

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF an Application by Ontario Power Generation Inc. pursuant to section 78.1 of the *Ontario Energy Board Act, 1998* for an Order or Orders determining payment amounts for the output of certain of its generating facilities (the “OPG 2008-2009 Payment Amounts Application”).

**POLLUTION PROBE
CROSS-EXAMINATION REFERENCE BOOK**

June 12, 2008

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EB-2007-0905

OPG Cost of Capital

Lawrence Kryzanowski and Gordon Roberts Recommendations

Scenario #1: Assuming 25% Fixed Charge for Nuclear Assets

	Equity as % of Rate Base	Return on Equity 2008	Return on Equity 2009
OPG - Hydro	40%	7.10%	7.25%
OPG - Nuclear	50%	7.10%	7.25%
OPG - Total	47%	7.10%	7.25%

Scenario #2: Assuming No Fixed Charge for Nuclear Assets

	Equity as % of Rate Base	Return on Equity 2008	Return on Equity 2009
OPG - Hydro	40%	7.10%	7.25%
OPG - Nuclear	53%	7.10%	7.25%
OPG - Total	49%	7.10%	7.25%

References: Ex. M, Tab 12, pages 7, 8 & 51.

Kathleen McShane

Scenario #1: Assuming 25% Fixed Charge for Nuclear Assets

	Equity as % of Rate Base	Return on Equity 2008	Return on Equity 2009
OPG - Hydro	45% - 50%	10.5%	10.5%
OPG - Nuclear	65% - 75% is higher than necessary	10.5%	10.5%
OPG - Total	55 to 60% (midpoint 57.5%)	10.5%	10.5%

Scenario #2: Assuming No Fixed Charge for Nuclear Assets

	Equity as % of Rate Base	Return on Equity 2008	Return on Equity 2009
OPG - Hydro			
OPG - Nuclear	60%	11.5% - 12.0%	
OPG - Total	60%	10.5%	

References: Ex. L, Tab 12, Schedules 1, 2, 3 & 4.

Pollution Probe Interrogatory #47

Ref: Ex. C2-T1-S1, page 73

Issue Number: 2.1

Issue: What is the appropriate capital structure for OPG's regulated business for the 2008 and 2009 test years? Should the same capital structure be used for both OPG's regulated hydroelectric and nuclear businesses? If not, what capital structure is appropriate for each business?

Interrogatory

Ms. McShane states on page 73:

"Given the significant volatility in uranium prices, which is not predictable and beyond management control, OPG is requesting a variance account to record variances between forecast and actual uranium costs. The proposed variance account would cover the preponderance of OPG's fuel price risk."

Please identify and explain any fuel price risk that would remain in the presence of the requested variance account.

Response

Not all uranium price increases or decreases would flow through to the variance account in the year the price impact happens. As a result, the impact of changes in uranium input prices in one period may not be accounted for until a subsequent period. When fuel costs are higher than anticipated, OPG would have to pay the higher costs, but recovery of those higher costs would be deferred.

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Issue Number: 2.1

Interrogatory

"For purposes of the business risk assessment, I proceed on the assumption that OPG will be treated no differently from any other utility subject to the Board's jurisdiction: OPG will be provided a reasonable opportunity to recover its prudently incurred costs and earn a return that reasonably reflects the risks to which it is exposed."

Please explain how these two statements are consistent.

The first statement simply means that the Board would seek to apply the same standards and principles to OPG as to other utilities under its jurisdiction. The second statement needs to be read in conjunction with the paragraph that follows:

"As the Board suggested in its November 20, 2006 report, the application of cost of service regulation to generation is a relatively unique phenomenon, with no track record upon which to gauge the outcome. The uncertainty of the "end state" is amplified by the fact that OPG will be regulated in a market environment which is a hybrid of regulation and competition, which creates additional pressure on regulated rates in a period of potentially significant cost increases (e.g., decommissioning costs, other post-retirement benefit expenses)."

Pollution Probe Interrogatory #54

Ref: Ex. C2-T1-S1, page 80 and Schedule 26

Issue Number: 2.1

Issue: What is the appropriate capital structure for OPG's regulated business for the 2008 and 2009 test years? Should the same capital structure be used for both OPG's regulated hydroelectric and nuclear businesses? If not, what capital structure is appropriate for each business?

Interrogatory

Ms. McShane expresses the "concern ... that a BBB rated utility would, at times, be completely shut out of the long-term (30-year) debt market". In footnote 86 she gives an example of Fortis as a Baa3 rated utility that experienced difficulties. In Schedule 26, Ms. McShane includes 6 additional companies that are rated below A by at least one bond rating agency: EPCOR, Newfoundland Power, Nova Scotia Power, Pacific Northern Gas Union Gas and Westcoast Energy.

Please provide all evidence/materials of which Ms. McShane is aware of regarding difficulties accessing financing experienced by any of these six additional companies with a rating of BBB.

Response

Ms. McShane is not aware of any specific financing issues that the referenced companies, other than Pacific Northern Gas, have faced. Pacific Northern Gas has experienced significant financing access issues. In the BCUC Decision In the Matter of Pacific Northern Gas Ltd., *Application for Approval to Recapitalize Under an Income Trust Ownership Structure* (September 9, 2005), the Commission cited the evidence of PNG, in which PNG stated "it has been unable to access sufficient third party debt to match its deemed capital structure. Instead, it has used retained earnings to replace third party debt (T4: 213; PNG 2005 RR, Exhibit B-3, BCUC IR 16.2), resulting in a capital structure comprising 51 percent common equity instead of 36 percent. PNG submits it has in the last few years pursued all avenues available to it in respect of obtaining debt financing, including approaching non-conventional lenders. Of these, only RoyNat Inc. ("RoyNat"), lastly in 2002, was willing to provide debt financing. The terms of the loan, however, are not typical for a regulated public utility, and include straight line amortization and a floating interest rate 300 basis points above Bankers' Acceptances."

With respect to the other companies listed, recent indicated spreads for new issues of long-term debt (as published by RBC capital markets) demonstrate that their cost of issuing new long-term debt can be materially higher than for A rated utilities.

Filed: 2008-04-08
 EB-2007-0905
 Exhibit L
 Tab 12
 Schedule 54
 Page 2 of 2

1 The following table provides the most recent indicated yield spread over long-term
 2 Canada bond yields for a new 30-year bond issue for various utilities.
 3

Utility	DBRS Debt Rating	S&P Debt Rating	Indicated Spread
CU Inc.	A (high)	A	157
Enbridge Gas	A	A-	170
Gaz Metro	A	A	172
Hydro One	A (high)	A	142
Terasen Gas	A	A	168
Toronto Hydro	A	A-	170
EPCOR Utilities	A (low)	BBB+	242
Nova Scotia Power	A (low)	BBB	205
Union Gas	A	BBB+	190
Westcoast Energy	A (low)	BBB+	190

4
 5 Source: RBC Capital Markets, *MTN New Issue Indicative Spreads*, March 24, 2008.

Pollution Probe Interrogatory #55

Ref: Ex. C2-T1-S1, Sections IV. D and IV. E, pages 81 - 88

Issue Number: 2.1

Issue: What is the appropriate capital structure for OPG's regulated business for the 2008 and 2009 test years? Should the same capital structure be used for both OPG's regulated hydroelectric and nuclear businesses? If not, what capital structure is appropriate for each business?

Interrogatory

In light of her emphasis on the views of rating agencies, please have Ms. McShane explain if there exists any evidence to suggest that the views of these agencies could be subject to error.

Response

Yes, there have been circumstances in which the rating agencies have misestimated the risk of firms or securities; e.g., with respect to the recent sub-mortgage crisis, the rating agencies underestimated the risk of many mortgage-backed securities.

European Shadow Financial Regulatory Committee (ESFRC) - Statement No.26

September, 2007

Shadow Financial Regulatory Committees of

Asia, Australia-New Zealand, Europe, Japan, Latin America, and the United States

Lessons from Recent Financial Turmoil

Joint Statement

Copenhagen (Denmark), September 10, 2007

Executive Summary

It was inevitable that global imbalances would eventually require an upward correction in the price of risk. As this occurred, it was similarly inevitable that the weakest borrowers would find themselves unable to pay some of their debt obligations.

In this statement the Shadow Financial Regulatory Committees of Asia, Australia-New Zealand, Europe, Japan, Latin America, and the United States identify some important weaknesses in the financial infrastructure and make the following recommendations:

1. A key weakness in the current period of financial turmoil is the linkage – through either explicit or implicit guarantees – between either conduits or special purpose investment vehicles and sponsoring investment banks and commercial banks. The activities of these conduits and vehicles are extremely complicated and opaque.
2. In many new forms of lending, responsibility for analyzing and pricing loan risk is shifted to credit scoring programs and outsourced to credit rating agencies. These agencies do not share in losses caused by misjudgement, however. To restore investor confidence in the securitization process, loan originators must track the long term performance of their underwriting staff and establish systems of deferred compensation that make loan officers share the losses generated by borrower defaults. The Shadow Committees urge regulators and industry study groups to immediately address the incentive problems caused by outsourcing of risk assessment.
3. The current turmoil on financial markets raises important questions with respect to the implementation of the Basel II capital adequacy framework for banks. The Basel Committee on Banking Supervision ought to re-evaluate the heavy reliance on ratings provided by credit rating agencies in the so-called Standardized Approach of Basel II. Moreover, the advanced Internal Ratings Based approach of Basel II, which allows large and sophisticated banks to use their internal risk models, needs to be re-examined. The recent turmoil revealed that these models performed poorly and underestimated the degree of risk exposure. The Shadow Committees urge the Basel Committee to conduct another quantitative impact study (QIS) using observations from the recent turmoil.

Background of the recent turmoil

The current turmoil in world financial markets, triggered by defaults on subprime mortgages in the US, raises questions about macroeconomic policy, financial stability and the design of financial regulation. The formulation of an appropriate policy response to the uncertainty generated by the current turmoil requires an understanding of developments that have led to the situation today.

The global economy has enjoyed a long period of relatively low interest rates and an ample supply of liquidity. Underlying factors include high savings rates in China and other Asian economies, and low and stable inflation rates in Europe, the US and Japan. In addition, some key countries have maintained unsustainably low interest rates and undervalued currencies. In this macroeconomic environment, fading memories of previous turbulent periods and efforts to reach out for higher yields supported a relatively low risk-premium on credit.

The environment favored the development of innovative financial instruments for trading in credit risk. Vehicles for collective investments and structured securitization products have enabled credit risk to be allocated globally to new investor groups. Besides making markets in derivatives, banks and investment banks set up special investment vehicles (SIVs), which hold exotic instruments such as collateralised debt obligations (CDOs) and finance themselves by issuing commercial paper (CP) to investors such as hedge funds. Hedge funds and conduits--a form of SIV--have been important buyers and traders in the new instruments. Their ability to absorb risk efficiently has contributed to the low cost of credit and enhanced the ability of firms and households to carry more debt. Consequently, firms and households have become increasingly levered while asset prices, notably for residential real estate, have risen sharply.

It was inevitable that global imbalances would eventually require an upward correction in the price of risk. As this occurred, it was similarly inevitable that the weakest borrowers would find themselves unable to pay some of their debt obligations. Defaults on subprime mortgage loans in the US must be seen in this light. In principle, the transfer of credit risk inherent in credit-linked instruments should mute the consequences of the defaults by spreading them across many participants.

A threat to financial stability arises if failures in financial markets amplify the initial shock, with adverse consequences for growth and employment. There is indeed evidence of such amplification. Furthermore, with 40 percent of the bonds backed by subprime mortgages held outside the US, the consequences of subprime mortgage defaults were felt around the world, especially in Europe. In the wake these defaults, a number of important financial-market failures have occurred. These include a few SIVs sponsored by two German banks. Some important hedge funds have rung up large losses as well.

