

RÉGIE DE L'ÉNERGIE

**SOCIÉTÉ EN COMMANDITE GAZ MÉTROPOLITAIN
CAUSE TARIFAIRE 1999
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WRITTEN EVIDENCE

of

WILLIAM R. WATERS

**RE RATE OF RETURN
AND CAPITAL STRUCTURE**

On behalf of

**INDUSTRIAL USERS GAS ASSOCIATION/L'ASSOCIATION
DES CONSOMMATEURS INDUSTRIELS DE GAZ**

SEPTEMBER, 1998

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1 **I INTRODUCTION AND SUMMARY**

2

3 Q. Please state your full name and business address.

4

5 A. My name is William R. Waters and my business address is Suite 301, 2221 Yonge St.,
6 Toronto, Ontario.

7

8 Q. Have you included a document describing your educational background and
9 professional experience?

10

11 A. Yes. My curriculum vitae is provided in Appendix I.

12

13 Q. At whose request and for what purpose have you prepared this report?

14

15 A. I have been asked by the Industrial Gas Users Association/l' Association des
16 Consommateurs Industriels de Gaz ("IGUA") to provide testimony before La Régie
17 de L'Énergie ("the Régie") on the following matters pertaining to the Société en
18 Commandite Gaz Métropolitain ("Gaz Métro") for the test year October 1, 1998 -
19 September 30, 1999 (the "1999" test year):

20 (i) the appropriate rate of return on common equity ("ROE"), recognizing the
21 implications of an incentive rate of return mechanism for the risks borne by equity
22 investors;

23 (ii) whether an automatic annual adjustment mechanism for resetting the rate of return
24 in years subsequent to a test year would be appropriate in order to reflect changes
25 in financial market benchmarks;

26 (iii) the appropriate frequency of a full cost of capital review and whether certain
27 financial market benchmark parameters should be put in place to trigger a hearing
28 on the matter.

29

30 Q. What are your conclusions?

31

- 1 A. Regarding the appropriate common equity rate of return, I have concluded that:
- 2 (i) an appropriate rate of return on common equity for the October 1, 1998-
- 3 September 30, 1999 test period for high-grade utilities lies within the range of
- 4 8.25-9.0 percent.
- 5 (ii) the use of a deemed capital structure for Gaz Métro incorporating a common
- 6 equity ratio of 38.5 percent and a preferred share ratio of 7.5 percent warrants the
- 7 use of the low end of my range; i.e., 8.25 percent for Gaz Métro.
- 8 (iii) The Régie should reject the incentive rate of return mechanism proposed by Gaz
- 9 Métro.

10 I recommend that a regulatory adjustment mechanism be established in which

11 changes in the allowed return on common equity reflect changes in forecast long

12 Canada bond yields on a one-for-one basis.

13 I recommend that an ongoing, multi-year regulation process with automatic

14 adjustment of the allowed return on common equity include a trigger mechanism

15 whereby a regular cost of capital hearing be held if the long Canada bond yield rises

16 above 8 percent and remains above 8 percent for more than 6 months.

17

18 Q. Please summarize the basis that your evidence provides for these recommendations.

19

20 A. In Section II, I examine recent changes in economic and capital market conditions and

21 estimate prospective long term interest rates over the test year.

22 A fundamental indicator of economic conditions that reflects investor

23 confidence and expectations of continued low inflation are the decreases during 1998

24 in long term interest rates. Long term Canada bonds are yielding under 5.75 percent

25 as of early September 1998. Earlier this year a level of 5.35 percent was reached, the

26 lowest in more than a quarter century. As well as being a signal of investor

27 perceptions of reduced risk in the economy, the current and projected long term

28 interest rates are central to the establishment of a fair rate of return on common equity

29 for Gaz Métro for the 1999 test year. In that regard, I have utilized a projected yield of

30 5.75-6.25 percent for long term Government of Canada bonds over the test period in

1 my application of the “Equity Risk Premium” methodology for determining a fair rate
2 of return on common equity.

3 In Section III, I assess Gaz Métro’s presently approved capital structure. It
4 consists of a deemed common equity ratio equal to 38.5 percent of investor supplied
5 capital and a deemed preferred share ratio of 7.5 percent. I believe that these ratios
6 result in a very low level of financial risk and result in the foregoing of some of the
7 advantage of the tax shield associated with debt financing. However; I have not
8 recommended that they be changed. Instead, I have recommended that the lower end
9 of my ROE range be used to partially redress the imbalance created in favour of the
10 shareholders by the capital structure.

11 In Section IV, I examine the issue of the extent to which the allowed return on
12 common equity should be adjusted to reflect changes in long term interest rates. In
13 several regulatory jurisdictions in Canada, the allowed rate is adjusted only partially;
14 for example, 80 basis points for each 100 basis points change in the forecast long
15 Canada rate. The evidence on which the partial adjustment mechanisms are based is a
16 set of statistical estimates submitted by company witnesses in past hearings in other
17 jurisdictions as well as by Dr. Morin in this hearing. These estimates allegedly support
18 a negative relationship between the equity risk premium above long term interest rates
19 (i.e., the premium required to compensate equityholders for bearing risk) and the level
20 of long term interest rates. A negative relationship is equivalent to a less than one-
21 for-one change in the cost of equity capital with changes in interest rates.

22 In my analysis of the relationship between the equity risk premium and long
23 term interest rates, I find that a deeper examination of the data used by other
24 witnesses supports a flat, i.e., a one-for-one relationship between the equity risk
25 premium and long term interest rates, within the currently relevant range of interest
26 rates.

27 The empirical findings of Section IV, supported with economic reasoning, lead
28 to two conclusions. First, it is inappropriate to adjust upward any historically based
29 estimate of the risk premium required by equityholders of a low-risk utility to reflect
30 currently low interest rates. Second, in any prospective adjustment mechanism, the

1 allowed return on common equity should be adjusted fully for changes in forecast long
2 term interest rates.

3 At the current level of interest rates, the likelihood of a substantial increase in
4 interest rates, while remote, is greater than the likelihood of a substantial decline in
5 interest rates. My recommendation of a one-for-one adjustment is therefore
6 favourable to Gaz Métro's shareholders. Finally, I recommend that a full cost of
7 capital hearing be held if the long Canada bond yield exceeds 8.0 percent for more
8 than six months. This allows the Régie the opportunity to adjust, as it sees fit, the rate
9 of return to reflect the economic conditions underlying the increase in long term
10 interest rates.

11 My common equity rate of return analysis, developed in Section V, is based
12 exclusively on the Equity Risk Premium approach to the estimation of the cost of
13 equity capital. Based on the historical returns achieved by investors in equity and bond
14 markets, I estimate the upper end of the risk premium on the overall equity market to
15 be 4.5 percent. Using a variety of measures, I then compare the risks of a sample of
16 high-grade utilities, a sample of low-risk non-utilities and the equity market as a
17 whole. I arrive at the conclusion that investments in high-grade utility common equity
18 require, at most, one-half the risk premium of the equity market as a whole. Adding
19 the resulting premium of 2.25 percent to my estimate of the prospective yield on long
20 term Government of Canada bonds of 5.75 – 6.25 percent for the 1999 test year
21 provides 8.0 – 8.5 percent as an estimate of the cost of common equity capital for the
22 1999 test year for high grade utilities.

23 In the light of current and prospective conditions in Canadian financial
24 markets, I conclude that the financial integrity of high grade utilities would be
25 adequately maintained if a "cushion" of 25-50 basis points were added to my estimate
26 of the common equity investors' required rate of return for the 1999 test year.
27 Accordingly, I conclude that a common equity rate of return of 8.25 – 9.0 percent
28 would be appropriate. This value is approximately 2.25 – 3.0 percentage points above
29 the midpoint (6.0 percent) of my projected range for the yield during the 1999 test
30 year on long term Government of Canada bonds. It is also approximately 2.45-3.2

1 percentage points above the 5.8 percent implicit forecast by the contributors to the
2 Consensus Forecasts publication for the 1999 test year.

3 In Section V, I compare my ROE estimate to the most recent awards made by
4 other regulatory boards. My basic conclusion is that the upper end of my range of 8.25
5 – 9.0 percent is consistent with the awards that would have been made by both the
6 British Columbia Utilities Commission and the National Energy Board *if*

7 (1) they were establishing awards for the period October 1, 1998 to September
8 30, 1999 on the basis of the financial market information currently available
9 and

10 (2) they had continued to use the 3.0 percent equity risk premium which they had
11 initially adopted.

1 II ECONOMIC AND CAPITAL MARKET CONDITIONS

2

3 *Current Economic Conditions and Outlook*

4

5 Q: Please explain the role in your analysis of an assessment of current economic
6 conditions and the economic outlook.

7

8 A. The Canadian economic outlook is an important element in my forecast of long term
9 interest rates over the test year; that forecast is central to my equity risk premium
10 estimate of the fair rate of return on common equity.

11

12 Q. Please describe the current state of the Canadian economy and prospects for growth.

13

14 A. Following the 1991 recession, until 1997, growth in Canada's GDP was stable but low
15 relative to growth in the typical recovery stage of a business cycle, averaging 2.1
16 percent. To some extent the slow growth of the economy was due to the tight fiscal
17 constraints on federal government policy that resulted from the large federal debt,
18 specifically to the adoption of the government policy to reduce and eliminate
19 extraordinarily high deficits.

20 The year 1997 was exceptional, with growth in GDP of 3.8 percent. Strong
21 employment growth and low interest rates raised consumer and business confidence,
22 thereby stimulating spending. While the instability in Asia dampened world growth
23 expectations towards the end of the year, the Canadian economy, with the exception
24 of British Columbia, has shown resiliency.

25 The 1998 forecast by TD Economics (July 1998) for growth in the Canadian
26 economy is the second highest among G-7 countries, at 3.3 percent. In April 1998,
27 the Organization for Economic Co-operation and Development forecast Canada's
28 growth at the highest rate among G7 countries for 1998 and 1999, with 3.3 percent
29 growth in 1998 and 3.0 percent growth in 1999 (*Financial Post*, April 9/98). Finally,
30 the *Consensus Forecasts* publication of London England, which collects and reports

1 monthly on the forecasts made by major financial institutions and other organizations
2 around the world, reported in its August 10, 1998 issue that the median forecast for
3 Canada's growth in GDP is 3.2 percent in 1998 and 2.8 percent in 1999. These values
4 are, respectively, the second highest and the highest reported for G7 countries. Both
5 values are only slightly lower than those projected at the beginning of 1998.

6 Canada's growth prospects are closely tied to growth in other countries,
7 particularly the United States. The Consensus median estimate for GDP growth for the
8 U.S. is 3.4 percent for 1998 and 2.2 percent for 1999.

9
10 Q. Is the prospect for strong growth in the Canadian economy accompanied by the risk of
11 high inflation?

12
13 A. No. Inflation in Canada was only 0.8 percent in 1997 and over the past three years has
14 averaged only 1.6 percent. Forecasts are for continued low inflation at about this level
15 in 1998 and 1999 (Table 16). The current economy is characterized by an
16 extraordinary combination of continued growth and low mid-term and long-term
17 interest rates, reflecting the confidence that the Bank of Canada will maintain its low
18 inflation policy. Investors' confidence in continued growth and low inflation is perhaps
19 higher than at any time since the 1960's.

20
21 Q. Please summarize the trend in the federal government deficit.

22
23 A. Although the accumulated deficit of Canada's federal government is quite large, it no
24 longer has a deficit going forward. High continuing deficits create significant
25 uncertainty and risk in the economy. This arises from the fact that deficits can be
26 financed in only three ways: by taxation, by inflation (i.e. an inflation tax in the form of
27 a reduction in the real value of outstanding nominal government debt) and by further
28 borrowing. Canada's rapid move to a position of budget surplus from deficit levels
29 that once led the *Wall Street Journal* to describe Canada as being on the brink of
30 third-world economic status has reduced investors' concerns substantially.

1
2 ***Current Capital Market Conditions***
3

4 Q: How do current interest rate levels compare to those prevailing in July 1997, the time
5 of the Régie's most recent determination of Gaz Métro's common equity rate of
6 return?

7
8 A: Canadian and U.S. interest rates and changes in rates are shown in Table II-A which
9 follows and in Table 1. Rates over intermediate and longer periods are shown in
10 Figures 1A, 1B and 2.

11 Over the last 14 months, there have been two major developments in Canadian
12 interest rate levels. Shorter term rates have risen by 200 basis points and more. At the
13 same time long term rates have declined by some 80 basis points. In contrast, over the
14 same period U.S. short term rates have declined slightly (in the order of 20 basis
15 points). As in Canada, U.S. long term rates have declined, but by a greater amount, in
16 the order of 125 basis points.

17 The divergence in rate moves in the two countries reflects changes in the two
18 countries' relative currency values. Over this period, most economies outside North
19 America and Europe -- notably those of Asia and Russia -- have weakened
20 substantially. The result has been a "flight of capital" to "safe havens" and particularly
21 to the U.S. dollar. This development has resulted in the Canadian dollar losing ground
22 to the U.S. dollar in relative terms while, at the same time, Canadian exports to Asian
23 countries, and hence demand for Canadian dollars, fell. The end result is that the
24 Canadian dollar fell from a level of 73¢ U.S. as of July 4, 1997 to 64¢ as of August 28,
25 1998. (Values over a longer period are shown in Figure 3.)

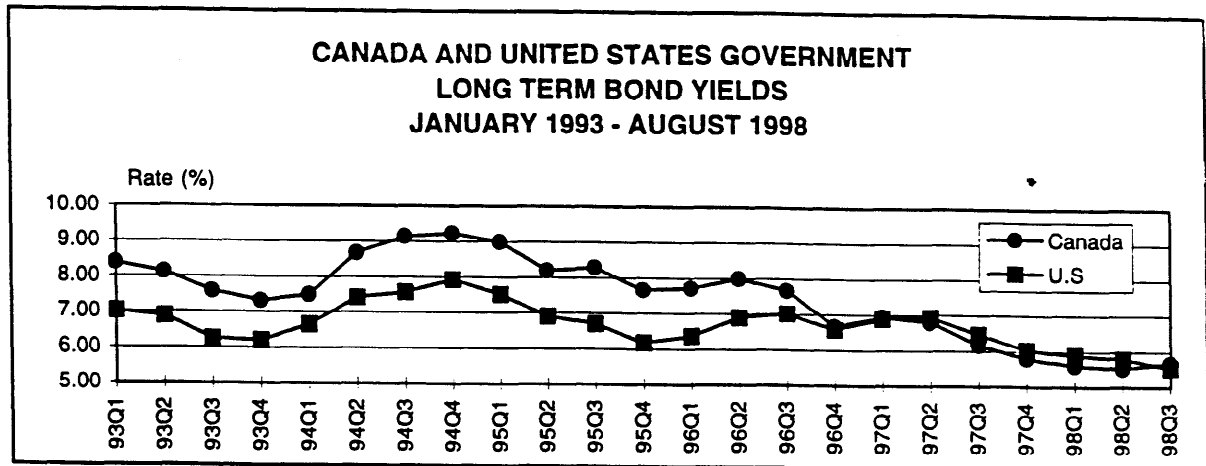
26 This drop in the value of the Canadian currency has been transmitted to Canadian
27 interest rates. Investors have required higher interest rates to hold bonds denominated
28 in Canadian dollars in order to provide additional compensation for the risk of further
29 reductions in the global purchasing power of Canadian dollars. This requirement has
30 prompted the Bank of Canada to raise short term rates to entice

TABLE II-A
CANADIAN AND U.S. INTEREST RATES, 1997 and 1998

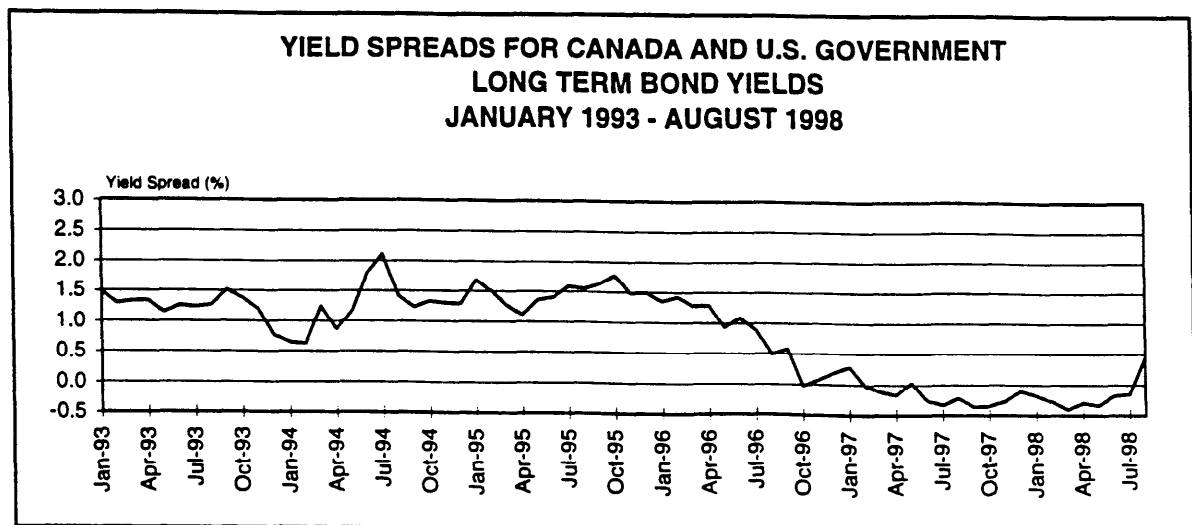
	As of July 4, 1997	As of Aug. 28, 1998	<u>Change</u> Aug 28/98 from July 4/97
			(basis points)
	(1)	(2)	(3)
<u>Canada</u>			
Chartered banks prime rate	4.75%	7.50%	275
3 month Govt. of Canada treas. bills	3.05	5.75	270
1 year Govt. of Canada treas. bills	3.92	5.92	200
Bank of Canada 10 years and over Govt. of Cda. series	6.55 (Jul 2)	5.78 (Aug 26)	-77
Selected Govt. of Canada long term issues			
8.00% of 2023	6.66	5.79	-87
9.00% of 2025	6.68	5.83	-85
8.00% of 2027	6.67	5.81	-86
<u>United States</u>			
Prime rate at major commercial banks	8.50	8.50	0
3 month U.S. Govt. treasury bills	5.12	4.92	-20
30 year U.S. Govt. treasury bonds	6.62	5.35	-127

investors to purchase Canadian securities while at the same time Canadian long term rates have begun to revert to their "normal" level relative to U.S. long term rates. The latter development accounts for the lesser decline in Canadian long term rates (approximately 80 basis points) as compared to the 125 basis points decline in U.S. long term rates. The result is that Canadian long term rates are currently some 40 basis points above U.S. rates. Nevertheless, as can be seen from Figure II-A below and Figures 1A and 1B, this spread is still well below its longer term historical range of 100-150 basis points.

FIGURE II-A



Note: Quarter end values based on average of monthly values.



Source: Figures 1A and 1B.

1

2 Q: What are the implications of global developments for your estimate of the fair rate of
3 return on Gaz Métro's deemed common equity for the test period October 1, 1998-
4 September 30, 1999?

5

6 A: They are as follows:

- 7 1. I do not believe that investors view inflation as a threat globally: indeed, the
8 possibility of deflation has to be given weight. While global output is likely to
9 grow over the period, its financing will not put pressure on costs of capital.
10 As a result, long term interest rates are unlikely to increase globally over the
11 test period.
- 12 2. For much of the past two years, Canadian long term interest rates have been
13 below U.S. rates. This situation is completely at odds with the relationship
14 that has prevailed throughout virtually all of Canada's history. I expect the
15 spread between Canadian and U.S. long term rates will widen over the test
16 year.

17

18 Q: What range have you adopted for Government of Canada long term interest rates over
19 the test period?

20

21 A: I have adopted a range of 5.75-6.25 percent. This can be compared to a level of
22 approximately 5.8 percent as of August 28, 1998. It can also be compared to an implicit
23 forecast by the contributors to the *Consensus Forecasts* of approximately 5.8 percent for
24 the test year.¹

25

26 Q: Have you made any further allowance for long term interest rate uncertainties over the

¹ The median values shown in the August 10, 1998 issue of the *Consensus Forecasts* (page 17) for the forecast yield on 10 year Government of Canada bonds are 5.5 percent as of the end of November 1998 and 5.7 percent as of the end of August 1999 for a mean of 5.6 percent. Adding to this value the current spread between 10 year and 30 year bonds of approximately 20 basis points gives a forecast of 5.8 percent for 30 year bonds over the test period.

1 test year?

2

3 A. Yes. I have included a “cushion” or safety margin of 25-50 basis points in my fair rate of
4 return recommendation. Most of this increment is included to protect Gaz Métro’s
5 shareholders from the adverse consequences of long term interest rates reaching levels
6 above the upper end of my range over the test period.

1 **III RISK AND CAPITAL STRUCTURE**

2

3 **Principles**

4

5 Q. Please summarize the risks faced by investors in a regulated utility.

6

7 A. The basic risk is that the utility's operating income may not be sufficient to service all
8 of its obligations, including the provision of the return on equity the investor regards
9 as fair and expects to receive, in one or more future periods. This risk, which is
10 usually identified as "business risk", is divided by the chosen capital structure between
11 the utility's lenders and owners.

12 Because lenders have a prior claim to the utility's cash flows, they bear a lower
13 than proportionate share of the utility's total business risk. As long as the utility
14 continues to operate and to generate cash flows in excess of its operating costs, its
15 lenders will receive some payment. If the utility ceases operations, the lenders will
16 have first claim on any monies raised from the disposal of the assets. Since creditors
17 bear a less-than-proportionate share of the total business risk, it follows that a greater-
18 than-proportionate share must be borne by the owners; i.e. by the common equity
19 shareholders. This amplification by the use of borrowed funds of the risks borne by
20 common equity investors is labeled "financial risk".

21 "Investment risks" represent the combined results of (1) the risks emanating
22 from the economic activity or operations engaged in by the corporation, i.e. from its
23 business risk and (2) the risks which are created through the corporation's financing
24 activities.

25

26

27 **Business Risk**

28

29 Q. What are the business risks borne by the creditors and owners of a regulated utility?

30

1 A. Essentially the risks divide into three categories:

- 2 1. The risk that the regulatory authority will not permit rates to be set at a level
3 sufficient to provide a fair rate of return on total capital invested;
4 2. The risk that a particular period's operating and/or financing costs will exceed
5 those utilized in setting the rates, or that the revenues will fall short of those
6 projected;
7 3. The risk that, at some point, the utility will become uneconomic and will be
8 shut down completely or will be unable to recover fully its fixed costs,
9 including those related to financing.

10

11 Q. Please comment on the risk that the Régie will not permit rates to be set at a level
12 sufficient to provide a fair rate of return on common equity.

13

14 A. In my view, investors will view this risk as being, for all practical purposes, non-
15 existent. Historically, the Régie has been very clear in its decisions that Gaz Métro's
16 financial integrity has been the primary consideration underlying the capital structure
17 and rate of return values it has utilized in determining Gaz Métro's revenue
18 requirements. The Régie has also shown its willingness to link the achievable rate of
19 return to indicators of productivity or service improvements. The Canadian bond
20 rating agencies appear to have recognized this to be so as they have typically described
21 Gaz Métro's regulation as "supportive".

22

23 Q. Please comment on the risk that Gaz Métro's operating margin will fall short, in a
24 particular operating period, of the amount needed to enable Gaz Métro to achieve its
25 allowed rate of return.

26

27 A. Through the operation of a variety of deferral accounts, the most notable of which is a
28 weather stabilization account, the present regulatory framework shields Gaz Métro
29 substantially from shortfalls that it might otherwise experience in each test period's
30 allowed rate of return. Gaz Métro is also shielded very significantly by its contractual

1 relationships from revenue shortfalls resulting from competitive fuel substitution.
2 Approximately one-half of its volumes (111 Bcf) are accounted for by rate categories
3 4 and 5. Of this amount, almost 90 percent (99 Bcf) are covered by contracts of 49
4 months or more.²

5 The protection afforded to Gaz Métro's shareholders by the various regulatory
6 and contractual safeguards is manifest by Gaz Métro's demonstrated ability to achieve
7 its allowed rate of return. In Table 14 the annual differences between Gaz Métro
8 allowed and achieved rates of return on common equity are shown for the period
9 1989-1996 inclusive. The largest shortfall over that period was only 50 basis points
10 (1993). The average difference was plus 6 basis points.

11 In my view, investors attach significant weight to the record of a utility that has
12 achieved a stable return; Gaz Métro's record provides considerable assurance in this
13 regard.

14
15 Q. Please comment on the risk that, at some point, the Gaz Métro system will become
16 uneconomic.

17
18 A. In my view, the best indicator of the extent to which this is perceived to be a
19 meaningful long term risk by equity investors is to examine the premium that investors
20 in Gaz Métro's long term bonds require. In effect, I view the premium that bond
21 investors require to accept the same risks (albeit with different priority status) as the
22 best quantitative indicator of the risk premium required by equity investors.
23 Specifically, I have examined the risk premium currently required by investors in Gaz
24 Métro's long term bonds relative to (1) its value at year end 1993 and 1997 and (2)
25 the premiums required at the same points in time by investors in the long term bonds
26 of a set of gas distribution and transmission companies.

27 The values shown in Table 15 indicate that investors in Gaz Métro long term
28 bonds currently view its relative risk to be essentially the same as in previous periods.
29 In particular, as of September 4, 1998 the yield required on the Gaz Métro bond was,

² SCGM3-Document 2.11(b).

1 only 11 basis points above the average yield for the four utilities in the comparative set
2 as compared to 6 basis points as of December 31, 1993. Given the various differences
3 among the bonds in terms of, for example, their coupons and maturity dates, this
4 difference is insignificant.

5 These results lead me to two conclusions. First, investors have not perceived
6 any increase in Gaz Métro's long term risks over the past five years. Secondly,
7 investors perceive Gaz Métro's long term risks to be basically comparable to those of
8 other high grade utilities.

9
10
11 **Financial Risk**
12
13

14 **Capital Structure**

15
16 Q. Please discuss the tradeoffs involved in the determination of an appropriate capital
17 structure for a regulated utility.

18
19 A. The principal advantages of an increased proportion of debt financing are in the tax
20 shields created and the lower cost of capital that results. This allows lower prices to
21 be established for the utility's customers. Excessive debt, however, would create
22 uncertainty in the matching of cash inflows with debt obligation payments, possible
23 disruption in the management of capital expenditures and operations and, in the
24 extreme, the risk of non-payment to debtholders. An equity cushion protects against
25 this outcome.

26 The optimal equity ratio is the level where the marginal benefit of additional
27 equity financing equals the foregone marginal tax advantages of additional debt
28 financing. Like many business decisions, the optimal equity ratio is, in practice,
29 difficult to pinpoint with certainty.

1 **Measurement of Financial Risk**

2
3 Q. How do you measure financial risk?

4
5 A. There is no single direct measure of financial risk. Capital structure provides
6 information about the degree of financial leverage applied and can, up to a point, be
7 considered as providing a surrogate measure of financial risk. However, the extent to
8 which financial risk results from any given capital structure also depends on the *cost*
9 *rates* of the different types of capital employed.

10 Both capital structure proportions and cost rates are reflected in coverage
11 ratios for interest obligations and for preferred dividend commitments. Coverage ratios
12 provide a more comprehensive measure of debt servicing capabilities than capital
13 structure ratios inasmuch as they reflect (i) the amount of fixed rates financing which
14 must be serviced, (ii) the rates which the corporation must pay on its fixed charge
15 securities and (iii) its operating income.

16
17 **Interest Coverage Ratios and Bond Ratings**

18
19 Q. The Régie, in its assessment of capital structure and rate of return recommendations
20 placed before it in earlier Gaz Métro hearings, has placed considerable emphasis on the
21 related interest coverage ratios. What is your view of the role played by these ratios in
22 determining debt costs and debt servicing ability?

23
24 A. Both interest and fixed charge coverage ratios are an indicator of a company's ability
25 to service its fixed rate financing. However, these ratios tell only part of the story of a
26 corporation's financial strength and are only one of several factors which contribute to
27 the assessment of its credit standing and the determination of its bond ratings.
28 Moreover, bond ratings themselves, are only one of the factors which bear on
29 investors' perceptions of creditworthiness and hence on a company's debt costs.
30 Accordingly, it is quite inappropriate to focus excessively on interest coverage ratios.

1 In assessing credit quality, the connections among the allowed rate of return on
2 common equity, capital structure and debt cost rates are complex with each element
3 having some influence on the others. Consideration must be given to the level and
4 stability of prospective cash flows, the critical determinant of which is the nature of the
5 risks inherent in the underlying business. Finally, in the case of utilities, the degree of
6 “enlightenment” possessed by the regulatory agency is a relevant consideration.

7 Bond ratings typically categorize most bond issuers reasonably well; however,
8 the fact that bond yields often deviate significantly from those applicable to their rating
9 category generally, demonstrates that investors -- the ultimate arbiters -- can and do
10 disagree with the assessments made by bond rating analysts.

11
12 Q. Please elaborate upon the links between bond ratings and debt cost rates.

13
14 A. Bond markets are dominated by institutional buyers. Decisions to buy or sell bonds,
15 and decisions about what to pay for them, are typically made by portfolio managers.
16 These decisions are based on the background information available to them about the
17 issuer, the issue and available alternatives, the composition of the portfolios they
18 manage and on the economic environment. This is the context in which the evaluations
19 of financial analysts, both internal and external, are considered.

20 Bond ratings are, in most cases, nothing more than evaluations made by a
21 particular group of financial analysts. While this group generally warrants considerable
22 respect, their conclusions are undoubtedly given different weights by different
23 investors.

24 Besides bond ratings and the opinions of financial analysts, decisions to buy or
25 sell -- and thus prices *and hence market yields* -- are influenced by many other
26 considerations. Among them are: the composition of existing portfolios, asset
27 allocation rules, coupon rates and terms to maturity, the nature and quality of
28 collateral security, whether a change in long term yields is perceived to be imminent,
29 and whether issuers are perceived as having sufficient liquidity to meet interest
30 payments were cash flows to atrophy unexpectedly.

