National Energy Board

Reasons for Decision

**Alliance Pipeline Ltd.
on behalf of the
Alliance Pipeline
Limited Partnership**

GH-3-97

November 1998

Facilities and Tolls & Tariffs

National Energy Board

Reasons for Decision

In the Matter of

**Alliance Pipeline Ltd.
on behalf of the
Alliance Pipeline
Limited Partnership**

Alliance Pipeline Project

Application dated 3 July 1997

GH-3-97

November 1998

Cat. No. NE22-1/1998-11E
ISBN 0-662-27356-7

This report is published separately in both official languages.

Copies are available on request from:
Publications Coordinator
National Energy Board
444 Seventh Avenue SW
Calgary, Alberta T2P 0X8
E-Mail: orders@neb.gc.ca
Fax: (403) 292-5503
Phone: (403) 299-3562
1-800-899-1265

For pick-up at the NEB office:
Library
Ground Floor

Printed in Canada

N° de cat. NE22-1/1998-11F
ISBN 0-662-83311-2

Ce rapport est publié séparément dans les deux langues officielles.

Exemplaires disponibles sur demande auprès du:
Coordonnatrice des publications
Office national de l'énergie
444, Septième Avenue S.-O.
Calgary (Alberta) T2P 0X8
Courrier électronique: orders@neb.gc.ca
Télécopieur: (403) 292-5503
Téléphone: (403) 299-3562
1-800-899-1265

En personne, au bureau de l'Office:
Bibliothèque
Rez-de-chaussée

Imprimé au Canada

Table of Contents

List of Tables iii

List of Figures iii

List of Appendices iii

Abbreviations iv

Recital and Appearances ix

Overview xiv

1. Introduction 1
1.1 The Application and Project Overview 1
1.2 GH-3-97 Proceeding 6
1.3 Requested Authorizations and Statutory Tests 7
1.3.1 Certificate of Public Convenience and Necessity 7
1.3.2 Traffic, Tolls, & Tariffs and Method of Regulation 8
1.4 Environmental Assessment 9

2. Economic Feasibility 11
2.1 The Appropriate Test of Economic Feasibility 11
2.2 Gas Supply 13
2.2.1 Overall Gas Supply 13
2.2.2 Shipper-Specific Gas Supply 16
2.3 Markets 21
2.4 Shipper Commitments and Project Financing 26
2.4.1 Shipper Commitments 26
2.4.2 Project Financing 27
2.5 Economic Feasibility of the Alliance Project 29

3. Potential Commercial Impacts 31
3.1 Competition and Netbacks 31
3.2 Potential Impacts on Existing Pipeline Infrastructure 35
3.2.1 NOVA Gas Transmission Ltd. 35
3.2.2 Northwestern Utilities Limited 39
3.2.3 Foothills Pipe Lines Ltd. 41
3.2.4 BC Gas Utility Ltd. 42
3.3 Potential Impacts on the Alberta Petrochemical Industry 43
3.4 Domestic Access to Natural Gas 48
3.4.1 Heartland Gas Initiative 48
3.4.2 Industrial Gas Consumers Association of Alberta 49

4. Socio-Economic and Land Matters 51
4.1 Socio-Economic Matters 51
4.1.1 General 51
4.1.2 Employment, Non-Labour Impacts, and Income 51
4.1.3 Municipal Services 52
4.1.4 Quality of Life 53
4.2 Land Matters 54
4.2.1 Routing and Facility Site Selection 54
4.2.2 Corridor versus Specific Route 55
4.2.3 Land Requirements 55
4.2.4 Safety Zone 56
4.2.5 Landowner Concerns 57

5. Engineering and Safety Matters 60
5.1 General 60
5.1.1 Regulations and Standards 60
5.1.2 Unique Design Aspects 60
5.1.3 Operational Considerations 60
5.1.3.1 Leak Detection 60
5.1.3.2 Prevention of Liquids Dropout 61
5.1.3.3 In-Line Inspection 61
5.2 Utility Crossings 62
5.3 Fracture Prevention and Control 63
5.3.1 Conceptual Overview 63
5.3.2 The Alliance Context 64
5.3.3 Application of CSA Z662 Requirements 64
5.3.4 Minimum Design Temperature 66
5.3.5 Fracture Initiation Control 66
5.3.6 Minimum Operating Temperatures 68
5.3.7 Fracture Propagation Control 69
5.3.7.1 The Battelle Two-Curve Method 69
5.3.7.2 Determination of Fracture Toughness 69
5.3.7.3 Alliance's Design 71
5.3.7.4 Full-Scale Burst Test Program 73
5.3.7.5 Crack Arrestors and Operating Limits 74

6. Traffic, Tolls, & Tariffs and Method of Regulation 80
6.1 Traffic, Tolls, & Tariffs 80
6.2 Method of Regulation 83

7. Disposition 86

List of Tables

1-1	Lateral Pipeline Legend	5
2-1	Summary of Overall Supply Evidence	15
2-2	U.S. Market Demand Forecast (Reed Study)	22
2-3	U.S. Market Demand Forecast (Reed Study Update)	23
2-4	U.S. Incremental Demand Forecast (Foothills)	24
2-5	Alliance Pipeline Ltd. Shippers	28
4-1	Direct Operations and Maintenance Employment	52
4-2	Standard Right-of-Way Configurations	55
5-1	Design Parameters for the Alliance Mainline	64
5-2	Data for Alliance Operating Conditions and Fracture Toughness Requirements	73
I-1	Mainline Compressor Station Particulars	87
I-2	Lateral System Pipeline Sizing	88
I-3	Details of Permanent Lateral Facilities	89
V-1	Concordance Between CSR Recommendations and Certificate Conditions	120

List of Figures

1-1	The Proposed Alliance Pipeline Project	2
1-2	Pipeline Route Map/Mainline and Compressor Stations	3
1-3	Pipeline Route Map/Laterals	4
2-1	Common NGTL/Alliance Receipt Points	17
5-1	Battelle Two-Curve Method	70

List of Appendices

I	Project Details	87
II	List of Issues	91
III	Text of Accord	92
IV	Minister's Letter re Environmental Assessment	104
V	Certificate Terms and Conditions	107
VI	Excerpts from Shipper Agreements re NGLs	121
VII	Order TG-7-98	123

Abbreviations

ADOE	Alberta Department of Energy
AGA	American Gas Association
AHA	all-heat average
ANG	Alberta Natural Gas Company Ltd
ANR	ANR Pipeline Company
AOS	Authorized Overrun Service
the Accord	"Agreement on Natural Gas Pipeline Regulation, Competition and Change to Promote a Competitive Environment and Greater Customer Choice", dated 7 April 1998 and signed by the Canadian Association of Petroleum Producers, NOVA Corporation, NOVA Gas Transmission Ltd., the Small Explorers and Producers Association of Canada, and TransCanada PipeLines Limited
Agency	Canadian Environmental Assessment Agency
Alliance	Alliance Pipeline Ltd.
Amoco	Amoco Canada Petroleum Company Ltd.
the Applicant	Alliance Pipeline Ltd.
Aux Sable	Aux Sable Liquid Products LP
B.C.	British Columbia
BC Gas	BC Gas Utility Ltd.
Bcf	billion cubic feet
Bcf/d	billion cubic feet per day
Bcf/yr	billion cubic feet per year
Btu/scf	British thermal units per standard cubic foot
Btu/kWh	British thermal units per kilowatt-hour
Board	National Energy Board
°C	degrees Celsius

CAPP	Canadian Association of Petroleum Producers
CCA	Consumers' Coalition of Alberta
CCPA	Canadian Chemical Producers' Association
CEAA	*Canadian Environmental Assessment Act*
cm	centimetre
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
CSA Z662-96	CSA Z662-96 standard entitled *Oil and Gas Pipeline Systems*
CSR	Comprehensive Study Report
CVN	Charpy V-Notch
CanWest	CanWest Gas Supply Inc.
Cochin	Cochin Pipe Lines Ltd.
Consumers' Gas	Consumers' Gas Company Ltd.
the Company	Alliance Pipeline Ltd.
conv.	conventional
dBA	decibals (A-weighted sound level)
DFO	Fisheries and Oceans Canada
DWTT	drop weight tear test
Duke	Duke Energy Marketing Limited Partnership
EIA	(U.S.) Energy Information Administration
EUB	Alberta Energy and Utilities Board
°F	degrees Fahrenheit
FERC	(U.S.) Federal Energy Regulatory Commission
Fekete	Fekete Associates Inc.
Foothills	Foothills Pipe Lines Ltd.

GAIA	Green Alternatives Institute of Alberta
GISB	Gas Industry Standards Board
GJ	gigajoule
GLJ	Gilbert Laustsen Jung Associates Ltd.
GRI	Gas Research Institute
HGI	Heartland Gas Initiative
ha	hectare
HRIA/AIA	Historical Resource Impact Assessment/Archeological Impact Assessment
IEA	Indigenous Ecology Alliance
IGCAA	Industrial Gas Consumers Association of Alberta
ILI	in-line inspection
IPLE	IPL Energy Inc.
Imperial Oil	Imperial Oil Resources Ltd.
J	joule
km	kilometre
KP	kilometre post
kPa	kilopascal
LDC	local distribution company
m	metre
m/s	metres per second
m^3	cubic metre
m^3/d	cubic metres per day
m^3/yr	cubic metres per year
Mbpd	thousand barrels per day
Mcf	thousand cubic feet

MDT	minimum design temperature
MELP	British Columbia Ministry of Environment, Lands and Parks
MFL	magnetic flux leakage
MJ	megajoule
MJ/kWh	megajoule per kilowatt-hour
MJ/m^3	megajoule per cubic metre
mm	millimetre
MMBtu	million British thermal units
MMcf/d	million cubic feet per day
MOP	maximum operating pressure
MOU	Memorandum of Understanding
MPa	megapascal
MW	megawatt
Marenco	Marenco Energy Associates
Memorandum of Guidance	Board's *Memorandum of Guidance on the Regulation of Group 2 Companies*
NEB	National Energy Board
NEB Act	*National Energy Board Act*
NGL	natural gas liquid
NGTL	NOVA Gas Transmission Ltd.
NICOR	NICOR Inc.
NOVA Chemicals	NOVA Chemicals Ltd.
NUL	Northwestern Utilities Limited
NYMEX	New York Mercantile Exchange
Northern Border	Northern Border Pipeline Company
PRRD	Peace River Regional District

psi	pounds per square inch
Pan-Alberta	Pan-Alberta Gas Ltd.
PanCanadian	PanCanadian Petroleum Limited
ProGas	ProGas Limited
Project	Alliance Pipeline Project
RMEC	Rocky Mountain Ecosystem Coalition
RTM	real-time modelling
Reed	Reed Consulting Group
SCADA	supervisory control and data acquisition
SEPAC	Small Explorers and Producers Association of Canada
SMYS	specified minimum yield stress
SPC DWTT	static pre-cracked drop weight tear test
Sproule	Sproule Associates Limited
the Standard	CSA Z662-96 standard entitled *Oil and Gas Pipeline Systems*
Tcf	trillion cubic feet
TCPL	TransCanada PipeLines Limited
TransCanada Gas	TransCanada Gas Services
Treaty 8	Treaty 8 Tribal Association
U.S. or U.S.A.	United States of America
Union Gas	Union Gas Limited
WCC	Wisconsin Capacity Coalition
WCPG	Western Canada Producer Group
WCSB	Western Canada Sedimentary Basin
WEI	Westcoast Energy Inc.

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* ("*NEB Act*") and the Regulations made thereunder;

AND IN THE MATTER OF an application dated 3 July 1997 by Alliance Pipeline Ltd., on behalf of the Alliance Pipeline Limited Partnership and pursuant to Parts III and IV of the *NEB Act*, for (i) a certificate of public convenience and necessity to construct and operate the Canadian portion of a proposed natural gas pipeline system from northeastern British Columbia and northwestern Alberta to the midwest United States and (ii) related toll and tariff authorizations;

IN THE MATTER OF National Energy Board Hearing Order GH-3-97;

HEARD in Calgary, Alberta on 17 to 21 and 26 November 1997, 6 to 9, 12 to 16, 19 to 23, and 26 to 30 January 1998, and 2 February 1998; in Regina, Saskatchewan on 4 and 5 February 1998; in Fort St. John, British Columbia on 11 to 13 February 1998; in Edmonton, Alberta on 17 and 18 February 1998; and in Calgary, Alberta on 23 to 27 February 1998, 2 to 5, 9, 11 to 13, 16, 18 to 20, 23 to 27, and 30 to 31 March 1998, 1 to 3, 6 to 8, 14 to 16, 20 to 24, and 27 to 30 April 1998, and 11 to 15 and 19 to 21 May 1998;

BEFORE:

K.W. Vollman	Presiding Member
A. Côté-Verhaaf	Member
C.M. Ozimy	Member

APPEARANCES:

C.K. Yates R.A. Neufeld F.M. Saville, Q.C. D.E. Crowther	Alliance Pipeline Ltd.
S. Arcand	Alexander First Nation
D.A. Holgate N.J. Schultz	Canadian Association of Petroleum Producers
L.L. Manning D. Goffin	Canadian Chemical Producers' Association
M. Posey	Federation of Alberta Naturalists
D. Opekokew V. Khaladkar	Federation of Saskatchewan Indian Nations; the Chiefs of the Treaty No. 4 and Treaty No. 6 First Nations
M. Oldershaw	Green Alternatives Institute of Alberta

T. Hall	Indigenous Ecology Alliance
N.J. McKenzie	Industrial Gas Consumers Association of Alberta
D. Bursey W.M. Moreland	IPL Energy Inc. (now Enbridge Inc.)
J. Yardley M. Stewart K. Goodings	Peace River Regional District
M.D. Sawyer G. Hunt N. Conrad	Rocky Mountain Ecosystem Coalition
E. Wolf	Native Canadian Petroleum Association
J. Maas J.R. Rath	Treaty 8 Tribal Association
I. Anderson	United Association of Plumbers and Pipefitters
D.G. Davies	Western Canada Producers Group (comprising AEC Marketing, Apache Canada Ltd., Anderson Exploration Ltd., Beau Canada Exploration Ltd., Benson Petroleum Ltd., Bonavista Petroleum Ltd., Cabre Exploration Ltd., Canadian Occidental Petroleum Ltd., Canor Energy Ltd., Chauvco Resources Ltd., Chevron Canada Resources, Conoco Canada Limited, Cordeca Corporation, Crestar Energy, Cypress Energy Inc., Encal Energy Ltd., Fortune Energy Inc., Genesis Exploration Ltd., Gulf Canada Resources Limited, Ironwood Petroleum Ltd., ISH Energy Ltd., Jarrod Oils Ltd., Merit Energy Ltd., Northstar Energy Corporation, Numac Energy Inc., Petro-Canada Oil and Gas, Pinnacle Resources Ltd., Poco Petroleums Ltd., Purcell Energy Ltd., Ranger Oil Limited, Remington Energy Ltd., Rigel Oil & Gas Ltd., Sabre Energy Ltd., Star Oil & Gas Ltd., Summit Resources Limited, Suncor Energy Inc., Talisman Energy Inc., Tarragon Oil & Gas Limited, Unocal Canada Ltd., and Wintershall Canada Ltd.)
G. Laplante	Aboriginal Pipelines
J.B. Ballem, Q.C. B. Stevenson	Alberta Natural Gas Company Ltd
H.R. Ward	Amoco Canada Petroleum Company Ltd.; Cochin Pipe Lines Ltd.
T.G. Kane, Q.C.	ANR Pipeline Company

E.C. Eddy	BC Gas Utility Ltd.
R.C. Beattie	CanWest Gas Supply Inc.
F.D. Cass	Consumers' Gas Company Ltd. (now Enbridge Consumers Gas)
C.B. Woods	Duke Energy Marketing Limited Partnership
R. McLennan G. McLennan C.B. Johnson R.M. Lonergan	Foothills Pipe Lines Ltd.; Foothills Pipe Lines (Alta.) Ltd.; Foothills Pipe Lines (Sask.) Ltd.; and Foothills Pipe Lines (South B.C.) Ltd.
W. Shalagan	Imperial Oil Resources
K.M. Fernandez	Mobil Oil Canada
D.I. Bloom	NICOR Inc.
G.J. Pratte K. Laroche	Northwestern Utilities Limited
F.R. Foran S. Lee D. Wright	NOVA Chemicals Ltd.
H.D. Williamson, Q.C. J. Liteplo J.H. Smellie	NOVA Gas Transmission Ltd.
D.M.K. Ellerton	Pacific Gas and Electric Company
E.S. Decter	Pan-Alberta Gas Ltd.
P. McCunn-Miller P. Kahler	PanCanadian Petroleum Limited
J.R.M. Kowch M.L. Voinorosky	ProGas Limited
M.J. Samuel	TransCanada Gas Services
P.R. Jeffrey J.M. Murray R. Graw B. Andriachuk	TransCanada PipeLines Limited
J.M. Murray R.W. Graw	TransVoyageur Transmission Ltd.

G. Cameron	Union Gas Limited
A.S. Hollingworth L.A. Cusano D.M. Wood	Viking Voyageur Gas Transmission Company, L.L.C.
L.G. Keough E. Bourgeault	Westcoast Energy Inc.
B.F. Kiely	Wisconsin Capacity Coalition (comprising Madison Gas and Electric Company, Wisconsin Fuel & Light Company, Wisconsin Gas Company, Wisconsin Public Service Corporation, and Northern States Power Company)
C.J.C. Page	Alberta Department of Energy
A. Johnstone	On His Own Behalf
R. Rutledge	On His Own Behalf
J.D. Carter, Q.C. T. King	Landowners of Grande Prairie County and Municipal District of Greenview (Byron Bue, Lowell Davis, Peter and Levke Eggers, Charles and Nora Evaskevich, Brian and Terry Fast, Raymond and Vicki Gilkyson, Stirling and Laura Hanson, Donald Meador, Mona Middleton, Brian and Janice Moe, Randy and Kris Moe, Franklin Moller, Lloyd and Katherine Olley, Scenic View Farms (Richard), Dale and Gwen Smith, Frank Thederahn, and Ed Welsh)
R. Bardak	On His Own Behalf
D. Bedier	On Her Own Behalf
Dr. W. Scott	On His Own Behalf
C. Bridge J. Austin C. Titus	Blueberry Farms Community
C.G. Apsassin	On His Own Behalf
R. Desfosses	On His Own Behalf
W. Sawchuk	Chetwynd Environmental Society
D.W. Orchard	Heartland Gas Initiative
B. Fayant	Métis Regional Council, Zone IV
G. Jones	Western Canada Wilderness Committee

J. Wachowich	Consumers Coalition of Alberta
D.E. Carlson L. Girvan	Strathcona County
T.R. Hankinson B.L. Hankinson	On Their Own Behalf
J. Rypien	Pipeline Contractors Association
M.W. Webber	Operating Engineers of Alberta
R. Collin	On His Own Behalf
S. Arcand	The Alexander First Nation
D.R. Horseman	Horse Lake First Nation
S. Elliott	On Her Own Behalf
J. Hanebury P. Noonan P. Enderwick	National Energy Board Counsel

Overview

(Note: This overview is provided solely for the convenience of the reader and does not constitute part of this Decision or the Reasons, to which the reader is referred for particulars. For the convenience of the reader, cross-references to the Reasons are provided.)

The National Energy Board, after taking into account extensive evidence compiled during 77 days of public hearings and the results of a comprehensive study on potential environmental effects, is satisfied that the proposed Alliance Pipeline Project is required by the public convenience and necessity. Therefore, subject to the approval of the Governor in Council, Alliance Pipeline Ltd. will receive a certificate from the Board authorizing the construction of the pipeline in Canada. The certificate will contain 54 terms and conditions to ensure that the Project is carried out with proper regard to the protection of property and the environment, the safety of the public, and other interests. The Board has also approved the tolling arrangement negotiated between Alliance and its shippers.

The following sections contain background on the application, the hearing process, and the key issues that were raised.

The Application [1.1]

On 3 July 1997, Alliance Pipeline Ltd. (''Alliance'' or ''the Company'') applied to the National Energy Board (''Board'') on behalf of the Alliance Pipeline Limited Partnership for (i) a certificate of public convenience and necessity to construct and operate the Canadian portion of a proposed natural gas pipeline system from northeastern British Columbia (''B.C.'') and northwestern Alberta to the area of Chicago, Illinois and (ii) related toll and tariff authorizations. The application was made pursuant to Parts III and IV of the *National Energy Board Act* (''*NEB Act*'').

The Canadian portion of the pipeline, referred to as the Alliance Pipeline Project (''Project''), is also subject to the provisions of the *Canadian Environmental Assessment Act* (''*CEAA*''). The *Comprehensive Study List Regulations*, made pursuant to the *CEAA*, required a comprehensive study of the proposal, since more than 75 km of new right-of-way will be required.

Alliance proposes to construct (i) approximately 1565 km (970 miles) of mainline and related facilities from a point near Gordondale, Alberta to a point on the Canada / United States border near Elmore, Saskatchewan and (ii) approximately 770 km (480 miles) of lateral pipelines and related facilities in B.C. and Alberta. Seven mainline compressor stations and 26 lateral compressor stations are planned. The mainline will be 914 and 1067 mm (36 and 42 inches) in diameter and the laterals will range in size from 114 to 610 mm (4 to 24 inches).

The pipeline is scheduled to be in service in the second half of the year 2000 and will be capable of delivering 37.5 million cubic metres (1.325 billion cubic feet) of natural gas per day on a firm basis. The estimated capital cost of the Canadian-based facilities is approximately $2 billion.

GH-3-97 Proceeding [1.2]

On 3 September 1997, the Board issued Hearing Order GH-3-97 setting out the Directions on Procedure for the public hearing to be conducted in respect of the Alliance Pipeline proposal.

The GH-3-97 proceeding was held both (i) to obtain the evidence and views of interested persons on the application which had been filed by Alliance under the *NEB Act* and (ii) to provide a forum for public participation in the comprehensive study to be conducted under the *CEAA*.

The hearing spanned 77 days between the dates of 6 January 1998 and 21 May 1998, with the Board's offices in Calgary serving as the primary hearing location. Regional hearings were held during the month of February 1998 in Regina, Fort St. John, and Edmonton to facilitate participation by persons living in areas along the proposed pipeline route.

On 7 April 1998, an "Agreement on Natural Gas Pipeline Regulation, Competition and Change to Promote a Competitive Environment and Greater Customer Choice" was signed by the Canadian Association of Petroleum Producers, NOVA Corporation, NOVA Gas Transmission Ltd. ("NGTL"), the Small Explorers and Producers Association of Canada, and TransCanada PipeLines Limited ("TCPL"). The signing of the document led NGTL and TCPL to withdraw substantial portions of evidence which they had filed in commercial opposition to Alliance.

Environmental Assessment [1.4]

The Board completed a Comprehensive Study Report ("CSR") for the Project in accordance with the provisions of the *CEAA* and also to satisfy its responsibilities pursuant to section 52 of the *NEB Act* relating to environmental matters. The CSR, which was publicly released on 2 October 1998, took into consideration comments from the public as well as advice from the other two Responsible Authorities for the Project (being Fisheries and Oceans Canada and the Prairie Farm Rehabilitation Administration), other federal departments, and the Province of Saskatchewan.

The Responsible Authorities (including the Board) concluded that the Project is not likely to cause significant adverse environmental effects, provided that the mitigative measures and undertakings committed to during the hearing are implemented together with the 41 recommendations contained in the CSR.

Having taken into consideration the CSR, public comments filed pursuant to subsection 22(2) of the *CEAA*, and the Canadian Environmental Assessment Agency's recommendation, the Minister of the Environment also concluded that the Project, as described, is not likely to cause significant adverse environmental effects. As a result, the Minister referred Alliance's proposed project back to the Board and other responsible authorities for action under subsection 37(1) of the *CEAA*.

The Board will include the 41 recommendations contained in the CSR as terms and conditions to any certificate issued to Alliance.

