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**VIA EMAIL**

July 12, 2012

**BRITISH COLUMBIA UTILITIES COMMISSION**  
**GENERIC COST OF CAPITAL PROCEEDING EXHIBIT A2-5**

To: All Registered Parties  
(*BCUC-GCOC*)

Re: British Columbia Utilities Commission  
Project No. 3698659/G-20-12  
Generic Cost of Capital Proceeding

Commission staff submits the following document for the record in this proceeding:

Response to FortisBC Energy Utilities Information Request No. 1  
to the Commission on the Consultants Survey Report

Yours truly,

Erica Hamilton

/dg  
Attachment

# Response to FortisBC Energy Utilities Information Request No. 1 to the Commission on the Consultants Survey Report.

## 1.0 Exhibit A2-3, Consultant Report, Page 1, Introduction and Summary

“We note that not all jurisdictions are discussed using the same topic headings or the same amount of detail. There are two reasons for this. The available information differs across jurisdictions and the treatment of, for example, Crown corporations [does lend] itself to a standard cost of capital discussion in some jurisdictions.”

- 1.1 Please confirm that the BCUC Consultant meant to convey that Crown Corporations do **not** lend themselves to standard cost of capital discussion in some jurisdictions.

**Response:** Confirmed.

## 2.0 Exhibit A2-3, Consultant Report, Page 2:

“...some regulators set rates by determining the weighted-average cost of debt and equity that the regulated company should be allowed to earn on its invested capital (as a whole)...”

Consultant Report, pages 99-100

“Rather than allowing TQM an ROE and a deemed capital structure, the NEB allowed TQM an After-Tax Weighted-Average Cost of Capital (ATWACC) to determine the appropriate rate of return on rate base.”

- 2.1 Please confirm that the NEB decision referenced in the second quote in the preamble is an example of the first quote in the preamble.

**Response:** Confirmed.

- 2.2 Since the first quote in the preamble refers to regulators (plural), please provide details regarding the specific regulators and cases other than the NEB decision referenced in the second quote above who set rates by determining the weighted-average cost of debt and equity, including whether those regulators and decisions relied on market value or book value weights in establishing the weighted average cost of capital.

**Response:** In Canada, the NEB is the only regulatory entity that has used the ATWACC method explicitly to set the allowed cost of capital. Regulators in other countries such as Australia, New Zealand, the U.K., and the Netherlands use the ATWACC method.

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### **3.0 Exhibit A2-3, Consultant Report, Page 4:**

The report states that different models may be better suited to different regulatory jurisdictions.

- 3.1 Please explain in more detail how and why different models may be better suited to different jurisdictions, including a discussion of the characteristics of different regulatory jurisdictions that would make specific models better suited. Please also provide relevant examples.

#### **Response:**

The suitability of a model depends on what the regulatory jurisdiction wants to capture. For example, the DCF model may be more acceptable in a jurisdiction which values the ability to capture quickly any change in the cost of capital due to the forward-looking nature of the DCF. The CAPM may be more appropriate in a jurisdiction which seeks stability in rates. In the latter case, the allowed ROE will adjust more slowly to changes in the cost of capital than if the DCF model were relied upon because the beta estimate and perhaps the MRP adjust more slowly even though the risk-free rate will be a current value.

### **4.0 Exhibit A2-3, Consultant Report, Page 4.**

“Moreover, the DCF model is highly sensitive to the growth rate estimates, which can vary widely among analysts, and that variation may increase in times of greater economic uncertainty.”

- 4.1 Please confirm that the results of applying the CAPM are highly sensitive to estimates of the risk-free rate, beta, and market risk premium, and that variation may increase in times of greater economic uncertainty. If not, why not?