1

2 Q. How exact is the link between interest coverage, debt quality and bond ratings?

3

4 A. Because of the impact of other factors identified above, a precise relationship will not
5 exist between interest coverages and bond quality ratings, nor between bond quality
6 ratings and the yields at which bonds sell in the marketplace.

7 While bond ratings are based on a number of factors that reflect quality, the
8 emphasis is on long-term ability to pay. Coverage ratios are an important aspect of
9 that ability, but they are only one among several indicators. That fact has not, in the
10 view of at least one bond rating agency, always been adequately appreciated by the
11 investment community. In a publication issued in the late 1970's, Moody's Investors
12 Service, Inc. expressed what appears to be exasperation with the concentration by
13 some analysts on capital structures and interest coverage ratios of public utilities.
14 Moody's stated:

15 With due respect to debt ratios and interest coverage
16 multiples, Moody's has repeatedly stated that many factors,
17 other than merely statistical ones, have a bearing on the
18 determination and judgment of utilities' debt quality. But, as
19 much as we emphasize this point, there are those outside the
20 rating profession who persist in attempts to categorize and
21 evaluate debt quality simply on the basis of comparison and
22 interpretation of essentially short-term statistical ratios. One
23 of the objectives of this booklet, then, is to bring into better
24 perspective important criteria we feel must be carefully
25 considered in the bond rating process.³
26

27

28 Q. Do the bond rating agencies have benchmarks in relation to which the particular
29 attributes of a bond issuer are assessed?

30

31 A. Yes. All bond rating agencies publish, for a variety of financial ratios, benchmark
32 values which serve as rough indicators of the values they would expect to see in order

³ Moody's Investors Service, Inc., "Electric Utility Bond and Preferred Stock Ratings: A Moody's Overview", (Undated: circa 1978), page 2.

1 for an issuer to achieve a particular rating. At the same time, however, the agencies
2 typically state what is perhaps self-evident: that the *totality* of the issuer's *prospective*
3 circumstances should be considered in assessing the quality of its debt. Accordingly, it
4 is inappropriate to state, categorically, that an issuer *must* be able to demonstrate an
5 ability to achieve a particular level of, say interest coverages in order to obtain a
6 particular credit rating.

7
8 Q. Is it always necessary for the minimum coverage ratio specified by the bond rating
9 agencies for a particular rating category to be met?

10
11 A. No. BC Gas Utility Ltd., a major gas distributor, is a particular case in point. Its debt
12 has been consistently rated A by the Dominion Bond Rating Service ("DBRS")
13 notwithstanding its coverage ratios being, for the period 1987-1996 below the 2.0
14 minimum level specified to achieve this rating. Several other anomalies appear in the
15 interest coverage values provided in Tables 9 and 10.

16 These tables show interest coverages over the period 1982-1996 for companies
17 ranked in the quality groups to which they have been assigned by DBRS. The AA
18 group includes companies with earnings coverage ratios ranging from 3.3 to 3.6 times
19 for the full period 1982-1996. For that period, coverage ratios for the A group range
20 between 1.5 and 3.7, while the companies in the BBB rating have ratios from 2.0 to
21 3.2. There are significant differences between the averages for the specific grades; for
22 example, the range of the AA group is completely contained within the range of the A
23 group. These data make it clear that other factors besides coverage ratios influence
24 ratings.

25 Interest coverage ratios reflect only the impact of financial leverage on basic
26 business risk. It is necessary, therefore to take into account factors directly affecting
27 business risk and the impact those factors have on the predictability of cash flows. It is
28 on the latter dimension that utilities, as a group, stand apart from all other businesses.

Gaz Métro's Capital Structure and Interest Coverage Ratios

Q. Please discuss Gaz Métro's capital structure and interest coverage ratios.

A. Several years ago, the Régie established a capital structure for Gaz Métro consisting of 54 percent long term debt and 46 percent shareholders equity. For revenue requirements purposes, the latter was "deemed" to be comprised of 38.5 percent common share and 7.5 percent preferred share financing. Since, in fact, no preferred shares exist, the "notional" split between the two forms of equity is really directed to (i) the determination of a fair rate of return on the overall equity component and (ii) Gaz Métro's interest coverage ratios.

Given that the preferred shares do not exist, there is no requirement to pay a preferred share dividend. That being the case, Gaz Métro's "fixed charge" coverage ratios are identical to its "interest" coverage ratios. The result is that Gaz Métro's fixed charge coverage ratios will, all other things being equal, exceed those of comparable utilities which actually have preferred shares in their capital structures. Accordingly, Gaz Métro's financial risk can properly be viewed as lower than that of its peers.

Q. What are the coverage ratios resulting from Gaz Métro's present application?

A. The values are 2.7 times using a common equity return of 10.57 percent and 2.8 times using a return of 10.7975 percent (Table 13 Cases 1 and 2).

Q. How do the interest coverage ratios resulting from Gaz Métro's application compare to those of other gas distribution companies?

A. Interest coverage ratios for seven gas distribution utilities (including Gaz Métro) rated by DBRS are shown in Table III-1 below together with their DBRS bond ratings.

1
2
3

TABLE III-1

	Interest Coverage		Current DBRS bond rating
	1990-96	1997	
Gaz Métropolitain	2.5	2.5	A
Others			
BC Gas Utility Ltd	1.7	1.9	A
Centra Gas Manitoba	2.6	3.3	A
Centra Gas Ontario	2.1	2.2	A
The Consumers' Gas Company	2.2	2.6	A(high)
Pacific Northern Gas Ltd.	2.1	2.7	BBB(high)
Union Gas Limited	2.3	2.3	A
High	2.6	3.3	
Low	1.7	1.9	
Average	2.2	2.5	

Source: Table 9.

4
5
6
7
8
9

Q. What are the interest coverage ratios that result from your use of the previously approved capital structure ratios and your recommended rate of return on deemed common equity?

A. As developed in Section V of my testimony, my recommended rate of return on deemed common equity for a utility comparable in business risk to Gaz Métro lies within a range of 8.25-9.0 percent for the 1999 test year. The resulting range for Gaz Métro's interest coverage ratio is 2.4-2.5 times (Table 13, Cases 3 and 4).

Both values lie well above the minimum value of 2.0 times stated as a condition by the two Canadian bond rating agencies for assigning an "A" rating to a

1 utility.

2

3 Q. What is your conclusion concerning the deemed level of Gaz Métro equity capital?

4

5 A. I have concluded that Gaz Métro's financial integrity could be maintained using a
6 capital structure which incorporated a somewhat lower equity component.

7

8 Q. Are you recommending a change in Gaz Métro's deemed capital structure at this time?

9

10 A. No. While I believe that the present level of deemed equity is unnecessarily high, I
11 recognize that this level has existed for several years and has been reviewed by the
12 Régie on occasion thereafter. I also recognize that capital structure proportions should
13 be viewed as long term values which, normally, will be altered only if the risk profile of
14 the utility changes meaningfully. I also note that the Régie, after a comprehensive
15 analysis in 1996 of very detailed submissions on Gaz Métro's capital structure decided
16 not to change its deemed equity component.

17 The Régie stated, rather forcefully, the case which it felt would have to be
18 made in order to warrant, from its perspective, a change in the deemed capital
19 structure.

20 In light of the foregoing, I accept Gaz Métro's present capital structure as a
21 given parameter for the remainder of my testimony.

22

23 Q. Does your conclusion concerning the previously approved capital structure of Gaz
24 Métro affect your common equity rate of return ("ROE") recommendation?

25

26 A. Yes. The interest coverage values resulting from the use of my ROE range and the
27 previously approved capital structure are well above the conventional minimums that
28 qualify a utility for an "A" rating⁴. Accordingly, I recommend that the lower end of my
29 ROE range be adopted for Gaz Métro. This would provide a better balance between

⁴ As indicated earlier, this requirement is frequently honoured in the breach.

- 1 Gaz Métro's rate of return on equity and the total investment risk borne by its
- 2 shareholders, given the mitigating effect on those risks of the high equity component
- 3 of the previously approved capital structure.

1 **IV THE RELATIONSHIP BETWEEN THE REQUIRED**
2 **RETURN ON EQUITY AND LONG TERM INTEREST RATES**
3
4

5 **1. Introduction**
6

7 Q. Please explain the purpose of this section of your evidence.
8

9 A. This section addresses the issue of whether there exists a systematic relationship
10 between long term interest rates and investors' required rates of return on utility equity
11 securities. The issue can be expressed in terms of the "equity risk premium" rather
12 than the required return on equity, since this premium is simply the difference between
13 investors' required rate of return for holding an equity security or portfolio of equities
14 and for holding a government bond.

15 The relationship between the required rates of return on equity and long term
16 interest rates is relevant for two issues in the current hearing:

- 17 (1) whether the change in interest rates since the last determination for Gaz Métro in
18 1997 warrants, all other things being equal, a change in the risk premium that
19 should be awarded common equityholders.
20 (2) the design of a regulatory adjustment mechanism going forward. Five regulatory
21 jurisdictions in Canada have adopted adjustment mechanisms that link the
22 allowed return on common equity to changes in forecast long term interest rates.

23 These mechanisms would result in an increase in the awarded equity risk
24 premium if long term interest rates were to decline and a decrease in the risk
25 premium were long term interest rates to increase.
26

27 Q. Please outline your approach to assessing the relationship between the equity risk
28 premium and long term interest rates.
29

30 A. I proceed by first outlining in subsection 2 the conceptual relationship between the
31 equity risk premium and the level of long term interest rates. I then examine in

subsection 3 the alleged empirical basis for a negative relationship between them. I
conclude with a discussion of the economic implications of the results.

2.
The linkage between the equity risk premium and the long term interest rate.

Q. Please discuss at a conceptual level the economic linkages between the equity risk
premium and the long term interest rate.

A. There is historical evidence that, at some levels of long term interest rates -- notably in
the area of 10 percent and above -- investors in utility common shares have been
willing to accept smaller premiums in order to hold equities in preference to long term
bonds. The explanation for that willingness has been ascribed to the existence of what
has been termed a "purchasing power risk premium". This premium is, effectively, the
increment in rate of return which investors require as compensation for accepting the
risk that their investment will lose some of its purchasing power over their holding
period.⁵

Exposure to purchasing power loss is generally greater for investments in long
term bonds than for investments in common equity securities. In addition, the higher
the levels of inflation anticipated by investors, the greater is the risk of purchasing
power loss associated with investments in long term bonds.

This risk probably increases for investors in most equities with rising levels of
inflation. However, it does not increase to the same degree for all equities and
particularly for the shares of regulated utilities. The latter result occurs because the
regulatory process itself, through the opportunity given to utilities to apply on a
regular basis when necessary for increases in allowed rates of return eliminates, for the
most part, this form of risk. The result is that long term bond yields reflect a risk that

⁵ This position was clearly and forcefully presented by Thomas C. Melzer, President of
the Federal Reserve Bank of St. Louis in "To Conclude: Keep Inflation Low and, in Principle,
Eliminate It", Federal Reserve Bank of St. Louis Review, November/December 1997, 3-7.
See also Agathe Côté, Jocelyn Jacob, John Nelmes and Miles Whittingham, "Inflation

1 is not matched by a commensurate increase in utility equity investors' required rates of
2 return. Consequently, the spread between utility equity investors' required rates of
3 return and long term bond yields narrows.

4 The protection of public utility equity securities from the loss of inflation-
5 induced purchasing power loss is key to the remainder of this discussion. It stands in
6 stark contrast, both conceptually and empirically, to investors' experience with
7 investments in long term bonds in the 1970's and early 1980's.

8 Substantial increases in both the risks and required rates of return on long term
9 bonds began in the early 1970's and continued for many years thereafter⁶. The reason
10 was the major increase in inflation (and in turn a marked change in inflation
11 expectations) which began at that time. Accordingly, investors in long term bonds
12 required much larger premiums than those previously required as prospective
13 compensation for accepting risk of the future erosion of their purchasing power. The
14 result was that yields on long term bonds increased to reflect not only the anticipated
15 rate of inflation but also the much greater risk that future inflation would turn out to
16 be higher than was anticipated when the bonds were purchased.

17 Over that same period, regulatory agencies did not increase the allowed rate of
18 return on utilities' common equity by the same amount as the increases in long term
19 interest rates. This behaviour was, in my view, totally appropriate. Given the
20 substantial uncertainties associated with the levels of future inflation, investors in long
21 term fixed income securities clearly required additional compensation for the increases
22 in their exposure to the risks of purchasing power risk. Since, in contrast, investors in
23 public utility equities were not exposed to these risks, they did not require
24 compensation for this source of risk. Effectively, therefore, the "equity risk premium"
25 as conventionally measured, narrowed because of a "new" risk premium, unique to
26 bonds, being incorporated in their yields.

27 Whether the purchasing power risk premium is constant at all levels or is
28 increasing above some level is a critical issue for rate of return regulation. The

Expectations and Real Return Bonds", Bank of Canada Review, Summer 1996, pp. 41-53.

⁶ The pattern of long term interest rates over the period 1970- June 1998 is shown in Figure 2.

1 discussion above suggests that high interest rates reflect both expectations for high
2 inflation and high uncertainty as to what the actual levels of inflation will ultimately
3 turn out to be, the latter leading to high purchasing power risk premiums being
4 incorporated in long term interest rates. At interest rates reflective of moderate or
5 low inflation, the uncertainty as to future inflation levels should be relatively low and
6 the purchasing power risk premium will neither be high nor vary substantially. Under
7 these circumstances, there is no reason to expect the equity risk premium to vary with
8 changes in interest rates. (Recall that the reason for the equity risk premium changing
9 at high interest rates was the change in the risk premiums required on bonds.) The
10 empirical results to be reviewed below support this prediction.
11
12

13 **3.1 *Review of the Empirical Analysis Offered in Support***
14 ***of a Negative Equity Risk Premium - Interest Rate Relationship***
15

16 Q. Please describe the empirical analyses offered in support of the negative relationship
17 between the equity risk premium and long term interest rates.
18

19 A. The empirical evidence that has been offered for the negative relationship between
20 equity risk premiums and long term interest rates before Canadian regulatory boards is
21 principally in the various reports by Ms. Kathleen McShane and Dr. Stephen Sherwin
22 of Foster Associates, Inc. and by Dr. Roger Morin, a witness for Gaz Métro in the
23 present proceedings.
24

25 Q. Please assess this evidence.
26

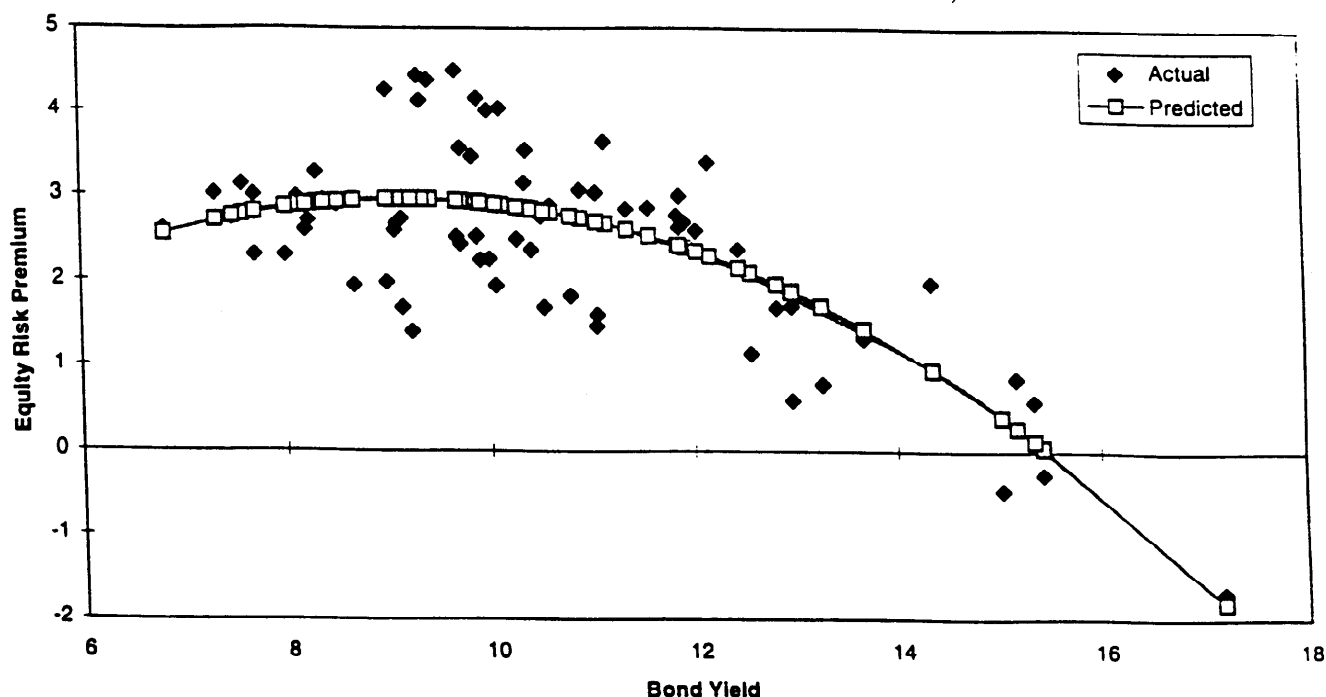
27 A. Ms. McShane included a detailed empirical analysis of this issue in her evidence before

the Ontario Energy Board in EBRO 495 (Consumers' Gas), January 1997⁷. She examined interest rates and equity risk premiums over the period 1979-1996. Ms. McShane found a negative relationship between the equity risk premium required by investors in utilities' common equity and long term interest rates but only when the relationship was estimated as a linear relationship.

My discussion above, however, concluded that this relationship was more likely to be non-linear in the sense of being highly negative at higher interest rates and of smaller, perhaps insignificant size at lower interest rates and low inflationary expectations. Moreover, Ms. McShane's own evidence demonstrates that the nonlinear relationship is supported by her data while the linear relationship is not.

The relationship is depicted in the figure below, which is based on Ms. McShane's data.

FIGURE IV-1
RELATIONSHIP BETWEEN EQUITY RISK PREMIUMS AND LONG
CANADA BOND YIELDS: NON-LINEAR MODEL, 1979-1996



⁷ Ms. McShane abandoned this test in her evidence on behalf of Newfoundland Light & Power Co. Limited before the Board of Commissioners of Public Utilities of Newfoundland and Labrador in June 1998. In an opinion dated July 1998 prepared on behalf of Gazifère Inc. for submission to the Régie (R-3406-98) she has included an empirical examination, using a much smaller sample, of the relationship between rates of return allowed by public utility boards and long term interest rates.

1 This figure clearly demonstrates the nonlinear relationship.

2 The effect is also clear in Ms. McShane's summary of her risk premium
3 estimates which are shown below.

4
5 **TABLE IV-I**
6 **BOND YIELD LEVEL AND ESTIMATED**
7 **EQUITY RISK PREMIUM: MS. MCSHANE'S**
8 **DATA FOR THE PERIOD 1979-1996**
9

	Bond Yield	Risk Premium
12% and above	1.0 %	2.5 %
11-12 %	2.7 %	3.5 %
10-11 %	3.3 %	
9-10 %		
Below 9 %		

18
19 Source: Evidence of Ms. Kathleen McShane in Ontario Energy Board EBRO 495,
20 p.A-6. (January 1997)

21
22 Ms. McShane's estimates of the risk premium, as summarized in the above table, do
23 not vary with the long term interest rate when the interest rate is below 9 percent.

24
25 **3.2 Testing For Nonlinearity using the Data from the Existing Studies**
26

27 Q. Is it possible to test statistically whether the nonlinear specification, depicted in Figure
28 IV-I, provides a superior statistical fit to the data than a negative, linear relationship?

29
30 A. Yes. I have undertaken a non-linear regression analysis using Ms. McShane's data.⁸
31 The fitted relationship is as follows:
32

1 Risk Premium = -3.28 + 1.36 (interest rate) - 0.07 (interest rate)²
 2 t-statistics: (-1.80) (4.17) (-5.22)

3
 4 The t-statistic on the squared term in this regression, -5.22, indicates that the linear
 5 specification is rejected by the data.

6
 7 Q. Please describe and assess the evidence provided by Dr. Morin in these proceedings.

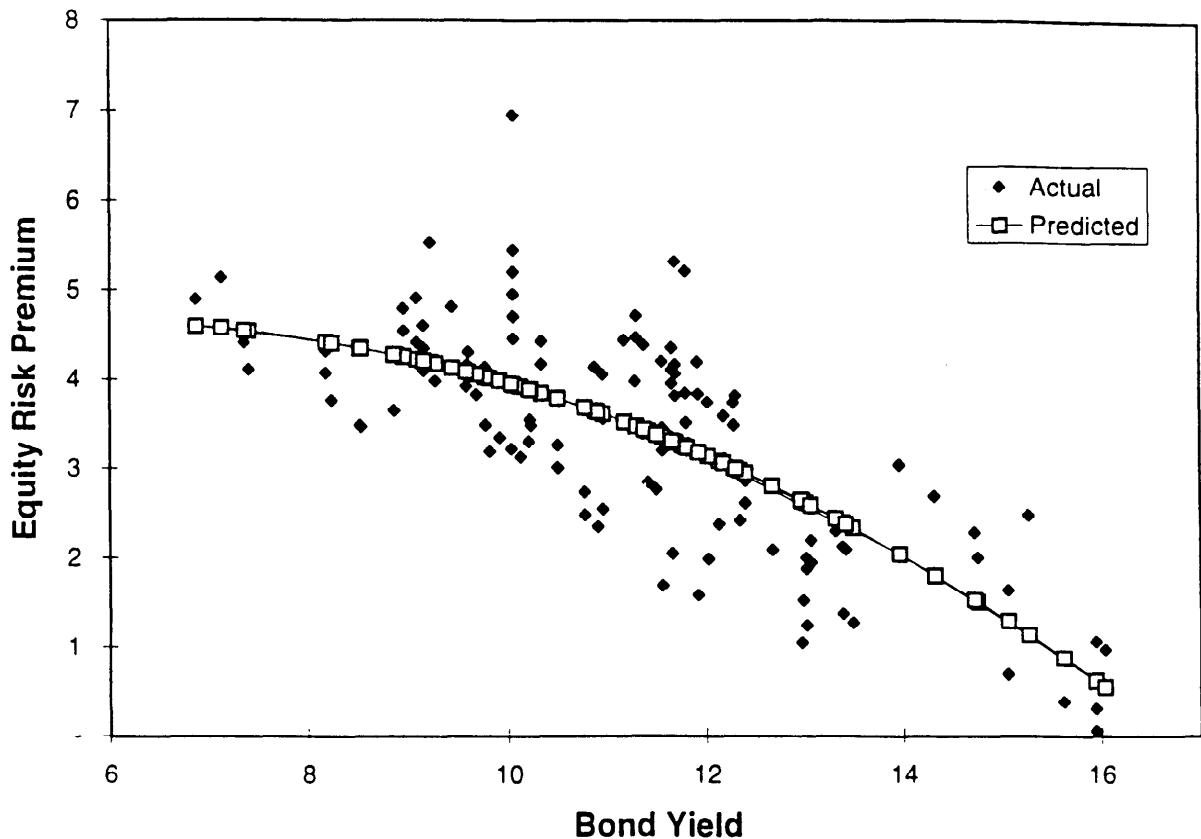
8
 9 A. Dr. Morin has undertaken an empirical analysis of the equity risk premium/bond yield
 10 relationship using risk premiums awarded in 184 Canadian regulatory proceedings held
 11 over the period 1980 - 1994 . As I did with Ms. McShane's data, I have undertaken a
 12 non-linear regression using Dr. Morin's data. The fitted relationship is as follows:

13
 14 Risk Premium = 3.28 + 0.46 (interest rate) - 0.04 (interest rate)²
 15 t-statistics: (1.86) (1.49) (-2.96)

16
 17 As was the case for the analysis undertaken using Ms. McShane's data, the t-statistic
 18 of -2.96 on the term used to identify the impact of the non-linearity in the relationship,
 19 indicates that the linear specification is rejected. The fitted non-linear relationship is
 20 shown below in Figure IV-2.

⁸ The 72 observations of the risk premium for Canadian utilities over the 1979-96 period on which this regression is based, included 6 data points that were estimated via visual inspection.

FIGURE IV-2
RELATIONSHIP BETWEEN EQUITY RISK PREMIUMS AND LONG
CANADA BOND YIELDS: NON-LINEAR MODEL
APPLIED TO DR. MORIN'S DATA, 1980-1994



Q. Please interpret your findings in light of your earlier discussion of the relationship between the purchasing power risks borne by bondholders and those borne by utility equityholders.

A. The non-linear relationship established using the data compiled by both Ms. McShane and Dr. Morin are consistent with the reduction, beginning in the mid-1980's, in the value of the purchasing power risk premium required by bond investors. The results are also consistent with the expectation that the required purchasing power risk premium essentially "flattens out" and remains in a relatively narrow range over what could be considered a return to more "normal" bond yield levels in an environment of low prospective inflation. Finally, the non-linear results provide support for an unchanging equity risk premium over a range of single digit interest rates rather than

1 for the simple linear model offered by Dr. Morin.

2
3 **4. *Implications for Regulatory Rate-setting***
4

5 Q. What are the implications of the empirical results discussed in this section for the
6 determination of a fair rate of return for Gaz Métro for the 1999 test year?

7
8 A. The absence of a relationship between the size of the equity risk premium and the level
9 of long term interest rates means that in establishing the 1999 fair rate of return for
10 Gaz Métro, it is inappropriate to proceed on the basis that a high risk premium over
11 the long Canada interest rate should accompany the currently low yield on long
12 Canada bonds. Put another way, no adjustment of an historically estimated risk
13 premium to account for current low interest rates is necessary.

14
15 Q. You have been asked to consider the feasibility of establishing an adjustment
16 mechanism which would enable the Régie to reset Gaz Métro's return on common
17 equity by reference to the level of long term interest rates. What are the implications
18 of your empirical results for the design of such a mechanism ?

19
20 A. In the design of an automatic adjustment mechanism whereby the allowed return on
21 equity varies directly with changes in the long term interest rate, the variation in the
22 allowed return should be one-for-one with changes in the interest rate. No increase in
23 the risk premium should be built in due to the process being initiated at a time of
24 relatively low interest rates, nor should the risk premium decline should interest rates
25 increase within the single digit (i.e., below 10 percent) range. Looking forward over
26 the medium term, the chance of a substantial increase in long term interest rates from
27 the percent level of 5.8 percent, while small, is surely larger than the chance of a
28 substantial decrease. Accordingly, an automatic adjustment mechanism for the
29 allowed ROE that incorporates changes in interest rates on a one-for-one basis is, in an
30 expected value sense, to the advantage of Gaz Métro's shareholders.

1

2 Q. What long term interest rate or interest rate forecasts have been incorporated by other
3 Boards in their adjustment mechanisms?

4

5 A. In the mechanisms adopted by the National Energy Board, the British Columbia
6 Utilities Commission, the Manitoba Public Utilities Board, and the Ontario Energy
7 Board, the forecasts used are those published by Consensus Economics of London,
8 England. The Consensus Economics forecasts are based on the average of forecasts
9 by prominent economic forecasters in Canada. The allowed rate of return is based on
10 the average of (i) the 3-month ahead forecast of 10-year Canada bonds and (ii) the 12-
11 month ahead forecast of 10-year Canada bonds, plus the estimated difference in yields
12 between the 10-year and 30-year bonds.

13 The Newfoundland and Labrador Board of Commissioners of Public Utilities
14 has taken a different approach. It appears to take the view that the best (or at least as
15 good) forecast of the long term bond rate over any 12 month period is the most
16 recently observed (i.e., the "spot") rate. There is considerable merit in this position.⁹
17 Time and time again, the forecasting ineptitude of financial market participants, both in
18 bond and equity markets, has been demonstrated.

19

20 Q. What is your opinion regarding the two approaches you have described?

21

⁹ In its Order P.U. 16 (1998-99), at page 105, the Newfoundland Board stated that:
An automatic adjustment mechanism will be implemented based upon the equity risk premium model, using the long term (30 years) Government of Canada bonds as the risk free rate. The Board will take an average of the daily closing yields on long term Canada bonds for the last five trading days in the month of October and the first five trading days in the month of November. The Government of Canada bond issues used by the Board will be the 8.00% Issue maturing June 1st, 2027, and the 5.750% Issue maturing on June 1st, 2029. This average of ten trading days will be adopted as the forecast long term bond rate for the following year to be used in implementation of the formula.

1 A. The approach used by the Newfoundland Board is appealing because it deals squarely
2 the reality that bond yield forecasts which deviate from a “no change” forecast are, on
3 average, no better at predicting future interest rate levels than a “no change”
4 forecast.¹⁰ On the other hand, the “consensus” approach used by other boards at least
5 has the appearance of not being affected by the happenstance of market activity over a
6 short period of time. And while there have been, to my knowledge, no tests of the
7 hypothesis that equity investors’ required rates of return are more closely linked to
8 prognosticators’ forecasts of long term bond yields than to “spot” yields, the matter is
9 arguable.

10 On balance, it is my view that the two approaches would give similar results,
11 on average, over several periods of use. However, the Newfoundland approach is
12 simpler to apply and for that reason, if for no other, is to be preferred.
13
14

15 5. *Calling of Hearing*
16

17 Q. In the context of an ongoing multiyear regulatory process which includes automatic
18 adjustment of the ROE, do you consider a trigger mechanism of any sort to be
19 appropriate, and if so what kind of trigger mechanism?
20

21 A. In my view, it would be appropriate to hold a full cost of capital hearing if a substantial
22 change occurred in capital market conditions, which I would define as an increase in
23 the long term Canada bond yield above, say, 8 percent that is sustained for more than
24 six months.

¹⁰ The vast conceptual and empirical literature on “efficient” capital markets provides ample support for the Newfoundland Board’s position.

1 **V. RISK PREMIUM ESTIMATES**

2

3 Q: Please elaborate on the concept of “equity risk premium”.

4

5 A: The equity market risk premium is the incremental prospective rate of return required by
6 investors to hold a typical or “market” portfolio of common shares rather than a fixed
7 income security such as a government bond. The equity risk premium reflects four
8 differences between the returns from equities and bonds: differences in the riskiness of
9 nominal returns between the two classes of securities; differences in the exposure to
10 purchasing power risk, or inflation risk, of a given nominal return from investment in each
11 class of securities; differences in the tax treatment of returns from each class; and
12 possibly differences in the transactions costs of investment in the two classes. On balance,
13 these factors, especially the first, favour fixed income investment, implying that equity
14 risk premiums are positive.

