the fact that the R-squared is low does not mean that the statistical significance or insignificance of the explanatory variables is somehow spurious. As discussed in my Direct Testimony, there is a strong theoretical foundation for the structure and results of my analyses.[2] Moreover, my findings are consistent with the studies conducted by Drs. Carleton and Vander Weide, and Harris and Marston. While Dr. Wilson may have preferred a higher R-squared, the fact remains that consistent with theory and prior research, the only growth variable that has a statistically significant and theoretically plausible relationship to the proxy group valuation metrics is earnings per share. Finally, Dr. Wilson has apparently concentrated his attention on the R-squared for the regression analysis, which is not the relevant statistic. The more important statistics (*i.e.*, the t- and

[1] Direct Testimony of John W. Wilson, at 17.
[2] Direct Testimony of Robert B. Hevert, at 41-44.

F-statistics) confirm the findings presented in my Direct Testimony regarding the relationship between EPS growth rates and P/E ratios for natural gas utilities.

The benefit of the tests used to calculate the t-statistic and the F-statistic is that these tests follow a distribution, so that one can determine a probability (or significance level) associated with the results of these tests, while R-squared does not allow one to determine whether the results are significant. Drs. Gujarati and Porter address this issue as follows:

> This example brings out an important empirical observation that in cross-sectional data involving several observations, one generally obtains low R^2 because of the diversity of the cross-sectional units. Therefore, one should not be surprised or worried about finding low R^2s in cross-sectional regressions. What is relevant is that the model is correctly specified, that the regressors have the correct (i.e., theoretically expected) sign, and that (hopefully) the regression coefficients are statistically significant.[3]

In order to determine whether the regression is significant, one must turn to the F-test; likewise to determine whether an individual independent variable is significant, given the other independent variables in the equation, one must rely on the t-test. As shown on Table 6 in my Direct Testimony, EPS is the only statistically significant explanatory variable.

[3] Damodar N. Gujarati and Dawn C. Porter, Basic Econometrics, Fifth Edition, McGraw-Hill International Edition, 2009, at 243.

(2) The Market-to-Book Ratio

Dr. Wilson asserts that "if the expected return exceeds the required return, the price of common stock will be greater than the stock's book value."[4] In that regard, Dr. Wilson appears to suggest that the appropriate outcome of the Constant Growth DCF estimate is a Market-to-Book ratio no greater than, or no less than unity. The following discussion explains why Dr. Wilson's assumptions are not correct.

(a) Explanation of the Market-to-Book Ratio

The Market-to-Book ratio equals the market value (or stock price) per share, divided by the total common equity (or the "book equity") per share. Book value per share is an accounting construct, which reflects historical costs. By contrast, the market value per share (*i.e.*, the stock price) is forward-looking, and is a function of many variables, including (but not limited to) expected earnings and cash flow growth, expected payout ratios, measures of "earnings quality", the regulatory climate, the equity ratio, expected capital expenditures, and the expected return on book equity.[5] It follows, therefore, that the Market-to-Book ratio likewise is a function of numerous variables in addition to the historical or expected return on book equity. Even if the number of relevant variables

[4] Direct Testimony of John W. Wilson, at 8.

[5] *See*, for example, Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 366. Please note that Dr. Morin cites several academic articles that address the various factors that affect the Market-to-Book ratio for utilities. In addition, the notion that book values should be set at a value approaching unity by regulatory commissions has been refuted for many years. As noted by Stewart Meyers in 1972: "In short, a straightforward application of the cost of capital to a book value rate base does not automatically imply that the market and book values will be equal. This is an obvious but important point. If straightforward approaches did imply equality of market and book values, then there would be no need to estimate the cost of capital. It would suffice to lower (raise) allowed earnings whenever markets were above (below) book." Stewart C. Meyers, *The Application of Finance Theory to Public Utility Rate Cases*, The Bell Journal of Economics and Management Science, Volume 3, No. 1(Spring 1972), at 58-97.

was more limited, the simple fact that the replacement value of assets exceeds their original cost suggests that the Market-to-Book ratio will exceed unity.

(b) Concerns regarding the theoretical relationship between the Market-to-Book ratios and required equity returns.

