Robert Hobbs
Email: rhhobbs@shaw.ca
Phone: (604) 742-1990

November 5, 2012

Via Email

Ms. Erica Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

Re: Generic Cost of Capital Proceeding Order No. G-20-12 (Project No. 3698660)

By Order G-47-12, the Commission issued the Final Scoping Document for the above noted proceeding, and by Order G-84-12 the Commission established the Regulatory Timetable. As contemplated in the Final Scoping Document and the Regulatory Timetable, the ICG respectfully files the attached written evidence from Dr. Andrew Safir.

Yours truly,

(original signed)

Robert Hobbs

cc Registered Parties

Attachments

BEFORE THE
BRITISH COLUMBIA UTILITIES COMMISSION

PREPARED EVIDENCE OF

DR. ANDREW SAFIR

on Behalf of the

INDUSTRIAL CUSTOMERS GROUP

November 5, 2012

Recon Research Corporation
Suite 1604
6380 Wilshire Boulevard
Los Angeles, CA 90048

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INTRODUCTION

Q1 **Please state your name, business address and occupation.**

A1 My name is Dr. Andrew Safir and I am President of Recon Research Corporation. My business address is Suite 1604, 6380 Wilshire Blvd., Los Angeles, CA 90048.

Q2 **What is your educational background and experience?**

A2 I received a Bachelor of Arts degree in economics and psychology from the University of Colorado in 1969, a Master of Arts in economics from Tufts University in 1970, and a Ph.D. in economics from Tufts University in 1975.

During the 1970s, I held a variety of positions with the U.S. Government. In 1972, I held a staff position on the President's Council of Economic Advisers. In 1973, I held a similar position on the White House staff. In 1974, I moved to the Department of Justice, where I served as a senior advisor on economic policy matters, including those pertaining to energy and finance. In 1975, I was appointed as the Assistant Director of the Office of International Energy Policy at the U.S. Treasury. I left that position in 1978 to join the Administration of Governor Edmund G. Brown, Jr., as Chief Business Economist for the State of California. However, I remained a special advisor to the U.S. General Accounting Office specializing in energy, international finance and national security matters throughout much of the 1980s. I founded Recon Research Corporation in 1980, and have remained the President of this economic and energy consulting firm for the past 32 years.

Between my government and private sector experience, I have been dealing with energy issues for more than 35 years. Over this period, I have provided energy consulting services and expert testimony throughout the U.S. and Canada, as well as in the U.K. and Australia. I have previously testified before the National Energy Board ("NEB"), including evidence given in RH-3-2011, RH-001-2011, RH-1-2010, RH-1-2008, RH-2-2007, MH-1-2006, GH-1-2004, RH-3-2004, RH-2-2004, RH-1-2002, RH-4-2001, RH-1-99, and RH-2-94. I have also testified in a number of proceedings before the Alberta Utilities Commission including the Generic Cost of Capital review in 2009, Application No. 1578571.[1]

PURPOSE AND SUMMARY OF EVIDENCE

Q3 **What is the purpose of your evidence in this proceeding?**

A3 I have been asked by the Industrial Customers Group ("ICG"), customers of FortisBC Inc. ("FBU"), the electric utility serving southern British Columbia, to recommend a fair and economically reasonable return on equity ("ROE"), for a benchmark utility under the jurisdiction of the British Columbia Utility Commission ("BCUC," or "Commission") for 2013.[2] I have also been asked to determine if FortisBC Energy ("FEI") can serve as the benchmark utility and to comment on the appropriateness of re-instituting a formulaic Automatic

[1] See Attachment A.

[2] FortisBC Inc. is an integrated electric utility operating in the southern interior of British Columbia, serving approximately 162,000 customers directly and indirectly. *Fortis Inc. 2011 Annual Report*, p. 11.

Adjustment Mechanism ("AAM") for use in establishing the ROE for subsequent years.[3]

Q4 **Please summarize your primary findings and opinions in this proceeding.**

A4. First, although a number of "benchmarks" could be developed against which to apply a representative equity return, it is most efficient and economically reasonable to use FEI as the "benchmark" utility in this proceeding. Second, at least three methods of calculating a fair return – an equity risk premium model such as the Capital Asset Pricing Model ("CAPM"), the Discounted Cash Flow ("DCF") model and the Comparable Earnings ("CE") model – can be useful in arriving at an appropriate benchmark equity return. Third, these models can be weighted equally in determining the regulated rate of equity return, assuming they are estimated appropriately. That is, if they are estimated appropriately, there is no inherent economic benefit in favoring one over another. Fourth, on the basis of the calculations presented here, and an equal relative weight assigned to each methodology, the recommended "benchmark" equity return for FEI is 7.6%. Fifth, I believe it is appropriate to re-institute the AAM, but limit it to three years, and follow this time span with a cost of capital rate hearing.

Q5 Why do you believe that FEI today is the appropriate benchmark for the generic cost of capital proceeding.

A5 There are several reasons, many of which were articulated in the prehearing conference in this proceeding on October 4, 2012. First, there is an efficiency issue

[3] Distinct from FBU, FEI is the largest distributor of natural gas in British Columbia, serving approximately 852,000 customers in more than 100 communities. *Fortis Inc. 2011 Annual Report*, p. 10.

involved. If an economically reasonable utility can be found that meets most requirements of a hypothetical one, it makes sense to develop a benchmark which requires no adjustment to make it immediately relevant to at least one required applicant. In addition, as a benchmark is simply a "numeraire," or neutral starting point for evaluating deviations from that point, both up and down, there is no bias in utilizing an actual entity for that purpose.

Second, FEI does appear to meet most requirements for a benchmark in any case. It has a large geographic and diverse customer and asset base, and has a relatively "pure play" profile at the present time. That is, it is currently a gas distribution utility and can be evaluated apart from other components of its overall corporate structure. Moreover, it is BC based and, because of that, experiences many of the economic, regulatory and business risk factors common to all parties ultimately reviewed in relation to the benchmark.

Finally, a benchmark should be as comprehensive a construct as possible. A hypothetical utility simply can never have as rich a set of potential variables against which to test alternatives than an actual one, with a real capital structure, risk profile, and economic circumstances.

Consequently, I see no downside in starting with FEI today as the numeraire or benchmark for which to develop an economically reasonable estimate of the return on equity.

Determining the Appropriate Cost of Equity for a Benchmark Utility

Q6 What is the "fair return" standard?

A6 The standard for a "fair return" arises from both legal and economic precedents and have been discussed in numerous Provincial decisions as well as those of the National Energy Board ("NEB"). Typically, as stated by utilities, this principal involves ensuring a regulated utility the opportunity to (a) attract capital on reasonable terms; (b) earn a return on investment commensurate with that of enterprises of comparable risk; and, (c) maintain its financial integrity. It is sometimes shortened to "an opportunity to earn competitive returns of and on capital," and is often referred to by utilities as "the regulatory compact." In reality, however, the fair return standard is really broader than the regulatory compact as it relates fundamentally to the regulatory bargain that exists between utility ratepayers, utilities and the regulatory commissions which oversee utility services.

Regulation is imposed to acquire the benefits of large scale efficiencies while protecting customers of those services from the potential exercise of monopoly power. It is designed to emulate competitive outcomes that would otherwise be unobtainable. As a result, regulation is imposed over utilities for the benefit of customers, not for the benefit of utilities themselves. Consequently, where a range of competitive returns is available for evaluation, the outcome of a "fair return" should always favor the lower range presented. This helps ensure the avoidance of monopolistic returns which are more or less inherent in the structure of utility earnings. There is nothing unfair in this approach, in that even the lower range of competitive alternatives should still provide a utility with the opportunity to compete for investable capital and maintain its existing capital structure.[4]

[4] This is in direct opposition to the position stated by FortisBC Utilities' witness Ms. Kathleen McShane. See Kathleen C. McShane, *Testimony on Cost of Capital for the FortisBC Utilities*, August 2012 p.9.

Q7 **What are the different approaches to estimating competitive equity returns for a benchmark utility.**

A7 There are basically three different approaches, although analysts may differ on how they should be utilized in evaluating empirical data. Specifically, competitive equity returns are typically estimated for a benchmark utility using some variant of a Capital Asset Pricing Model ("CAPM"), a Discounted Cash Flow model ("DCM") or a Comparable Earnings model ("CE"). In fact, most analysts calculate all three, either for purposes of generating a weighted average recommendation or in order to compare and contrast a favored choice method with other "less optimal" ones.

Capital Asset Pricing Model

Q8 **What are the theoretical underpinnings of the CAPM?**

A8 A commonly accepted method for estimating the expected return to equity is to apply the CAPM. In this approach, the expected return to equity is directly related to the level of risk. The starting point for the analysis is the risk-free rate of interest. The market source for the risk-free rate is typically the yield to maturity on government borrowings.[5]

[5] Government borrowings are used as an indicator of the risk-free rate because generally there is little risk of default. Therefore, if the bonds are held to maturity, the yield is a very good indicator of the market's value for the risk-free rate. However, the yield to maturity differs among government borrowings, depending on the length of time to maturity. The proper risk-free rate would be taken from the government bond whose time to maturity most clearly matches the life expectancy of the asset whose income stream is being valued.