Economic Feasibility [1.3.1 and 2]

Consistent with past practice for natural gas pipeline facility proposals, the Board assessed the economic feasibility of the Project by determining the likelihood of the applied-for facilities being used at a reasonable level over their economic life and the likelihood of the demand charges being paid. [2.1]

This assessment included an evaluation of (i) the availability of long-term gas supply, (ii) the long-term outlook for gas markets, (iii) the contractual commitments underpinning the proposal, and (iv) project financing. The Board's main findings in these areas were as follows:

(i) *Supply* - The Board recognized that the approval and construction of the Project could result in pipeline capacity leading supply for a period of time and result in some temporary offloading from other pipeline systems. However, it is inherent in the nature of any greenfield pipeline that the investment must be large enough to take advantage of economies of scale. The Board found that Alliance made a credible case that, on a long-term basis, overall supply will be sufficient to sustain reasonable utilization rates of the Alliance Pipeline and of the other pipeline systems transporting gas from the Western Canada Sedimentary Basin. [2.2]

(ii) *Markets* - The Board is satisfied that natural gas markets will be sufficient to support the Alliance Pipeline over the life of the Project. Canadian gas producers have demonstrated that they can compete successfully in U.S. markets and the long-term outlook for gas demand in the U.S. appears to be robust. [2.3]

(iii) *Contractual Commitments* - The Board noted that subscriptions have been taken by 37 shippers for approximately 98 per cent of the available firm capacity for terms of 15 years, which translates into demand charge commitments of $4.7 billion (including the U.S. segment of the pipeline, the commitments are for $8.2 billion). The evidence satisfied the Board that shippers committed to the Project after a thorough assessment of the value of the proposed transportation service and the associated risks. [2.4]

(iv) *Financing* - The Board was satisfied with both the ability of Alliance and its partners to finance the Project and the proposed debt/equity structure. Alliance indicated that it had firm commitments for all of the equity, and that its lenders had underwritten all of the debt financing on a non-recourse basis. [2.4]

Having considered all of the evidence, the Board concluded that the Project is economically feasible. [2.5]

Potential Commercial Impacts [1.3.1 and 3]

A large-scale project such as that proposed by Alliance inevitably raises the potential for commercial impacts on persons other than the owners and users of the pipeline. The Board considered these potential impacts in its overall assessment of whether the applied-for Project is in the public convenience and necessity. Its main findings in this regard were as follows:

(i) *Competition and Netbacks* - The Board found that Alliance is a well-conceived project that will provide an innovative alternative to the existing gas transportation infrastructure. The Board concluded that, in the long term, the Alliance Pipeline will help ensure that there is adequate transportation capacity from the Western Canada Sedimentary Basin to the major market centres and that the pipeline will have a positive effect on producer netbacks. The Board also found that the long-term competitive benefits of the Project will be significant and will extend beyond those directly participating in the Project as owners and shippers. [3.1]

(ii) *Potential Impacts on Existing Pipeline Infrastructure* - The Board heard arguments relating to potential impacts on pipeline facilities owned by NGTL, Northwestern Utilities Limited, Foothills Pipe Lines Ltd., and BC Gas Utility Ltd. (the last by virtue of its dependency on the pipeline system of Westcoast Energy Inc.). These arguments focused mainly on the potential for offloading and stranded capacity. Having considered all of the evidence and the submissions of parties, the Board was not persuaded that there were sufficient public interest reasons to justify any regulatory action in the context of the Alliance application. The Board also noted that the potential for some duplication of facilities is inherent in the nature of competition, and that duplication which results in beneficial competition may be considered to be in the public interest. [3.2]

(iii) *Potential Impacts on the Alberta Petrochemical Industry* - The Board heard arguments relating to concerns that the removal of natural gas liquids from Alberta on the Alliance Pipeline would result in negative impacts on the Alberta petrochemical industry. The concerns focused on the following elements of Alliance's proposed tariff: (1) the requirement for shippers to relinquish the rights to liquids entrained in the gas streams delivered to Alliance; (2) the proposed volumetric tolling methodology; (3) Authorized Overrun Service, whereby firm service shippers may utilize spare capacity for the cost of fuel only; and (4) physical access to liquids on the Alliance Pipeline. Having considered all of the evidence and submissions by parties, the Board did not find that any features of Alliance's proposed transportation service package are contrary to the public interest. In the Board's view, the evidence showed that there will be adequate ethane supply for both the currently planned and future expansions of the Alberta petrochemical industry. Further, the Board does not believe that physical access to the liquids that will be carried on the Alliance Pipeline will be a significant issue once the pipeline is in operation. [3]

(iv) *Domestic Access to Natural Gas* - The Board was not persuaded to adopt any specific proposals advanced by parties aimed at enhancing domestic access to natural gas. The Board suggested, in its Reasons, that potential gas buyers should attempt to negotiate commercial arrangements with gas suppliers and gas transportation companies under market conditions. [3.4]

Socio-Economic and Land Matters [4]

As part of its public interest determination, the Board considered the potential socio-economic effects of the Project. The three principal categories studied by Alliance were: (i) employment, non-labour impacts, and income; (ii) municipal services; and (iii) quality of life. Certain issues, including those relating to quality of life, were addressed in the CSR. [4.1.1]

Alliance estimated that direct employment associated with construction would total 4,485 person-years, and that, in the broader context, construction would create approximately 12,000 person-years of direct, indirect, and induced employment in B.C., Alberta, and Saskatchewan. Alliance further submitted that operation and maintenance of the pipeline in Canada would generate approximately 335 person-years of direct, indirect, and induced employment. [4.1.2]

Alliance also described the mechanisms that will be used to ensure First Nations and Métis participation in the Project. The Board will include in any certificate a condition requiring Alliance to

report on its performance in respect of its First Nations and Métis employment and commercial participation objectives for the construction and operation of the pipeline. [4.1.2]

The Board was satisfied with the information provided by Alliance on the potential adverse effects of the Project on municipal services. [4.1.3]

In respect of land matters, the Board considered Alliance's proposed land requirements for permanent right-of-way and temporary work space and found that these were reasonable and justified. The Board was also satisfied with the proposed general location of the Alliance Pipeline. The Board considered Alliance's request for an 800 m corridor but concluded that such a corridor would not be consistent with the specific route that was communicated to landowners and that the request was not supported by the studies undertaken for the Project. Any certificate issued will be conditioned to require Board approval of any deviations from the specific route. [4.2]

Engineering and Safety Matters [5]

The Project is planned to be designed, constructed, and operated in accordance with the Board's *Onshore Pipeline Regulations* and the latest edition of the CSA Z662 standard entitled *Oil and Gas Pipeline Systems* ("CSA Z662-96"). Alliance will also comply with other federal, provincial, and municipal codes and regulations where applicable. [5.1]

The pipeline will employ high-pressure technology and will be capable of transporting rich natural gas mixtures. The unique combination of pressure and gas composition will result in the transportation of dense phase gas and will give rise to cost efficiencies. State-of-the-art leak detection and in-line inspection techiques will be employed. [5.1]

Pursuant to section 108(5.1) of the *NEB Act*, the Board waived the requirement for Alliance to obtain leave to cross other utilities, aside from navigable waterways and railways, provided that (i) a written agreement is entered into between Alliance and the utility owner for the construction of any crossings and (ii) any such crossings are constructed in conformity with CSA Z662-96 requirements. Where agreement is not reached, the Board will adjudicate after hearing from both Alliance and the utility owner. [5.2]

The Board considered the various aspects of Alliance's fracture prevention and control design. The Board is satisfied with the Company's fracture initiation control design and notes that the fracture propagation control design is proposed to be validated through a full-scale burst testing program. Any certificate issued will include a condition requiring Alliance to file a detailed report on the burst test results with the Board for approval at least 30 days prior to the commencement of mainline trenching. The condition will further stipulate that, in the event that the tests are unsuccessful, Alliance shall submit operating limits or a crack arrestor program, with or without operating limits, for either or both of the 914 mm and 1067 mm diameter sections of mainline, together with technical justification, for approval by the Board. [5.3]

Traffic, Tolls, & Tariffs and Form of Regulation [1.3.2 and 6]

Alliance requested that the Board issue an order pursuant to Part IV of the *NEB Act* (i) approving the toll methodology and the tariff that would apply to the service provided by the Company and (ii) designating Alliance as a Group 2 company for purposes of toll and tariff regulation.

The Board has determined that (i) Alliance's proposed tolling methodology would result in tolls that are just and reasonable and (ii) that there would be no unjust discrimination in tolls, service, or facilities. The Board noted that the tariff and resultant tolls were negotiated between Alliance and its shippers, and considers that the proposed volumetric tolling methodology best respects the principle that tolls should be cost-based. The Board also found Alliance's proposed Authorized Overrun Service to be an innovative and appropriate approach to dealing with the variability of available capacity on a natural gas pipeline.

The Board concluded that Alliance should be designated as a Group 1 company for purposes of toll and tariff regulation, based on the following considerations: (i) the Alliance Pipeline will be one of the largest under the Board's jurisdiction, (ii) it will transport natural gas for a number of third party shippers, and (iii) the Company's tolls will be set on a cost-of-service basis. The Board also decided that it would be appropriate to relieve Alliance from the requirement to file Quarterly Surveillance Reports and Performance Measures.

Chapter 1

Introduction

1.1 The Application and Project Overview

On 3 July 1997, Alliance Pipeline Ltd. (''Alliance'', ''the Applicant'', or ''the Company'') applied to the National Energy Board (''Board'' or ''NEB'') on behalf of the Alliance Pipeline Limited Partnership for (i) a certificate of public convenience and necessity to construct and operate the Canadian portion of a proposed natural gas pipeline system from northeastern British Columbia (''B.C.'') and northwestern Alberta to the midwest United States (''U.S.'' or ''U.S.A.'') and (ii) related toll and tariff authorizations.[1] The application was made pursuant to Parts III and IV of the *National Energy Board Act* (''*NEB Act*'').

The Canadian portion of the pipeline system, referred to as the Alliance Pipeline Project (''Project''), is also subject to the provisions of the *Canadian Environmental Assessment Act* (''*CEAA*''). The *Comprehensive Study List Regulations*, made pursuant to the *CEAA*, required a comprehensive study of the proposal, since more than 75 km of new right-of-way would be required.

Alliance proposes to construct (i) approximately 1565 km (970 miles) of mainline and related facilities from a point near Gordondale, Alberta to a point on the Canada/U.S. border near Elmore, Saskatchewan and (ii) approximately 770 km (480 miles) of lateral pipelines and related facilities in B.C. and Alberta. Seven mainline compressor stations and 26 lateral compressor stations are planned. The mainline would be 914 and 1067 mm (36 and 42 inches) in diameter and the laterals would range in size from 114 to 610 mm (4 to 24 inches).

The U.S. portion of the pipeline would extend approximately 1430 km (890 miles) to the system's terminus near Chicago, Illinois, where it would connect with the integrated North American pipeline grid. Alliance Pipeline L.P. filed an application with the Federal Energy Regulatory Commission (''FERC'') in Washington, D.C. for a certificate of public convenience and necessity to construct and operate the U.S.-based facilities.[2]

The Project is depicted in Figures 1-1, 1-2, and 1-3, and is described in more detail in Appendix I. As shown by the last of those figures, and the accompanying lateral legend (Table 1-1), the system is configured to receive gas from 44 existing gas plants.

The pipeline is proposed to commence service in the second half of the year 2000 and would be capable of delivering 37.5 million cubic metres (1.325 billion cubic feet) of natural gas per day on a

[1] Alliance Pipeline Ltd. is the general partner of the Alliance Pipeline Limited Partnership, which has as its members (as of 30 January 1998): IPL Energy Inc., Westcoast Energy Inc., and Mapco Canada Energy Inc. together with affiliates of Fort Chicago Energy Partners L.P., Coastal Corporation, PanEnergy Corp., and Unocal Canada Limited.

[2] On 23 September 1998, Alliance Pipeline L.P. publicly announced that it had accepted a certificate of public convenience and necessity which was offered by the FERC on 17 September 1998.

firm basis. As further detailed in section 2.4, approximately 98 per cent of the available firm capacity has been subscribed for a 15-year term.

Figure 1-1
The Proposed Alliance Pipeline Project

Figure 1-2
Pipeline Route Map/Mainline and Compressor Stations

Figure 1-3
Pipeline Route Map/Laterals

Table 1-1
Lateral Pipeline Legend

Lateral Name	Plant No.	Plant Name	Plant Location
Highway Lateral	BC 01	Highway - WGSI	b-36-I 94-B-16
Aitken Creek Lateral	BC 02	Aitken Creek - Westcoast	d-44-L 94-A-13
Taylor Lateral	BC 03	McMahon - Westcoast	01-36-82-18W6
Taylor Lateral	BC 04	Younger - Solex	02-36-82-18W6
Boundary Lake Lateral	AB 05	Boundary - Petrocan	14-24-84-15W6
Boundary Lake Lateral	AB 07	Boundary Lake S. - Rigel	01-14-85-09W6
Peace River Lateral	AB 09	Fourth Creek - Cranrock	16-11-82-09W6
Peace River Lateral	AB 10	Josephine - Rigel	09-01-88-10W6
Pouce Coupe Lateral	AB 11	Pouce Coupe - Star	11-34-79-12W6
Gordondale West Lat.	AB 12	Pouce Coupe - C.N.R.L.	11-19-79-11W6
Gordondale West Lat.	AB 13	Gordondale - Westcoast	16-02-79-12W6
Peace River Lateral	AB 14	Gordondale - Cranrock	11-24-79-11W6
Whitburn Lateral	AB 15	Progress - Suncor	07-22-78-09W6
Whitburn Lateral	AB 16	Progress - Norcen	08-01-78-10W6
Valhalla North Lateral	AB 17	Valhalla - Can. Abraxas	13-21-76-09W6
Valhalla S. Connection	AB 20	Valhalla - Crestar	01-29-75-09W6
Teepee Creek Lateral	AB 21	Teepee Creek - Talisman	07-02-74-04W6
Spirit River Lateral	AB 23	Sexsmith - AEC	04-08-75-07W6
Hythe Lateral	AB 24	Hythe / Brainard - AEC	14-18-74-12W6
Hythe Lateral	AB 26	Knopic - Rigel	16-21-73-10W6
Wembley Connection	AB 27	Wembley - Crestar	05-19-73-10W6
Elmworth Lateral	AB 27A	Elmworth - Can. Hunter	01-08-70-11W6
Wapiti Lateral	AB 29	Wapiti - Imperial	04-08-69-08W6
Gold Creek Lateral	AB 30	Gold Creek - Petrocan	13-26-67-05W6
Karr Lateral	AB 31	Karr - Can. Hunter	04-10-85-02W6
Simonette Lateral	AB 32	Simonette - Encal	09-06-63-25W5
Ante Creek Lateral	AB 34	Ante Creek - Rio Alto	10-18-65-23W5
Ante Creek Lateral	AB 35	Waskahigan - Rio Alto	15-07-64-23W5
Bigstone Lateral	AB 36	Bigstone W. - Petromet	14-28-59-22W5
Bigstone Lateral	AB 37	Bigstone - Amoco	06-10-61-22W5
Two Creeks Lateral	AB 38	Two Creeks - Summit	07-04-63-18W5
Fox Creek Lateral	AB 40	Kaybob - Petrocan	08-09-64-19W5
Kaybob Lateral	AB 41	Kaybob - S. I & II - Amoco	01-12-62-20W5
Edson West Lateral	AB 43	Galloway - Ranger	14-14-53-20W5
Edson Lateral	AB 44	Edson - Talisman	04-11-53-18W5
Edson Lateralp	AB 44A	Wolf South - Poco	05-01-51-15W5
Kaybob South Lateral	AB 45	Kaybob S. - III Chevron	11-15-59-18W5
Edson Lateral	AB 46	W. Whitecourt - Amoco	08-17-60-15W5
Carson Creek Lateral	AB 47	Carson Creek - Mobil	04-23-61-12W5
Whitecourt Lateral	AB 48	Whitecourt - Petrocan	12-26-59-11W5
Paddle River Lateral	AB 49	Paddle River - Canoxy	13-06-57-08W5
Cherhill Lateral	AB 50	Cherhill - Chauvco	02-25-56-06W5
Fort Sask. Lateral	AB 53	Fort Sask. - Chevron	05-14-55-22W4
Fort Sask. Lateral	AB 54	Fort Sask. - Dow	12 & 13-55-22W4

The estimated capital cost of the entire pipeline to Chicago is approximately $3.7 billion in Canadian dollars, about $2 billion of which would be for the Canadian portion of the system.

For logistical purposes, Alliance has divided the construction of the mainline into nine segments or spreads to be built over 18 months. Lateral construction work would also be packaged into spreads. Individual contractors may construct several laterals.

1.2 GH-3-97 Proceeding

On 3 September 1997, the Board issued Hearing Order GH-3-97 setting out the Directions on Procedure for the public hearing to be conducted in respect of the Alliance Pipeline proposal. The list of issues that appeared in the hearing order has been reproduced as Appendix II.

As the Board indicated in its hearing order, the GH-3-97 proceeding was held both (i) to obtain the evidence and views of interested persons on the application which had been filed by Alliance under the *NEB Act* and (ii) to provide a forum for public participation in the comprehensive study to be conducted under the *CEAA*.

The Board convened a pre-hearing conference on 17 November 1997 (and which spanned six days) to hear argument on a number of pre-filed notices of motion. Among the outcomes were (i) Board directions to Alliance for additional evidence and (ii) the fixing of 6 January 1998 as the commencement date for the oral hearing.

The oral hearing spanned 77 days between the dates of 6 January 1998 and 21 May 1998, with the Board's offices in Calgary serving as the primary hearing location. Regional hearings were held during the month of February 1998 in Regina, Saskatchewan, Fort St. John, B.C., and Edmonton, Alberta to facilitate participation by persons living in areas along the proposed pipeline route.

On 7 April 1998, an "Agreement on Natural Gas Pipeline Regulation, Competition and Change to Promote a Competitive Environment and Greater Customer Choice" ("the Accord") was signed by the Canadian Association of Petroleum Producers ("CAPP"), NOVA Corporation, NOVA Gas Transmission Ltd. ("NGTL"), the Small Explorers and Producers Association of Canada ("SEPAC"), and TransCanada PipeLines Limited ("TCPL").

The Accord recognized the importance of maintaining an alignment of interest and embraced the following three guiding principles:

(i) support for competition and greater customer choice;

(ii) the need to construct competitive incremental pipeline capacity from the Western Canada Sedimentary Basin ("WCSB") by both new competitors and existing pipelines alike in a timely, safe, and cost-effective manner; and

(iii) the need to effect regulatory changes that would provide existing and new pipelines equal opportunity to compete, recognizing that such competition is desirable and in the best interests of all industry stakeholders.

The signing of the Accord led NGTL and TCPL to withdraw substantial portions of evidence which they had filed in commercial opposition to Alliance. For convenience of reference, the full text of the Accord has been reproduced as Appendix III.

1.3 Requested Authorizations and Statutory Tests

1.3.1 Certificate of Public Convenience and Necessity

The certificate application by Alliance was filed pursuant to section 52 of the *NEB Act*, which reads as follows:

> *The Board may, subject to the approval of the Governor in Council, issue a certificate in respect of a pipeline if the Board is satisfied that the pipeline is and will be required by the present and future public convenience and necessity and, in considering an application for a certificate, the Board shall have regard to all considerations that appear to it to be relevant, and may have regard to the following:*
> *(a) the availability of oil, gas or any other commodity to the pipeline;*
> *(b) the existence of markets, actual or potential;*
> *(c) the economic feasibility of the pipeline;*
> *(d) the financial responsibility and financial structure of the applicant, the methods of financing the pipeline and the extent to which Canadians will have an opportunity of participating in the financing, engineering and construction of the pipeline; and*
> *(e) any public interest that in the Board's opinion may be affected by the granting or refusing of the application.*

During final argument, comments were made by counsel for Westcoast Energy Inc. ("WEI") on the degree of latitude provided to the Board by the statute. In this connection, the Board notes that the English and French versions of section 52 convey different meanings. The English version states that the Board may have regard to the factors described in paragraphs (a) through (e), while the meaning of the French version does not convey that element of discretion and suggests that the factors in paragraphs (a) though (e) must be considered.[1] Since both versions are official, resort must be taken to the rules for construing bilingual legislation to determine the intention of Parliament. Applying the rules of statutory interpretation applicable in this context, the Board is of the opinion that the French version of section 52 conveys the intention of Parliament and is the version which must be applied.

In recent years, the Board has assessed the economic feasibility of a gas pipeline facilities application by determining the likelihood of the facilities being used at a reasonable level over their economic life

---

[1] The French version of section 52 of the *NEB Act* reads as follows (more restrictive text underlined): *Sous réserve de l'agrément du gouverneur en counseil, l'Office peut, s'il est convaincu de son caract ère d'utilité publique, tant pour le présent que pour le futur, délivrer un certificat à l'égard d'un pipeline; ce faisant, il tient compte de tous les facteurs qu'il estime pertinents, et notamment de ce qui suit :*
(a) l'approvisionnement du pipeline en pétrole, gaz ou autre produit;
(b) l'existence de marchés, réels ou potentiels;
(c) la faisabilité économique du pipeline;
(d) la responsabilité et la structure financières du demandeur et les méthodes de financement du pipeline ainsi que la mesure dans laquelle les Canadiens auront la possibilité de participer au financement, à l'ingénierie ainsi qu'à la construction du pipeline;
(e) les conséquences sur l'intérêt public que peut, à son avis, avoir sa décision.

and the likelihood of the demand charges being paid.[1] This assessment typically includes an evaluation of such factors as (i) the availability of long-term gas supply, (ii) the long-term outlook for gas demand in the markets to be served, (iii) the contractual commitments underpinning the proposal, and (iv) project financing. Therefore, the subject of economic feasibility encompasses paragraphs (a) through (d) of section 52 of the *NEB Act*.

A large-scale project such as that proposed by Alliance inevitably raises the potential for commercial impacts on persons other than the owners and users of the pipeline. Paragraph 52(e) of the *NEB Act* enables the Board to consider these potential impacts in its overall assessment of whether the applied-for Project is in the public convenience and necessity. Other aspects considered under this paragraph include environmental protection, socio-economic impacts, and public safety.

The Board has generally aligned these Reasons with section 52 of the *NEB Act*. Chapter 2 addresses the economic feasibility of the Project while Chapters 3 through 5 address the other public interest considerations articulated above with the exception of environmental protection. As further detailed in section 1.4, that aspect was addressed in the Comprehensive Study Report ("CSR") for the Alliance Pipeline Project which was publicly released on 2 October 1998.

1.3.2 Traffic, Tolls, & Tariffs and Method of Regulation

Alliance requested that the Board issue an order pursuant to Part IV of the *NEB Act* (i) approving the toll methodology and the tariff that would apply to service provided by the Company and (ii) designating Alliance as a Group 2 company for purposes of toll and tariff regulation.

With respect to the former, the Board has a duty under Part IV to ensure that the tolls for the pipelines under its jurisdiction are just and reasonable, and that there is no unjust discrimination in tolls, service, or facilities.[2] The Board also has to establish an appropriate level of regulatory scrutiny and filing requirements in this area. For this purpose, the Board classifies each of the pipeline companies under its jurisdiction as either a Group 1 or Group 2 company. Matters pertaining to Part IV of the *NEB Act* are addressed in Chapter 6.

The Board notes that some aspects of Alliance's proposed transportation service package are relevant to the public interest determination that the Board must make pursuant to section 52 of the *NEB Act*, as they potentially have implications for parties other than Alliance and its shippers. These potential implications are addressed in Chapter 3.

---

[1] The Board first articulated this test in its GH-5-89 decision respecting a TCPL expansion proposal (reference GH-5-89 Reasons for Decision, Volume 1 "Tolling and Economic Feasibility" dated November 1990, Chapter 3, pages 26 and 29).

[2] Section 62 of the *NEB Act* states as follows: *All tolls shall be just and reasonable, and shall always, under substantially similar circumstances and conditions with respect to all traffic of the same description carried over the same route, be charged equally to all persons at the same rate.* Section 67 states that: *A company shall not make any unjust discrimination in tolls, service or facilities against any person or locality.*

1.4 Environmental Assessment

The Board completed a CSR for the Alliance Pipeline Project in order to satisfy the requirements of the *CEAA* and also to satisfy its responsibilities pursuant to section 52 of the *NEB Act* relating to environmental matters. The CSR took into consideration comments from the public as well as advice from the other Responsible Authorities, interested federal departments (including Environment Canada), and the Province of Saskatchewan. The other two Responsible Authorities for the Alliance Pipeline Project were Fisheries and Oceans Canada and the Prairie Farm Rehabilitation Administration.

The CSR described the Project, the environmental assessment process (including public participation), the potential environmental effects, the assessment methodology, mitigative measures, and the criteria used in evaluating the significance of the environmental effects. It also provided conclusions and recommendations regarding the significance of the Project's potential adverse environmental effects.

The Responsible Authorities (including the NEB) concluded that the Project is not likely to cause significant adverse environmental effects, provided that the mitigative measures and undertakings committed to by Alliance during the hearing are implemented together with the 41 recommendations contained in the CSR.

As previously indicated, the Board used its public hearing process as a means of obtaining the views of interested persons on both the particulars of the environmental assessment and Alliance's application under the *NEB Act* for a certificate of public convenience and necessity to construct and operate the pipeline. Prior to the public hearing, the environmental assessment process commenced with a public scoping process to identify the scope of the assessment including the factors to be assessed. After the public hearing, participants were provided with an opportunity to comment on a draft of the CSR prior to it being finalized.

The Canadian Environmental Assessment Agency (''Agency'') facilitated a public comment process on the final CSR between 5 October 1998 and 3 November 1998. Following the receipt of comments, the CSR was forwarded to the Minister of Environment for a decision on the course of action to be taken under section 23 of the *CEAA* in respect of the environmental assessment of the Project. The Board's decision on Alliance's certificate application was reserved pending this determination.

Having taken into consideration the CSR, public comments filed pursuant to subsection 22(2) of the *CEAA*, and the Agency's recommendation, the Minister of the Environment concluded that the Project, as described, is not likely to cause significant adverse environmental effects. As a result, the Minister of the Environment referred Alliance's proposed project back to the Board and other Responsible Authorities for action under subsection 37(1) of the *CEAA*.[1]

Views of the Board

Upon receipt of the referral from the Minister of the Environment, the Board has considered the CSR and is of the view that, with the implementation of Alliance's proposed mitigative measures and the recommendations set forth in the CSR, the Project is not likely to cause significant adverse environmental effects. In this regard,

[1] Reference Appendix IV for a copy of the Minister's correspondence to the Board dated 23 November 1998.

the Board would incorporate all recommended conditions as described in the CSR into any certificate issued to Alliance for the Project (see Appendix V). [1]

The seven recommendations contained in Chapter 5 of the CSR (and which appear in Appendix V of these Reasons as certificate conditions 18, 33, 43, and 50 through 53) describe the procedures that would be put in place to inspect, monitor, and follow up on environmental issues relevant to the Project should a certificate be issued. It should be noted that the Board will carry out its own inspections and audits in accordance with the relevant legislation and conditions of approval to ensure protection of the environment.

Chapter 3 of the CSR provides a description of Alliance's public participation program. The Board is of the view that the requirements of Part II of the Board's *Guidelines for Filing Requirements* have been satisfied as interested groups and persons have been afforded opportunities for meaningful public input at both the local and regional levels during the planning and design stages of the Project.

Alliance stated that it would continue to apprise the Board of the results of ongoing consultation on a quarterly basis until such time that all concerns and comments are resolved. Alliance also noted that it would notify the Board of any new issues that may arise as a result of consultations. With respect to specific issues, such as the development of Alliance's air quality monitoring programs, the issue of further consultation is addressed in the recommendations contained in the CSR and the corresponding conditions in Appendix V of these Reasons.

[1] Reference the table at the end of Appendix V for concordance between the recommendations contained in the CSR and the certificate terms and conditions.

Chapter 2

Economic Feasibility

Some parties, notably TCPL and Foothills Pipe Lines Ltd. ("Foothills"), invited the Board to clarify its expectations with respect to the standards an applicant is expected to meet to demonstrate that pipeline facilities applied for under section 52 of the *NEB Act* are economically feasible. This chapter first addresses the arguments of parties with respect to the appropriate test of economic feasibility and then addresses the arguments with respect to supply, markets, and shipper commitments and project financing. It concludes with a finding on the economic feasibility of the applied-for facilities.

2.1 The Appropriate Test of Economic Feasibility

Views of the Applicant

Alliance stated that the Board should make a determination of the economic feasibility of the proposed pipeline facilities by having regard to evidence on all relevant factors which impact on the likelihood of the facilities being used at a reasonable level over the Project's economic life and the likelihood of the demand charges being paid.

Alliance maintained that there has been an evolution of the economic feasibility test over time. This evolution is part of the challenge to the traditional regulatory paradigm under which monopoly pipelines are regulated. It is part of the changing market dynamics, the increase in competition, and the deregulation of natural gas markets and prices.

In Alliance's view, the best evidence with respect to an assessment of the feasibility of the Project is provided by the financial commitments made to the Project. If markets work, and competition is present, evidence with respect to contracts and financial commitments should be adequate to demonstrate that the facilities will be used and paid for over the useful economic life of the Project; i.e. that the Project is economically feasible.

Views of Intervenors

TCPL took the view that, if the Alliance Project were to be certificated, the Board would be applying a relaxed standard for the determination of economic feasibility. TCPL contended that the determination of whether demand charges would be paid is difficult for the Board to make because Alliance's total capital cost is unknown. Therefore, TCPL argued that the toll or demand charge is indeterminate. TCPL maintained that the Board would either be dispensing with a determination as to whether the toll is likely to be paid over the economic life of the facilities or that it would be assuming that Alliance's shippers would pay regardless, and that would be the new standard.

According to TCPL, a second area in which an approval of the Alliance Project by the Board would represent a change in regulatory standards would be with respect to the advance capacity nature of the application. By approving the Alliance application, the Board would be moving further away from a need to demonstrate project-specific supply or market evidence. TCPL requested that the Board

expressly state how it regards these and any other aspects in which it is adjusting the regulatory standard.

At the end of the hearing, TCPL stated that, on the strength of the Accord and the platform for industry consensus on regulatory change that the Accord represents, it did not oppose many of the changes to the regulatory standards of review that would be represented by certification of the Project. Rather, TCPL expected to receive similar treatment in the future.