It would be a mistake for policymakers to reflexively bail out distressed banks, investors and mortgage borrowers. Bailouts increase the beneficiaries' willingness to take risk in the future. Not only would taxpayers have to pay for the bailouts, but the global economy would become more crisis prone.

This statement identifies some important weaknesses in the financial infrastructure, and explains how they have contributed to the turmoil we have observed. We also analyze appropriate regulatory responses. The following issues are discussed:

1. Conduits and Special Investment Vehicles (SIVs)
2. Outsourcing of risk assessment and due diligence to rating agencies and credit scoring programs
3. The implications of recent turmoil in financial markets for Basel II
4. The drying up of the interbank market in Europe in particular
5. Impact on markets outside Western Europe and the US

1. Conduits and Special Investment Vehicles (SIVs)

A key weakness in the current period of financial turmoil is the linkage – through either explicit or implicit guarantees – between either conduits or special purpose investment vehicles and sponsoring investment banks and commercial banks. The activities of these conduits and vehicles are extremely complicated and opaque, which is a big part of the problem.

For some time these conduits functioned effectively as collateralized investment pools that collected pools of subprime mortgages or other risky financial assets (such as loans to buyout funds) and financed these holdings by issuing short-term commercial paper. The tranching of cash flows from asset-based securities is carried out by investment banks using quality ratings provided by rating agencies based on models that could not be time-tested due to the newness of the instruments. The conduits are in most cases highly leveraged. Putting little or no equity in a conduit constitutes a way of circumventing equity requirements that would be applicable to the sponsoring banks. Moreover, the debt funding of these positions was often much shorter in duration than the assets. This mismatch creates rollover risk.

Conduit debt was typically distributed to investors including pension funds, insurance companies and hedge funds. Linkage between a sponsoring bank and the conduit was established either by using puts, guarantees or other mechanisms that transfer residual risks in the conduit back to the commercial or investment bank if and when the value of assets declined significantly.

Current regulatory and accounting standards, such as Basel I, fail to recognize sufficiently the degree of risk to the residual risk holders. Uncertainty about the value of assets in the conduits has dried up temporary and permanent sources of funding for the conduits. In Europe, where substantial proportions of the structured securities have been placed in commercial banks, the declining value of subprime mortgages has engendered uncertainty about the quality of bank assets and contributed to problems in the interbank credit market.

This suggests that regulators and supervisors must be concerned not only about the quality and transparency of assets in the conduits, but also about the nature of the obligations and risks that the conduits pass on to banks and banking systems. In particular, they must make sure that bank managers and board members take their responsibility of having a reliable risk management system in place.

2. Outsourcing of risk assessment and due diligence to rating agencies and credit scoring programs

In traditional lending, the ability of individual loan officers to analyze and price risk is monitored by senior management and subjected to reputational and career disciplines. Officers that originate a disproportionate number of bad loans are invited to leave the banking business.

In many new forms of lending, responsibility for analyzing and pricing loan risk is shifted to credit scoring programs and outsourced to credit rating agencies. Because data on loan defaults develops slowly, loan officers are rewarded more for the quantity than the quality of the loans they originate. This reward structure is particularly inappropriate for low-quality loans such as subprime mortgages. The ways in which outsourcing due diligence misaligns lenders' incentives at the origination stage explain many of the problems that are surfacing in structured securitizations. Except in unusual cases when defaults surface early in the life of a loan, investors rather than originators absorb the losses generated by the underwriting mistakes.

To restore investor confidence and discipline in the securitization process, loan originators must accept the responsibility for tracking the long-term performance of their underwriting staff and establishing systems of deferred compensation that make loan officers share in the losses generated by borrower defaults. The committee urges regulators and industry study groups to address the incentive realignment issue immediately.

3. The implications for the Basel Capital Accords

Basel II comes into force in many industrialized countries in 2007-2008. Basel II aims to address weaknesses in the Basel I capital adequacy framework for banks by incorporating more detailed calibration of credit risk and by requiring the pricing of other forms of risk. It assigns more responsibility to bankers to implement proper risk governance.

Despite these intentions and the meticulous preparation over a decade, including a series of quantitative impact studies (QIS), recent events challenge the accuracy and usefulness of important elements in Basel II. The standardized ratings approach makes heavy use of debt ratings assigned by credit rating agencies. The wisdom of relying on these ratings is thrown into doubt by the numerous delays credit rating agencies have shown in making appropriate downward revisions in recent months. In one notable example of delay, the

senior tranche of a Special Purpose Vehicle was downgraded 17 notches overnight from a triple A rating when the credit rating agency covering the security finally acted. Such delays are consistent with the research evidence that ratings changes lag increases in market assessments of risk.

Using agencies' credit ratings for borrowers to set regulatory capital requirements for banks represents an outsourcing of bank supervisors' responsibilities. As noted above, the outsourcing of due diligence places the risk assessment task with agents who have no financial responsibility to cover losses from their mistakes. This tells us that the Basel Committee ought to reevaluate the heavy reliance on credit rating agencies in the Standardized Approach and insist that supervisors conscientiously introduce their own supplementary assessments into the process. It is also important that the Basel Committee and supervisors recognize the incentive conflict between them and the credit rating agencies. The current incentive structure entails the rating agency being paid by the issuer of the securities, which may dampen the agencies' enthusiasm to highlight weaknesses in the client's financial condition.

The turmoil also reveals that the internal risk models of many banks performed poorly and underestimated the degree of risk exposure. To some extent, this reflects failure to estimate these models with observations from previous crisis periods and, thus, the difficulties of capturing low probability events in internal models created by large banks under Basel II. On these grounds the Committee urges the Basel Committee to conduct another quantitative impact study using observations from the recent turmoil.

4. The drying up of the interbank market in Europe in particular

Serious problems have developed in the interbank market in the Euro area and the UK. Spreads on interbank loans have increased and are higher than in the USA despite large injections of liquidity by the ECB in particular. In addition, quantity rationing has been observed.

The reasons for the differences between the US and Europe are still unclear. One possible explanation is institutional. More of the liquidity pressure has been felt in the US by the commercial paper market, whereas in the Euro zone it has affected rates in the interbank market. Liquidity shortages in the US focused on hedge-fund efforts to roll over asset-backed commercial paper rather than bank loans. As of September 6, 2007 the US commercial paper market had declined by some 300 billion dollars from its peak of 2.225 trillion in July. Most of this decline has been in the segment of the commercial paper market used to fund the subprime mortgage conduits. In the Euro area, data on the quantitative impacts and substitute sources of funding are not available, but spreads have remained persistently high despite the injection of significant funds by the ECB.

A second explanation for the persistently high interbank rates is that the European banks may have good reason to suspect that some of their number are in poor shape and must be charged correspondingly higher premiums.

A related explanation is that safety-net managers in the Euro zone have no experience in resolving cross-border bank insolvencies. Their ability to handle problem banks fairly and efficiently may end up being tested for the first time. Uncertainty will remain high until the condition of individual banks can be clarified, and authorities set out the policy guidelines they will follow.

The ECB has made significant injections of liquidity, nearly EUR 100 billion on August 9th alone, but lending indefinitely to potentially insolvent banks is likely to be a source of moral hazard problems in cross-border operations in particular.

5. Impact on Markets outside Western Europe and the US

Although the impact of the recent turmoil on countries outside the US and Europe has shown limited real effects to date, a sustained increase in global risk premia is bound to affect countries whose debt has been regarded as risky. In other crises, global shocks have had serious repercussions in those countries through substantial interruptions in capital flows. Although this has not occurred yet, sudden stops in capital flows could occur if European liquidity shortages persist. Authorities should recognize this possibility and strive to

reduce potential vulnerabilities.

Specifically, outside of the US and Europe, increased uncertainty has led to increased exchange rate and stock price volatility in many countries and credit spreads have generally increased. There has been fewer problems observed in interbank markets than in Europe, although Central Banks have had to monitor conditions and stand ready to meet increased demand for short term liquidity which may arise.

In developing countries, like Indonesia, there is a fear that capital flow shocks could destabilize markets for foreign exchange and sovereign debt, and indirectly output and employment. Such an impact could also slow down capital account liberalization in these countries.

In Latin America spreads on sovereign debt have increased by as much as 200-300 basis points in Argentina and Venezuela but substantially less in Mexico and Brazil. Generally the stronger fiscal positions, current account surpluses and accumulated official international reserves have helped markets adjust to the increased uncertainty. Also, domestic banking systems have limited exposures to the affected foreign markets. Risks from structured products and exposures to highly leveraged institutions, such as hedge funds and private equity, are relatively low.

In Japan, interbank and commercial paper markets have operated smoothly, reflecting the abundant liquidity of the Japanese Banking system. However, the general increase in uncertainty and nervousness has contributed to the unwinding of the Yen carry trade, and significant declines in Japanese stock prices.

The unwinding of the yen carry trade has also contributed to the significant decline observed recently in the values of Australasian currencies. Also, in Australia, where securitization, structured products and hedge funds are significant, uncertainty about exposures and increased demand for liquidity have been reflected in upward pressure on interest rates in interbank markets. Several banks have shifted assets from conduits back onto balance sheets. Injection of liquidity by the Reserve Bank via its repurchase agreements (and widening the range of eligible securities) has so far smoothed the adjustment process in credit markets.

News

Credit crisis 'made in Canada'; Lax Rules Blamed

Duncan Mavin and John Greenwood

National Post, With Files From Sean Silcoff; National Post

906 words

27 September 2007

National Post

National

A1

English

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Canadian banks are struggling to contain a credit crisis that could spiral out of control here more than it has elsewhere because of a lax regulatory regime, sources have told the National Post.

The crisis relates to the market for a complex type of short-term funding known as **asset backed commercial paper (ABCP)**, which had grown out of proportion in this country partly thanks to Canadian rules that were not as tough as in other nations.

"It's a made-in-Canada problem," said Claude Lamoureux, head of Ontario Teachers' Pension Plan. Many people in the market "didn't know or didn't ask questions" because they were making more profits than elsewhere, he added.

The Canadian ABCP market attracted a flood of foreign financial institutions such as Barclays Bank and Deutsche Bank, who exploited the gaps in the Canadian ABCP rules to make big profits at lower risk to themselves, sources said.

"They were effectively able to earn fees from supplying liquidity without ever having to supply the liquidity or set aside capital," said a source.

In the worst-case scenario, if global financial players lose confidence in the Canadian ABCP system altogether, the crisis could spread to Canada's big banks, leaving them on the hook for tens of billions of dollars.

ABCP is a package of debt obligations -- anything from car loans to credit-card debt. The product grew in popularity in recent years among everyone from pension funds to corporate treasury departments to banks because ABCP offered higher returns than, for example, a corporate bond or treasury bill.

Typically, ABCP products also involve liquidity support from a supplier, usually a major bank. In simple terms it is an agreement to buy the ABCP in the event of a disruption to the market.

In Canada, the market grew more quickly than in other countries, doubling between 2000 and 2007 to \$120-billion, because the Canadian definition of disruption to the market was much narrower than elsewhere.

In Canada, liquidity suppliers did not have to provide funding except in catastrophic circumstances.

Also the Canadian banking regulator, unlike regulators in other countries, did not ask the liquidity supplier -- the bank -- to set aside any capital, so they could use it to grow other lines of business.

"ABCP growth outstripped traditional personal and commercial loan growth," and was "meaningfully above the pace of U.S. ABCP market expansion," said Blackmont Capital banking analyst Brad Smith.

In addition, Canadian debt rating agency Dominion Bond Rating Service gave a rating to Canadian ABCP even though other rating agencies such as Moody's and Standard & Poors shied away from doing so.

By June this year, Canada's ABCP market was about 10% of the size of the market in the United States, although the overall U.S. financial system is proportionately far larger than Canada's.

When concerns surfaced in August about the underlying assets in ABCP -- many of which have included troubled mortgage loans in the U.S. -- some owners of ABCP were caught off guard. Owners of ABCP were under the belief that they could convert it to cash or another similar product at the end of 30 or 60 days but instead were left holding the product.