Investments other than risk free government bonds have more variable returns. To compensate for the increased risks from greater variability, investors must on average receive greater returns than the risk free rate of return. This additional return over and above the risk free rate faced by owners of equity investments is referred to as the "risk premium."

Note, however, that part of the risk faced by an equity owner of a particular asset can be diversified away through ownership of a portfolio of many different equity assets. Therefore, the relevant measure of risk is the degree to which the return to an equity owner varies in comparison to the return to a completely diversified market portfolio.[6]

How a specific investment performs relative to the market portfolio provides the basis for calculating the *risk entailed in the specific investment*. The measure of an investment's non-diversifiable market or systematic risk is referred to as *beta* (ß). Beta measures the sensitivity of the returns over time for a specific investment relative to the returns of a diversified portfolio. A beta value of 1 indicates that the change in the returns to a specific investment equals the change in returns one would expect if an investment were made in a fully diversified portfolio.

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[6] Conceptually, the CAPM separates risk into two parts. The first is referred to as unsystematic or diversifiable risk. It represents the amount that can be avoided by diversifying investments into a portfolio drawn from all the available market investments. The other component is labeled systematic or market risk. This is the amount of risk that *cannot* be avoided by investing in a diversified portfolio.

Because some individual investments may perform better while other investments are doing less well, a diversified portfolio of many different investments can achieve the same average returns, but at a lower risk. Therefore, some, though not all, of the risk of investments can be eliminated by diversifying. A comparison over time of the returns on risk-free government bonds to the average return on a highly diversified portfolio of stocks (such as the returns from the S&P 500) gives a measure of the risk premium from an investment in a diversified portfolio of risky stocks.

Investments with betas greater than one are associated with greater risks than a diversified portfolio. In these instances, their returns will change by a proportionately larger amount than the change in the market as a whole.[7]

Mathematically, the CAPM can be expressed in the following form:

$$k_E = R_F + ß(RP)$$

where k_E = expected return on equity (equity discount rate)

R_F = risk-free rate of return

RP = risk premium

ß = beta, a measure of non-diversifiable risk

In this model, k_E represents the appropriate discount rate for an investment in a company's equity or stock. R_F is the risk free rate of return, typically calculated from the current yield on government securities. RP represents the risk premium, the amount over and above the risk-free rate of return. It is typically based on the average historical returns for a completely diversified portfolio of stock investments such as the S&P 500. This expression captures the extra amount of risk that would be accepted in conjunction with the anticipated higher returns of the diversified stock portfolio. The expression ß(RP) gives the risk premium for the specific investment. The risk-premium for a diversified portfolio is adjusted

[7] For example, a beta of 1.2 indicates that when the market return increases by 1% (say from 11% to 12%), the specific investment has an increase in its returns of 1.2 (say from 15% to 16.2%).

by a factor (ß) representing the riskiness of the particular investment relative to the market.

Q9 **What variables are actually utilized in deriving the cost of equity under this approach.**

A9 In order to actually derive a competitive cost of equity capital utilizing the CAPM, information is required on (a) the risk free rate of return faced by investors having the option to invest in the benchmark utility, (b) the overall stock market return available to potential benchmark utility investors, (c) the variability of utility investment returns relative to those of the overall stock market portfolio, and (d) any transactions costs faced by actual utility investors.

The risk free rate can be represented by the forecasted rate on the Canadian Long Bond. The overall stock market return is based on the average annual returns of the S&P/TSX Composite index. The variance of specific utility stocks in relation to the stock market as a whole is represented by the "beta" term in the equation. In reality, this is an average of the covariance of a number of stocks with similar characteristics to the benchmark utility in relation to a general stock portfolio. The "beta" is a proxy for the relative risk faced by utility investors. A beta of less than one generally denotes an investment risk less than that of the market as a whole, and beta of greater than one denotes a higher than average market risk. Transaction costs, typically referred to as "floatation costs," are simply added once the other elements of the CAPM estimate is derived.

Q10 **Have you calculated a CAPM estimate for FEI as the benchmark utility?**

A10 Yes. On the basis of the CAPM approach, I have calculated that a competitive return on equity for FEI at the current time should be approximately 7%. This represents a weighted average of separate CAPM estimates for the United States and Canada, as discussed below.

Q11 **How have you calculated the CAPM estimate for Canadian Companies?**

A11 Table 1 provides a CAPM estimate based primarily on Canadian data. Basically, the approach taken is to utilize Canadian data where possible, but allow for the modification of that information where necessary from inputs derived from the broader U.S. capital markets. Relying primarily on financial metrics from the Canadian market, the equity return derived from the CAPM is about 6.5%.

Table 1
Canadian CAPM Equity Return Estimate

Risk-free rate (R_f)		4.00%
Market Risk Premium (MRP)		5.96%
Annual Total Market Return (1924-2010)	11.66%	
Est. Annual Long Bond Income Return (1924-2010)	5.70%	
Adjusted Beta [B_r*(0.67) + B_t*(0.33)]		0.36
Recon calculated "raw" beta (B_r)	0.25	
Long run market tendency beta (B_t)	0.58	
Utility Risk Premium (B*MRP)		2.15%
Unadjusted Cost of Equity ($K_e = R_f$ + B*MRP)		6.15%
Flotation Cost (FC)	5.00%	
Floatation Cost Allowance [FCA = K_e(FC/(1-FC))]		0.32%
Cost of Equity = ($K_e = R_f$ + B*MRP) + FCA =		6.47%

Q12 **How did you estimate the long bond income return from 1924-2010?**

A12 The annual total Canadian bond return over the 1924-2010 can be calculated from information provided by Statistics Canada. However, the appropriate measure to use in determining the market risk premium is only the income portion of that return.[8] U.S. data reported by Ibbotson provides both a long term total bond return and a total bond income return for essentially the same period (1926-2011).[9] As a result, the ratio between these two series (1.14%) provided a reasonable adjustment proxy by which to divide the average total Canadian bond return and thereby derive the long term annual Canadian bond income return of 5.7%

Q13 **How did you estimate the "raw beta" used in your CAPM calculation?**

A13 The "raw" beta was calculated by regressing the annual return to each of 5 Canadian companies sharing general characteristics of an appropriate Canadian benchmark (including metrics of the actual benchmark chosen) against market returns as a whole using a 60 month time series to calculate each annual data point from 2008 through October, 2012. In this manner the beta coefficient in each equation is equivalent to the covariance of the utility and market returns divided by the variance of the market return as a whole. This estimation procedure is consistent with most calculation techniques to derive individual corporate betas typically used in analyzing financial risk. The companies chosen for this analysis

[8] The income return does not include any capital appreciation, which occurs because of changes in bond prices during a specific period. As a result, income returns better captures the riskless portion of the return. See *Ibbotson SBBI 2012 Valuation Yearbook*.

[9] *Ibbotson SBBI 2012 Valuation Yearbook*.

included Canadian Utilities, Emera, Enbridge, Fortis, and TransCanada.[10] The raw average of these individual beta estimates over the 2008 to October 2012 period was approximately 0.25. (See Safir Schedule 1.)

Q14 **Why should these "raw" numbers be "adjusted" prior to use in estimating the cost of capital?**

A14 Beta estimates can vary widely from year to year, and relying on any particular time period may not accurately reflect the actual systematic risk faced by investors in any particular industry sector. Consequently, in order to better capture long terms trends which may affect industry risk, "raw" beta numbers are often adjusted to allow for the possibility that they will under or over estimate the actual sectoral risk faced by industry participants. This adjustment can be done in several ways. For example, some analysts simply assume that the long term risk of the utility sector is essentially similar to that of the market as a whole, and postulate that all betas tend toward one over time. On that basis, while the bulk of the weight in any adjustment formula is placed on the "raw" results, some percentage of one is also included to reflect what is assumed to be the long term trend.

Q15 **Have you taken this approach in your own calculations?**

A15 No. Although I believe long term trends should be taken into account, the notion that long term betas in the utility industry trend toward one is not in keeping with economic theory or empirical investigation. As a theoretical matter, the utility industry should have lower risk than the market as a whole. It has a regulated rate

[10] This is the same data set of companies used by Ms. McShane in her Canadian analysis.

structure and is designed to supply monopoly services. As a result, its revenue structure is highly stable and not subject to much variability in relation to industries more prone to economic cycles. Thus the utility sector should have relatively low earnings variability in relation to the market average, and consequently a long term beta substantially less than one. In addition, as an empirical matter, a wide range of "beta" studies – at least 11 of them – undertaken with North American industry data suggest that utility "betas" have ranged from 0.35 to 0.77 over the past 40 years**,** with an average value of 0.58. This is in keeping with the theoretical understanding that betas should be well less than "one" on average in this industry.[11]

Q16 **How have you calculated the "adjusted" beta used in your CAPM estimate?**

A16 I have assumed that "raw" betas adjust toward industry norms over time. To reflect that trend in an empirical result, I have weighted the "raw" beta of 0.25 by 66% and the observed industry average in the Schaeffler & Weber survey, 0.58, by 34%. As a result, my adjusted beta is 0.36.