15

16 Q: Please explain the “equity risk premium method” of estimating the cost of equity capital
17 for a public utility.

18

19 A: This method of estimating the investors’ required return on equity capital exploits the fact
20 that the required return over a long commitment period on government *bonds* is given
21 simply by the observable yield on the bond. One estimates from historical data the equity
22 risk premium on the equity market as a whole (i.e., a diversified portfolio of equities).
23 Then, in the comparative risk step, one estimates from comparative risk measures the risk
24 of the utility common equity relative to the equity market as a whole. The use of
25 benchmark portfolios of low-risk industrials and low-risk utilities as proxies for
26 comparative risk analysis, rather than just a direct comparison of the utility or utilities in
27 question with the overall equity market, increases the reliability of the estimate. Adding
28 the estimated portion of the market premium required by the utility equityholders to the
29 observable yield on the bond provides the estimate of their currently required return and
30 hence the cost of equity capital of the utility.

1
2 The main limitations of this estimation method lie in (1) the reliance on a relatively
3 small historical sample of a volatile statistical series to estimate the market risk premium:
4 and (2) the demonstrable changes over time in the economic factors underlying the
5 market risk premium. One must be cognizant of developments that may affect these
6 factors over time, in interpreting the equity risk premium estimate.

7
8
9 ***The Equity Market Risk Premium***

10
11 Q: For which securities do you estimate equity risk premiums?

12
13 A: I estimate the equity risk premium for the Canadian equity market as a whole, using
14 historically achieved rates of return. I then estimate the risk, relative to the market, of
15 two benchmark groups or portfolios, which I can compare to Gaz Métro: (1) a sample of
16 20 low-risk non-utilities; and (2) the ten lowest-risk utilities. In constructing these two
17 groups, I use five risk measures which are defined in Appendix II and discussed in this
18 section. This procedure provides risk premium estimates for these two groups. The risk
19 premium for the non-utility group is developed as a check on the premium estimate for
20 the lowest risk utilities.

21
22 Q: On what definition of historically achieved average rates of return do you base your
23 estimate?

24
25 A: The estimate is based principally on geometric mean values. The rationale for using the
26 geometric rather than the arithmetic mean in the context of developing a fair rate of
27 return for Canadian public utilities is provided in Appendix VIII.

28 The geometric mean over a period provides the realized rate of return for an
29 investor holding the asset over the entire period. I consider, in addition, the realized rates
30 of return over different holding periods (5 year and 10 year), calculating the arithmetic

1 average of each of these holding period returns.

2

3 Q: What historical data did you examine in developing your estimate of the equity risk
4 premium required during the 1999 test year on the market portfolio?

5

6 A: I examined the data reported in several studies undertaken on the rates of return which
7 could have been achieved in the past from investments in portfolios of Canadian common
8 stocks and investments in long term bonds. The studies span the period 1920 - 1997.
9 They are:

10 Canadian Institute of Actuaries, *Report on Canadian Economic Statistics,*
11 *1924-1997*, (Ottawa: CIA Committee on Economic Statistics, July 1998).

12

13 James E. Hatch and Robert W. White, *Canadian Stocks, Bonds, Bills, and*
14 *Inflation: 1950 - 1987* (Charlottesville, Va., The Institute of Chartered
15 Financial Analysts, 1988).

16

17 Government of Canada, *The Retirement Income System in Canada:*
18 *Problems and Alternative Policies for Reform*, Volume II, Appendix 10.
19 (Period covered: 1920 - 1978 inclusive.)

20

21 M. J. Gordon and L. I. Gould, "The Nominal Yield and Risk Premium on
22 the TSE-300, 1956 - 1982," *Canadian Journal of Administrative*
23 *Sciences*, Vol. 1, No.1 (1985), pp. 50-60.

24

25 ScotiaMcLeod Inc., *Investment Returns*, annual.

26

27

28 Q: What is your estimate of the premium that is required in 1998 by investors for the equity
29 market as a whole?

30

31 A: I estimate the premium to have been in the range of 4 to 4 ½ percent. The basis for this
32 estimate is summarized in Table 5. In arriving at this estimate I gave primary weight to
33 the fact that the average premium for the Canadian market over the period 1926 - 1997
34 was 3.7 percent.¹¹ Giving recognition to the somewhat higher result for the U.S. market

¹¹ If 1924, the beginning year in the Canadian Institute of Actuaries study had been used the average premium would be 4.0 percent rather than 3.8 percent.

1 over the same period (5.8 percent) and to the Canadian result of 4.3 percent for the 1950-
2 1997 period suggests the higher end of the range. In my application of the equity risk
3 premium test I therefore use this value; i.e., **4.5 percent**.

4 There is a substantial basis for believing that this is a generous estimate of the
5 market risk premium. I analyse the potential sources of estimation error at the end of this
6 section, after completing the derivation of my equity risk premium estimate.

7
8
9 *Comparative Risk Analysis*

10
11 Q: Please describe how you estimated the incremental risk premium for your lowest risk
12 non-utility group.

13
14 A: The procedure involves two steps:

- 15 1. I estimate the risk of this group relative to the market portfolio (i.e., the TSE
16 300);
17 2. I then apply the relative risk value established in step one to the previously
18 estimated incremental premium for the market portfolio.

19 To estimate the group's risk relative to that of the market portfolio, I compare the
20 group's values to those of the market portfolio for each of my five risk measures. As
21 shown in Table 7B, all five of the risk values for the low-risk non-utility group are
22 significantly below those for the market as a whole. In particular, the three measures of
23 share price volatility (two of which are frequently used by other witnesses in rate of
24 return proceedings) indicate that the risk exposure associated with the low-risk non-utility

1 group is in the order of two-thirds that of the equity market as a whole.¹²

2 Applying a relative risk value of two-thirds to the 4.5 percentage points estimate
3 for the incremental premium required in the 1999 test year on the market portfolio results
4 in a required incremental premium of approximately 3.0 percentage points for the low-
5 risk non-utilities group.

6

7 Q: How have you estimated the incremental risk premium required in the 1999 test year for
8 the lowest risk utilities?

9

10 A: I have applied the procedure described above for estimating the relative risk of the low-
11 risk non-utility group.

12

13 Q: How is the "lowest risk utilities" group defined?

14

15 A: It consists of the ten lowest risk utilities. The companies comprising the group together
16 with their values and ranks on each of the five risk measures and their composite rank are
17 listed in Table 8.

18

19 Q: What are your estimates of the relative risk of the lowest risk utilities group?

20

21 A: I have concluded that the risk exposure of the lowest risk utilities group is no more than
22 one-half that of the equity market as a whole. This conclusion is based on the relative
23 risk values shown in Table 7C (the highest of which is only 0.54) with due allowance for

¹² One of the measures is the "beta factor", a measure of the relationship between the prospective systematic risk premium on a security and the prospective risk premium on a broadly defined market portfolio. The systematic risk concept has recently been subjected to considerable scrutiny beginning with a study by Eugene Fama and Kenneth French ("The Cross-Section of Expected Stock Returns", *Journal of Finance*, June 1992, pp. 427-465) which suggested that beta was unable to explain rates of return *achieved* on common stocks. Closer inspection of the analyses, however, reveals that the perceived deficiencies of the beta factor are limited to formal tests of the capital asset pricing model, and that it is useful for many purposes, including, most importantly, determining relative risk. See Richard C. Grinold, "Is Beta Dead Again?", *Financial Analysts Journal*, July/August 1993, pp. 28-34.

1 the approximations inherent in any statistical analysis of historical data.¹³

2
3 Q: Have you examined any other evidence to support your conclusion on the relative risk of
4 utilities?

5
6 A: Yes. I have examined relative price declines for utilities and the TSE 300 index in the
7 wake of the stock market "crash" of October 1987. On October 19, 1987, the TSE 300
8 fell 11.3 percent and a further 6.7 percent on the following day. The Utilities sub-index,
9 however, fell only 7.2 percent on October 19, and actually rose by 2.8 percent on the
10 following day. During the month of October, the TSE 300 declined by 22.6 percent
11 while the decline for the Utilities sub-index was only 7.2 percent; i.e., approximately 1/3
12 of that for the market as a whole.¹⁴

13 This analysis is particularly useful in establishing the relative risk of utilities
14 inasmuch as the price changes for the market as a whole were essentially "across the
15 board". The short length of the period coupled with the severity of the decline created a
16 situation in which events peculiar to a particular industry have minimal impact.
17 Accordingly, it represented a basically unique real world approximation to a controlled
18 experiment for the determination of relative risks of industry categories.

19
20 Q: In your view, would it be appropriate to estimate the incremental premium for utilities by
21 reference to the difference between the rates of return achieved, even over relatively long
22 time periods, on investments in utilities' common shares and long term bonds?

23
24 A: No. The difficulty with such an approach is the tendency for the share prices, and hence
25 achieved rates of return of individual companies and of narrowly defined industry groups

¹³ Some of the companies included in this group have undertaken significant amounts of diversification into non-utility activities. Accordingly, the risk measures in all likelihood overstate the riskiness of the utility activities as such.

¹⁴ Source: James E. Hatch and Robert W. White, *Canadian Stocks, Bonds, Bills, and Inflation: 1950 - 1987* (Charlottesville, Va., The Institute of Chartered Financial Analysts, 1988), pp. 108 - 109 and Tables 5-38, 5-39 and 5-40.

1 to deviate, often for extended periods of time, from the values which would be consistent
2 with their perceived risks. This point is demonstrated in Table 6 which shows the
3 achieved rates of return for each of the 14 sub-indexes of the TSE 300 for all possible 1,
4 3, 5 and 10 year holding periods beginning on each January 1 for the inclusive period
5 1956 - 1997. Also shown are the results for various sub-periods.

6 The inconsistency of particular industries' risk rankings and achieved rates of
7 return (and hence risk premiums) can be illustrated by reference to the rates of return
8 achieved on the utilities sub-index and the major natural resource industries. These
9 industries were chosen because they are, on both a statistical basis and an intuitive basis,
10 more risky than utilities. The "all periods" values, 1956 - 1997, are summarized below.

11		
12	TSE 300	10.3%
13	Utilities	10.6
14		
15	Metals and minerals	8.6
16		
17	Oil and gas	9.5
18		
19	Paper and forest products	9.1
20		

21 Q: From your statistical analysis you concluded that the risk exposure associated with your
22 low risk groups is in the order of two-thirds that of the market portfolio for non-utilities
23 and one-half that of the market portfolio for utilities. Are the business circumstances of
24 the two groups consistent with the utility group having the lower risk value?

25
26 A: Yes. There are two considerations which lead to this conclusion:

- 27 1. the protection from inflation afforded utilities' shareholders and
- 28 2. the high degree of assurance of the recovery of costs and profit realization.

29 With regard to inflation protection, the common shares of Canadian utilities are
30 generally recognized as providing year-to-year protection superior to that of non-utilities
31 against inflation. While this recognition was not extended at the same time to all utilities,
32 it appears to have general applicability today. The awareness stems from the steps taken

1 by Canadian regulatory bodies since the mid-1970s to make the regulatory process
2 responsive to inflationary pressures. While the very low rates of inflation experienced in
3 Canada in recent years (as shown in Appendix IV) have reduced investors' concerns with
4 respect to this source of risk, this protection continues to be a source of comfort to
5 investors.

6 Investors do not view this responsiveness as a guarantee by the regulatory
7 authorities that such protection will be provided; instead, it demonstrates that the
8 regulatory authorities are aware that reasonable estimates of the investors' rate of return
9 embody investor expectations of future inflation levels. This recognition, coupled with the
10 opportunities provided for timely rate reviews, and more recently in some jurisdictions,
11 for automatic adjustments based on current levels of long bond rates, generally results in
12 utilities' year-by-year achieved rates of return closely reflecting, all other things being
13 equal, the inflation compensation implicit in the awarded rates of return.

14 Most of a utility's costs are independent of its level of output; accordingly, cost
15 recovery and profit realization are critically dependent upon the quality of forecasts of
16 output and/or the pricing process utilized. Because Canadian regulatory authorities have,
17 in general, tailored the mechanics of the revenue determination and cost recovery
18 processes to the particular circumstances of the utilities under their jurisdiction, the
19 differences between the achieved and allowed rates of return on common equity are likely
20 to be small for most utilities.

21
22 Q: Please summarize your estimates of the incremental risk premiums.

23
24 A: The values are tabulated below.

TABLE V-A
ESTIMATED RISK PREMIUMS

	Risk relative to the market portfolio	Incremental risk premium (percentage points)
Market portfolio	--	4.5 maximum
First septile non-utilities	two-thirds	3.0 maximum
First septile lowest risk utilities	one-half	2.25 maximum

Q: How do you apply these risk premiums to arrive at an estimate of the cost of the deemed common equity capital of Gaz Métro for the 1999 test year?

A: In Section III, I examined investor assessments of Gaz Métro's various types of risk. I regard Gaz Métro as a high-grade utility, having the same investment risk (i.e., its balance of business and capital structure risks) as my lowest-risk set of utilities. Adding the corresponding risk premium, 2.25 percent, to the projected yield on long Canadas for the 1999 test year of 5.75 to 6.25 percent yields an estimated cost of common equity capital of 8.0 to 8.5 percent.

Q: In arriving at a fair rate of return on Gaz Métro's common equity for the 1999 test year, is it necessary to incorporate an allowance for factors beyond the long Canada interest rate and the compensation for risk?

A: Yes. An allowance is normally required to (1) cover the underwriting and issue costs associated with new issues of common equity; (2) minimize the extent to which dilution of the existing shareholders' equity would occur if the new issue had to be made at a time when the market price is depressed sufficiently to result in the net proceeds per share

1 being less than the common equity per share, and (3) cover the risk that the estimate of
2 the yield required on long term Government of Canada bonds over the test year used in
3 the equity risk premium calculation is too low.

4 The need to treat flotation costs as an “add on” to the investor’s required rate of
5 return is arguable. The possibility of dilution is only one of the many risks borne by
6 investors. It is generally thought to be a more prevalent source for utility investments
7 than for non-utility investments because of utilities’ obligation to provide service and the
8 generally rapid expansion of the associated capital investment. Even if this is accepted, it
9 is necessary to consider that there are other risks for which the relative impact on utilities
10 and non-utilities is the reverse of that of potential dilution.

11 The case for singling out the dilution aspect for special treatment is not persuasive
12 when the data utilized in estimating the investors’ required rate of return are not for the
13 subject utility, as is the case in my analysis. Under these circumstances, any explicit
14 allowance for dilution effectively represents a safety factor rather than an element
15 required to provide investors with fair treatment.¹⁵

16
17 Q: What is the “margin of safety” that you have incorporated in your recommended fair rate
18 of return?

19
20 A: I have incorporated a range of 25 to 50 basis points.

21
22 Q: What is your conclusion as to the equity risk premium based estimate of the appropriate
23 1999 test year rate of return on Gaz Métro’s common equity?

24
25 A: Adding 25 to 50 basis points to my estimate of 8.0 to 8.5 percent for the cost of equity
26 capital yields a **recommended rate of return of 8.25 to 9.0 percent.**

27
28

¹⁵ The quantum of the flotation cost allowance and the rationale for incorporating at most only a few basis points for it in the allowed rate of return is discussed in Appendix XI.

1 ***Sources of Possible Estimation Bias***
2

3 Q: What are the possible sources of bias in your equity risk premium estimate of Gaz
4 Métro's cost of equity capital?
5

6 A: The main sources of bias are (1) the reliance on a relatively small historical sample of a
7 volatile statistical series to estimate the market risk premium; and (2) the changes over
8 time in the economic factors underlying the market risk premium. I cannot state whether
9 the first factor has led to positive or negative bias in my estimate; this is the limitation of
10 any statistical estimation. The possibility of bias led me to select the upper end of the
11 estimated range, 4.5 percent, for the equity market premium. I can, however, investigate
12 the second possible source of bias by reviewing economists' findings on the trends in the
13 equity risk premium.
14

15 Q: Please review the research on trend in historically achieved equity market risk premiums.
16

17 A: Research by Professor Jeremy Siegel of the Wharton School, University of Pennsylvania
18 indicates that the achieved historical risk premiums over the period I have used (1926-
19 1997) may well exceed the premiums investors can expect over the 1999 test year.¹⁶ His
20 research, encompassing the period 1820-1992, suggests that the equity risk premiums
21 achieved since 1926 are unlikely to be repeated. It is his view, as reported in *Forbes*, June
22 21, 1993 that

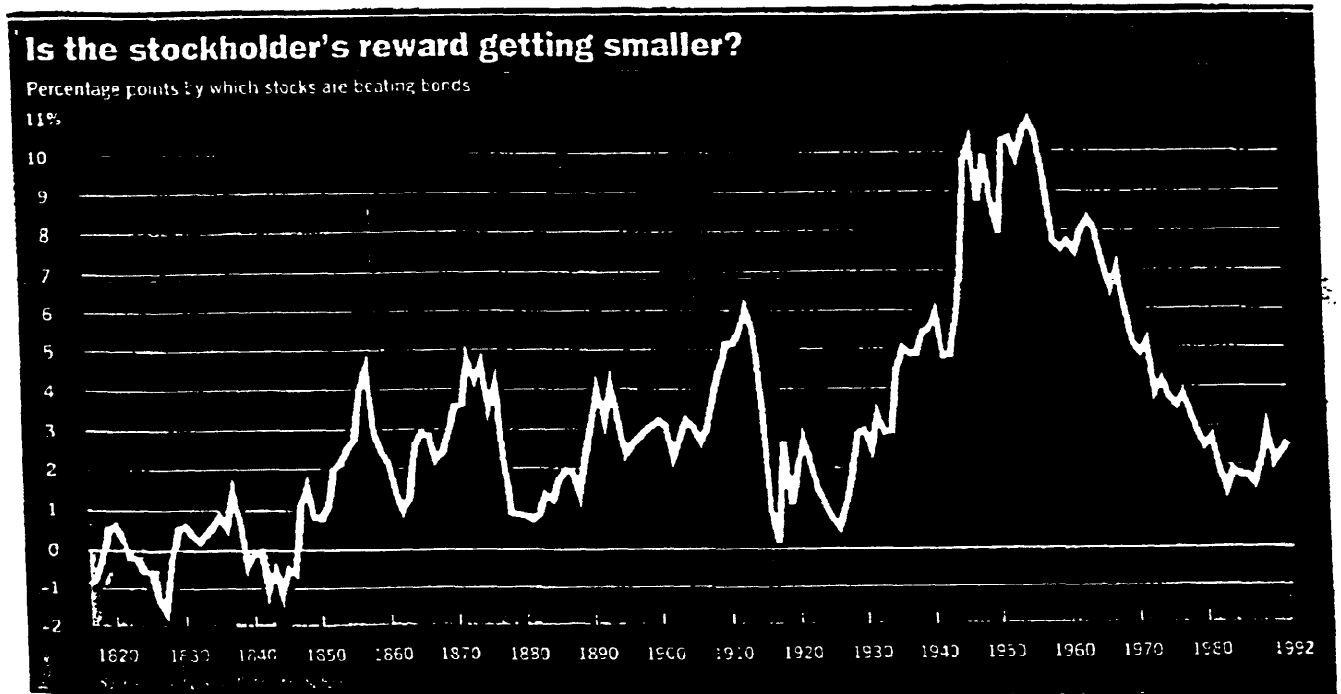
23 ... for the indefinite future stocks will continue to beat bonds, but by a
24 considerably smaller margin than they have over the past half-century or
25 so.
26

27 By studying stock and bond returns back to the Jeffersonian era, Siegel
28 found that the equity risk premium -- the margin by which stocks
29 outperform bonds -- has historically run far lower than its post-1926
30 average (see chart above). From 1802 to 1870 stocks outperformed bonds
31 by 0.8 percentage points per year. From 1870 to 1925 stocks beat bonds
32 by 2.8 points per year. Thus, stocks' 5-point-plus annual outperformance

¹⁶ Jeremy J. Siegel, *Stocks For the Long Run*, Richard D. Irwin Inc., 1994.

1 from 1926 to 1992 looks out of line.¹⁷

2
3 One of Professor Siegel's charts (published in the *Forbes* article) is shown below. (The
4 complete *Forbes* article is included as Appendix IX.)
5
6



24 There is considerable academic and industry evidence arguing against the
25 mechanistic use of historical spreads between returns on equity and debt as a measure of
26 the *prospective* risk premium. Robert Harris, for example, notes:
27
28

29 Use of such historical risk premia assumes that past realizations
are a good surrogate for future expectations and that risk premia
are roughly constant over time. Additionally, the choice of a time
period over which to average data is essentially arbitrary.¹⁸

¹⁷ Jason Zweig, "History Lesson", *Forbes*, June 21, 1993, pp. 148-150.

¹⁸ Robert Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return", *Financial Management*, Spring 1986, pp. 58-67.

1
2
3 Finnerty and Lestikow state their concerns even more directly:¹⁹

4
5 Portfolio managers, investors, utility regulators, and corporate
6 financial officers should not use historical average risk premiums
7 as their forecast for future period risk premiums in decision-
8 making and performance evaluation. Generally, the stochastic
9 processes generating equity, horizon, small stock, and default risk
10 premiums *are not stationary over time*. (emphasis added)
11

12 Indeed, far from being stationary, Finnerty and Lestikow concluded from their empirical
13 work that the equity risk premium has displayed a statistically significant downward trend
14 over time. Yamaguchi, in analyzing *ex post* return differences ending every five years for
15 various holding periods from 1926 to 1990, concluded:²⁰

16
17 Because these observations vary significantly depending on the
18 sample period used, we cannot rely with confidence on the
19 assumption implicit in this approach - that the future will be the
20 same as the past.
21

22 The conclusion to be reached from this research is clear: historical relationships should be
23 used only with consideration of adjustment for current and prospective circumstances.
24

25
26 ***Comparisons to awards made by other regulatory boards***
27

28 Q. Please comment on the fact that your recommended rate of return on common equity of
29 8.25-9.0 percent is below all of the rates of return listed for Canadian utilities in Table 12,
30 the lowest of which is the 9.25 percent awarded to Newfoundland Light & Power Co.
31 Limited in July 1998.
32

¹⁹ John D. Finnerty and Dean Lestikow, "The Behaviour of Equity and Debt Risk Premiums", *Journal of Portfolio Management*, Summer 1993, pp. 73-84.

²⁰ Katsunari Yamaguchi, "Estimating the Equity Risk Premium from Downside Probability", *Journal of Portfolio Management*, Summer 1994, pp. 17-27.

1 A: To simplify the discussion, I have restricted my comparisons to the awards made by the
2 National Energy Board (“NEB”) and the British Columbia Utilities Commission
3 (“BCUC”). These were the boards which took the lead in introducing an “automatic”
4 tracking mechanism for the resetting of the ROE. There are two factors which, for the
5 most part, account for the differences: both the “risk free” long term bond yield and the
6 equity risk premium applied to Gaz Métro are lower than those used by other regulatory
7 boards.

8 My use of a lower long term bond yield simply reflects the fact that long term
9 yields have continued their lengthy decline and have reached levels below those prevailing
10 at the time other boards made their decisions. For example, the projected long Canada
11 rates applicable under the BCUC and NEB formulas in November 1997 when they
12 established their allowed returns for 1998 were in the order of 6.4-6.5 percent, some 60-
13 70 basis points above the formula level of 5.8 percent which would apply if these boards
14 were making their decisions today.

15 Turning to the second factor – the difference between the equity risk premium I
16 have utilized and those utilized by regulatory boards which have adopted a “tracking
17 mechanism” – there are two considerations: (1) the level of the equity risk premium set
18 initially by those boards and (2) the assumed relationship between changes in the forecast
19 long Canada yield and changes in the equity risk premium.

20 Both the BCUC and the NEB set the initial level of the equity risk premium at 3.0
21 percent. (See Table V-B.) My recommendation for Gaz Métro incorporates a value of
22 2.50-2.75 percent; i.e., a difference of 25 to 50 basis points.

23 Of greater significance is the difference resulting from the assumption by the
24 BCUC and the NEB that the equity risk premium increases as interest rates fall. This
25 assumption resulted in the 1998 equity risk premiums (set in November 1997) exceeding
26 the initial 3.0 percent level by 61 basis points (after rounding) in the case of the BCUC
27 and 68 basis points in the case of the NEB.

28 Table V-B below has been constructed to demonstrate the narrowing of the
29 differences between my recommended ROE for Gaz Métro of 8.25-9.0 percent and the
30 awards that would have been made by the BCUC and the NEB if:

1 1) They were making their awards today and

2 2) They assumed that the equity risk premium did not change; i.e., that a value of 3.0
3 percent was used.

4 The table contains four panels:

5 Panel 1 contains the most recent awards (made in November 1997 for the year
6 1998). They were 10.00 percent and 10.21 percent in the case of the BCUC and the NEB
7 respectively.

8 Panel 2 provides the awards which would have been established for 1998 in
9 November 1997 by the BCUC and the NEB if they had applied the 3.0 percent premium
10 initially established. The values would have been 9.39 percent (rounded to 9.50 percent)
11 in the case of the BCUC and 9.53 percent in the case of the NEB.

12 Panel 3 contains the awards which would materialize if the BCUC and the
13 NEB were, as is the Régie, in the position of establishing awards today based on current
14 market conditions and forecasts. The values would be 9.50 percent (BCUC) and 9.63
15 percent (NEB).

16 Panel 4 shows the awards which would materialize if the BCUC and the NEB
17 were establishing awards today using current interest rate forecasts and their initial risk
18 premium of 3.0 percent. In both cases, the values are 8.73 percent (rounded to 8.75
19 percent by the BCUC).

TABLE V-B

MOST RECENT ROE AWARDS BY THE BRITISH COLUMBIA UTILITIES COMMISSION AND THE NATIONAL ENERGY BOARD AND ALTERNATIVE AWARDS UNDER VARIOUS ASSUMPTIONS

	British Columbia Utilities Commission	National Energy Board
1. Most recent award (Nov./97)	9.96% (rounded to 10.0%)	10.21%
2. Most recent award if unchanging risk premium had been used	9.39% (rounded to 9.50%)	9.53%
3. Award if made today (Aug 28/98)	9.43% (rounded to 9.50%)	9.63%
4. Award if made today (Aug 28/98) and unchanging risk premiums were used	8.73% (rounded to 8.75%)	8.73%

Source: Table 18.

Q: You indicated earlier that your equity risk premium estimate for low risk utilities is slightly smaller than the 3.0 percent value initially established by the BCUC and the NEB in their generic rate of return hearings. What accounts for the difference?

A: Two items account for the difference. First, both the BCUC and the NEB utilized an equity market risk premium range of 4.5-5.0 percent. I have utilized a value of 4.5 percent. Second, I have estimated the risk of low risk utilities to be in the order of 50 percent of that of the equity market as a whole. Both the BCUC and the NEB used (by implication) a range of 60 to 67 percent. (Table 4.)

Q: Your estimate of 4.5 percent for the equity market risk premium is very similar to the 4.5-5.0 percent used by the BCUC and the NEB in their generic rate of return hearings. What

1 is the overall range of market risk premiums used by Canadian regulatory boards whose
2 decisions you have examined?

3

4 A: Not all boards have made explicit the extent to which they have quantified the equity
5 market premium and the value utilized when they have relied upon it. However, my
6 analysis indicates that the CRTC's 5.8-6.0 percent range is almost certainly the highest.
7 The overall range appears to be 4.5-6.0 percent. (See Table 4.)

8

9 Q: What is the overall range of relative risk values used by the Canadian regulatory boards
10 whose decisions you have examined?

11

12 A: As shown in Table 4, the range is in the order of 60-75 percent. The high end is
13 attributable to the CRTC in its most recent (1998) decision. All witnesses in the related
14 proceeding (including myself) concluded that the relative risks of the telecom companies
15 exceed those of all other utility sectors.

16

17 Q. Please summarize your comparison of your recommended ROE for Gaz Métro to the
18 most recent awards made by other regulatory boards.

19

20 A: My basic conclusion is that the upper end of my range of 8.25 – 9.0 percent is consistent
21 with the awards that would have been made by both the BCUC and the NEB if
22 (1) they were establishing awards for the period October 1, 1998 - September 30, 1999
23 on the basis of the financial market information currently available and
24 (2) they had continued to use the 3.0 percent equity risk premium which they had
25 initially adopted.

26 Under these conditions, the BCUC and NEB awards will be 8.75 percent and 8.73
27 percent respectively.

28

29

30

31

Comparisons of Waters and Morin Parameters

- Q. Please outline and discuss the points of difference between you and Gaz Métro's witness, Dr. Morin, on the determination of the ROE for Gaz Métro.
- A. In Table V-C below, I have listed the values utilized by Dr. Morin and me for each of the key components of the equity risk premium method.

TABLE V-C
VALUES FOR KEY COMPONENTS OF
EQUITY RISK PREMIUM METHODOLOGY

	Waters	Morin	Difference (using mid-points of ranges)
1. Prospective yield on long Canada bonds	5.75-6.25%	6.02%	0.02%
2. Components of equity risk premium			
(a) Equity market risk premium	4.5%	6.5%	2.0%
(b) Gaz Métro's risk relative to equity market	0.50	0.65	0.15
3. The Gaz Métro equity risk premium 2(a) x 2(b)	2.25%	4.25	2.00%
4. Other elements	0.25-0.50	0.30	0.07%
5. ROE range (1)+(3)+(4)	8.25-9.00%	10.57%	1.95%

1 The primary difference between us is the estimate of the equity risk premium for
2 the utility: my estimate is 2.25 percent plus a safety factor of 25-50 basis points while Dr.
3 Morin's is 4.25 percent plus 30 basis points for flotation.²¹ The 200 basis points
4 difference is attributable to the difference in our estimates of the equity market risk
5 premium -- 4.5 percent versus 6.5 percent -- and the difference in our estimates of the
6 risk of the utility relative to that of the equity market -- 0.50 versus 0.65.

