

MANITOBA PUBLIC UTILITIES BOARD

CENTRA GAS MANITOBA INC.

2019/20 GENERAL RATE APPLICATION

EVIDENCE OF

RICHARD G DEWOLF

on behalf of

THE CONSUMERS ASSOCIATION OF CANADA (MANITOBA) INC.

1 **Q. Please identify yourself and the party on whose behalf you appear, and briefly**
2 **describe your qualifications?**

3 **A.** My name is Richard DeWolf and I am appearing on behalf of the Consumers Association
4 of Canada (Manitoba) Inc. (“CAC”). I am an oil and natural gas consultant with expertise
5 related to oil and natural gas supply; pricing; pipeline tolls and tariffs and utility
6 regulations. I have submitted evidence and appeared before the Manitoba Public Utilities
7 Board (“MPUB” or “the Board”) in a number of Centra Gas Manitoba Inc. (“Centra”)
8 proceedings related to gas supply and transportation, pricing and other matters. My CV,
9 attached as Appendix A, describes my experiences and qualifications,

10 **Q. Please provide your experience related to Centra’s Storage & Transportation**
11 **Portfolio contracts and gas supply?**

12 **A.** I have been involved as a consultant in each iteration of Centra’s Storage & Transportation
13 Portfolio since 1991. In 1991, while I was at the Ziff Energy Group, I was retained by
14 Centra to assess the prudence and reasonableness of the original contract with Great Lakes

1 Gas Transmission (“GLGT”) and ANR Pipelines (“ANR”) as well present an over view of
2 the natural gas supply, transportation and markets. I have also appeared in a number of
3 General Rate Cases on behalf of Centra providing evidence before the Board regarding gas
4 supply, market trends and pricing. During the time I was at Ziff Energy (1991-2003), I
5 provided ongoing advisory services to Centra relating to the North American natural gas
6 industry.

7 Subsequently, after leaving Ziff Energy, I was retained by the MPUB in 2013 to assist in
8 the Board’s review of the existing Centra Gas Storage and Transportation Portfolio with
9 GLGT and ANR that will expire in 2020.

10 **Q. Please explain the purpose of your testimony and identify the issues that you address.**

11 A. On November 30, 2019 Centra filed its 2019/20 General Rate Application (“Application”).
12 In early 2019 CAC asked me to review those sections (specifically Tabs 8 and 9) of the
13 Application related to gas supply management and the proposed Storage & Transportation
14 Portfolio [REDACTED] I was asked to assist in
15 the development of information requests related to Tabs 8 and 9 of the Application and
16 develop written evidence regarding my opinion on Centra’s gas supply management and
17 the proposed [REDACTED] Portfolio.

18 Included in this review, and the fact that the last Centra Cost of Gas Application was for
19 the years 2015/2016, my testimony addresses a number of the key changes (many of which
20 have been identified by Centra in its Application and well as Centra’s responses to
21 Information Requests) that have taken place in the Canadian natural gas market influencing
22 natural gas supply and transportation for Manitoba.

1

2 **Q. Please outline your evidence and provide a summary your findings related to your**
3 **review of the Application.**

4 A. My evidence will provide at the outset a summary of my findings regarding Centra's
5 proposed Storage and Transportation Portfolio [REDACTED] [REDACTED] as well Centra's gas
6 supply management process. Subsequent to the summary, I will provide additional
7 background as to my findings regarding these two components of Centra's 2018/2019
8 General Rate Application.

9 **Gas Supply Management Findings (Summary)**

10 This is an unusual application in that Centra is seeking final approval for the actual costs
11 of natural gas supplies the periods 2014/2015 to 2017/2018. It is my understanding that
12 typically, approval of these gas costs would occur on an annual basis. The other
13 components of the application relate to Centra's gas supply portfolio, and development
14 issues related to upstream transportation capacity contracts on TCPL and Nova Gas
15 Transmission Limited ("NGTL").

16 At the outset, I have not attempted to second guess Centra regarding its gas purchasing or
17 transportation contracting practices, but rather I examined Centra's gas purchasing and
18 transportation practices in light of the recent past, current and possible outlook of the
19 Canadian and US natural gas markets in which Centra is a participant.