As a practical matter, no rational investor would invest in utility stocks if they believed that utility commissions would set rates in an effort to move the M/B ratio toward unity. If, for example, an investor purchased a utility stock at the long-term average M/B ratio for the proxy group of 1.79, as shown on Table 1, that investor would incur a loss of approximately 44.00 percent if the M/B ratio reached 1.00. Such a result would certainly impair a utility's ability to attract the capital required to support its operations.

There are many factors that affect the M/B ratio beyond the authorized or achieved ROE. As noted above, book value is based on historical costs for utility plant assets, many of which were acquired at significantly lower prices and which have been partially depreciated according to Commission-approved depreciation rates. However, despite the effects of inflation and depreciation over time, the regulated utility continues to use those assets to provide utility service to customers and to earn revenues and net income, both of which are reported in today's dollars. Therefore, the Market/Book ratio does not match the historical value of utility assets with the market value of those assets.

In addition, the notion that the Market-to-Book ratio should equal 1.00 is only appropriate to the extent that the strict assumptions of the Constant Growth DCF model

apply, and growth is defined as the product of the ROE and the retention ratio. As noted in the Rebuttal Testimony of Mr. Hevert, those assumptions clearly are not compatible with current market conditions. Consequently, there is no reason to assume that Market-to-Book ratios should reach unity.

If Dr. Wilson's assertion were true, then one would expect that investors would not be willing to pay market prices for utilities that were well above the book equity per share. However, as shown in Table 1 below, the Market-to-Book ratios for the proxy group have been consistently above unity, which suggests that the capital markets do not agree with Dr. Wilson's premise.

Table 1: Historical Market-to-Book ratios for Mr. Hevert's Proxy Group Companies

	MARKET-TO-BOOK RATIO								
	AGL	LG	GAS	NWN	PNY	SJI	SWX	WGL	**AVERAGE**
1990	1.70	1.28	1.88	1.36	1.60	1.34	n/a	1.45	**1.52**
1991	1.94	1.48	1.85	1.57	1.73	1.44	n/a	1.67	**1.67**
1992	1.94	1.72	1.95	1.53	1.87	1.65	0.86	1.81	**1.67**
1993	1.96	1.95	2.15	1.72	1.85	1.66	0.98	1.87	**1.77**
1994	1.47	1.60	1.72	1.44	1.66	1.25	0.86	1.46	**1.43**
1995	1.95	1.63	2.01	1.51	1.89	1.58	1.21	1.72	**1.69**
1996	2.00	1.76	2.43	1.56	1.79	1.52	1.35	1.77	**1.77**
1997	1.86	1.97	2.73	1.93	2.58	1.88	1.33	2.30	**2.07**
1998	2.02	1.84	2.64	1.56	2.41	1.67	1.70	1.95	**1.97**
1999	1.47	1.45	1.93	1.28	1.92	1.71	1.41	1.87	**1.63**
2000	1.92	1.56	2.78	1.48	2.31	1.70	1.30	1.99	**1.88**
2001	1.89	1.57	2.63	1.37	2.07	1.76	1.29	1.79	**1.80**
2002	1.94	n/a	2.06	1.44	1.98	1.69	1.31	1.52	**1.71**
2003	1.99	n/a	1.99	1.58	2.32	1.80	1.22	1.65	**1.79**
2004	1.84	1.84	2.17	1.60	2.08	4.25	1.32	1.76	**2.11**
2005	1.81	1.69	2.14	1.61	2.10	2.15	1.38	1.64	**1.81**
2006	1.88	1.86	2.41	1.93	2.26	2.21	1.78	1.73	**2.01**
2007	1.73	1.73	2.02	2.16	2.21	2.22	1.30	1.65	**1.88**
2008	1.46	2.08	1.61	1.87	2.61	2.30	1.07	1.56	**1.82**
2009	1.59	1.45	1.84	1.81	2.11	2.09	1.17	2.95	**1.88**
									1.79

Source: Bloomberg

For all of the reasons stated in this section, I ask the Commission to reject Dr. Wilson's thesis that M/B ratios above 1.00 indicate that authorized ROEs exceed investors' return requirements.