7 The very substantial difference in our estimates of the equity market risk premium
8 is essentially attributable to my reliance upon the geometric mean values of historically
9 achieved premiums and Dr. Morin's reliance upon arithmetic mean values. My use of the
10 geometric mean is predicated on the fact that, to estimate the utility's cost of capital, it is
11 necessary to estimate the rate of return required by investors to own the shares of that
12 utility. Moreover, since investments in utility shares are investments in long term assets,
13 the relevant earning power of the utility is its prospective compound rate of return over a
14 multi-year investment horizon. This return is most appropriately measured by the
15 geometric mean and, to the extent that averages of historically achieved rates of return
16 are used as proxies for this unobservable future rate of return, the geometric mean of
17 those returns should be used. (In Appendix VIII, I expand on the link between the
18 investors' required rate of return as measured by the geometric mean and the utility's
19 allowed rate of return.)

20 The use of the geometric mean, i.e., the compound rate of return, in the context
21 of investors' returns has been standard practice throughout the world for decades if not
22 centuries. Investors' investment goals, opportunities and achieved returns are invariably
23 stated in these terms by the financial institutions that serve them.

24 The most basic computation in this context is the yield on a bond providing two
25 or more payments. This computation underlies the yield values for the 30 year long term
26 bond "risk free" investment used by Dr. Morin and myself. The same computation should
27 be used in determining the appropriate "add on" in constructing the investors' required
28 compound rate of return on a risky equity investment.

²¹ Dr. Morin's evidence, Appendix B, page 9.

1 The inappropriateness of the arithmetic mean rate of return in this context is
2 demonstrated by the following simple example.

3		
4	Investment at beginning of year 1	\$100.00
5		
6	Value at the end of year 1	150.00
7		
8	Value at the end of year 2	100.00
9		
10	Rate of return achieved over year 1	
11	(\$50.00 increase on \$100.00)	+50.0%
12		
13	Rate of return achieved over year 2	
14	(\$50.00 decline on \$150.00)	-33.3%
15		
16	Arithmetic mean rate of return over	
17	2 years	
18	Year 1 +50.0%	
19	Year 2 -33.3%	+8.3%
20		
21	Geometric mean	0.0%

22
23 At the end of year 2, the investment was worth \$100.00, the amount paid for it at the
24 beginning of year 1. Clearly, the investor is no better off at the end than at the beginning.
25 The geometric mean, for which the computation uses only the beginning and ending
26 values, captures this situation. In contrast, the arithmetic mean gives the mistaken
27 impression that the investor has on average earned 8.3 percent over the investment
28 period.

29
30
31 Q. You indicated that a second point of significant difference between you and Dr. Morin
32 lies in your estimates of the risk of high grade utility common shares relative to the equity
33 market as a whole. Please comment.

34
35 A. I have utilized a value of 0.5 while Dr. Morin has used a value of 0.65. If our various
36 additional premiums (for flotation, safety cushion, etc.) are included, my value becomes

1 0.56 to 0.61 while Dr. Morin's becomes 0.69. The main difference between us is our
2 approach to estimating the value. I base my estimate on the results from the application of
3 five measures of risk, one of which is the "beta factor" or "systematic risk" value. The
4 highest relative risk value resulting from these measures is 0.51.

5 Dr. Morin utilizes the beta factor only. However, Dr. Morin does not use the
6 value as estimated from historical data. Instead he uses an "adjusted" value which
7 purports to adjust the statistically estimated value for bias often noted in analyses
8 undertaken using observed beta values for equity securities covering the entire spectrum
9 from lowest to highest risk. For securities having observed beta values below 1.0, the
10 adjustment is upward.

11 Adjustments are often made by providers of such data to "correct" for the bias
12 that is often properly associated with some of the observed values at the extremes of the
13 risk range. However, the adjustment model is typically applied to all securities' beta
14 values without regard to whether adjustment is necessarily warranted for particular sub-
15 groups. As I indicated at an earlier point in this section and in the analysis presented in
16 Appendix V, this adjustment is not warranted for the beta values of Canadian utilities
17 generally. Their observed low values are because their risk levels are low, and not
18 because the results are biased by atypical or abnormal outcomes.

19
20
21 **The incentive mechanism proposed by Gaz Métro**
22

23
24 Q. In developing your recommendations, what have you assumed concerning the incentive
25 mechanism proposed by Gaz Métro in these proceedings?

26
27 A. I have assumed that the incentive mechanism proposed by Gaz Métro will be rejected by
28 the Régie. Underlying my assumption is the analysis contained in the evidence prepared
29 by Mr. Hugh Johnson and submitted by IGUA in these proceedings. That analysis
30 demonstrates that the proposed incentive mechanism would basically result in a
31 potentially significant increase in Gaz Métro's return and a reduction in its risk exposure
32 irrespective of whether or not productivity improvements, as distinct from increases in

1 gas volumes, occurred.

2

3 Q. How would your rate of return recommendation be affected if the Régie were to approve
4 the mechanism proposed by Gaz Métro?

5

6 A. If the Gaz Métro proposal were approved, I would recommend that the allowed dollar
7 return on equity be reduced by the anticipated amount of the value (in an expected value
8 sense) of the prospective gains to Gaz Métro. The concomitant reduction in shareholder
9 risk associated with the mechanism would provide yet another reason for utilizing the
10 lower end of my ROE range.

11

12

13 **Conclusion on Fair Rate of Return on Common Equity**

14

15 I have concluded that a fair rate of return on deemed common equity for a utility
16 comparable to Gaz Métro lies within a range of 8.25-9.0 percent for the 1999 test year.
17 However, given my conclusion that Gaz Métro's 46.0 percent equity ratio results in a
18 very low level of financial risk, I conclude that the lower end of my range should be
19 utilized.

LIST OF APPENDICES

- I** Curriculum Vitae of William Robert Waters
- II** Construction of Low Risk Samples and Definitions of Risk Measures
- III** Companies Contained in 20 Lowest Risk Non-Utility Sample
- IV** Annual and Compound Annual Rates of Inflation, Consumer Price Index, Canada, July 1988 – July 1998
- V** Analysis of the Stability of Beta Values for Utilities and Low Risk Non-Utilities
- VI** Capital Market Rates of Return and Yields, Canada and United States (Arithmetic Means) 1926 - 1997
- VII** Annual Achieved Rates of Return for Canadian Common Stocks and Long Term Bonds, 1924-1997
- VIII** The Use of the Geometric Mean in Establishing the Risk Premium for Utilities
- IX** Article by Jason Zweig, "History Lesson", *Forbes*, June 21, 1993, pp. 148-150.
- X** Dominion Bond Rating Service "Characteristics of Utilities in Canada"
- XI** Comment on the Magnitude of the Allowance for Flotation Costs

**CURRICULUM VITAE
WILLIAM ROBERT WATERS**

Education

B.A.	University of Toronto, 1960 (Economics and Political Science)
M.B.A.	University of Toronto, 1962 (Business Administration)
M.B.A.	University of Chicago, 1964 (Economics and Finance)
Ph.D.	University of Chicago, 1976 (Finance)

Academic Honours

University of Toronto: Stevenson & Kellogg Dissertation prize, 1962.

University of Chicago: Ford Foundation Pre-doctoral Fellow in Business Administration, 1962-63; Doctoral Program Fellow, 1963-64; Ford Foundation Doctoral Fellow in Business Administration, 1964-65. Elected to Beta Gamma Sigma, 1964.

Canada Council Leave Fellowship, 1974-75.

Academic Positions

Professor (Emeritus), Faculty of Management, University of Toronto (Financial Markets and Investment Analysis, Managerial Economics). Associate Dean (Academic), 1972 - June 1975. Academic Director, Executive MBA Program, 1982 - June 1985. Faculty member since 1964.

Regulatory Experience***Appearances***

1973: Ontario Energy Board re fair rate of return for The Consumers' Gas Company (jointly with G. David Quirin).

1976: Snavelly Commission on the Costs of Transporting Grain by Rail re cost of capital for Canadian Pacific Limited and Canadian National Railways (jointly with G. David Quirin).

1977 and 1978: Alberta Public Utilities Board, Inquiry re accounting for income tax on utility income.

1978: National Energy Board re accounting for income taxes for TransCanada PipeLines Limited.

1985: National Energy Board re fair rate of return for Trans Mountain Pipe Line Company Ltd.

Ontario Energy Board re certain financial aspects of the Unicorp takeover of Union Enterprises.

British Columbia Utilities Commission re income tax treatment of Pacific Northern Gas Ltd.

National Energy Board re fair rate of return for TransCanada PipeLines Limited.

Alberta Public Utilities Board re fair rate of return for Canadian Western Natural Gas Company Limited, TransAlta Utilities Corporation and Alberta Power Limited (three separate appearances).

1986: National Energy Board re fair rate of return for Trans Quebec & Maritimes Pipeline Inc.

Saskatchewan Public Utilities Review Commission re financial targets for the Saskatchewan Power Corporation.

British Columbia Utilities Commission re fair rate of return for Inland Natural Gas Co. Ltd. and Columbia Natural Gas Limited.

National Energy Board re fair rate of return for TransCanada PipeLines Limited.

Alberta Public Utilities Board re fair rate of return for Alberta Power Limited.

1987: British Columbia Utilities Commission re the proposed acquisition of West Kootenay Power and Light Co. Ltd. by UtiliCorp United Inc.

National Energy Board re fair rate of return for Interprovincial Pipe Line Limited.

Alberta Public Utilities Board re fair rate of return for Alberta Government Telephones.

National Energy Board re fair rate of return for Westcoast Transmission Company Limited.

Alberta Public Utilities Board re certain working capital issues in the context of Edmonton Power.

National Energy Board re fair rate of return for Trans Quebec & Maritimes Pipeline Inc.

Alberta Public Utilities Board re fair rate of return for Northwestern Utilities Limited.

1988: The High Court of New Zealand re fair rate of return for the Natural Gas Corporation of New Zealand Limited.

Ontario Automobile Insurance Board re financial issues in the regulation of the Ontario automobile insurance industry.

An arbitration re royalties payable to Oil Basins Limited by ESSO Exploration And Production Australia Inc. et al.

National Energy Board re fair rate of return for Trans Quebec & Maritimes Pipeline Inc.

Alberta Public Utilities Board re regulatory treatment of excess capacity, for ratemaking purposes in the context of Edmonton Power.

1989: British Columbia Utilities Commission re fair rate of return for West Kootenay Power Ltd.

National Energy Board re fair rate of return for TransCanada PipeLines Limited (two appearances).

British Columbia Utilities Commission re economic and financial aspects of the proposed gas pipeline to Vancouver Island (Application of Pacific Coast Energy Corporation).

An arbitration re rates payable to Minette Bay Ship Docking Ltd. for services provided in the Port of Prince Rupert, B.C.

Alberta Public Utilities Board re fair rate of return for TransAlta Utilities Corporation.

Alberta Public Utilities Board re fair rate of return for Alberta Power Limited.

National Energy Board re fair rate of return for Westcoast Energy Inc.

1990: Board of Commissioners of Public Utilities of Newfoundland and Labrador re the implications of certain financial issues for the revenue requirements of Newfoundland & Labrador Hydro.

Alberta Public Utilities Board re fair rate of return for Canadian Western Natural Gas Company Limited.

National Energy Board re fair rate of return for Westcoast Energy Inc.

National Energy Board re a proposed incentive scheme for TransCanada PipeLines Limited to minimize system expansion costs.

National Energy Board re fair rate of return for Trans Quebec & Maritimes Pipeline Inc.

1991: British Columbia Utilities Commission re fair rate of return for Pacific Northern Gas Ltd.

Alberta Public Utilities Board re treatment of unbilled revenues for TransAlta Utilities Corporation.

Alberta Public Utilities Board re the treatment of incomes taxes for Canadian Western Natural Gas Company Limited.

Alberta Public Utilities Board re fair rate of return and treatment of income taxes for Northwestern Utilities Limited.

National Energy Board re fair rate of return for TransCanada PipeLines Limited.

Alberta Public Utilities Board re fair rate of return and treatment of income taxes for Alberta Power Limited.

Alberta Public Utilities Board re fair rate of return and treatment of income taxes for TransAlta Utilities Corporation.

New Brunswick Board of Commissioners of Public Utilities re incorporation of investment income in its automobile insurance rate making procedures.

1992: Board of Commissioners of Public Utilities of Newfoundland and Labrador re the implications of certain financial issues for the revenue requirements of Newfoundland & Labrador Hydro.

National Energy Board re fair rate of return and treatment of income taxes for Interprovincial Pipe Line Inc.

Canadian Radio-television and Telecommunications Commission re fair rate of return for AGT Limited.

British Columbia Utilities Commission re fair rate of return for Pacific Northern Gas Ltd.

National Energy Board re fair rate of return for Trans Mountain Pipe Line Company Ltd.

Alberta Public Utilities Board re treatment of sulphur revenues in determining the cost of service for gas processing.

National Energy Board re fair rate of return for Westcoast Energy Inc.

British Columbia Utilities Commission re fair rate of return for BC Gas Inc.

Alberta Public Utilities Board re fair rate of return for Canadian Western Natural Gas Company Limited.

Alberta Public Utilities Board re fair rate of return for Alberta Gas Transmission Division of NOVA Corporation of Alberta.

National Energy Board re fair rate of return for TransCanada PipeLines Limited.

National Energy Board re fair rate of return for Trans Quebec & Maritimes Pipeline Inc.

1993: British Columbia Utilities Commission re fair rate of return for West Kootenay Power Ltd.

Alberta Public Utilities Board re fair rate of return for TransAlta Utilities Corporation.

Alberta Public Utilities Board re fair rate of return for Alberta Power Limited.

Alberta Public Utilities Board re fair rate of return for Northwestern Utilities Limited.

Alberta Public Utilities Board re fair rate of return for Alberta Gas Transmission Division of NOVA Corporation of Alberta.

Canadian Radio-television and Telecommunications Commission re income tax matters relating to AGT Limited.

Canadian Radio-television and Telecommunications Commission re fair rate of return for AGT Limited.

National Energy Board re fair rate of return for Foothills Pipelines Ltd.

British Columbia Utilities Commission re rate of return for British Columbia Hydro and Power Authority.

National Energy Board re fair rate of return for Westcoast Energy Inc.

1994: National Energy Board re fair rate of return for TransCanada PipeLines Limited.

British Columbia Utilities Commission re joint hearing on fair rates of return for BC Gas Utility Ltd., Pacific Northern Gas Ltd., and West Kootenay Power Ltd.

Alberta Public Utilities Board re fair rate of return for Nova Gas Transmission Limited Division of NOVA Corporation of Alberta.

National Energy Board re joint hearing on cost of capital of Alberta Natural Gas Company Ltd; Foothills Pipe Lines Ltd; Interprovincial Pipe Line Inc.; TransCanada Pipe Lines Limited; Trans Mountain Pipe Line Company Ltd; Trans-Northern Pipelines Inc.; Trans Quebec & Maritimes Pipeline Inc. and Westcoast Energy Inc.

1995: Alberta Energy and Utilities Board re fair rate of return for TransAlta Utilities Corporation 1995 rate review application.

1996: The High Court of New Zealand re the valuation of generation assets of the Electricity Corporation of New Zealand.

Alberta Energy and Utilities Board re fair rate of return for TransAlta Utilities Corporation and Alberta Power Limited.

1997: Canadian Radio-Television and Telecommunications Commission re fair rate of return for Stentor companies (written submissions only).

1998: Alberta Energy and Utilities Board re fair rate of return for TransAlta Utilities Corporation for the 1995 test year.

British Columbia Utilities Commission re capital structure and rate of return for Pacific Northern Gas Ltd.

Board of Commissioners of Public Utilities of Newfoundland and Labrador re fair rate of return for Newfoundland Light & Power Co. Limited.

Consultant on cost of capital and related matters

1968 and subsequent: Bell Canada re cost of capital and accounting for inflation.

1970: Consortium of Ontario gas distributors re fair rate of return for TransCanada PipeLines Limited.

1974: Ontario Energy Board re fair rate of return for Union Gas Limited.

1974 and subsequent:

City of Calgary re fair rate of return and other matters for Canadian Western Natural Gas Company, Calgary Power, Alberta Government Telephones.

1977: Shell Canada re fair rate of return for Interprovincial Pipe Line Limited.

1978 and subsequent:

Canadian Petroleum Association re fair rate of return and other matters for Westcoast Transmission, Foothills Pipeline, Cochin Pipe Lines, Great Lakes Gas Transmission Company, Alberta Natural Gas Company Ltd.

The Alberta Gas Producer Group re fair rate of return and other financial matters for the gas transmission division of NOVA Corporation of Alberta.

1979: Association of Major Power Consumers in Ontario re financial aspects of Ontario Hydro.

1980: City of Edmonton re fair rate of return for Northwestern Utilities Limited.

1981: American Water Works Service Co., Inc.

1981 and subsequent: CN Rail.

1982: New Brunswick Telephone Company, Limited.

1983: Chevron Canada Resources Limited re fair rate of return for Interprovincial Pipe Line Limited.

1985-86: Province of Ontario, Commission of Inquiry into Residential Tenancies.

1987: New Zealand Forestry Corporation.

Saskatchewan Public Utilities Review Commission re SaskTel.

Province of Ontario, Ministry of Energy re cost of capital determination for gas utilities.

Other Related Experience

Consultant to several pension funds, financial organizations, and the Department of Energy Mines and Resources, Government of Canada. Member, President's Investment Committee, University of Toronto.

Corporate Positions

President, William R. Waters Limited, Waters Associates Inc., Portfolio Analytics Limited. Chairman, Financial Models Company Inc. Member, Canadian Advisory Board, Ecclesiastical Insurance Office PLC.

Publications

"Individual Investment: Canadian Experience", *The Journal of Finance*, vol. 18, no. 4 (Dec. 1963), 647-65 (with J.V. Poapst).

"Rates of Return on Consumer Durables", *The Journal of Finance*, vol. 19, no. 4 (Dec. 1964), 673-77 (with J.V. Poapst).

A Study of The Canadian Mutual Fund Industry, Toronto: Canadian Mutual Funds Association, 1969, xxiii, 326 (with G.D. Quirin).

"Some public policy aspects of Canadian mutual funds", *Canadian Chartered Accountant*, vol. 96, no.2 (Feb. 1970), 106-110 (with G.D. Quirin).

"The invisible hand in the Canadian mutual fund industry: fact or fiction?" *The Canadian Banker*, vol. 77, no. 1 (Jan., Feb. 1970), 4-7.

"Credit and the Lifetime Financial Planning of Canadians: The Decade Ahead", *1970 Canadian Consumer Credit Factbook*, Toronto: The Canadian Consumer Loan Association and the Federated Council of Sales Finance Companies, 1970, 2-7.

Proposals for Tax Reform and the Composition of Household Saving, Montreal: Private Planning Association of Canada, 1971, vii, 38.

Competition, Economic Efficiency and Profitability In The Canadian Property And Casualty Insurance Industry, Toronto: The Insurance Bureau of Canada, 1974, ix, 593, (with G.D. Quirin, et al).

APPENDIX II (cont'd)

II. *Definitions of Five Risk Measures*

A. Measures relating to instability of earnings per share

1. The maximum percentage shortfall in annual earnings per share below the trend value fitted to annual data for 13 years. ("NEGEPS")
2. The mean absolute deviation (expressed in percentage terms), of annual earnings per share about a three year moving average. ("DEV3")

B. Measures relating to instability of share price

3. The maximum drop (expressed in percentage terms), over a 12 month period in share price utilizing month-end prices for a period of 60 months. ("NEGPRICE")
4. The systematic component of the variation in the price appreciation component of investor yields as measured by the "Beta factor" utilizing month-end share prices for a five year period. ("BETA")
5. The total variability in investor yields as measured by the standard deviation of the price appreciation component utilizing month-end share prices for a five year period. ("STDEV")

**APPENDIX III
COMPANIES CONTAINED IN
TOP 20 LOWEST RISK NON UTILITY SAMPLE**

Companies

Bank of Montreal
Bank of Nova Scotia
CT Financial Services Inc.
Corby Distilleries Ltd.
Corporate Foods Ltd.

Dover Industries Ltd.
Imasco Limited
Imperial Oil Limited
Loblaw Companies Limited
Oshawa Group Ltd.

Power Corporation of Canada
Quebecor Inc
Rothmans Inc
Royal Bank of Canada
Seagram Company Ltd.

Shaw Communications Inc.
Thomson Corporation
Toronto Dominion Bank
UAP Inc.
Weston, George Ltd.

APPENDIX IV

**ANNUAL AND COMPOUND ANNUAL RATES OF INFLATION,
CONSUMER PRICE INDEX, CANADA
JULY 1988 - JULY 1998**

Year	Jul. CPI	Annual growth	Compound growth rate		
			5 year	8 year	10 year
1988	85.2				
1989	89.8	5.4 %			
1990	93.6	4.2			
1991	99.1	5.8			
1992	100.3	1.3			
1993	102.0	1.6	3.6 %		
1994	102.1	0.2	2.6		
1995	104.7	2.5	2.3		
1996	105.9	1.2	1.4	2.8 %	
1997	107.8	1.8	1.5	2.3	
1998	108.8	0.9	1.3	1.9	2.5 %

Source: *The Consumer Price Index*, Statistics Canada. (1992 based.)

APPENDIX V

ANALYSIS OF THE STABILITY OF BETA VALUES FOR UTILITIES AND LOW RISK NON-UTILITIES

An important measure of securities' risk -- both conceptually and empirically -- is the "beta factor". This appendix presents analyses undertaken to evaluate the stability over time of this risk measure for Canadian utilities and low risk non-utilities.

Some rate of return witnesses have made upward adjustments to the so-called "raw beta" values estimated from the historical data. The adjustment is based on the not unreasonable generality that estimated beta values above the average value of 1.0 are often upward biased estimates of their "true" (but unobservable) values, while conversely, observed beta values below the average value are often downward biased estimates of their true values. There are two basic factors contributing to this result. First, since the estimation process involves applying the statistical technique of regression analysis to a large number of rate of return outcomes, the resulting estimate can be unduly affected by one or more atypical or abnormal outcomes. The second factor contributing to the "regression toward the mean" tendency is changes in underlying risk characteristics of an investment. *If* high risk investments tend, over time, to evolve into lower risk investments *and if* the converse is also true, beta values based on past history will, on average, be biased estimates of the true (but unobservable) values.

Extremely high or extremely low beta estimates are usually the result of abnormal observations of relative price changes being included in the set of observations used in the estimation process. That is why in some later period the estimated beta value for such a security is likely to move towards the average value of 1.0 for all securities. Consequently, if a lowest-risk group of companies is selected solely on the basis of the companies' beta values, the group will almost certainly include some companies which are there inadvertently.

Since a particular set of abnormal observations is unlikely to materialize in two consecutive time periods, subsequent estimates of beta values of the securities in this so-called lowest-risk group are unlikely to contain as many low values as in the previous period. Almost certainly, therefore, the group's average beta value in the second period will be higher than the first period's value.

APPENDIX V (cont'd)

The approach adopted in this testimony to create a group of lowest risk companies involves the use of five indicators of the company's riskiness, only one of which is the beta value. Consequently, this methodology minimizes the likelihood that a company will inadvertently be classified as a lowest risk group company should its beta value in a period happen to be extremely low due to the impact of abnormal observations on the statistical estimation process.

Such a low risk "impostor" will be exposed as such by its values on some or all of the other four criteria which indicate that it is really a member of a higher risk category. The result of this screening process is that the average beta value for the securities included in the lowest risk group, or for that matter in any risk group, will not contain a bias due to abnormally low or abnormally high estimated beta values for the individual securities contained in the group.

While securities having abnormal values must, of course, appear in some risk group, the five criteria grouping process results in the majority of such securities being assigned to risk groups which are consistent with their correct beta values. Accordingly, the subsequent period beta value of each security having an abnormal value in the first period is more likely to be consistent with the average beta value of its group.

Provided each group contains a sufficiently large number of securities, the impact on the group's average beta value of any abnormally high or low beta values will be attenuated significantly. This occurs because the abnormal values are distributed over the full spectrum of the risk groups instead of being concentrated at the extremes, as is the case if the groups are constructed on the basis of beta values as the only criterion.

APPENDIX V (cont'd)

An empirical analysis was undertaken to assess the validity of this conclusion. The first set of analyses showed that the estimated beta values for the portfolio of the 20 lowest risk non-utilities (Table 1) displayed movement of 0.04 toward 1.0 during the second 2 1/2 year period but movements away from 1.0 in the third and fourth periods. This result provides very strong support for the absence of bias in the estimated values. It can be concluded from these data that the beta value of 0.69 for the 20 lowest risk non-utilities and 0.50 for the 15 utilities (calculated for the most recent five year period) are reasonable estimates of their true (but unobservable) values. Therefore, these values are appropriate to use as estimates of the respective group's risk relative to the market portfolio in equity risk premium analyses.

APPENDIX V - TABLE 1

**PORTFOLIO BETA VALUES
SELECTED HOLDING PERIODS, 1987-1997**

Period (year and month end)	Number of observations	20 lowest risk non-utilities			15 lowest risk utilities		
		Beta	Std. error	R2	Beta	Std. error	R2
10 year period							
8712 - 9712	120	0.71	0.04	0.69	0.48	0.05	0.42
5 year periods							
8712 - 9212	60	0.75	0.06	0.75	0.43	0.06	0.45
9212 - 9712	60	0.69	0.07	0.64	0.50	0.08	0.38
2 1/2 year periods							
8712 - 9006	30	0.74	0.09	0.72	0.47	0.06	0.65
9006 - 9212	30	0.78	0.07	0.81	0.38	0.12	0.27
9212 - 9506	30	0.71	0.07	0.77	0.54	0.09	0.55
9506 - 9712	30	0.66	0.11	0.57	0.44	0.13	0.30

1. Portfolios are constructed on the basis of an equal dollar amount being invested in each security. Since the relative share prices will vary over time, ten versions of each portfolio were constructed, differing only as to the year used for share price (average of 12 monthly closing prices). The values shown are mean values for all price-weighting years.
2. Sample contents: 15 lowest risk utilities: BCE Inc, BC Gas Inc, BC Tel, Bruncor Inc, Canadian Utilities Ltd, Fortis Inc., IPL Energy, Island Tel Ltd., Maritime Teleg & Tel., Newtel Enterprises, Pacific Northern Gas, Quebec Tel, TransAlta Utilities, TransCanada PipeLines and Westcoast Energy Inc.

APPENDIX VI
CAPITAL MARKET RATES OF RETURN AND YIELDS,
CANADA AND UNITED STATES
(ARITHMETIC MEANS)
1926-1997

	Canada			United States		
	1926-1949	1950-1997	1926-1997	1926-1949	1950-1997	1926-1997
<i>percent</i>						
A. Nominal rates of return						
Common stocks	9.8	12.4	11.5	10.0	14.4	13.0
Long term govt. bonds	<u>4.8</u>	<u>7.4</u>	<u>6.5</u>	<u>4.3</u>	<u>6.3</u>	<u>5.6</u>
Difference	5.0	5.1	5.0	5.7	8.2	7.4
B. Change in Consumer Price Index	1.3	4.3	3.3	1.3	4.1	3.2
C. Inflation-adjusted (i.e., real) rates of return						
Common stocks	8.5	8.1	8.2	8.7	10.3	9.8
Long term govt. bonds	<u>3.5</u>	<u>3.0</u>	<u>3.2</u>	<u>3.0</u>	<u>2.1</u>	<u>2.4</u>
Difference	5.0	5.1	5.0	5.7	8.2	7.4
D. Differences between prospective and achieved returns on long term bonds	0.3 (1937-49)	-0.1	0.0 (1937-97)	1.0 (1937-49)	0.02	0.2 (1937-97)

Notes:

Inflation-adjusted rates of return are calculated by taking the differences between the nominal rates of return and the changes in the consumer price index.

Sources:

For the Canadian data on common stocks, government bonds and the consumer price index:

1926-1949: Canadian Institute of Actuaries, "Report on Canadian Economic Statistics", Table 1, page 2.

1950-1987: Hatch & White, "Canadian Stocks, Bonds, Bills and Inflation: 1950-1987", Table 5-1, page 110.

1988-1997: Canadian Institute of Actuaries, "Report on Canadian Economic Statistics", Table 1, page 2.

For the Canadian data on prospective and achieved returns on long term bonds:

"Bank of Canada Review", Table F-1, B14013.

For the United States data on common stocks, government bonds and the consumer price index:

For 1926-1997: Ibbotson Associates, "Stocks, Bonds, Bills and Inflation 1998 Yearbook".