20 While I believe Centra has acted in a prudent and responsible manner in its gas supply
21 management, as presented in its application, I also believe Centra management and staff

1 could benefit from the retention of advice and research from independent 3rd party
2 consultants in its gas supply management team in making its decision regarding its role in
3 determination of an appropriate mis of transportation capacity contracting, and gas supply
4 arrangements based upon the 3rd party knowledge and expertise.

5 Similar to outside expert evidence submitted by Centra regarding rate of return issues, it is
6 my opinion that all parties to these proceedings would have been better informed and
7 confident of Centra's gas supply management if Centra had retained and provided as part
8 of its application an independent 3rd party report. I see this recommendation regarding
9 the submission of a 3rd party report by Centra different that my assessment which has been
10 done after-the-fact and without the advantage of having discussions and insight directly
11 with Centra's staff [REDACTED].

12 [REDACTED] **Findings (Summary)**

13 Centra is applying to the Board for an approval of the proposed Storage and Transportation
14 arrangements [REDACTED]. This
15 new arrangement will replace the existing 7-year arrangement which was effective April
16 1, 2013. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

17 [REDACTED]

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[REDACTED] Similar

to my prior comments regarding Centra's gas supply management, I believe Centra would

have benefitted from independent 3rd party advice and research [REDACTED]

[REDACTED] The filing of a report by an

independent 3rd party consultant in its application would have assisted all interested parties

to this application.

1 **Q. Please provide your review of Centra's Gas Supply Management?**

2 **A.** It is important to understand that over the nearly 3 decades that Centra initially made the
3 decision to contract for downstream storage and related transportation capacity, the natural
4 gas industry in Canada and the US has undergone significant changes particularly as it
5 relates to the purchasing of natural gas to serve its franchise area. Specially the following
6 issues are key influencers:

7 a. Developments in the Canadian and US natural gas supplies;

8 b. Upstream pipeline capacity on TransCanada Pipeline's Mainline Transmission
9 System ("TCPL") and NGTL and changes to capacity contracting on these systems.

10 While I describe some of the changes to the above drivers in my review of the proposed
11 [REDACTED] arrangement, the following review relates to the
12 key situation experience by Centra as described in its application and the challenges it has
13 faced due to changes in upstream transportation capacity and contracting and developments
14 in the gas supply in Canada and the US.

15 **Q. Please describe some of the key changes in the Canadian and US gas supplies that**
16 **have had an influence on gas supply and pricing to Centra and other market**
17 **participants?**

18 **SHALE GAS DEVELOPMENT**

19 **A.** The key changes in Canadian and US natural gas supply and pricing which are interrelated
20 that I will discuss relates to the increase in shale gas development and its effect on natural
21 gas prices and contacted pipeline capacity.

1 Over the past decade, and particularly in the past 5 years, there has been a dramatic focus
2 and increase in natural gas from shale formations in western Canada (Northeast BC and
3 Northwest Alberta) and the US (Marcellus/Utica and Permian). These natural gas
4 formations are considered rich gas in that they have considerable associated natural gas
5 liquids. Due to the high concentration of natural gas liquids, these natural gas formations
6 have considerable value as compared to the traditional gas supply formations with little or
7 no natural gas liquids. The Marcellus and Utica shale development have been a major
8 disruptor to the western Canadian natural gas market in that as Marcellus and Utica
9 developed interconnecting pipelines have occurred from these supplies to the traditional
10 markets in the US Midwest and Central Canada, displacing western Canadian supplies as
11 well as supplies from regions in the US. The result has been a loss of market share and a
12 decline in the price of natural gas.

13 In many ways the focus on shale gas is the inherent value of the associate gas liquids rather
14 than the actual natural gas; hence the continued exploitation of these formations even when
15 the price of natural gas is so low.

16 The development of these types of reserves in Northeast BC had 2 focuses: (1) natural gas
17 development for exports via Liquid Natural Gas (“LNG”) facilities on the west coast of BC
18 and; (2) the associated liquid production to be used in heavy oil from oil sands
19 development. Needless to say, LNG development of the BC west coast has not developed
20 as expected nor has the development of incremental crude oil pipeline take away capacity
21 from Alberta. The result is that most of the natural gas in Northeast BC is currently stranded
22 (lack of pipeline capacity to move it to market). With the likelihood of only one or a very
23 limited number of LNG facilities being developed, the focus of the Northeast BC gas has

1 changed to markets east of this region. As such, these producers have contracted for new
2 long-term capacity on the NGTL system commencing in 2021. [REDACTED]