Foothills argued that, in this new era of pipeline competition, all pipelines regulated by the Board must be subject to the same type and degree of regulation. For there to be fair competition, the Board must ensure that owners of existing pipelines are not encumbered by regulatory rules or precedents which inhibit competition.

Foothills stated that one important element of competition among pipelines is competition for commitment to capacity on new pipeline facilities. Ideally, the Board should have enunciated its rules or guidelines for the new era of competition before considering the Alliance Project.

Foothills recommended that the Board clarify the test for public convenience and necessity that should apply to all natural gas pipeline proposals, not just the Alliance Project, and that recognition should be given to the fact that the new era of pipeline competition will require a reduced level of economic regulation.

IPL Energy Inc. ("IPLE") submitted that consistent and fair regulatory treatment did not mean identical treatment or adhering to a set pattern that had been evident in past practice; rather, it meant considering the circumstances of each case on its own merits. If other pipeline companies wish to seek a change from the Board regarding their regulation following the Alliance hearing, they may do so.

In the view of Westcoast Energy Inc. ("WEI"), the Board has shown considerable flexibility in the administration of the economic feasibility test and has approached applications on a case-by-case basis. WEI submitted that the Board can continue to rely on the underlying fundamentals of the economic feasibility test.

Views of the Board

Since the GH-5-89 TCPL hearing, the Board has assessed the economic feasibility of applications for new natural gas pipeline facilities by determining the likelihood of the facilities being used at a reasonable level over the economic life of the project and the likelihood of the demand charges being paid. As noted in Chapter 1, this assessment includes an evaluation of: (i) the availability of long-term gas supply, (ii) the long-term outlook for gas markets, (iii) the contractual commitments underpinning the proposal, and (iv) project financing.

The Board is not changing its basic test of economic feasibility in the assessment of the Alliance Project. The Board notes, however, that there are important distinctions between the circumstances of the GH-5-89 application and the Alliance application. In GH-5-89, TCPL was proposing a large expansion to its system which would result in a large increase to its rate base. There was considerable concern express by existing

shippers who believed they could be negatively impacted. They were concerned about the toll increase they would have to bear to help pay for the new facilities and about the risk that they might have to pay for the costs of any underutilization of the TCPL system in the event that the markets to be served by the expansion were not sustainable.

In its application, Alliance declared itself to be "at-risk" with respect to any underutilization of the applied-for facilities. If any of the shippers default on their demand charge payments, Alliance shareholders will bear any subsequent cost impacts, rather than other shippers on the system. This fact addresses one potentially significant public interest consideration. When there is potential for existing shippers to be harmed by a planned expansion, the Board has a heightened responsibility to ensure that the proposed expansion facilities are likely to be needed.

The Board is of the view that, in the circumstances of this application, considerable weight should be placed on an assessment of shipper support for the Project as demonstrated through a willingness to pay demand charges and a demonstration of the financing capability of the Project owners. Financial commitments made to the Project by shippers and banks, and the commercial judgements that stand behind these commitments, provide strong evidence of the commercial need for the Project. Further, the Board is of the view that the at-risk nature of the Project is a factor to be taken into account in the review of supply and market evidence.

With respect to the requests for clarification of regulatory "standards" that applications pursuant to section 52 of the *NEB Act* must meet, the Board reiterates that it is not making any fundamental changes to the test of economic feasibility. The Board is assessing the likelihood that the applied-for facilities will be used at a reasonable level over the economic life of the Project and the likelihood that the demand charges will be paid.

2.2 Gas Supply

At the outset of the hearing, Alliance argued that an overall supply study provided sufficient evidence with respect to the availability of gas to the Project. In support of its application, Alliance submitted an aggregate supply study prepared by Gilbert Laustsen Jung Associates Ltd. ("GLJ"). Following the hearing of procedural motions in November 1997, Alliance was required to submit supply information for each of its shippers. Nonetheless, Alliance argued that evidence on aggregate supply, in conjunction with transportation contracts, should be sufficient to support its application. Alliance maintained that shipper commitments behind the transportation contracts provide the best evidence that supply will be available and argued that shipper-specific supply evidence has very real limitations in today's natural gas market.

2.2.1 Overall Gas Supply

Views of the Applicant

The GLJ Study submitted by Alliance was based on an assessment of supply in the entire WCSB. It was Alliance's view that the study reflects the reality that all WCSB gas supply will be available to

Alliance, either directly or indirectly. Alliance stated that swaps and exchanges between producers would allow this to happen. Furthermore, the signing of the Accord has increased the likelihood that interconnections with NGTL will be built in the future, thus decreasing the need for exchanges.

The GLJ Study tested the adequacy of gas supply in the WCSB to meet overall demand under several demand scenarios. Two estimates of reserves were employed: (i) a Base Case that used a current Board estimate of ultimate reserves (7.9 $10^9 m^3$ or 280.2 Tcf) and (ii) a Sensitivity Case that used the current Board estimate plus an assumed growth in ultimate reserves of 2.5 per cent per year to the year 2007 (10.7 $10^9 m^3$ or 378.7 Tcf).

The GLJ Study concluded that only a small fraction of the currently-recognized resource base would need to be depleted to satisfy all demand over the next 20 years, even assuming large export pipeline capacity additions, combined with continuous robust growth in domestic gas demand. In addition, drilling activity levels that are reasonable, vis-a-vis recent industry performance, should maintain sufficient production capability to meet even the most aggressive demand scenario. Alliance claimed that the GLJ Study reflects defensible and reasonable production decline rates that are supported by previous studies by both Sproule Associates Limited ("Sproule") and the Board, and that its assumption of an average of 42.5 $10^6 m^3$ (1.5 Bcf) reserves additions per well is conservative.

In support of its claim, Alliance prepared summary tables of some of the key variables and assumptions behind the overall supply studies referred to during the proceeding. Highlights of these summaries are provided in Table 2-1.

In summary, Alliance argued that there would be adequate gas supplies available for both its Project and for existing pipeline systems.

Views of Intervenors

The Western Canada Producers Group ("WCPG"), IPLE, Union Gas Limited ("Union Gas"), and WEI all supported Alliance's view that the capacity of the WCSB was sufficiently robust to ensure that the Alliance pipeline would be used at reasonable levels over its economic life. Union added that it was confident that the market forces that have driven the Alliance Project will operate to keep both existing systems and Alliance substantially full for the foreseeable future. WEI argued that there was no basis to suggest that anything other than a normal refill period would occur following start-up of Alliance and was confident that tools such as swaps and exchanges would ensure that the necessary supply would be available to Alliance. Further, WEI believed that the Interconnection Policy in the Accord would alleviate the need for swaps and exchanges. [1]

Certain other intervenors were not supportive of Alliance's position.

The Green Alternatives Institute of Alberta ("GAIA") did not agree that Alliance's supply evidence demonstrated adequacy of supply and suggested that the GLJ study contained errors that neutralized its value. In particular, GAIA was of the view that the GLJ model added reserves beyond the level of ultimate potential assumed. Alliance argued that this was an incorrect conclusion. GAIA also argued that, because no new ultimate potential estimates had been published by either the Geological Survey

[1] The Interconnection Policy is set out in article 2 of the Accord (reference Appendix III).

of Canada or the Board since 1992 and 1994 respectively, it was unlikely that future ultimate potential estimates would grow significantly. GAIA was also concerned that the number of new wells required would be significantly higher than estimated by Alliance.

Table 2-1
Summary of Overall Supply Evidence

Study	Ultimate Potential $10^{12}m^3$ (Tcf)	Maximum Annual Production from WCSB 10^9m^3 (Tcf)
Coles Gilbert Associates Ltd. 1994 study prepared for Foothills in support of its Wild Horse Pipeline Project	8.5 (300) from WCSB	170 (6.0) in 2011
Sproule Associates Limited July 1996 study prepared for Foothills in support of its 1998 Eastern Leg Expansion Project	8.1 (287) from Alberta 9.9 (351) from WCSB	184 (6.5) in 2012 (WCSB Case A)
Sproule Associates Limited May 1997 study prepared for TCPL in support of its GH-2-97 facilities application	7.7 (270) from Alberta 9.3 (329) from WCSB	212 (7.5) in 2017 (Base Case)
NGTL May 1997 Annual Plan	>6.0 (>210) from Alberta	
Gilbert Laustsen Jung Associates Ltd. prepared for Alliance	Base Case (NEB Estimates) 5.6 (196) from Alberta 7.4 (260) from WCSB (conv.) 7.9 (280) from WCSB (total) Current NEB plus 2.5% Growth 7.7 (270) from Alberta 10.2 (359) from WCSB (conv.) 10.7 (379) from WCSB (total)	204 (7.2) in 2019 204 (7.2) in 2019

Foothills argued that the overall supply evidence was nothing more than a literature search and a trend analysis with some judgement applied. Foothills suggested that the Sproule Study which was undertaken for its 1998 Eastern Leg Expansion Project implied that adding an additional 46.7 $10^6m^3/d$ (1.65 Bcf/d) for Alliance would result in insufficient production capacity for existing pipelines and Alliance by 2003. Foothills was concerned that there was a potential lack of deliverability that would result in shippers having to compete for supplies that would otherwise be transported on existing pipeline systems. Alliance countered that, when properly applied, the Sproule model supports the Alliance case.

NGTL was concerned that there may not be sufficient supply to fully satisfy the needs of both Alliance and NGTL. It retained Fekete Associates Inc. ("Fekete") to examine the supply available at

the 35 receipt points that would be common to both NGTL and Alliance (depicted in Figure 2-1). NGTL argued that the Fekete Study of the Alliance catchment area represented the only receipt-specific supply information filed during the proceeding. The Fekete analysis was based on a production decline method and predicts an 18-year refill (i.e. either Alliance, NGTL, or both pipelines would be underutilized for at least 18 years following the in-service date of the Alliance Pipeline). Based on its system design forecast, NGTL predicted a minimum 6-year refill period, but stated that the design forecast was not necessarily the appropriate forecast to use to determine a refill period.

Alliance argued that the Fekete evidence was not used by NGTL for either its Annual Plan or its facilities filings with the Alberta Energy and Utilities Board ("EUB") and that Fekete's reserves estimates were inconsistent with NGTL and EUB data. Accordingly, it contended that the evidence provided by this study was of no value to the Board. Alliance believed that, given a realistic assumption about Alliance's volume, decline rates, and additional wells, the refill period could be eliminated.

While Alliance suggested that NGTL's own forecasts demonstrate growth of supply availability at the 35 common receipt points, NGTL believed that all of the incremental volumes projected would be transported to market on NGTL during the period between 1997-98 and the Alliance in-service date. Alliance argued that there would still be incremental volumes available after its proposed in-service date.

The Rocky Mountain Ecosystem Coalition ("RMEC") submitted a study, prepared by Drummond Consulting, on discovered reserves, cumulative production, and remaining reserves for the area accessible to Alliance. That study reported an estimate of ultimate remaining gas reserves of 984.2 $10^9 m^3$ (34.9 Tcf) in the immediate area and 1715.7 $10^9 m^3$ (60.8 Tcf) in an expanded area which included gas reserves that might be available to Alliance at some point in the future.

BC Gas Utility Ltd. ("BC Gas") noted that, while Alliance had made a general statement that 25 to 40 per cent of its supply might come from B.C., it had designed its facilities into B.C. to remove some 14.2 $10^6 m^3/d$ (500 MMcf/d) or 25 per cent of the province's current gas production. BC Gas submitted that, at this rate, there would be a real risk of insufficient deliverability in B.C. over the short run.

2.2.2 Shipper-Specific Gas Supply

As indicated at the commencement of section 2.2, Alliance filed shipper-specific supply evidence. Detailed supply and demand information was provided for the 30 producer and aggregator shippers, representing about 60 per cent of the contracted capacity. The majority of the supply estimates submitted were those of either provincial regulators or third party consultants. All but four of the shippers currently have established reserves exceeding their total requirements over the term of their Alliance commitment. For each of the seven other shippers, which are either major gas marketing companies or Canadian local distribution companies ("LDCs"), Alliance provided a general description of overall marketing strategy.

Figure 2-1
Common NGTL/Alliance Receipt Points

Alliance argued that the level of supply detail for the aggregator and producer shippers was far greater than that provided by other pipeline companies in support of recent facility applications. Alliance also commented that much of the shipper supply information submitted was identical to that provided in support of recent export applications before the Board. Alliance argued that the shipper-specific supply information provides additional compelling evidence in support of its application.

Views of Intervenors

Several intervenors, namely the WCPG, Consumers' Gas Company Ltd. ("Consumers' Gas"), Duke Energy Marketing Limited Partnership ("Duke"), IPLE, ProGas Limited ("ProGas"), Union Gas, and WEI, supported Alliance's position regarding the relative value of its shipper supply information.

Consumers' Gas pointed out to the Board that the company does not match specific gas supply contracts with the terms of any specific transportation contracts. Consumers' Gas has adopted a gas acquisition process that provides flexibility to contract gas supply shortly before it is needed so as to obtain pricing and other terms to better match the gas market.

Duke argued that the shipper-specific supply issue advanced by Alliance's competitors should not distract the Board from an unconditional approval of the Alliance application.

IPLE pointed out that, for oil pipeline facility applications, the Board does not review project-specific or shipper-specific supply; rather, the focus is on macro supply. IPLE argued that the Board should also rely on an aggregate assessment of supply for the Alliance application. Evidence on shipper-specific supply does not provide assurance that gas will flow through the pipeline facilities over the lifespan of a project.

ProGas indicated that its gas supply is more than sufficient to meet all of its sales commitments, including sales intended to flow on Alliance. ProGas noted that it has access to 11.9 $10^6 m^3/d$ (419 MMcf/d) at the 44 proposed Alliance receipt points and has full supply capability through 2007 without the need for infill drilling or additional field compression.

Union Gas pointed out that for the past nine years, TCPL has benefitted from the Board's GHW-3-89 decision which exempted TCPL from filing shipper-specific supply information for normal growth markets.[1] It stated that, in the current market, neither buyers nor sellers of natural gas prefer long-term contracts. Union Gas argued that the Board gets assurance that Alliance will be used and useful through a combination of the dynamic market for gas and shippers' incentives to make maximum use of their transportation entitlements for which they are paying demand charges.

WEI argued that, in the current circumstances, there was no need for shippers to specifically dedicate supply in advance for the Board to have the necessary level of comfort to approve facilities. WEI indicated that Engage Energy, its marketing affiliate with sales in excess of 198 $10^6 m^3/d$ (7.0 Bcf/d), would be ensuring that WEI utilizes its contracted capacity at high levels throughout the term of its Transportation Service Agreement with Alliance.

---

[1] NEB Reasons for Decision dated January 1990 on "Information on Gas Supply Required to be Provided by TransCanada PipeLines Limited in Support of its 1991/92 and 1992/93 Facilities Application" (GHW-3-89).

Both the RMEC and Foothills had concerns about the adequacy of shipper-specific supply supporting Alliance's proposed facilities. The RMEC pointed out that most of the Alliance shippers had far less than 15 years of supply and, therefore, there was "no demonstration" that there would be adequate gas supply to justify the Project.

Foothills was concerned that shippers which had no gas supply arrangements in place, and which had contracted for approximately 36 per cent of the Alliance Pipeline's capacity, would be competing for gas supply that would otherwise be transported on existing systems.

Views of the Board

The Board is required by section 52 of the *NEB Act* to have regard to the availability of gas to a proposed gas pipeline project. This requirement does not mean that the Board must assure itself that there will be adequate gas supplies to keep a pipeline project full at all times. Rather, the Board must be satisfied that there is a reasonable expectation that adequate supplies of natural gas will be available so that the facilities can be justified over the economic life of a project.

There was considerable discussion during the hearing about the usefulness of evidence on shipper-specific supply to the Board in making its determination on the adequacy of supply. The Board is of the view that, in the context of this application, the most appropriate way to satisfy itself with respect to the adequacy of supply is to examine the overall assessment of supply and the shipper commitments that underpin the transportation contracts.

The Board is of the view that it is unnecessary to rely on evidence that Alliance's shippers have long-term sources of supply in place at the outset of the Project. Adherence to this requirement would be inconsistent with current market realities and could impose unnecessary costs on Canadian producers. The natural gas market is extremely competitive and both producers and buyers strive to minimize costs in all aspects of their business. Producers now attempt to bring on additional supply capability as required by market demand, rather than developing this capability in advance.

The Board is also of the view that the financial commitments that shippers have made to pay $8.2 billion in demand charges on the Alliance system over the first 15 years of operation provides a powerful incentive for shippers to acquire adequate gas supplies. These companies, backed by their lenders, have made expert determinations that they will have access to adequate gas supplies in order to utilize their capacity entitlements on the Alliance Project.

The Board notes that the Alliance Project is unique in that it appears to be relying on a specific catchment area for gas supply to support the pipeline. NGTL's evidence, prepared by Fekete, was the only evidence subjected to cross-examination that directionally addressed supply from the Alliance catchment area. The Board has difficulty in accepting the results of the Fekete study because of its conservative approach and the study's relatively low estimates of supply availability from B.C. Further, the Board notes that NGTL's own forecasts suggest that field deliverability at

the 35 receipt points which are common to NGTL and Alliance in Alberta will increase significantly.

In the absence of interconnections with NGTL, Alliance's 44 receipt points will provide the only physical connections through which gas supply can enter Alliance. The Board notes that the Accord provides for a framework which is intended to facilitate the construction of interconnections between Alliance and NGTL. Any such interconnections would provide Alliance with access to a broader area of supply. However, whether or not this occurs, the Board is of the view that the transportation contracts provide strong evidence that adequate supply will be available to the Alliance Pipeline.

The RMEC did not present a witness to support the evidence of Drummond Consulting that was tendered in evidence. The Board thereupon indicated to the RMEC that its failure to present a witness to speak to that evidence could tell against the RMEC in the weight to be attributed to it, a position which the RMEC freely acknowledged "would be a logical position that the Board may want to take".

The Board considers that this evidence should not be given great weight since it was in the nature of expert evidence and no expert witness appeared at the hearing to speak to it. To the extent that this evidence has been taken into account, however, the Board does not believe that it impeaches the evidence put forward by Alliance regarding the availability of supply to the pipeline.

With respect to overall supply, the Alliance Project, together with approved expansions to other pipeline systems, would provide an opportunity to increase natural gas production in the WCSB from 161 $10^9 m^3$ (5.7 Tcf) per year to nearly 190 $10^9 m^3$ (6.7 Tcf) per year. Alliance alone would provide 14.2 $10^9 m^3$ (0.5 Tcf) per year of additional capacity. The Board finds merit in Foothills' suggestion that this will create competition among pipelines for supply to an extent that has not previously existed, at least initially.

As illustrated by Table 2-1, the Board is mindful that projections of overall supply are inherently uncertain. The actual supply that is made available to the market will depend upon producers' decisions to develop supplies in the light of prevailing market conditions. However, on the basis of evidence filed by experts on basin potential, the Board is of the view that it is reasonable to expect that production from the WCSB can be increased to the projected levels.

The GLJ Study and the most recent Sproule Study (1997) both conclude that the WCSB can sustain production levels in excess of 198 $10^9 m^3$ (7 Tcf) per year. In the GLJ base case, production increases can match growing demand until 2011, at which time rates of 227 $10^9 m^3$ (8 Tcf) per year would be achieved. In GLJ's sensitivity case, production matches growing demand throughout the study period (1997-2019) reaching 241 $10^9 m^3$ (8.5 Tcf) per year at the end of that period. The GLJ approach is a somewhat simplified analysis of the ability of the WCSB to meet projected demand. Nonetheless, the analysis in GLJ's base case is based on sound and reasonable assumptions about ultimate potential, drilling activity, reserves to production ratios,

decline rates, initial well productivities, and reserves per well. While the Board agrees that estimates of ultimate potential may increase in the future, it believes that the assumption by GLJ in its sensitivity case that ultimate potential will grow at a rate of 2.5 per cent a year appears optimistic. Furthermore, this assumption was not supported by any substantial analysis or evidence.

The Sproule Study is somewhat more detailed than the GLJ Study, including, for example, consideration of several financial parameters. However, like the GLJ Study, it utilizes a non-equilibrium model in which gas demand and price are externally generated. The modelling results indicate an ability to produce in excess of 198 $10^9 m^3$ (7 Tcf) per year throughout the period examined (1996-2018).

In summary, the Board recognizes that the approval and construction of the Alliance Pipeline Project could result in pipeline capacity leading supply for a period of time. The "lumpiness" of investment in a project such as this, along with the related shipper commitments to Alliance, may result in some temporary offloading from other pipeline systems, necessitating some period of refill. However, it is inherent in the nature of any greenfield pipeline that the investment must be large enough to take advantage of economies of scale. The Board accepts that Alliance has made a credible case that, on a long-term basis, overall supply will be sufficient to sustain reasonable utilization rates of the Alliance Pipeline and of other pipeline systems transporting natural gas from the WCSB.

2.3 Markets

Views of the Applicant

Alliance stated that the main objective of its Project is to provide incremental capacity from the WCSB to the U.S. market centre in the Chicago area and to other connected markets. Alliance argued that there is demand for incremental Canadian gas supplies and that there is a need for its Project to provide additional export capacity from the WCSB.

In support of its application, Alliance provided a market study prepared by the Reed Consulting Group ("Reed"). The Reed Study focused on the Chicago area and markets accessible from that market centre. The Alliance Project is intended to interconnect with three major pipelines: ANR Pipeline Company ("ANR"), Midwestern Gas Transmission Company, and Natural Gas Pipeline Company of America. Alliance indicated that there is approximately 123.2 $10^6 m^3/d$ (4,350 MMcf/d) of take-away capacity from the Chicago Hub, including two major LDCs (Peoples Gas and Light and Northern Illinois Gas Company). The physical capacity on the connecting interstate pipelines was not provided. The Reed Study also noted that there are a number of proposals to construct new pipeline connections that would move gas from the Chicago market centre to markets in the U.S. Northeast and Atlantic Seaboard regions.

Reed developed its market assessment by using published projections of gas demand prepared by the Gas Research Institute ("GRI"), the U.S. Energy Information Administration ("EIA"), the American Gas Association ("AGA"), and Natural Resources Canada. The study examined natural gas demand forecasts published in for all regions that Alliance considered to be accessible to its Project for the 1995 to 2015 period. The study incorporated most census regions in the U.S., including the South

Atlantic and Gulf Coast regions, although it excluded the Mountain and Pacific market regions. Table 2-2 summarizes the demand forecasts for those market regions accessible to the Alliance Project.

Table 2-2
U.S. Market Demand Forecast (Reed Study)
$10^9 m^3$ (Tcf)

Year	Minimum	Average	Maximum
1995 Base Demand	329.4 (11.62)	438.7 (15.48)	514.3 (18.15)
2000 Forecast Demand Annual Growth Rate	495.9 (17.50) 8.5%	530.5 (18.72) 3.9%	560.3 (19.77) 1.7%
2005 Forecast Demand Annual Growth Rate	556.1 (19.62) 5.4%	588.0 (20.75) 3.0%	596.0 (21.03) 1.5%
2010 Forecast Demand Annual Growth Rate	600.3 (21.19) 4.1%	641.5 (22.64) 2.6%	661.3 (23.34) 1.7%
2015 Forecast Demand Annual Growth Rate	675.3 (23.83) 3.7%	693.8 (24.49) 2.3%	712.3 (25.14) 1.6%

These forecasts yield growth rates of 3.9 per cent and 2.3 per cent for the 1995-2000 and 1995-2015 periods, respectively. Most of the growth is expected to occur in the electric generation sector as a result of deregulation and restructuring toward a competitive market. Retirement of uneconomic generating capacity and the development of efficient gas-fired combined-cycle generation units is expected to increase demand for gas. Alliance contended that fuel efficiencies for gas-fired plants tend to be about 50 per cent higher than coal-fired plants (10.5 MJ/kWh or 10,000 Btu/kWh for coal versus 6.8 MJ/kWh or 6,500 Btu/kWh for gas) which makes gas competitive, even if its price on a heat-equivalent basis were higher.

The Reed Study also analyzed the market potential by utilizing five different scenarios of the market share that Canadian gas is likely to capture: (i) a 14.3 per cent share of the total U.S. market as per its 1995 share; (ii) a 46 per cent share of the incremental U.S. market; (iii) market share based on a forecast of Canadian exports, assuming a Canadian market share ranging from 13.6 per cent in 1995 to 15.3 per cent in 2000; (iv) market share based on relative gas production and reserves; and (v) the Canadian market share of the U.S. market that would be necessary to fully utilize incremental capacity provided by the Alliance Pipeline.

Based on an assessment of the likely outcomes with respect to market share in these scenarios, the Reed Study suggested that Alliance's capacity would be needed by 2000 or shortly thereafter, even assuming that the 1998 Foothills/Northern Border expansion was completed in advance of the Alliance Project coming on stream.

The Reed Study concluded that, with increased market liquidity and by means of displacement, exchange, and backhauls, Canadian supplies will have access to markets currently served almost exclusively by U.S. gas supplies. Alliance explained the mechanism by which backhauls could work, using St. Louis as an example. Gas on ANR, originally destined for Joliet, could be exchanged in St. Louis for gas delivered to Joliet via Alliance. Alliance led evidence to indicate that this exchange would not result in any incremental cost, but that a small service charge (one or two cents per GJ or MMBtu) might be levied.

In response to an undertaking taken during cross-examination, Alliance provided an updated demand projection based on the EIA's 1998 Annual Energy Outlook (Table 2-3).

Table 2-3
U.S. Market Demand Forecast (Reed Study Update)
$10^9 m^3$ (Tcf)

Year	Minimum	Average	Maximum
1995 Base Demand	503.0 (17.75)	503.0 (17.75)	503.0 (17.75)
2000 Forecast Demand Annual Growth Rate	538.5 (19.01) 1.6%	551.9 (19.48) 1.8%	565.4 (19.95) 2.4%
2005 Forecast Demand Annual Growth Rate	587.9 (20.75) 1.6%	603.9 (21.31) 1.8%	620.0 (21.88) 2.0%
2010 Forecast Demand Annual Growth Rate	641.7 (22.65) 1.6%	660.4 (23.30) 1.8%	679.1 (23.96) 2.0%
2015 Forecast Demand Annual Growth Rate	699.0 (24.67) 1.7%	718.3 (25.35) 1.8%	737.6 (26.03) 1.9%

The revised outlook uses only GRI and EIA projections, resulting in lower growth rates in demand than those indicated in Table 2-3. Alliance also recognized that the incremental approved export capacity would be 31.5 $10^9 m^3$/yr (1,110 Bcf/yr) by 2000, including that provided by its own Project. In its market analysis, Alliance estimated capacity on its system as 37.5 $10^6 m^3$/d (1,325 MMcf/d) plus an estimated Authorized Overrun Service of ten per cent, yielding a capacity of 40.9 $10^6 m^3$/d (1,445 MMcf/d) for an annual throughput capability of 15.1 $10^9 m^3$ (532 Bcf).