Q17 **Why have you included a Floatation Cost Allowance of 0.5% in your CAPM calculation?**

A17 When new issues of equity capital are sold to investors, the issuing company incurs transactions costs such as underwriting fees, legal expenses and prospectus preparation costs. These cost are referred to as flotation costs. Much like loan fees

[11] See Shaeffler & Weber for a range of beta estimates in studies surveyed since 1971 regarding the capital cost requirements of the utility sector. The results from the 11 studies used here reflect only those related to utilities in North America. [Stephan Schaeffler and Christoph Weber, "The Cost of Equity of Network Operators - Empirical Evidence and Regulatory Practice," June 2012.]

or points on a mortgage, flotation costs effectively reduce the net proceeds that a firm will receive from issuing securities. Canadian utility regulators typically allow the cost of capital to be adjusted upward to reflect the expected flotation expenses. A recent study by the California State Board of Equalization has surveyed flotation costs for "A" and "B" rated U.S. natural gas distribution companies and determined that these costs were approximately 4.5% of the recommended rate of return.[12] I have used 5% to reflect the marginally higher costs that would be faced by Canadian issuers either crossing the border to utilize the U.S. market or in issuing in the smaller Canadian capital market.

Q18 **How do flotation costs affect your estimated ROE?**

A18 Because flotation costs reduce the net proceeds available to a firm for investment purposes, it means that the company will have to generate an effectively higher internal return to satisfy investors' demands for a competitive opportunity cost return. For example, assume investors purchase $10,000 worth of equity and expect a 10% return. As a result, the utility must generate $1,000 in profits to satisfy that demand. However, if flotation costs were 20%, then utility would only have $8,000 available to generate the $1,000 in profit. This means that the effective return to the utility would have to be 12.5% ($1,000/$8,000). Mathematically, the effect of flotation costs on the required return to equity is to increase it by a factor of $[1/(1-f_c)]$, where f_c represents the flotation costs expressed

[12] See Flotation Cost Adjustment Table for Natural Gas Distribution Utilities, David Gau and John Thompson, "Capitalization Rate Study," California State Board of Equalization, 2012.

as percentage of the issue value accounted for by the flotation costs. As a result, flotation costs of 5.0% increase the ROE by a multiple of about 5.26%.[13]

Q19 **Do you include any other "adders" to your Canadian CAPM estimate?**

A19 No. While regulators have in some instances included an additional adder to both CAPM and DCF estimates to reflect a concern that the "allowed return" provided by these estimation methods may potentially fall short of a "fair return" standard, I do not think this is appropriate. If the cost of capital is calculated properly, it should – more likely than not – meet the fair return requirement of the benchmark utility without any arbitrary return "adder."

Q20 **What is the CAPM estimate that results from the utilization of U.S. data?**

A20 The CAPM estimate utilizing U.S. data is presented in Table 2.

[13] The assumption of flotation costs explicitly assumes that these costs are not part of the utility's cost of service. It should also be noted that not all analysts believe that market conditions warrant a flotation costs adder. In particular, see Division of Ratepayer Advocates, California Public Utilities Commission, "Report on the Cost of Capital for Test Year 2013," A.12-04-015 et al, pp. 5-69 to 5-71.

Table 2
CAPM Equity Return Estimate for U.S. Companies

Risk-free rate (R_f)		4.50%
Market Risk Premium (MRP)		6.62%
Annual Total Market Return (1926-2011)	11.77%	
Est. Annual Long Bond Income Return (1926-2011)	5.15%	
Adjusted Beta [β_r*(0.67) + β_t*(0.33)]		0.48
Recon calculated "raw" beta (β_r)	0.43	
Long run market tendency beta (β_t)	0.58	
Utility Risk Premium (β*MRP)		3.18%
Unadjusted Cost of Equity ($K_e = R_f$ + β*MRP)		7.68%
Flotation Cost (FC)	5.00%	
Floatation Cost Allowance [FCA = K_e(FC/(1-FC))]		0.40%
Cost of Equity = ($K_e = R_f$ + β*MRP) + FCA =		8.08%

Q21 **Are there any differences in estimation techniques between the U.S. and the Canadian estimates?**

A21 No. The only real differences are the data inputs. Obviously, the companies included in the analysis are U.S. based, and information on market equity and bond returns covers a slightly different time period (1926-2011 in contrast to 1924-2010).[14] Apart from that, the approach taken for adjusting betas and applying the financing flexibility percentage remains the same.[15] As might be expected, however, given that the business risk faced by U.S. utilities is somewhat greater

[14] In my selection of companies for the U.S. CAPM estimate, I included eighteen companies, the twelve utilities Ms. McShane used, plus six additional utilities.

[15] See Safir Schedule 2 for U.S. betas.

than that faced in Canada, the overall CAPM estimate is a bit higher, at about 8.1%.

Q22 **Should the U.S. CAPM estimate be given any weight in the construction of a CAPM equity return recommendation for the Canadian benchmark utility?**

A22 Yes it should. The economies and capital markets of both the United States and Canada are closely aligned. Canadian firms routinely borrow and invest on both sides of the border as do U.S. companies. As a result, U.S. economic trends and values should have an influence on the capital and rate of return requirements of the Canadian utility sector and therefore the appropriate equity rate of return afforded the Canadian "benchmark" utility.

Q23 **How do you propose to take the U.S. influence into account?**

A23 The most straightforward method for doing this is to provide a modest weight to U.S. equity returns in recommending a benchmark number. In my view, a weight of approximately one third would allow for such an influence while still ensuring Canadian economic factors and empirical outcomes will provide the predominate inputs in formulating the benchmark equity return ultimately adopted by the regulator. On this basis, the recommended CAPM equity return for use in evaluating a "benchmark" estimate is 7.01%

Q24 **How does the result of your CAPM analysis differ from the CAPM prepared by Ms. Kathleen McShane, the expert for the FortisBC Utilities ("FBCU") in this proceeding?**

A24 The cost of equity based on the CAPM approach in my calculation is 7%. According to Ms. McShane, this same approach should generate a cost of equity closer to 10%. Consequently, there exists a gap between our assessments of about 300 basis points.

Q25 **What generates this empirical gap?**

A25 Three primary differences are apparent. First, Ms. McShane has a market risk premium that varies from 7.25 to 7.50%. I have estimated a market risk premium on average between my U.S. and Canadian data sets of about 6.2%. Second, Ms. McShane has calculated an adjusted beta to be between 0.65 and 0.70. My weighted average adjusted beta is 0.40. Third, in the event that the CAPM results are to be relied upon most heavily by regulators, she recommends an "adder" for both financial flexibility and the assurance of meeting the "fair return" standard of at least 100 basis points. I have included only an adder for flotation costs equal to about 5% of my CAPM estimate.

Q26 **Do you feel the calculation made by Ms McShane is a reasonable one?**

A26 No, I do not. First, the equity risk premium generated by Ms. McShane is simply not one that is supported by the CAPM approach. The calculated difference between long term stock earnings and the long term risk free rate forecast is in the range of 6%. Ms. McShane arbitrarily ups this premium to between 7.25 and 7.50 to reflect her belief that in past periods when risk free rates have been in the 4% range, risk premiums have been higher than 6%. Although this may be the case, other factors affecting business risk may also have been higher during those periods as well.

There is simply no empirical evidence or theoretical rationale for substituting an exogenous market risk premium of this magnitude within the CAPM formula.[16] This is particularly true when such adjustments serve to increase the equity cost of capital generated from the model by over 100 basis points.

The second problem with Ms McShane's CAPM analysis is her beta calculation, and the impact that has in conjunction with her higher market risk premium in the calculation of utility specific risk. Both of us arrive at essentially the same "raw" beta from the Canadian data set. However, Ms. McShane chooses to adjust this number toward a long term beta of "one." As I indicated earlier, there is simply no theoretical or empirical basis for adopting a long term trend in utility betas which would approach one in either the Canadian or U.S. market. As a result, her adjusted beta is higher than it should be.

Finally, Ms. McShane uses what I believe to be an unacceptably high financing flexibility adder of 10%. As I indicated earlier, the supportable number is no higher than 5%.

Overall, the inflated beta, the unsubstantiated market risk premium, and other unexplained additions act to increase the utility risk premium used in Ms. McShane's CAPM calculation to well over twice the level it would be without these adjustments. All in, Ms. McShane's utility risk premium is between 5.2 and 5.6%. My own estimate is on the order of 2.5%.

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[16] See, for example, Pablo Fernandez *et al.*, "Market Risk Premium Used in 56 Countries in 2011: A Survey with 6,014 Answers," April 2011. Here the authors solicit 6,014 market risk premium estimates from academics, consultants and regulators. 36 survey participants reported on Canadian market risk premiums with an average premium of 5.9%.

DCF Estimates

Q27 **Have you conducted any other estimates of the cost of equity?**

A27 Yes. I also estimated the appropriate cost of equity by the development of a Discounted Cash Flow Model (DCF).