3 [REDACTED]
4 [REDACTED]
5 [REDACTED]
6 [REDACTED]

7 As indicated in Centra's filings, Centra has [REDACTED]

8 [REDACTED] due to changes in TCPL service offerings [REDACTED]

9 [REDACTED]. TCPL introduced Long-Term Fixed Price ("LTFP")

10 service to lower the cost to ship on its system so as to compete with natural gas production
11 from the Marcellus/Utica. Unlike Firm Transportation service on TCPL, LTFP does not
12 permit upstream diversions. While Centra has opposed the restriction on upstream
13 diversions as part of the LTFP service offering before the NEB, the NEB has rejected
14 Centra's opposition and has approved TCPL's LTFP service with the restriction on
15 upstream diversions. In this regard I believe Centra should continue to oppose the LTFP
16 upstream diversion restriction in future TCPL rate cases.

17 **Q. Does this conclude your evidence regarding Centra's gas supply management?**

18 **A. Yes.**

1 Q. Please provide your review of Centra's [REDACTED]
2 Portfolio?

3 A. [REDACTED]
4 [REDACTED]
5 [REDACTED]
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11 [REDACTED]

12 [REDACTED]

13 Q. Please elaborate on Centra's preferred [REDACTED]

14 [REDACTED] option [REDACTED]

15 [REDACTED]

16 A. [REDACTED]

17 [REDACTED]

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14 [REDACTED]
15 [REDACTED]
16 [REDACTED]

17 **Q. Please provide your final observations and recommendations regarding Centra's**
18 **proposed [REDACTED] [REDACTED] portfolio and Centra's Gas**
19 **Supply Management?**

20 **A.** Based upon my review of the various filings by Centra, I believe Centra has acted in the
21 prudent and responsible manner in its gas supply management and the [REDACTED]

1 [REDACTED] [REDACTED] as presented in its application. It is also my opinion that the
2 proposed [REDACTED] portfolio is appropriate.

3 I want to add that it is important for all parties to recognize that my recommendations are
4 based upon my review of Centra's filings which have been done after-the-fact and as such
5 as I have previously stated, it would better serve the Board and all parties had Centra filed
6 a 3rd party independent report on these matters. The advantage of Centra filing its own 3rd
7 part independent reports is that these consultants would likely have had the advantage of
8 discussions with Centra's staff and other parties [REDACTED] and I would expect
9 have provided their independent expertise to the decision making process of Centra.

10 **Q. Does this conclude your evidence?**

11 **A. Yes.**

Richard DeWolf has been involved in the oil and natural gas industry for over 40 years in Canada and the United States. For half his career, he has been involved in the natural gas and liquid petroleum consulting sector.

He specializes in the areas of:

- Development and implementation crude oil/liquid pipelines and natural gas rates and tariff design
 - Development of economic/financial (cost of service) computer models related to pipeline rates and tolls design
 - Cost allocation and appropriateness of cost of service components
- Cost allocation and pricing of storage and other gas distribution services and assets
- Facilitation of project strategic plans and economic/financial scenario planning related to liquid and oil supplies, natural gas markets, storage, transportation and regulatory developments including the development of financial computer models to assist in the analysis of the economic evaluations
- Development of regulatory processes and frameworks related to the administration and operations of pipelines and gas distribution systems
- Strategic and operational planning for all sections of the natural gas industry, liquids and petroleum regarding investment opportunities, to infrastructure development and usage
- Expert witness on the above matters before energy regulators

Employment History

- Independent Energy Consultant (1991 to Present)
- Navigant Consulting Inc (2003 to 2004 – Director Energy Practice - Associate)
- Ziff Energy Group (1991 to 2003 – Senior Vice President - Associate)
- Independent Petroleum Association of Canada (1984 to 1990 – Manager Regulatory Affairs)
- Dome Petroleum Ltd/ Hudson Bay Oil and Gas Company Limited (1977 to 1984 – Senior Regulatory and Market Analyst, Senior Pipeline (Oil) and Project Engineer – Gas Liquids)
- Royal Bank of Canada (1980/1981 – Senior Pipeline Engineer)
- KPMG (formerly Peat, Marwick, Mitchell) (1975 to 1977 – Auditor/Consultant)
- 4 Summers working in the mining industry in Ontario and British Columbia as part of engineering studies

Education and Professional Experience

- 1975 Bachelor of Engineering (Mining) McGill University, Montreal, Quebec, Canada
 - Emphasis in econometric modeling and resource economics
- 1975 to 1977 Graduate Studies in Accounting and Finance (McGill University)
- 1980 Registered Professional Engineer, Province of Alberta, Canada (Association of Professional Engineers, Geologists and Geophysicists of Alberta). Awarded Life Membership 2015

Oil and Natural Gas Related Work Experience

1977-1984: worked for a couple of Petroleum Producers, specializing in the development, economics, rate design and regulation of pipelines; pricing and marketing of various petroleum products and natural gas throughout North America.