#### **Response:**

- a) All models are sensitive to their parameters, but the DCF model is particularly sensitive to the growth rate estimate because a difference in estimated growth rate by 1 percent has a greater than 1 percent effect on the estimated cost of capital. Growth rate estimates from different analysts frequently differ by substantial amounts, certainly more than 1 percent. The individual parameters in the CAPM have less effect. For example, the risk-free rate is observable (once a choice of whether to use a long or short-term estimate has been made). Estimating the beta and the MRP have larger effects, but the range of estimates for the parameters is generally relatively narrow. In the authors' experience, the range of estimates from the DCF model is usually much wider than the range of estimates from the CAPM.
- b) Model results generally vary more in times of greater economic uncertainty, in part because the assumptions underlying the models are violated to a greater degree. For example, the DCF model assumes that earnings, dividends, prices and book values all grow at a constant rate, but

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in times of economic uncertainty, this assumption is likely to be violated to a greater degree than in more settled economic conditions.

### **5.0 Exhibit A2-3, Consultant Report, Page 4.**

“As such the reliability of DCF methods can be questionable in times of economic turmoil or when an industry is in transition.”

5.1 Please confirm that the reliability of the CAPM can also be questionable in times of economic turmoil or when an industry is in transition. If not confirmed, why not?

**Response:** Confirmed.

### **6.0 Exhibit A2-3, Consultant Report, Page 4, and Figure 3, page 23.**

“Moreover, the results of applying the [DCF] methodology can be unstable over time, leading to rapid shifts from high cost of capital estimates to low ones.”

6.1 In view of the high variability in beta estimates shown in Figure 3, page 23, please confirm that the results of applying the CAPM can be unstable over time, leading to rapid shifts in cost of equity estimates. If not, why not?

**Response:**

Confirmed. The authors note that the rate with which betas change depend on the horizon over which such betas are estimated, so that today's beta estimate reflects information back in time (specifically, if 5-year betas are used then information from 5 years ago is reflected). It is unusual for a beta estimate to change dramatically when the oldest month's return is dropped and the most recent month's added.

### **7.0 Exhibit A2-3, Consultant Report, Page 24, Betas**

“Balancing these considerations, economists typically recommend beta be estimated using either weekly or monthly returns over the most recent 2 to 5 year period, with weekly betas becoming more common.”

7.1 Please discuss whether it is common regulatory practice in Canada to accept the results of a CAPM analysis using betas calculated over the most recent 2 to 5 year period, without applying informed judgement on the reasonableness of those results.

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## Response:

Most Canadian regulatory jurisdictions look to the beta estimates submitted by experts in the relevant proceeding and use judgment to determine the relied upon beta. Moreover, it is not best practice to accept any estimate without judging the reasonableness of the result.

- 7.2 Please reference particular rate proceedings and utilities for which Canadian regulators have used betas calculated over the most recent 2 to 5 year period.

## Response:

The Canadian Transportation Agency uses 5 years of weekly betas (see Decision 425-R-2011, p. 70 and Appendix A)

## 8.0 Exhibit A2-3, Consultant Report, Page 25, CAPM

### "c. Empirical challenges to the CAPM

Perhaps the most fundamental challenge to the CAPM has been the consistent empirical observation that the model does not explain stock performance well in a statistical sense. For example, low beta stocks tend to have higher average returns than predicted by the CAPM, and high beta stocks have lower average returns – that is, the empirical estimates seem to require a pivot of the SML around  $\beta = 1.0$  from the traditional version of the CAPM.<sup>48</sup>

<sup>48</sup> We are not aware of any Canadian regulator that makes an explicit adjustment to the CAPM model for the empirical observation that the empirical SML may be flatter than the theoretical SML, so we do not discuss the details of any adjustment procedure.'

Brattle Group, *Review of Regulatory Cost of Capital Methodologies, September 2010*, Prepared for the Canadian Transportation Agency, page 43.

### 3. Empirical Challenges to the CAPM

Perhaps the most fundamental challenge to the CAPM has been the consistent empirical observation that the low beta stocks have higher average returns than predicted by the CAPM, and high beta stocks lower average returns – that is, the empirical estimates seem to require a pivot of the SML around  $\beta = 1$  from the traditional version of the CAPM. **To the extent that this is valid, it suggests that cost of capital for regulated companies, which often have a beta less than one, will be underestimated by the traditional CAPM.**<sup>77</sup>(emphasis added)

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"<sup>77</sup> Implementing a long-run version of the CAPM which uses (annualized) long-horizon returns (e.g., with long bond rates as risk-free rate) generally produces a flatter SML than obtained by using short-rates, due to the general presence of an upward sloping yield curve. While this partially compensates for the empirically observed flattening, it is not sufficient to explain all of the observed flattening of the SML. That is, even implementations that utilize a long-run risk-free interest rate require a further, albeit smaller, adjustment to match the empirical SML. "

8.1 Please confirm that "requiring a pivot of the SML around  $\beta = 1.0$  from the traditional version of the CAPM" would increase the estimated cost of equity for companies such as public utilities with estimated betas less than 1.0.