Q28 **What is the basis for the DCF?**

A28 The DCF begins with the theoretical recognition that the price paid for a stock share reflects current and potential owner's anticipations of the returns that can be earned. In particular, stock ownership is anticipated to result in a continual payment of future dividends. As a result, today's current price for a stock share would equal the discounted value of the anticipated future dividends. If dividends are anticipated to grow over time, then the current stock price would also reflect this appreciation. Mathematically, the stock price can be expressed as

$$P = \frac{D_1}{(1+r)} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \ldots + \frac{D_t}{(1+r)^t}$$

where

P = current price

D_t = Dividend payment in periods 1, 2, … , t

r = discount rate

If it is assumed that future growth occurs at a constant rate, then the above equation for share price becomes equal to the following:

$$P = \frac{D(1+g)}{(1+r)} + \frac{D(1+g)^2}{(1+r)^2} + \frac{D(1+g)^3}{(1+r)^3} + \ldots + \frac{D(1+g)^t}{(1+r)^t}$$

If the dividend stream is expected to continue and grow at a constant rate indefinitely, the equation can be reduced to give the following form:

$$P = \frac{D(1+g)}{(r-g)}$$

Rearranging terms and solving for r gives the following:

$$r = \left(\frac{D(1+g)}{P}\right) + g$$

When expressed in this manner, the DCF indicates that the discount rate, or expected rate of return to an owner, is equal to the dividend yield plus the anticipated future rate of growth. Empirical estimates can be derived for the dividend yield and the growth rate, leading to an empirical estimate for the rate of return, or return on equity.

Q29 **What are the advantages of the DCF?**

A29 From a theoretical perspective, the DCF captures the basis for how investors value the shares of a company, namely the expectations of present and future yields. In addition to its theoretical strengths, it is also relatively straightforward to estimate.

Q30 **What are the disadvantages of the DCF?**

A30 The primary disadvantage to the DCF is that it relies on simplifying assumptions regarding future growth that may not prove to be accurate. In particular, the simplification of the equation depends on the assumption of constant future growth. However, growth is rarely constant.

Q31 **How did you go about estimating the ROE from the Discounted Cash Flow Model?**

A31 I began by selecting a sample of Canadian companies, and a sample of U.S. companies. These were the same ones that I used in my CAPM calculations. For these companies, I determined the most recent dividends paid by the company. As each of the companies in my sample paid dividends on a quarterly basis, I annualized the dividends by multiplying by four. In addition, I determined the average closing stock price for the company shares during the most recent month of October 2012. Dividing the annualized dividends by the average closing price gave me an estimate for the current annualized dividend rate. [See Table 3.] For my Canadian sample, the average dividend rate was 3.38%. The average dividend rate for my U.S. sample was 3.87%. However, because the DCF model begins with an estimate of future dividends, I adjusted the current dividend yield by the estimated short-term growth factor.

The next step was to derive estimates for future growth. I used a two stage process, looking at both expectations for short term growth and then long-term growth. For the first stage, I based my estimates of short-term growth on analysts'

projections of the future growth in the company.[17] For the second stage, expected long-term growth, I used expectations of future growth for the overall economy, in particular, GDP growth. (See Safir Schedule 3.)

Once I obtained these two separate estimates of growth, I calculated a weighted average of the two to establish a weighted average growth rate. I weighted analysts' estimates of company growth by 33%, and estimates of GDP growth by 67%.

The final steps were to combine the adjusted dividend yield with the weighted average growth rate to obtain an estimate of the ROE. To these estimates I added a flotation cost adjustment of 5% of the initial ROE estimate.

Q32 **What were your results?**

A32 My empirical analysis indicated a discount rate/ROE for my Canadian sample of 8.99%. (See Table 3.) Including flotation costs increased the estimate to 9.46% For the U.S. sample, my results indicated a discount rate of 8.86, with an increase to 9.33% when flotation costs are added. (See Safir Schedule 4.) As indicated previously, I believe an economically appropriate manner in which to account for the U.S. results is to include it in an overall average, but weighted at 33%. This leads to an overall average of 9.42% for my DCF analysis.

[17] My source was Yahoo Finance. Yahoo Finance obtains its projection from Thomson Reuters, a business information company, which owns First Call and IBES, among other entities. In making its growth projections, Thomson Reuters surveys analysts regarding earnings growth over the next three to five years and reports the median estimate. This is similar to how ValueLine and other business information companies gather projections for future growth..

Table 3
DCF Results

	Canadian Sample	U.S. Sample
Most Recent Dividend Yield	3.38%	3.88%
Adjusted Dividend Yield	3.50%	3.98%
Average Growth rate	5.49%	4.88%
ROE	8.99%	8.86%
Flotation costs (@ 5%)	0.47%	0.47%
Adjusted ROE	9.46%	9.33%

Q33 **How does the result of your DCF analysis differ from the DCF results reported by Ms. McShane?**

A33 Although Ms. McShane and I based our analyses for Canada on the same samples of companies, Ms. McShane obtains slightly higher results.[18] She reports an average ROE for her Canadian DCF sample, prior to any "financing flexibility adjustments," of about 9.8%, about 80 basis greater than my analysis indicates. For her U.S. sample, the equivalent ROE is about 9.1%, about 20 basis points higher than my results.

Q34 **What generates this empirical gap?**

A34 One difference, which has only a minor effect, is that I used data from slightly different time periods. As a result, Ms. McShane's calculations for dividend yields

[18] Kathleen C. McShane, *Testimony on Cost of Capital for the FortisBC Utilities*, August 2012 pp. 113, 119.

is based on slightly different market prices than my analysis. However, the more fundamental difference stems from her selection of short term growth rates.

In particular, Ms. McShane presented two different DCF estimates which differed in the manner in which she treated the dividend growth rate. In one, she added to her dividend rate a combined growth rate, based on both analysts' company specific projections and long-term GDP growth estimates. This was similar to how I conducted my analysis. In the other, Ms. McShane considered only analysts' company specific growth projections and added them directly to her calculated dividend rates. Empirically, in her Canadian calculations, analysts' growth forecasts are much higher than long-term GDP growth estimates. As a result, Ms. McShane's second procedure leads to significantly higher DCF estimates.

Q35 **Do you feel the DCF calculations made by Ms McShane are economically reasonable?**

A35 No, I do not. The analysts' forecasts that I and Ms. McShane use are company specific and tend to be biased towards expectations of growth over the more immediate future. In addition, analysts' forecasts tend to be relatively higher, higher even than expectations for future growth for the entire economy. This generates an economic paradox. By relying exclusively on company growth larger than the economy, the implications is that company size would one day exceed the level of the entire economy, of which it is only a part. Of course, this could not occur. As a result, I combine analysts' company specific predictions, weighing them at 33%, with longer term estimates of overall (GDP) growth. I believe this

is a more economically reasonable estimate of the growth rate that would be applicable to the appreciation of the dividend payments.

Comparable Earnings

Q36 **What is the theory behind the Comparable Earnings Test?**

A36 The theory behind the comparable earnings test is that an investor will find it worthwhile to invest in a particular firm only if he or she can earn a return on equity comparable to what could be earned on an alternative investment with an equivalent risk in the competitive market. In other words, the comparable earnings test looks at the opportunity cost of capital. To calculate what an appropriate return on equity would be for a particular utility, one should select competitive firms with comparable risk and determine their return on equity.

Q37 **How did you select the comparable companies?**

A37 For the sample of Canadian comparables, I began with the same sample of companies that Ms. McShane used in her cost of capital evidence submitted for FortisBC Utilities.[19] She describes her criteria for selecting companies in her Appendix E.

In addition to analyzing comparable earnings from Canadian comparables, I also analyzed comparable earnings for companies that had comparable risk in the U.S. competitive market. This is because Canadian utility companies operate in the

[19] Kathleen C. McShane, *Testimony on Cost of Capital for the FortisBC Utilities*, August 2012, Appendix E. Ms. McShane included 21 companies in her analysis. For three, I was unable to find the relevant data to make my calculations, so they were excluded. In addition, five other companies reported negative income, so they were also excluded.

broader North American markets for gas and electricity. They also compete for capital in the U.S. market in addition to the Canadian market. To begin creating the U.S. comparable companies sample, I narrowed down the number of universe of potential comparables by looking at companies listed on the New York Stock Exchange, similar to Ms. McShane's looking at companies listed on the Toronto Stock Exchange. To further select the U.S. comparables, I used similar criteria as Ms. McShane did for the Canadian comparables. I filtered for companies that were listed as being based in the United States, had a beta of less than one, had a debt/equity ratio of at least 50%, had at least $500 million in market capitalization, and which were classified as being in either the Consumer Goods, Industrial Goods, or Services sectors, as identified by SIC codes (roughly equivalent to GICS sectors 20-30). To assist with this selection process, I used the website www.finviz.com which lists companies on various U.S. exchanges meeting given sets of conditions.