Using the market shares in scenarios 1 and 2, Alliance projected that it would have a 55 to 65 per cent utilization rate in 2000 and a 100 per cent utilization rate in 2005. Alternatively, Alliance would have to capture 14.2 per cent of the market share in its seven market regions for full utilization in 2000, compared to the 9.3 per cent for which Canadian gas accounted in 1995 (scenario 5). The market shares with respect to scenarios 3 and 4 were not submitted with the update.

Alliance stated that it was not privy to the details of the marketing efforts or downstream transportation arrangements made by its shippers, but expects that its shippers will either sell to end-users in Chicago, access transportation service on existing pipelines, enter into swaps/exchanges, or access transportation on new pipeline facilities.

Incremental gas markets may exist in Ontario due to the potential closure of nuclear generating stations. Alliance's assessment is that not all of these plants will return to service because they will not be economical sources of power generation. Alliance estimated the incremental natural gas market for electricity generation in Ontario to be between 4.93 and 7.03 $10^9 m^3/yr$ (174 and 248 Bcf/yr).

Alliance argued that Canadian gas will be competitive with U.S. gas. Alliance surmised that U.S. gas, particularly from the Gulf Coast, would have production costs that are approximately double those from the WCSB, which would make Canadian gas more attractive in the Chicago market. In conclusion, Alliance argued that gas flowing on its system would capture additional market share in the U.S., both in the Chicago market and in other connected markets.

Views of Intervenors

Foothills was of the view that Alliance's demand forecast was overly optimistic. Foothills examined all recently-approved natural gas export expansions (TCPL 1996/97 and 1997/98, Foothills 1998 Eastern Leg Expansion, and Maritimes & Northeast Pipeline) and concluded that the Alliance Project was not necessary to satisfy the expected incremental demand in the near term. Foothills noted that the Board had approved additional export capacity of 8.6 $10^9 m^3/yr$ (304 Bcf/yr) to Midwest markets and an additional 7.65 $10^9 m^3/yr$ (270 Bcf/yr) to Northeast markets. Adding the planned Alliance volumes of approximately 15.1 $10^9 m^3/yr$ (532 Bcf/yr) would result in the addition of 31.3 $10^9 m^3/yr$ (1,106 Bcf/yr) of export capacity by the year 2000.

Foothills examined incremental regional demand, based on evidence provided by Alliance in an appendix to the Reed Study. After some intermediate calculations, Foothills showed its estimate of incremental demand, relative to 1995 (Table 2-4).

Table 2-4
U.S. Incremental Demand Forecast (Foothills)
$10^9 m^3/yr$ (Bcf/yr)

U.S. Market Region	Incremental demand 2000	Incremental demand 2005
Midwest	10.65 (376)	29.4 (1,038)
Northeast	7.82 (276)	17.3 (612)
Gulf Coast	9.78 (345)	26.3 (928)
South Atlantic	16.0 (565)	28.7 (1,013)
Total	**44.26 (1,562)**	**101.8 (3,592)**

Foothills concluded that Canadian exports would need to capture 71 per cent of all incremental U.S. demand if the new pipelines, including the Alliance Pipeline, were to operate at a 100 per cent utilization factor in the year 2000. Foothills also suggested that the Midwest and the Northeast were the only market areas directly connected to Alliance and that Alliance would need to capture 170 per cent of the market increment in these two regions to attain full utilization. In other words, significant displacement of U.S. supply would have to take place in these markets. This was disputed by Alliance, which indicated that gas carried by Alliance could access the Gulf Coast and South Atlantic markets by exchange and backhaul, and that there could be some displacement of U.S. gas in these two regions. Alliance acknowledged, however, that the Reed Study was not in any way based on discussions of the U.S. market with Alliance shippers.

Foothills stated that price differentials (in American dollars) between Chicago and New York averaged about $0.31/GJ or $0.33/MMBtu during the September 1996 to March 1998 period, whereas information extracted from ANR's website showed tolls on proposed pipelines from Chicago to New York of $0.82 to $0.98/GJ or $0.86 to $1.03/MMBtu. Foothills contended that gas would not flow on these pipelines as the price differential was substantially less than the toll. Alliance maintained that the New York price would likely rise, but did not come to a firm conclusion regarding the magnitude of the increase.

Foothills filed a study by the Brattle Group entitled "An Assessment of the Impact of the Alliance Project and its Implications for Foothills Pipe Lines Ltd". This assessment concluded that there is no incremental market demand to support the Alliance Project. More specifically, it argued that the Reed Study had three major flaws: (i) it ignores the effects of additional capacity being provided by TCPL and Foothills/Northern Border expansions prior to Alliance's in-service date; (ii) the market area is too broad; and (iii) the study contains numerical and conceptual mistakes. It questioned the definition of the market area, the measurement of base year demand, and market share assumptions. The Brattle Group Study concluded that only the Midwest and the U.S. Northeast should be recognized as potential markets for Alliance.

Foothills concluded that, if the Alliance Project were approved and built on schedule, there would be excess export capacity from the WCSB to U.S. markets. Foothills therefore argued that some existing pipelines, including its own, would be underutilized for a significant period of time until market demand caught up with pipeline capacity. Foothills asked the Board to take this potential impact into account in making its determination on the application.

Views of the Board

The Board notes that a project like that applied for by Alliance must attain a minimum scale in order to be viable. The addition of a new large-diameter pipeline will, of necessity, result in large volumes of gas suddenly coming onto the market.

The Board tends to agree with Foothills that, with the current expansions of Foothills and TCPL, the U.S. Midwest market will be well served by Canadian gas supplies. With the addition of the Alliance Project, it is likely that Canadian gas will have to move to U.S. markets further east and south through existing and new pipeline connections, and through displacement sales.

The Board expects that additional Canadian gas will be sold in markets in both the U.S. Northeast and Eastern Canada, either directly through interconnections with the Alliance Pipeline or indirectly through swaps and exchanges. The Board also accepts that some gas may be marketed in non-traditional markets such as the South Atlantic and Gulf Coast. However, these latter sales will tend to be short-term and not necessarily indicative of sustainable market sales. In the Board's view, the inclusion of these non-traditional markets in Alliance's market assessment is not warranted at this time given the pattern of gas sales in the North American gas market.

Canadian gas will probably displace some U.S.-sourced gas in the Midwest market and, as a result, Canadian gas may gain a large share of the incremental demand in this market. Production costs in the WCSB compare favourably with production costs in U.S. basins and recent history indicates that Canadian gas has the potential to capture a large share of the growth market in the U.S. However, this may be achieved only if Canadian producers are willing to compete aggressively on the basis of price.

The Board is satisfied that markets will be sufficient to support the Alliance Pipeline over the life of the Project. Canadian gas producers have demonstrated that they can compete successfully in U.S. markets and the long-term outlook for gas demand in the U.S. appears to be robust. The financial commitments of the Alliance shippers to the Project provide strong evidence that the market will be adequate. The Board recognizes the shippers' business expertise and their confidence that the market opportunities merit the investments to which they have committed.

The Board accepts that it may initially be difficult to market the large increment of gas able to flow into U.S. markets, and that capacity on the Alliance Pipeline or on existing pipelines may not be fully utilized for some time following completion of the Project. The possibility of some period of underutilization is inherent in launching a large-scale greenfield natural gas pipeline.

2.4 Shipper Commitments and Project Financing

2.4.1 Shipper Commitments

In the fall of 1996, Alliance conducted an open season for the subscription of firm transportation service on its proposed pipeline. This process resulted in subscriptions being taken by 37 shippers for 36.8 $10^3 m^3/d$ (1,300.3 MMcf/d) or approximately 98 per cent of the available firm capacity for terms of 15 years.

Alliance filed pro forma copies of both the Precedent Agreement that had been entered into by each of the shippers and the Transportation Service Agreement that would be executed once the conditions precedent have been met. The Company also reported that comparable precedent agreements for matching capacities had been executed by Alliance Pipeline L.P. and shippers on the U.S. portion of the pipeline.

Alliance initially reported the open season results in aggregate terms, arguing that the Project would be adversely impacted if the identities of the shippers and the details of their commitments were to be

publicly disclosed. This position was challenged by certain of the intervenors and was the subject of a pre-hearing motion.

The Board was not persuaded of the need for confidential treatment and directed Alliance to provide a listing of the shippers and the respective individual contracted capacities. This listing has been reproduced as Table 2-5.

Under the terms of the Transportation Service Agreement, shippers are required to pay the applicable demand charges regardless of the volumes actually tranported on the pipeline. Alliance reported that the 98 per cent subscription level translates into an aggregate financial commitment to the Project of approximately $4.7 billion during the first 15 years. When the corresponding commitments relating to the U.S. segment are included, shippers have made commitments to pay approximately $8.2 billion (Canadian).

Alliance submitted that shipper subscriptions and the attendant commitments to pay demand charges, which were made in the face of other existing and proposed transportation options, represent a solid endorsement of the Project and constitute compelling evidence of the need for the new pipeline capacity that it would provide. This position was backed by CAPP, the WCPG, and certain other intervenors, including individual Alliance owners and shippers.

2.4.2 Project Financing

The capital structure of the Alliance Project is anticipated to be 30 per cent equity, consisting of the general and limited partner contributions, and 70 per cent debt. The Company is targeting an annual rate of return of 12 per cent on equity and estimates an annual effective interest rate of 6.70 per cent.

To obtain its debt financing, Alliance and its financial advisors, Goldman, Sachs & Co. and ScotiaMcLeod Inc., actively marketed the Project within the banking community. The Project was promoted on the basis that 37 shippers had signed 15-year transportation contracts for 98 per cent of the capacity, that the proposed toll structure of the pipeline reflects a reasonable allocation of risk between the pipeline and its shippers, and that the Project offers a competitively-priced, market-responsive service.

Alliance indicated that it had firm commitments for all of the equity, and that its lenders have underwritten all of the debt financing on a non-recourse basis.

During the proceeding, Foothills requested that Alliance be required to produce its commitment letter to the banks so that the Project's financing arrangements could be effectively tested. Alliance argued that provision of the requested document could put it at a competitive disadvantage because of its sensitive nature. The Board took the positions of both parties into consideration, exercised its powers pursuant to section 16.1 of the *NEB Act*, and permitted the letter to be filed with the Board on a confidential basis. The Board also directed Alliance to produce a summary of the letter for the hearing record.

No concerns were raised about Alliance's ability to finance the construction and operation of the pipeline.

Table 2-5
Alliance Pipeline Ltd. Shippers
(as of 21 January 1998)

	Contracted Capacity	
Shipper Name	**$10^3m^3/d$**	**MMcf/d**
AEC Marketing	1416.4	50.0
ANR Alliance Transportation Services Company	4128.8	145.75
Apache Canada Ltd.	141.6	5.00
Beau Canada Exploration Ltd.	529.7	18.70
Cabre Exploration Ltd.	283.3	10.00
Canadian Hunter Exploration Ltd.	1416.4	50.00
Canadian Natural Resources by its Managing Partner Canadian Natural Resources Limited	708.2	25.00
Canadian Occidental Petroleum Ltd.	424.9	15.00
Chauvco Resources Ltd.	2124.6	75.00
Chevron Canada Resources, a Partnership by its Managing Partner, Chevron Canada Resources Limited	849.8	30.00
The Consumers' Gas Company Ltd.	2124.6	75.00
Cordeca Corporation	1458.9	51.50
Crestar Energy by its Managing Partner Crestar Energy Inc. (Including Grad and Walker Energy Corporation)	1447.6	51.10
Duke Energy Marketing Limited Partnership	849.8	30.00
Duke Energy Resources Management Company	1905.0	67.25
Encal Energy Ltd.	566.6	20.00
Gulf Canada Resources Limited	1416.4	50.00
IPL AP Holdings (U.S.A.) Inc.	849.8	30.00
MAPCO Canada Energy Inc.	283.3	10.00
Newport Petroleum Corporation	212.5	7.50
Northstar Energy Corporation	566.6	20.00
Penn West Petroleum by its Managing Partner Penn West Petroleum Ltd.	141.6	5.00
Petro Canada	2407.9	85.00
Pinnacle Resources Ltd.	283.3	10.00
Poco Petroleums Ltd.	708.2	25.00
ProGas Limited	1841.3	65.00
Ranger Oil Limited	793.2	28.00
Remington Energy Ltd.	566.6	20.00
Rigel Oil & Gas Ltd.	424.9	15.00
Rio Alto Exploration Ltd.	212.5	7.50
Star Oil & Gas Ltd.	113.3	4.00
Summit Resources Limited	424.9	15.00
Talisman Energy Inc.	566.6	20.00
Tarragon Oil & Gas Limited	424.9	15.00
Union Gas Limited	2266.2	80.00
Westcoast Energy Inc.	1869.6	66.00
Wintershall Canada Ltd.	85.0	3.00
Total	**36834.6**	**1300.30**

Views of the Board

When shippers make long-term commitments by signing transportation contracts, they have obviously concluded that these commitments constitute the best use of their available capital in comparison to other options. The evidence presented by Alliance has satisfied the Board that shippers committed to the Project after a thorough assessment of the value of the proposed transportation service and the associated risks.

Given the importance of the shipper commitments in support of this application, the Board will include in any certificate which might be issued a condition requiring Alliance, prior to the commencement of construction, to submit an affidavit confirming that Transportation Service Agreements have been executed for the subscribed capacity.

On the basis of the evidence presented, the Board is satisfied with both the ability of Alliance and its partners to finance the Project and the proposed debt/equity structure.

2.5 Economic Feasibility of the Alliance Project

Views of the Applicant

Alliance argued that the hearing record clearly demonstrates that its Project underwent an extensive and thorough review and assessment by the market. Alliance was involved in an intense competition with proposed alternatives and the Alliance Project was chosen by the marketplace, as evidenced by the $8.2 billion that shippers have committed to pay to Alliance through the firm long-term transportation contracts which they have signed.

A broad spectrum of owners, including producers, pipelines, and public and institutional investors, have committed to provide the equity. The evidence indicated that lenders had underwritten all of the debt financing on a non-recourse basis, and were in the process of successful syndication of those loans.

Alliance also argued that it had provided sufficient evidence with respect to the availability of gas to its pipeline and with respect to the markets to be served by the Project. In conclusion, Alliance requested the Board to find that the market has worked effectively and that Alliance has satisfied the economic feasibility test.

Views of Intervenors

WEI submitted that there was no refuting the proposition that the Alliance Pipeline would be used at a reasonable level for the foreseeable future, and that the demand charges would be paid. WEI argued that the Board should find that the Project is economically feasible and justified.

The WCPG noted that producers expressed confidence about supply, markets, and economic feasibility, not by writing reports, but by writing cheques. The WCPG submitted that the Board can and should rely on these commitments and expressions of confidence to conclude that Alliance has satisfied the economic feasibility requirements.

As discussed in section 2.1, some parties made submissions regarding the appropriate test of economic feasibility. However, none of these parties actually argued that Alliance had failed to demonstrate that its Project was economically feasible.

Views of the Board

The Board finds that the Alliance Project is economically feasible; i.e. that the applied-for facilities are likely to be used at a reasonable level over the life of the Project and that the demand charges will likely be paid.

As previously discussed in this chapter, the Board recognizes that, with the completion of the Alliance Project, total take-away capacity from the WCSB may exceed the ability or willingness of natural gas producers to supply gas at prevailing market prices for some period of time after the pipeline is constructed. The Board is satisfied, however, that the Alliance Project will be economically viable. By its actions, the gas producing community has demonstrated strong support for an alternative transportation system. Canadian natural gas producers have repeatedly shown that they can compete effectively in U.S. markets and that they can increase gas production in response to market demand. The evidence provided by Alliance with respect to shipper commitments to the Project and the anticipated financial commitments by the banking community provide the Board with confidence that there is strong commercial support for the Project.

Chapter 3

Potential Commercial Impacts

A large project like that of Alliance can potentially have significant commercial impacts on third parties. These impacts could be beneficial, such as by providing increased choice and competitive benefits to parties other than the shippers on Alliance. They could also be negative, such as offloading gas volumes on existing pipelines, thereby creating financial hardship for the shareholders and/or the customers.

This chapter addresses: (i) the potential impact of the Alliance Pipeline Project on competition and on netback prices to gas producers; (ii) the potential impacts on existing pipeline companies; (iii) the potential impacts on the Alberta petrochemical industry; and (iv) concerns about domestic access to natural gas supplies.

3.1 Competition and Netbacks

Views of the Applicant

Alliance maintained that its application was about competition. This includes allowing markets to work, moving away from monopoly, and offering producers alternative access to markets. Alliance contended that its Project is fundamentally driven by the need for additional natural gas capacity from the WCSB to available markets, and by a desire to provide a competitive alternative to the dominant Canadian natural gas pipelines that currently provide transportation out of the basin.

As a "paradigm shift in energy transportation", Alliance planned to achieve its competitive objectives and hoped to establish a price connection between Chicago and Empress. Alliance estimated that the industry has been foregoing between $3.5 billion and $6 billion a year because of low gas prices. Alliance suggested that it would provide significant benefits to the natural gas industry through increased netback prices to producers.

Alliance stated that one of its main goals is to create fundamental change in the pipeline industry, whereby pipeline capacity leads supply instead of lagging supply as in the past. Alliance noted that Dr. Carpenter, a witness for Foothills, affirmed that some excess capacity, and the attendant costs, are acceptable and that stranded costs must be dealt with on a case-specific basis. He testified that spare capacity provides flexibility and is not necessarily a waste of resources. The WCSB has generally been unable to avoid gas-to-gas competition due to a lack of spare capacity.

Alliance also noted that Dr. Carpenter stated that the public interest is served by maximizing the value of gas production in the WCSB. He explained that if gas production value is to be maximized, the objective should be to optimize the quantity of pipeline capacity needed to connect prices in the WCSB with downstream market prices, and not necessarily to minimize pipeline costs.

Alliance submitted that it will be serving the public interest by building sufficient capacity to connect prices in the WCSB with downstream market prices and by maximizing the value of gas production.

Alliance suggested that it will provide a single, direct route from producer to consumer, resulting in greater certainty in terms of cost, timing, and security.

Alliance referred to the Accord, which states that TCPL and NGTL are supportive of competition. The Accord acknowledges that fostering competition in the pipeline industry is good public policy in terms of the WCSB, even though a role for regulation remains.

Alliance encouraged the Board to decide that competition can and does work within a regulated environment, and that the market has operated so as to create competition and to create a market-based solution to the WCSB capacity constraint.

Views of Intervenors

A number of parties also supported the competition that Alliance would bring to the gas transportation sector.

The 40 members of the WCPG were united in their unconditional support of the Project notwithstanding their diverse interests.[1] The WCPG submitted that new additional export capacity out of the WCSB would assist Western Canadian producers in obtaining higher prices for their gas. The WCPG also argued that the presence of Alliance as a competitive alternative would promote innovation and efficiency in the gas pipeline sector.

In CAPP's view, supporting market choice would be consistent with the Board's views on competition as expressed in MH-2-97[2]: the market should be permitted to operate; undue influence on the market should not be exercised by any individual or small group of individuals; and most importantly, shippers must be permitted to exercise the choice to have access to alternative means of getting their products to market.

CAPP pointed out that the Accord recognizes the benefits of pipeline competition and facilitates resolution of competition issues. In CAPP's view, the Accord, and the intention of the parties who signed it, lays the foundation for an industry solution to many of the issues before the Board. According to the WCPG, the best solutions are market-driven, industry-determined, and competitive, even though a need for regulatory oversight remains.

As stated in the Accord, CAPP emphasized that there must be some reasonable amount of spare or duplicative pipeline capacity which can create competition. Without that capacity, competition is non-existent, because shippers have no choices at the margin.

IPLE and PanCanadian Petroleum Ltd. ("PanCanadian") noted that the competitive service that Alliance is offering has several benefits that may not be available on other pipeline expansions: (i) it is a fieldgate-to-citygate service capable of handling rich gas; (ii) it is a direct transportation service from

---

[1] The WCPG comprises 40 producers and marketers of natural gas from the WCSB and includes Alliance owners and non-owners and Alliance shippers and non-shippers. Refer to page (x) for a list of the members.

[2] NEB Reasons for Decision dated October 1997 on an application dated 12 May 1997 by Novagas Canada Ltd. requesting that the Board inquire into the practices of Westcoast Energy Inc. with respect to gas shipping arrangements at Taylor, British Columbia (MH-2-97).

northeastern B.C. and northwestern Alberta to Chicago; (iii) it applies innovative technology that provides economic transportation; (iv) it is a negotiated package of terms and service; and (v) perhaps most importantly, it would provide a competitive influence on other pipelines.

In CAPP's view, "competition" is not just a mantra; it is an essential activity that promotes economic efficiency and provides significant benefits, whether or not the industry in which the competition takes place is regulated. PanCanadian stated that Alliance's competitive impact was one of several commercial considerations of shippers when they elected to commit to paying the demand charges for service on Alliance. PanCanadian supported Alliance because it would likely result in more choice and competitive rate structures. PanCanadian, CAPP, and the WCPG argued that competition among pipelines is healthy and essential to the future well-being of the producing industry.

IPLE submitted that competition in the pipeline business occurs when pipelines vie for subscription to new capacity and that, in this instance, the market has indicated its support for the Alliance Project. IPLE noted that, despite Alliance's size, the new capacity is still small relative to the existing pipeline capacity. The market power of the incumbent pipelines is still strong, indicating that fully developed pipeline-on-pipeline competition will take time.

Consumers' Gas indicated a preference to encourage competition among TCPL and other transporters, particularly in relation to tolls. One of the gas supply objectives of the company, which sources the majority of its gas supply in Western Canada, is to diversify its portfolio of transportation service agreements. Portfolio diversification enhances security of supply and provides alternative transportation paths to the company's franchise areas.

Union Gas remarked that the Alliance Project is unique because it gives Eastern Canadian markets a competitive alternative source of transportation while, at the same time, allowing Western Canadian producers the opportunity to capture the incremental Canadian market.

Gaz Métropolitain also suggested that Alliance would improve security of supply, although this might occur at the possible expense of medium-term upward pressure on Canadian gas prices.

Some parties did not believe that the Alliance Project would necessarily have beneficial effects for producers and others were concerned about the impact on consumers.

TCPL and Foothills did not agree that the Alliance Project would lead to increased gas prices in the WCSB. TCPL noted that at the time Alliance went to the market for capacity commitments on its proposed system, in early 1996, the industry was characterized by basis differentials in the $1.80 (U.S.) range between prices in Alberta, as measured at the Alberta Energy Company trading hub, and prices in the Chicago area, as measured by prices posted on the New York Mercantile Exchange ("NYMEX"). At that time, supply deliverability in the WCSB significantly exceeded pipeline capacity out of the WCSB by about 14.2 $10^6 m^3/d$ (500 MMcf/d). Alliance shippers were motivated by the prospect that the Alliance Project would narrow price differentials and increase netback prices.

In TCPL's view, recently added and upcoming pipeline capacity has already closed price differentials dramatically from the $1.80 (U.S.) range. TCPL stated that a recent check of the *Canadian Gas Price Reporter* revealed a forward market differential of 52 cents (U.S.) between Empress and NYMEX. TCPL submitted that the target Alliance promoters were aiming for had already been reached.

Foothills agreed that the market already indicates that basin prices have been connected. Through its witness, Dr. Carpenter, Foothills stated that current forecasts of natural gas demand in the U.S. Midwest indicated that demand will be inadequate to support the Alliance Project once already approved projects are taken into account. Foothills contended that if the Alliance Project was built, it would likely result in excess capacity to the Midwest and have significant displacement effects. This excess capacity would, in turn, likely result in reduced netbacks to Alberta relative to what they would have been in the absence of Alliance.

The Industrial Gas Consumers Association of Alberta ("IGCAA") submitted that, while the development of increased competition may be desirable, consideration should be given to the potential impacts on Alberta gas users. The IGCAA was concerned that the Project could result in an increase in prices to Alberta industrial gas users. In the IGCAA's view, the development of competition in a regulated industry demands careful consideration of all parties' interests.

In TCPL's view, the Accord more closely aligns the interests of the pipelines with their stakeholders. TCPL believes that it represents the creation of a platform for the development of both effective incentives for pipelines to expand sooner and competitive pressures upon pipelines' cost control, all towards the continued competitive positioning of the WCSB.

The Consumers' Coalition of Alberta ("CCA"), supported by the Native Canadian Petroleum Association, expressed concern that Alliance will increase gas costs to Alberta customers of natural gas LDCs. Alliance agreed that the impact of Alliance on the Alberta customer might be an increase of as much as $0.60/GJ. The impact on an average residential customer using 150 GJ of gas per year would be an increase of approximately $90 per year based on a $0.60/GJ price increase. For 500,000 residential customers, the province-wide impact would be $45 million per year.

The CCA argued that it was unable to understand how anyone could suggest that the residential customer in Alberta would be well served by the Project. It would not be convenient to that public nor is it necessary to that public that the Project be approved. The CCA suggested that non-residential customers of natural gas would also be adversely impacted.

Views of the Board

The Board is of the view that Alliance is a well-conceived project that will provide an innovative alternative to the existing gas transportation infrastructure. While difficult to measure, the Board believes that there will be large long-term competitive benefits from the Alliance Project. The Board agrees with those parties who argued that Alliance will provide benefits by offering producers an alternative transportation service and by increasing competition among pipelines.

The Alliance Project is strongly supported by natural gas producers in the WCSB who, through CAPP and the WCPG, expressed their desire for choice. The desire for competition and choice is also clearly recognized in the Accord by gas producers, NGTL, and TCPL. Alliance also appears to have received support from natural gas LDCs in Eastern Canada.

It is difficult to predict the specific impact that the Alliance Project will have on gas prices in Alberta and on producer netbacks once it is built. The Board believes that,

in the long term, the Alliance Pipeline will help ensure that there is adequate transportation capacity from the WCSB to the major market centres and that the pipeline will have a positive impact on producer netbacks. In the short term, it is possible that Alliance might even reduce netbacks to producers, relative to what they might be in the Project's absence. However, such a result would be a consequence of the lumpy nature of the Project which would result in a very large addition to gas export capacity upon start-up.

The Board is of the view that the long-term competitive benefits of the Alliance Project will be significant and will extend beyond those directly participating in the Project as owners and shippers. Arguably, the presence of Alliance has already contributed to positive changes in the natural gas transportation industry. The Accord indicates that NGTL and TCPL are supportive of and prepared to adapt to increased competition.

3.2 Potential Impacts on Existing Pipeline Infrastructure

3.2.1 NOVA Gas Transmission Ltd.

Views of NGTL and Supporting Intervenors

At the outset of the hearing, NGTL was opposed to approval of Alliance's application. However, after signing the Accord, NGTL modified its position. In final argument, NGTL stated that it neither supported nor opposed the Alliance application, but wanted to draw the Board's attention to its remaining concerns respecting the duplication of laterals on the Alliance Pipeline with NGTL's laterals.

NGTL argued that there would be inadequate supplies of gas at the 35 common NGTL and Alliance receipt points. NGTL provided evidence demonstrating that it would take a minimum of six years from Alliance's originally proposed in-service date for sufficient additional supply to develop at these receipt points to fully utilize both NGTL's existing facilities and the Alliance Pipeline. NGTL noted that its system has been designed, approved, and constructed according to the maximum flow of gas which NGTL expected to be available immediately upstream of each receipt point. At the time that NGTL's facilities were constructed, there was no expectation that other competing facilities might be built in the same areas.