**Response:** Confirmed. The estimated cost of capital for all assets with betas less than 1.0 would increase.

8.2 Please confirm that Michael Vilbert and Bente Villadsen also wrote, along with Matthew Aharonian, the report prepared for the Canadian Transportation Agency cited above.

**Response:** Confirmed.

8.3 Please confirm that the statement emphasized in the second quote and the related footnote still represent the authors' views.

**Response:**

The authors' task in the BCUC report was to report on the methods used by Canadian regulators but to avoid injecting the authors' views as much as possible. Responding to this part of the request would be inconsistent with the authors' charter in this proceeding.

### **9.0 Exhibit A2-3, Consultant Report, Page 25:**

"Eighth, because the model was developed as a generic approach to determine the cost of capital for companies, it does not specifically take the regulatory context into account."

9.1 Please explain in more detail what is meant by the statement that the CAPM "does not specifically take the regulatory context into account."

**Response:**

The CAPM was developed as a generic equilibrium model and not specifically for regulatory purposes. It relies on market data (usually for a comparable group of companies) and only through the comparable entities may regulatory factors enter. However, there is nothing in the model itself that considers the regulatory context of the company for which the cost of capital is being determined.

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### **10.0 Exhibit A2-3, Consultant Report, Page 31, Adjusting Beta**

“The realized risk premium is highly dependent on the time period over which it is estimated, so that choice is also important. The historical risk premium approach assumes that a historically realized risk premium is an appropriate measure for expected returns. However, over any given period, and especially over a short period of time, realized returns can differ substantially from expected returns. Therefore, the accuracy of the estimated risk premium will typically increase if estimated using a longer time period.<sup>55</sup>”

<sup>55</sup> The more tosses we undertake with a fair coin, the more likely it becomes that we realize heads close to 50% of the time and tails 50% of the time.

10.1 Please confirm that an additional rationale for the use of a longer time horizon for estimating the equity market risk premium is to capture the impacts of varied market conditions. If not, why not?

**Response:** Confirmed.

### **11.0 Exhibit A2-3, Consultant Report, Page 32, footnote 57:**

“For example, Roger A. Morin, “New Regulatory Finance,” Public Utilities Reports, Inc., 2004 pp. 128-129 summarizes several studies and found that the realized ROE changes approximately 50 basis points when government bond rates change 100 basis points.” (emphasis added)

11.1 Please confirm that publication date of the text referred to was 2006, not 2004.

**Response:** Confirmed.

11.2 Please confirm that Dr. Morin did not use the term “realized ROE” in his summary, but rather the term, “cost of equity”.

**Response:** Confirmed. The authors acknowledge that the term “realized” should not have been included in footnote 57.

### **12.0 Exhibit A2-3, Consultant Report, Pages 33 to 34:**

The authors state with respect to the risk premium model:

“The difficulty with the model is determining the appropriate risk premium and whether it has changed since it was last estimated. There is also an issue of whether the

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relationship of the risk premium to changes in the benchmark interest rate remains constant. If the interest rate increases by 1%, does the risk premium stay constant or change? Because there is no underlying theory, there is no definitive answer to the question.”

12.1 Please confirm that the CAPM is a risk premium model.

**Response:** Confirmed.

12.2 Please confirm that the difficulty with the risk premium model described in the preamble also applies to the CAPM. If not, why not?

**Response:**

The difficulties identified are present for the CAPM, too. However, the CAPM is, unlike the risk premium model, a theory based model.

12.3 Please confirm that the “issue of whether the relationship of the risk premium to changes in the benchmark interest rate remains constant” also applies to the CAPM. If not, why not?