Of the set of companies found by the search, I excluded companies which did not have the necessary data going back at least through 2004. I also did not use companies which reported a negative net income. The final sample of U.S. comparables consisted of 31 companies.

Q38 **How did you calculate the comparable earnings?**

A38 To calculate comparable earnings, I followed Ms. McShane and looked at the time period of 2004 through 2011. This time period was identified by Ms. McShane as "commencing subsequent to the 2001 downturn and includes the 2008-2009 recession," and as being most representative of the next business cycle.

To calculate the rate of return, I looked up three pieces of data for each company firm for each year: Net income or net earnings and average number of shares from filed 10-K reports and stock monthly closing prices from Yahoo Finance. I divided the company's reported net income by the market capitalization for each year. I first calculated market capitalization for each year as the average number of shares times the average closing price per share for each year.

Q39 **What are the benefits of using the Comparable Earnings Test?**

A39 The comparable earnings as I've calculated them, using net income and market-value of equity, provide a picture of what the cost of capital is in the competitive market currently. Because these comparable earnings were calculated using market-based values instead of book value, they more accurately capture the conditions in the current capital markets in which the benchmark firm would be competing for capital.

Calculating comparable earnings as I have done accounts for factors such as inflation, since both the net income and the stock prices will reflect the level of inflation occurring at the time these numbers were reported. Book value-based calculations of comparable earnings will not account for inflation.

Q40 **Are there any drawbacks to using the Comparable Earnings Test?**

A40 There are some potential drawbacks. One key drawback is that the regulating bodies in Canada have largely rejected the Comparable Earnings Test in recent years. In fact, this very board has rejected McShane's Comparable Earnings Test results in two recent hearings, in 2006 and 2009. In it's March 2, 2006 decision

on ROE for Terasen Gas, the Commission noted that regulatory bodies are reluctant to use CE because "the sample selection can lead to very different results." However, the Commission did say that it "is not convinced that the CE methodology has outlived its usefulness, and believes that it may yet play a role in future ROE hearings."[20]

Q41 **Have other ways of calculating Comparable Earnings been suggested?**

A41 Yes. The Comparable Earnings Test has typically been calculated using have used book value rather than market value. A book-value measured return is calculated and then applied to the book-value of equity, giving more of an accounting ROE as opposed to an economic one. The result is often adjusted to account for the differences between book and market values, especially if there are large differences between the two due to factors such as inflation.

In order to evaluate what an investor would be willing to invest in today, one should look at what can be earned on investments today. The return on investment should take into account current and expected conditions in the competitive capital markets. This is best represented by the economic rate of return as opposed to an accounting rate of return. An economic rate of return will look at the current cost of capital, which is based on market prices. Market prices will take into consideration things such as inflation and other conditions in the current marketplace. Book values do not account for such things. By using market-based values, no adjustments to attempt to account for the difference between book and

[20] BCUC Decision: Terasen Gas Inc., and Terasen Gas (Vancouver Island) Inc. Application to Determine the Appropriate Return on Equity and Capital Structure and to Review and Revise the Automatic Adjustment Mechanism., March 2, 2006, p. 56.

market values are needed. The rate of return should account for current conditions in the capital market since that is the place where any alternative investment would be made and the basis by which the investment in the utility should be compared.

Others agree with the view that using book-value- or accounting-based measures to calculate the cost of capital is not ideal. A Brattle Group presentation given in July of this year points out one of the weaknesses of the Comparable Earnings model is that it is "not market-based, and subject to a number of problems due to its reliance on accounting measures of return."[21] Others have criticized CE because "The cost of equity is set in the stock market, but the comparable earnings method does not look to market data."[22] Thus, using market value of stocks rather than book value should address this criticism.

Capitalization rates in real estate investment are based on a similar theory. Cap rates look at how much return one gets on an investment in a particular piece of real estate. An investor, when looking at this cap rate, will take into account how much money could be made if the building were sold and the money invested in an alternative asset in the stock market. Thus, one should use the current market value of the real estate in the cap rate calculations. And this is what is done, as shown in cap rate studies published by various state regulating bodies.[23]

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[21] Bente Villadsend, The Brattle Group, "Current Issues in Cost of Capital," EEI Members Advanced Rate Course 2012, July 23, 2012, p. 30.

[22] Seth Armitage, "The Cost of Capital: Intermediate Theory," (Cambridge University Press: 2005), p. 327.

[23] For an example, see Minnesota Department of Revenue's "Capitalization Rate Study, 2012 Assessment Year," published April 17, 2012.

Q42 **What rates of return did the comparable earnings test suggest?**

A42 For Canadian comparable companies, the average rate or return from 2004 through 2011 was 6.85%. (See Safir Schedule 5.) For U.S. comparable companies, the average rate of return over the period 2004-2011 was 5.81%. (See Safir Schedule 6.)

Table 4
CE Results

	Canadian Sample	U.S. Sample	Weighted Average
Average ROE (2004-2011)	6.85%	5.81%	6.50%

Because Canadian companies operate within the broader North American market and compete for capital with U.S. companies, the return calculated using the U.S. sample should be given some weight in the final return on equity calculation, though not as much as the return calculated using the Canadian sample. A weighting giving the Canadian results twice the weight as the U.S. results is reasonable. The weighted average ROE is 6.50%.

Q43 **How does the result of your Comparable Earnings analysis differ from the Comparable Earnings analysis prepared by Ms. McShane?**

A43 Ms. McShane's estimates of 12.25-13.5% result from calculating a book value-measured return using the book value of the company. By contrast, I use a market value-measured return calculated using the market capitalization of the firm. The

use of market capitalization rather than book value results in lower rates of return by a magnitude of about 5.4% to 6.7% for the Canadian comparable companies.

However, Ms. McShane adjusts her "raw" comparable earnings results downward "to reflect the differential risk of a Canadian utility relative to the selected unregulated companies." To do this, she adjusts the rates of return by 125-150 basis points.[24] Still, this leads to rates of return that are roughly 4-5% higher than my unadjusted market-based rates of return. I do not believe that this adjustment is needed because the sample selected already contains very low-risk companies – those with betas less than one. When regulators set returns on equity, they attempt to match as closely as possible the returns on such low-risk companies. Thus, no downward adjustment should be needed.

Ms. McShane does not analyze comparable earnings for U.S. comparable companies. Her reasoning is that the sample of Canadian firms is of sufficient size to get a reasonable result. However, because Canadian firms do operate at least somewhat in the U.S. market, in addition to the Canadian market, I felt it was appropriate to include an analysis of U.S. comparable earnings along with the analysis of Canadian comparable earnings.

Q44 **Do you feel the calculation made by Ms McShane is a reasonable one?**

A44 No, I do not. In order to evaluate what an investor would be willing to invest in today, one should look at what can be earned on investments today. Ms.

[24] Ms. McShane says this is based on the "typical spread between Moody's BBB-rated long-term industrial bond yields and long-term A-rated utility bond yields and the relative betas of the unregulated companies and Canadian utilities." (McShane evidence p. 116, fn. 137)

McShane's use of book values in her calculations does not account for current conditions in the capital market nor expectations of what market conditions will be in the future. Using market prices, as I have done here, more effectively takes into account such things and thus is a more reasonable way of estimating return on equity using the Comparable Earnings method.

Further, as described in the previous answer, I do not agree that the "raw" comparable earnings results need to be adjusted for differences in risk, as the sample was chosen specifically to only include very low-risk companies.

Recommended ROE

Q45 **Which approach for a benchmark ROE do you recommend be taken by the BCUC in this proceeding?**

A45 I believe that all three of the approaches that I have discussed represent economically sound methods to develop a fair return for a utility. However, as can be seen by the summary Table 5, there are differences in the final estimates. Yet, because that are all economically valid approaches, I believe it would be appropriate to take a simple average of all three. As a result, my recommendation for a benchmark utility ROE would be 7.6%.

Table 5
ROE Overall Recommendation

	Canadian	US	Wt Avg
CAPM	6.47%	8.08%	7.01%
DCF	9.46%	9.33%	9.42%
CE	6.85%	5.81%	6.50%
Average	7.59%	7.74%	7.64%

Automatic Adjustment Mechanism

Q46 **Do you believe that the reestablishment of an automatic adjustment mechanism (AAM) for ROE is warranted?**

A46 Yes, I believe an AAM for a limited number of years would be appropriate. It is simply not economically efficient to revisit the entire ROE setting mechanism annually. Rather, an adjustment mechanism can and should be structured to capture changes in the more variable factors of the ROE such that it remains relevant to the fair return standard within some near term period.

Q47 **How should this mechanism be structured?**

A47 Although markets and market valuations are constantly in flux, these are not the kind of changes that necessarily affect a fair ROE. Rather, a utility's fair ROE is dependent on market expectations as to what a long term capital investment will realize. <u>No matter what empirical manner the Commission uses to arrive at the benchmark ROE, the theoretical underpinnings of this rate remain the same.</u> Fundamentally it is composed of a market risk premium for BC utilities over a risk

free long term rate, essentially the CAPM formulation. Given that the sector specific risk premium developed by a CAPM is based on long term trends, there is no reason to believe that it is highly variable. Consequently, it is unlikely to change significantly over a three year period. However, the CAPM is subject to variability from factors which affect the risk free rate. Probably the most significant factor is the rate of inflation, which will directly influence actual and expected long term bond interest rates. As a result, AAMs that reference long term bond rates, such as the one previously used by the BCUC, are good ways to account for near-term influences which affect a fair ROE.