1984-1990: was employed by a leading petroleum industry association. He was directly involved in the deregulation of pricing, markets of natural gas and development of open access on the pipeline systems throughout North America. He testified extensively during this timeframe before many Energy Regulators both as a policy and expert witness regarding all issues affecting the deregulation of the oil and natural gas markets and pipelines in North America.

Consulting Experience

Since 1991, has consulted to most sectors of the petroleum and natural industry in the above areas of expertise, as well as for electrical generators, natural distribution companies, mining companies and a variety of federal and provincial government energy departments and regulatory agencies. Not only does Rick provide strategic advice and recommendations regarding his specific expertise, he has developed specific computer financial models to assist in the evaluation of the various scenarios related to investment opportunities, to investors in the upstream and midstream sectors of the petroleum and gas industry.

Has appeared before energy regulatory agencies in Canada and in the United States as an expert witness related to natural gas transmission and distribution rates and tariffs design; and the development of regulatory processes related to natural gas distribution and transmission systems; natural gas pricing determination and supply assurance; oil pipeline rate design as well affiliate cost allocation rate designs regarding gas storage operation. He has written and spoken at energy conferences on a variety of energy development issues including development of regulatory frameworks, changes to gas transmission and distribution systems in a competitive environment, natural gas supply and pricing outlooks.

Selected Consulting Assignments

Nova Gas Transmission Limited (NGTL): Retained to provide expert advice and assistance to institutional investors regarding its Alberta assets which have been negatively affected by changes in NGTL tariffs and tolls (ongoing).

Financial Advisory/Research Services: Providing ongoing advice and presentations to clients of financial advisory/research service companies in the United States regarding development issues related to existing and new pipelines throughout North America (ongoing).

Liquid Pipeline Cost Allocation Study: Retained to assist in the examination of various allocation policies respecting regulated liquid pipelines operated in Canada and the United States on behalf of several owners. Retained to examine in detailed all cost of service components allocations were appropriate and properly be allocated.

Liquid Pipeline Purchase: Retained to assist client and legal counsel regarding tolls and tariff and various regulatory issues in the purchase of an international (Canada and the US) liquid pipeline.

Plateau Pipeline (Pembina Pipeline): Retained and appeared as an expert witness regarding toll design and other regulatory matters for an intra-provincial oil pipeline.

Canadian Municipality: Retained to assist in the examination of its municipal gas supply arrangements and develop various alternatives. Examination of utilities cost of service (revenue requirements) and the appropriateness and design of specific cost of service components. Further retained by the municipality to assist in the development and renegotiation of a new franchise agreement between the municipality and gas distributor.

Nova Scotia Utility and Review Board: The lead regulatory/technical/economic consultant to the Board Members, staff and counsel regarding the examination of a new gas distributor(s) for the Province of Nova Scotia. The process also involved review and development of all aspects of Board review of gas distribution regulations, including the regulations governing the review of gas distributors, including the development of program to related increased Board regulatory operational costs, application fees and hearing costs. The selection process was undertaken under the directions of a formal public hearing, involving pre-filed testimony, data requests and interrogatories, and oral cross-examination and delivery of final briefs.

Canada-Newfoundland Offshore Petroleum Board's Public Review Commissioner: Aided the Public Review Commissioner of the C-NOPB in evaluating the potential for natural gas development from the proposed Husky Oil White Rose Offshore Oil project. This involved a review of all aspects of the potential development including markets, transportation systems and pricing for offshore natural gas production.

Council of Yukon First Nations: Retained to provide advice and expertise to the Grand Chief, Chief's committee and legal counsel in development of CYFN's strategic preparedness plan to respond to potential oil and natural gas exploration, development, and associated pipelines in the northern regions of Canada and Alaska. Prepared and delivered several daylong work shops and presentations to Elders, First Nation Chiefs. Assisted as a keynote speaker before the 3rd Annual Oil and Gas First Nation Northern Summit. The assistance has led to a better understanding of the current changes in the North American natural gas industry, which will be used in CYFN's decision-making process.