NGTL stated that, while the Accord may not address all of NGTL's specific concerns respecting the Alliance Project, it may result in the reduction of duplication of laterals. NGTL confirmed that the Accord states that costs associated with lower utilization of existing facilities on its system as a result of the construction of Alliance are to be included in NGTL's rates. NGTL also acknowledged that it is willing to resolve any outstanding issues with respect to potential underutilization and interconnection between its system and Alliance outside of the hearing process.

Amoco was concerned that the configuration of the proposed Alliance Project would result in duplication of existing facilities and would produce underutilization costs, particularly on the NGTL system. These costs could be potentially imposed on existing shippers on NGTL. Amoco recommended that the Board provide for a mechanism that sends the correct economic signal to the

Alliance, so that the Company would participate in the costs which would be created through the duplication of facilities and stranded investment on the NGTL system.

Amoco recommended that the Board recognize that construction of the Alliance Project could have a negative impact on existing pipeline systems and that the Board address this issue by requiring Alliance to set aside a contingency fund to help pay for any consequent underutilization. Amoco argued that it is reasonable to require a company that is imposing costs on others to bear part of the burden of those costs.

Amoco argued that duplication, to the degree that it introduces competition in a regulated environment, is not a bad thing. However, to the degree that competition in a regulated environment duplicates facilities, and a new entrant is operating under different rules, then it is reasonable to require a transition mechanism such that the costs imposed by the new entrant are shared equitably among the stakeholders.

Although Amoco took some comfort that, through the Accord, CAPP and SEPAC have supported Amoco's concern relating to the underutilization of the NGTL system, it maintained that the Accord does not provide for cost-sharing by the various parties. To the extent that the Accord imposes additional costs on the remaining captive shippers on NGTL, without assigning any risk or responsibility for those costs on pipeline shareholders, Amoco did not consider itself bound by the Accord.

Amoco cautioned the Board that the Accord should not be taken as providing a proper means for the treatment of underutilization costs. The Accord does not provide any incentive for Alliance to negotiate in good faith with NGTL or to accept any good faith offer made by NGTL. Amoco submitted that it is up to the Board to provide such an incentive by recognizing Alliance's responsibility for sharing in underutilization costs.

Amoco's primary interest is that the principle of cost-sharing be recognized by the Board, not that a specific dollar amount be determined. Amoco felt that it would be reasonable if Alliance were to pay for about half of any underutilization costs.

The IGCAA argued that the Board must consider the overall impact and ramifications of the Alliance Project on those using the NGTL system.

Views of the Applicant and Supporting Intervenors

Alliance maintained that there would be no duplication of facilities. Alliance's position was that it would move gas that was incremental to gas that was already moving from the WCSB. According to Alliance, NGTL is predicting growth of approximately 56.7 $10^6 m^3/d$ (2 Bcf/d) at common NGTL/Alliance receipt points. That growth is over and above the gas that is presently being moved by NGTL through existing facilities.

With B.C. receipt points included, and NGTL's own figures for growth in production at the common receipt points, Alliance argued that there would be sufficient incremental gas to fill 102 per cent of Alliance's firm capacity in the year in which it starts operation, and 120 per cent in the next year. Alliance contended that its pipeline could run entirely full without affecting the total volumes moving on NGTL.

Alliance noted that, even if there were any merit to NGTL's fears of underutilization of its facilities, NGTL would be allowed to recover the associated costs by its shippers, pursuant to the terms of the Accord. After signing the Accord, NGTL's only remaining concern with Alliance was the potential duplication of gas gathering infrastructure, with respect to laterals only. Alliance stated that negotiations on laterals would take place because it made "financial sense for Alliance to prudently pursue options to optimize the system, if opportunities exist".

Alliance stated that the only potential impact on NGTL might be to limit future growth. Alliance noted that NGTL had acknowledged that if the Alliance Project were constructed, NGTL's average annual growth would be reduced over the next several years, from 4 to 5 per cent to 2 to 3 per cent.

Alliance urged the Board to reach the following conclusions based on the evidence respecting the potential for duplication of facilities: (i) there will be no duplication; (ii) Alliance will provide a different service from that provided by NGTL; (iii) any similarity of facilities will be justified by the different service, by the need for choice and a competitive alternative to NGTL, and the operation of the market; and (iv) Alliance will only impact the growth of NGTL, not existing facilities.

Duke agreed with Alliance in suggesting that both NGTL and Alliance will operate at full capacity after Alliance is built.

With respect to Amoco's proposal to establish a contingency fund to cover stranded costs on NGTL, Alliance argued that NGTL's withdrawal of its evidence removed the evidentiary basis for Amoco's position. Alliance argued that the proposal of Amoco and its expert witness, Dr. Safir, did not make sense. Even if there were costs that could be ascribed to duplication of facilities, the evidence was clear that there would also be very substantial benefits accruing to all producers as a result of increased take-away capacity. A contingency fund set up to compensate only for the costs would be inherently unfair.

Alliance's witness, Mr. Engbloom, stated that any compensatory scheme would discourage new entrants from seeking entry into the market, thereby constraining the introduction of desirable competition among pipelines. Secondly, any discipline on costs and service offerings provided by potential new entrants would be muted or eliminated if the pipelines which were unsuccessful in the competition were protected from competition.

The WCPG argued that, if costs were to be shared, then it would logically follow that Alliance should also share in the benefits that its Project would provide to other parties. According to the WCPG, NGTL shippers would actually be better off if some of NGTL's projected load growth were absorbed by Alliance because it would reduce NGTL's required capital expenditures and the need for toll increases. The WCPG submitted that Amoco's request for a cost-sharing mechanism should be rejected.

IPLE noted that competitors often claim that others duplicate the services that they can provide. The example was given that 7-UP does not duplicate Coke; it offers an alternative. IPLE argued that the same principle applies in this case. The industry would be best able to resolve the issues surrounding the interconnection of facilities and minimization of duplication if the threat of alternative facilities were credible.

IPLE submitted that the proposals for stranded asset charges have not been thought through and are unworkable. Under the scheme proposed by Amoco, Alliance shippers would bear a front-end cost that may be incurred on other systems as a result of stranded assets. Even though Amoco only argued for the principle of a contingency fund, this contingency liability would be a real cost that would be borne by Alliance's shippers.

In IPLE's opinion, a contingency fund would hinder a competitive entrant, which is at a competitive disadvantage to begin with against an incumbent service provider. In short, it was argued that it would send the wrong price signal and would remove the competitive threat.

Amoco accepted that NGTL did not have an exclusive franchise to gas supply or shippers. Similarly, Foothills accepted that it did not have an exclusive franchise. IPLE stated that these parties, nonetheless, would have the Board impose a financial obligation on Alliance shippers for any loss by the existing pipelines related to gas supply or the shippers' business. It was argued that the suggestion for cost sharing is illogical if one accepts that the gas supply and the shippers' business is not exclusive to the existing pipelines.

IPLE submitted that, by virtue of the Accord, NGTL and TCPL had accepted the risk that there may be adjustments to existing facilities in the transition to a more competitive environment. IPLE submitted that those adjustments are manageable costs for the greater benefits to be achieved.

ProGas indicated that it is, and would remain, a significant shipper on existing systems such as NGTL. The company was not convinced by the evidence filed by NGTL that there would be underutilization and stranded facilities on its system. The possibility of duplication of facilities, particularly laterals, was foreseen by ProGas. ProGas suggested that an Alliance/NGTL interconnection near Windfall, Alberta or Edson, Alberta would minimize the duplication of facilities.

ProGas commented that, while statements by Alliance on the hearing record and by NGTL in the Accord that they will negotiate are to be applauded, there is no assurance that the two competitors will be sufficiently motivated to negotiate in good faith. However, ProGas stated that it was prepared to rely on the undertakings by Alliance and the spirit of the Accord to motivate the parties to facilitate appropriate interconnections and to minimize duplication of facilities and any corresponding toll increases on the NGTL system.

Union Gas stated that it would not support Alliance if there was any credible risk of material under-utilization of either the NGTL or TCPL systems. Both Union Gas and Consumers' Gas already forecast a requirement for additional transportation into their respective franchise areas, even after Alliance is taken into account.

WEI submitted that the imposition of a contingency fund or exit fees would not be in the public interest, and suggested that such proposals are impractical and represent an attempt to impose obligations upon shippers which simply do not exist.

Views of the Board

By virtue of the Accord, NGTL and shippers, as represented by CAPP and SEPAC, have agreed to negotiate the issues associated with possible underutilization of NGTL's facilities and interconnection between Alliance and NGTL. The Board is confident

that, where an adequate economic incentive exists, the parties will come to reasonable commercial agreements without the need for regulatory intervention.

The Board notes that the potential for some duplication of facilities is inherent in the nature of competition. If commercial negotiations do not completely eliminate potential duplication, it will likely be due to the parties' judgement that they are willing to compete in certain areas. In the Board's view, duplication which results in beneficial competition may be considered to be in the public interest.

The Board notes that Amoco's contingency fund suggestion was not supported by other parties. The Board finds that there is little merit in the suggestion, particularly given the willingness of the affected pipeline companies to negotiate a settlement. It is not clear that there will be any costs imposed on third party shippers on other pipelines. Without any certainty of these costs, the Board believes that it would be unfair to saddle Alliance with the onerous financial requirement to create a contingency fund.

Moreover, the Board agrees with those parties who argued that the Alliance Project will create benefits for third parties. Therefore, it would be unreasonable to require Alliance to compensate third party shippers for potential costs when these shippers may, in fact, receive indirect benefits from the Project due to potentially higher netbacks, greater choice, and the increased competition that will take place among gas transportation providers.

3.2.2 Northwestern Utilities Limited

Views of Northwestern Utilities Limited

Northwestern Utilities Limited ("NUL") argued that this application involved both competition and the negative impacts that the Alliance Project would have on other utilities. NUL argued that the interconnections that Alliance had planned with the Paddle River and Cherhill gas plants (situated at receipt points 49 and 50 on Figure 1-3) would have negative consequences for NUL.

NUL argued that the entire volumes currently being produced at Paddle River and Cherhill are essential, on peak day, for the integrity of the NUL system. Unless the gas was available from those plants, dire consequences could befall the Edmonton market, save and except that, as a prudent utility, NUL would do what was necessary to avoid those consequences.

NUL noted that the Cherhill Lateral's design capacity is 462 $10^3 m^3/d$ (16.3 MMcf/d) and that its ultimate capacity is 850 $10^3 m^3/d$ (30.0 MMcf/d), both of which exceed the current capacity of the Cherhill Plant. The Paddle River Lateral's design capacity is 742 $10^3 m^3/d$ (26.2 MMcf/d) and its ultimate capacity is 1,133 $10^3 m^3/d$ (40.0 MMcf/d), which would be able to take 75 per cent and 100 per cent of current flows from the plant respectively. On a combined basis, the two laterals could take approximately 90 per cent of current flows from these two plants. NUL asked the Board to make a finding of fact that gas from these plants, at its historical volumes, is essential to its current peak day design.

NUL suggested that if it had to pursue options other than obtaining gas from the Cherhill and Paddle River Plants, such as buying gas from Alliance shippers, it would have to pay a premium that would most likely be equivalent to the cost of constructing new alternative facilities. According to NUL, the cost of constructing alternative facilities would be in the order of $11 million.

NUL argued that Alliance should be required to build an interconnection with the NUL system, through which it could access gas from the Cherhill and Paddle River plants. In NUL's view, the evidence in support of an interconnection between itself and Alliance was uncontested. NUL argued that such an interconnection would be preferable from a supply and engineering point of view, that it would avoid duplication, and htat it would be fully consistent with Alliance's objectives. However, if an interconnection were to take place, some adjustments would have to be made to Alliance's tolls.

NUL noted that its facilities were approved by the Alberta Energy and Utilities Board (and its predecessors) as being in the public interest. NUL argued that it would be unfair for its customers to pay more for their gas in order for Alliance shippers to increase their profits.

Views of the Applicant

Alliance argued that the NUL Paddle River system would not be offloaded by Alliance but would continue to carry gas and be used by NUL to serve its customers. The revenue loss calculations by NUL assumed a worst-case scenario that could not occur if recent production levels at the Paddle River Plant could be taken as an indication of future trends. Alliance facilities would not have sufficient capacity to completely offload the NUL Paddle River system, which was the basis for the NUL revenue loss estimate.

Alliance submitted that, if volumes flowing on the NUL Paddle River system did become a problem, NUL would have the option of buying gas at the Paddle River or Cherhill Plants. Alliance suggested that another option open to NUL would be to construct additional facilities. NUL had acknowledged that the construction of additional facilities was inevitable at some point in time and that NUL would have to study its options.

Alliance stated that it was not at all convinced that NUL's proposed interconnection would be consistent with Alliance's objectives. Alliance also noted that NUL had acknowledged that it would be inappropriate for the Board to direct Alliance to interconnect with NUL or to place Alliance in a disadvantageous position in negotiating with NUL.

Alliance submitted that the best approach would be for the Board approve the Paddle River and Cherhill Laterals as proposed, and leave it to Alliance and NUL to pursue a commercial solution to NUL's concerns.

Views of Other Intervenors

The IGCAA agreed that the proposed construction of the Paddle River and Cherhill Laterals by Alliance threatens the security of supply for thousands of NUL's customers and noted that the cost of constructing any additional facilities would likely be borne by NUL's customers. The IGCAA supported the interconnection between NUL and Alliance, but proposed a connection that was both a receipt and delivery point. The IGCAA did not agree with NUL's suggestion that any interconnection to Alliance should be limited to pipelines.

In the WCPG's view, NUL is attempting to use regulatory intervention to effect a result where Alliance could only access the gas at the Paddle River and Cherhill Plants by using NUL's facilities. The WCPG suggested that NUL would like the Board to guarantee that result by denying Alliance the opportunity to construct its Paddle River and Cherhill Laterals.

The WCPG recommended that the Board reject NUL's argument because the best solution would be a market-based solution, rather than a Board-mandated solution. The WCPG argued that if the Board denies Alliance the opportunity to construct the two laterals, Alliance would be compelled to reach a commercial arrangement with NUL to obtain access to Paddle River and Cherhill gas.

Views of the Board

The Board finds some merit in the argument that NUL could be negatively impacted if Alliance builds lateral connections to the Paddle River and Cherhill Plants.

At the same time, the construction of these laterals would provide gas producers in the areas of these plants with an alternative outlet for their gas production. NUL would be free to compete with other gas buyers for the available gas production in the area. It is possible that NUL will have to pay more for gas moving through these plants than they would have paid in the absence of the Alliance Project; however, the Board finds that this would be a natural outcome of a competitive market process.

The Board has not been persuaded that there are sufficient public interest reasons for it to intervene in the Alliance Project in the manner suggested by NUL.

3.2.3 Foothills Pipe Lines Ltd.

Foothills submitted that the shippers which have contracted for approximately 36 per cent of the capacity on Alliance have no gas supply arrangements in place. Foothills argued that if shippers on Alliance did not have supply under contract, they would be competing for the gas supply which would otherwise be transported on existing pipeline systems. Thus, the Alliance Project could result in underutilization of existing pipeline facilities, including the Foothills system.

In Foothills' view, the Board could approve the Alliance Project even in the face of a lack of evidence on supply adequacy. However, if the Board did so, then it would have to be aware of the potential lack of sufficient supply to fill all of the proposed and existing pipeline capacity and the consequent underutilization of pipeline facilities.

Foothills requested that the Board make a number of findings, including:

(i) recognition that existing pipelines regulated by the Board should be given the option of providing a menu of tolls and services which could be individually packaged and negotiated;

(ii) recognition that the contract renewal policies now in place for existing Board-regulated pipelines have been restrictive and must be altered; and

(iii) affirmation of the principle of reallocation of pipeline costs amongst shippers in the event of underutilization of pipeline facilities constructed under the previous paradigm, when the primary concern was to ensure that only necessary facilities would be constructed.

Foothills believed that the first two findings are necessary to ensure that existing pipelines would have an opportunity to compete with new entrants and thereby have a fair opportunity to ensure that their facilities would not be underutilized. The last finding is necessary to maintain investors' confidence in the existing pipelines.

Alliance argued that the evidence did not support the view that Foothills would be offloaded if the Project proceeded, noting that only 0.45 $10^6 m^3/d$ (16 MMcf/d) of Foothills' contracts will expire between 1998 and 2003. According to Alliance, 52 per cent of the total volume on the Foothills 1998 Eastern Leg Expansion is held with 10-year contracts by shippers who are also Alliance shippers.

In Alliance's view, the concept of capacity development in anticipation of increases in supply is not new. Alliance argued that, if necessary, producers and shippers are willing to pay for the concept of advance capacity to allow competition to work.

The WCPG submitted that the intention of Foothills' evidence was unclear. In the WCPG's view, the Board does not have to rely on the studies of Dr. Carpenter or Mr. Reed but should simply let the market work and rely on decisions made by the market.

Views of the Board

As recognized elsewhere in these Reasons, the Board accepts that there may be some temporary underutilization of existing pipeline systems following the start-up of Alliance, primarily due to the large scale of the Project.

The Board notes that it was presented with an application for certification of the Alliance Project pursuant to section 52 of the *NEB Act*. Tolls and tariffs on pipelines other than Alliance were not an issue at this hearing. The Board does not believe that it is necessary to make any of the findings requested by Foothills. If Foothills or any other federally-regulated pipeline company desires specific regulatory actions with respect to their systems, they are free to make the appropriate application to the Board.

3.2.4 BC Gas Utility Ltd.

BC Gas neither supported nor opposed the Alliance application. Nonetheless, in the interests of its customers, BC Gas raised its concerns regarding the potential impacts that may occur as a result of the construction and operation of the Alliance Pipeline.

BC Gas is almost totally dependent on one pipeline system, that owned and operated by WEI, for the delivery of its gas supply requirements. The company's main concern is that Alliance has the potential to divert gas that would otherwise flow on WEI's T-North and T-South mainline, resulting in underutilization of these facilities and higher tolls for its customers. BC Gas argued that, given WEI's ownership position in Alliance, in any future toll hearings the Board should put the onus on WEI to justify an attempt to pass on the costs of underutilization of its system to its shippers.

BC Gas also raised a concern that the transportation of liquids-rich gas on the Alliance Pipeline will reduce the heat content of the gas delivered to WEI's facilities. It was suggested that this could exacerbate the challenge to provide supply to feed both pipeline systems and could possibly trigger another expansion of WEI's T-South line to enable WEI to maintain its deliveries to downstream customers on an energy-equivalent basis. The consequences of any such expansion would be higher tolls borne by WEI's tollpayers, given that the negotiated settlement between WEI and its shippers calls for rolled-in tolling treatment for mainline pipeline facilities.

WEI submitted that, after Alliance is built, natural gas supply will continue to be available at market prices for consumers currently receiving gas off its system. WEI suggested that supply/demand forces will ensure that gas will be available to B.C. markets. In fact, WEI contended that the Alliance Project will stimulate additional development and production in northeastern B.C.

WEI further submitted that there was no causal link between Alliance proceeding and its future tolls, and that matters relating to its system could be appropriately dealt with in the context of regulatory proceedings specific to WEI.

Views of the Board

The Board notes that BC Gas will continue to have access to natural gas supplies in northeastern B.C. and will be free to compete with other potential buyers for those supplies. The Board also notes that toll and tariff issues related to the WEI pipeline system are outside the scope of this proceeding. Any such issues would be appropriately addressed in separate proceedings pursuant to Part IV of the *NEB Act*.

3.3 Potential Impacts on the Alberta Petrochemical Industry

Alliance has designed its Project to provide shippers with an option to ship liquids-rich gas if market conditions are favourable.[1] Shippers are required to relinquish the rights to their liquids when they deliver their gas to Alliance. In return, they will have their receipts and deliveries balanced such that they will receive, at the delivery point off of the U.S. portion of Alliance, quantities of natural gas equivalent in thermal content to that delivered into the pipeline in Canada. Refer to Appendix VI for a copy of the articles in the pro forma Alliance Precedent Agreement and Transportation Service Agreement relating to natural gas liquids ("NGLs") and liquefiable hydrocarbons.

The evidence suggests that Alliance may build an NGL extraction plant, through Aux Sable Liquid Products LP ("Aux Sable"), near the pipeline's terminus in Chicago. Depending on assumptions, the volumes of liquids which could be recovered at Aux Sable range from 4.77 to 30.2 $10^3 m^3/d$ (30 to 190 Mbpd). The Alberta petrochemical industry voiced concern about the removal of ethane from the province and the impacts that this could have on the industry and the Alberta economy.

[1] Further particulars with respect to gas richness are provided in section 5.1.2.

Views of Alberta Natural Gas Company Ltd, NOVA Chemicals Ltd., the Canadian Chemical Producers Association, and the Alberta Department of Energy

NOVA Chemicals Ltd. ("NOVA Chemicals") stated that the Alberta petrochemical industry is a great Canadian success story. Since the inception of the industry in 1979, over $5 billion has been invested in ethane-based petrochemical facilities in Western Canada. Over that time, the industry has achieved an annual growth rate of about 8 per cent.

Ethane is principally used to manufacture ethylene, providing about 50 per cent of the feedstock. Ethane burned as fuel in export markets has a value of about 8.5 cents per kilogram (4 cents per pound) of ethylene. Upgrading ethane into petrochemical derivative products in Alberta results in a product worth 85 cents per kilogram (40 cents per pound) of ethylene, a tenfold increase in value.

NOVA Chemicals filed a study on Canadian and U.S. ethane markets prepared by Marenco Energy Associates ("Marenco"). The Marenco Study noted that, in Alberta, ethane demand for ethylene manufacture was 21.0 $10^3 m^3/d$ (133 Mbpd) in 1996, although capacity was about 22.3 $10^3 m^3/d$ (141 Mbpd). A further 9.48 $10^3 m^3/d$ (60 Mbpd) is used in hydrocarbon miscible flood projects for a total demand of about 31.6 $10^3 m^3/d$ (200 Mbpd). Several ethylene plant expansions and new plants are proposed for Alberta. If all were to proceed, ethane demand for feedstock could reach 41.2 $10^3 m^3/d$ (261 Mbpd) by 2000. Beyond the year 2000, the outlook is difficult to project. However, Marenco suggested that petrochemical requirements for ethane could reach 53.6 $10^3 m^3/d$ (339 Mbpd) based on similar growth rates in the U.S. It is uncertain how the demand for hydrocarbon miscible flood projects will evolve.

Alberta Natural Gas Company Ltd ("ANG"), NOVA Chemicals, the Canadian Chemical Producers' Association ("CCPA"), and the Alberta Department of Energy ("ADOE") were all concerned that Alliance could distort the operation of a competitive market in Alberta for NGLs, in particular ethane. The concerns related to the following elements of Alliance's proposed tariff: (i) the requirement for shippers to relinquish the rights to their liquids; (ii) volumetric tolls; (iii) Authorized Overrun Service ("AOS"); and (iv) physical access to the liquids on the Alliance Pipeline.

NOVA Chemicals recommended that the Board not sanction Alliance's tariff, under which shippers must relinquish their rights to natural gas liquids to obtain gas transportation service. In its view, pipeline services should not in any way be tied to the ownership of the commodity being transported. NOVA Chemicals argued that this tariff provision creates a conflict of interest because ethane on the Alliance system would be indirectly owned by the same companies that own the pipeline. The owners of Aux Sable have a particular interest in having Alliance transport a rich gas stream.

In ANG's view, Alliance creates two classes of shippers: owner-shippers and non-owner shippers. ANG submitted that owner-shippers could use Alliance as a private NGL pipeline since they are the only shippers who could inject, transport, and recover NGLs. ANG argued that this would be a unique and clearly discriminatory arrangement, as all of the other shippers who are not owners of Aux Sable would have no rights to their NGLs once they enter the Alliance Pipeline. Further, the owner-shippers would have the exclusive right to extract not only their proprietary NGLs (i.e. the NGLs they own themselves that would be flowing on the pipeline), but also those injected by the other shippers on the system. ANG argued that this cannot foster a competitive NGL market.

The ADOE stated that market participation would be limited if the Alliance owners were given control of liquids through articles 5.2, 5.3, and 5.4 of the Transportation Service Agreement, rather than having to compete with others to obtain extraction rights at a market price. In the ADOE's view, the Board should not simply accept that because the tariff was negotiated, it is in the public interest. Also, Alliance's inclusion of the required relinquishment of liquids in its tariff seems incompatible with the general trend towards the unbundling of services in deregulated energy markets. The ethane to be transported by Alliance should not be effectively excluded from the market by a tariff approved by a regulatory body.

NOVA Chemicals and the CCPA both objected to the volumetric tolling methodology and the AOS proposed by Alliance (see Chapter 6 for a description of these services). NOVA Chemicals stated that the Board should look beyond the standard cost allocation issues associated with toll design and consider the associated public interest implications. NOVA Chemicals argued that the volumetric toll design provides an incentive for shippers to deliver high heat content gas to Alliance and to inject NGLs into their gas streams. NOVA Chemicals argued that a thermal-based toll would compromise this incentive and the attendant impacts on the Alberta petrochemical industry while still providing Alliance and its shippers with cost-effective new export capacity.

NOVA Chemicals also argued that AOS would provide an additional incentive for shippers to inject NGLs into their gas deliveries to Alliance because there would be no additional charge for this service. It argued that this aspect of the toll design raised further public interest issues that could be addressed most easily by denying Alliance's request for AOS.

Finally, the CCPA, NOVA Chemicals, and the ADOE were concerned with the lack of physical access within Alberta to extract the NGLs transported on the Alliance Pipeline. The CCPA held the view that Alliance would prevent Canadian access to a significant portion of the NGLs produced in the WCSB and this would effectively distort the operation of the competitive market in Alberta for NGLs.

In summary, these parties were concerned that the tariff provisions on Alliance would have the effect of inducing the export of ethane from the WCSB and that the petrochemical industry would not have a fair opportunity to obtain this ethane. The removal of this ethane from the WCSB would limit the future growth potential of the petrochemical industry in Alberta.

NOVA Chemicals stated that Alliance would be capable of removing 9.54 $10^{3}m^{3}/d$ (60.4 Mbpd) of indigenous ethane assuming 42.5 $10^{6}m^{3}/d$ (1.5 Bcf/d) of gas throughput at 40.6 MJ/m^{3} (1088 Btu/scf). Furthermore, injection of NGLs could result in as much as 23.4 $10^{3}m^{3}/d$ (148 Mbpd) of ethane leaving Canada in Alliance's enriched gas case. The Marenco Report indicated that, in the absence of the Alliance Project, the Alberta ethane supply/demand balance would be constrained by 2007 to 2008; if 9.48 $10^{3}m^{3}/d$ (60 Mbpd) were to be removed from Alberta on the Alliance Pipeline, potential growth of Alberta's petrochemical industry would be constrained by 2004. The CCPA argued that the future of the petrochemical industry is at risk because of uncertainty regarding the continued existence of its feedstock advantage.