While there may be some drawbacks from the reestablishment of the AAM, there would also be definite benefits. On the whole, I believe the advantages outweigh the disadvantages and that the better policy would be reestablishment.

Q48 **What is your opinion of the advantages?**

A48 One advantage is that an AAM conveys to utilities relative certainty in the ROE and in their rates. Perhaps more importantly, an AAM is administratively efficient, resulting in significant saving by avoiding costly, annual rate hearings.

Q49 **What is your opinion of the disadvantages?**

A49 The chief disadvantage is that there is a risk that the ROE may deviate beyond the normal band of uncertainty. (It should always be recognized that, although it relies on empirical information, the determination of a fair ROE is not absolute science, but remains something of an art.) As was quite clear in recent years, the Western economies faced an enormous monetary crisis which resulted in atypical market

prices, specifically yields on long term bonds. Although these risks are not reduced by an AAM, it should be clear that in atypical economic times, regulators always have the power to suspend formulaic adjustments to the ROE.

Q50 **What is your recommendation for an AAM?**

A50 An appropriate AAM formula would be similar to the one used by the BCUC before it was discontinued in 2009. Under that previous approach, the Commission had more or less settled on an equity risk premium, reflecting the risk of utilities relative to the market as whole. To that given equity risk premium, a proxy for the risk free rate was added. This proxy was subject to yearly changes based on changes in the forecasted long bond rate. I believe that this represents an economically reasonable approach to capturing short term changes that are likely to affect the ROE. I recommend that this process be utilized to adjust the allowed ROE for a three year period, after which a new cost of capital proceeding would again be conducted.

Q51 **Do you believe that it would be appropriate to limit rate hearings only to instances where the utility believes that they are necessary?**

A51 No, I do not. As indicated above, there may be instances where there are relatively large shocks to the economy that cause the established ROE to deviate from what may be the fair return standard. This could result in utilities receiving less than what might be appropriate. But it could also lead to instances where utilities are recovering more than a fair return. Relying on the utility to request a rate hearing when it is being over-compensated would be akin to having the proverbial fox guard the hen house. As a result, I believe a three year AAM followed by a rate

hearing would be a sound policy to prevent significant deviation from an ROE that meets the fair return standard.

Generic Methodology for Establishing Each Utilities Unique Cost of Capital

Q52 **How do you propose to go from your recommended ROE for a benchmark utility to the appropriate cost of capital for all the other utilities in British Columbia?**

A52 I believe the most efficient manner to assign the appropriate cost of capital for British Columbia utilities is to begin with the ROE for the benchmark utility and adjust the cost of capital through different deemed debt and equity percentages. The differential debt to equity ratios would be based on the Commission's assessment of the differential risks relative to the benchmark utility. For those utilities with a higher relative risk, a larger equity percentage would be appropriate. Conversely, utilities facing less risk than the benchmark utility would be assigned a lower equity percentage.

Q53 **Do you have a recommendation for setting the debt and equity percentages for the benchmark utility.**

A53 Not at this time. However, several factors bear on this issue. The BCUC had allowed the use of the embedded cost of debt as a component of the overall weighted cost of capital in the past. In contrast, the market long term borrowing rates for most utilities, including the benchmark, is undoubtedly lower than the

embedded cost of debt at the present time.[25] Consequently, under current circumstances, a benchmark utility will have an incentive to refinance its debt no matter what weighted cost of capital the BCUC allows. If a multi-year adjustment mechanism is adopted which operates to change the WACC as outlined above, without requiring annual adjustments in the actual cost of debt annually, an equity debt ratio lower than the current 40% would be more appropriate for the benchmark utility.

[25] Just as an illustration, in August 2012 TransCanada Pipelines issued $1 billion in 10 year bonds at a rate of 2.5%.

ATTACHMENT A: REPRESENTATIVE ENERGY TESTIMONY OF DR. ANDREW SAFIR

Testimony before Regulatory Bodies:

Oral Testimony of Dr. Andrew Safir on Behalf of the Association of Power Producers of Ontario before the National Energy Board in the Matter of an Application for Approval of Restructuring and Mainline Final Tolls for 2012 and 2013, September, October 2012 (RH-003-2011).

Updated Reply Evidence of Dr. Andrew Safir on Behalf of the Association of Power Producers of Ontario before the National Energy Board in the Matter of an Application for Approval of Restructuring and Mainline Final Tolls for 2012 and 2013, August 31, 2012 (RH-003-2011).

Written Reply Evidence of Dr. Andrew Safir on Behalf of the Association of Power Producers of Ontario before the National Energy Board in the Matter of an Application for Approval of Restructuring and Mainline Final Tolls for 2012 and 2013, May 11, 2012 (RH-003-2011).

Written Evidence of Dr. Andrew Safir on Behalf of the Association of Power Producers of Ontario before the National Energy Board in the Matter of an Application for Approval of Restructuring and Mainline Final Tolls for 2012 and 2013, March 9, 2012 (RH-003-2011).

Oral Testimony of Dr. Andrew Safir on Behalf of Indicated Shippers, before the FERC regarding a rate proceeding for Enbridge Pipelines (Southern Lights) LLC, January 11, 2012, (IS10-399-000 and IS11-146-000).

Oral Testimony of Dr. Andrew Safir on Behalf of Imperial Oil before the National Energy Board in the Matter of an Application by Enbridge Pipelines Inc., November 2011 (RH-1-2011).

Prepared Cross-Answering Testimony of Dr. Andrew Safir on Behalf of Indicated Shippers, before the FERC regarding a rate proceeding for Enbridge Pipelines (Southern Lights) LLC, September 27, 2011, (IS10-399-000 and IS11-146-000).

Prepared Answering Testimony of Dr. Andrew Safir on Behalf of Indicated Shippers, before the FERC regarding a rate proceeding for Enbridge Pipelines (Southern Lights) LLC, August 16, 2011, (IS10-399-000 and IS11-146-000).

Written Evidence of Dr. Andrew Safir on Behalf of Imperial Oil before the National Energy Board in the Matter of an Application by Enbridge Pipelines Inc., July 2011 (RH-1-2011).

Affidavit of Dr. Andrew Safir On Behalf of the Indicated Shippers (Imperial Oil and ExxonMobil Oil Corporation), before the FERC regarding a complaint against Enbridge Pipelines (Southern Lights) L.L.C., May 11, 2011, (IS10-399-000, OR11-____).

Written Evidence of Dr. Andrew Safir on Behalf of Imperial Oil before the National Energy Board in the Matter of an Application by Enbridge Pipelines Inc., June 2010 (RH-1-2010).

Oral Testimony on behalf of the Canadian Association of Petroleum Producers regarding business risks faced by Alberta utilities in the Generic Cost of Capital hearing before the Alberta Utilities Commission, Application No. 1578571, Proceeding ID. 85, June, 2009.

Written Evidence on behalf of the Canadian Association of Petroleum Producers regarding business risks faced by Alberta utilities in the Generic Cost of Capital hearing before the Alberta Utilities Commission, Application No. 1578571, Proceeding ID. 85, March, 2009.

Oral Testimony on behalf of the Canadian Association of Petroleum Producers regarding business risks faced by Trans-Québec Maritimes Pipeline before the National Energy Board of Canada, October, 2008 (RH-1-2008).

Oral Testimony before the Alberta Utilities Board on behalf of Imperial Oil Resources and Exxon/Mobil Canada Energy, before the Alberta Energy and Utilities Board in the Matter of an Inquiry into Natural Gas Liquids Extraction, Application No. 1513726, June, 2008.

Written Evidence on behalf of the Canadian Association of Petroleum Producers regarding business risks faced by Trans-Québec Maritimes Pipeline before the National Energy Board of Canada, April, 2008 (RH-1-2008).

Written Rebuttal Submission on behalf of Imperial Oil Resources and Exxon/Mobil Canada Energy, before the Alberta Energy and Utilities Board in the Matter of an Inquiry into Natural Gas Liquids Extraction, Application No. 1513726, November 6, 2007.

The Impact of Comprehensive Component Metering and Competitive Extraction on the Alberta Natural Gas Liquids Market, on behalf of Imperial Oil Resources and Exxon/Mobil Canada Energy, before the Alberta Energy and Utilities Board in the Matter

of an Inquiry into Natural Gas Liquids Extraction, Application No. 1513726, August 28, 2007.

Written Evidence of Dr. Andrew Safir on Behalf of Imperial Oil before the National Energy Board in the Matter of an Application by Enbridge Pipelines Inc., July 2007 (RH-2-2007).

Testimony of Dr. Andrew Safir on Behalf of the Mackenzie Valley Pipeline before the National Energy Board regarding the Application for a Certificate of Public Convenience and Necessity for the Mackenzie Gas Pipeline, July and November 2006, (GH-1-2004).