**Response:** Confirmed.

12.4 Please confirm that the CAPM does not contain an underlying theory regarding the constancy of the risk premium with changes in the risk-free rate. If not, why not?

**Response:** Confirmed.

### **13.0 Exhibit A2-3, Consultant Report, Page 34.**

“Among the weaknesses of the risk premium approach is that it may be influenced by monetary policy - especially if the implementation relies on government bond yields.”

13.1 Please confirm that the CAPM relies on government bond yields.

**Response:**

Not confirmed. The CAPM uses a risk-free asset which may be either the yield on government bills or bonds.

13.2 Since the CAPM relies on government bond yields, please confirm that, among the weaknesses of the CAPM is that it may be influenced by monetary policy. If not confirmed, why not?

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### **Response:**

If implemented using the return or yield on government bill or bond, the CAPM is influenced by monetary policy through this factor.

- 13.3 Please confirm that utility bond yields are also influenced by monetary policy. If not, why not?

### **Response:**

Confirmed, but with the caveat that utility bond yields are also influenced by other factors including factors unique to the company that issued the debt.

### **14.0 Exhibit A2-3, Consultant Report, Page 34, discussing the risk premium model.**

“Because inflation and other factors that are not directly related to the cost of equity capital may affect bond yields, the model will not necessarily produce like results for like conditions.”

- 14.1 Please explain why inflation is not directly related to the cost of equity capital.

### **Response:**

As noted on p. 3 of the report, the cost of equity “is the expected rate of return investors require based on the risk-return alternatives available in competitive capital markets. Stated differently, the cost of capital is a type of opportunity cost . . .” Thus, the cost of equity depends on investors’ opportunity costs. For example, growth opportunities may be reflected in the cost of equity but not in the cost of debt. In theory, interest rates change one for one with expected inflation, it has not been established that the cost of capital changes one for one as well. The effect of changes in interest rates on the MRP is an unsettled question.

- 14.2 Please explain what is meant by “like results for like conditions.”

### **Response:**

As noted in the response to 14.1 above, the cost of equity depends on investors’ opportunity costs whereas the cost of debt depends on creditors’ expectations regarding the repayment of the funds. Thus, if creditor expectations change dramatically, as has recently been the case in, for example, Greece, the cost of debt changes dramatically, but the cost of equity may or may not be affected to the same degree.

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Please see also the response to Commercial Energy Consumers Association's (CEC) request No. 2.5.

### **15.0 Exhibit A2-3, Consultant Report, Page 35, discussing the risk premium model.**

"However, the estimates from the model may or may not recognize the regulatory context in which the cost of capital is being applied at any given time."

15.1 Please provide examples of situations where the risk premium model "may or may not recognize the regulatory context in which the cost of capital is being applied at any given time."

#### **Response:**

Please refer to the response to Question FBCU-3.

15.2 Please confirm that cost of equity models such as the CAPM, DCF, and risk premium, are generally applied using stock market data for a proxy group of comparable-risk, publicly-traded companies.

#### **Response:** Confirmed.

15.3 Please confirm that stock market data for a proxy group of publicly-traded companies may or may not reflect the specific regulatory context of the utility whose rates are being determined in a particular proceeding, especially when the utility is a wholly-owned subsidiary of a holding company.

#### **Response:**

Confirmed. The stock market data for the proxy companies are unlikely to be affected by a particular regulated entity. Selecting an appropriate proxy group is always an issue for estimating the cost of capital.

15.4 Please confirm that, since cost of equity models such as the CAPM, DCF, and risk premium, are not applied directly to a wholly-owned subsidiary of a publicly-traded holding company, the results of all cost of equity models may or may not strictly recognize the regulatory context in which the cost of capital is being applied at any given time.

#### **Response:** Confirmed.

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### 16.0 Exhibit A2-3, Consultant Report, Pages 38 to 40:

The authors discuss the impact of financial leverage on the cost of equity.

16.1 Please confirm that the WACC formula set forth on page 39 is based on market value capital structure ratios.

**Response:** Confirmed.

16.2 Please confirm that, based on the results of the authors' survey, the typical approach followed by Canadian regulators has been to apply the cost of equity to a book value capital structure. If this cannot be confirmed, please explain why not.