Canadian investment bank Coventree Capital Inc. became one of the first major victims of the global credit crunch when it was unable to trade the ABCP it was holding because of the general seizing up of credit markets around the world.

Following Coventree's collapse, Canadian non-bank owners of \$40-billion of troubled **asset-backed commercial paper** -- pension funds and corporate treasury departments -- were forced into an unprecedented joining-of-forces known as the Mont-real Accord to try to salvage their holdings.

If the Montreal Accord does not result in a long-term agreement on how to resolve the issues in Canada's non-bank ABCP market by an Oct. 15 deadline, there could be a carryover effect on the demand generally for ABCP, said Blackmont's Mr. Smith.

"Failure to fully restore investor confidence levels could reduce demand ...which could restrict the future ability of banks to manage capital," he said.

Mr. Smith calculated that Canada's big six banks are on the hook for total liquidity facilities worth \$135-billion.

Canada's bank regulator -- the Office of the Superintendent of Financial Institutions -- did not return calls from the National Post seeking comment for this story. However, in an e-mail the regulator indicated that the rules enforced in Canada were in accordance with international guidelines.

HOW IT WORKS

- A bank packages a collection of mortgages, credit card balances, or lines of credit into an ABCP that matures in 30 days.
- The bank sells ABCP for a fee to an intermediary that assumes all the risk associated with the underlying assets.
- The intermediary sells pieces of the ABCP to investors, including pension funds or corporations or individuals.
- Investors are paid interest and assume there will be a buyer for their piece of the ABCP after 30 days.
- For a fee, the bank supplies funds to buy the ABCP if there are no other buyers - in Canada, this feature did not work in August when investors could not find a buyer.

Rescue plan in trouble, FP1 Banks switch tactics, FP3 Middlemiss, FP3

Document FINP000020070927e39r0003d

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Filed: 2008-04-08
EB-2007-0905
Exhibit L
Tab 12
Schedule 56
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Pollution Probe Interrogatory #56

Ref: Ex. C2-T1-S1, Section IV. E, pages 85 - 88

Issue Number: 2.1

Issue: What is the appropriate capital structure for OPG's regulated business for the 2008 and 2009 test years? Should the same capital structure be used for both OPG's regulated hydroelectric and nuclear businesses? If not, what capital structure is appropriate for each business?

Interrogatory

Ms. McShane refers to business risk profile scores from Standard & Poor's.

Please provide all of the evidence/materials that Ms. McShane is aware of that Standard & Poor's business risk ranking scale is an accurate measure of business risk.

Response

Ms. McShane is not aware of any studies that have been done to test the accuracy of the business risk ranking scale. Nevertheless, it provides an objective, third-party assessment of the relative risks of all utilities in the S&P universe. She is aware, however, that the business risk profile scores have been widely utilized by analysts to differentiate among utilities on the basis of relative business risk.

Pollution Probe Interrogatory #9

Ref: Ex. C2-T1-S1, page 9

Issue Number: 2.2

Issue: What is the appropriate return on equity (ROE) for OPG's regulated business for the 2008 and 2009 test years? Should the ROE be the same for both OPG's regulated hydroelectric and nuclear businesses? If not, what is the appropriate ROE for each business?

Interrogatory

With regard to the views of capital market participants included in Ms. McShane's "review" mentioned at page 9:

(a) What returns are investors expecting from their share holdings in the traded utility entities in Canada?

(b) What returns have investors achieved on their share holdings in the traded utility entities in Canada?

(c) How do the returns achieved in part (b) compare to the returns that these investors achieved from holding the market index in Canada?

(d) Please have Ms. McShane¹ provide all of the references consulted in her "review".

¹ For the purpose of Pollution Probe's interrogatories, references to Ms. McShane include both her and Foster Associates, Inc.

Response

(a) As discussed at Ex. C2-T1-S1, pages 38 - 39 of Ms. McShane's testimony, an analysis of Canadian utility returns shows that the achieved returns (arithmetic and geometric basis) indicates no upward or downward trends; the historic utility returns to shareholders have clustered in the 11-12 percent range. This historic range is a reasonable proxy for investor expectations.

(b) Please see Ex. C2-T1-S1, page 38 (Table 3) of Ms. McShane's testimony.

(c) Over the long-term, the returns from the traded utilities have been higher; see Ex. C2-T1-S1, Schedule 4, page 218 and Schedule 11, page 228 of Ms. McShane's testimony.

(d) The following documents are attached:

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- 1 1. Conference Board of Canada, *Electricity Restructuring: Opening Power*
 2 *Markets*, May 2004
- 3
- 4 2. December 2004 DBRS report for ATCO Ltd
- 5
- 6 3. November 2004 DBRS report for AltaLink
- 7
- 8 4. September 2004 DBRS report for FortisAlberta
- 9
- 10 5. DBRS, *The Rating Process and the Cost of Capital For Utilities: Five Reasons*
 11 *Why Canadian Utilities have Lower Ratios and Five Changes to Regulation*
 12 *Which Should be Introduced in Canada*, May 2003
- 13
- 14 6. S&P, *Research Update: ATCO Group of Companies 'A' Ratings Affirmed;*
 15 *Outlook Stable*, November 9, 2004
- 16
- 17 7. S&P, *Research Summary: AltaLink*, June 5, 2006
- 18
- 19 8. S&P, *Research: Union Gas*, August 24, 2006
- 20
- 21 9. S&P's *Industry Report Card: Regulatory Rulings, M&D, and Fuel Cost*
 22 *Recovery Dominate Global Utilities Credit Environment*, November 21, 2006,
- 23
- 24 10. CIBC World Markets Report entitled *Pipelines and Utilities: Time to Lighten*
 25 *Up*", December 2001,
- 26
- 27 11. National Energy Board's *Canadian Hydrocarbon Transportation System* report,
 28 2005
- 29
- 30 12. National Energy Board's *Canadian Hydrocarbon Transportation System* report,
 31 2006
- 32
- 33 13. National Energy Board's *Canadian Hydrocarbon Transportation System* report,
 34 2007
- 35
- 36 14. Karen Taylor, BMO Capital Markets, *Pipelines/Gas & Electric Utilities*,
 37 December 7, 2006

Pollution Probe Interrogatory #14

Ref: Ex. C2-T1-S1, page 29

Issue Number: 2.2

Issue: What is the appropriate return on equity (ROE) for OPG's regulated business for the 2008 and 2009 test years? Should the ROE be the same for both OPG's regulated hydroelectric and nuclear businesses? If not, what is the appropriate ROE for each business?

Interrogatory

In using the historic average risk premiums for the U.S. and U.K. presented on this page: | |

(a) What adjustment did Ms. McShane make for any differences in risk of these market proxies compared with the market proxy she uses for Canada? Please explain.

(b) What adjustment did Ms. McShane make for the foreign exchange risk premium that Canadian investors would require for investing in either of these two foreign markets? Please explain. | |

Response

(a) She did not make any adjustments. The standard deviation of the returns for Canada and the U.S. are virtually identical over the 1947 - 2006 period. The U.K. returns were not relied on in any formal way, and thus there was no reason to make an adjustment.

(b) She did not make any adjustment for foreign exchange risks. Foreign exchange risk can be diversified or hedged. The average return on U.S. stocks in Canadian dollars over the 1947 - 2006 period (as per the data provided in the Canadian Institute of Actuaries' *Report on Canadian Economic Statistics 1924 - 2006*) was 13.4 percent versus the 13.2 percent average of the U.S. stock returns reported in U.S. dollars as per Ms. McShane's Ex. C2-T1-S1, Schedule 3, page 217. | |

Pollution Probe Interrogatory #19

Ref: Ex. C2-T1-S1, page 32

Issue Number: 2.2

Issue: What is the appropriate return on equity (ROE) for OPG's regulated business for the 2008 and 2009 test years? Should the ROE be the same for both OPG's regulated hydroelectric and nuclear businesses? If not, what is the appropriate ROE for each business?

Interrogatory

(a) Please have Ms. McShane confirm that the underlying logic behind the adjusted beta method is that the beta is assumed to revert to a hypothesized true value of 1 over time.

(b) Please have Ms. McShane provide all evidence/materials of which she is aware that there is mean reversion in the betas of Canadian stocks.

(c) In the absence of any evidence that Canadian stock betas exhibit mean reversion to 1 and given that "utility returns have consistently been higher than what raw betas would indicate", does this not imply that utility returns have been too generous? Please explain.

Response

(a) It is confirmed. However, please see Ms. McShane's evidence at Ex. C2-T1-S1, page 35, specifically,

"The deficiencies in 'raw' beta can be mitigated by using adjusted betas. Adjusting betas entails moving betas above and below the market mean of 1.0 toward the market mean. The adjustment that is used by the major commercial suppliers of betas uses a formula that gives approximately two-thirds weight to the stock's own beta and one-third weight to the market mean beta of 1.0. Use of adjusted betas implicitly recognizes that 'raw' utility betas do not adequately explain utility returns. For example, as illustrated above, 'raw' betas do not capture utilities' interest rate sensitivity. Further, the objective of the relative risk adjustment is to predict the investors' required return. Since utility returns have consistently been higher than what raw betas would indicate, adjusted betas are better predictors of utility returns than 'raw' betas." (footnotes excluded).

(b) To Ms. McShane's knowledge, there is no empirical evidence of mean reversion in the betas of Canadian stocks. However, please see response to (a).

(c) No. It means that "raw" betas are not a good predictor of the expected or required ROE.

Pollution Probe Interrogatory #26

Ref: Ex. C2-T1-S1, page 49

Issue Number: 2.2

Issue: What is the appropriate return on equity (ROE) for OPG's regulated business for the 2008 and 2009 test years? Should the ROE be the same for both OPG's regulated hydroelectric and nuclear businesses? If not, what is the appropriate ROE for each business?

Interrogatory

(a) What official definition of a business cycle was used by Ms. McShane to identify the 1994 - 2006 period as a complete business cycle in Canada?

(b) If the Canadian business cycle is being measured from peak to peak, what are the two peak years?

(c) If the Canadian business cycle is being measured from trough to trough, what are the two trough years in the 1994 - 2006 business cycle identified by Ms. McShane?

(d) Why are the years 1990 through 1993 not included in the Canadian business cycle examined in Ms. McShane's evidence?

(e) What year(s) is (are) recession year(s) in the 1994 - 2006 period in Canada?

Response

(a) - (e) The period 1994 - 2006 is not based on an official definition of a business cycle, which traditionally is measured from trough to trough. The most recent trough in the official business cycle in Canada ended in 1992, with 1993 continuing to reflect the hang-over of the effects of both the deep recession and the ongoing restructuring of the economy in part arising out of the provisions of NAFTA and thus relatively anemic growth (2.3 percent). The period 1994 - 2006 does not include a year of technical recession, since unlike the U.S., Canada did not experience a recession in 2001. The period does, however, include three years of slowdown, as demonstrated in the annual growth rates provided below, and a balance of years of expansion (above trend growth), economic downturns and growth at approximately trend (average) levels.

YEAR	GROWTH RATE	YEAR	GROWTH RATE
1994	4.8%	2000	5.2%
1995	2.8%	2001	1.8%
1996	1.6%	2002	2.9%
1997	4.2%	2003	1.9%
1998	4.1%	2004	3.1%
1999	5.5%	2005	3.1%
		2006	2.8%

Pollution Probe Interrogatory #28

Ref: Ex. C2-T1-S1, page 124

Issue Number: 2.2

Issue: What is the appropriate return on equity (ROE) for OPG's regulated business for the 2008 and 2009 test years? Should the ROE be the same for both OPG's regulated hydroelectric and nuclear businesses? If not, what is the appropriate ROE for each business?

Interrogatory

Please have Ms. McShane explain how the discussion in Appendix B relates to the residual income model of stock valuation.