Northern Natural Gas Infrastructure (Project 1): Retained to develop several financial models related to petroleum and natural gas production and infrastructure investment opportunities in northern Canada. Financial models were developed for each potential investment in a variety of infrastructures as well as an overall corporate model that integrated all the potential individual investment opportunities.

Northern Natural Gas/Liquid Infrastructure (Project 2): Retained to develop and evaluate strategic investment options related to petroleum and natural gas facilities in Northern Canada from delivery to burner-tip. Several financial models (including detailed cost-of-service pipeline/distribution models) were developed for each potential investment in a variety of infrastructures as well as an overall corporate model that integrated all the potential individual investment opportunities.

Natural Gas Storage Evaluation: Retained to provide expert opinion on the value of an independent storage operator respecting potential markets in Ontario and Quebec.

Natural Gas Storage: Retained annually by a Canadian Utility to develop a new transfer price methodology related to affiliate contracting of capacity. This assignment also included the evaluation of the utility's requirement for storage but both utility and non-utility markets.

Storage Investment Company: Assisted in the research and analysis of potential natural gas storage facilities (reservoir and salt cavern) investment opportunities in eastern Canada and the United States that could be developed. The examination reviewed the potential for market and production directed use of the storage facilities, as well as considerations regarding access issues to existing or potential pipeline systems.

Mackenzie Valley Gas Pipeline: Retained to assist and provide expert evidence (pipeline tolls, tariffs and regulatory policies) to a Canadian oil and natural gas producer in their regulatory involvement before the National Energy Board and Joint Review Panel regarding the public hearing process for the application to construct this pipeline system.

Energy Industry Association: Retained by one of the major Canadian energy industry association to undertake the development of a pipeline cost of service financial model to examine the variation in tolling concepts between Canada and the United States.

CERI and PRAC: Retained by the Canadian Energy Research Institute and Petroleum Research Atlantic Canada to assist them in the development of a multi-client study regarding the effects on the natural gas industry of the development of LNG in the eastern regions of Canada.

Pipeline Rate and Revenue Requirement Model for Scenario Planning: Developed a pipeline rate design model and revenue requirement model to simulate a major Canadian pipeline transmission company to permit financial planning of various corporate development scenarios for large-scale supply diversity, including LNG development.

Corporate Due Diligence: Assisted a client in undertaking its due diligence regarding a potential pipeline acquisitions involving the review of existing and potential natural gas supplies and markets, competitive transportation alternatives, and development of a long-term outlook regarding gas price and basis differentials and their influence on competitive transportation toll designs.

Corporate Bond Issuance: Was a lead consultant regarding long-term gas price determination and outlook on supply and transportation factors influencing prices throughout various regions in North America regarding electrical generation used for the underpinning of a corporate bond issue.

Canadian Market and Regulatory Review for US Investment Company: Undertook an examination of the Canadian natural gas transportation system, market outlook, and regulatory framework respecting near term future developments for a US Investment company. The assignment involved not only a detailed description of the existing Canadian natural gas industry, but conducting confidential interviews with key stakeholder to determine their views of current issues, challenges and possible changes to the natural gas market and transportation systems in Canada related to the ability of a new entrant into the gas merchant business.

Canadian Power Company: Developed and prepared a long term North American annual natural gas price forecast based upon various development scenarios and key industry factors in the natural gas industry until 2025.

El Paso Canada – Blue Atlantic Project: Retained to examine the potential effect alternative landfall for a sub-sea pipeline on the potential development of a natural gas liquid industry in the Province of Nova Scotia. The report concludes that an additional landfall for offshore natural gas in the southwest region of the Province will not be detrimental to the potential development of a natural gas liquid industry in the Province. The report also concludes there are significant advantages to the Province of a major landfall for natural gas in the southwest region that far-out way any proposal to require a single landfall in the Guysborough County.

Scotia Shelf Natural Gas Potential: Has been retained by several companies to author a series of studies outlining the potential for natural gas developed off the East coast of Canada.

Canadian Electrical Generator: Retained to provide an expert opinion regarding the rate design and possible tolling methodology on an inter-provincial pipeline system.