**Response:**

In Canada, the estimated cost of equity is applied to the equity portion of the rate base which is generally measured at book value.

16.3 Please confirm that Dr. Vilbert, one of the authors of the Consultant Report, stated in evidence filed in RH-003-2011 before the National Energy Board, "If the sample's estimated cost of equity were adopted without consideration of differences in financial risk, it could lead to an unfair rate of return." [TransCanada Pipelines Limited, BUSINESS AND SERVICES RESTRUCTURING AND MAINLINE 2012 – 2013 TOLLS APPLICATION, RH-003-2011, Appendix D, Evidence of Michael J. Vilbert, page 69, lines 9-11. [A2C6R5]]

**Response:** Confirmed.

16.4 Please confirm that by differences in financial risk, Dr. Vilbert was referring to differences in the market value capital structures of the sample firms used to estimate the cost of equity and the regulatory capital structure used to set rates.

**Response:** Confirmed.

16.5 Please confirm that the statements contained in 7.3 and 7.4 still represent Dr. Vilbert's views. If not, why has Dr. Vilbert changed his views?

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### **Response:**

The authors' task in the BCUC report was to report on the methods used by Canadian regulators, but to avoid injecting the authors' views as much as possible. Responding to this part of the request would be inconsistent with the authors' charter in this proceeding.

### **17.0 Exhibit A2-3, Consultant Report, Page 43, BCUC History**

"The formula in (20) was modified in 2006 to include less than 100% of the forecasted change in the long Government of Canada yield in the ROE formula. Specifically, the BCUC adopted an adjustment factor of 75% instead of 100%..."

17.1 Please confirm that the elasticity factor in the automatic adjustment formula was modified to 0.80 in 1997, was made asymmetrical under certain interest rate conditions in 1999, and was later modified from 0.80 to 0.75 (and was made symmetrical again) in 2006.

### **Response:**

Confirmed that the elasticity factor became 0.75 in 2006 and also was made symmetrical.

Confirmed that the adjustment was made asymmetrical in 1999. (Order G-80-99)

Confirmed that the elasticity factor was changed to 0.80 in 1997. (Order G-49-97)

### **18.0 Exhibit A2-3, Consultant Report, Page 51, Deferral Accounts**

"In its 2009 decision, the BCUC considered the effects of deferral accounts on reducing short-term risk and not the long-term business risk. As a result, the effect was taken into account through the ROE rather than through the capital structure. The BCUC concluded that significant risk adjustments to U.S. data are required to take into account the effect of deferral accounts."

Please refer to the testimony of Mr. Carpenter of the Brattle Group in *Cause tarifaire 2010, R-3690-2009*, in which Mr. Carpenter and Dr. Vilbert testified on the topics of utility risk and recommended return, respectively, on behalf of GazMet. In his testimony, Mr. Carpenter states the following:

"While one would expect investors to pay more for a stable earnings stream than for a more volatile one with the same long term expected value, it is not a risk on which long term investors would place great importance. Other examples of short term risk include one-time events such as a regulatory cost disallowance that would affect year-on-year earnings, but would not be

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expected to affect an investor's long-term estimate of expected earnings. These short-term earnings variability risks may be mitigated through the use of deferral accounts or weather normalization procedures." [Demande de modifier les tarifs de Société en commandite Gaz Métro à compter du 1er octobre 2009, Cause tarifaire, R-3690-2009, Exhibit B-4\_GM-7doc13, Written Evidence of Paul R. Carpenter for Gaz Métro, May 2009, page 8.]

- 18.1 Please confirm whether the BCUC consultant agrees with Mr. Carpenter that it is generally short-term earnings variability risk that is mitigated through the use of deferral accounts.

### **Response:**

The authors' task in the BCUC report was to report on the methods used by Canadian regulators and to avoid injecting the authors' views as much as possible. Responding to this request would be inconsistent with the authors' charter in this proceeding.

- 18.2 Please confirm whether the BCUC consultant agrees with Mr. Carpenter that investors do not place great importance on short term earnings variability risk, provided that the long term expected value of the earnings stream remains stable.