(3) Relevance of a Small Size Premium for National Grid NH

The purpose of this proceeding is to establish the appropriate ROE for National Grid NH on a stand-alone basis. Therefore, it is appropriate to consider the small size of National Grid NH compared to the proxy group companies because if the Company were publicly traded, it would be competing for capital against larger, more diverse natural gas utilities. Although the Company is part of National Grid plc, it must still compete for capital with other operating subsidiaries based on their relative risks. As with any enterprise, National Grid must allocate its capital investments based on the expected risk-adjusted returns. Since small size is a recognized and meaningful element of risk, it is appropriate to reflect that risk in the Company's cost of equity.

As discussed in my Direct Testimony, the academic community has recognized the effect that small size has on stock returns and the required cost of equity.[6] In particular, Fama and French developed a "three factor" model to explain expected security returns. I applied the Fama-French model in my Direct Testimony, and developed a regression equation to study average daily returns for Laclede Gas, South Jersey Industries, and

[6] Direct Testimony of Robert B. Hevert, at 79.

Southwest Gas. The results of that regression analysis showed that the size factor was positive and highly statistically significant.[7]

As noted above, the relevant analytical perspective is the Company's size relative to the proxy group. In that regard, there is little question that National Grid NH is measurably smaller than the comparison group and by that measure, is incrementally more risky. It also is true that the proxy companies themselves are susceptible to the small size effect. Consequently, contrary to Dr. Wilson's assertion, it is reasonable and appropriate to reflect the Company's small size in the estimated cost of equity. That said, as in my Direct Testimony, I did not make a specific adjustment for that risk; rather, I considered it in determining where the Company's cost of equity falls within the range of analytical results.

(4) The consideration of common equity flotation costs in determining the cost of equity

Dr. Wilson argues that National Grid NH does not incur flotation costs because none of its equity capital is obtained through public offerings since the Company is wholly-owned by National Grid plc.[8]

As discussed above in relation to the small size premium, the purpose is to establish the appropriate ROE for National Grid NH. The fact that the Company is an operating

[7] *Ibid*, at 79-80.
[8] Direct Testimony of John W. Wilson, at 36.

subsidiary of a larger organization does not preclude it from incurring equity issuance costs. When National Grid issues common stock to fund the operations of its wholly-owned subsidiaries, it incurs flotation costs, which are appropriately allocated to the unit which received the equity capital. Therefore, the recovery of flotation costs is another factor in National Grid's decision to allocate capital to its operating subsidiaries. To the extent flotation costs cannot be recovered, National Grid NH is less able to compete for equity capital than other operating subsidiaries, which are allowed to recover this cost, and shareholders in National Grid (the parent company) are penalized.

Furthermore, Dr. Wilson has advocated use of a "fundamental growth" rate in his DCF analysis. The fundamental growth rate assumes growth attributable to both an increase in earnings per share and an increase in the number of shares outstanding. Therefore, Dr. Wilson has utilized a growth rate, which implicitly assumes growth in the number of shares, but fails to recognize that there are legitimate issuance costs associated with those new shares, which should be recoverable through rates.

(5) Decoupling Event Study

It is possible to conduct an empirical analysis to assess investors' reactions to the implementation of decoupling structures. To the extent that investors perceive significantly lower risk for companies that implement decoupling structures, the implementing companies' returns should be less volatile with the decoupling mechanism than they were prior to the implementation of the decoupling mechanism. This hypothesis can be tested by analyzing the relationship between the implementing

company's stock returns and an index of gas utility returns over time. Much as a lower Beta coefficient in the CAPM reflects lower systematic risk, the effect of decoupling likewise would be reflected in a lower slope coefficient when the subject company's returns are regressed on the market index.[9]

In order to test whether there is a difference in returns for individual companies that have implemented decoupling structures, in order to do so, weekly returns were modeled based on the following specification:

$$r_{i,t} = a + b(r_{g,t}) + e \qquad [1]$$

where:

$r_{i,t}$ = weekly return for company *i*

a = intercept term

b = slope term

$r_{g,t}$ = monthly return on the natural gas utility index

e_t = error term for week *t*

Based on Equation 1, a regression was performed for each of the five proxy group companies that have implemented revenue stabilization mechanisms for greater than 50.00 percent of their total residential and commercial net revenue (GAS, NWN, PNY, SJI, and WGL) between 2000 and 2009. In order to ensure that the error terms are not serially correlated, the regression analyses were run using the Prais-Winsten

[9] Please note that the Beta coefficient in the CAPM is the slope coefficient when the subject company's returns are regressed on the market average return.

autocorrelation correction routine. In all cases, in the final equation, the Durbin-Watson statistics indicate no serial correlation in the error terms.