For the United States data on prospective and achieved returns on long term bonds:

"Federal Reserve Bulletin", Table 1.35 (composite over 10 years)

APPENDIX VII

(page 1 of 2)

W.R. Waters

ANNUAL ACHIEVED RATES OF RETURN
FOR CANADIAN COMMON STOCKS AND LONG TERM BONDS, 1924-1997

Date	Canadian Institute of Actuaries Study [1]			Hatch & White Study			Differences between the two studies		
	Common	Long Term	Difference	Common	Long Term	Difference	Common Stocks	L-T Bonds	Difference
	Stocks	Bonds	[1]-[2]	Stocks	Bonds	[4]-[5]	[1] - [4]	[2] - [5]	[3] - [6]
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
1924	11.25	7.84	3.41						
1925	28.74	5.17	23.57						
1926	24.42	5.39	19.03						
1927	44.92	10.18	34.74						
1928	32.92	0.56	32.36						
1929	-11.60	2.34	-13.94						
1930	-30.90	9.26	-40.16						
1931	-32.96	-4.97	-27.99						
1932	-12.92	12.37	-25.29						
1933	51.63	7.37	44.26						
1934	19.99	19.66	0.33						
1935	30.30	0.83	29.47						
1936	25.77	11.12	14.65						
1937	-15.34	-0.58	-14.76						
1938	7.80	5.63	2.17						
1939	-0.23	-2.98	2.75						
1940	-19.03	8.69	-27.72						
1941	2.87	3.80	-0.93						
1942	13.75	3.08	10.67						
1943	19.02	3.88	15.14						
1944	13.25	3.16	10.09						
1945	35.66	5.18	30.48						
1946	-1.51	6.02	-7.53						
1947	0.79	3.17	-2.38						
1948	12.24	-2.38	14.62						
1949	23.86	4.85	19.01						
1950 [2]	51.69	-0.12	51.81	27.91	-0.11	28.02	23.78	-0.01	23.79
1951	25.44	-3.13	28.57	25.50	-3.01	28.51	-0.06	-0.12	0.06
1952	0.01	1.99	-1.98	1.17	2.05	-0.88	-1.16	-0.06	-1.10
1953	2.56	3.64	-1.08	-8.28	3.76	-12.04	10.84	-0.12	10.96
1954	39.37	9.99	29.38	43.61	9.78	33.83	-4.24	0.21	-4.45
1955	27.67	-0.34	28.01	24.11	-0.43	24.54	3.56	0.09	3.47
1956	12.88	-3.63	16.51	8.81	-3.54	12.35	4.07	-0.09	4.16
1957	-20.58	6.40	-26.98	-20.64	6.60	-27.24	0.06	-0.20	0.26
1958	31.25	-5.98	37.23	30.67	-5.82	36.49	0.58	-0.16	0.74
1959	4.59	-4.67	9.26	2.28	-4.44	6.72	2.31	-0.23	2.54

Date	Canadian Institute of Actuaries Study [1]			Hatch & White Study			Differences between the two studies		
	Common	Long Term	Difference	Common	Long Term	Difference	Common Stocks	L-T Bonds	Difference
	Stocks	Bonds	[1]-[2]	Stocks	Bonds	[4]-[5]	[1] - [4]	[2] - [5]	[3]-[6]
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
1960	1.78	7.10	-5.32	1.49	6.88	-5.39	0.29	0.22	0.07
1961	32.75	9.78	22.97	34.09	9.75	24.34	-1.34	0.03	-1.37
1962	-7.09	3.05	-10.14	-7.56	3.16	-10.72	0.47	-0.11	0.58
1963	15.60	4.60	11.00	14.18	4.59	9.59	1.42	0.01	1.41
1964	25.43	6.59	18.84	24.69	6.74	17.95	0.74	-0.15	0.89
1965	6.68	0.96	5.72	5.75	1.04	4.71	0.93	-0.08	1.01
1966	-7.07	1.55	-8.62	-5.24	1.72	-6.96	-1.83	-0.17	-1.66
1967	18.09	-2.20	20.29	20.29	-2.27	22.56	-2.20	0.07	-2.27
1968	22.45	-0.52	22.97	23.55	-0.62	24.17	-1.10	0.10	-1.20
1969	-0.81	-2.31	1.50	-1.32	-2.36	1.04	0.51	0.05	0.46
1970	-3.57	21.98	-25.55	-2.65	22.70	-25.35	-0.92	-0.72	-0.20
1971	8.01	11.55	-3.54	11.27	11.79	-0.52	-3.26	-0.24	-3.02
1972	27.38	1.11	26.27	30.16	1.59	28.57	-2.78	-0.48	-2.30
1973	0.27	1.71	-1.44	-3.72	1.96	-5.68	3.99	-0.25	4.24
1974	-25.93	-1.69	-24.24	-27.02	-0.98	-26.04	1.09	-0.71	1.80
1975	18.48	2.82	15.66	22.18	2.74	19.44	-3.70	0.08	-3.78
1976	11.02	19.02	-8.00	11.72	19.65	-7.93	-0.70	-0.63	-0.07
1977	10.71	5.97	4.74	15.44	6.19	9.25	-4.73	-0.22	-4.51
1978	29.72	1.29	28.43	29.36	1.47	27.89	0.36	-0.18	0.54
1979	44.77	-2.62	47.39	50.56	-2.77	53.33	-5.79	0.15	-5.94
1980	30.13	2.06	28.07	28.05	2.46	25.59	2.08	-0.40	2.48
1981	-10.25	-3.02	-7.23	-10.89	-2.02	-8.87	0.64	-1.00	1.64
1982	5.54	42.98	-37.44	4.07	45.81	-41.74	1.47	-2.83	4.30
1983	35.49	9.60	25.89	36.04	9.69	26.35	-0.55	-0.09	-0.46
1984	-2.39	15.09	-17.48	0.37	16.43	-16.06	-2.76	-1.34	-1.42
1985	25.07	25.26	-0.19	24.79	26.10	-1.31	0.28	-0.84	1.12
1986	8.95	17.54	-8.59	12.19	17.70	-5.51	-3.24	-0.16	-3.08
1987	5.88	0.45	5.43	-0.28	0.59	-0.87	6.16	-0.14	6.30
1988	11.08	10.45	0.63						
1989	21.37	16.29	5.08						
1990	-14.80	3.34	-18.14						
1991	12.02	24.43	-12.41						
1992	-1.43	13.07	-14.50						
1993	32.55	22.88	9.67						
1994	-0.18	-10.46	10.28						
1995	14.53	26.28	-11.75						
1996	28.35	14.29	14.06						
1997	14.98	17.45	-2.47						
Arithmetic Mean:									
1924-1997	12.10	6.36	5.74						
1950-1987	13.21	5.36	7.85	12.54	5.65	6.90	0.67	-0.28	0.95

Note: [1] The major difference in the common stock values from the CIA and Hatch and White studies was for the year 1950. Research indicates that the Hatch and White value is the more valid of the two.

Sources: Canadian Institute of Actuaries, "Report on Canadian Economic Statistics", Table 1, page 2.
Hatch & White, "Canadian Stocks, Bonds, Bills and Inflation: 1950-1987", Table 5-1, page 110.

APPENDIX VIII

THE USE OF THE GEOMETRIC MEAN IN ESTABLISHING THE RISK PREMIUM FOR UTILITIES

Underlying the use of risk premium analyses to establish the utility investors' required rate of return is the assumption that the objective is to provide the utility investor with the opportunity to achieve an end-of-period wealth level that is equal to some proportion of the level the investor could prospectively achieve by having invested in another type of investment. If the other investment were of the same risk level as the utility investment, then the proportion would be 100 percent; if the alternative investment had say, twice as much risk associated with it, then the proportion would be computed as the sum of the base risk free rate plus 50 percent of the risk premium associated with the alternative opportunity.

In the context of utility regulation, the use of risk premium analyses often involves estimating the historically achieved risk premium on a broadly based or "market" portfolio of common stocks. From further analyses and assumptions, a conclusion is reached as to the value (albeit unobservable) which is expected to prevail over future periods.

While the historically achieved values can be summarized in a variety of ways, there are two statistics which dominate: the geometric mean and the arithmetic mean. The geometric mean provides an exact and unambiguous statement of the value from one point in time to another, with the overall time frame typically consisting of a large number of periods, in some studies as many as 60 plus years. The interesting point here is that many different patterns of year-to-year values could all provide the same result in overall terms; i.e., the same geometric mean. This point can be seen from the following simple example:

APPENDIX VIII (cont'd)

	<u>Case A</u>		<u>Case B</u>	
<u>Year</u>	<u>Wealth at end of year</u>	<u>Annual rate of return</u>	<u>Wealth at end of year</u>	<u>Annual rate of return</u>
0	\$100.00		\$100.00	
1	110.00	10.0%	150.00	50.0%
2	121.00	10.0	100.00	-33.3
3	133.10	10.0	133.10	33.1
Geometric mean		10.0		10.0
Arithmetic mean		10.0		16.6

This example shows that:

1. Both investments provided the investor with an ending level of wealth of \$133.10.
2. Both provided the investor with an annual compound rate of return (i.e., a geometric mean rate of return) of 10.0 percent.
3. The arithmetic mean was markedly different for the two investments: in Case A it was 10.0 percent, the same as the geometric mean; in Case B it was 16.6 percent.

Without going into a detailed technical explanation at this point, it is sufficient to state that a systematic relationship exists between the geometric and arithmetic mean values which both lead to a particular ending value. The relationship is that the arithmetic mean exceeds the geometric mean by an amount which is directly related to the variation in the sub-period rates of return. (The relationship is examined in more detail in Attachment A.) Accordingly, if a third case were to be added to the example in which the variability in the intervening values were even greater than shown in Case B, the arithmetic mean would be even higher than the 16.6 percent applicable to Case B.

This relationship leads directly to the issue of the circumstances under which it is appropriate to adopt the geometric mean value over the arithmetic mean value, and vice-versa. Again, an example is used. In the example it is assumed that the investment for which the required rate of return is being established provides highly stable returns. For simplicity, assume that the

APPENDIX VIII (cont'd)

rate of return established ex ante for a particular period is, in fact, always achieved. Suppose further that the objective is to provide a rate of return which, prospectively, will provide an increment in wealth equal to one-half the increment for the riskier "benchmark" investment. Finally, assume that while the returns on the benchmark investment are highly unstable from one year to another, it is known by investors that the geometric return of 10.0 percent per year will be achieved, on average, in each three year period. Moreover, it is known that the associated arithmetic mean annual rate of return will be 16.6 percent. (These two values are those computed for Case B in the earlier example.) Utilizing Case B for present purposes results in the prospective increment in the value of the benchmark being \$33.10. Accordingly, the required prospective increment for the subject investment is \$16.55.

The results of awarding one-half of the geometric mean (i.e. 5 percent in this case) and one-half of the arithmetic mean (i.e., 8 percent in this case), given the assumption that the rate of return awarded annually is, in fact, always achieved are as follows: When 5 percent is allowed and earned in each of three years, the ending amount of wealth (assuming an original investment of \$100.00) is \$115.76 (i.e., $\$100(1.05)^3$) and, as such, is \$0.79 or 4.8 percent below the desired increment of \$16.55. In contrast, a rate of 8 percent results in the amount at the end of the three years being \$125.97 (i.e., $100(1.08)^3$). Accordingly, the actual increment exceeds the desired increment by \$9.44 or 57 percent. Again in the interest of minimizing the number of technical considerations introduced, it is simply stated that the use of the geometric mean will provide a result closer to the desired result, the greater the stability of the outcomes for the investment in question.

The next issue to consider is the degree of stability actually manifest by the returns achieved on utility investments. More specifically, the question becomes: If a utility is allowed to earn an annual rate of return established by reference to the geometric mean return achieved on the benchmark, how close will the rate of return actually achieved by the utility over a period of several years be to the allowed geometric mean? The answer to this question will clearly depend upon the particular circumstances of the utility: almost certainly there will be variation among utilities with respect to the differences between the utility's prospectively allowed and after the fact achieved rates of return.

APPENDIX VIII (cont'd)

To address this issue, I examined the allowed and achieved rates of return on common equity for four utilities regulated by the National Energy Board and for four utilities regulated by the Public Utilities Board, Alberta. In all cases, the differences between the arithmetic and geometric means are extremely small, in the order of only a few basis points at most.

The implications of these results are clear: Given that the objective is to enable the utility to earn rates of return which will increase shareholders' equity in direct proportion to the increase achievable from an investment in the benchmark portfolio, then the geometric mean of the benchmark or market portfolio is more appropriate than the arithmetic mean. Given the low variation in utilities' achieved rates of return relative to the variability in year-to-year rates of return on the market portfolio, the use of the market portfolio's arithmetic mean in establishing utilities' allowed rates of return would inadvertently result in end-of-(multi)period shareholder equity values which were much closer than intended to the end-of-period wealth values for the market portfolio.

The next point to consider is the fact that, even if the subject utility operates in a fair regulatory environment, the actual geometric mean of a series of sub-period rates of return will typically be less than the intended geometric mean and the arithmetic mean of the same series. More specifically, if 1) the rate of return allowed by the Board in each sub-period were always equal to the investors' required rate of return as determined by reference to the geometric mean of the market portfolio and 2) the circumstances under which the utility operates are such that, while the allowed rate of return is never achieved exactly but is, on average, neither higher nor lower than the allowed rate of return, then the geometric mean of the utility's achieved sub-period rates of return will be below the intended geometric mean, albeit only slightly.

The final matter to consider in the context of setting allowable rates of return is the reality that a utility's achieved rate of return in a particular sub-period will never equal exactly the sub-period's allowed rate of return. And even if the deviations are not expected to be systematically positive or negative (i.e., their "expected value" in a probability sense is zero), the geometric mean of the sub-period values will still be lower than the geometric mean of the rates allowed in each of the sub-periods. This systematic difference between a utility's allowed and achievable rates of return makes it necessary to incorporate a modest amount (in the order of the few basis points) in

APPENDIX VIII (cont'd)

the allowed rate of return to compensate for this effect. It does not, however, provide a justification for utilizing the arithmetic mean of the market portfolio. That alternative would only be appropriate in circumstances where the prospective difference between allowed and achievable rates of return was as large as the average difference between the sub-period rates of return and the full period mean rate of return for the market portfolio. Comparison of the year-by-year rate of return deviations for the eight utilities used in my analysis to the year-by-year deviations for the market portfolio gives some general indication of the extent to which adoption of the arithmetic mean of the market portfolio risk premium would result in a substantial upward bias in the adjustment. In any event, there is clear evidence that the downward bias resulting from the use of the geometric mean would be no more than a few basis points. Accordingly, recognition of this element can be effected through the amount established as the "add-on" or "cushion" (described as a "sweetener" in some of the literature on the use of the arithmetic and geometric means) to the formally computed investors' required rate of return in arriving at a fair rate of return for the utility.

APPENDIX VIII (cont'd)

ATTACHMENT A

A TECHNICAL NOTE ON
GEOMETRIC VS ARITHMETIC MEAN
FOR RATES OF RETURN SERIES

Definitions:

- **Arithmetic mean:** the sum of all values (r_t) in a growth or return series divided by the number (n) of values in the series:

$$A_{mean} = \frac{\sum_{t=1}^n r_t}{n}$$

- **Geometric mean:** the n th root of the product of all return or growth ratios $(1+r)$ in the series

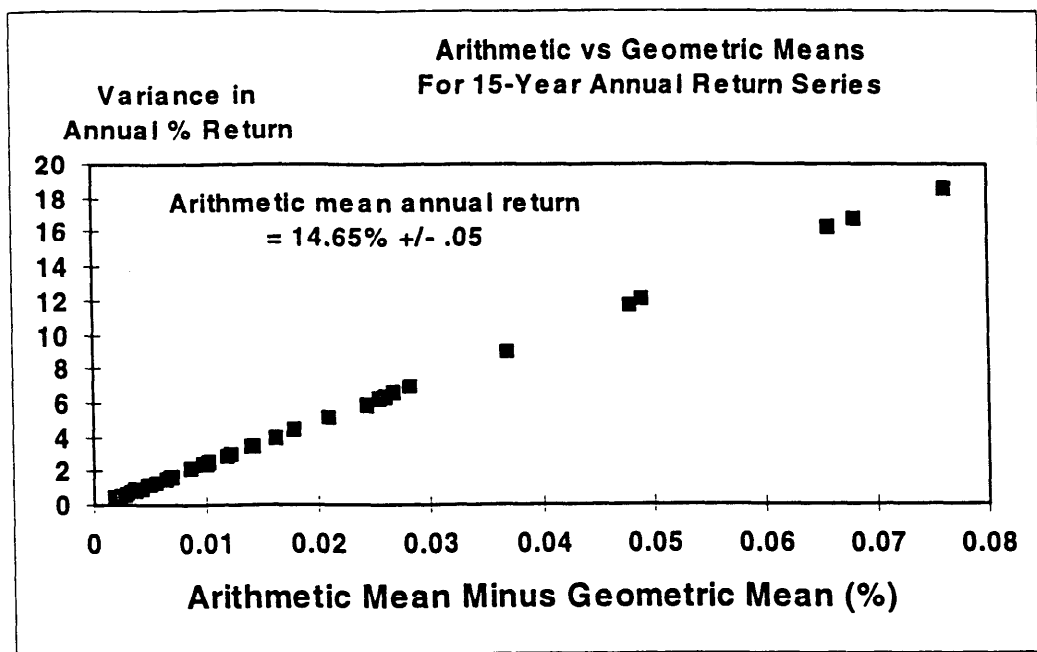
$$G_{mean} = \sqrt[n]{(1+r)_1 (1+r)_2 (1+r)_3 \dots (1+r)_n} - 1$$

The geometric mean of a series of periodic returns is lower than the arithmetic mean whenever the series has a positive variance. The difference between the two values depends on several variables, including the value of the arithmetic mean itself and the variance of the return series.

For a constant arithmetic mean and a constant number of sub-periods, the difference between the arithmetic and geometric means of a return series is approximately a linear function of the series variance. The following chart illustrates this relationship for randomly generated 15-year series of annual returns. Each series has an arithmetic mean of 14.65% +/- 5 basis points and a variance in the range of 0% to 20%.

APPENDIX VIII (cont'd)

ATTACHMENT A



A Practical Example:

For Alberta Power Limited and Canadian Western Natural Gas Company Limited, allowed annual rates of return for the fifteen years 1976-1990 have averaged 14.7%; the variance of allowed annual returns has been 2.4% and 0.6% respectively. From the graph above, it can be seen that the difference between the geometric and arithmetic mean returns for such series can be expected to be 1 basis point or less.

Achieved returns for the two companies have averaged 15.9% and 17.0% respectively during 1976-1990; the corresponding variances are 6.4% and 13.2%. Expected differences between arithmetic and geometric means for the achieved return series are between 2 and 6 basis points.

For both the allowed and achieved rate of return series, for each of these utilities, observed differences between the arithmetic and geometric means are consistent with the expected differences as illustrated below:

	<u>Allowed Returns</u>			<u>Achieved Returns</u>		
	<u>Arith Mean</u> <u>1976 - 90</u>	<u>Geom Mean</u> <u>1976 - 90</u>	<u>Difference</u>	<u>Arith Mean</u> <u>1976 - 90</u>	<u>Geom Mean</u> <u>1976 - 90</u>	<u>Difference</u>
Alberta Power	14.69	14.68	0.01	15.93	15.91	0.02
CWNG	14.69	14.69	0.00	17.04	16.99	0.05

APPENDIX VIII (cont'd)

ATTACHMENT B

**COMPARISON OF ARITHMETIC AND GEOMETRIC
MEANS OF ALLOWED AND ACHIEVED RATES OF RETURN
FOR SELECTED CANADIAN UTILITIES**

The data examined were allowed and achieved common equity rates of return for eight Canadian utilities; four are regulated by the National Energy Board and four by the Public Utilities Board, Alberta. For all companies, comparisons were made between the arithmetic and geometric means for the periods 1986-1990 inclusive. In addition, comparisons over longer periods were made for six utilities. The results are summarized below.

	Difference between arithmetic and <u>geometric mean</u>
	Percent
<u>For 1986-1990</u>	
TransAlta Utilities Corporation	0.00
Alberta Power Limited	0.01
Canadian Western Natural Gas Company Limited	0.05
Northwestern Utilities Limited	0.03
TransCanada PipeLines Limited	0.00
Westcoast Energy Inc.	0.00
Interprovincial Pipe Line Inc.	0.01
Trans Mountain Pipe Line Company Ltd.	0.04
<u>For Other Periods</u>	
Interprovincial Pipe Line Inc. (1981-1990)	0.03
TransAlta Utilities Corporation (1975-1990)	0.01
Alberta Power Limited (1975-1990)	0.02
Canadian Western Natural Gas Company Limited (1975-1990)	0.05
Northwestern Utilities Limited (1975-1990)	0.06
Westcoast Energy Inc. (1979-1990)	0.01

APPENDIX VIII (cont'd)**ATTACHMENT B**

These data show that the arithmetic and geometric mean values are virtually identical for all the utilities. The largest difference for companies regulated by the Public Utilities Board, Alberta (Northwestern Utilities Limited for the period 1975-1990) was a mere 6 basis points. For companies regulated by the National Energy Board, the largest difference, 4 basis points, occurred for Trans Mountain Pipe Line Company Ltd. This difference materialized in the circumstances of the company having the largest single year negative difference between allowed and achieved rates of return of all companies examined (4.15 percentage points in 1986). Accordingly, the data clearly indicate that the use of the geometric mean for utility rate of return determination would not disadvantage the utilities' common equity shareholders. It is also noteworthy that, but for two very minor exceptions, the achieved rates of return for all of the utilities, whether measured by the arithmetic or geometric mean, exceeded their allowed rates of return.

They tell you that stocks will always tower over bonds. Maybe so, but remember that this argument is based on performance over a relatively brief period of time.

Appendix IX

in stocks.

W.R. Waters

History lesson

By Jason Zweig

MUTUAL FUNDS and stock salesmen love a particular chart. They often use it. It shows stocks outperforming bonds by five percentage points per year from 1926 to 1992.

Think about this, they like to say: Thanks to the power of compounding at those rates, \$10,000 invested in Standard & Poor's composite stock index in 1926, when good dividend

data for the index begin, would have climbed to a mountainous \$7.3 million by the end of last year.

Bonds? The same investment in long-term Treasuries would have inched up to a mere \$237,000.

Even Securities & Exchange Commissioner J. Carter Beese Jr. has been getting on the stump, hectoring the public to put more retirement money

Not so fast, folks. History did not begin in 1926; it did not end in 1992. Is there any reason to assume the 1926-92 era is typical? Maybe not.

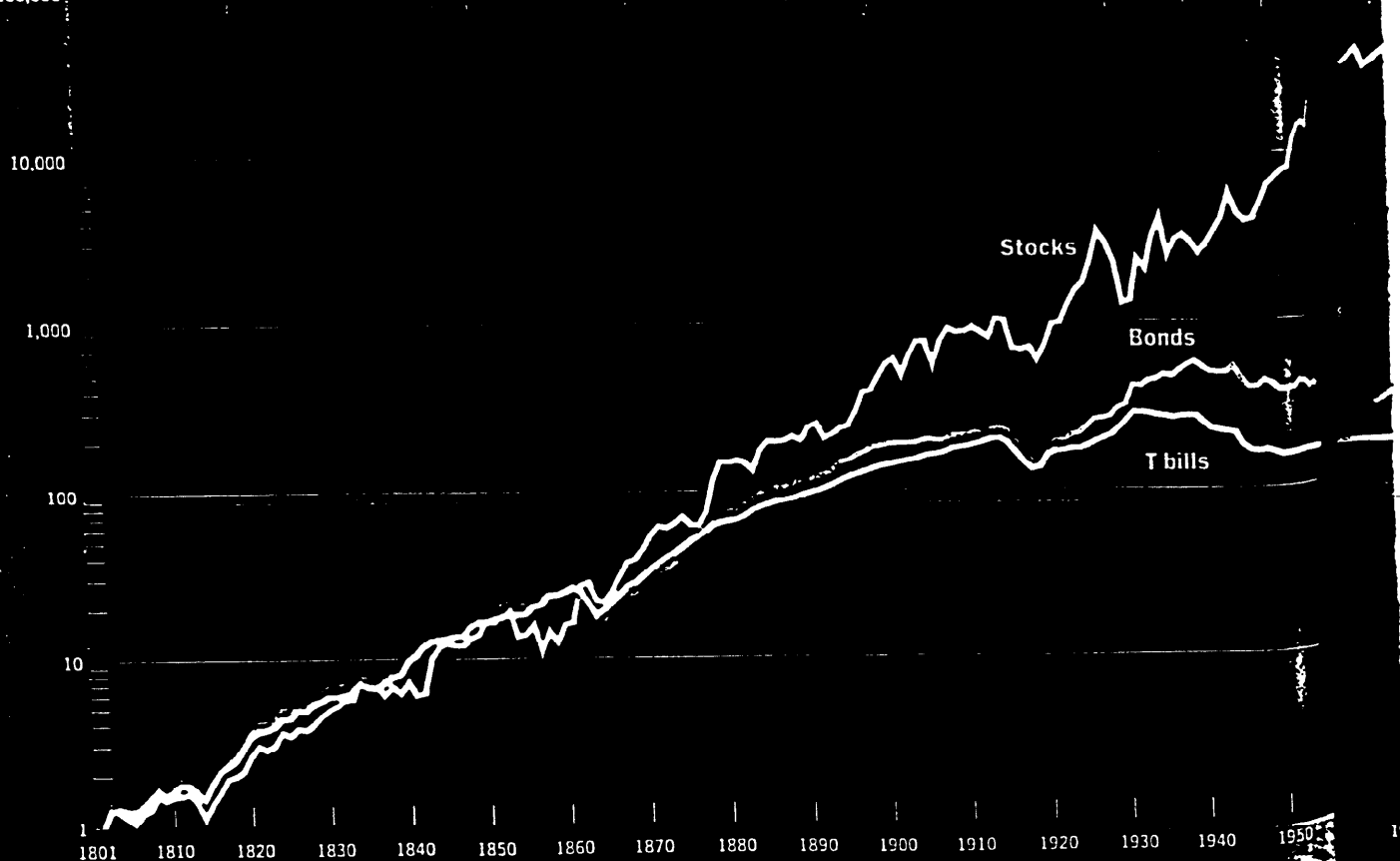
Jeremy Siegel, 47, a finance professor at the University of Pennsylvania's Wharton School, thinks it is not. Siegel has studied the relative returns of stocks and bonds over a far longer period—from 1802 to the present.

Consider this: The 1926-92 period was one of exceptional economic instability. Just before World War II, for example, it was unclear that the country would ever really pull out of the Great Depression. It was by no means clear that the democracies would triumph over fascism. In subsequent decades it wasn't certain that capitalism would triumph over socialism.

Times being highly uncertain, investors demanded—and got—higher nominal returns for the risks inherent

In the long long run

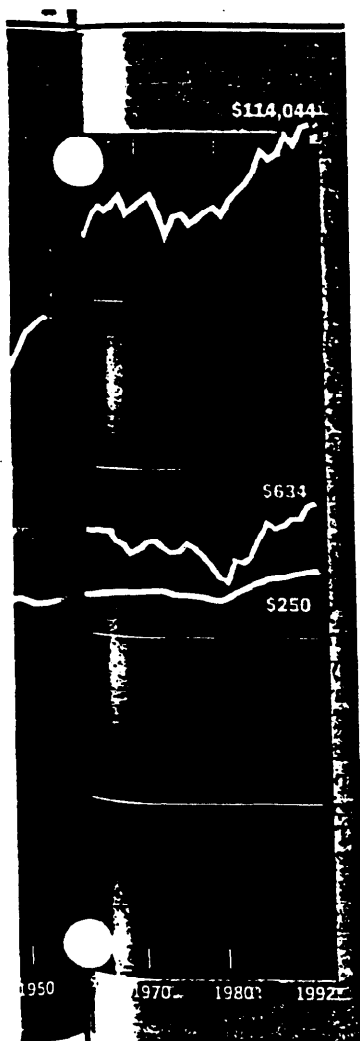
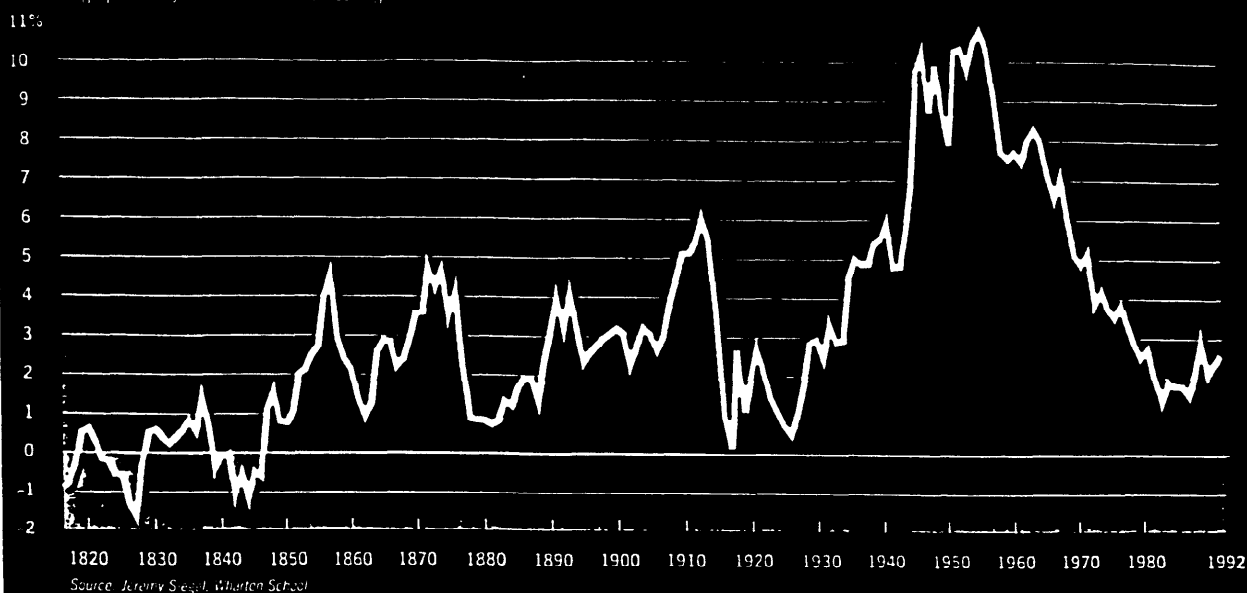
Total real return on \$1 invested Dec. 31, 1801 (ratio scale)
\$100,000



Source: Jeremy Siegel, Wharton School

Is the stockholder's reward getting smaller?

Percentage points by which stocks are beating bonds



ABOVE:
It's a catchy sales pitch to talk of a mountainous gap between stock and bond returns. But that slope—so steep a few decades ago—is already flattening toward historical norms.

LEFT:
However, thanks to the power of compounding, even a little outperformance can go a very long way.

in ownership or part ownership of businesses. And, when the uncertainties were strongest—in the 1930s, 1940s and 1950s, for example—stock prices were relatively low, leaving lots of room for the appreciation that took place in the 1960s and 1980s.

In recent decades, with the economy more stable and corporate profits more predictable, the risks—and thus the returns—of equity investments should have fallen. So why did the S&P 500 index return 18% a year in the 1980s? What's going on?

Those spectacular performances appear to be historical aberrations. Siegel's conclusion, laid out in an article last year in the *Financial Analysts Journal* and in the book *Stocks for the Long Run* (forthcoming from Business One Irwin), is that people are reading far too much into too brief a period. In the long sweep of history, the S&P 500 is only 36 years old.

Siegel predicts that for the indefinite future stocks will continue to beat bonds, but by a considerably smaller margin than they have over the past half-century or so.