### **Response:**

The authors' task in the BCUC report was to report on the methods used by Canadian regulators but to avoid injecting the authors' views as much as possible. Responding to this portion of the request would be inconsistent with the authors' charter in this proceeding.

### **19.0 Exhibit A2-3, Consultant Report, Page 95, Newfoundland AAM**

"A formulaic approach was put in place in 1998, and the formula was designed to adjust NP's return on equity annually based on changes in long-term Canada bond yields. The Order also confirmed a maximum common equity ratio of 45% and determined the return on rate base to be 9.81% based on an ROE of 9.25%.<sup>250</sup>

The Automatic Adjustment Formula uses three variables to adjust the rate of return on rate base: rate base, invested capital and the estimated cost of common equity. The first two variables are established as part of the annual approval of NP's capital budget, while the cost of equity is adjusted based on average daily closing yields of the long-term (30 year) Government of Canada bonds over the last five trading days in October and the first five trading days of November.<sup>251</sup>

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The formula differed from that of other jurisdictions along several dimensions. First it determined the total return on rate base rather than the return on equity:

Return on rate base = (Invested Capital in Rate Base) × WACC + Z / (Rate Base)”

- 19.1 Please confirm that the Automatic Adjustment Formula described in the second referenced paragraph pertains to the setting of a total return on rate base and not for setting ROE, for which a separate formula has been historically applied.

### Response:

Confirmed. As noted in the text immediately above the formula “determined the total return on rate base rather than the return on equity” (Report p. 95)

- 19.2 Please confirm that the mechanism described above for the return on rate base was discontinued in December 2007, ORDER No. P.U. 32(2007) in NP’s 2008 general rate proceeding.

### Response:

Confirmed. According to Order No. P.U. 32 (2007), p. 26

*The revised arithmetic expression for the AAF is as follows:*

*Return on rate base = [rate base x weighted average cost of capital]*

*The Board agrees that the continued use of the AAF is appropriate both in terms of Regulatory efficiency and greater regulatory predictability and certainty. The change in the arithmetic expression of the AAF is required to reflect the full adoption of the ARBM [Asset Rate Base Method] for calculating the rate base.*

### 20.0 Exhibit A2-3, Consultant Report, Page 97.

"Because no party objected to the proposal, the NLPUB accepted the request in December 2012, and the 2012 allowed ROE remained the same as the previous year, 8.38%."

- 20.1 Please confirm the reference to December 2012 is meant to be December 2011.

Response: Confirmed.

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- 20.2 Please confirm that what the NLPUB approved in December 2011 was the suspension of the formula and “the continued use of the current rate of return on rate base for Newfoundland Power of 7.96% in a range of 7.78% to 8.14% until a further Order of the Board is approved on an interim basis.”

### Response:

Not confirmed as to “the suspension of the formula.” The order suspended the formula for 2012.

Confirmed as to “the continued use of the current rate of return on rate base for Newfoundland Power of 7.96% in a range of 7.78% to 8.14% until a further Order of the Board is approved on an interim basis.”

- 20.3 Please confirm that subsequent to the NLPUB decision in December 2011, Newfoundland Power filed a full cost of capital application for 2012.

### Response:

Confirmed. Newfoundland Power filed the application in late March 2012. The application was under review at the time of the Report. The docket can be located here:

<http://www.pub.nf.ca/applications/NP2012CostOfCapital/index.htm>

- 20.4 Please confirm that a settlement was filed with the regulator on June 5, 2012, approved on June 15, 2012, which establishes the rate of return on common equity to be used to determine a just and reasonable return on rate base at 8.8% for 2012.

**Response:** Confirmed. (Order NO. P.U. 17 (2012) p. 2)

- 20.5 Please confirm that the formula NP proposed for suspension was the following formula, found on p.21 of the evidence filed by Newfoundland Power in its 2012 Cost of Capital Application:

Forecast cost of equity =  $9.00 + (0.80 (RFR - 4.50))$ , where RFR is the risk free rate.

### Response:

Confirmed. For clarification, 9.00 is the cost of equity approved for ratemaking purposes for 2010, 0.80 is the adjustment coefficient and 4.50 is the risk-free rate approved by the NLPUB for the 2010 test year.