Testimony of Dr. Andrew Safir on Behalf of the Industry Group before the National Energy Board regarding TransCanada Pipelines Limited and TransCanada Keystone Pipeline GP Ltd. Application for Leave to Transfer Pipeline Facilities, October 2006, (MH-1-2006).

Written Evidence of Dr. Andrew Safir on Behalf of the Industry Group before the National Energy Board regarding TransCanada Pipelines Limited and TransCanada Keystone Pipeline GP Ltd. Application for Leave to Transfer Pipeline Facilities, September 2006, (MH-1-2006).

Reply Evidence of Dr. Andrew Safir on Behalf of the Mackenzie Valley Pipeline before the National Energy Board regarding the Application for a Certificate of Public Convenience and Necessity for the Mackenzie Gas Pipeline, July 2005, (GH-1-2004).

Prepared Cross Answering Testimony of Dr. Andrew Safir On Behalf of The Firm Shipper Group, before the FERC regarding a rate proceeding for Maritimes & Northeast Pipeline, L.L.C., March 2005, (RP04-360-000).

Prepared Direct and Answering Testimony of Dr. Andrew Safir On Behalf of The Firm Shipper Group, before the FERC regarding a rate proceeding for Maritimes & Northeast Pipeline, February 2005, L.L.C. (RP04-360-000).

Additional Written Evidence of Dr. Andrew Safir on Behalf of the Mackenzie Valley Pipeline before the National Energy Board regarding the Application for a Certificate of Public Convenience and Necessity for the Mackenzie Gas Pipeline, January 2005, (GH-1-2004).

Written Evidence of Dr. Andrew Safir on Behalf of the Canadian Association of Petroleum Producers before the National Energy Board regarding TransCanada PipeLines Limited Mainline 2004 Tolls Application (Phase 2, Cost of Capital), October 2004, (RH-2-2004).

Response Evidence of Dr. Andrew Safir on Behalf of the Canadian Association of Petroleum Producers before the National Energy Board regarding TransCanada PipeLines Limited Application for the North Bay Junction, July 2004, (NBJ RH-3-2004).

Written Evidence of Dr. Andrew Safir on Behalf of the Canadian Association of Petroleum Producers before the National Energy Board regarding TransCanada PipeLines Limited 2003 Tolls and Tariff Application, April 2003, (RH-1-2002).

Prepared Rebuttal Testimony of And Exhibits of Dr. Andrew Safir On Behalf of Coral Power L.L.C., November 2002, before the FERC regarding the request by the California Public Utilities Commission and California Electricity Oversight Board to have long term power contracts abrogated as unjust and unreasonable, (EL02-60-003 and EL02-62-003).

Written Evidence of Dr. Andrew Safir on Behalf of the Canadian Association of Petroleum Producers before the National Energy Board regarding TransCanada PipeLines Limited 2001 and 2002 Fair Return Application, January 2002, (RH-4-2001).

Testimony of Dr. Andrew Safir on Behalf of the Canadian Association of Petroleum Producers before the National Energy Board regarding TCPL'S application for discretionary rate authority, January 2000, (RH-1-99).

Prepared Direct Testimony of Andrew Safir on Behalf of Northern Natural Gas Company, June 1998, regarding storage and secondary transportation services markets, FERC rate proceeding for Northern Natural Gas, (RP98-203-000).

Oral Testimony of Dr. Andrew Safir on Behalf of El Paso Refinery, Refinery Holding Company and Chevron Products Co. USA, May 6, 1996, FERC rate proceeding for Santa Fe Pacific Pipeline (OR92-8-000, *et al*).

Prepared Sur-Surrebuttal Testimony of Dr. Andrew Safir on Behalf of El Paso Refinery, Refinery Holding Company and Chevron Products Co. USA, January 10, 1996, FERC rate proceeding for Santa Fe Pacific Pipeline (OR92-8-000, *et al*).

Prepared Rebuttal Testimony of Dr. Andrew Safir on Behalf of El Paso Refinery, Refinery Holding Company and Chevron Products Co. USA, August 27, 1995, FERC rate proceeding for Santa Fe Pacific Pipeline (OR92-8-000, *et al*).

Prepared Direct Testimony of Dr. Andrew Safir on Behalf of Canadian Association of Petroleum Producers, November 17, 1994. FERC rate proceeding for Pacific Gas Transmission Company, dealing with the issue of rolled-in rate design and its applicability to the PGT expansion (RP94-149-000).

Prepared Direct Testimony of Dr. Andrew Safir, September 26, 1994, National Energy Board Pipeline Cost of Capital Proceeding (RH-2-94).

ATTACHMENT B: SAFIR SCHEDULES 1-6

Safir Schedule 1

Monthly Betas for Regulated Canadian Utilities

"Raw" Monthly Price Betas
Five Year Period

Company	2008	2009	2010	2011	2012 (Oct)	Average 2008-2012
Canadian Utilities	0.319	0.066	0.068	0.072	0.020	0.109
Emera	0.128	0.146	0.209	0.244	0.210	0.187
Enbridge	0.430	0.294	0.330	0.334	0.283	0.334
Fortis	0.386	0.189	0.202	0.173	0.145	0.219
TransCanada	0.408	0.386	0.407	0.417	0.349	0.394
Mean	0.334	0.216	0.244	0.248	0.201	0.249
Median	0.338	0.254	0.287	0.292	0.247	

Safir Schedule 2

Monthly Betas for Regulated US Utilities

"Raw" Monthly Price Betas
Five Year Period

Company	2008	2009	2010	2011	2012 (Oct)	Average 2008-2012
AGL Resources	0.359	0.389	0.458	0.466	0.434	0.421
Alliant Energy	0.765	0.591	0.558	0.533	0.530	0.596
Atmos	0.632	0.499	0.523	0.531	0.483	0.534
Consolidated Edison	0.455	0.264	0.314	0.296	0.236	0.313
Integrys	0.594	0.824	0.919	0.883	0.841	0.813
Northwest Natural Gas	0.599	0.297	0.300	0.306	0.274	0.355
Piedmont Natural Gas	0.040	0.058	0.240	0.262	0.284	0.177
Southern Co	0.428	0.378	0.364	0.334	0.273	0.355
Vectren	0.392	0.354	0.421	0.423	0.377	0.394
WGL	0.599	0.223	0.223	0.256	0.238	0.308
WEC	0.598	0.385	0.398	0.363	0.326	0.414
Xcel	0.660	0.457	0.453	0.415	0.362	0.469
Laclede Group	0.562	0.074	0.047	0.064	0.064	0.162
NJ Resources	0.523	0.162	0.188	0.217	0.237	0.266
NiSource	0.512	0.755	0.866	0.842	0.753	0.746
SJI	0.226	0.086	0.182	0.310	0.319	0.224
Southwest Gas	0.588	0.697	0.727	0.740	0.703	0.691
Spectra					0.951	0.951
Mean	0.502	0.382	0.423	0.426	0.427	0.432
Median	0.562	0.378	0.398	0.363	0.344	

Safir Schedule 3

DCF Cost of Equity for Sample of Canadian Utilities

Company	Most Recent Dividend Yield[1]	Yahoo Finance 5 Year Growth Rate[2]	Adjusted Dividend Yield[3]	Avg GDP Growth[4]	Weighted Average Growth[5]	DCF Cost of Equity[6]
Canadian Utilities Ltd	2.62%	7.80%	2.72%	4.49%	5.60%	8.32%
Emera Inc	3.87%	6.10%	3.99%	4.49%	5.03%	9.02%
Enbridge Inc	2.87%	12.00%	3.04%	4.49%	7.00%	10.04%
Fortis Inc	3.58%	4.23%	3.66%	4.49%	4.41%	8.06%
TransCanada Corp	3.96%	7.30%	4.10%	4.49%	5.43%	9.53%
Average	**3.38%**	**7.49%**	**3.50%**	**4.49%**	**5.49%**	**8.99%**
Median						**9.02%**

Notes:

1. Most recent annualized dividend divided by monthly average stock price, as of October 31, 2012
2. Source: Yahoo Finance, Analyst Estimates
3. Most recent dividend yield times (1 + (Yahoo finance 5 year Growth Rate/2))
4. Calculated from data in National Energy Board - Canada's Energy Future: Energy Supply and Demand Projections to 2035 (November 2011) Appendix, Table A1.1 Reference Case
5. Weighted Average of Yahoo Finance Growth Rate of 1/3 and Average GDP Growth of 2/3.
6. Adjusted Dividend Yield plus Weighted Average Growth