By studying stock and bond returns back to the Jeffersonian era, Siegel found that the equity premium—the margin by which stocks outperform bonds—has historically run far lower than its post-1926 average (see chart above). From 1802 to 1870 stocks

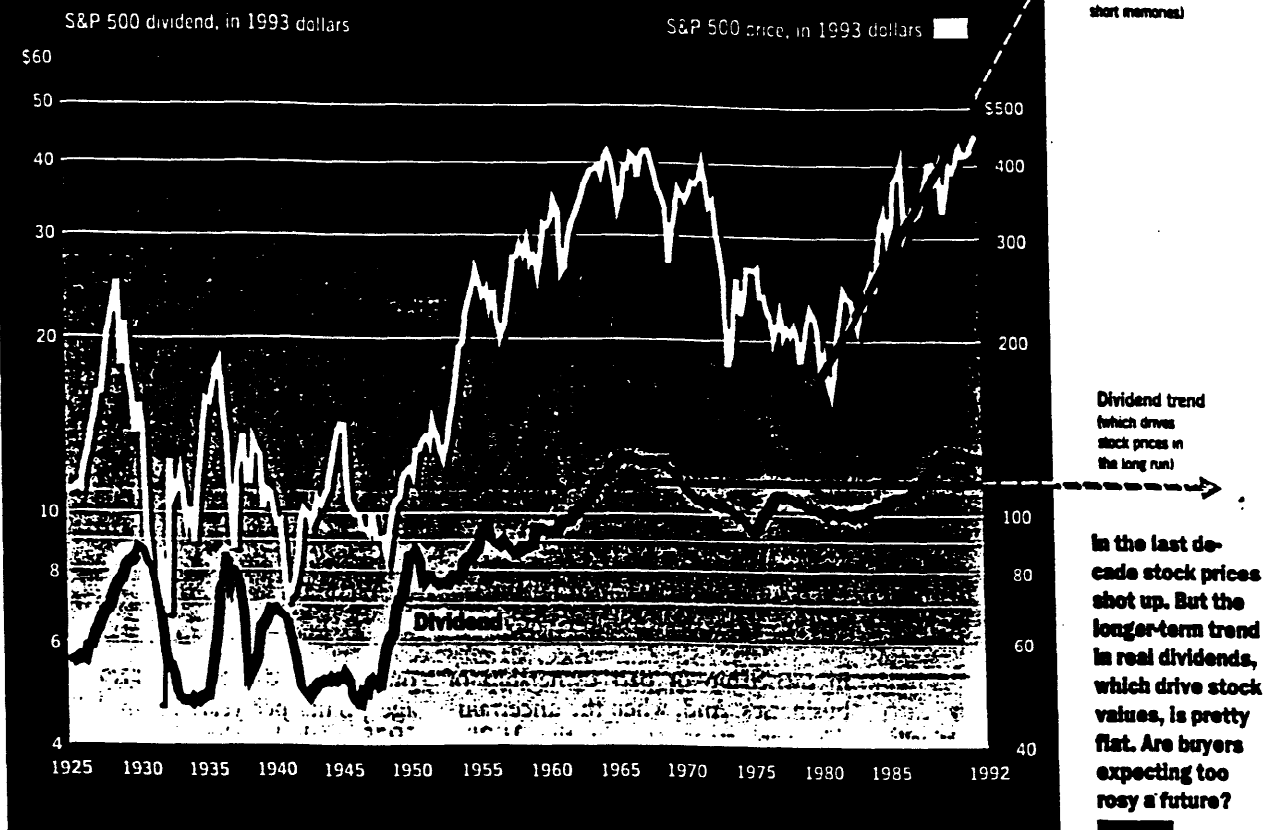
outperformed bonds by 0.8 percentage points per year. From 1870 to 1925 stocks beat bonds by 2.8 points per year. Thus, stocks' 5-point-plus annual outperformance from 1926 to 1992 looks out of line.

As Siegel himself concedes, early data on stock market performance are somewhat sketchy. Just before the turn of the century, the stock market was largely a basket of railroad, oil and steel shares. It's hard to know what history might look like if we had two centuries of prices for car, computer, electric and retailing firms. Before the railroads, the market was sketchier still. In 1802 only seven stocks were traded in New York: three banks and four insurance companies.

However uncertain the data, the exercise is enough to make wise investors think about whether 1926 to 1992 forecasts the future.

As it happens, the total return on stocks has been remarkably constant—averaging a bit better than 6% a year, after inflation, through all three of Siegel's historical periods. Thus Siegel concludes that the equity premium has widened not because stock returns have increased but because bond returns have shrunk. From 1802 to 1870 bonds returned 4.9% per year, net of inflation; from 1870 to 1925, 3.8%; and from 1926 to 1992, a skinny 1.4%.

Different slopes



How does Siegel explain the erosion in bond returns? Two ways. First, this century's redistribution of wealth to the middle class and lower-middle class has benefited stocks over bonds. Rich people, who prefer stocks, lost wealth to more cautious middle-income people, who bought bonds or kept their money in bank accounts. "Until the 1960s and 1970s, many middle-income people thought stocks were too risky," Siegel says. The result was that stock prices were artificially depressed, making yields high and eventually raising total returns. At the same time investors crowded the fixed-income market, lowering yields, and thus total returns, there.

The second part of the explanation is inflation. "The 1926 to 1992 returns capture the period of time when we went off the gold standard and when inflation first became a chronic problem," explains Siegel. "Fixed-income holders didn't understand the inflationary consequences of the change to a fiat money system," in which bank note holders cannot re-

deem for gold. As a result, investors accepted bond yields that were too meager. They didn't understand that a 6% coupon was no longer a virtual guarantee of a 6% real return, as it had been during much of the 19th and early 20th centuries.

Siegel believes that investors have at last fully factored the specter of inflation into bond returns. "I don't think the low real yields of the post-1926 period will continue," he says. "People have already wised up. That's why the yield on the long bond is not 4%; it's almost 7%." Put another way, the real yield on long Treasuries—their yield to maturity less the current inflation rate—is about 3.5%, almost as good as the 3.8% real return on bonds in the 1870-1925 era.

As much as stock returns may be disappointing and bond returns pleasant in the next decade, Siegel says, stocks will still most likely beat bonds. He figures stocks will deliver a total real return of 5% to 6% a year over the next decade, while bonds will return 3% to 4%. And he says that for very long holding periods, say 30 years,

stocks are in a way less risky: They don't suffer the same hazard of runaway inflation.

So where does all this leave intelligent investors? It should make them cautious. The return assumptions built into current stock prices may simply be too high. In that case, stocks should get a comeuppance. Longer term, of course, stocks will probably make up for any such drop. If you are investing for the very long run—ten years and up—you probably should have most of your money in stocks. But if you will need the money sooner or are over 60, you might want to cut stocks back in favor of intermediate-term bonds.

Siegel is no in-and-out market timer, but he can't help noticing that dividend yields averaging 2.8% today are abnormally low. To get the market's yield back to its 5% long-run average, the S&P 500 would have to fall by 44%. Even if we don't get a correction that severe, it would still take several years of essentially flat markets to allow dividend yields to get back to their historical level. ■

APPENDIX X

November 24, 1989

UTILITIES

DBRS**Characteristics of Utilities in Canada**

Utilities in Canada have various characteristics which make them unique from industrial companies, and also from the way utilities operate in the United States. Some of the characteristics are as follows:

- (1) The utilities generally have a near monopoly in the field in which they operate. The rates they charge are regulated by a Regulatory Commission, and income is virtually assured and tends to be highly stable.
- (2) Various Regulatory Commissions exist in Canada, under the administration of both the federal and provincial governments. With rising costs for raw material, interest and operating costs, unless the Commissions act quickly in allowing the utility to pass on higher costs, regulatory lag results. Although there are differences between the various Commissions, on the whole, in recent times, regulatory lag has been minimal. In fact, many Commissions have allowed the basic rate of return a utility can earn to rise and fall in line with interest rates.
- (3) In Canada, the area of electrical generation tends to be nationalized and owned by the provincial governments, with only a handful of exceptions, most notably in the Province of Alberta. Thus, very few private utilities engaged in the generation of electricity borrow in the Capital Market, and those that do often have a provincial guarantee.
- (4) Telephone companies in Canada tend to be in private hands, with the exceptions of those telephone systems in the provinces of Alberta, Saskatchewan and Manitoba, which have been nationalized by the provinces. One Company, Bell Canada, controls most of the telephones in Canada. Its territory, through subsidiaries, includes the major telephone networks from the Manitoba/Ontario border to the Atlantic ocean. The other major telephone companies are British Columbia Telephone, which operates in Canada's furthest western province and is privately owned, four telephone companies operating in each of the Maritime provinces, and Quebec Telephone in Quebec. Others are not in the Capital Market. Note that, as a result of a recent supreme court decision, all telephone utilities which offer service beyond provincial boundaries now fall under federal jurisdiction, and will be regulated by the CRTC, as opposed to the provincial commissions.
- (5) Thus, with electric companies largely provincially owned, and the telephone area mainly predominated by one company, most other utilities in Canada are in private hands. Those utilities most active in the Capital Markets in Canada are found in the area of natural gas distribution.
- (6) Most utilities engaged in the distribution of natural gas in Canada have adequate supplies of raw material to look after normal growth into the foreseeable future. Alberta utilities are probably in the best position in terms of raw material supply because that is where most of Canada's natural gas is located today. However, there is a large surplus of natural gas in Canada today, and securing adequate natural gas is not a problem for a utility.
- (7) Because of the high stability and certainty of earnings, most utilities in Canada have working capital deficits. The utilities tend to have almost no inventories, and relatively small accounts receivable. They borrow short term to help finance their construction programs between longer term issues. Note, because current assets are so small for a utility, any short term borrowing will result in almost immediate negative working capital, even if only modest short term amounts are borrowed.

Ratios for Utilities**(1) Current Ratio**

The current ratio is defined as current assets divided by current liabilities. Utilities usually have almost no inventory, and relatively small accounts receivable. Consequently, it takes a relatively small level of short term borrowing to make working capital negative, and the current ratio less than 1. The current ratio is not considered important for a utility.

(2) Asset Coverage

Asset coverage is defined as net tangible assets minus virtually all current liabilities except short and long term debt, divided by short and long term debt plus shareholders' equity. The ratio is defined quite conservatively, and most utilities have ratios of 1.5-2.0 times. The ratio shows the assets which are available to pay off all borrowings, with the assumption that the assets can be sold at book value.

(3) Total Assets/Long Term Debt

This ratio is closely related to asset coverage, except that it tends to be somewhat less conservative. With low current assets, fixed assets compose a high proportion of total assets. However, excluded from the calculation are such factors as minority interest, short term debt, accounts payable and deferred taxes. Thus, most utilities tend to have ratios above 2.0 times with this ratio, as opposed to 1.5-2.0 times for asset coverage.

(4) Investment Latest Year in Fixed Assets/Average Gross Fixed Assets

This ratio shows how quickly a utility is adding to its fixed assets, and gives a hint as to the future growth rate of the utility. Gross plant is used in the denominator instead of net plant to allow for inflation, and to maintain the value of assets closer to today's value. A range of 0.10 to 0.15 is quite common among utilities.

(5) Revenue/Average Fixed Assets after Depreciation

This ratio relates revenue to net fixed assets. The trend of this ratio over a period of years is more important than its absolute value in any one year. The ratio indicates whether revenue is growing faster or slower than net fixed assets, suggesting such problems as regulatory lag or slow volume growth. Construction work in progress is excluded from fixed assets.

(6) % Total Debt in the Capital Structure

The numerator of this ratio is defined to include all short and long term debt. The denominator is defined as short and long debt plus shareholders' equity. The ratio is the best measure of the level of debt/equity for a utility. Ratios for most utilities fall in the 50%-60% range.

(7) % Net Debt in the Capital Structure

Net debt is defined as total debt minus cash and marketable securities. The ratio measures the proportion of debt in the capital structure, allowing for any cash and marketable securities that the utility may have acquired. The ratio will always have a lower proportion of debt than that calculated in ratio (6).

(8) Cash Flow/Long Term Debt

Cash flow is defined as net earnings plus depreciation and amortization and deferred taxes minus equity earnings in excess of dividends minus capitalized interest. The ratio shows the % of long term debt which could be retired in a given year if cash flow were so directed. Most utilities have a ratio of at least 15%, and many fall in the 30%-40% range, particularly telephone utilities.

(9) Interest Capitalized during Construction/Net Income before Taxes

Many utilities, in an attempt to match revenue with expenses, will capitalize that interest which can be identified with funds that were borrowed to finance construction in progress. The net effect is an increase in present income. The above ratio indicates the % of net income which actually resulted from capitalizing this interest and, as such, it partly serves as a test of the accounting policies followed by the utility. Generally, unless a utility is engaged in a heavy capital expenditure program, this ratio would be well below 10%.

(10) Depreciation/Average Gross Fixed Assets

This ratio measures the rate of depreciation for a utility in a given year and, among other things, it serves as a test of accounting. Rates of about 3%-4% for natural gas utilities are quite common. Telephone utilities tend to fall in a higher range of about 6%-8%. Note that gross fixed assets exclude construction work in progress.

(11) Interest Coverage based on Gross Interest

The times interest earned ratio has been redefined for utilities to exclude equity earnings of single line equity consolidated subsidiaries and also to exclude other income. "Other income" is excluded because it is often of very low quality, and can include unusual or non-recurring items. A rough standard for this ratio is a minimum interest coverage of 2 times, although there may be some exceptions.

(12) Interest Coverage based on Net Interest

Earnings available to pay interest is the numerator of this ratio. The denominator is defined as interest expense net of interest income, and this is divided into available earnings. The ratio gives a company credit for any arbitrage that it is doing, or any interest earned from cash raised from a recent issue. For most utilities, the difference between this ratio and ratio (11) is insignificant.

(13) Times Interest Earned After Taxes

The customary definition of times interest earned is before taxes, which is a recognition of the fact that interest costs can be deducted for tax purposes. However, in the utility field there are certain companies which are now allowed to recognize deferred taxes by their Regulatory Commissions, and are not in a current tax payable position. These companies have a decidedly downward bias in their times interest ratio, if the ratio is calculated before taxes. Ironically, as soon as these companies move into a tax paying position - which should not be a positive situation - their times interest earned ratio improves. The after tax definition of interest coverage neutralizes this, and adjusts every utility to the same base - regardless of whether or not the utility is allowed to recognize deferred income taxes.

(14) Common Dividend Payout

This ratio tends to be called the payout ratio, and measures the % of earnings available to common shareholders which were paid out in a year. Generally, utilities tend to have a higher payout ratio than industrial companies, although the ratio is usually not far over 60%.

(15) Profit Margin

Profit margin is defined as net earnings after taxes and minority interest but before extraordinary items divided by total sales revenue. This ratio shows the proportion of sales which is represented by net income, and is one measure of profitability. It tends to vary greatly between utilities, and is not considered to be an important ratio.

(16) Return on Equity

The numerator of this ratio is defined as net earnings after taxes and minority interest but before extraordinary items. The denominator is defined as average shareholders' equity, which includes preferred shares. Most utilities tend to have a return of at least 13%, with the return having risen and fallen along with inflation.

(17) Return on Common Equity

This definition looks only at common shares in the denominator, and defines the numerator as net earnings after preferred dividends available to common shareholders. This definition is more consistent with the terms used by the Regulators of utilities, and yields a higher rate of return due to the "leverage" effect of preferred shares. A good standard for this ratio would be somewhere close to 14%-15%.

(18) Common Equity/Total Equity

The ratio of common equity to total equity shows the proportion of equity which is permanent. The balance is preferred shares, which are not as permanent a source of capital, since they may have a short maturity or be redeemable. Thus, the higher the ratio, the more permanent and stable is the equity base of the Company. This ratio has historically been very close to 75%, although, with taxes changes having reduced the incentive for issuing preferred shares in recent years, many companies today have ratios in the 90%-100% range.

(19) Cash Flow - Dividends/Net Capital Expenditure

Cash flow is defined to include earnings, deferred taxes and depreciation/amortization minus the extent to which equity earnings exceed dividends minus capitalized interest. Dividends are deducted from cash flow to reduce the numerator of this ratio to "free cash available", which is compared to capital expenditure. The ratio shows the proportion of capital expenditure which was financed by internal cash flow net of dividends. The higher the proportion, the less will have to be borrowed by the utility from external sources. Generally, utilities supply at least 1/2 their gross capital expenditure from internal sources.

(20) % Long Distance Tolls

This ratio is geared towards the telephone utilities, and measures the proportion of total revenue which stems from long distance tolls. The remainder of revenue comes largely from local revenue, which tends to be much more stable. Thus, the ratio is a measurement of the stability of revenue. Most telephone utilities derive between 50%-60% of their revenue from long distance. With growing potential for competition in the long distance area (particularly in the case of very heavy users), this ratio has become even more important in recent years.

(21) Times Fixed Charges Covered

This ratio measures the degree to which fixed charges are covered. The numerator of the ratio is defined as operating profit plus any other recurring earnings, such as equity income or interest income. The denominator includes all interest plus preferred dividends grossed up to a pre tax basis to cover the fact that preferred dividends are not tax deductible. The ratio is usually less than the times interest earned ratio.

APPENDIX XI

**COMMENT ON THE MAGNITUDE OF
THE ALLOWANCE FOR FLOTATION COSTS**

Flotation costs are potentially comprised of two components:

1. The underwriting and issue costs associated with new issues of common equity securities; and
2. The dilution of existing shareholders' equity that would occur if the issue is made at a time when the market price is depressed sufficiently to result in the net proceeds per share being less than the common equity per share.

For mature utilities, the allowance required in the fair rate of return to minimize the likelihood of dilution is unlikely to be more than a few basis points. This is demonstrated by the following illustration which assumes that the financing is undertaken under adverse capital market conditions.

Number of common shares outstanding prior to the issue	100 million
Book value per share	\$15.00
Number of new shares issued	10 million
Net proceeds per share	\$13.95
Number of common shares outstanding after the issue	110 million
Book value per share (\$1,500 million + \$139.5 million / 110 million shares)	\$14.91
Investors' required rate of return	14.00%
Earnings per share required to provide initial investors with 14.00% return on their book value (14.00% of \$15.00)	\$2.10

APPENDIX XI (cont'd)

The primary argument advanced to support the inclusion of an allowance in a utility's fair rate of return to compensate for the possibility of earnings dilution is that the utility's obligation to provide service may require it to go to the equity market under adverse financial market conditions. Earnings dilution would result for the existing shareholders if the new issue were made below book value. The difficulty with this argument is that it proceeds from the presumption that the estimate made of the investors' required rate of return does not incorporate a component to compensate utility investors for accepting the risk of dilution. To proceed on that basis is extremely subjective and essentially arbitrary. It is all the more so when the risk measures and risk premium calculations are based on financial markets data inclusive of utilities and thereby reflect investors' reactions to the vicissitudes in the values of utility shares.

Even less convincing is the argument that the allowance should be large enough to permit share issues above book value in the face of severe "market breaks" or "market pressure". Such developments are both difficult to define and difficult to anticipate. This is all the more reason for investors to require compensation in their required rate of return as a matter of course and not leave prospective compensation for this risk to the views of each regulatory board.

Save for the explicit transactions costs associated with new issues of utilities' common shares, the "costs" are essentially compensation for risk bearing. For the reasons given above, separate compensation for risks related to future share issues would provide, in all likelihood, unnecessary additional compensation for risks already compensated for in the investors' required rate of return.

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National Energy Board and Alternative Awards Under Various Assumptions

W.R. Waters

TABLE 1
GOVERNMENT OF CANADA AND UNITED STATES TREASURY
LONG TERM BOND YIELDS
DECEMBER 1987 - AUGUST 1998

Date	Yield		Difference (1)-(2)
	Canadian (1)	U.S. (2)	
Dec-87	10.34	8.97	1.37
Jan-88	9.74	8.56	1.18
Feb-88	9.61	8.43	1.18
Mar-88	10.13	8.74	1.39
Apr-88	10.36	9.07	1.29
May-88	10.38	9.33	1.05
Jun-88	10.13	8.98	1.15
Jul-88	10.42	9.22	1.20
Aug-88	10.65	9.42	1.23
Sep-88	10.46	9.08	1.38
Oct-88	10.13	8.88	1.25
Nov-88	10.32	9.13	1.19
Dec-88	10.36	9.00	1.36
Jan-89	10.20	8.81	1.39
Feb-89	10.55	9.13	1.42
Mar-89	10.49	9.10	1.39
Apr-89	10.19	8.98	1.21
May-89	9.85	8.60	1.25
Jun-89	9.60	8.04	1.56
Jul-89	9.62	8.08	1.54
Aug-89	9.62	8.19	1.43
Sep-89	9.91	8.26	1.65
Oct-89	9.54	7.91	1.63
Nov-89	9.80	7.87	1.93
Dec-89	9.69	7.98	1.71
Jan-90	10.04	8.26	1.78
Feb-90	10.64	8.50	2.14
Mar-90	10.91	8.56	2.35
Apr-90	11.54	8.76	2.78
May-90	10.86	8.73	2.13
Jun-90	10.74	8.46	2.28
Jul-90	10.82	8.50	2.32
Aug-90	10.83	8.86	1.97
Sep-90	11.54	9.03	2.51
Oct-90	11.15	8.86	2.29
Nov-90	10.70	8.46	2.24
Dec-90	10.51	8.29	2.22
Jan-91	10.22	8.20	2.02
Feb-91	9.89	8.18	1.71
Mar-91	9.88	8.24	1.64
Apr-91	9.91	8.19	1.72
May-91	9.53	8.26	1.27
Jun-91	10.36	8.49	1.87
Jul-91	10.17	8.43	1.74
Aug-91	9.97	8.08	1.89
Sep-91	9.59	7.88	1.71
Oct-91	9.12	8.07	1.05
Nov-91	9.18	7.96	1.22
Dec-91	8.97	7.52	1.45
Jan-92	8.92	7.74	1.18

W.R. Waters

TABLE 1
GOVERNMENT OF CANADA AND UNITED STATES TREASURY
LONG TERM BOND YIELDS
DECEMBER 1987 - AUGUST 1998

Date	Yield		Difference
	Canadian	U.S.	(1)-(2)
	(1)	(2)	(3)
Feb-92	8.97	7.88	1.09
Mar-92	9.28	7.97	1.31
Apr-92	9.51	8.04	1.47
May-92	9.17	7.92	1.25
Jun-92	8.87	7.75	1.12
Jul-92	8.21	7.46	0.75
Aug-92	8.19	7.44	0.75
Sep-92	8.53	7.41	1.12
Oct-92	8.33	7.63	0.70
Nov-92	8.66	7.56	1.10
Dec-92	8.54	7.36	1.18
Jan-93	8.67	7.19	1.48
Feb-93	8.19	6.90	1.29
Mar-93	8.27	6.94	1.33
Apr-93	8.27	6.93	1.34
May-93	8.12	6.98	1.14
Jun-93	7.96	6.70	1.26
Jul-93	7.79	6.56	1.23
Aug-93	7.40	6.13	1.27
Sep-93	7.55	6.04	1.51
Oct-93	7.35	5.97	1.38
Nov-93	7.45	6.25	1.20
Dec-93	7.12	6.35	0.77
Jan-94	6.86	6.21	0.65
Feb-94	7.33	6.71	0.62
Mar-94	8.25	7.01	1.24
Apr-94	8.18	7.32	0.86
May-94	8.55	7.39	1.16
Jun-94	9.29	7.51	1.78
Jul-94	9.50	7.39	2.11
Aug-94	8.89	7.48	1.41
Sep-94	9.04	7.81	1.23
Oct-94	9.29	7.96	1.33
Nov-94	9.24	7.94	1.30
Dec-94	9.16	7.87	1.29
Jan-95	9.41	7.73	1.68
Feb-95	8.86	7.36	1.50
Mar-95	8.70	7.43	1.27
Apr-95	8.44	7.33	1.11
May-95	8.11	6.75	1.36
Jun-95	8.02	6.62	1.40
Jul-95	8.50	6.91	1.59
Aug-95	8.24	6.69	1.55
Sep-95	8.11	6.48	1.63
Oct-95	8.11	6.34	1.77
Nov-95	7.44	6.24	1.20
Dec-95	7.43	5.94	1.49
Jan-96	7.38	6.03	1.35
Feb-96	7.83	6.40	1.43
Mar-96	7.94	6.66	1.28
Apr-96	8.07	6.78	1.29
May-96	7.92	6.99	0.93

TABLE 2
Yield Spreads for Selected Government of Canada
Bonds Relative to Bonds of
Major Foreign Governments
Month End, March 1992 - August 1998

Month- end [2]	Cda 9.75% Jun 1/21 and U.S. 30 yr Treasury	Cda 8.0% Jun 1/23 and U.S. 30 yr Treasury	Mean of columns (1) and (2)	Canada "10 year" and U.K. "10 year" [3]	Canada "10 year" and Germany "10 year" [3]	Canada "10 year" and Japan "10 year" [3]
	(1)	(2)	(3)	(4)	(5)	(6)
Sep	171	170	171	-33	116	494
Oct	195	195	195	-18	140	480
Nov	156	156	156	-31	106	441
Dec	163	164	164	-36	101	385
1996						
Jan	162	162	162	-34	114	371
Feb	161	161	161	-41	117	430
Mar	147	147	147	-54	120	454
Apr	139	139	139	-30	135	422
May	113	113	113	-40	118	455
Jun	107	107	107	-19	119	452
Jul	103	103	103	-30	121	426
Aug	81	82	82	-53	98	443
Sep	79	79	79	-62	97	416
Oct	37	37	37	-100	52	386
Nov	30	30	30	-146	23	372
Dec	45	44	44	-128	42	366
1997						
Jan	45	42	43	-101	73	408
Feb	25	24	24	-93	74	390
Mar	18	18	18	-106	68	430
Apr	19	20	19	-79	98	449
May	9	9	9	-68	57	384
Jun	3	4	3	-79	57	376
Jul	0	2	1	-98	39	372
Aug	-6	-4	-5	-108	30	391
Sep	-12	-3	-7	-70	18	369
Oct	-18	-15	-16	-105	-8	376
Nov	-13	-11	-12	-87	17	385
Dec	-7	-4	-5	-53	31	401
1998						
Jan	-12	-9	-11	-66	32	359
Feb	-17	-15	-16	-62	51	378
Mar	-27	-25	-26	-57	49	370
Apr	-34	-33	-33	-50	42	381
May	-22	-22	-22	-43	44	409
Jun	-9	-10	-9	-50	61	412
Jul	-14	-14	-14	-27	87	423
Aug	49	45	47	46	n/a	467

Notes:

1. n.a "not available".
2. All values are based on yields reported for the last Friday of the month.
3. The maturity of 10 years is approximate. Comparison bond issues have changed periodically over the period covered. The issues compared currently are:
U.K. 7.25% due Dec. 1, 2007 and comparable Canada bond 7.25% due June 1, 2007.
Germany 5.25% due Jan. 1, 2008 and comparable Canada bond 7.25% due Jun 1, 2007.
Japan 3% due Sept. 1, 2005 and comparable Canada bond 8.75% due Dec 1, 2005.

TABLE 3
YIELDS FOR SELECTED CANADIAN UTILITY
AND GOVERNMENT OF CANADA LONG TERM BOND ISSUES,
AUGUST 28, 1998

Issuer	Dominion Bond Rating Service debenture rating	Maturity date	Coupon	Yield	Spread relative to Govt of Canada [1] (basis points)
Bell Canada	A(high)	15 Dec. 2032	9.70	6.49	70
BC Telephone	A(high)	08 Apr. 2022	9.65	6.49	70
Canadian Utilities	AA(low)	01 May 2023	9.40	6.39	60
Gaz Metropolitain	A	16 May 2025	9.00	6.73	94
Interprovincial Pipeline	A(high)	15 Feb. 2024	8.20	6.45	66
Nova Corporation	BBB(high)	16 Dec. 2024	9.90	6.73	94
Nova Scotia Power	A(low)	19 May 2025	8.85	6.63	84
TransCanada PipeLines	A(low)	5 Feb. 2026	8.29	6.73	94
Union Gas	A	10 Nov. 2025	8.65	6.63	84
Westcoast Energy	A(low)	21 Jul. 2025	8.85	6.63	84
Mean				6.59	
Govt. of Canada		01 Jun. 2023	8.00	5.79	

1. Spread is relative to the Government of Canada 01 June 2023 issue.

Source for yields: Toronto Globe and Mail, August 31, 1998.

TABLE 4
COMPONENTS OF SELECTED CANADIAN UTILITY COMMON EQUITY
RATE OF RETURN AWARDS

Board/Commission		Date of Award	Award	L-T GofC rate as per testimony	L-T GofC rate as per Board/Comm.	Implied equity premium (inclusive of risk, flotation, safety factors)	Equity market risk prem. as per testimony	Equity market risk prem. as per Board/Comm.
		[1]	[2]	[3]	[4]	[5]	[6]	[7]
AEUB	(APL & TransAlta)	31-Oct-97	10.75-11.75% (p. 245)	7.50-8.00% (pp.236-242)	7.50-8.00% (p. 245)	3.25-3.75%	3.5-6.5% (p.245)	no finding
BCUC - latest (as per letter)	(BC Gas)	02-Dec-97	10.00%		6.39%	3.61%		
	(WKP)		10.25%		6.39%	3.86%		
	(PNG)		10.75%		6.39%	4.36%		
- first award	(BC Gas)	10-Jun-94	10.75%	7.25-8.25%	7.75%	3.00%	3.5-6.0%	4.5-5.0%
	(WKP)		11.00%	7.25-8.25%	7.75%	3.25%	3.5-6.0%	4.5-5.0%
	(PNG)		11.50% (pp. 31,24,35)	7.25-8.25% (p.5)	7.75% (p.5)	3.75%	3.5-6.0% (pp.8-16)	4.5-5.0% (p.18)
CRTC		05-Mar-98	11.00% (l.305)	6.00-7.20% (l. 204)	6.70-7.00% (l. 207)	4.15%	4.5-7.0% [A]	5.8-6.0% (l. 228)
MPUB		19-Jun-98	9.91% (p. 67)	no finding	no finding	no finding	no finding	no finding
NEB	(news release) (RH-2-94)	05-Dec-97	10.21%		6.53%	3.68%		
		Mar-95	12.25% (p.6)	8.00-9.25% (p.5)	9.25% (p.6)	3.00%	3.5-6.9% (p.5)	4.5-5.0% (p.6)
NFLD		31-Jul-98	9.25% (p.100)	5.45-6.00% (p.92)	5.75% (p.99)	3.50%	2.5-6.5% (p.92)	5.00% (p.99)
NS Utility and Review Board		01-Jan-96	10.75% (p.38)	7.64-7.75% (p.37)	7.25% (p.38)	3.50%		
Ontario Energy Board		21-Aug-97	10.30% (p.135)	6.50-7.50%	6.79% (p.131)	3.51%	3.5-6.0% [B]	no finding
Regie De L'Energie		30-Jul-97	10.75% (p.8)	[To be completed at a later date.]				