Response

The residual income model for stock valuation is a discounted cash flow model that estimates the value of a stock using the discounted value of the economic profit of the firm after applying a charge for the cost of capital (debt plus equity). The comparable earnings test results include total earnings, including economic profits in excess of the cost of capital, that low risk (comparable) unregulated companies are able to earn, but not on a discounted basis.

Pollution Probe Interrogatory #37

Ref: Ex. C2-T1-S1, page 165

Issue Number: 2.2

Issue: What is the appropriate return on equity (ROE) for OPG's regulated business for the 2008 and 2009 test years? Should the ROE be the same for both OPG's regulated hydroelectric and nuclear businesses? If not, what is the appropriate ROE for each business?

Interrogatory

A number of studies argue that the growth of publicly traded firms is less than the growth in GDP. Assuming that this is the case, please have Ms. McShane explain why the growth rates of higher dividend-paying firms (such as the utilities) are expected to be higher than those of lower dividend-paying firms.

Response

They are not. The average expected long-term growth rate in earnings for the S&P 500 companies (which have an average dividend yield of approximately two percent), for example, as per the most recent I/B/E/S forecasts, is 12.5 percent. The corresponding long-term forecast growth rates for the sample of benchmark utilities as per the I/B/E/S forecasts were 4.9 percent on an average basis and 4.5 percent on a median basis, with a corresponding dividend yield of approximately 4.5 percent.

CCC and VECC Interrogatory #15

Ref: Ex. C2-T1-S1, page 31

Issue Number:

Issue:

Interrogatory

- a) Can Ms. McShane confirm that OPG is owned by the province of Ontario?
- b) Would Ms. McShane please assess the risk of OPG relative to the stream of tax revenues expected to accrue to the province and whether this risk assessment is the same as that for the beta coefficient she estimates?
- c) Would Ms. McShane generally agree that since provincial tax revenues are a percentage of the profits *and wages* earned in the province, it is more diversified than the stock market claims on profits? If not why not?
- d) If the beta of OPG is smaller as indicated in c) above such that the province requires a lower rate of return would economic theory indicate that these efficiency gains in terms of lower required levels of profit should be ignored? Please discuss in full.
- e) Given that the Canadian institute of Actuaries data goes back to 1922 explain in detail why Ms. McShane decided to start her estimation period in 1947.
- f) Please provide Ms. McShane's estimate of the realised excess return of Canadian equities over bonds for the period 1947-1956.
- g) Please explain in detail how the four factors in footnote 18 lead to the choice of 1947 as the start date rather than some other date.

Response

- a) It is confirmed.
- b) The request presumes (1) that the return should be dependent on government's relative ability to bear risk versus the ability of investors in privately-owned enterprises; and (2) that the contribution of OPG to the province's "portfolio" risk is the relevant basis for estimating OPG's cost of equity. Ms. McShane does not accept the premise of the question. See response to c).
- c) This is an argument that has been used to support the proposition that a government owned entity requires a lower return than a similar privately-owned business. The counter argument, which invalidates this claim, is that the relevant measure of risk is its contribution to the total portfolio of households, which hold both private and public investments, and that whether an investment is public or private has no effect on total portfolio risk.
- d) N/A

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1 e) & g)

2
3 The estimation of the expected market risk premium from achieved market risk
4 premiums is premised on the notion that investors' expectations are linked to their past
5 experience. Basing calculations of achieved risk premiums on the longest periods
6 available reflects the notion that it is necessary to reflect as broad a range of event types
7 as possible to avoid overweighting periods that represent 'unusual' circumstances. On
8 the other hand, the objective of the analysis is to assess investor expectations in the
9 current economic and capital market environment. Hence, focus should be placed on
10 periods whose economic characteristics, on balance, are more closely aligned with what
11 today's investors are likely to anticipate over the longer-term.
12

13 The four factors in footnote 18 list the key structural economic changes that have taken
14 place since the end of World War II. As a result, the economic characteristics of the pre-
15 World War II economy that would give rise to returns from equity investment were
16 materially different than today. In Canada, World War II represents a significant line of
17 demarcation in the development of the economy. Prior to World War II, Canada was
18 primarily an agrarian economy; World War II transformed the economy in a relatively
19 short period of time. Moreover, 1947 marks the discovery of oil in Western Canada,
20 which also represents a transforming event in the nature of the Canadian economy.
21

22 f) The differential between stock and bond returns was 17.5% (arithmetic average). For
23 the entire period 1924 to 2006 for which data are available for stock and bond returns,
24 the average return on stocks was 11.9%; the average return on bonds was 6.5%, for an
25 achieved risk premium in Canada of 5.4%. The average experienced return on bonds, at
26 approximately 6.5%, is considerably higher than the current and expected yield, and
27 thus overstates a reasonable estimate of the expected risk-free rate.

Opinion

on

**Capital Structure and
Fair Return on Equity**

Prepared for

ONTARIO POWER GENERATION

Prepared by

KATHLEEN C. McSHANE

FOSTER ASSOCIATES, INC.



November 2007

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The addition of an allowance for financing flexibility of 50 basis points to the “bare-bones” return on equity estimate of 9.25-10.25% derived from both the DCF and equity risk premium tests respectively, results in an estimate of the fair return on equity of 9.75%-10.75%.

F. COMPARABLE EARNINGS TEST

The comparable earnings test provides a measure of the fair return based on the concept of opportunity cost. Specifically, the test arises from the notion that capital should not be committed to a venture unless it can earn a return commensurate with that available prospectively in alternative ventures of comparable risk. Since regulation is a surrogate for competition, the opportunity cost principle entails permitting utilities the opportunity to earn a return commensurate with the levels achievable by competitive firms facing similar risk. The comparable earnings test, which measures returns in relation to book value, is the only test that can be directly applied to the equity component of an original cost rate base without an adjustment to correct for the discrepancy between book values and current market values. Neither the equity risk premium results nor the DCF results, if left without adjustment, recognizes the discrepancy. The 50 basis point financing flexibility adjustment only minimally addresses the discrepancy.

The comparable earnings test is an implementation of the comparable earnings standard, as distinguished from the cost of attracting capital standard. The comparable earnings standard recognizes that utility costs are measured in vintaged dollars and that rates are based on accounting costs, not economic costs. In contrast, the cost of attracting capital standard relies on costs expressed in dollars of current purchasing power, i.e., a market-related cost of capital. In the absence of experienced inflation, the two concepts would be quite similar, but the impact of inflation has rendered them dissimilar and distinct.

The concept that regulation is a surrogate for competition may be interpreted to mean that the combination of an original cost rate base and a fair return should result in a value to investors

commensurate with that of competitive ventures of similar risk. The fact that an original cost rate base provides a starting point for the application of a fair return does not mean that the original cost of the assets is a measure of their fair value. The concept that regulation is a surrogate for competition implies that the regulatory application of a fair return to an original cost rate base should result in a value to investors commensurate with that of similar risk competitive ventures. The comparable earnings standard, as well as the principle of fairness, suggests that, if competitive industrial firms facing a level of total risk similar to utilities are able to maintain the value of their assets considerably above book value, the return allowed to utilities should not seek to maintain the value of utility assets at book value. It is critical that the regulator recognize the comparable earnings standard when setting a just and reasonable return.

The comparable earnings test remains the only test that explicitly recognizes that, in the North American regulatory framework, the return is applied to an original cost (book value) rate base. The persistence of moderate inflation continues to create systematic deviations between book and market values. Application of a market-derived cost of capital to book value ignores that distinction. To illustrate, if the market value of an investment is \$15 and the required return is 10%, the return, in dollars, expected by investors is \$1.50. However, regulatory convention applies the market-derived return to the book value of the investment. If the book value of the investment is \$10.00, application of a 10% return to the book value will result in a return, in dollars, of only \$1.00. The application of the results of the cost of attracting capital tests, i.e., equity risk premium and discounted cash flow to the book value of equity, unless adjusted, do not make any allowance for the discrepancy between the return on market value and the corresponding fair return on book value.⁵¹ The comparable earnings test, however, does. It applies “apples to apples”, i.e., a book value-measured return is applied to a book value-measured equity investment.

⁵¹ As previously noted, the 50 basis point financing flexibility adjustment is only a minimal recognition of the discrepancy.

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The principal issues in the application of the comparable earnings test are:⁵²

- ◆ The selection of a sample of industrials of reasonably comparable risk to a benchmark Canadian utility.
- ◆ The selection of an appropriate time period over which returns are to be measured in order to estimate prospective returns.
- ◆ The need for any adjustment to the "raw" comparable earnings results if the selected industrials are not of precisely equivalent risk to the benchmark utility.
- ◆ The need for a downward adjustment for the industrials' market/book ratios.

The application of the comparable earnings test first requires the selection of one or more samples of industrials of reasonably comparable risk to a benchmark Canadian utility. The selection should conform to investor perceptions of the risk characteristics of utilities, which are generally characterized by relative stability of earnings, dividends and market prices. These were the principal criteria for the selection of samples of industrial companies (from consumer-oriented industries). The criteria for selecting comparable unregulated low risk companies include industry, size, dividend history, stock and bond ratings and betas (See Appendix F).

Since the universe of Canadian industrial companies is sufficiently large to produce a representative sample of sufficient size, the focus of the comparable earnings analysis was on Canadian firms. However, a sample of U.S. companies was also used as a check on the reasonableness of the Canadian sample results. The application of the selection criteria to the Canadian universe produced a sample of 20 companies. ||

Next, since industrials' returns on equity tend to be cyclical, the selection of an appropriate period for measuring industrial returns must be determined. The period selected should encompass an entire business cycle, covering years of both expansion and decline. That cycle should be representative of a future normal cycle, e.g., the historic and forecast cycles should be

⁵² Full discussion in Appendix F.

similar in terms of inflation and real economic growth.⁵³ The period 1994-2006 provides a reasonable proxy for a future business cycle, as the experienced rates of inflation and economic growth are reasonably similar to the rates projected by economists over the next business cycle. The experienced returns on equity of the sample of 20 Canadian low risk industrial companies over this period were in the approximate range of 12.75-13.25% (see Appendix F and Schedule 17).

The next step is to assess whether or not there is a need to adjust the “raw” comparable earnings results to reflect the differential risk of a benchmark Canadian utility relative to the selected industrials. The comparative risk data (including betas and stock and bond ratings) indicate, on balance, the Canadian industrials are of modestly higher risk than a benchmark utility. To recognize the industrials’ higher risk, the comparable earnings test results require a downward adjustment to a range of 12.25-12.75% (mid-point of 12.50%).

Since the Canadian sample is relatively small, in large part a function of the size and make-up of the Canadian equity market, as noted above, I also selected a sample of low risk U.S. industrials to serve as a check on the reasonableness of the Canadian results. The selection criteria were virtually identical to those used for the Canadian industrial sample. The greater breadth of the U.S. market allowed the selection of a sample of 157 companies in the same stable industries used to select the Canadian industrials. The experienced returns of the U.S. industrials were in the range of 13.5-14.5% (see Schedule 19). The comparative risk data indicate that the U.S. industrials are of relatively similar risk to the Canadian industrials (see Schedule 18), and thus of slightly higher risk than a benchmark Canadian utility. When used as a check against the Canadian firms, the returns of the significantly larger U.S. sample of industrials underscore the reasonableness of the comparable earnings results for the sample of Canadian industrials.

⁵³ Returns on equity during earlier periods may not be comparable as the economic fundamentals that impact achievable returns (e.g., inflation) were not comparable.

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The final step is to assess the need for a market/book adjustment to the comparable earnings results. The sample results would warrant such an adjustment if their market/book ratios relative to the overall market indicated an ability to exert market power. In other words, a relatively high market/book ratio would point to returns on equity that were higher than the levels achievable if market power were not present. The average market/book ratio of the sample of Canadian comparable industrial companies over the 1994-2006 period was 2.1 times, virtually identical to the market/book ratio of the S&P/TSX composite over the same period (see Appendix F). For the U.S. industrial sample, the average market/book ratio for 1994-2006 was approximately 2.7 times, compared to 3.4 times for the S&P 500. The similar to market/book ratios of the proxy samples relative to the market composites indicate no evidence of market power and thus no rationale for a downward adjustment. As a result, a fair return for a benchmark Canadian utility based on the comparable earnings test is approximately 12.5%.