As noted earlier, if investors believe that the effect of decoupling mechanisms so materially reduces risks relative to similar investments, which are modeled in this case as an index of natural gas utilities, the return volatility and, therefore, the slope coefficient would decrease in the post-implementation period for those companies that implement decoupling structures. If, however, investors do not attribute significant risk reduction relative to the gas utility index as a result of the decoupling structures, the slope coefficient should not decrease in the post-implementation period.

For purposes of this analysis, I tested the hypothesis that decoupling structures cause investors to reduce return requirements relative to similar risk investments by calculating Equation 1 in the pre- and post-implementation periods for all five companies noted previously.[10] Table 2 below demonstrates that the slope coefficient did not decrease in the post-implementation period, suggesting that investor return requirements for the company more closely approximated the return requirements for the market index following the implementation of the decoupling mechanism. Consequently, it is reasonable to concluded that investors do not reduce their return requirements relative to comparable investments specifically as a result of the implementation of decoupling structures.

[10] The event date in this analysis is the date of the commission decision to approve a decoupling mechanism.

Table 2: Decoupling Event Study Results[11]

	State	Docket Number	Filing Date	Order Date	Entire Period (t-stat)	Prior to Event Date (t-stat)	Post Event Date (t-stat)
GAS	IL	08-0363	4/29/2008	3/25/2009	0.7318 (20.47)	0.6979 (15.98)	0.8177 (11.48)
NWN	OR	UG 143	6/1/2001	9/12/2002	1.0026 (13.18)	0.6863 (9.50)	1.1384 (10.47)
PNY	NC	G-9, SUB 499	4/1/2005	11/3/2005	0.5535 (11.36)	0.5700 (9.11)	0.5670 (7.71)
SJI	NJ	GR05121019	12/5/2005	12/12/2006	0.8248 (8.41)	0.6105 (4.62)	1.0944 (8.33)
WGL	MD	8990	3/31/2003	8/8/2005	0.5638 (13.24)	0.5328 (8.84)	0.5710 (9.47)

Since it is possible that the market reflected the effect of decoupling at an earlier point in the regulatory process, an additional analysis was conducted changing only the decoupling event date to the midpoint of the date on which the company filed its request for decoupling and the date of the commission decision on decoupling. The results of that analysis, which are presented in Table 3, below, are generally consistent with the results discussed above; the slope coefficients in the post-implementation period did not decline, again suggesting that investor return requirements were not reduced as a result of the implementation of decoupling.

Table 3: Decoupling Results - Event Date at the Midpoint of the Filing and Order Dates

	State	Docket Number	Filing Date	Order Date	Entire Period (t-stat)	Prior to Event Date (t-stat)	Post Event Date (t-stat)
GAS	IL	08-0363	4/29/2008	3/25/2009	0.7173 (16.40)	0.7200 (6.30)	0.7160 (15.57)
NWN	OR	UG 143	6/1/2001	9/12/2002	0.8676 (8.64)	0.8813 (5.12)	0.8685 (9.60)
PNY	NC	G-9, SUB 499	4/1/2005	11/3/2005	0.6566 (12.94)	0.7395 (8.68)	0.6351 (10.86)
SJI	NJ	GR05121019	12/5/2005	12/12/2006	0.5512 (7.33)	0.4909 (4.63)	0.5734 (5.47)
WGL	MD	8990	3/31/2003	8/8/2005	0.5865 (8.94)	0.4869 (6.89)	0.7570 (6.32)

The results of these empirical analyses find no support for the proposition that investors would measurably reduce their return requirements as a direct result of the Company's proposed decoupling structure.

[11] The results in Table 1 are based on an event date that was at the date of the order.