Notes: All data as per Board/Commission decisions except as where noted.
[A] Evidence: McShane, p. 100, Morin, p. 173, VanderWeide, p. 267 and Waters, p.8.
[B] Evidence: McShane, p. A-26 and Booth and Berkowitz, p. 58.

TABLE 5
CAPITAL MARKET RATES OF RETURN AND YIELDS,
CANADA AND UNITED STATES
1926-1997

	Canada			United States		
	1926-1949	1950-1997	1926-1997	1926-1949	1950-1997	1926-1997
<i>percent</i>						
<i>A. Nominal rates of return [A]</i>						
Common stocks	7.4	11.1	9.9	6.8	13.2	11.0
Long term govt. bonds	<u>4.7</u>	<u>6.9</u>	<u>6.1</u>	<u>4.2</u>	<u>5.8</u>	<u>5.2</u>
Difference	2.7	4.3	3.7	2.6	7.4	5.8
<i>B. Change in Consumer Price Index</i>						
	1.1	4.3	3.2	1.2	4.1	3.1
<i>C. Inflation-adjusted (i.e., real) rates of return [B]</i>						
Common stocks	6.3	6.9	6.7	5.6	9.1	7.9
Long term govt. bonds	<u>3.6</u>	<u>2.6</u>	<u>2.9</u>	<u>3.0</u>	<u>1.7</u>	<u>2.1</u>
Difference	2.7	4.3	3.7	2.6	7.4	5.8
<i>D. Differences between prospective and achieved returns on long term bonds</i>						
	0.3 (1937-49)	-0.5	-0.3 (1937-97)	1.0 (1937-49)	-0.4	-0.1 (1937-97)
<i>E. Nominal rates of return over various holding periods [C]</i>						
<u>5 year periods</u>						
Common stocks		10.7	9.5		12.3	10.5
Long term govt. bonds		<u>7.0</u>	<u>6.0</u>		<u>6.0</u>	<u>5.2</u>
Difference		3.8	3.5		6.3	5.4
<u>7 year periods</u>						
Common stocks		10.4	9.5		11.9	10.7
Long term govt. bonds		<u>6.9</u>	<u>5.9</u>		<u>5.9</u>	<u>5.1</u>
Difference		3.5	3.6		6.0	5.6
<u>10 year periods</u>						
Common stocks		10.4	9.8		11.5	10.9
Long term govt. bonds		<u>6.8</u>	<u>5.7</u>		<u>5.9</u>	<u>4.9</u>
Difference		3.6	4.1		5.6	6.0

Notes:

A. All values are geometric means.

B. Inflation-adjusted rates of return are calculated by taking the differences between the nominal rates of return and the changes in the consumer price index.

C. Numbers are arithmetic means of holding period returns.

Sources:

For the Canadian data on common stocks, government bonds and the consumer price index:

1926-1949: Canadian Institute of Actuaries, "Report on Canadian Economic Statistics", Table 1, page 2.

1950-1987: Hatch & White, "Canadian Stocks, Bonds, Bills and Inflation: 1950-1987", Table 5-1, page 110.

1988-1997: Canadian Institute of Actuaries, "Report on Canadian Economic Statistics", Table 1, page 2.

For the Canadian data on prospective and achieved returns on long term bonds:

"Bank of Canada Review", Table F-1, B14013.

For the United States data on common stocks, government bonds and the consumer price index:

1926-97: Ibbotson Associates, "Stocks, Bonds, Bills and Inflation 1997 Yearbook", Table 1-2, page 24.

For the United States data on prospective and achieved returns on long term bonds:

"Federal Reserve Bulletin", Table 1.35 (composite over 10 years)

TABLE 6
INVESTORS' REALIZED RATES OF RETURN FOR
TORONTO STOCK EXCHANGE SUB-INDEXES,
SELECTED HOLDING PERIODS AND SUB-INTERVALS, 1956-1997

Sub-index and holding period	Rate of return				
	1956-1997	1966-1997	1971-1997	1976-1997	1981-1997
	percent				
<u>Metals & Minerals</u>					
1 year	9.8	9.5	10.5	12.4	7.7
3 years	8.9	8.7	10.2	12.2	9.1
5 years	8.8	8.4	10.3	11.5	8.9
10 years	8.6	8.9	10.7	10.3	8.7
All periods	8.6	9.0	10.4	11.3	8.9
<u>Gold & Silver</u>					
1 year	15.9	17.1	18.9	18.2	8.9
3 years	13.3	13.4	15.7	14.7	7.9
5 years	12.8	13.3	14.6	13.8	8.9
10 years	12.7	13.7	14.2	11.3	7.0
All periods	13.3	14.1	14.9	13.5	8.3
<u>Oil & Gas</u>					
1 year	11.8	13.9	13.6	14.6	5.2
3 years	9.5	10.9	10.0	11.9	4.8
5 years	9.1	9.6	9.7	9.4	4.7
10 years	9.3	9.1	9.0	6.7	4.4
All periods	9.5	9.8	9.5	9.0	4.6
<u>Paper & Forest Products</u>					
1 year	9.7	10.5	12.0	13.4	8.7
3 years	8.9	9.7	11.1	12.5	9.5
5 years	8.8	9.6	11.1	12.1	9.8
10 years	8.9	10.5	12.0	11.7	8.1
All periods	9.1	10.4	11.7	12.0	9.1
<u>Consumer Products</u>					
1 year	13.3	13.4	14.4	16.6	14.4
3 years	12.8	12.8	13.0	16.4	14.1
5 years	12.4	12.4	13.1	15.8	13.0
10 years	12.0	12.6	14.4	15.0	12.1
All periods	12.2	12.9	13.9	15.7	13.2
<u>Industrial Products</u>					
1 year	10.8	9.8	11.3	11.5	10.8
3 years	9.7	9.2	9.8	10.9	9.9
5 years	9.3	8.9	9.5	10.3	9.0
10 years	8.7	8.5	9.2	8.8	7.6
All periods	9.0	8.8	9.5	9.7	8.9

TABLE 6
INVESTORS' REALIZED RATES OF RETURN FOR
TORONTO STOCK EXCHANGE SUB-INDEXES,
SELECTED HOLDING PERIODS AND SUB-INTERVALS, 1956-1997

Sub-index and holding period	Rate of return				
	1956-1997	1966-1997	1971-1997	1976-1997	1981-1997
	percent				
<u>Real Estate & Construction</u>					
1 year	N/A	15.6	13.5	13.8	2.1
3 years	N/A	10.1	9.2	9.6	-1.7
5 years	N/A	8.3	8.5	6.6	-2.8
10 years	N/A	10.5	10.4	5.8	-5.4
All periods	N/A	10.5	9.6	6.7	-3.0
<u>Transportation and Environmental Services</u>					
1 year	14.1	13.4	14.5	16.7	11.3
3 years	12.6	11.9	12.5	13.8	9.0
5 years	12.3	11.2	12.1	11.6	7.5
10 years	13.1	12.6	13.2	11.5	5.5
All periods	13.1	12.4	12.8	12.0	7.6
<u>Pipelines</u>					
1 year	14.1	13.3	14.3	17.4	14.4
3 years	11.2	12.0	12.3	14.9	12.9
5 years	10.9	11.6	12.8	14.0	12.7
10 years	10.7	12.0	13.4	13.6	13.1
All periods	10.9	12.0	13.0	14.0	12.8
<u>Utilities</u>					
1 year	11.5	12.6	14.4	17.0	16.5
3 years	10.7	11.9	13.3	15.0	14.6
5 years	10.5	11.8	13.5	14.3	13.2
10 years	10.4	12.5	13.9	13.9	12.3
All periods	10.6	12.4	13.8	14.3	13.5
<u>Communication & Media</u>					
1 year	17.2	17.5	17.3	17.7	14.3
3 years	15.7	15.2	14.0	16.1	13.8
5 years	15.4	14.4	14.2	16.0	13.2
10 years	15.7	14.8	15.8	15.9	11.6
All periods	15.7	15.2	15.2	15.8	12.8
<u>Merchandising</u>					
1 year	12.8	11.8	12.7	13.2	12.6
3 years	10.8	9.6	9.5	12.0	10.5
5 years	10.2	9.2	9.9	11.8	9.9
10 years	10.4	9.9	11.5	12.2	9.1
All periods	10.4	10.1	10.9	11.9	10.0

TABLE 6
INVESTORS' REALIZED RATES OF RETURN FOR
TORONTO STOCK EXCHANGE SUB-INDEXES,
SELECTED HOLDING PERIODS AND SUB-INTERVALS, 1956-1997

Sub-index and holding period	Rate of return				
	1956-1997	1966-1997	1971-1997	1976-1997	1981-1997
	percent				
<u>Financial Services</u>					
1 year	14.5	16.2	16.8	17.7	17.8
3 years	12.5	14.2	13.4	15.2	15.0
5 years	11.9	13.2	12.9	14.3	13.8
10 years	11.5	12.6	13.1	13.6	12.8
All periods	11.9	13.2	13.3	14.0	14.1
<u>Conglomerates</u>					
1 year	12.9	14.4	15.3	17.8	14.2
3 years	11.3	12.5	12.7	15.5	13.3
5 years	11.3	11.8	12.8	14.2	11.9
10 years	11.8	12.2	13.6	13.6	9.7
All periods	11.7	12.5	13.4	14.2	11.8
<u>TSE 300</u>					
1 year	11.2	11.6	12.6	14.2	11.0
3 years	10.4	10.8	11.4	13.3	10.7
5 years	10.2	10.5	11.5	12.5	10.2
10 years	10.2	10.8	11.9	11.6	9.3
All periods	10.3	10.9	11.7	12.2	10.1

Source: Computed from data contained in the Toronto Stock Exchange '300' Indices Manuals.

TABLE 7A
RISK VALUES FOR LOWEST RISK GROUP
AND PROXY FOR THE MARKET PORTFOLIO

	Share price volatility [2]			Per share earnings volatility [3]	
	Relative to index ("beta")	Total (standard deviation)	Maximum share price decline	Maximum decline	Deviation from trend
A. Median values					
20 lowest risk non-utilities	0.66	5.2	17.9	47.9	8.4
15 lowest risk utilities	0.45	4.5	15.7	39.6	6.0
10 lowest risk utilities	0.45	4.5	15.3	13.2	3.0
"Truncated TSE 300" (257 companies) [1]	0.91	8.4	35.7	111.5 [4]	30.4 [4]
B. Mean values					
20 lowest risk non-utilities	0.67	6.0	21.6	49.2	12.3
15 lowest risk utilities	0.50	4.3	17.0	64.6	20.0
10 lowest risk utilities	0.50	4.3	16.8	27.9	6.5
"Truncated TSE 300" (257 companies) [1]	0.95	9.2	39.8	197.8 [4]	51.9 [4]

- [1] Limited to those TSE 300 companies for which 5 years of price data are available ending December 1992.
[2] Based on prices ending December 1997.
[3] Based on earnings ending in 1995.
[4] For 208 companies based on earnings ending in 1991.

Source: Financial Models Company Inc. Securities Database, Stock Guide Database and Financial Post Corporate Database.

W.R. Waters

TABLE 7B

**RELATIVE RISK VALUES FOR
LOWEST RISK NON-UTILITIES**

Measure	Lowest risk non-utilities	TSE 300	Relative value (1)/(2)
<u>A. Measures of share price volatility</u>			
1. Volatility in relation to total market price movements ("beta" factor)			
Median	0.66	1.0	0.66
Mean	0.67	1.0	0.67
2. Total volatility (standard deviation of achieved rates of return)			
Median	5.2	8.4 [1]	0.62
Mean	6.0	9.2 [1]	0.65
3. Maximum drop in share price over 12 months			
Median	17.9	35.7 [1]	0.50
Mean	21.6	39.8 [1]	0.54
<u>B. Measures of per share earnings volatility</u>			
1. Maximum percentage decline			
Median	47.9	111.5 [2]	0.43
Mean	49.2	197.8 [2]	0.25
2. Deviation around trend			
Median	8.4	30.4 [2]	0.28
Mean	12.3	51.9 [2]	0.24

Notes: [1] For 257 companies.
[2] For 208 companies.

Source: Table 7A.

TABLE 7B

**RELATIVE RISK VALUES FOR
LOWEST RISK NON-UTILITIES**

Measure	Lowest risk non-utilities	TSE 300	Relative value (1)/(2)
<u>A. Measures of share price volatility</u>			
1. Volatility in relation to total market price movements ("beta" factor)			
Median	0.66	1.0	0.66
Mean	0.67	1.0	0.67
2. Total volatility (standard deviation of achieved rates of return)			
Median	5.2	8.4 [1]	0.62
Mean	6.0	9.2 [1]	0.65
3. Maximum drop in share price over 12 months			
Median	17.9	35.7 [1]	0.50
Mean	21.6	39.8 [1]	0.54
<u>B. Measures of per share earnings volatility</u>			
1. Maximum percentage decline			
Median	47.9	111.5 [2]	0.43
Mean	49.2	197.8 [2]	0.25
2. Deviation around trend			
Median	8.4	30.4 [2]	0.28
Mean	12.3	51.9 [2]	0.24

Notes: [1] For 257 companies.
[2] For 208 companies.

Source: Table 7A.

TABLE 7C

**RELATIVE RISK VALUES FOR
LOWEST RISK UTILITIES**

Measure	10 lowest risk non-utilities	TSE 300	Relative value (1)/(2)
<u>A. Measures of share price volatility</u>			
1. Volatility in relation to total market price movements ("beta" factor)			
Median	0.45	1.0	0.45
Mean	0.50	1.0	0.50
2. Total volatility (standard deviation of achieved rates of return)			
Median	4.5	8.4 [1]	0.54
Mean	4.3	9.2 [1]	0.47
3. Maximum drop in share price over 12 months			
Median	15.3	35.7 [1]	0.43
Mean	16.8	39.8 [1]	0.42
<u>B. Measures of per share earnings volatility</u>			
1. Maximum percentage decline			
Median	13.2	111.5 [2]	0.12
Mean	27.9	197.8 [2]	0.14
2. Deviation around trend			
Median	3.0	30.4 [2]	0.10
Mean	6.5	51.9 [2]	0.13

Notes: [1] For 257 companies.
[2] For 208 companies.

Source: Table 7A.

TABLE 8

RISK MEASURES OF THE TEN LOWEST RISK UTILITIES

Name	Measure				
	Negprice	Beta	St Dev	Negeps	Dev3
Fortis Inc.	15.7	0.29	3.0	4.4	1.7
Quebec Tel	17.7	0.47	3.9	7.9	2.0
Cdn. Utilities Ltd.	13.2	0.62	3.7	12.9	3.0
Pacific Northern Gas	14.8	0.38	4.5	13.5	3.7
Island Telephone Ltd.	27.3	0.45	4.9	5.1	1.0
BC Tel	8.7	0.78	5.0	8.6	1.4
Maritime Teleg & Tel	23.0	0.65	5.2	39.6	3.0
Newtel Enterprises	17.7	0.44	4.5	22.9	6.0
TransAlta Util Corp	14.8	0.45	3.6	77.1	12.1
Bruncor Inc	14.6	0.45	4.6	87.2	30.9

Note: Definitions of the five risk measures are given in Appendix II.

TABLE 9
PRE TAX INTEREST COVERAGE RATIOS FOR
INVESTOR-OWNED UTILITIES IN CANADA RATED BY DBRS
(GROUPED BY BUSINESS TYPE)
1982-1996

Company (grouped by business type)	Dominion		Interest Coverage [C]																Average	
	Bond Ratings for																		1982	1990
	First Mtge. Bonds	L-T Debentures																		
			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	[A]	1989	1996		
ENERGY TRANSMISSION																				
TransCanada PipeLines Limited	A	A	1.6	2.0	2.0	2.2	1.8	1.7	1.6	1.5	1.6	1.7	1.8	1.8	2.1	1.9	2.0	1.8	1.8	
IPL Energy Inc.		A(l)	5.6	6.1	7.2	5.4	4.6	2.7	2.6	3.4	3.7	3.5	2.2	2.5	1.1	1.8	[G]	4.7	2.5 [H]	
Trans Mountain Pipe Line Company Ltd.		A(l)	[E]	4.4	2.5	3.3	2.5	2.1	2.2	2.0	2.0	2.6	2.7	2.4	2.8	2.1	3.1	2.7 [H]	2.5	
Westcoast Energy Inc.		A(l)	2.1	2.2	2.3	2.4	1.9	2.2	1.9	2.0	1.5	1.4	1.8	1.8	1.8	1.6	1.8	2.1	1.7	
NOVA Gas Transmission Ltd.		A	1.3	1.5	1.8	2.0	1.6	2.0	2.8	1.6	1.5	1.0	1.6	1.9	1.7	1.5	1.8	1.8	1.6	
TransQuebec & Maritimes Pipeline [A]	A(l)		1.1	1.3	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.5	1.6	1.6	1.6	1.9	2.0	1.3	1.6	
GROUP MEAN			2.3	2.9	2.9	2.8	2.3	2.0	2.1	2.0	1.9	2.0	2.0	2.0	1.8	1.8	2.1	2.4	1.9	
ELECTRIC																				
TransAlta Utilities Corporation	AA(l)	AA(l)	2.4	2.7	3.6	3.8	3.7	4.3	3.7	2.9	2.7	2.8	3.6	3.6	3.5	3.8	4.0	3.4	3.4	
Newfoundland Light & Power	A		4.0	3.8	3.4	3.3	3.1	2.8	2.8	2.5	2.7	2.7	2.8	2.9	2.9	2.6	2.7	3.2	2.7	
West Kootenay Power Ltd. [A] [F]		BBB(h)	1.9	2.9	2.7	2.4	2.4	2.4	2.4	3.0	3.0	3.1	3.2	2.7	2.1	2.6	2.7	2.5	2.8	
GROUP MEAN			2.8	3.1	3.2	3.2	3.1	3.2	3.0	2.8	2.8	2.9	3.2	3.1	2.8	3.0	3.1	3.0	3.0	
GAS DISTRIBUTION																				
The Consumers' Gas Company Ltd.		A(h)	2.4	2.4	2.9	2.9	2.7	2.3	2.5	2.3	2.0	1.7	2.2	2.4	2.4	2.0	2.6	2.6	2.2	
Centra Gas Manitoba [A] [B]		A	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.4	2.5	2.7	2.8	2.7	3.0	3.3	n.a.	2.6	
Centra Gas Ontario Inc. [A] [F]		A	2.1	1.8	2.0	1.5	3.0	2.4	3.7	3.2	2.4	2.1	2.2	2.1	1.9	2.0	2.2	2.5	2.1	
Gaz Metropolitain and Company [A]	A	A	2.0	2.2	3.2	2.3	2.1	2.1	2.2	2.4	2.6	2.5	2.6	2.6	2.4	2.4	2.5	2.3	2.5	
BC Gas Utility Ltd.		A	2.7	3.0	2.2	2.2	2.1	1.7	1.6	1.5	1.5	1.6	1.6	1.8	1.6	1.7	1.9	2.1	1.7	
Union Gas Limited		A	2.0	2.5	2.6	2.6	2.5	2.4	2.2	2.0	2.1	2.2	2.4	2.6	2.1	2.2	2.3	2.4	2.3	
Pacific Northern Gas Ltd.		BBB(h)	1.4	2.0	2.1	2.3	2.0	1.9	1.9	1.9	1.8	2.1	1.9	2.1	2.3	2.1	2.7	1.9	2.1	
GROUP MEAN			2.1	2.3	2.5	2.3	2.4	2.1	2.4	2.2	2.0	2.1	2.2	2.3	2.2	2.2	2.5	2.3	2.2	
COMBINED ELECTRIC AND GAS																				
Canadian Utilities Limited		AA(l)	3.6	4.1	4.2	3.7	4.1	3.6	3.2	3.1	2.6	2.4	2.7	3.0	3.1	2.7	3.0	3.7	2.8	
GROUP MEAN			3.6	4.1	4.2	3.7	4.1	3.6	3.2	3.1	2.6	2.4	2.7	3.0	3.1	2.7	3.0	3.7	2.8	
TELEPHONE																				
Bell Canada [A]		A(h)	3.0	3.5	3.5	3.8	4.0	3.9	3.9	4.0	3.9	3.9	3.7	3.4	3.2	2.7	2.9	3.7	3.4	
BC TEL	A(h)	A(h)	2.3	2.5	2.2	2.5	2.9	3.3	3.4	3.1	3.1	3.2	3.4	3.6	3.9	3.3	4.0	2.8	3.5	
Maritime Telegraph & Telephone Comp.	A	A(l)	3.3	3.4	3.3	3.1	3.0	3.1	3.0	2.9	2.7	2.9	3.3	3.1	2.5	2.0	2.6	3.1	2.7	
The New Brunswick Telephone Co. Ltd. [A]		A	3.6	3.8	4.1	3.9	3.4	3.8	3.6	3.1	3.1	3.1	3.0	3.1	3.0	3.3	3.6	3.7	3.2	
NewTel Communications Inc.	A(l)		2.9	3.4	3.9	4.3	3.5	4.0	4.1	3.1	2.8	2.9	3.1	3.2	3.1	2.7	3.0	3.7	3.0	
The Quebec-Tel Group Inc.	A(l)	A(l)	3.6	3.8	3.6	4.5	4.9	4.1	3.3	3.0	3.1	3.3	3.5	3.7	3.9	3.6	3.7	3.9	3.5	
The Island Telephone Company Limited	BBB(h)		3.4	3.3	3.5	3.5	3.1	3.6	3.2	2.7	2.5	2.8	3.3	3.1	3.0	3.1	3.5	3.3	3.1	
GROUP MEAN			3.2	3.4	3.4	3.7	3.5	3.7	3.5	3.1	3.0	3.2	3.3	3.3	3.2	3.0	3.3	3.4	3.2	
GRAND MEAN			2.7	3.0	3.1	3.0	2.9	2.8	2.7	2.5	2.4	2.5	2.6	2.7	2.5	2.4	2.8	2.8	2.6	

Note: A: Interest coverage ratios obtained from the Dominion Bond Rating Service.
 B: 1982-89 not provided since the company existed as two separate entities prior to 1990.
 C: Interest coverage
$$\text{before taxes} = \frac{\text{Net income before unusual and extraordinary items, income taxes and total interest charges}}{\text{Interest charges (including amortization of long term debt expenses)}}$$

 D: AFUDC is not included in the numerator of "Interest coverage before taxes".
 E: Not meaningful (zero interest expense).
 F: Calculated using data obtained from the company's 1991-1994 Annual Reports.
 G: Not included in most recent DBRS rating report.
 H: Average for years having data available.

Sources: Company Annual Reports. Dominion Bond Rating Service Limited.

TABLE 10
PRE TAX INTEREST COVERAGE RATIOS FOR
INVESTOR-OWNED UTILITIES IN CANADA RATED BY DBRS
(GROUPED BY RATING CATEGORY)
1982-1996

Company (grouped by rating category) [A]	Dominion Bond Ratings for		Interest Coverage [D]																Average	
	First Mtge.	L-T																	1982	1990
	Bonds	Debentures	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	[B]	1995	1996	to 1989	to 1996
AA CATEGORY																				
TransAlta Utilities Corporation	AA(I)	AA(I)	2.4	2.7	3.6	3.8	3.7	4.3	3.7	2.9	2.7	2.8	3.6	3.6	3.5	3.8	4.0	3.4	3.4	
Canadian Utilities Limited		AA(I)	3.6	4.1	4.2	3.7	4.1	3.6	3.2	3.1	2.6	2.4	2.7	3.0	3.1	2.7	3.0	3.7	2.8	
Bell Canada [B]		A(h)	3.0	3.5	3.5	3.8	4.0	3.9	3.9	4.0	3.9	3.9	3.7	3.4	3.2	2.7	2.9	3.7	3.4	
GROUP MEAN			3.0	3.4	3.8	3.8	3.9	3.9	3.6	3.3	3.1	3.0	3.3	3.3	3.3	3.1	3.3	3.6	3.2	
A CATEGORY																				
BC TEL	A(h)	A(h)	2.3	2.5	2.2	2.5	2.9	3.3	3.4	3.1	3.1	3.2	3.4	3.6	3.9	3.3	4.0	2.8	3.5	
The Consumers' Gas Company Ltd.		A(h)	2.4	2.4	2.9	2.9	2.7	2.3	2.5	2.3	2.0	1.7	2.2	2.4	2.4	2.0	2.6	2.6	2.2	
IPL Energy Inc.		A(I)	5.6	6.1	7.2	5.4	4.6	2.7	2.6	3.4	3.7	3.5	2.2	2.5	1.1	1.8	[H]	4.7	2.5 [I]	
The New Brunswick Telephone Co. Ltd. [B]		A	3.6	3.8	4.1	3.9	3.4	3.8	3.6	3.1	3.1	3.1	3.0	3.1	3.0	3.3	3.6	3.7	3.2	
TransCanada PipeLines Limited	A	A	1.6	2.0	2.0	2.2	1.8	1.7	1.6	1.5	1.6	1.7	1.8	1.8	2.1	1.9	2.0	1.8	1.8	
Newfoundland Light & Power	A		4.0	3.8	3.4	3.3	3.1	2.8	2.8	2.5	2.7	2.7	2.8	2.9	2.9	2.6	2.7	3.2	2.7	
BC Gas Utility Ltd.		A	2.7	3.0	2.2	2.2	2.1	1.7	1.6	1.5	1.5	1.6	1.6	1.8	1.6	1.7	1.9	2.1	1.7	
Centra Gas Manitoba [B] [C]		A	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.4	2.5	2.7	2.8	2.7	3.0	3.3	n.a.	2.6	
Centra Gas Ontario Inc. [B] [G]		A	2.1	1.8	2.0	1.5	3.0	2.4	3.7	3.2	2.4	2.1	2.2	2.1	1.9	2.0	2.2	2.5	2.1	
Gaz Metropolitain and Company [B]	A	A	2.0	2.2	3.2	2.3	2.1	2.1	2.2	2.4	2.6	2.5	2.6	2.6	2.4	2.4	2.5	2.3	2.5	
Maritime Telegraph & Telephone Company	A	A(I)	3.3	3.4	3.3	3.1	3.0	3.1	3.0	2.9	2.7	2.9	3.3	3.1	2.5	2.0	2.6	3.1	2.7	
NewTel Communications Inc.	A(I)		2.9	3.4	3.9	4.3	3.5	4.0	4.1	3.1	2.8	2.9	3.1	3.2	3.1	2.7	3.0	3.7	3.0	
NOVA Gas Transmission Ltd.		A	1.3	1.5	1.8	2.0	1.6	2.0	2.8	1.6	1.5	1.0	1.6	1.9	1.7	1.5	1.8	1.8	1.6	
The Quebec-Tel Group Inc.	A(I)	A(I)	3.6	3.8	3.6	4.5	4.9	4.1	3.3	3.0	3.1	3.3	3.5	3.7	3.9	3.6	3.7	3.9	3.5	
Union Gas Limited		A	2.0	2.5	2.6	2.6	2.5	2.4	2.2	2.0	2.1	2.2	2.4	2.6	2.1	2.2	2.3	2.4	2.3	
Trans Mountain Pipe Line Company Ltd.		A(I)	[F]	4.4	2.5	3.3	2.5	2.1	2.2	2.0	2.0	2.6	2.7	2.4	2.8	2.1	3.1	2.7 [I]	2.5	
TransQuebec & Maritimes Pipeline [B]	A(I)		1.1	1.3	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.5	1.6	1.6	1.6	1.9	2.0	1.3	1.6	
Westcoast Energy Inc.		A(I)	2.1	2.2	2.3	2.4	1.9	2.2	1.9	2.0	1.5	1.4	1.8	1.8	1.8	1.6	1.8	2.1	1.7	
GROUP MEAN			2.7	2.9	3.0	2.9	2.8	2.6	2.6	2.4	2.3	2.4	2.5	2.5	2.4	2.3	2.6	2.7	2.4	
BBB CATEGORY																				
The Island Telephone Company Limited	BBB(h)		3.4	3.3	3.5	3.5	3.1	3.6	3.2	2.7	2.5	2.8	3.3	3.1	3.0	3.1	3.5	3.3	3.1	
Pacific Northern Gas Ltd.		BBB(h)	1.4	2.0	2.1	2.3	2.0	1.9	1.9	1.9	1.8	2.1	1.9	2.1	2.3	2.1	2.7	1.9	2.1	
West Kootenay Power Ltd. [B] [G]		BBB(h)	1.9	2.9	2.7	2.4	2.4	2.4	2.4	3.0	3.0	3.1	3.2	2.7	2.1	2.6	2.7	2.5	2.8	
GROUP MEAN			2.2	2.7	2.8	2.7	2.5	2.6	2.5	2.5	2.4	2.7	2.8	2.6	2.5	2.6	3.0	2.6	2.7	
GRAND MEAN			2.7	3.0	3.1	3.0	2.9	2.8	2.7	2.5	2.4	2.5	2.6	2.7	2.5	2.4	2.8	2.8	2.6	

Note: A: Companies are grouped according to their lowest long term debt rating.
 B: Interest coverage ratios obtained from the Dominion Bond Rating Service.
 C: 1982-89 not provided since the company existed as two separate entities prior to 1990.
 D: Interest coverage $\frac{\text{Net income before unusual and extraordinary items, income taxes and total interest charges before taxes}}{\text{Interest charges (including amortization of long term debt expenses)}}$
 E: AFUDC is not included in the numerator of "Interest coverage before taxes".
 F: Not meaningful (zero interest expense).
 G: Calculated from data obtained from company's 1991-1994 Annual Reports.
 H: Not included in most recent DBRS rating report.
 I: Average for years having data available.

Sources: Company Annual Reports. Dominion Bond Rating Service Limited.