According to NOVA Chemicals, if ethane were exported on Alliance without the opportunity for upgrading in Alberta, then significant adverse economic impacts would result. The Wright Mansell Report, submitted by NOVA Chemicals, suggested that the export of indigenous ethane on Alliance in sufficient quantities to reduce the Alberta supply by 6.95 $10^{3}m^{3}/d$ (44 Mbpd) would result in a net loss of $11.3 billion in Gross Domestic Product to Alberta over 20 years. The impact would be more

pronounced if NGL injection occurred or if Alliance's capacity were expanded to 56.7 $10^6 m^3/d$ (2 Bcf/d).

In a study commissioned by the CCPA, Chem Systems estimated that the construction of Alliance as proposed would result in foregone investment and lost opportunity costs of about $3 billion (U.S.) in the year 2000 and up to $7.3 billion (U.S.) in the year 2010.

To address the potential for distortions in the ethane market and to preclude the negative impacts on the petrochemical industry that Alliance would cause, NOVA Chemicals and the CCPA recommended that the following conditions be attached to any certificate which might be issued to Alliance: (i) require Alliance to eliminate article 5.5 of the Precedent Agreement and articles 5.2, 5.3, and 5.4 of the Transportation Service Agreement; (ii) require Alliance to allow NGL consumers physical access to extract and purchase NGLs in Alberta; (iii) require thermal tolls; and (iv) require the elimination of AOS.

ANG supported the first and third of the proposed conditions and the ADOE supported the first condition

Views of the Applicant and Supporting Intervenors

Alliance stated that there was no evidence to suggest that its Project would result in negative impacts on the petrochemical industry, or at least any impacts that warranted intervention by the Board. According to Alliance, there are presently huge surpluses of ethane in Alberta which will continue provided that the natural gas industry continues to grow.

Alliance argued that the ethane supply and demand forecast in the Marenco Report cannot be relied upon. In the report, ethane supply was constrained by the ethane demand forecast, and was limited by a low gas supply forecast with constant gas export demand. Furthermore, the Marenco Report excluded ethane supply from oilsands and refineries. Alliance pointed out that assuming a higher natural gas supply forecast, such as in the Chem Systems Study, would result in an additional 37.9 $10^3 m^3/d$ (240 Mbpd) of ethane at a 75 per cent recovery rate in the year 2010, enough supply for another eight ethylene plants. Alliance also argued that other gas supply forecasts (e.g. NGTL's 2 per cent per year system growth, Sproule's overall supply studies, and GLJ's supply study) support the view that ethane supply will be much higher than suggested by the Marenco Report.

In Alliance's view, the real issue behind the arguments of NOVA Chemicals and the CCPA is one of competition. Alliance argued that any ethane which it might access would also be accessible to the Alberta petrochemical industry. Its shippers are under no obligation to ship rich gas on Alliance. Companies wishing to acquire petrochemical feedstock have many options available to them, including the option of purchasing ethane from the gas plants with ethane extraction capabilities that will be connected to Alliance's receipt points at Taylor, Wembley, Wapiti, Elmworth, and Kaybob III.

Alliance suggested that it was time for NOVA Chemicals to enter the world of competition for ethane feedstock. Alliance stated that it offered nothing more than an additional outlet to producers for ethane produced in Alberta. It is not contrary to the public interest for companies who incur the risk and expense of finding and developing natural gas to achieve a higher value for their product.

In response to the recommendations of the ADOE, Alliance stated the ADOE was asking the Board to deprive the market of the ability to choose. Alliance argued that the Government of Alberta was asking the Board to forbid its shippers from transferring their rights to extract NGLs to the parties of their choice on the terms of their choice. Alliance submitted that, in terms of ethane accessibility, the market has functioned, and that it will continue to function. Regulatory intervention is not required because there has been no market failure.

Alliance noted that there was a possibility that the Aux Sable extraction plant would not be built. Also, Alliance committed in a letter dated 16 December 1997 to the Alberta Minister of Energy that "in the unlikely event that Alberta ethane requirements exceed the supply available from sources other than those indigenous to Alberta gas production delivered into Alliance, [the Company] would be prepared to have an extraction plant constructed on the Alliance pipeline near Fort Saskatchewan on commercial terms acceptable to the relevant parties".

In Alliance's view, the Wright Mansell Report was fundamentally flawed. Alliance submitted that it was simply not credible to argue that its Project would have adverse economic effects due to ethane removal when, in fact, there were substantial surpluses of ethane available to anyone wanting to acquire it at the time that these impacts would allegedly be suffered. Alliance argued that hundreds of thousands of barrels a day of ethane leave Alberta as part of the TCPL, Foothills, and ANG sales gas streams. The fact that 40 per cent of all ethane currently produced in Alberta leaves on those systems to be burned as fuel downstream did not seem to be a problem for Wright Mansell.

Alliance's position was supported by other intervenors, including IPLE, the WCPG, and WEI. IPLE argued that Alliance offers an additional option for ethane, and that the increased exploration and development generated by Alliance would ultimately add to the supply of petrochemical feedstock.

The WCPG argued that NOVA Chemicals and the CCPA want the Board to change Alliance's tolling and tariff provisions in order to provide ethane supply and price protection to the Canadian petrochemical industry. The WCPG submitted that it would not expect the Board to give preference to the petrochemical industry over the gas producing industry. The main issue to be considered by the Board was whether or not Alliance's tolls and tariffs are just and reasonable.

WEI argued that there was no evidence to suggest that the Alberta petrochemical industry would not be able to obtain its required feedstock at prevailing market prices. Shippers have the choice to use either NGTL or Alliance to move their gas with or without entrained ethane.

Views of the Board

The Board does not believe that any features of Alliance's proposed transportation service package are contrary to the public interest.

Representatives of the petrochemical industry argued that they were concerned about the future availability of ethane supply and that the potential growth of the industry could be curtailed by removal of ethane from the province. In the Board's view, the evidence shows that there will be adequate ethane supply for both the currently planned and future expansions of the Alberta petrochemical industry. In this regard, the Board notes that, by providing enhanced market access, the Alliance Project would

encourage additional gas production in the WCSB, thereby yielding increased supplies of ethane.

The Board also notes that, currently, only about 55 per cent of the ethane entrained in gas streams flowing on the NGTL system is extracted prior to export from the Province of Alberta. Additional straddle plants and expansions of the existing plants are planned to enhance the availability of ethane feedstock in Alberta.

With respect to the concerns expressed about the requirement that shippers relinquish ownership rights to any liquids entrained in gas streams delivered to the pipeline, the Board accepts that shippers understood the terms of the tariff when they signed Precedent Agreements. The Board also recognizes that many shippers would have the option of removing their liquids prior to delivery into the Alliance Pipeline. The Board is of the view that the real effect of Alliance will be to provide gas producers with an alternative market outlet for their liquids production.

The Board does not believe that physical access to the liquids that will be carried on the Alliance Pipeline will be a significant issue once the pipeline is in operation. The petrochemical industry will be free to purchase liquids from shippers prior to their delivery to the Alliance Pipeline, at least in those cases where shippers have access to extraction facilities. This appears to be the case for the majority of the gas volumes that could be delivered into the Alliance Pipeline. The natural gas streams that could be delivered into the pipeline, and that do not currently have access to deep-cut extraction facilities, represent a small percentage of the total natural gas volumes produced in the WCSB.

The Board further notes that the potential removal of article 5.5 of the Precedent Agreement and articles 5.2, 5.3, and 5.4 of the Transportation Service Agreement was not debated during the hearing, and has not been persuaded that it should render a decision ordering the removal of same. The Board agrees with Alliance that the provision of ACOS is a fundamental condition of the Company's arrangements with its shippers, owners, and lenders.

Finally, the Board does not agree with NOVA Chemicals' argument, as contained in the Wright Mansell Report, that the export of ethane entrained in the Alliance gas stream would result in negative economic effects on the Province of Alberta. The Board does not find that the primary premise of the study, that there would be inadequate supplies of ethane for the future expansion of the Alberta petrochemical industry, is valid.

3.4 Domestic Access to Natural Gas

3.4.1 Heartland Gas Initiative

The Heartland Gas Initiative ("HGI") is an association of 13 rural municipalities, 13 towns, three Economic Development Associations, and the Association of Bilingual Municipalities, all located in south-central Manitoba. In April 1997, the HGI was formed to try and persuade TCPL to construct a

natural gas pipeline through south-central Manitoba. The HGI's singular objective is to provide natural gas services to farms, businesses, homes, and public institutions in the area.

The HGI advised that all previous efforts to bring natural gas to the area have been thwarted by the up-front capital requirement of some $12 million to construct laterals from the TCPL mainline.

With the suspension of the proposed Viking Voyageur gas pipeline project by TCPL and its partners, HGI is losing the benefit of access to natural gas access from a TCPL mainline at no incremental cost to HGI.

HGI requested that the Board consider a levy to be imposed on "multinational" exporters to assist in providing access to the natural resource that is being exported out of Canada. This contribution could be a percentage of the total infrastructure budget and be set aside for Canadian access.

Views of the Board

The Board notes that the proposal by HGI was raised in final argument and that there was no opportunity to test it during the course of the hearing. Accordingly, the Board is of the view that it cannot properly assess the merits of HGI's proposal. The Board would add, however, that potential gas buyers should attempt to negotiate commercial arrangements with gas suppliers and gas transportation companies under market conditions.

3.4.2 Industrial Gas Consumers Association of Alberta

The IGCAA stated that, while the Alliance Project would provide producers with a transportation alternative to U.S. markets, and U.S. consumers with another source of Canadian gas, it would leave Alberta consumers open to increased tolls on NGTL and potential increases in NUL rates. The IGCAA argued that the Project should only be approved if provision is made for (i) direct access to Alliance by end-users in Alberta and (ii) interconnections with other pipeline systems within the province. In this way, the benefits of improved competition would be provided to all sectors of the industry.

The IGCAA recommended that the following conditions be included in any certificate which might be issued to Alliance:

(i) that Alliance be required to provide the Board with a plan of how existing and future Alliance shippers can or will be able to access Canadian gas consumers;

(ii) that this plan include the potential for direct access to Alliance by Canadian gas consumers and indirect access by way of gas exchanges; and

(iii) that this plan be filed with the Board no later than 31 December 1998.

Alliance stated that it is not opposed to an Alberta delivery point and that it would be willing to consider Alberta deliveries. However, to date there had been no apparent demand for Alberta deliveries, and no shipper had been willing to pay for Alberta deliveries or for additional receipt facilities.

Views of the Board

The Board has not been persuaded that there is an adequate public interest reason to justify adopting any of the conditions that were suggested by the IGCAA. The Board is of the view that it is most appropriate to let potential gas buyers negotiate their own commercial arrangements with gas suppliers and gas transportation companies. If an adequate economic incentive exists, the parties should come to terms without the need for regulatory intervention.

Chapter 4

Socio-Economic and Land Matters

4.1 Socio-Economic Matters

4.1.1 General

Alliance identified socio-economic issues through the compilation of a list of issues from sources including: (i) municipal, provincial, and federal government agencies; (ii) special interest groups such as the Alberta Wilderness Association and the Saskatchewan Environmental Society; (iii) First Nations; (iv) the general public via the Early Public Notification Program; and (v) information in the public domain such as municipal plans, forest management agreements, maps of registered fur management areas.

The study area included all municipal designations crossed as well as all communities potentially affected due to proximity to the Project. Since the effects on communities would be dependant on the size and range of goods and services available, communities with populations greater than 1,000 and within 40 km of the Project, and those with populations less than 1,000 within 10 km of the Project, were included. Major population centres along the Project mainline route include Edmonton, Regina, and, to a lesser extent, Grande Prairie.

The issues identified were grouped into three categories: (i) employment, non-labour impacts, and income; (ii) municipal services; and (iii) quality of life.

Those socio-economic effects directly resulting from changes in the environment are addressed, pursuant to the *CEAA*, in the CSR.

4.1.2 Employment, Non-Labour Impacts, and Income

Due to the highly-automated nature of the pipeline system, the majority of employment associated with the Project would be short term and would occur during the construction phase. Alliance estimated that direct employment associated with the construction of all aspects of the Project, including the mainline, laterals, and operations and maintenance offices, would total approximately 4,485 person-years (see Table 4-1). Approximately 60 per cent of the work would be generated in Alberta with the remaining 30 per cent and 10 per cent being generated in Saskatchewan and B.C. respectively. The estimated peak workforces for the mainline summer, winter, and lateral spreads are 500, 530, and 235 workers respectively. Construction on each spread would be sequential with 15 to 20 crews per spread with activity at any given location generally being completed in six to eight weeks.

Alliance stated that it would use its ongoing public consultation process to raise awareness about the timing and the nature of employment opportunities to enhance opportunities for local contractors, service companies, and individuals.

During construction, the Project is expected to create approximately 12,000 person-years of direct, indirect, and induced employment in B.C., Alberta, and Saskatchewan. The economic impact of the

Project would be reflected elsewhere in Canada through the purchase of steel pipe, compressors, valves and other equipment. Alliance estimated that, once operational, 155 people would be directly employed to operate and maintain the pipeline and its associated facilities. Alliance further submitted that annual operating and maintenance expenditures of approximately $35 million would generate approximately 335 person-years of direct, indirect, and induced employment.

Table 4-1
Direct Operations and Maintenance Employment

Office Location	**Number of Employees**
Head Office - Calgary, Alberta	80
Control Centre - Calgary or Fort Saskatchewan, Alberta	11
Regional Office - Fort Saskatchewan, Alberta	9
Area Maintenance Centres	
- Fort St. John, B.C.	11
- Grand Prairie, Alberta	11
- Whitecourt or Fort Saskatchewan, Alberta	11
- Rosetown, Saskatchewan	11
- Estevan, Saskatchewan	11
Total Employment	155

The mechanisms that Alliance submitted would be used to ensure that local and Aboriginal contractors participate in the Project include: (i) awarding contracts such as for clearing, grubbing, and fencing in connection with laterals separately from the overall mechanical contracts in areas where local contractors have demonstrated capabilities that would meet Alliance's requirements; (ii) appropriately sizing lateral clearing, grubbing, and fencing contracts; (iii) use of construction contractors with field operations in smaller centres for the laterals; (iv) having contractors provide Alliance with a plan as to how local and Aboriginal contractors would be utilized; (v) purchasing agreements with local stores where possible; (vi) creation and updating of a list of location suppliers of goods and services; (vii) use of local and Aboriginal content as one of the criteria in evaluating contractors; and (viii) Memoranda of Understanding ("MOUs") with First Nations' communities which, in part, establish a process to help Alliance and First Nations communities identify employment and business opportunities.

The MOUs with First Nations' communities and the participation of First Nation and Métis persons in the Project are further addressed in section 4.15 of the CSR.

4.1.3 Municipal Services

The issues associated with municipal services include: (i) availability of fixed roof accommodation; (ii) increased demand on medical services; and (iii) increased demand on law enforcement.

Further municipal service issues associated with the location of temporary facilities such as marshalling areas, fire protection, disposal of construction garbage and solid waste, and road damage are discussed in sections 4.2.2, 4.18, 4.13, and 4.14 respectively of the CSR.

Alliance submitted that annual industrial property tax assessments would increase for the rural municipalities in which the Project would be located. Alliance estimated that the annual property taxes paid to municipalities in B.C., Alberta, and Saskatchewan respectively would be approximately $1.4 million, $8.9 million, and $3.5 million (1996 Canadian dollars).

In the event that accommodation shortages are encountered, Alliance would mitigate the problem with the provision of additional beds to hotel and motel rooms, billeting crew members in private homes, renting homes and apartments, setting up temporary recreational vehicle trailer parking in mobile home parks, fair grounds and other space available in local communities, and using accommodations in larger centres to offset shortages in smaller communities. Alliance noted that as much as 25 per cent of the workforce would bring some form of mobile accommodation during summer construction. In respect of the laterals, Alliance noted that a construction camp may be utilized during the winter construction.

Alliance stated that at least one ambulance and a registered emergency medical technician would accompany each mainline, lateral, and compressor station construction crew. Local hospitals would be contacted regarding the timing and nature of construction activities. Protocols for the transfer and treatment of workers would be established with the hospitals.

Crime prevention would be addressed in cooperation with local Royal Canadian Mounted Police detachments. Alliance submitted that, in addition to safety, its orientation program would cover the rules of conduct on and off the job. Alliance further submitted that those persons disregarding the rules of conduct would be released.

The Peace River Regional District ("PRRD") submitted that primary service communities have not been able to access most of the property tax related to petroleum sector activity as most of this activity takes place outside of the municipal boundaries. The PRRD noted that the Project laterals would not pass through either Fort St. John or Dawson Creek, the primary host communities in the region. The PRRD submitted that recent industry growth has placed mounting fiscal burdens on local government and that the municipal infrastructure is deteriorating. The PRRD raised concerns with the possibility of having to shoulder the cost of establishing and maintaining facilities for mobile accommodations. The PRRD raised further concerns with the added costs resulting from short-term demands on health, fire, and police services and the possibility of road repairs. The PRRD proposed its "Fair Share" initiative to address the issue of not being able to access property tax outside of the municipal boundaries. Alliance submitted that this "Fair Share" proposal would not significantly impact the viability of the Project.

4.1.4 Quality of Life

Issues pertaining to quality of life, such as dust and construction noise, noise resulting from the operation of the compressor stations, air quality and visual aesthetics, and public health and safety are addressed in the CSR.

Views of the Board

The Board notes that substantial evidence was placed on the record during the hearing pertaining to the importance of affording meaningful opportunities for the participation of First Nations and Métis in the oil and gas industry. The Board notes that First Nations and Métis participating in the hearing were generally supportive of the efforts undertaken by Alliance to involve their communities in the Project and that those parties with MOUs with Alliance were satisfied with Alliance's commitments to identify and afford opportunities. The Board is of the view that, given the importance of participation in the Project to Aboriginal persons, and since the MOUs do not include all of the Aboriginal persons along the Project route, that Alliance should be required to monitor the success of the commitments identified during the hearing. Accordingly, the Board will include in any certificate a condition requiring Alliance to report on its performance in respect of its First Nations and Métis employment and commercial participation objectives for the construction and operation of the pipeline. The condition would require Alliance to submit the reports on a quarterly basis during construction and annually during the first three years of operation.

In respect of the potential adverse effects of the Project on municipal services, the Board is satisfied with the information provided by Alliance. These effects would be limited to the construction phase of the Project and would either be avoided or minimized through the commitments made by Alliance. In addition, revenue would be generated within the municipalities through the purchase of goods and services. Property tax, which is the focus of the PRRDs "Fair Share" initiative, is a provincial matter.

4.2 Land Matters

4.2.1 Routing and Facility Site Selection

The criteria and the process used to select the proposed route and facility sites are described in section 4.2 of the CSR.

As noted in that section, Alliance made an initial determination to follow existing rights-of-way and chose to generally follow the Cochin Pipe Lines Ltd. ("Cochin") route from Fort Saskatchewan to Chicago because it was considerably shorter than the other potential routes and less environmentally sensitive. As presently configured, the Alliance Pipeline would cross Cochin's pipeline 22 times in Canada.

Citing safety concerns, Cochin asked that the Board direct Alliance to substantially reduce the number of crossings, preferably to one. Alliance stated that there was nothing unusual about the number of crossings and that all of the proposed crossings would be necessary based on a number of factors including safety, practicality, terrain, environmentally sensitive areas, and discussions with landowners.

The technical aspects of Cochin's argument are addressed in section 5.2 of these Reasons.

4.2.2 Corridor versus Specific Route

Alliance stated that in its communications with the public it has been as specific as possible as to the location of the right-of-way and the associated work space and that the majority of landowners have consented to the proposed location. Alliance noted that it had defined a corridor area of notification of 400 m on either side of the proposed centre line and that landowners and tenants whose land fell within this corridor were also contacted.

Alliance proposed that the Board authorize construction within the 800 m corridor to accommodate future route refinements. Alliance further proposed that any modification of the alignment involving a shift of more than 50 m be the subject of a supplementary filing with the Board describing the public consultation process and environmental review of the modification.

4.2.3 Land Requirements

The width of the mainline construction right-of-way would typically be 32 m in width, consisting of 18 m of permanent easement and 14 m of temporary work space that would be used for construction purposes only. Additional temporary work space may be required at areas such as roads, railways, rivers, and streams.

The width of the lateral construction right-of-way would vary from 18 to 27 m in width depending on the diameter of the pipeline, with a maximum of 18 m in permanent right-of-way as per Table 4-2.

Table 4-2
Standard Right-of-Way Configurations

Pipe Size (mm)	Construction Right-of-Way (m)	Permanent Right-of-Way (m)	Temporary Work Space (m)	Additional Work Space at Road Crossings* (m)
660 to 1076	32	18	14	10 by 30
457 to 610	27	18	9	10 by 30
273 to 406	23	18	5	10 by 25
114 to 219	18	18	0	5 by 20

* The four blocks of additional temporary work space at road crossings would be located along both sides of the right-of-way on both sides of the road being crossed. The 10 m width can be reduced to 5 m when abutting other permanent easements.

Mainline block valves would be located at approximate 32 km intervals. At mainline valve installations, Alliance would obtain a surface lease for an 18 m by 30 m fenced site.

For compressor station facilities, Alliance would obtain, through fee simple purchase, approximate 8 ha and 1 ha sites respectively for the mainline and lateral compressor stations. The fenced area for the single unit compressor stations would be approximately 2.5 ha for those without pigging facilities

and approximately 3.3 ha for those with pigging facilities. The fenced area for the multiple compressor unit Windfall Compressor Station would be 5 ha. Alliance also noted that it would be attempting to acquire the sites for the eight compressor stations identified for possible future expansion although these are not part of the applied-for facilities. The facilities that would be installed at these sites would be similar to the other mainline block valves, with the exception that side valves for the future compressor station would also be installed. Meter station sites would be approximately one-quarter hectare. Additional land would be required for access roads and electric power lines as further set out in the application.

Alliance committed to meet with all Crown-held and freehold occupants to secure written consent, and in addition, to obtain any land withdrawals and consents from holders of Forest Management Areas and Coniferous and Deciduous Timber Licences.

Alliance stated that current and future land claims areas were identified through consultation with First Nations and any easements or surface land interests required would be negotiated with the appropriate First Nations and the government representatives. The proposed mainline route would traverse two pending land claims, the Alexander First Nation Land Claim Areas near Fox Creek from approximately KP 403 to KP 405 as well as the Alexis First Nation Land Claim from approximately KP 463 to KP 467.

Alliance submitted that it has approached all adjacent pipeline owners along the mainline for permission to use a portion of contiguous rights-of-way as temporary work space and that it intends to utilize shared work space wherever consent is received. As of 15 December 1997, Alliance had obtained permission to share work space along approximately 176 km of the mainline. Alliance noted that it was compiling information on the rights-of-way paralleling the laterals and that formal requests would be made to the owners to use shared temporary work space. Information on agreements or negotiations for shared work space along the laterals would be forwarded to the Board prior to construction.

Alliance noted that the service of notices pursuant to section 87 of the *NEB Act* had commenced and that, as of 17 November 1997, the land acquisition program for the mainline was approximately 80 per cent complete and the program for the laterals approximately 35 per cent complete.

Alliance stated that its land representatives would be present during the construction and reclamation phases of the Project and would serve as liaison between the Alliance employees, contractors, and the landowner community to address any issues that might arise such as off right-of-way concerns or inconvenience to farming or cattle operations.

4.2.4 Safety Zone

Subsection 112(1) of the *NEB Act* regulates the construction of facilities across, on, along, or under a pipeline or excavation using power-operated equipment or explosives within 30 m of a pipeline right-of-way.

Alliance advised persons of the provisions of section 112 of the *NEB Act* through the provision of the Board's publications entitled *Living and Working Near Pipelines*, *Information Bulletin #13 Pipeline Regulation: An Overview for Landowners and Tenants*, and *Pipelines: A Guide for Landowners and Tenants*.

Alliance submitted that all landowners, persons, or companies with an encumbrance registered on the title of any lands lying within 30 m of the pipeline would be served with the Board publication entitled *Excavation and Construction Near Pipelines* to ensure public safety and the protection of the pipeline.

4.2.5 Landowner Concerns

In addition to concerns identified in Alliance's application, several landowners, either participating in the hearing or through letters of comment, identified concerns with the proposed pipeline including: (i) safety; (ii) abandonment; (iii) routing of the pipeline; (iv) loss of existing vegetation and wildlife habitat; (v) impacts on use and enjoyment of the land; (vi) possible effects of heat from the pipeline on crops; and (vii) visibility of compressor stations. These matters are addressed in the CSR and throughout these Reasons.

As part of its ongoing public involvement program, Alliance noted that it is continuing discussions with landowners regarding concerns such as site-specific wildlife enhancement opportunities. Alliance submitted that, if a concern is raised by a landowner, the Company's policy is to work with the landowner to reach a mutually-agreeable solution. Solutions would be established in writing and depending on the nature of the measures identified, would be included in the construction line list. Alliance's Land Manager would be responsible for landowner concerns. Alliance noted that, to date, it had not agreed to any provisions beyond the mitigation measures identified in its application, supplemental information and responses to information requests to address wildlife or vegetation concerns.

Mr. Carter participated in the GH-3-97 proceeding on behalf of clients who are landowners in the County of Grande Prairie and the Municipal District of Greenview, Alberta. Through the written process preceding the oral hearing, and cross-examination during the hearing, Mr. Carter extensively examined matters of concern to his clients.

During the hearing, Mr. Carter pursued the issue of whether Alliance would commit to summer construction where this was the construction timing communicated to landowners. Alliance responded that its land program communicated to its landowners does not include winter construction. Alliance clarified that it considered winter work to be work commencing after the ground is frozen. Alliance submitted that pipeline contracting crews would be required to move off the summer spreads in order to complete the work scheduled for the winter. Alliance further submitted that, if it changes the program that it committed to its landowner community, it would be necessary to communicate these changes to the landowners to identify their concerns and address them in an appropriate manner.

Mr. Carter submitted that Alliance had presented to landowners that much of what it is doing is based upon what other pipeline companies have done in the past. Mr. Carter cross-examined Alliance on the potential impacts on topsoil of the heavy equipment that would be used during construction. It was also confirmed that the 14 m of temporary workspace immediately adjacent to the permanent right-of-way would be subject to traffic from heavy equipment. Mr. Carter explored whether the practice of treating this 14 m as temporary workspace was consistent with industry practice, particularly that of NGTL.

Alliance noted that its understanding was that NGTL's policy was to obtain permanent easement for its full right-of-way, including its entire working area. Alliance submitted, however, that this did not make the practice an industry practice.

Alliance submitted that the negotiation for temporary workspace is a contractual agreement between Alliance and the landowner for a specific period of time. As such, the Company would not hold permanent rights to the land. Accordingly, Alliance submitted that it is simply a contractual agreement and not a land acquisition. Alliance further submitted that activities on the temporary working space, in terms of reclamation and compensable losses and inconveniences, will be treated the same as the permanent right-of-way.