US Southwest Gas Distributor: Development of an independent study regarding the appropriateness of using natural storage for a local gas distribution company's gas supply and delivery portfolio, including the potential influence on the company's system gas prices.

Other Consulting Assignments prior to 2000

Liquid and Gas Pipelines and Natural Gas Distribution

- Rates, tolls and tariff analysis and design including development of cost of service models
- Cost Allocation and affiliate transfer pricing
- Supply/purchase portfolio analysis and development
- System gas price determination and arbitration
- Transportation and storage portfolio evaluation
- Regulatory and legislative issues regarding competitive markets

Liquid and Gas Producers

- Competitive market analysis, including gas sale price determination
- Transportation and processing development
- Deregulation market, supply and transportation framework development
- Unbundled liquid and natural gas pipeline rate design

Electrical Industry

- Natural gas supply and transportation due diligence
- Natural gas price forecasting

Government Departments and Agencies

- Gas supply, transportation and storage contacting
- Greenfield gas distribution development
- Legislative and regulatory frameworks for gas distribution development
- Technical support to international and domestic development agencies regarding natural gas pipelines and distribution tariffs economic developments - Bolivia
- Assistance in pricing and market review of the Canadian natural gas industry
- Expert opinion regarding liquid pipeline rates and development contracts

Specific appearances and/or assistance in the following public regulatory proceedings:

- **2006/2007 National Energy Board – Mackenzie Valley Pipeline**
Provided expert evidence regarding pipeline tolls, tariffs and regulatory policies on behalf of a Canadian oil and natural gas producer as well as assisting Legal counsel.
- **2004 Nova Scotia Utility and Review Board – Heritage Gas Rate Case**
Lead rates and tariff consultant to Board Members and counsel regarding the first rate case application by the principal natural gas distributor in Nova Scotia.
- **2004 Nova Scotia Utility and Review Board Gas Distribution Rights – Strait Area Gas**
Lead technical, regulatory and management consultant regarding examination of revised gas distribution rights application in a specific region of Nova Scotia.
- **2002 Nova Scotia Utility and Review Board Gas Distribution Rights – Revisited**
Lead technical and management consultant to Board Members and counsel regarding the awarding of natural gas distribution rights (subsequent proceeding required due to the relinquishment of franchise rights by Sempra Atlantic)
- **2002 Ontario Energy Board Enbridge Gas Distribution– Alliance Pipeline Capacity**
Appeared as an expert witness as to the appropriateness of contracting for long term capacity on the Alliance Pipeline system and the Canadian natural gas market conditions existing at the time of contracting for capacity by the utility.
- **2002 Alberta Energy and Utilities Board ATCO Gas – Carbon Storage**
Appeared as an expert witness regarding an appropriate storage transfer price between affiliates and whether the existing regulated storage facilities were continued to be required for utility purposes.
- **2001 British Columbia Utilities Commission Plateau Pipelines (Pembina Pipelines)**
Appeared as an expert witness regarding oil pipeline toll designs and regulatory policies regarding safely and environmental practices.
- **2001 National Energy Board TransCanada PipeLines**
Appeared as an expert witness regarding various tariff/tolling matters on behalf of long-term transportation shippers.
- **2000 Nova Scotia Utility and Review Board Sempra Atlantic Gas**
Lead technical and management consultant to Board Members and counsel regarding Sempra Atlantic's initial distribution tolls and tariff application.
- **2000 Nova Scotia Utility and Review Board Gas Marketing Licence**
Lead technical and management consultant to Board Members and counsel regarding the determination of gas marketing licences.
- **1999 Nova Scotia Utility and Review Board Gas Distribution Rights**
Lead technical and management consultant to Board Members and counsel regarding the awarding of natural gas distribution rights.
- **1998 National Energy Board Coleman Pipeline**
Appeared as an expert witness respecting future gas supply and markets relating to natural gas in Alberta.
- **1997 National Energy Board Novagas Canada Ltd.**
Appeared as an expert witness regarding tolling and tariff issues related to transportation services access.