TABLE 11
PREFERRED STOCK AS A PERCENTAGE OF INVESTOR SUPPLIED CAPITAL FOR
INVESTOR-OWNED UTILITIES IN CANADA RATED BY DBRS
1982 - 1996

Company (grouped by business type)	Preferred Stock as a Percentage of Investor Supplied Capital as at Year End																Average	
																	1982	1990
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996		to 1989	to 1996
ENERGY TRANSMISSION																		
Interprovincial Pipe Line Inc.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
TransCanada PipeLines Limited	9.4	8.6	8.6	8.7	8.9	9.2	9.9	8.4	8.3	9.2	7.9	6.9	6.8	7.1	4.7		9.0	7.3
Trans Mountain Pipe Line Company Ltd.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Westcoast Energy Inc.	2.8	2.9	2.7	2.6	5.2	4.5	4.5	4.5	2.7	2.4	3.9	3.5	5.8	4.2	5.9		3.7	4.1
NOVA Corporation	17.2	15.1	17.3	19.8	19.9	11.5	5.5	5.6	5.9	6.7	6.0	5.7	0.0	0.0	0.0		14.0	3.5
TransQuebec & Maritimes Pipeline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
GROUP MEAN	4.9	4.4	4.8	5.2	5.7	4.2	3.3	3.1	2.8	3.1	3.0	2.7	2.1	1.9	1.8		4.4	2.5
ELECTRIC																		
TransAlta Utilities Corporation	n.a	n.a	n.a	n.a	21.6	23.6	21.1	20.4	19.5	22.0	21.7	16.2	14.1	11.6	8.7		21.7	16.3
Newfoundland Light & Power	16.8	15.3	14.1	12.7	11.9	10.6	9.6	8.5	7.3	6.7	4.8	2.3	2.3	2.0	2.0		12.4	3.9
West Kootenay Power Ltd.	0.5	0.5	0.5	0.5	0.5	0.5	9.5	9.0	8.4	8.0	7.7	2.9	0.3	0.3	0.0		2.7	3.9
GROUP MEAN	8.6	7.9	7.3	6.6	11.3	11.6	13.4	12.6	11.7	12.2	11.4	7.1	5.6	4.6	3.6		12.3	8.0
GAS DISTRIBUTION																		
The Consumers' Gas Company Ltd.	4.9	9.4	8.6	8.1	7.4	6.8	6.3	6.0	5.5	4.9	5.1	4.7	4.2	3.9	3.6		7.2	4.5
Centra Gas Manitoba [a]	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	0.0	0.0	0.0	0.0	0.0	0.0	0.0		n.a	n.a
Centra Gas Ontario Inc.	8.3	7.4	6.3	5.7	5.6	5.0	4.7	5.5	3.5	3.4	3.2	2.7	2.3	2.3	1.1		6.1	2.7
Gaz Metropolitain and Company	11.9	11.1	9.9	6.1	12.8	9.0	8.0	8.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0		9.6	1.1
BC Gas Inc.	12.9	8.7	8.4	8.4	7.7	5.3	1.5	8.5	9.6	8.9	8.1	8.6	7.9	9.2	8.9		7.7	8.7
Union Gas Limited	11.6	13.4	13.4	14.5	13.3	13.2	12.0	12.1	9.2	11.3	11.7	10.7	9.7	8.9	5.4		12.9	9.5
Pacific Northern Gas Ltd.	6.4	6.4	6.6	6.5	5.4	5.4	5.2	5.1	4.7	4.5	4.3	3.9	3.6	n.a	n.a		5.9	4.2
GROUP MEAN	9.3	9.4	8.9	8.2	8.7	7.5	6.3	7.5	5.8	4.7	4.6	4.4	4.0	4.0	3.2		8.2	5.1
COMBINED ELECTRIC AND GAS																		
Canadian Utilities Limited	37.3	39.6	37.4	38.3	35.1	26.2	24.2	22.3	20.6	25.8	23.8	20.6	18.6	15.5	13.6		32.5	19.8
GROUP MEAN	37.3	39.6	37.4	38.3	35.1	26.2	24.2	22.3	20.6	25.8	23.8	20.6	18.6	15.5	13.6		32.5	19.8
TELEPHONE																		
Bell Canada	6.0	5.0	4.0	5.0	6.0	7.0	5.0	7.0	7.0	7.0	6.4	6.3	6.4	4.7	3.8		5.6	5.9
BC Tel	14.4	13.2	11.7	10.7	9.3	9.0	8.3	7.8	5.7	5.0	4.7	4.5	2.2	1.7	1.7		10.6	3.6
Maritime Telegraph & Telephone Company	9.1	8.4	7.3	6.3	4.2	3.8	3.3	7.1	10.2	9.6	8.7	7.0	3.4	n.a	n.a		6.2	7.8 [b]
The New Brunswick Telephone Co. Ltd.	4.5	4.1	3.7	3.3	2.9	2.5	2.0	1.7	0.9	0.8	0.0	0.0	0.0	0.0	0.0		3.1	0.2
NewTel Communications Inc.	12.5	11.4	10.8	10.0	9.0	8.6	3.2	2.8	2.5	2.3	2.2	0.0	0.0	0.0	0.0		8.5	1.0
Quebec-Telephone	8.6	8.2	7.9	7.2	4.6	3.6	3.4	3.1	3.0	2.9	2.8	2.6	2.5	2.0	2.0		5.8	2.5
The Island Telephone Company Limited	11.3	11.0	10.9	10.1	8.8	8.5	7.4	6.6	6.1	5.8	5.5	5.2	5.0	4.3	4.1		9.3	5.1
GROUP MEAN	9.5	8.7	8.1	7.5	6.4	6.1	4.7	5.2	5.1	4.8	4.3	3.7	2.8	2.1	1.9		7.0	3.8
GRAND MEAN	9.4	9.1	8.6	8.4	8.7	7.6	6.7	7.0	6.2	6.1	5.8	4.8	4.0	3.5	3.0		8.5	5.0

Note: n.a.: Not available in DBRS report.

[a] 1982-1989 not provided since the company existed as two separate entities prior to 1990.

[b] Average for years having data available.

Source: Preferred share ratios obtained from the Dominion Bond Rating Service.

TABLE 12
ALLOWED RATES OF RETURN, ALLOWED COMMON EQUITY RATIOS
AND MARKET TO BOOK RATIOS, MAJOR CANADIAN UTILITIES

Company	Year of Award	Common Equity Ratio	Allowed ROE	Market/Book Ratio [5]
ELECTRIC				
Alberta Power Limited (exclusive of CIAC)	1997 [6]	35.7	11.25	n/a
Newfoundland Light & Power (Fortis)	1998	45.0	9.25	1.7
Nova Scotia Power Inc.	1996	33.0-34.0	10.75	1.7
TransAlta Utilities Corporation (exclusive of CIAC)	1997 [6]	40.0 max	11.25	2.2
West Kootenay Power Ltd.	1998	40.0 [4]	10.25	n/a
GAS DISTRIBUTION				
BC Gas Utility Ltd. (BC Gas Inc.)	1998	33.0	10.00	1.8
Canadian Western Natural Gas Company Ltd. (exclusive of CIAC)	1993 [2]	34.1	12.25	n/a
(inclusive of CIAC)	1993 [2]	28.2	12.25	n/a
Centra Gas Manitoba Inc.	1998	39.1	9.91	n/a
Centra Gas Ontario Inc.	1997	36.0	11.25	n/a
Consumers' Gas Company Ltd.	1997	35.0	10.30	n/a
Gaz Metropolitain	1997	38.5	10.75	n/a
Northwestern Utilities Limited (exclusive of CIAC)	1994	35.6	11.875	n/a
(inclusive of CIAC)	1994	30.9	11.875	n/a
Pacific Northern Gas Ltd.	1998	36.0	10.75	1.7
Union Gas Limited	1997	34.0	11.00	n/a
GAS TRANSMISSION				
Alberta Natural Gas Ltd	1998	30.0	10.21	n/a
Foothills Pipe Lines Limited	1998	30.0	10.21	n/a
TransCanada PipeLines Limited	1998	30.0	10.21	2.1
Trans Quebec & Maritimes Pipeline Inc.	1998	30.0	10.21	n/a
Westcoast Energy Inc.	1998	35.0	10.21	1.7
NOVA Gas Transmission Ltd. (Nova Corporation)	1997	32.0	10.67	1.6
OIL PIPELINE				
Interprovincial Pipe Line Inc. (IPL Energy Inc.)	1993 [3]	45.0 [1]	11.50	3.0
Trans Mountain Pipe Line Company Ltd.	1995	45.0	12.25	n/a
TELEPHONE				
AGT Limited (Telus)	1998	55.0 max	11.00	2.0
Bell Canada (BCE Inc.)	1998	55.0 max	11.00	3.8
BC Telecom	1998	55.0 max	11.00	2.4
Island Telephone Company Limited	1998	55.0 max	11.00	1.9
Maritime Telephone & Telegraph Company Limited	1998	55.0 max	11.00	2.9
New Brunswick Telephone Company (Bruncor)	1998	55.0 max	11.00	2.6
Newfoundland Telephone Company Limited (NewTel Ent.)	1998	55.0 max	11.00	2.4
Quebec Telephone	1995	54.7	11.25-12.25	2.0

Notes:

[1] Deferred taxes deducted from total capitalization. With deferred taxes included, common equity ratio is 38.4.

[2] The common equity and allowed ROE pertain to the 1992 test year.

[3] The values reflect the Settlement Agreement, dated November 19, 1993, between Interprovincial Pipe Line Inc., and the IPL Industry Task Force.

[4] Deferred taxes are included in capital structure.

[5] Defined as the closing price for December 1997 divided by the estimated year end book value per share.

[6] For 1996.

Sources:

Decisions and orders of the appropriate regulatory boards and commissions.

Market-to-book ratios calculated with data from various annual and interim reports, the TSE Review and Stock Guide.

TABLE 13

**PRETAX INTEREST COVERAGE RATIOS FOR GAZ MÉTRO
RESULTING FROM ALTERNATIVE RATES OF RETURN**

	Case 1:	Case 2:	Case 3:	Case 4:
Common equity ratio	38.50%	38.50%	38.50%	38.50%
and	and	and	and	and
Return on common equity	10.57%	10.7975%	8.25%	9.00%
\$ 000's				
1. Preferred dividends	6,118.7	6,118.7	6,118.7	6,118.7
2. Earnings to common	<u>56,846.6</u>	<u>58,070.1</u>	<u>44,369.4</u>	<u>48,403.0</u>
3. Net income	62,965.4	64,188.9	50,488.2	54,521.7
4. Add: Interest on debt	64,317.4	64,317.4	64,317.4	64,317.4
5. Income taxes [1]	<u>49,471.9</u>	<u>50,433.2</u>	<u>39,668.5</u>	<u>42,837.7</u>
6. Sub-total	176,754.7	178,939.5	154,474.1	161,676.9
7. Interest coverage (L.6/L.4)	2.7 x	2.8 x	2.4 x	2.5 x

Note:

[1] Using an effective tax rate of 44%.

Sources:

Case 1: SCGM-14, Document 3, Page 1.

Case 2: SCGM-14, Document 3, Page 2.

TABLE 14

**ACHIEVED RETURNS ON EQUITY AND ALLOWED RETURNS ON EQUITY:
GAZ METROPOLITAIN AND COMPANY, LIMITED PARTNERSHIP, 1989-1997**

Year	Allowed ROE (%)	Realized ROE (%)	Difference (%)
1989	13.50	13.62	0.12
1990	14.25	14.49	0.24
1991	14.25	14.45	0.20
1992	14.00	13.78	-0.22
1993	12.50	12.00	-0.50
1994	12.00	12.13	0.13
1995	12.00	12.88	0.88
1996	12.00	11.66	-0.34
1997	11.50 [a]	n/a	n/a
Average			0.06

Note: [a] Gaz Metropolitain and Company, Limited Partnership, 1997 Annual Report.

Source: Dominion Bond Rating Service, Rating report for Gaz Metropolitain and Company, Limited Partnership dated June 23, 1997.

TABLE 15

**PREMIUMS FOR GAZ MÉTROPOLITAIN LONG TERM DEBT
OVER SELECTED UTILITY AND GOVERNMENT OF CANADA ISSUES**

	Dec. 31/93	Dec. 31/97	Sept. 4/98
A. Yields		(percent)	
Gaz Métro, 10.45% Oct. 16, 2016	8.23	6.51	6.41
Consumers Gas, 10.80% Apr. 15, 2011	8.02	6.30	6.16
TCPL, 11.80% Nov. 20, 2020	8.23	6.56	6.41
Westcoast, 8.55% Sep. 4, 2018	8.20	6.54	6.34
BC Gas, 10.30% Sept. 30, 2016	8.22	6.49	6.29
Canada, 9.75% June 1, 2021	7.40	5.93	5.64
B. Premium over Government of Canada issue		(basis points)	
Gaz Métro, 10.45% Oct. 16, 2016	83	58	77
Consumers Gas, 10.80% Apr. 15, 2011	62	37	52
TCPL, 11.80% Nov. 20, 2020	83	63	77
Westcoast, 8.55% Sep. 4, 2018	80	61	70
BC Gas, 10.30% Sept. 30, 2016	82	56	65
C. Premium over Gaz Métro issue		(basis points)	
Consumers Gas, 10.80% Apr. 15, 2011	-21	-21	-25
TCPL, 11.80% Nov. 20, 2020	0	5	0
Westcoast, 8.55% Sep. 4, 2018	-3	3	-7
BC Gas, 10.30% Sept. 30, 2016	-1	-2	-12

Sources:

Canadian Bond Prices, Financial Post (1993 and 1997 issues).
Globe and Mail, various issues.

TABLE 16
YEAR OVER YEAR CHANGE IN CPI AND
FORECASTS OF INCREASES IN SELECTED
ECONOMIC INDICATORS FOR G7 COUNTRIES

Country	Year over year change in CPI to July 1998	Forecast increase in CPI [2]		Forecast one year increase in [2]	
		1998	1999	Producer prices	Wages/ earnings
		percent			
Britain	3.5	3.2	2.8	0.8	5.0
Canada	1.0	1.3	1.8	-0.3	0.9
France	0.8	1.0	1.5	-0.7	2.4
Germany	0.9	1.1	1.6	-2.0	1.7
Italy	1.8	1.8	2.2	0.4	2.1
Japan	0.1 [1]	0.3	-0.2	-0.3	-0.2
United States	1.7	1.7	2.6	-0.3	4.2

Note:

(1) For Japan, to June 1998.

(2) In most cases forecast month is July.

Source:

The Economist, August 29, 1998.

TABLE 17
UNEMPLOYMENT RATES
IN G7 COUNTRIES

JUNE 1990 - JUNE 1998 [a]

Country	June								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
	(percent)								
Britain	5.7	7.9	9.6	10.4	9.4	8.3	7.7	7.3	6.4
Canada	7.5	10.5	11.6	11.6	10.3	9.6	10.0	9.4	8.4
France	8.8	9.5	10.0	11.6	12.4	11.6	12.4	12.5	11.9
Germany	7.3	6.3	6.6	8.3	8.3	8.3	9.9	11.4	11.0
Italy	9.8	9.8	11.0	10.8	11.2	12.4	12.1	12.1	12.0
Japan	2.1	2.0	2.1	2.5	2.8	3.1	3.5	3.5	4.1
United States	5.2	7.0	7.8	6.8	6.1	5.6	5.3	5.0	4.5

Notes [a] For some countries, the month for which data is shown is May.

Source: *The Economist*, July 11, 1998; July 20, 1996; July 22, 1995; July 23, 1994; August 21, 1993; July 18, 1992; and July 20, 1991.

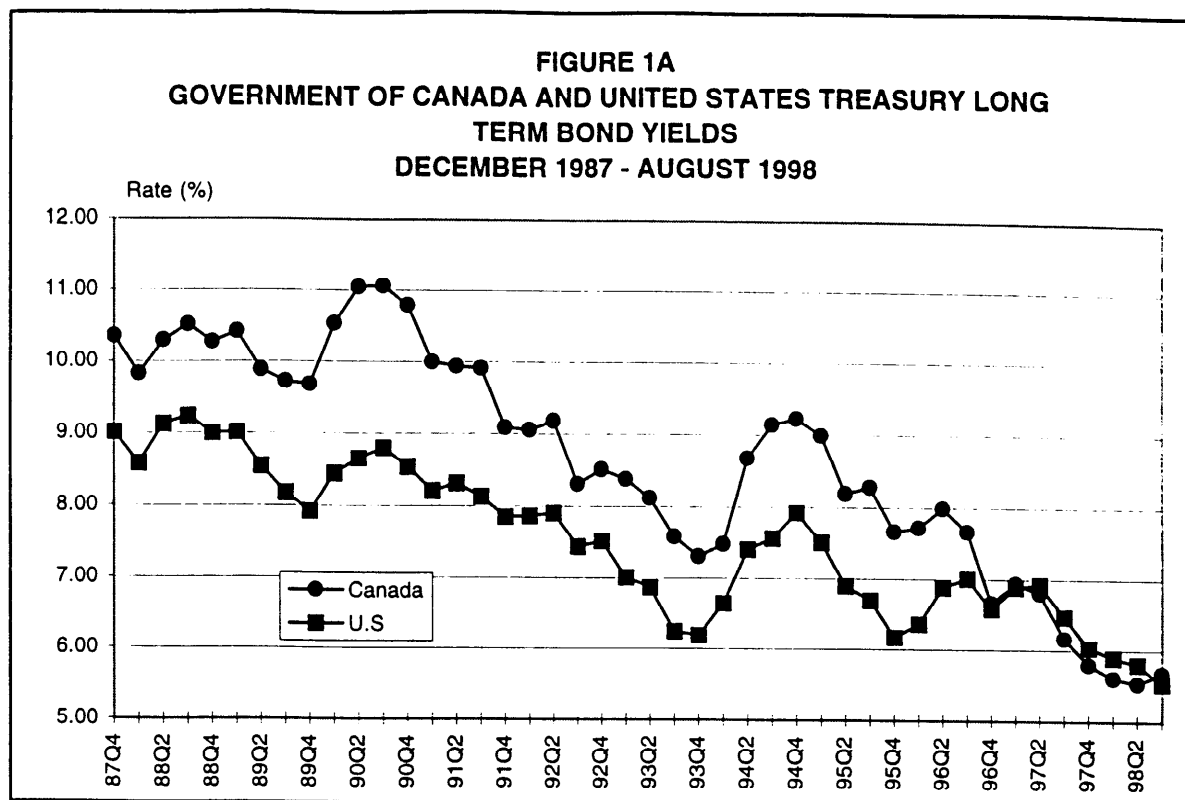
TABLE 18

**MOST RECENT ROE AWARDS BY THE BRITISH COLUMBIA UTILITIES
COMMISSION AND THE NATIONAL ENERGY BOARD AND ALTERNATIVE
AWARDS UNDER VARIOUS ASSUMPTIONS**

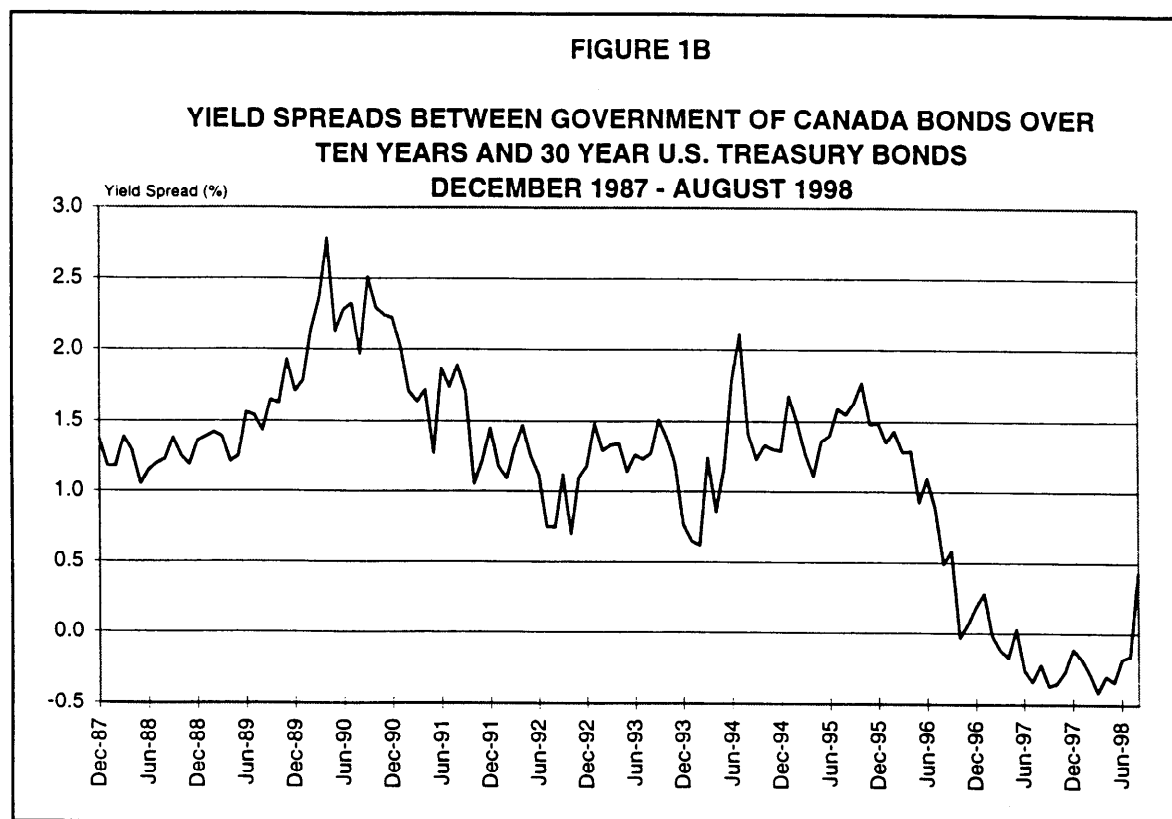
	British Columbia Utilities Commission	National Energy Board
1. <u>Most recent award</u>		
Based on data as of	November 1997	November 1997
Assumed 30 year bond yield	6.39 %	6.53 %
Computed equity risk premium	<u>3.57</u>	<u>3.68</u>
Awarded ROE	9.96 %	10.21 %
	rounded to 10.00%	
2. Most recent award if original equity risk premium of 3.0% had been used		
Assumed 30 year bond yield	6.39 %	6.53 %
Original equity risk premium	<u>3.00</u>	<u>3.00</u>
Resulting ROE	9.39 %	9.53 %
	rounded to 9.50%	
3. Award consistent with current <u>financial market expectations</u>		
Based on data as of	August 28, 1998	August 28, 1998
Assumed 30 year bond yield	5.73 %	5.73 %
Computed equity risk premium	<u>3.70</u>	<u>3.90</u>
Resulting ROE	9.43 %	9.63 %
	rounded to 9.50%	
4. Award if current financial market expectations used with original equity risk premium of 3.0%		
Assumed 30 year bond yield	5.73 %	5.73 %
Original equity risk premium	<u>3.00</u>	<u>3.00</u>
Resulting ROE	8.73 %	8.73 %
	rounded to 8.75%	

LIST OF FIGURES

- 1A** Government of Canada and United States Treasury Long Term Bond Yields December 1987 - August 1998
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- 2** Government of Canada Bond Yields 10 Years and Over and Changes in Consumer Price Index, March 1970-June 1998
- 3** Exchange Rate, U.S. Cents per Canadian Dollars, June 1995-August 1998

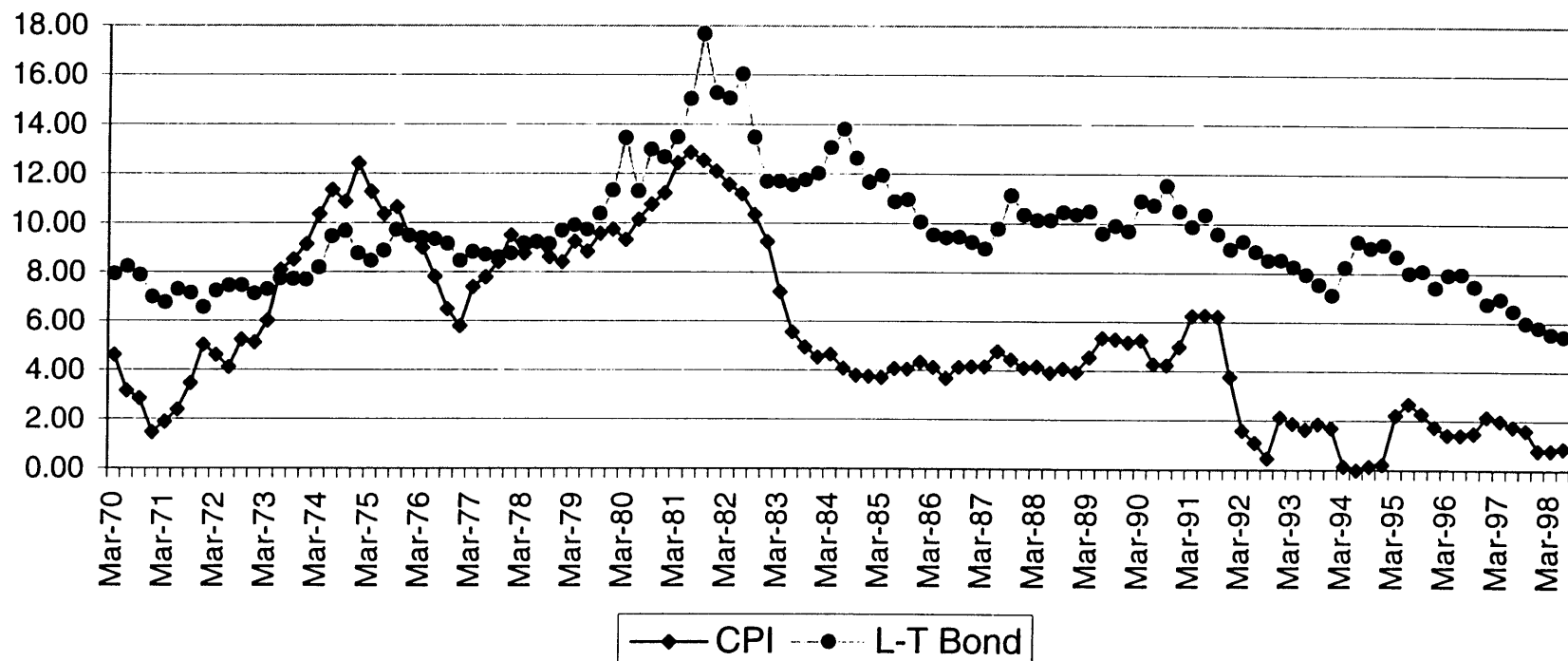


Note: Quarter end values based on average of monthly values.



Source: Table 1.

FIGURE 2
GOVERNMENT OF CANADA BOND YIELDS 10 YEARS AND OVER AND CHANGES IN
CONSUMER PRICE INDEX,
MARCH 1970-JUNE 1998

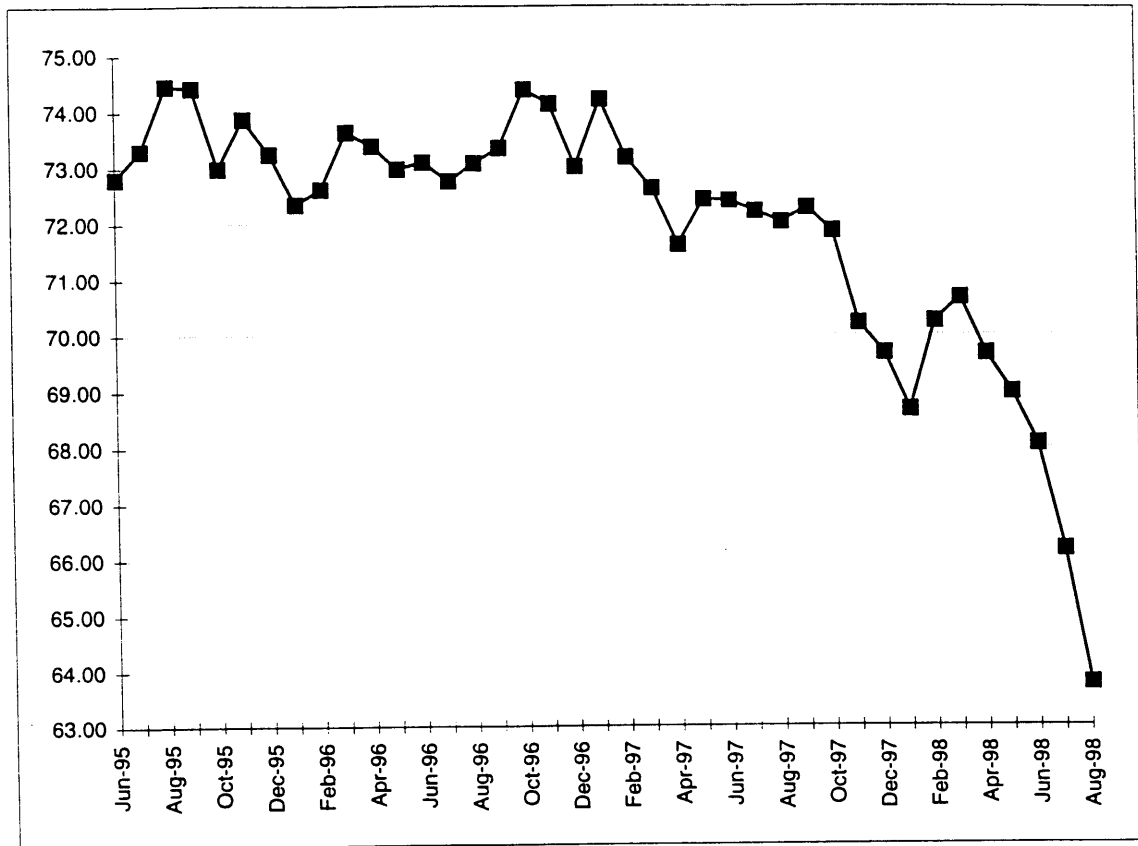


Notes: The CPI shown is the annualized quarterly percent change.
The L-T bond shown is the yield at each quarter end.

Sources: Consumer Price Index, Canada, All Items: Statistics Canada.
Government of Canada 10 Years and Over: Bank of Canada Review.

FIGURE 3

**EXCHANGE RATE
U.S. CENTS PER CANADIAN DOLLARS
JUNE 1995 - AUGUST 1998**



Source: Globe and Mail.