Views of the Board

The Board notes that while Mr. Carter participated in the hearing up to and including cross-examination, he did not provide final argument. As a result, the Board did not receive his submissions in relation to the evidence adduced. With respect to the issue of winter construction in areas where Alliance had communicated to landowners that summer construction would occur, the Board accepts Alliance's commitment to consult with landowners in the event of a revised construction schedule. The Board takes seriously representations and commitments made by pipeline companies to landowners. Accordingly, the Board expects that, as part of Alliance's ongoing public consultation program, the Company will advise the Board of any concerns identified and how these will be addressed in the event that changes to the construction schedule are proposed.

In the absence of argument, the Board assumes that no parties have taken issue with Alliance's proposal to retain only part of the area required for construction as permanent right-of-way. The Board is of the view that, although Alliance's proposed combination of temporary workspace and permanent right-of-way might not be consistent with NGTL policy, Mr. Carter has not demonstrated that it would be inconsistent with industry practice or inappropriate in any way.

The amount of land required for pipeline construction is of concern to the Board because of the potential effects on landowners and the environment. The Board has considered Alliance's proposed land requirements for permanent right-of-way and temporary work space and finds that these are reasonable and justified.

The Board is satisfied with the proposed general location of the Alliance Pipeline. In this regard, the Board has not not been persuaded by Cochin that the number of crossings of its system should override the other criteria used by Alliance is selecting this proposed general location. Site-specific issues relating to utility crossings will be dealt with in the manner outlined in section 5.2.

The Board has considered Alliance's request that an 800 m corridor be authorized but has concluded that approval of such a corridor would not be consistent with the specific route that was communicated to landowners and that the request is not supported by the studies undertaken for the Project.

Re-routes may be identified prior to construction to address considerations such as those identified as a result of pre-construction surveys for wildlife or rare or unique plant species. Addressing these deviations, where known, prior to the process for approval of the detailed route will serve to eliminate confusion for parties involved. Accordingly, the Board is of the view that any certificate issued in respect of the Project should be conditioned to require Board approval of these deviations from the specific route prior to the filing of the plans, profiles, and books of reference pursuant to section 33 of the *NEB Act*.

Given the magnitude of the Project, and the variety of conditions encountered, the Board is of the view that this condition should apply to all reroutes and not just those of greater than 50 m.

Chapter 5

Engineering and Safety Matters

5.1 General

5.1.1 Regulations and Standards

The Project is planned to be designed, constructed, and operated in accordance with the Board's *Onshore Pipeline Regulations*, the latest edition of the CSA Z662 standard entitled *Oil and Gas Pipeline Systems* ("CSA Z662-96" or "the Standard"), and all applicable standards, specifications, and codes that are incorporated by reference into that Standard. Alliance would also comply with other federal, provincial, and municipal codes and regulations where applicable.

5.1.2 Unique Design Aspects

The pipeline would employ high-pressure technology and would be capable of transporting rich natural gas mixtures. As detailed in Appendix I, much of the system is designed to operate at pressures up to 12 000 kPa (1,740 psi). In terms of gas composition, the design is based on an Ultimate Rich Gas Mixture having a 19.6 per cent liquids content and a gross heating value of 44.3 MJ/m ^{3} (1,188 Btu/scf).

This unique combination of pressure and gas composition would result in the transportation of a denser medium, referred to as dense phase gas. By increasing the density, Alliance would reduce the velocity of the gas flow in the pipeline. Since friction losses between compressor stations would be proportional to the square of the gas velocity, the density of the gas would also reduce the pressure drop, compression requirements, and associated fuel gas usage. Alliance is also able to use a smaller-diameter pipeline, as a dense phase mixture occupies a proportionally smaller volume than more conventional natural gas mixtures. This would result in reduced capital costs and lower power requirements.

5.1.3 Operational Considerations

5.1.3.1 Leak Detection

Alliance also indicated that it would employ a state-of-the-art leak detection program to reduce the risk associated with leaks. The leak detection program would consist of up-to-date supervisory control and data acquisition ("SCADA") equipment in conjunction with real-time modelling ("RTM") and line patrol.

With respect to the SCADA and RTM components of the leak detection program, Alliance asserted that its system would be unique in that there would be pressure and temperature monitors at each mainline valve and at each compressor station. The Company would also measure flow at all of the receipt points using orifice meters. The data would be communicated to the control centre via SCADA and continually monitored and analyzed.

Alliance stated that its leak detection model is based on mass balance in conjunction with transient modelling. The leak detection model would take all of the data from the pressure and temperature gauges and flow meters and place it in a computer program which would perform calculations every one to ten minutes to determine what the actual flow volume and state of the product was at the time of data collection. This data would be compared with the previous calculation and any differences would be evaluated to determine if a leak had occurred.

Alliance submitted that its leak detection system would be able to detect a leak of 566 $10^{3}m^{3}/d$ (20 MMcf/d) within a day and a leak of 2.83 $10^{6}m^{3}/d$ (100 MMcf/d) in approximately one hour. The 2.83 $10^{6}m^{3}/d$ leak would represent an opening in the pipe approximately 50 mm (2 inches) in diameter, which is below the critical defect size that would initiate a rupture.

Alliance also stated that it would perform monthly aerial patrols of the pipeline. Ground patrols along the entire mainline and laterals would also be performed annually using standard gas detection instrumentation.

5.1.3.2 Prevention of Liquids Dropout

Alliance indicated that it would use state-of-the-art modelling and numerous SCADA points to ensure that its system does not enter two-phase flow. Among other things, two-phase flow would have the potential to both impact compressor operations and compromise the leak detection system by giving erroneous meter readings.

The Company indicated that its SCADA system model would have the ability to predict and alarm on any approach to a dewpoint. The alarm would trigger a shutdown before the system entered two-phase flow.

Alliance indicated that even the richest potential gas mixture could be kept out of the two-phase region in the mainline. Nevertheless, Alliance has confirmed that a slug catcher would be installed at the downstream end of the 1067 mm mainline. This slug catcher would provide a contingency in the event that liquid from an upstream gas plant upset somehow escaped the quality control of both the plant and the Alliance receipt point.

5.1.3.3 In-Line Inspection

Alliance advised that it would use the most up-to-date inspection methods, including state-of-the-art in-line inspection ("ILI") tools, to ensure that the integrity of the pipeline is not compromised.

The Company indicated that the entire mainline and lateral system would be designed to accommodate the passage of ILI tools. This would be facilitated by using through-conduit type valves as well as permanent and transportable pig launchers and receivers. Alliance plans on using both magnetic flux leakage ("MFL") and ultrasonic type tools when inspecting its mainline. Alliance also stated that each section of the pipeline would be inspected on a five-year cycle. An initial baseline would be established over the first four years of operation using MFL tools and subsequent runs would utilize either MFL or ultrasonic tools.

Alliance submitted that the safety of the pipeline would be enhanced by using ILI equipment, as defects would be found before progressing to the critical stage. Alliance contended that the full ILI capability and inspection plans would ensure that the pipeline would exceed the industry standard.

5.2 Utility Crossings

The construction of the Alliance Project would involve the crossing of a multitude of utilities, including navigable waters, highways, railways, underground telephone lines, electricity lines, and other pipelines. As noted in section 4.2.1, one of the utilities that would be crossed is the Cochin pipeline system, which is also Board-regulated.

As discussed in that section, Cochin expressed concern over the proposed number of crossings of its pipeline. Cochin also asked that, for any such crossings, Alliance be required to: (i) cross at an angle not less than 70 degrees, (ii) install heavier-walled pipe within 200 m of each crossing, (iii) install crack arrestors before and after each crossing, and (iv) install its pipeline under the Cochin pipeline maintaining a distance of at least 30 cm (12 inches).

Alliance submitted that this series of measures, which it characterized as remarkable, was not justified. With respect to the crossing angle, Alliance indicated that it is industry practice to cross pipelines at the approach angle of the line and that it is not necessary to cross a pipeline at any more than 45 degrees. Alliance further submitted that crossing at a higher angle could introduce a sharp bend which would restrict the hydraulics of the pipeline.

Cochin also indicated that its concerns would not be addressed by the execution of the CAPP Facility Crossing Agreement.[1] While acknowledging that the form is used extensively in industry, Cochin submitted that the provisions in the document are conditional upon mutually agreed upon terms and conditions which have not been reached on many basic issues between itself and Alliance. Cochin went on to state that, without appropriate indemnity and provisions for cost coverage, it would not provide its consent for Alliance to cross its pipeline. Alliance indicated that the CAPP Facility Crossing Agreement was designed to avoid situations where issues are raised and litigated on a case-by-case basis. Alliance further indicated that it would use standard industry practices for crossing procedures, surface facility locations, and financial indemnity of companies whose pipeline facilities are being crossed.

No other utility owner made submissions on crossing matters during the GH-3-97 proceeding.

Views of the Board

The Board is of the view that Alliance may still be able to reach agreement with the owners of the utilities which it may cross and, at the least, should be given an opportunity to attempt to reach such agreements. Accordingly, pursuant to section 108(5.1) of the *NEB Act*, the Board has decided to waive the requirement for Alliance

[1] In June 1993, CAPP's Board of Governors approved the universal Facility Crossing Agreement which was developed by the Canadian Petroleum Association in 1990 to streamline processing of federal and provincial crossing agreements.

to obtain leave to cross other utilities, aside from navigable waterways and railways [1], provided that (i) a written crossing agreement is entered into between Alliance and the utility owner for the construction of any such crossings and (ii) any such crossings are constructed in conformity with CSA Z662-96 requirements. Should Alliance be unable to reach agreement with the utilities which it may cross, Alliance may apply to the Board under section 108 and all other relevant provisions of the *NEB Act* for leave to cross a utility. The Board will make a decision with respect to any such application after hearing from both Alliance and the utility owner.

5.3 Fracture Prevention and Control

5.3.1 Conceptual Overview

Safety and operational integrity of natural gas transmission pipelines are important goals. Pipeline integrity is achieved by planning, controlling, and monitoring a number of elements, all of which contribute to the overall pipeline system integrity. Elements that affect overall pipeline integrity are system design, material specifications, pipe transportation and handling, pipeline construction and inspection, pre-service testing, and operation and maintenance practices. Fracture prevention and control is common to a number of these elements.

The fracture initiation tolerance of a pipe is a measure of the pipe wall's resistance to penetration by a crack or other flaw. Fracture initiation tolerance is also a measure of the pipe's resistance to rupturing once a defect has penetrated the wall. Thus, fracture initiation resistance is the first line of defence and a key element in fracture prevention and control design. Fracture propagation resistance determines the distance at which a fracture will arrest. Control of fracture propagation is a secondary line of defence because once a defect has penetrated through the wall, a risk to public safety, property, and the environment has been created.

Fracture initiation is a function of: (i) the fracture initiation toughness of the steel; (ii) the diameter, wall thickness, and material toughness; (iii) the size of the defect; and (iv) the stress acting perpendicular to the defect. Fracture propagation, on the other hand, is a function of: (i) the fracture propagation toughness of the steel; (ii) the decompression of the gas in the pipeline; (iii) the operating temperature relative to the brittle-to-ductile transition temperature of the steel (which in turn controls the ductility and speed of the fracture); and (iv) the backfill conditions.

An ideal goal of any fracture prevention and control design would be to specify pipe characteristics and operating parameters that would only result in leaks in a pipeline regardless of the flaw size and type. This is not possible because no matter how high the toughness, there is a flaw which would rupture the pipe. As such, fracture prevention and control design must balance and conservatively provide for both initiation resistance and propagation resistance.

[1] Crossing of navigable waterways and railways are administered by public authorities other than the Board.

5.3.2 The Alliance Context

In its application, Alliance provided only a general approach to fracture prevention and control. After the filing of extensive technical evidence on this subject by TCPL and Foothills, Alliance responded with extensive additional filings. The key filing was a January 1998 report entitled "The Alliance Fracture Prevention and Control Program" which incorporated reports by Clearstone Engineering, R.J. Eiber, Consultant Inc., and Dr. B.N. Leis of the Battelle Memorial Institute.

Alliance's proposed pipeline design approaches the limit of today's technology through a combination of its maximum operating pressure ("MOP"), operating temperature, pipe size, and gas composition. The design parameters for the mainline are listed in Table 5-1.

Table 5-1
Design Parameters for the Alliance Mainline

Diameter	1067 mm (42 inches)	914 mm (36 inches)
Wall Thickness	11.4 mm (0.450 inches)	14.2 mm (0.560 inches)
Pipe Grade	483 (X70)	483 (X70)
Pipe Forming Process	helical and U&O	helical and U&O
Maximum Operating Pressure	8 275 kPa (1,200 psi)	12 000 kPa (1,740 psi)
Maximum Stress, %SMYS	80	80
Minimum Design Temperature	-5°C (23°F)	-5°C (23°F)
Minimum Operating Temperature at MOP	4°C (39°F)	24°C (75°F)

The balance of section 5.3 addresses the basis and particulars of Alliance's fracture prevention and control plan and the issues raised in respect thereof.

5.3.3 Application of CSA Z662 Requirements

Section 10 of the Board's *Onshore Pipeline Regulations* provides as follows:

> *(1) A fracture control design shall be submitted to the Board for approval prior to the construction of a pipeline*
> *(a) if the pipeline is intended to carry hydrocarbons in a gaseous state; or*
> *(b) if the pipeline is to be tested with a gaseous medium.*
>
> *(2) The Board shall approve the design referred to in subsection (1) if the design provides for a level of safety at least equivalent to the level of safety generally provided for by CSA standards.*

In connection with subsection 10(2) of the *Onshore Pipeline Regulations*, the materials clause of CSA Z662-96 specifies pipe steel toughness requirements and explicitly notes that these requirements are intended to provide protection against both fracture initiation and fracture propagation. [1] Included is specific direction on the determination of the mimimum design temperature for notch toughness purposes.[2]

The notch toughness requirements relating to fracture initiation resistance do not technically apply to Alliance since the design parameters are outside the limits of the applicable clause of the Standard. [3] Moreover, while the Standard clearly requires supplementary design measures to provide positive control of fracture propagation (such as the use of higher toughness pipe or the use of specially designed fracture arrest devices), the formula provided as a guide for estimating arrest toughness values cannot be applied to Alliance's design. [4]

Therefore, engineering principles and fracture mechanics methods need to be applied to achieve a conservative design that would satisfy the intent of the Standard.

The Standard is clear in its requirement that, if the fracture driving force is above a certain limit (CSA Z662 specified threshold stresses and the pressure limit), the pipeline must be designed to provide positive fracture propagation control. The standard does not allow for a reduced fracture propagation control in the event that high fracture initiation resistance is achieved.

Views of the Board

The Board notes that Alliance has accepted CSA Z662 as the appropriate standard for the design of the Canadian portion of its pipeline system. The Board recognizes that the complexities associated with Alliance's fracture prevention and control design stem from the fact that there are no explicit requirements in the Standard applicable to the

---

[1] Reference Clause 5.2.2 of CSA Z662-96 on "Notch Toughness Requirements - Pipe".

[2] Clause 5.2.1.2 of CSA Z662-96 states as follows: *The minimum design temperature for notch toughness purposes shall be taken to be at or below the lowest expected metal temperature when the pipe hoop stress exceeds 50 MPa during pressure testing and service under design conditions, having due regard to past recorded temperature data, the minimum fluid temperature that could occur, and the possible effects of lower air and ground temperatures.*

[3] The second note to Clause 5.2.2.2 of CSA Z662-96 indicates that "specified minimum absorbed energy values higher than those required by Table 5.1 [of the standard, which is referred to in relation to fracture initiation resistance] should be considered for pipe with both a design operating stress greater than 72% of its specified minimum yield strength and a nominal wall thickness exceeding 12.7 mm". The Alliance design is outside of both these limits for pipe in Class 1 locations.

[4] Clause 5.2.2.3 of CSA Z662-96 states as follows: *Where the design operating stress for a gas pipeline or the hoop stress developed by a gaseous pressure-test medium exceeds the applicable pipe threshold stress value given in Table 5.2, Category II pipe shall be required and supplementary design measures to provide positive control of fracture propagation shall be considered. Such measures may include the use of Category II pipe with higher values of absorbed energy or the use of specially designed fracture arrest devices.* The threshold stresses given in Table 5.2 are 240 MPa for 914 mm diameter pipe and 225 MPa for 1067 mm diameter pipe. With its 80 per cent SMYS design for the mainline, Alliance is beyond these thresholds (for Grade 483 pipe, 80 per cent of SMYS is 386 MPa). The formula provided in the note to Clause 5.2.2.3 for the estimation of arrest toughness values, however, is not valid for pipelines at pressures exceeding 8 000 kPa. As well, the formula is for buried pipelines containing gases that exhibit single-phase decompression; in the case of Alliance, there would be two-phase decompression due to the design richness of the gas.

selected design parameters; rather, the Standard requires supplementary design measures to provide positive fracture control. These measures must be developed through sound engineering practices. The Board notes that the measures for achieving a conservative fracture prevention and control design, which would satisfy the intent of the Standard, may differ even among recognized experts.

The Board is of the view that, while CSA Z662-96 does not provide explicit requirements which could be applied to the Alliance Pipeline design parameters, the Company must demonstrate that the fracture design of its pipeline satisfies the intent of the Standard by achieving the required degree of safety and integrity. This onus is reinforced by the preface to the Standard.[1]

5.3.4 Minimum Design Temperature

Alliance developed a fracture prevention and control design based on the minimum design temperature ("MDT") of -5°C. This MDT is specified as the test emperature for the Charpy V-notch ("CNV") test and the drop weight tear test ("DWTT").

In order to determine the MDT, Alliance compiled temperature data from Environment Canada readings taken at relevant locations along the pipeline route dating back to 1964. The data demonstrated that the lowest daily temperature at 150 cm soil depth did not fall below -5 °C at any of the locations.[2] The Company also provided, for each location, the average daily temperature at 150 cm soil depth for each date within seven calendar days of the date of the lowest reading.

TCPL argued that the selected MDT of -5 °C may not be low enough. TCPL filed evidence indicating that minimum daily soil temperatures at a depth of 1 m can be as low as –6.7 °C during the winter months, based on a reading taken at Outlook, Saskatchewan in 1975. The average temperature during the month when the minimum temperature was recorded was –6.09 °C.

Alliance argued that its pipeline will be installed at a depth of approximately 2 m to trench bottom and that the spot soil temperature of -6.7°C once in twenty years at a depth of 1 m is irrelevant.

Views of the Board

In the Board's view, Alliance has satisfactorily demonstrated that -5 °C is an acceptable MDT for the pipeline, provided that the minimum mid-pipe depth is 150 cm. The onus will be on Alliance to ensure that this minimum mid-pipe depth is achieved.

---

[1] The preface to CSA Z662-96 states, in part: *Requirements for abnormal or unusual conditions are not specifically provided for, nor are all details related to engineering and construction prescribed. It is intended that all work perfo rmed within the scope of this Standard meets the standards of safety and integrity expressed or implied therein.*

[2] The lowest measured temperature of -4°C was measured at Ellerslie, Alberta in February 1980.

5.3.5 Fracture Initiation Control

The fracture initiation control design is intended to ensure that a pipeline can tolerate the sizes and types of flaws that could be introduced during manufacturing or developed in service. These may be mechanical damage defects and other part-through-wall and through-wall flaws and punctures.

When designing against fracture initiation, the primary concern is to specify the toughness properties of the pipe material which would tolerate axial flaw sizes subject to the hoop stress (which is typically the predominant stress). This involves specifying the fracture initiation toughness of the steel at the MDT.

The fracture initiation toughness is a function of temperature. To prevent brittle fracture in the pipeline, the minimum operating temperature must be above the fracture initiation transition temperature. Alliance would achieve this by requiring that the all-heat average (''AHA'') fracture appearance is at least 85 per cent shear area at the MDT.

Since the required fracture propagation resistance is higher than the CVN toughness which would be obtained from fracture initiation considerations, Alliance used the fracture propagation control CVN energy values for fracture initiation design. For the 914 mm diameter pipe, Alliance used an AHA toughness of 195 J with a minimum individual heat average of 136 J. For the 1067 mm diameter pipe, Alliance used an AHA toughness of 215 J with a minimum individual heat average of 160 J. The maximum tolerated through-wall flaws are 147 mm and 155 mm (5.8 inches and 6.1 inches) for the 914 mm and 1067 mm lines respectively. Alliance also stated that the 914 mm and 1067 mm diameter pipes can tolerate (i) gouge lengths of 247 mm and 290 mm (9.7 inches and 11.4 inches) respectively with depths 10 per cent of the pipe wall thickness and (ii) dents 10 per cent of the pipe diameter.

Alliance stated that the puncture resistance of a pipeline with an essentially static loading, such as from a backhoe tooth, is proportional to the wall thickness and the ultimate tensile stress. Alliance claimed that, since Grade 483 pipe has relatively high tensile strength and the line pipes have substantial wall thickness, the designed pipeline would have excellent puncture resistance. Alliance further stated that its pipeline would have the best fracture initiation resistance of gas transmission pipelines in North America.

TCPL indicated that, while the resistance of the Alliance Pipeline to fracture initiation does not cause any specific concerns, it is not convinced that Alliance would have "generally the best fracture initiation resistance of gas transmission pipelines built in North America''. TCPL argued that the steel produced for other customers of the same pipe manufacturers is no different from that produced for Alliance and that, therefore, the fracture initiation resistance of the Alliance Pipeline would not be superior to any other modern natural gas transmission pipeline.

Foothills was of the view that Alliance had submitted a satisfactory fracture initiation control design and that Alliance's proposed pipeline can be considered to have resistance to fracture initiation comparable to any modern, well-designed natural gas transmission pipeline.

Views of the Board

The Board is satisfied that the CVN energy values obtained by Alliance from fracture arrest considerations provide acceptable tolerance of defects for fracture initiation. The Board notes that the specified DWTT of 85 per cent shear area at the MDT ensures that any fracture would initiate in a ductile mode.

5.3.6 Minimum Operating Temperatures

Alliance advised that the minimum operating temperatures for fracture propagation design are 4 °C for the 1067 mm diameter pipe at an MOP of 8 274 kPa and 24 °C for the 914 mm diameter pipe at an MOP of 12 000 kPa.

To control operating pressures and temperature, Alliance has committed to installing a state-of-the-art SCADA system with pressure and temperature measurement at every block valve (spaced at approximate 32 km intervals). Alliance stated that this system would be programmed with the allowable pressure and temperature limits to ensure that the pipe is operated within the range which was considered in the fracture propagation control design.

Alliance committed to further ensure that, if SCADA communication is lost at any compressor station or at either of the two subsequent mainline block valves, the local discharge pressure control set point would be lowered to ensure that the line is always operated well within the range of its fracture arrest toughness capability.

Alliance stated that, if necessary, it would use cooler by-pass and recycle heating to prevent temperatures and pressures from exceeding the fracture control requirements anywhere along the pipeline.

TCPL argued that the after-cooler by-pass and recycle heating may not be an effective means of preventing the temperature drop within the required time.

To support its contention, TCPL performed a shut-in test on its 914 mm diameter Line 100-3 at Station 17 and monitored the conditions at Station 13. The distance between the two stations is 105 km and the elevation difference is 7 m. The experiment showed that the gas temperature from the time of the line isolation stayed almost constant, demonstrating isothermal rather than adiabatic behavior.

Views of the Board

The Board acknowledges that operating temperature is an important consideration in fracture propagation analysis.

The Board is of the view that Alliance's SCADA system would reduce the possibility of events with combinations of pressure and temperature occurring which would exceed the designed fracture arrest conditions.

Further, the Board notes that a number of factors would have to occur simultaneously to contribute to an event which would lead to a propagating fracture under conditions

exceeding the design conditions for fracture arrest. First, a fracture would have to be initiated under conditions which are not conducive to fracture initiation (per section 5.3.5 on fracture initiation control); second, the downstream compressor would have to be shut down; and third, the pressure/temperature conditions would have to develop along the pipeline which would exceed the fracture arrest design conditions. The Board is of the view that the possibility of such an event is remote.

The Board is of the view that the onus is on Alliance to ensure that the pipeline is operated within the design range for fracture arrest.

5.3.7 Fracture Propagation Control

5.3.7.1 The Battelle Two-Curve Method

It was generally recognized during the hearing that the design of the Alliance Pipeline is outside the range of the ductile fracture propagation control criteria of CSA Z662-96. Therefore, Alliance resorted to the use of the "Battelle two-curve" method for determination of the arrest conditions for ductile fracture propagation.

The method is illustrated conceptually by Figure 5-1. The lower curve represents the gas decompression velocity and the upper curve represents the fracture velocity, both as a function of the pressure inside the pipeline.

When a fracture is initiated in a pressurized pipeline and starts propagating, it is driven by the internal pressure. As a result of the fracture, the original internal pressure starts decreasing with the velocity of the decompression wave which is moving in the same direction as the propagating fracture. If the decompression wave moves faster than the propagating fracture, the fracture starts to lose the driving force and arrests.

The decompression wave velocity curve for methane is a smooth curve which can be determined analytically or experimentally in a separate decompression experiment. On the other hand, rich natural gas decomposes during decompression into two phases, which demonstrates itself in a plateau within the decompression curve. This has the effect of slowing down the decompression wave velocity so that a high pressure exists longer at the fracture tip than would be the case for the decompression of pure methane. This longer duration of high pressure necessitates a higher fracture toughness for the arrest of a propagating fracture.

The velocity of a propagating fracture is a function of the stress in the pipe wall, the pipe size, and the pipe's resistance to ductile fracture propagation. The fracture velocity curve is determined by using an equation derived empirically from pipe burst tests.

If the fracture velocity curve is above the gas decompression velocity curve in the Battelle two-curve diagram, this indicates that the fracture would stop within one or two pipe joints. In other words, the gas decompression wave quickly "outruns" the fracture, thus removing the driving force at the crack tip. At the toughness level where the curves are tangent, a fracture has just enough driving force to propagate long distances. The toughness must therefore be increased above this level to ensure fracture arrest.

Figure 5-1
Battelle Two-Curve Method

5.3.7.2 Determination of Fracture Toughness

Fracture propagation resistance is provided by the pipe material's fracture toughness, which is measured by the absorbed energy required to break a laboratory test specimen (expressed in joules ("J")). In addition to the absorbed energy, the percentage of shear area of the fractured surface is also measured to express the ductility of the material.

The CVN test is most often employed to measure the fracture toughness and involves a small dimensionally-standardized specimen with a machined V-shaped notch from which the crack is initiated. Another test that is sometimes used is the DWTT, which involves the breaking of larger-size specimens that have the full wall thickness of the line pipe.

In many cases, the CVN test has proven to be of high value due to its low cost and good correlation with full-scale fracture behaviour. It has been recognized since the late 1970s, however, that the established correlation between CVN toughness and resistance against full-scale fracture propagation (based on the Battelle two-curve analysis) starts to break down for steels with CVN energies above 100 J. These steels are so tough that a high proportion of the CVN energy is used on deformation of the test specimen and crack initiation from the notch. The analysis therefore provides less information on the resistance against fracture propagation with increasing toughness of the steel. In other words, CVN values above 100 J obtained from the Battelle two-curve analysis under-predict the full-scale dynamic fracture resistance of the pipe.

Therefore, CVN energy determined from the Battelle two-curve analysis must be increased to become representative of the toughness required for fracture arrest. The magnitude of this increase must be based on correlation with full-scale burst test results.