Safir Schedule 4

DCF Cost of Equity for Sample of U.S. Utilities

Company	Most Recent Dividend Yield[1]	Yahoo Finance 5 Year Growth Rate[2]	Adjusted Dividend Yield[3]	Avg GDP Growth[4]	Weighted Average Growth[5]	DCF Cost of Equity[6]
AGL Resources	4.52%	4.05%	4.61%	4.57%	4.39%	9.00%
Alliant Energy Corp	4.05%	6.30%	4.18%	4.57%	5.14%	9.32%
Atmos Energy Corp	3.85%	5.50%	3.95%	4.57%	4.88%	8.83%
Consolidated Edison Inc	4.03%	3.02%	4.09%	4.57%	4.05%	8.14%
Integrys Energy Group Inc	4.97%	5.00%	5.09%	4.57%	4.71%	9.80%
Northwest Natural Gas	3.71%	4.50%	3.79%	4.57%	4.54%	8.33%
Piedmont Natural Gas Co	3.77%	5.35%	3.87%	4.57%	4.83%	8.70%
Southern Co	4.25%	5.38%	4.37%	4.57%	4.84%	9.20%
Vectren Corp	4.82%	10.90%	5.08%	4.57%	6.68%	11.76%
WGL Holdings Inc	4.05%	5.60%	4.16%	4.57%	4.91%	9.07%
Wisconsin Energy Corp	3.15%	6.05%	3.24%	4.57%	5.06%	8.30%
Xcel Energy Inc	3.87%	5.09%	3.97%	4.57%	4.74%	8.71%
The Laclede Group Inc	3.88%	5.30%	3.98%	4.57%	4.81%	8.79%
New Jersey Resources Corp	3.53%	2.70%	3.58%	4.57%	3.94%	7.52%
NiSource Inc	3.76%	8.00%	3.92%	4.57%	5.71%	9.63%
South Jersey Industries Inc	3.11%	6.00%	3.20%	4.57%	5.04%	8.24%
Southwest Gas Corp	2.69%	4.05%	2.74%	4.57%	4.39%	7.14%
Sepctra Energy Corp	3.80%	6.13%	3.91%	4.57%	5.09%	9.00%
Average	**3.88%**	**5.50%**	**3.98%**	**4.57%**	**4.88%**	**8.86%**
Median						**8.81%**

Notes:

1. Most recent annualized dividend divided by monthly average stock price, as of October 31, 2012
2. Source: Yahoo Finance, Analyst Estimates
3. Most recent dividend yield times (1 + (Yahoo finance 5 year Growth Rate/2))
4. Calculated using data from the following sources:
   a. US Energy Information Administration - Annual Energy Outlook 2012 (Released June 25, 2012). Table 20
   b. Social Security Administration: The 2011 OASDI Trustees Report, Table VI.F4
5. Weighted Average of Yahoo Finance Growth Rate of 1/3 and Average GDP Growth of 2/3.
6. Adjusted Dividend Yield plus Weighted Average Growth

Safir Schedule 5

Returns on Average Common Stock Equity for Canadian Low Risk Unregulated Companies

Company Name	2004	2005	2006	2007	2008	2009	2010	2011	Average 2004-2011
Algoma Central Corp	9.16%	9.81%	10.64%	9.96%	9.72%	14.38%	5.81%	18.37%	10.98%
Canada Bread Co Ltd	8.73%	5.66%	3.69%	5.51%	4.24%	7.00%	5.15%	4.51%	5.56%
Canadian National Railway Co	3.60%	3.52%	7.29%	8.08%	7.82%	7.94%	7.25%	7.35%	6.61%
Canadian Pacific Railway Ltd	7.67%	7.45%	8.72%	8.73%	6.65%	7.23%	6.45%	5.46%	7.29%
Canadian Tire Corp	6.15%	4.34%	3.82%	5.63%	7.14%	6.85%	8.32%	8.13%	6.30%
Empire Co Ltd		7.85%	10.85%	6.93%	11.28%	8.68%	8.22%	10.65%	9.21%
Leon's Furniture Ltd	7.77%	7.08%	1.72%	2.76%	7.94%	8.23%	2.60%	6.26%	5.54%
Metro Inc	8.65%	6.52%	6.84%	6.77%	9.37%	8.68%	8.39%	7.88%	7.89%
Reitmans (Canada)	5.51%	4.68%	5.83%	5.33%	10.93%	9.61%	5.68%	8.27%	6.98%
Ritchie Bros Auctioneers Inc							2.92%	2.95%	2.93%
Saputo Inc		6.12%	5.19%	2.48%	5.33%	5.54%	5.65%	5.14%	5.06%
Toromont Industries Ltd	4.75%	5.47%	6.39%	7.08%	7.80%	7.94%	4.90%	13.22%	7.20%
Weston (George) Ltd)	3.44%	5.19%	1.19%	6.16%	12.63%	13.38%	7.18%	10.38%	7.44%
Average									6.85%

Safir Schedule 6

Returns on Average Common Stock Equity for U.S. Low Risk Unregulated Companies

Company Name	2004	2005	2006	2007	2008	2009	2010	2011	Average 2004-2011
Advanced Auto Parts, Inc.	4.22%	4.24%	6.04%	6.13%	6.92%	7.09%	7.62%	8.07%	6.29%
Alliant Techsystems Inc.	7.02%	5.66%	5.37%	5.42%	6.45%	5.43%	11.51%	14.33%	7.65%
Altria Group Inc.	8.74%	7.72%	7.86%	6.43%	8.35%	8.96%	8.53%	6.12%	7.84%
AmerisourceBergen Corporation	3.70%	1.90%	5.10%	2.59%	1.99%	6.17%	7.44%	6.67%	4.45%
Ametek, Inc	4.96%	3.25%	4.07%	5.42%	3.63%	3.89%	4.05%	5.76%	4.38%
Archer Daniels Midland Company	4.32%	6.97%	5.41%	9.29%	8.28%	9.21%	10.30%	10.10%	7.99%
Bemis Company, Inc.	4.53%	5.54%	3.20%	5.69%	6.42%	3.82%	3.38%	3.24%	4.48%
Campbell Soup	5.85%	5.82%	5.34%	5.81%	9.11%	6.91%	7.04%	7.38%	6.66%
Colgate-Palmolive Co.	4.77%	4.96%	4.37%	4.86%	5.35%	6.50%	5.69%	5.79%	5.29%
ConAgra Foods, Inc.	5.68%	5.06%	4.43%	6.02%	9.35%	11.16%	5.95%	7.73%	6.92%
Ecolab Inc.	3.55%	3.78%	3.56%	3.88%	4.20%	4.42%	4.82%	3.70%	3.99%
Fidelity National Information Services, Inc.	4.11%	4.30%	3.58%	6.17%	4.01%	2.20%	3.97%	5.47%	4.23%
General Mills, Inc.	7.20%	3.11%	3.12%	3.35%	3.16%	3.94%	5.53%	7.29%	4.59%
H.J. Heinz Company	6.12%	5.94%	4.68%	5.14%	5.90%	7.95%	6.39%	6.06%	6.02%
Hershey Co.	4.66%	4.45%	6.02%	2.64%	5.09%	7.11%	6.72%	6.74%	5.43%
John Wiley & Sons Inc.	4.42%	4.86%	4.80%	6.05%	5.32%	7.15%	6.91%	7.24%	5.84%
Kellogg Company	5.18%	5.34%	5.31%	5.30%	5.98%	6.89%	6.42%	6.33%	5.84%
Kimberly-Clark Corporation	5.68%	5.60%	5.60%	6.36%	7.10%	8.62%	7.56%	6.25%	6.60%
Kohl's Corp.	4.37%	4.89%	5.67%	5.35%	6.62%	6.76%	7.11%	8.37%	6.14%
L-3 Communications Holdings	5.57%	5.66%	5.28%	5.92%	8.02%	10.27%	10.69%	12.28%	7.96%
McCormick & Company, Inc.	4.56%	4.74%	4.34%	4.79%	5.53%	7.03%	6.91%	5.85%	5.47%
McDonald's Corp.	6.45%	6.50%	7.76%	3.96%	6.55%	7.28%	6.58%	6.25%	6.42%
Molson Coors Brewing Company	7.76%	1.29%	3.03%	3.37%	4.17%	9.10%	8.57%	8.21%	5.69%
Republic Services, Inc.	3.79%	3.50%	3.48%	4.62%	1.28%	5.35%	4.49%	5.29%	3.97%
Sysco Corp.	3.94%	4.43%	3.09%	4.87%	6.47%	7.29%	6.81%	6.79%	5.46%
Target Corp	7.80%	5.16%	0.61%	0.55%	6.08%	8.03%	7.56%	8.43%	5.53%
The Coca-Cola Company	4.34%	4.77%	4.90%	4.78%	4.71%	6.02%	9.07%	5.59%	5.52%
The Home Depot, Inc.	6.04%	6.85%	7.32%	6.66%	5.30%	6.32%	6.52%	6.79%	6.47%
The Sherwin-Williams Company	6.93%	7.56%	8.11%	7.36%	7.40%	6.91%	5.94%	5.12%	6.92%
United Parcel Service, Inc.	3.94%	4.75%	5.10%	0.64%	1.04%	3.83%	5.20%	5.44%	3.74%
Wal-Mart Stores Inc.	4.41%	5.58%	5.80%	6.70%	6.08%	7.38%	8.51%	7.42%	6.49%
Average									**5.81%**