G. FAIR RETURN ON EQUITY FOR A BENCHMARK CANADIAN UTILITY

The results of the three tests used to estimate a reasonable return on equity for a benchmark Canadian utility are summarized below:

Table 5

<u>Test</u>	<u>"Bare-Bones"</u> <u>Cost of Equity</u>	<u>Fair</u> <u>Return on Equity</u>
Equity Risk Premium	9.25-10.25%	9.75-10.75%
Discounted Cash Flow	9.25-9.5%	9.75-10.0%
Comparable Earnings	N/A	12.5%

In arriving at a reasonable return for a benchmark utility, I have given primary weight to the cost of attracting capital, as measured by both the equity risk premium and DCF tests. The "bare-bones" cost of attracting capital based on these two tests is approximately 9.25-10.0%. Including the allowance for financing flexibility, the indicated return on equity is 9.75-10.5%. However,

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This benefit is provided at no cost (i.e., there is no debt fee paid to the Province for the potential financial support). The proper application of the stand-alone principle to the determination of the deemed capital structure (and return on equity) for OPG's regulated operations ignores the happenstance of ownership; the capital structure should reflect the business risks of OPG's regulated operations irrespective of the identity of the shareholder. This approach ensures that the shareholder is properly compensated for the total risk borne.

A.2. Business Risks

The capital structure should be consistent with the business risks of the specific entity for which the capital structure is being set. The business risks to which investors in a utility are exposed are those that reflect the basic characteristics of the operating environment and regulatory framework of the utility that can lead to the failure to recover a compensatory return on, and/or the return of the capital investment itself.

A.3. Maintenance of Creditworthiness and Financial Integrity

The capital structure, in conjunction with the returns allowed on the various sources of capital, should provide the basis for stand-alone investment grade debt ratings for the regulated operations. An investment grade debt rating provides the basis for access to the capital markets on reasonable terms and conditions. As a corporate entity operating with a commercial mandate to operate on a financially sustainable basis, OPG should be positioned to access the public debt markets. The regulated operations of OPG should contribute their fair share to the creditworthiness and financial integrity of Ontario Power Generation Inc., the corporate entity responsible for raising debt capital on behalf of the entire organization. The importance of investment grade debt ratings is discussed in detail in Chapter IV.C.

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ONFA related costs (Nuclear Liabilities Deferral Account) and costs to increase/add or refurbish its generation capacity (Capacity Increases/Additions and Refurbishments Deferral Account). OPG is also proposing to continue the variance accounts for the net revenue impact for variability in hydroelectricity production due to changes in water conditions (Water Conditions Deferral Account) and forecast ancillary service revenues (Ancillary Services Revenue Variance Accounts). The variance account for transmission outages and restrictions will be eliminated, as will the variance accounts associated with Acts of God and unforeseen changes in nuclear technology or regulatory requirements⁶³, but OPG has reserved the right to do so in the future should there be material financial consequences arising from these factors. OPG is also proposing several new variance accounts, the most important of which will record the difference between actual and forecast pension/OPEB expense.⁶⁴

The use of deferral and variance accounts can mitigate forecasting risks related to costs over which the utility has no control, but does not change the utility's fundamental risks. Moreover, the ability to create a variance or deferral account and accrue differences between forecast and actual costs does not guarantee recovery of those costs. The extent to which deferral accounts lower the forecasting risk faced by a utility and thus cost of capital is a function of the scope of the accounts and the materiality of the costs that are covered by those accounts.

All utilities have the ability to apply to the regulator for deferral accounts. The OEB has demonstrated an inclination to establish deferral accounts and recover costs accrued therein, subject to criteria of prudence, materiality, causation and uncontrollability. Therefore, OPG's

⁶³ The variance accounts established for ancillary services (to be continued) and transmission outages and restrictions (to be eliminated), while they relate to revenues and costs beyond the control of management, the amounts are minor relative to the total revenue requirement and thus have little or no impact on the level of business risk.

⁶⁴ The potential variance between actual and forecast pension/OPEB expense is significant, primarily due to changes in the discount rate. A 25 basis point change in the discount rate used to establish the expense can alter expense by \$50 million. OPG proposes to accumulate differences between actual and forecast expense in a variance account, but the amounts in the account would not be cleared until the cumulative balance (positive or negative) in the account reaches \$100 million.

beginning of 2007, market prices have continued to show high volatility with world prices reaching as high as \$136 per pound (U.S.) from a low of \$75 per pound (U.S.). Delays in bringing on new production could lead to even higher market prices. In addition, OPG's exposure to market prices for future years has increased due to a larger proportion of supply contracts that contain pricing indexed to market indicators at the time of delivery, a growing trend in the industry and a function of a strong sellers' market. For example, over 50% of the deliveries in 2009 are priced based on world prices at the time of delivery. Historically, a significant proportion of supply contracts were base price contracts with CPI or similar forms of escalation. This had resulted in considerably lower uncertainty in forecasting fuel expense than will be the case for the next several years. Higher uranium prices have already increased OPG forecast fuel expense in 2009 by almost 140% relative to 2004; continued increases in uranium prices could push the fuel expense even higher. As a result, regulated payments may not cover unanticipated uranium price increases. Given the significant volatility in uranium prices, which is not predictable and beyond management control, OPG is requesting a variance account to record variances between forecast and actual uranium costs. The proposed variance account would cover the preponderance of OPG's fuel price risk. //

With respect to decommissioning and used fuel risks, OPG is responsible for the decommissioning of its nuclear stations, including the leased Bruce facilities⁸⁰, and for the management and disposal of used fuel from those plants. The Ontario Nuclear Funds Agreement (ONFA) between the Government of Ontario and OPG provides for segregated Decommissioning and Used Fuel Funds, and requires contributions to those funds, limits OPG's risk with respect to long-term used fuel management, and requires the Province to provide financial guarantees to CNSC that there will be funds available to discharge the used fuel and decommissioning liabilities.⁸¹ Pursuant to ONFA, OPG's liability with respect to the management and disposal of used fuel is limited to approximately \$6 billion based on the present value of the obligation in 1999 (approximately \$9.1 billion in 2007 dollars). The Province and

⁸⁰ Bruce Power makes payments to OPG that cover decommissioning and waste management funding.

⁸¹ The Provincial guarantee on unfunded liabilities was required by the CNSC to satisfy licensing requirements.

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spread between long-term BBB rated utility debt and A rated utility debt in Canada has been as high as 175 basis points.⁸⁵ In the U.S. over the past five years, the spread between A and Baa long-term utility bonds has been as high as 85 basis points. Of particular concern would be that a BBB rated utility would, at times, be completely shut out of the long-term (30-year) debt market.⁸⁶

A utility with split ratings (that is, one debt rating agency rates the company's debt in the A category and another debt rating agency rates it in the BBB category) could face a materially higher cost of debt than a utility with both ratings in the A category. Debt investors are likely to take the lowest rating into account when pricing an issue. To illustrate, the credit spreads for new 30-year bond issues for Canadian utilities with split ratings have been approximately 35 basis points higher than for Canadian utilities for which all debt ratings are in the A category. Within the past five years, the spread differentials have been as high as approximately 65 basis points.

The public market for BBB rated debt remains more limited in Canada than in the U.S. Many institutions, who are major purchasers of corporate debt issues, either may not purchase BBB rated debt or have limitations on the proportion of BBB rated debt that they can hold in their portfolio. If an issuer's debt is downgraded further, into a non-investment grade category, the institution may have to dispose of its holdings in those securities. To illustrate, the NEB reported in its August 2005 *Canadian Hydrocarbon Transportation System Report* that Canadian bonds are an important revenue source to pension funds and other institutional investors, and a downgrade could require institutional holders to sell a large percentage of their bonds at discounted prices.⁸⁷

⁸⁵ Based on a comparison between the indicated spreads for TransAlta Corporation and Canadian utilities whose debt ratings are all in the A category.

⁸⁶ FortisBC, for example, rated at the time Baa3 by Moody's and BBB(high) by DBRS, had a difficult time during late 2004 and early 2005 accessing the 30-year debt market, despite the fact that the debt markets at the time were some of the most robust that had been experienced in Canada for years.

⁸⁷ More generally, the pension funds had indicated to the NEB that the basic financial parameters (allowed return on equity and deemed capital structure) in the Board's regulatory scheme should be improved.

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common equity ratio for OPG's regulated operations compatible with a stand-alone A rating would be in the range of 50-60%.

The common equity component alone does not determine the debt rating. Other financial metrics, along with qualitative factors, are also taken into account by debt rating agencies. Thus, for example, if a utility is able to achieve adequate ratios such as FFO Interest Coverage and FFO/Debt ratios despite a debt ratio that is higher than indicated by guidelines (as a result of the combination of ROE, cost of debt and cash flows from depreciation), it still may be able to achieve an A rating. Consequently, S&P's guideline range for the debt ratio is an important indicator of an appropriate capital structure for OPG's regulated operations, but other financial metrics need to be taken into account. An analysis of stand-alone "notional"¹⁰⁰ coverage ratios at the benchmark return on equity of 10.5% and a common equity ratio of 57.5%, in the absence of experiencing risks that cause the actual performance of the regulated operations to fall short of expected levels, the principal cash flow metrics (FFO interest coverage and FFO to total debt) for the regulated operations would be expected to be sufficient to achieve and maintain stand-alone debt ratings in the A category.

F. CAPITAL STRUCTURES OF PEERS

The actual capital structures of OPG's peers, which underpin those utilities' debt ratings, may also provide some insight into an appropriate stand-alone capital structure for an A rating. Since there are no other regulated generation companies in North America, the closest peers for OPG's regulated operations would be, in Canada, TransAlta Utilities and TransAlta Corporation, and in the U.S., electric utilities with S&P business profile scores of "6".

¹⁰⁰ The debt rating agencies do not calculate ratios for individual divisions of a company; they look at the ratios of the entity that raises capital. The notional ratios were estimated solely to test the impact of the combination of hypothetical capital structure and return on equity on the ability of the regulated operations to attract capital and maintain their creditworthiness on a stand-alone basis.

TransAlta Corporation is rated BBB by both DBRS and S&P. TransAlta Utilities, the subsidiary of TransAlta Corporation that holds the PPAs for the “heritage” Alberta generation, is rated A(low) by DBRS and BBB+ by S&P. The debt ratio for TransAlta Corporation, as measured by DBRS, has averaged 47.9% from 2003-2005; the corresponding debt ratio for TransAlta Utilities has averaged 52.3%. The average ratios as measured by S&P for 2004-2006 were 53.2% for TransAlta Corporation and 21.1% for TransAlta Utilities. The differences in the measurement of the debt ratios for TransAlta Utilities by the two debt rating agencies relates primarily to the treatment of preferred securities and preferred shares; DBRS treats TransAlta Utilities’ inter-company preferred securities as 50% debt and the perpetual preferred shares as 30% debt, while S&P treats both the preferred securities and shares as equity.¹⁰¹ The large proportion of TransAlta Utilities’ capital structure that is made up of “hybrid” preferred securities makes it difficult to draw definitive conclusions regarding a reasonable deemed debt/common equity capital structure for OPG. Moreover, since the ratings of TransAlta Utilities are split (A(low) by DBRS and BBB+ by S&P) and the ratings of TransAlta Corporation are both in the BBB category, they provide some insight into what would be warranted for a BBB rating, but not for an A rating. For a BBB rating, the TransAlta capital structures are indicative of a common equity ratio (based solely on a debt/equity split) of approximately 50% for a generating company.

With respect to U.S. companies, there are no A rated electric utilities with business profile scores of “6”. The following table summarizes the debt ratios and other corresponding financial metrics for the universe of electric utilities with rated debt.