- **1996 Manitoba Public Utilities Board** Generic Hearing - Future Role of the Gas Distributor Appeared as an expert witness relating to the past, current and future business environment for the marketing of natural gas from the wellhead to the burner tip and the future changes to the retail marketing of natural gas and other energy services.
- **1995 Alberta Energy & Utilities Board** NOVA Gas Transmission
Appeared as an expert witness on natural gas pricing issues, outlook for the forthcoming tolling year
- **1994 California Public Utilities Commission** Pacific Gas & Electric Company
Appeared as an expert witness on behalf of a major shipper respecting the appropriate financial and economic performance measure to evaluate pipeline efficiency and effectiveness.
- **1993 Manitoba Public Utilities Board** Centra Gas Manitoba Inc. Rate Case
Appeared as an expert witness on natural gas pricing issues, outlook for the forthcoming tolling year
- **1993 Ontario Energy Board** Centra Gas Ontario Inc. Rate Case
Appeared as an expert witness on natural gas pricing issues related to revisions in the gas utility purchase contract
- **1992 Ontario Energy Board** Centra Gas Ontario Inc. Rate Case
Appeared as an expert witness on natural gas pricing issues related to revision in the gas utility purchase contract
- **1992 Manitoba Public Utilities Board** Centra Gas Manitoba Inc. Rate Case
Appeared as an expert witness on pipeline tolls, tariffs for a storage and transportation project as well as natural gas pricing issues.
- **1991 Manitoba Public Utilities Board** Centra Gas Manitoba Inc. Storage Case
Appeared as an expert witness on pipeline tolls, tariffs for storage and transportation project and the prudence of the utility's decision process.
- **1990 National Energy Board** TransCanada PipeLines Facilities Application
Appeared as an expert witness on the appropriate toll methodology for expanded facilities and export volumes.
- **1990 National Energy Board** Westcoast Energy Facilities Application
Appeared as an expert/policy witness on the appropriate level of facilities expansion and toll design for incremental facilities.
- **1990 National Energy Board** Westcoast Energy Toll Case
Appeared as an expert/policy witness on cost of service, rate design and tariff issues on the Westcoast system.
- **1989 National Energy Board** TransCanada PipeLines Toll Case
Appeared as an expert/policy witness on toll design and allocation of costs.
- **1989 Alberta Public Utilities Board** Northwestern Utilities Limited Transportation Rate Design
Appeared as an expert witness on the appropriate toll methodology for expanded facilities and export volumes.
- **1989 National Energy Board** Westcoast Energy Toll Case
Appeared as expert/policy witness on various toll methodologies, design and allocation of costs.
- **1989 National Energy Board** Westcoast Energy Export Toll
Appeared as an expert witness on the appropriate cost allocation and toll design for natural gas exports.

- **1988 National Energy Board Foothills Pipeline, Interruptible Tolls**
Appeared as an expert witness on the appropriate toll design for interruptible transportation service for gas exports to the United States.
- **1988 Alberta Public Utilities Board Canadian Western Rate Case**
Appeared as a policy witness on issues pertaining to rate classification for transportation (open access) service for natural gas utility.
- **1988 National Energy Board TransCanada PipeLines Toll Case**
Appeared as an expert/policy witness on rates and cost allocation issues at an annual toll hearing.
- **1988 National Energy Board TransMountain PipeLine**
Appeared as an expert/policy witness on the appropriate cost allocation and toll methodology for new incremental crude oil pipeline facilities.
- **1988 National Energy Board TransCanada PipeLines Facilities Application**
Appeared as an expert/policy witness on the appropriate rate design and allocation of costs for new incremental gas pipeline facilities.
- **1987 National Energy Board Foothills Pipelines (Yukon) Toll Case**
Appeared as an expert witness regarding toll and tariff design for exports to the United States.
- **1987 National Energy Board Westcoast Gas Transmission Toll Case**
Appeared as an expert witness on the appropriate toll design and cost allocation process for natural gas.
- **1987 British Columbia Utilities Commission Inland Natural Gas Rate Case**
Appeared as an expert/policy witness on the appropriateness of transportation rates for unbundling the utility's gas supply and transportation services.
- **1987 National Energy Board Manitoba Oil and Gas Corporation**
Appeared as an expert/policy witness regarding transportation service and gas supply to the local utility's market related to the continuing process of deregulation in Canada.
- **1987 Manitoba Public Utilities Board ICG (Manitoba)**
Appeared as a technical/policy witness on available transportation services related to direct sales between end users and gas suppliers
- **1987 British Columbia Utilities Commission Inland Natural Gas Rate Case**
Appeared as an expert/policy witness on the appropriateness of existing rates and tariff and advocating changes to permit direct sales between producers and end-users.
- **1987 Manitoba Public Utilities Board ICG (Manitoba)**
Appeared as an expert/policy witness regarding transportation service and gas supply for sales between Canadian provinces resulting from changes due to deregulation in Canada.
- **1987 National Energy Board Westcoast Transmission Tolls Case**
Appeared as an expert witness on the appropriate toll design and cost allocation for interruptible export transportation service of natural gas to the United States.
- **1986/87 National Energy Board TransCanada PipeLines Toll Case**
Appeared as an expert/policy witness regarding cost allocation and appropriate toll design for natural gas transportation in Canada and exported to the United States.
- **1986 National Energy Board Interprovincial Pipelines Tolls Case**
Appeared as an expert/policy witness advocating changes to existing toll design and cost allocation for crude oil transportation in Canada.