¹⁰¹ Over 50% of TransAlta Utilities’ 2005 total capital, when defined as debt, preferred securities and common equity, was preferred securities.

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Table 8

Group	S&P Business Profile	2005 Debt Ratio ^{1/} (%)	S&P Credit Stats					Average ROE 2003-2005 (%)
			2005 Debt Ratio (%)	Average 2003-2005				
				Debt Ratio (%)	EBIT Coverage (X)	FFO/Debt (%)	FFO Coverage (X)	
All A Rated	4	51.6	55.9	56.6	3.7	21.8	4.8	12.2
All BBB Rated	5	51.8	56.8	57.2	2.8	19.5	4.1	10.5
BBB Business Profile 1-4	4	55.6	57.6	55.9	2.7	18.7	3.7	11.1
BBB Business Profile 5	5	51.0	55.4	56.1	2.7	20.9	4.0	10.6
BBB Business Profile 6	6	51.2	57.3	59.0	2.7	18.7	4.2	10.5
BBB Business Profile 7	7	54.7	59.3	61.5	3.5	20.6	4.3	13.7
BBB Business Profile 7-10	8	49.0	56.0	56.6	3.5	20.9	4.1	12.4
ENTIRE SAMPLE	5	51.7	56.6	56.8	2.9	20.7	4.2	10.9

^{1/} Sum of long-and short-term debt divided by sum of long- and short-term debt, common equity and preferred stock.
 Source: Schedule 27.

The table indicates that the typical debt ratio is approximately 55% (45% equity ratio) irrespective of debt rating category. However, the earned returns on equity for the utilities, at those capital structures, have been approximately 11% for the industry as a whole, 12% for the A rated utilities and approximately 12% for the highest risk companies. The resulting FFO Coverage ratios have been approximately 5 times for the A rated utilities (which are of lower business risk than OPG), and 4.2 times for the BBB rated companies with a “6” business profile score. FFO/Debt ratios are approximately 22% for the low risk A rated utilities and approximately 20% for BBB rated utilities with a “6” business profile score. The results suggest that the industry average is an approximately 45% common equity ratio. However, the equity ratio cannot be considered independently of the ROEs that have been key to the achievement of the utilities’ financial metrics. As indicated above, the achievement of the referenced coverage ratios was dependent on earned returns on equity in the 11-12% range. In deriving an appropriate common equity ratio for OPG at the proposed benchmark return on equity of 10.5%, which is premised on equating the total risks of OPG’s regulated operations to those of low business risk utilities rated in the A category, the deemed equity ratio will need to be higher than the industry average of 45%. The alternative is to set the capital structure at the industry

standard, and to recognize OPG's higher business risks relative to the benchmark in the common equity return. Chapter IV.G following analyzes the trade-off between the equity ratio and the return on equity.

G. CAPITAL STRUCTURE FOR OPG AT BENCHMARK RETURN¹⁰²

In contrast to OPG's regulated operations, which are 100% generation, the individual utilities used to derive the benchmark return on equity are largely "wires" or "pipes" companies. Of the seven individual Canadian utilities with publicly-traded stock¹⁰³, and for which betas were calculated, only three (Canadian Utilities, Emera and TransCanada) have any material generation activities. Of these three, only one has any nuclear generation; TransCanada has a 47.9% ownership stake in Bruce Power. The U.S. companies used to derive the benchmark return are also largely low risk wires and pipes utilities. Of the 13 utilities in the benchmark U.S. utility sample, only 5 are integrated electric utilities. The sample's asset mix includes approximately 2.5% generation based on the median and 15.0% generation based on the average. The average business profile score of the U.S. benchmark sample is "3", compared to the typical generation business profile score of "7" to "10". The business profile scores that have been assigned to Canadian utilities by S&P have averaged "3"; only two electricity firms, Emera/NSPI ("4") and TransAlta Corporation ("6") have been assigned scores higher than "3".

OPG's regulated operations, 100% of which are generation, and approximately 45% of whose regulated assets (65% of regulated generation capacity) are nuclear generation, are of significantly higher risk than the utilities used to establish the benchmark return. As discussed in Chapter III.A, the benchmark return is applicable to a typical, or average risk, Canadian utility. For the benchmark return to be applicable to OPG's regulated operations, the deemed capital structure must be estimated that would equate OPG's total (business plus financial) risks to those

¹⁰² A complete discussion of the methodology applied in this section is provided in Appendix I.

¹⁰³ The seven utilities referenced are: Canadian Utilities, Emera, Enbridge, Fortis, Pacific Northern Gas, Terasen Inc. (stock has not been publicly-traded since its purchase by Kinder Morgan in November 2005), and TransCanada PipeLines.

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of the utilities used to derive the benchmark return. The benchmark return would be applicable to a utility which, given its business risk and capital structure, would be able to achieve debt ratings in the A category.

In order to estimate the common equity ratio for OPG that would permit the application of the benchmark return to its regulated operations, I selected a sample of vertically integrated utility companies with significant generation operations in order to estimate the incremental cost of equity for regulated generation company like OPG. The incremental cost of equity for the “high generation” sample can then be translated into the common equity differential required to equate OPG’s total business and financial risk to that of an average risk benchmark Canadian utility. At the identified common equity ratio, the benchmark utility return on equity will be applicable to OPG. For purposes of establishing the incremental cost of equity and the common equity differential, the sample of low risk U.S. electric and gas utilities (similar in risk to an average risk Canadian utility) served as the benchmark against which the selected sample of “high generation” U.S. utilities was compared.

The principal criteria for selection of the “high generation” sample included (1) an investment grade debt rating and (2) generation assets accounting for no less than one-third of total assets.¹⁰⁴ The selected sample includes 21 utilities with an average S&P debt rating of BBB (Moody’s rating of Baa2), and an average proportion of generation to total assets of 48%. Sixteen of the 21 utilities have nuclear generation.¹⁰⁵

The comparative S&P business profile scores, debt ratings, betas and common equity ratios of the high generation and benchmark low risk utility samples are provided in the table below.

¹⁰⁴ Criteria for selection of the “high generation” utilities are set out in Appendix I.

¹⁰⁵ The selected utilities are listed on Schedule 28.

Table 9

	Value Line Beta	Research Insight Beta	Average of Value Line and Research Insight Betas	S&P		Moody's	Common Equity Ratio (2006)
				Business Profile	Debt Rating		
Benchmark Utility Sample							
Mean	0.86	0.59	0.73	3	A	A2	44.9%
Median	0.85	0.60	0.73	3	A	A3	44.6%
Weighted Average	0.80	0.53	0.67	4	A	A2	43.5%
High Generation Utility Sample							
Mean	0.93	0.77	0.85	6	BBB	Baa2	44.8%
Median	0.95	0.81	0.88	6	BBB	Baa2	45.8%
Weighted Average	0.93	0.68	0.81	6	BBB+	Baa1	43.0%

Source: Schedules 13 and 28.

The betas in the table are investment risk or levered betas. Investment risk betas are a function of both business and financial risks. When the financial risks of the sample companies (capital structures) are materially different, the business and financial risk components of the investment risk betas need to be segregated to determine how much of the risk differential between the samples is due to differences in business risk and how much is due to differences in financial risk. In the case of the high generation and benchmark utility samples, the capital structure ratios are very similar. Hence, the differences in the investment risk betas of the samples can be attributed to differences in business risk. The conclusion that the principal risk difference is related to business risk is supported by the difference in the S&P business risk profile scores between the two samples; "3" for the benchmark sample and "6" for the high generation sample.

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Based on the average of the *Value Line* and Research Insight adjusted betas, the beta for the high generation sample is approximately 0.84 versus 0.71 for the benchmark sample. Using my estimated 6.5% market risk premium, the difference in equity return requirement between a high generation utility and the benchmark is close to 1.0 percentage point $((0.84-0.71) \times 6.5\% = 0.85\%)$. As both samples have similar common equity ratios (approximately 45%), the approximately 1.0% differential in return requirement is applicable to a higher business risk utility at a 45% common equity ratio. Since the high generation sample contains significant wires operations (43.7% of assets on average), this differential equity return requirement should be viewed as the minimum difference required for a generation-only company with a common equity ratio of 45%.

The high generation sample was then used to derive a generation-only beta using the residual beta model (See Appendix I for theoretical basis). The residual beta model is based on the premise that the beta for the company is a weighted average of the betas of the individual betas of the different divisions of the company. If the beta for the company is known, and the betas for all but one of the divisions can be separately estimated, the beta for the remaining division can be derived by disaggregating the beta for the company as a whole. The residual generation-only beta was estimated using the following equation:

$$\beta_{\text{HighGx}} = \beta_{\text{Gx}} \times \% \text{Assets}_{\text{Gx}} + \beta_{\text{Pure Wires}} \times \% \text{Assets}_{\text{Wires}} + \beta_{\text{Other}} \times \% \text{Assets}_{\text{Other}}$$

The beta for the “wires” operations of the high generation sample was estimated from a sample of utilities with primarily “wires” operations. The selection of the “wires” sample is described in Appendix I. The beta of pure wires was estimated at 0.70; the beta for the “other operations” which account for 8.0% of the assets of the high generation sample was assumed to be 1.0, equal to the beta for the market as a whole (or, alternatively, of an average risk stock). The common equity ratio of the “wires” sample, at 43.7%, is virtually identical to the common equity ratio for the high generation sample. Thus, since the average common equity ratio of the “wires” sample is identical to that of the “high generation” sample, differences in beta between the two samples

can be attributed to differences in business risk (i.e., there is no need to segregate the investment risk betas of the "wires" sample into business and financial risks components). Using the formula and betas above, the derived beta for generation-only was estimated at 0.94. The difference in the equity return requirement between generation and a benchmark utility can then be estimated as approximately 1.5%, calculated as the difference in betas multiplied times the market risk premium $((0.94-0.71) \times 6.5\% = 1.5\%)$. As with the estimation of the return requirement differential based on the high generation sample compared to the benchmark sample, the 1.5% applies to a generation-only company with a similar common equity ratio, that is, 45%.

Because OPG's regulated operations are 100% generation, the incremental equity returns at a 45% equity ratio are at the upper end of the range, i.e. in the range of approximately 1.25% to 1.50%. This incremental equity return was then used to develop the range of equity ratios for OPG's regulated operations that would be required to equate the fair return for OPG's regulated operations to the benchmark return of 10.5%. The quantification of the common equity ratio range was based on the application of two capital structure theories.

Theory 1 posits that income taxes and the deductibility of interest for corporate income tax purposes have no impact on the cost of capital. Under this theory, the overall cost of capital stays constant when the capital structure changes, although the costs of the debt and equity components change (i.e., the cost of equity rises when the equity ratio declines). Theory 2 posits that income taxes and the corporate deductibility of interest expense cause the overall cost of capital to continually decline as the equity ratio declines and the debt ratio increases. The actual impact on the cost of capital most likely lies in between the results of the two theories; income taxes and the deductibility of interest do tend to decrease the cost of capital (as the income trust market has demonstrated), but as the debt ratio rises, there are increasing costs in terms of loss of financing flexibility and potential bankruptcy. Moreover, in the case of regulated companies, the benefit of the tax deductibility of interest is to the benefit of ratepayers, while in the unregulated

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sector, the benefit goes to the shareholder. Since both theories have merit, both were applied to estimate the impact of a change in return on equity on capital structure.

The table below indicates that, based on both theories, the range of common equity ratios required to equate the return on equity for OPG's regulated operations to the benchmark return of 10.5% is in the range of 55-60%.

Table 10

	Common Equity Ratio		
	55%	57.5%	60%
Theory 1	10.5%	10.2%	10.0%
Theory 2	11.0%	10.8%	10.6%
Average	10.75%	10.5%	10.3%

Source: Appendix I and Schedule 31.

H. RECOMMENDED CAPITAL STRUCTURE AND FAIR RETURN

Based on (1) my analysis of the OPG's business risks, (2) the debt rating agencies' quantitative guidelines for specific debt ratings, (3) OPG's own debt ratings and its financial metrics, (4) the financial metrics of the electricity industry (including equity ratios), and (5) the incremental cost of equity for regulated generation relative to that of integrated utilities, the deemed common equity ratio for OPG's regulated operations should be set within a range of 55-60% (mid-point of 57.5%). A 57.5% common equity ratio would, in my opinion, be adequate to allow OPG's regulated operations to achieve a stand-alone debt rating in the A category. On the basis of the combined business and financial risks, OPG's regulated operations would then be of approximately equivalent total risk to a benchmark utility. At a 55-60% deemed common equity

B. VIEWS OF CANADIAN DEBT RATING AGENCIES

As indicated in Chapter III.D, debt rating agencies and debt investors look at a variety of quantitative financial measures in assessing the financial strength of a regulated company. For a regulated utility, the ability to achieve strong financial metrics arises not only from the equity component, but also the return allowed on that equity component and the rate of depreciation. Both DBRS and S&P have consistently commented on the highly levered nature of Canadian utilities and the low allowed common equity returns relative to their global peers, particularly those in the U.S.

DBRS has noted that it would like to see both the deemed common equity ratios and allowed returns increased to levels more consistent with U.S. returns.¹⁰⁹

In December 2004, subsequent to the AEUB's Generic Cost of Capital Decision (2004-052, dated July 2004), DBRS referred to the low deemed equity and returns as a "challenge" for the ATCO Utilities. The DBRS report for ATCO Ltd. stated,

While ATCO's diversified operations, coupled with the Company's prudent management approach, provide a level of earnings stability, additional challenges over the medium term include the relatively low approved returns on equity (ROE) and deemed equity for the regulated businesses, continuing regulatory risk and lag and ATCO's merchant power exposure in Alberta.

Additional recent DBRS reports citing the challenge of low approved returns on equity have been published for other Alberta utilities, i.e., AltaLink (November 2004), and FortisAlberta (September 2004).

As previously noted, IV.D.1, DBRS has commented with specific reference to OPG, that regulated vertically integrated utilities in the U.S. have deemed capital structures ranging from

¹⁰⁹ DBRS, *The Rating Process and the Cost of Capital for Utilities: Five Reasons Why Canadian Utilities have Lower Ratios and Five Changes to Regulation Which Should be Introduced in Canada*, May 2003.

Before the Ontario Energy Board

In the matter of:

EB-2007-0905 - OPG - 2008-09 Payments

Exhibit M
Tab 12

**Evidence on Behalf of
Pollution Probe**

**On Capital Structure, Return on Common Equity, Automatic Adjustment
Formula**

Text, Appendices and Schedules

Prepared Testimony of

Dr. Lawrence Kryzanowski and Dr. Gordon S. Roberts

Concordia University Research Chair in Finance, John Molson School of
Business, Concordia University, Montreal; and CIBC Professor of
Financial Services, Schulich School of Business, York University, Toronto.

April 2008

"No exact formula is available for evaluating the optimal debt-equity ratio."¹⁰

While we expect an introductory textbook to contain an element of simplification in order to present material to beginning students, this statement has yet to be superseded by advanced research. We review selected research on capital structure in Appendix 3.A.

This important implication of finance theory has been accepted by Canadian regulators including the Alberta Utilities Commission (formerly the Alberta Energy and Utilities Board). In Decision 2004-052, page 35, it wrote:

"In the Board's view, setting an appropriate equity ratio is a subjective exercise that involves the assessment of several factors and the observation of past experience. The assessment of the level of business risk of the utilities is also a subjective concept. Consequently, the Board considers that there is no single accepted mathematical way to make a determination of equity ratio based on a given level of business risk."

Although it does not offer a formula, finance theory does highlight key considerations in determining capital structure. In the same textbook we find the following:

"How should companies establish target debt-equity ratios? While there is no mathematical formula for establishing a target ratio, we present three important factors affecting this ratio:¹¹

- Taxes. As pointed out earlier, firms can only deduct interest for tax purposes to the extent of their profits before interest. Thus, highly

¹⁰ S.A. Ross, R.W. Westerfield, J. F. Jaffe and G.S. Roberts, *Corporate Finance*, Fifth Canadian Edition, Toronto, McGraw-Hill Ryerson, 2008, p. 500.

¹¹ S.A. Ross, R.W. Westerfield, J. F. Jaffe and G.S. Roberts, *Corporate Finance*, Fifth Canadian Edition, Toronto, McGraw-Hill Ryerson, 2008, p. 502.

3.3 BUSINESS RISK OF ONTARIO POWER GENERATION

3.3.1 Framework for Analysis

Our assessment of business risk focuses on uncertainty of operating income introduced earlier in our overview of important factors in the determination of capital structure. Factors that increase costs to a utility such as higher fuel prices do not necessarily translate directly into increased business risk. Management can prevent these factors from increasing the uncertainty of operating income in several ways. First, it can forecast their impacts and build them into proposed pricing. In a fair regulatory environment, such costs will be allowed and passed on to customers. Second, management can engage in risk mitigation to control the impact of such factors on operating income. Third, risk can be mitigated by use of deferral accounts. Business risk is only increased to the extent that these three approaches to control risk only work incompletely.

Our analysis of business risk begins with an examination of the risks of hydroelectric and nuclear generation for OPG. Because the two types of generation carry different risks we assess each separately. We introduce each of the three major categories of business risk for utilities: market, operational and regulatory, and discuss each in detail first for the regulated hydro and then for the nuclear operations of OPG. Our discussion presents a detailed breakdown of the components of business risk within each category and a numerical ranking of each on a scale of low (1), moderate (3) or high (5). We create a summary table, Schedule 3.6, displaying the rankings of each of 9 individual risks covering our three categories. Our conclusion is that the regulated hydro generation activities of OPG carry a low to moderate level of business risk (1.8 on our 5 point scale with a score of 1 representing low risk and 5 the highest risk for a utility). The regulated nuclear operations are rated as approaching moderate risk (2.3 on our 5-point scale).

To provide perspective on our business risk rankings, we next use our framework to measure the business risks of other sectors of the utilities industry and explain why we agree with the commonly held view that transmission (wires) carries the lowest business risk followed by distribution and then by generation with the highest business risk. We assess the business risk of transmission utilities as low (score of 1 out of 5) and distribution utilities as somewhat higher at low to moderate (1.4). These assessments form the basis for our capital structure recommendations for OPG Hydro and OPG Nuclear below. The analysis of business risks in the transmission and distribution sectors provides the basis for comparisons with deemed capital structures in those sectors.

3.3.2 Business Risk of OPG's Hydroelectric Generating Assets

3.3.2.1 Market Risk

Market risk is the risk that a hydro generator will not be able to meet its target sales due to weak markets, to competition or to other related factors. OPG is the market leader in Ontario accounting for 71% of the electricity sold in 2007.¹³ DBRS expects that the company will retain this position for the near future out to 2014. The Ontario economy is facing slowing growth in the short-run particularly in the manufacturing sector as discussed in Section 2 but residential growth remains steady. The province has experienced long-term growth of around 1% annually in electricity consumption over the period 1998-2007. In the most recent years, growth has displayed a flattening tendency with rates of -3.8% and 0.7% for 2006 and 2007, respectively.¹⁴ Because OPG is a base-load, low marginal cost generator it is not expected to experience a significant level of demand or dispatch risk. Competitive cost structure and transmission limitations protect

¹³ Our discussion draws on Ontario Power Generation, Corporate Credit Rating, Standard & Poor's, December 9, 2005 and DBRS Rating Reports, August 3, 2006 and November 30, 2007.

¹⁴ 18 Month Outlook: An Assessment of the Reliability of the Ontario Electricity System From April 2008 to September 2009, Independent Electricity System Operator (IESO), March 12, 2008, www.ieso.ca

parent holding company. The assets of the regulated utility can then serve as collateral to increase the borrowing power of the unregulated part of the holding company adding value for the shareholders. If this occurs, the shareholders gain unfairly at the expense of the customers of the regulated utility who have to pay higher rates to "compensate" the regulated utility for the cost of carrying unwarranted extra equity.

Returning to the discussion of benchmarks, we can develop another benchmark common equity ratio by focusing on one company from Schedule 3.5: ATCO Pipelines. We select ATCO Pipelines because it represents an example of a utility with greater business risk than a relevant set of comparison companies drawn from different segments of the utility industry in Alberta – the eleven utilities included in the AEUB's Generic Decision 2004-052. In that hearing, we recommended a common equity ratio for ATCO Pipelines of 40%, Ms. McShane recommended 50% and the Board awarded 43%. These numbers are drawn from Table 8 on page 35 of the Decision. We also identified AltaGas Distribution as a company with business risk well above the average and recommended an equity ratio of 40%. The Board awarded 41%. Based on these numbers and recalling our earlier discussion of "generosity" in past decisions, we regard 40 to 43% as an appropriate range for a higher risk utility.

We summarize our discussion of utility industry benchmark equity ratios as falling into a range of 39% to 43%. We form three estimates of the appropriate equity ratio for a utility. The first is 41.92% (Schedule 3.2) and represents the average of actual equity ratios for eight traded utility companies. The second estimate is the average equity ratio allowed 13 regulated entities within these companies by their regulatory boards of 39.40% (Schedule 3.5). The third estimate is the range allowed by the AEUB for two high-risk utilities of 40 to 43%. These benchmark equity ratios all fall in a range of 39% to 43%.

3.6.2 Relating the Benchmarks to OPG Hydro

In order to use benchmarks to set a recommended capital structure for OPG's two types of assets, it is necessary to draw on our earlier business risk analysis. Our analysis of the business risk faced by OPG Hydro assesses this risk as low to moderate – higher than that of a distribution utility and somewhat above the business risk of an integrated electric utility. This suggests that a fair common equity ratio for OPG Hydro should be at 40%, just below the middle of our range.

To explore the reasonableness of this conclusion, we reconsider our four benchmarks in turn. Our first benchmark, the average of actual equity ratios for 8 traded utilities is 41.92%. These companies are transmission, distribution or integrated utilities. However, because this measure also includes capital for unregulated activities which tend to be riskier than regulated businesses, we believe that it exceeds the appropriate level of equity for an average-risk utility. We confirm this view when we look next at our second benchmark of 39.40% which we regard as a generous measure of an appropriate capital structure. Given our view that OPG Hydro's level of business risk is above those of transmission, distribution and integrated utilities in our sample, our second benchmark indicates that a level of equity of no less than 39% is required.

We reinforce this view with our third benchmark of 40 to 43% equity allowed by the AEUB for high-risk Alberta utilities. Given, OPG Hydro's level of business risk, we believe that its target equity ratio should fall into this range.

Schedule 3.7 summarizes this discussion and restates our recommendation to set the common equity ratio for OPG Hydro at 40%.

3.6.3 Relating the Benchmarks to OPG Nuclear

We take a similar approach in reaching a recommendation for the equity ratio for OPG Nuclear. As we discuss above and summarize in Schedule 3.7, OPG's nuclear assets carry higher levels of operational risk compared to its hydro assets. Further, regulatory risk associated with environmental and safety issues are also elevated compared to that of OPG Hydro. Our analysis rates the business risk of OPG's regulated nuclear assets as moderate (2.3 on our 5 point scale).

Schedule 3.7 shows that this business risk rating for OPG Nuclear exceeds the rating for OPG Hydro (1.8). It also signals that OPG Nuclear bears higher business risk than generic integrated companies (rated 1.5) or generic distribution utilities rated (1.4). The higher business risk of OPG Nuclear should translate into a significant increase in its common equity ratio on the order of 5-10% over that for OPG Hydro producing a recommended equity ratio for OPG Nuclear of 45 to 50%. In the interests of conservatism and to ensure fairness to the shareholder, we recommend the higher number of 50% for the equity ratio.