- **1986 Ontario Energy Board Consumer Gas Rate Case**
Appeared as a technical/policy witness respecting the unbundling of existing rates resulting from the deregulation of natural gas in Canada.
- **1986 National Energy Board TransCanada PipeLines - Availability of Service**
Appeared as a policy witness respecting the appropriate mechanisms for pipeline access and contracting practices to allow an orderly transition to a market responsive natural gas pricing regime in Canada.
- **1985 National Energy Board Westcoast Gas Transmission Toll Case**
Appeared as an expert witness avocation changes to existing rate design to conform to the natural gas deregulation process and open access on the pipeline network.
- **1985 Ontario Energy Board Consumers Gas Rate Case**
Appeared as a technical/policy witness advocating changes to existing rate design and cost allocation among ratepayers responding to deregulation in the Canadian natural gas industry.
- **1985 National Energy Board TransCanada PipeLines Toll Case**
Appeared as a technical/policy witness advocating changes to existing tolls and tariff design to respond to the development of open access transportation.
- **1985 National Energy Board Omnibus Gas Export - Surplus Determination Procedures - Phase I**
Appeared as a technical/policy witness respecting the appropriate guidelines and regulations for natural gas exports from Canada to the United States.
- **1985 Alberta Energy Resources Conservation Board Alberta Ethane Policy Proceedings**
Appeared as a technical/policy witness respecting the appropriateness of existing regulations resulting from the change to a market responsive pricing regime in Canada for natural gas.
- **1985 Alberta Energy Resources Conservation Board Consoligas Management Gas Removal Application**
Appeared as a technical/policy witness respecting the appropriate regulation for gas removal permits.
- **1984/85 National Energy Board TransCanada PipeLines Method of Regulation**
Assisted in the development of policy evidence respecting the methodology of pipeline regulation in Canada.
- **1984 National Energy Board Westcoast Transmission Toll Case**
Assisted in the development of expert testimony respecting the appropriate toll design and methodology for the Westcoast gas pipeline system.
- **1984 National Energy Board TransCanada Pipelines Limited**
Assisted in the development of expert testimony on toll and tariff design.
- **1984 National Energy Board TransQuebec and Maritimes Pipeline Toll Case**
Committee chairman and representative of IPAC in support of the Canadian Independent Producer positions respecting the appropriate pipeline toll design.
- **1983 National Energy Board Interprovincial Pipelines Toll Case**
Assisted in the development of expert testimony respecting toll design and cost allocation, as well as technical support to legal counsel in formulation of cross-examination.
- **1983 National Energy Board Westcoast Transmission Toll Case**
Assisted in the development of expert testimony respecting rate design and tariff issues.
- **1983 Ontario Energy Board The Cost of Feedstock Inquiry**
Assisted in the preparation of expert testimony on the price and availability of natural gas through direct selling to end-users.

- **1983 National Energy Board TransCanada PipeLines Toll Case**
Assisted in the development of expert testimony on rate and tariff design.
- **1983 Manitoba Public Utilities Board Steelgas Utilities Rate Case**
Assisted in the development of appropriate rate designs for a propane distribution system.
- **1983 National Energy Board TransQuebec and Maritimes Pipelines Toll Cases**
Assisted in the development of expert testimony on rate and tariff design, and supported counsel in the development of cross-examination of witnesses.
- **1982 National Energy Board Gas Export Omnibus Hearing**
Assisted in the preparation of expert testimony on the appropriate markets for Canadian natural gas.
- **1982 National Energy Board Manito Pipeline Toll Case**
Appeared as a technical advisor to a pipeline shipper respecting toll and tariffs.