3.6.4 Recommended Capital Structure for OPG's Overall Rate Base

In order to achieve an overall recommended capital structure for OPG's rate base we calculate a weighted average of our individual capital structures using the asset breakdown in the Electricity Restructuring Act of Ontario of 2004 which set OPG's prices for electricity for 6,606 MW from regulated nuclear generation and 3,332 MW for hydro generation. These two sources total 9,938 MW of which 66.47% is nuclear and 33.53% hydro. Applying these weights to our two separate capital structure recommendations results in an overall rounded

6.5 FAIR RATE OF RETURN ESTIMATES FROM MS. MCSHANE'S IMPLEMENTATION OF THE EQUITY RISK PREMIUM METHOD

6.5.1 MERP Estimation Problems

6.5.1.1 Choice of Return Series for Determining the MERP

Ms. McShane uses the historic average MERP for Canada, the U.S. and the U.K. over the period 1947-2006. This results in an inappropriate estimate of the MERP going forward. First, the chosen time period results in an inflated estimate of the going-forward likelihood of achieving the high realized returns on equities and low realized returns on bonds that followed World War II. This period began with rapid economic growth due to pent up demand from the war period and administered low interest rates. The MERP that Ms. McShane estimates for Canada for the 1947-2006 period is materially impacted by the first four years of this period. To illustrate, the annual average over the first four years (1947-1950) are 7.69% for the Consumer Price Index, 1.38% for long Canada bonds, 0.46% for 91-day Canadian Treasury Bills and 20.88% for the equity market index. The result is an annual average MERP over this four-year period of 19.50%!

Second, minimal or no weight is placed on the declining trend of MERPs for the three markets over this time period. Third, no adjustments are made for differences in risks across the market proxies used to calculate the MERP in the different countries. Fourth, no adjustments are made for the effect of equity re-valuations over this period of time. Mr. Arnott and Mr. Bernstein (2002) find that a good part of the realized MERP over this period was caused by rising valuation multiples. Specifically, Mr. Arnott and Mr. Bernstein (2002) report that the U.S. price-to-dividend multiple increased from 18 to 70 times from 1926 to 2001, with most of the increase in the last 17 years of this period.⁹² The most recent (2008) price-to-dividend multiple that reflects the drop in the U.S. market is still over 42

⁹² Robert D. Arnott and Peter L. Bernstein, 2002, What risk premium is "normal"?, *Financial Analysts Journal* 58:2 (March/April), pages 64-85.

6.5.2.2 The Validity of the CAPM

6.5.2.2.1 *The empirical evidence provided by Ms. McShane against the CAPM*

The empirical tests of the CAPM conducted by Ms. McShane are unreliable in that they do not examine the cross-sectional nature of the conditional return-risk relationship postulated by the CAPM, and do not conform to any of the accepted methodologies for testing the CAPM.¹⁰⁷ Ms. McShane could not provide any references to the peer-reviewed literature that provide support for the methodology that she used to test the relationship between beta and return in the Canadian equity market. Specifically, her response to Pollution Probe Interrogatory #34 was:¹⁰⁸

“Ms. McShane’s analysis was not constructed based on a peer-reviewed methodology. It is a simple correlation between betas and returns which demonstrates that over a long period of time, the betas of lower and higher risk sectors of the economy and the returns they have achieved have not conformed to the relationship predicted by the CAPM, leading to the conclusion that depending on a raw beta to predict the expected return is problematic at best.”

Based on a survey of a large sample of U.S. corporations, Graham and Harvey (2001, 2002) find that the:¹⁰⁹

“Capital Asset Pricing Model (CAPM) was by far the most popular method of estimating the cost of equity capital: 73.5% of respondents always or almost

¹⁰⁷ Ms. McShane’s Evidence, EB-2007-0905, Exhibit C2, Tab 1, Schedule 1, starting on the bottom of page 154 of 261.

¹⁰⁸ Ms. McShane’s Evidence, EB-2007-0905, Exhibit C2, Tab 1, Schedule 34, page 1 of 1.

¹⁰⁹ John Graham and Campbell Harvey, How do CFOs make capital budgeting and capital structure decisions?, *Journal of Applied Corporate Finance* 15:1 (Spring 2002), page 12. This article was a practitioner version of the following paper that won the Jensen prize for the best *JFE* paper in corporate finance in 2001: John Graham and Campbell Harvey, The theory and practice of corporate finance: Evidence from the field, *Journal of Financial Economics* 60 (2001).

always used it. The second and third most popular methods were average stock returns and a multi-factor CAPM, respectively. Few firms used a dividend discount model to back out the cost of equity.”

6.5.2.2.2 The empirical evidence based on tests of the CAPM

Earlier studies that found biases in the CAPM typically used U.S. 90-day Treasury bills as a proxy for the risk-free rate. These studies found that the estimated intercept of the Security Market Line or SML was above this choice of risk-free rate, and that the estimated slope of the SML was smaller than the difference between the mean return on the market proxy and the mean return on T-Bills (i.e., the MERP measured relative to the T-Bill rate). More recent studies find strong support for the zero-beta version of the CAPM where the estimated intercept is the return on the zero-beta portfolio and for conditional forms of the CAPM. The expectation of the CAPM is that the return on the zero-beta portfolio should exceed the return on T-Bills.¹¹⁰ The use of the higher long Canada rate as the proxy for the risk-free rate instead of the 30- or 90-day Treasury Bill rate is consistent with these empirical findings.

The use of the higher long Canada rate when constructing the SML increases the intercept of the SML and also flattens the slope of the SML. This implies that an over or double adjustment for the same empirical phenomenon if one makes a further adjustment to the beta to account for a flatter-than-expected SML. Thus, this represents another unsupported rationale that some experts use to adjust their beta estimates upwards for a sample of utilities or to attack the validity of the CAPM. In Appendix 6.A, we discuss the type of adjustment that should be made if, for the sake of argument, one accepted that there should be an adjustment for the early empirical evidence of a flatter-than-expected SML.

¹¹⁰ Robert F. Stambaugh, 1982, On the exclusion of assets from tests of the two-parameter model: A sensitivity analysis, *Journal of Financial Economics*, November, pages 237-268.

Although a number of older studies do not support the unconditional (or single period) version of the traditional CAPM, the empirical evidence for multifactor or conditional CAPM is much stronger.

The U.S. literature includes the study by Drs. Pettengill, Sundaram and Mathur (1995) that explains the not significant beta-return relation that is observed when the unconditional beta is used.¹¹¹ When they use a constant beta model that is conditioned on up and down markets, they find significant risk premiums for both types of betas. Drs. Pettengill, Sundaram and Mathur (2002) find significant risk premiums for both types of betas for constant risk and dual beta models that are conditioned on the market return.¹¹² For up markets, they find an insignificant premium for the Fama and French book-to-market equity factor for both models and a marginally significant premium for the Fama and French size factor for only the constant risk beta model. For down markets, they find significant premiums for both Fama and French factors for both models.

Very recent studies by Drs. Ang, Hodrick, Xing and Zhang (2006 forthcoming) strongly demonstrate that for 23 developed markets (including the U.S.) over a sample period that spans January 1980 to December 2003 that only the market factor is consistently priced.¹¹³ Furthermore, the small-minus-big capitalization factor and the high-minus-low book-to-market factor are often insignificant and often have the wrong sign predicted by Drs. Fama and French (1993).¹¹⁴

Drs. He and Kryzanowski (2006) find that the significant beta-return relation that is observed when the unconditional beta is used for Canada is well

¹¹¹ G.N. Pettengill, S. Sundaram and I. Mathur, The conditional relation between beta and returns. *Journal of Financial and Quantitative Analysis*, 30 (1995), pages 101–115.

¹¹² G. Pettengill, S. Sundaram and I. Mathur, Payment for risk: Constant beta vs. dual-beta models, *The Financial Review* 37:2 (May 2002), pages 123-136.

¹¹³ A. Ang, R.J. Hodrick, Y. Xing and X. Zhang, The cross-section of volatility and expected returns. *Journal of Finance*, 61:1 (2006a), pages 259–299; and A. Ang, R.J. Hodrick, Y. Xing and X. Zhang, High idiosyncratic volatility and low returns: International and further U.S. evidence., forthcoming *Journal of Financial Economics*.

¹¹⁴ E. F. Fama and K.R. French, Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (1993), pages 3-56.

Schedule 3.6

Allowed Common Equity Ratios

Utility	Allowed	Decision
ATCO LTD.		
ATCO ELECTRIC TRANSMISSION DISTRIBUTION	33.00 37.00	EUB 2004-052, U2005-410
ATCO GAS ATCO PIPELINES	38.00 43.00	
CANADIAN UTILITIES LIMITED		
ENBRIDGE GAS DISTRIBUTION	36.00	EB-2006-0034
EMERA (NOVA SCOTIA POWER)	40.00	2007-NSUARB-8
FORTIS INC.		
ALBERTA	37.00	EUB 2004-052
BRITISH COLUMBIA	40.00	G-14-06
MARITIME ELECTRIC	42.70	UE 20934
NEWFOUNDLAND POWER	44.50	PU40 (2006)
PACIFIC NORTHERN GAS LIMITED	40.00	G-14-06
TRANSALTA CORPORATION	45.00	U99099
TRANS CANADA PIPELINES LTD.	36.00	RH-2-2004
Average	39.40	

Source: Board decisions.

Schedule 3.7**Electric Utilities Business Risk Rating and Capital Structures**

	Transmission	Distribution	OPG Hydro	Integrated	OPG Nuclear	OPG Regulated
Business risk^a	L 1	L-M 1.4	L-M 1.8	L-M 1.5	M 2.3	M 2.1
Equity Component Deemed by Regulators						
EUB 2004	33%	37%		40%		
NSUARB 2007						
OEB 29006, 2007	40%	40%				
Fortis Alberta		37%				
Fortis BC				40%		
Maritime Electric				42.70%		
Newfoundland Power				44.50% ¹⁷²		
Recommended by Drs. Kryzanowski And Roberts Prior Evidence	30% ¹⁷³	35% ¹⁷⁴		35% ¹⁷⁵ 42% ¹⁷⁶		
For OPG			40%		50%	47%¹⁷⁷

^aL refers to low business risk; L-M refers to low to medium business risk; and M refers to medium business risk. L 1 refers to low business risk based on a business risk rating of 1 to 5 where 5 is the highest numerically business risk rating.

¹⁷² Integrated company, buys 90% of power from Newfoundland and Labrador Hydro.

¹⁷³ Generic hearing, Alberta, 2004.

¹⁷⁴ Generic hearing, Alberta, 2004.

¹⁷⁵ NSPI 2002.

¹⁷⁶ Northwest Territories Power Corporation 2007, included business risk premium for size and isolation.

¹⁷⁷ 6,606 regulated MW nuclear (66.47%), 3,332 MW hydro (33.53%).

Schedule 6.4**Comparison of Witnesses' Rate of Return Evidence Against Selected Adjustment Formulas**

Source	Long-Canada Forecast	Recommended Return	Risk Premium (Basis Points)
<i>I. Witnesses</i>			
<u>2008</u>			
Kryzanowski/ Roberts	3.85%	7.10%	325
McShane	5.00%	10.50%	<u>550</u>
<u>2009</u>			
Kryzanowski/ Roberts	4.25%	7.25%	300
McShane	5.00%	10.50%	550
<i>II. Regulatory Boards^a</i>			
<u>2007 Actual</u>			
AUC	4.22%	8.51%	<u>429</u>
NEB	4.22%	8.46%	<u>424</u>
<u>2008 Projected based on Kryzanowski / Roberts Long-Canada forecast</u>			
AUC	3.85%	8.23%	438
NEB	3.85%	8.18%	433
<u>2009 Projected</u>			
AUC	4.25%	8.53%	428
NEB	4.25%	8.48%	423
Average-risk Premium for Boards			<u>431</u>

^a "AUC" refers to the Alberta Utilities Commission, and "NEB" refers to the National Energy Board.