There is a pool of full-scale burst test results in the literature which provide CVN absorbed energy values applicable to the simulated design and operating parameters. In cases where the specified parameters are beyond the envelope of past tests, representative new full-scale burst tests are typically performed so as to validate the design and at the same time expand the envelope. For example, Foothills conducted a testing program at its Northern Alberta Burst Test facility in the early 1980s to simulate the parameters applicable to its Alaska Highway Pipeline Project. [1] From these tests, Foothills determined a correction factor of 1.3.

5.3.7.3 Alliance's Design

For the purpose of fracture propagation control, the Alliance Pipeline design involved the following three considerations: (i) ensuring that the line pipe specified would exhibit ductile properties at the minimum design temperature of the pipeline; (ii) determining the minimum design temperature for measuring notch toughness; and (iii) determining the minimum toughness required to arrest propagating ductile fracture for the Alliance Pipeline operating conditions.

---

[1] The Canadian portion of the Alaska Natural Gas Transportation System, which is also referred to as the Alaska Highway Pipeline Project, was certificated in 1978 by the Parliament of Canada through the passage of the *Northern Pipeline Act*. Only the southernmost portion of the pipeline in Canada (referred to as the Foothills Prebuild) has been constructed to date.

As noted in section 5.3.4, the minimum design temperature was determined by Alliance to be -5 °C. The Company specified a minimum AHA of 85 per cent shear area in the DWTT at -5 °C to ensure that the pipe would be in the ductile region under any operating conditions.

In applying the Battelle two-curve method, Alliance used a decompression wave velocity curve developed by Clearstone Engineering for three design gas compositions, the maximum operating pressure, and the corresponding operating temperature. As shown by Figure 5-1, the curve for the ultimate rich gas mixture has a plateau at about 6 200 kPa, indicating that liquid particles begin to form at this point in the decompression. This has the effect of producing a sustained pressure for a longer period at about 6 200 kPa, which would require high fracture toughness for arrest. The fracture velocity curve was calculated using the "duct tough" spreadsheet. For the 914 mm diameter, 14.2 mm wall thickness, grade 483, and ultimate rich gas case, the fracture velocity curve for 149 J CVN energy is tangent to the gas decompression curve, representing a transitional point between propagating and arresting fracture ranges. Since this CVN energy value is over 100 J, a correction factor had to be applied.

Dr. B.N. Leis of the Battelle Memorial Institute was commissioned to develop corrections to the two-curve Battelle model for the Alliance Pipeline. These corrections were presented in a June 1997 report entitled "Relationship Between Apparent (Total) Charpy V-Notch Toughness and the Corresponding Dynamic Crack-Propagation Resistance".[1]

In developing the corrections, Dr. Leis assessed the energy area under the force-displacement curves obtained for eight instrumented Charpy tests for eight different materials. In each case, he divided the energy into (i) deformation energy, (ii) fracture initiation energy, and (iii) fracture propagation energy so as to obtain the energy available for crack arrest and to ensure that the specified CVN value would contain the necessary fracture arrest component.

For the 914 mm diameter section of mainline, Alliance utilized a correction factor of 1.21 based on Dr. Leis's analysis. The corrected CVN energy for arrest is 149 J times 1.21, or 181 J.

If the minimum CVN energy value for a pipe order were to exceed this value, then all pipe lengths would have energy levels adequate for fracture arrest. Alternatively, if this CVN energy was specified as an AHA, approximately 50 per cent of the lengths would have the ability to arrest a fracture. Alliance chose to specify 195 J for the 914 mm diameter section of the mainline as the AHA CVN energy value. Alliance also specified the minimum CVN absorbed energy for any heat as 136 J. After discussing these specifications with a potential supplier of helically formed pipe, Alliance received assurance that the AHA fracture toughness specification could be raised to 280 J.

Alliance followed the same procedure for determining the fracture toughness requirements for the 1067 mm diameter section of the mainline and obtained a corrected CVN energy value of 208 J (calculated as 168 J from the two-curve diagram times a Leis correction factor of 1.24). The Company chose to specify an AHA CVN energy value of 215 J.

Alliance intends to use the 280 J pipe for the construction of the 914 mm diameter mainline, which is significantly higher than the calculated fracture arrest toughness of 181 J. Although the fracture

[1] An addendum to the Leis report (dated 11 November 1997) was also placed on the hearing record.

driving force for the 1067 mm diameter mainline is higher than that for the 914 mm diameter mainline, Alliance specified 215 J, which is marginally higher than the calculated value for fracture arrest of 208 J.

The most severe operating conditions and the fracture toughness specified for these conditions are shown in Table 5-2. Alliance also calculated fracture toughness for less severe operating conditions, leaner gas compositions, and thicker-wall pipe. All these combinations require lower fracture toughness than those calculated for the most severe conditions.

Table 5-2
Data for Alliance Operating Conditions and Fracture Toughness Requirements

Pipe Specification	Stress Level	Discharge Conditions		Gas Comp.	Calculated CVN Energy		Specified CVN Energy		Pipe forming process	CVN test temp.
	% SMYS	Pressure kPa	Temp °C	MJ/m³	Battelle 2-curve (J)	Leis Corrected (J)	Minimum (J)	AHA (J)		°C
914 mm x 14.23 mm, Grade 483	80	12000	24	Ultimate Rich 44.33	149	181	136	195	U and O	-5
							181	280	helical	
1067 mm x 11.43 mm, Grade 483	80	8274	4	Ultimate Rich 44.33	168	208	160	215	helical U and O	-5

Alliance also assessed and specified fracture toughness requirement for components and for the line pipe seam weld. A minimum CVN absorbed energy of 36 J was specified for the seam weld.

Alliance proceeded to calculate the expected fracture length for the 914 mm diameter section by assuming that the fracture toughness for a pipe order would be normally distributed and the pipe lengths would be randomly distributed in the pipeline. Under these assumptions, the ductile fracture would arrest within 14 pipe lengths or 168 m using the ultimate rich gas composition. Alliance repeatedly emphasized that the fracture control design determined for the most severe operating conditions and ultimate rich gas would provide a wide range of safety for less severe operating conditions and leaner gas compositions.

5.3.7.4 Full-Scale Burst Test Program

Alliance initially contended that its fracture propagation control design for the 914 and 1067 mm diameter sections of mainline was fully validated on the basis of existing burst test data. However, during the hearing and following challenges of its fracture arrest design, Alliance committed to a full-scale burst test program for 914 mm diameter pipe.

The test program is intended to validate both the specified CVN energy value for fracture propagation arrest and the Leis correction model. Up to three tests were planned to be conducted between August and December 1998 at the Spadeadam test site in Cumbria, England using 914 mm diameter line pipe produced by the steel mills which will be supplying the pipe for the Project.

Alliance noted that, at the ultimate rich gas composition and at maximum operating pressure, the 1067 mm diameter mainline would experience a higher driving force than the 914 mm diameter

mainline. The Company advised of its intent to perform an adjustment in conditions on one of the 914 mm diameter line tests in order to simulate this higher level of driving force and to allow the fracture arrest design for the 1067 mm diameter mainline to be verified without physically testing the larger-diameter pipe.

Alliance committed to review and, if necessary, to revise its fracture prevention and control plan based on the results of the first two burst tests. Given the testing schedule, Alliance indicated that the confirmed or revised plan could be submitted to the Board well in advance of field construction.

Each burst test would involve an approximate 100 m long test section comprising nine pipes of various notch toughness values commencing with the initiation pipe of very low toughness. The fracture would be initiated by an explosive charge placed in the middle of the initiation pipe. The fracture would propagate in the pipes of increasing fracture toughness. The toughness of the pipe where arrest occurs would represent the notch toughness which would be required for arrest in the proposed pipeline. With these tests, Alliance hoped to (i) demonstrate that the CVN toughness of the selected pipe material is sufficient for fracture arrest and (ii) validate its fracture propagation prevention and control design including the Leis analysis.

Alliance planned to install crack arrestors at both ends of the test section as an added precaution and to test a specific arrestor design.

5.3.7.5 Crack Arrestors and Operating Limits

Alliance stated that, in the unexpected event that none of the pipe in the full-scale test sections arrested the propagating fractures, crack arrestors would be installed on the pipeline in accordance with Clause 5.2.2.3 of CSA Z662.

Crack arrestors are mechanical means of arresting a propagating fracture which typically consist of bands of steel wrapped around the pipeline or thicker-wall sections of pipe placed at intervals along the pipeline. As a propagating fracture passes into an arrestor, the fracture driving force is reduced below the fracture resistance of the arrestor and the fracture stops.

The crack arrestors would become the primary method of providing positive control of fracture propagation; however, the pipe would still be purchased as originally specified to maintain the very high level of crack initiation resistance achieved.

A preliminary consideration of crack arrestors in the Alliance fracture propagation control design calls for their installation approximately every 350 m. The spacings might vary in the vicinity of dwellings and in other circumstances such as in the vicinity of significant roadways.

Alliance submitted that its fracture propagation arrest design is already validated on the basis of existing burst test data for gas compositions having a gross heating value up to 42.5 MJ/m^3 (1138 Btu/scf) at the highest intended MOP of 12 000 kPa. The Company therefore argued that the pipeline could be safely operated at those levels pending successful burst tests. The Company also noted that the gas actually expected to be transported on the pipeline would have a gross heating value of approximately 40.0 MJ/m^3 (1072 Btu/scf), showing the conservatism inherent in the design.

Views of Intervenors

Duke, IPLE, and WEI argued in support of Alliance's fracture propagation control design, including the proposed full-scale burst test program. On the other hand, and as explained in the following text, TCPL and Foothills were critical of the design. Cochin commented in final argument that it would be appropriate for the Board to impose a condition requiring validation of the design by full-scale burst tests.

TCPL argued that the Leis analysis is flawed and provides no reliable guidance in determining the fracture toughness required to arrest a propagating fracture under the extreme conditions represented by the Alliance proposal. TCPL's specific criticism was as follows:

(i) The correlation set out in the study by Dr. Leis did not account for the effects of two-phase gas decompression and is, in TCPL's view, not applicable to steels exhibiting rising upper shelf behaviour.[1] With respect to the former, Dr. Leis applied the correction factor to the existing full-scale burst test data available in the literature which was predominantly obtained from tests with air and other single-phase decompression gases. Only a limited amount of two-phase decompression data was available.

(ii) The analysis wrongly assumed a constant pendulum velocity during the Charpy tests performed by Dr. Leis.

(iii) Dr. Leis derived his equation for determination of the correction factor on the basis of only a few valid data points and was not able to produce the data for the purpose of replication. Two of his eight tests were invalidated by the Charpy machine not having enough energy to break the specimens and three others were below the 100 J limit for the proposed correction. This left three points on which to base the correction correlation.

(iv) There were calibration errors during the entire test program.

TCPL also submitted that Dr. Leis's correction does not reflect material or Charpy test characteristics and therefore does not represent a reliable procedure for using Charpy tests for pipeline fracture arrest predictions. TCPL suggested that more reliable test methods are available to predict the fracture resistance, such as the static pre-cracked DWTT ("SPC DWTT"). The specimen used in this test provides better dimensional similarity to the pipeline wall than the CVN specimen, and the SPC DWTT absorbed energy is predominantly energy used for crack propagation. TCPL claimed that this method was used on Japanese pipe and that a good correlation was obtained between predicted fracture velocity and the actual fracture velocity measured in full-scale burst tests.

TCPL completed a testing program on the 280 J AHA helical pipe steel that Alliance proposes to use for its 914 mm diameter mainline. This testing program generated correlations between Charpy toughness values and the SPC DWTT values. In TCPL's view, the results of this correlation illustrate the lack of reliability of Leis's prediction that arrest will occur at 181 J for the 914 mm diameter mainline and 208 J for the 1067 mm diameter mainline. TCPL could not predict, on the basis of this program, whether the 280 J pipe would be able to arrest the fracture in a 914 mm diameter pipe full-

[1] Rising upper shelf behaviour is exhibited by heavily controlled rolled, low alloy, high strength steels.

scale burst test, but was confident in predicting that the fracture would not arrest in a 1067 mm diameter pipe full-scale burst test.

TCPL also commented on Alliance's full-scale burst test program. One aspect highlighted by TCPL is that Alliance is not planning to test the case that has the highest crack driving force. TCPL observed that the combination of higher crack driving force and the lower toughness at +4 °C makes the 1067 mm diameter line the more critical one from a fracture control viewpoint (i.e. versus the 914 mm diameter case). As an alternative to physically testing both 914 mm and 1067 mm diameter pipe, TCPL suggested that Alliance could perform tests solely on the 914 mm diameter pipe provided that both of the following conditions are met:

(i) The temperature, or pressure, or a combination of both is adjusted to represent the higher fracture propagation driving force of the 1067 mm diameter design. In this respect, if the 914 mm diameter pipe test is conducted at 12 000 kPa, the test temperature would need to be +16°C. Alternatively, if the 914 mm diameter pipe test is conducted at +24 °C, the initial test pressure would need to be 12 210 kPa.

(ii) The Leis CVN-based method of predicting fracture resistance requirements would need to be abandoned in favour of a method which is capable of accommodating manufacturer-specific properties in full-thickness fracture propagation resistance behaviour as a function of the test temperature. TCPL recommended the use of full-thickness tests such as the SPC DWWT, chevron-notch DWTT, or crack-tip-opening angle specimens to supplement standard CVN testing.

In relation to crack arrestor validation, TCPL observed that the proposed burst tests involve having the crack arrestor on the highest toughness pipe. In TCPL's view, the arrestor should be scaled up to work on the lower toughness pipe where the crack driving force which the arrestor needs to overcome is higher.

TCPL also questioned the appropriateness of utilizing crack arrestors as a primary means of controlling propagating fractures in the event that full-scale burst tests are unable to validate Alliance's design. Furthermore, TCPL submitted that it would not be prudent for Alliance to operate on the basis of its proposed interim operating parameters prior to the completion of full-scale burst testing.

Foothills also made submissions on Alliance's fracture propagation control design, and in particular on Dr. Leis's analysis and on Alliance's proposed full-scale burst test program.

With respect to the former, Foothills was not convinced of the validity of the Leis correction method and the data to support it. To support its view, Foothills analyzed the data of all eight instrumented CVN tests conducted by Dr. Leis and concluded that the data was unreliable. Since this data was used to derive the equation for the correction factor and for the prediction of the required CVN absorbed energy for the fracture arrest in the Alliance Pipeline, Foothills considered that Alliance's fracture arrest prediction was also unreliable.

Foothills explained that it performed full-scale burst tests for its Alaska Highway Pipeline Project directly involving the relevant combination of gas composition and the pressure and temperature range. On the basis of these project-specific tests, a 1.3 correction factor was empirically determined by Foothills

Foothills applied the Leis correction method to the parameters applicable to its own project and obtained correction factors between 1.18 and 1.24, which under-predict the Foothills full-scale burst test results. Foothills did not consider that even the correction factor of 1.3 could be confidently applied to Alliance's design conditions. According to Foothills, the limited experimental data available for the conditions most closely approximating the parameters for Alliance's 914 mm diameter mainline design indicates that the correction factor for these full-scale burst test are 1.66 and 1.82. Foothills concluded that Alliance would have to validate its pipeline design by full-scale burst tests specific to the design conditions and the project pipe.

Based on its experience with full-scale burst tests and the evaluation of the testing results, Foothills was of the opinion that the limited Alliance test program would not produce a validation for the Leis correction method. The Alliance full-scale test program would provide empirical validation of the fracture arrest toughness for the conditions tested.

Foothills also commented on the applicability of the 914 mm diameter full-scale tests for the validation of the 1067 mm diameter fracture arrest design. Foothills was of the view that the 1067 mm diameter fracture arrest design could be potentially addressed by conducting one or more 914 mm diameter tests under more severe conditions (e.g. by reducing the test temperature). This could provide a reasonable basis for the determination of modified arrest criteria for the 1067 mm diameter pipeline design. The other options were: (i) to conduct 1067 mm diameter full-scale burst tests under operating conditions, (ii) to modify the fracture length design criteria, (iii) to modify the operating conditions, or (iv) to utilize crack arrestors.

Foothills suggested that Alliance might consider additional types of small-scale laboratory testing on full-thickness specimens such as instrumented and/or alternative notched DWTT or crack-tip-opening angle test specimens to provide a wider range of alternative solutions.

Foothills also argued that Alliance's suggested interim operating limits are not within the envelope for which unequivocal evidence of arrest based on pipe toughness has been achieved. Foothills submitted that, pending successful full-scale burst testing, the gas composition should be limited to a C_{2+} content of about 4.5 per cent or, alternatively, a gross heating value of about 49.3 MJ/m^3 (1050 Btu/scf). Foothills also submitted that, for a gas composition having a gross heating value of 42.5 MJ/m^3 (1138 Btu/scf), the MOP should be limited to that for which pipe body arrest has been demonstrated in full-scale tests for the same composition, namely 8 687 kPa (1260 psi).

Applicant's Reply to Intervenor Submissions

Alliance defended its ductile fracture propagation control design during cross-examination, in written filings, and in final argument. Following are some of the points raised by the Company in reply to the submissions made by TCPL and Foothills:

(i) Alliance suggested that the participation by TCPL and Foothills on the fracture prevention and control issue was not solely motivated by concerns of safety or public interest but, rather, by concerns of competition from a new more efficient pipeline. The Company further suggested that TCPL and Foothills were applying double standards through certain of their criticisms.

(ii) The Company noted that the issue of fracture propagation control is clearly a complex one, subject to a great deal of engineering judgement. The Company went on to state that it had

assembled a team of world-renowned experts to assist in the development of its fracture prevention and control program and, moreover, that the program was endorsed through a peer review by certain of its owners who are experienced pipeline companies.

(iii) Alliance noted that, prior to the work of Dr. Leis, the industry tended to use a flat 30 per cent correction to CVN energy values determined from the Battelle two-curve method when considering designs requiring high toughness. The Company maintained that the Leis correction factor is appropriate and constitutes a conceptual advance over the flat 30 per cent "gross-up" because: (1) it has been developed based on tests designed to separate the energy available to resist propagation from the total measured CVN energy; (2) it has been validated by comparison to the universe of burst test data, both for rich gas and otherwise; and (3) it is consistent with the results of Foothills' Northern Alberta Burst Tests, which is particularly significant given that these tests represent fracture driving forces reasonably similar to those that Alliance has calculated for its system.

(iv) Alliance acknowledged that Dr. Leis assumed constant velocity of the hammer in the CVN test, but went on to note that, in developing his correction, Dr. Leis addressed this concern by excluding energy associated with the significant effects of decreasing velocity in calculating integrated energy.

(v) For the following reasons, Alliance disagreed with TCPL's assertion that the SPC DWTT is a more appropriate means than CVN testing for assessing toughness and general arrestability of pipe: (1) the SPC DWTT induces large amounts of cold work into the steel in the pre-cracking through which the fracture subsequently runs in breaking the specimen; (2) the cold work lowers the toughness of the steel and increases the transition temperature; (3) current Battelle research shows that the SPC DWTT specimen does not usually continue to crack along the pre-cracked plane when impact tested but, rather, that the crack reinitiates on different crack planes in many cases, further undermining any logical appeal this test might have had; and (4) the test is not a standardized test and was rejected when proposed for American Petroleum Institute standardization in 1979. Alliance also noted that the correlation of prediction based on the SPC DWTT has not been validated with the existing full-scale burst test data base as has the CVN toughness measurement with the predicted toughnesses using the Battelle two-curve method and Leis correction factor.

(vi) The Company argued that, regardless of the detailed concerns in relation to the fracture control design, the required minimum and AHA toughness specifications for the whole Alliance system, and particularly the 914 mm diameter portion of mainline, are very conservative.

(vii) Furthermore, regardless of the conservatism inherent in the Alliance Pipeline design, a full-scale burst testing program will be carried out to validate the Leis correction model and to clearly demonstrate the ability of the pipe to arrest propagating fractures.

Views of the Board

The Board considers, rhetoric aside, that there was a constructive debate during the GH-3-97 proceeding on the appropriate fracture prevention and control design for the Alliance Pipeline.

The Board notes that the recognized experts who participated in the hearing did not fully agree on the approaches that would lead to a safe design for ductile fracture propagation arrest. The Board observed that this issue evolved over the course of the hearing and resulted in Alliance undertaking to simulate the operating conditions for the proposed mainline pipe in full-scale burst tests prior to the commencement of construction. The Board notes that there was final consensus among the hearing participants that full-scale burst testing would be the most appropriate means of validating the selected design.

The Board is satisfied that Alliance included the full-scale burst testing of 914 mm diameter pipe at the proposed MOP in the fracture prevention and control plan. The full-scale burst test results will be used to validate the ductile fracture propagation control design for the 914 mm diameter mainline and smaller-diameter lateral lines with lower fracture driving force.

Given the particulars of the burst test program, the use of the Leis correction model is of no practical concern for the 914 mm diameter mainline. The use of the model is, however, of concern with respect to the 1067 mm diameter mainline.

The Board is of the view that the 1067 mm diameter mainline, which is characterized by a fracture driving force higher than for the 914 mm diameter mainline, would ideally be validated by a full-scale burst test program performed on that pipe. The Board is also of the view that, if such a burst test program is impractical, Alliance may use the burst test program for 914 mm diameter pipe to simulate the equivalent fracture driving force of the 1067 mm diameter mainline by lowering the test temperature or increasing the test pressure or both. The Board further considers that Alliance should establish the equivalent fracture driving force based on full-thickness tests, such as the SPC DWTT, in addition to CVN tests.

Any certificate issued would include a condition requiring Alliance to file a detailed report on the results of the above testing with the Board for approval at least 30 days prior to the commencement of mainline trenching. The condition would further stipulate that, in the event that the tests are unsuccessful, Alliance shall submit operating limits or a crack arrestor program, with or without operating limits, for either or both of the 914 mm and 1067 mm diameter sections of mainline, together with technical justification, for approval by the Board.

Chapter 6

Traffic, Tolls, & Tariffs and Method of Regulation

6.1 Traffic, Tolls, & Tariffs

Views of the Applicant

Alliance stated that it had designed a transportation service package that satisfied the needs of the shippers, owners, and lenders associated with the Project. In the Company's view, the transportation service package will provide both toll certainty and toll stability for its shippers, and adequate revenue to satisfy investor and lender requirements.

Alliance argued that all of its shippers are treated equally, and that all have the same rights, privileges, and obligations. The Company noted that 37 shippers have contracted for 98 per cent of the pipeline's capacity for a term of 15 years, that the transportation service package was freely negotiated by shippers, and that no shipper sought changes to the tariff. The Company contended that the tolls are just and reasonable and that there is no discrimination.

Alliance explained that the toll consists of a demand charge, which is essentially a reservation charge for the right to transport gas, a commodity charge for volumes actually transported, and an in-kind charge for fuel. In addition, there is a surcharge for contracted capacity on the Taylor-Aitken Creek portion of the pipeline to reflect the extra distance that the gas must be shipped. Under the terms of the pro forma Transportation Service Agreement, shippers would commit to paying demand charges for the first 15 years of service.

Alliance stated that the pipeline has 44 receipt points in Canada and only one delivery point in the United States, at Joliet, near Chicago, Illinois. Apart from the surcharge to be levied on shippers on the Taylor-Aitken Creek portion of the pipeline, there will be only one toll for service to Joliet.

The tolls would be set on a cost-of-service basis, under which the tolls would reflect the capital and operating costs of the system, plus an allowance for a return on the investment capital. The transportation service package includes a capital efficiency incentive which encourages Alliance to build the Project in a cost-effective manner. The incentive provides for an increase or reduction in the Company's return on equity according to whether actual capital costs are less than or exceed agreed-upon baseline estimates.

The Company also has committed to bear the risk of shipper default on payment, stating that any costs arising from default would be borne by the owners as opposed to being spread among the remaining shippers.

Alliance has proposed a volumetric tolling system under which shippers would be billed according to the volumetric capacity which they have contracted on the system. The Company argued that the costs of shipping gas on its system would vary with the volumes of gas transported, and not with the heat content of the gas. In Alliance's submission, the unique design of the pipeline will allow the

Company to carry dense phase gas without incurring any increase in transmission costs. On that basis, Alliance argued that a volumetric toll would be most consistent with the principle that tolls should be cost-based.

In response to suggestions by intervenors that thermal-based tolls would be more appropriate, Alliance argued that such tolls would not adhere to the principle of cost causation and submitted that no attempt was made to show that thermal tolls represent a proper allocation of costs. The Company also stated that issues of intra-shipper inequity would be created if different tolls for natural gas of different heating values were charged.

Alliance responded as follows to NOVA Chemicals' submissions relating to the Gas Industry Standards Board ("GISB"). Alliance noted that the GISB is an industry body, and not a regulator, whose recommendations are sometimes adopted by the FERC as guidance in establishing its own rate design policies. Alliance stated that, based on a GISB recommendation, the FERC has determined that the rates charged by gas pipelines under its jurisdiction should be stated (as opposed to calculated) on a heat content basis. In Alliance's view, this policy is simply meant to facilitate a comparison by shippers of the relative transportation costs on the various pipeline systems, and is not intended to shift costs between shippers of rich and lean gas. Alliance also suggested that any plan by TCPL to move to energy-based tolls has no bearing on what is appropriate for the Alliance Pipeline.

The tariff also provides for another service which Alliance has named Authorized Overrun Service ("AOS"). Under AOS, Alliance would allocate all of the spare capacity that exists on the system on any particular day to the firm service shippers according to each shipper's contracted firm service volumes (up to a maximum of ten per cent of each shipper's contracted demand quantity). There will be no charge for moving gas under this service, other than the fuel charge.

Alliance submitted that AOS was an innovative approach to the problems that are created by the fact that available daily capacity on a pipeline system varies considerably. As a result of this variability, most gas pipeline companies carry extra capacity which is marketed daily as interruptible service. The Company stated that AOS will puts maximum control of the available capacity in the hands of the shippers. It noted that, since shippers would be paying for all of the fixed costs of the pipeline through their demand charge payments, they are entitled to all of the pipeline's capacity. Alliance also stated that the transportation rights will be tradeable on a secondary market, thereby providing additional flexibility to the shippers.

In response to some intervenors' arguments that AOS would provide a "free ride" for NGL injection, Alliance argued that removal of this benefit would interfere significantly with the commercial arrangements agreed to between Alliance and its shippers, owners, and lenders.

Alliance also noted that if firm shippers do not fully utilize AOS, the excess capacity will be marketed as interruptible service. The interruptible service toll is would be 100 per cent of the firm service demand and commodity tolls, plus in-kind fuel, and additional revenues from interruptible service would be refunded to firm service shippers in the next billing period.

Finally, the proposed tariff requires that shippers relinquish to Alliance the rights to any liquids entrained in the gas streams delivered to the pipeline. As compensation for any liquids that are extracted, shippers would receive at the U.S. delivery point quantities of natural gas having an equivalent thermal content. Alliance noted that shippers are not required to deliver liquids to the

pipeline and stated that the pipeline's design provides shippers with increased options for marketing their liquids.

Views of Intervenors

The concerns that intervenors expressed about Alliance's proposed tariff were summarized in section 3.3 of these Reasons. In brief, a number of parties objected to various aspects of Alliance's proposed transportation service package because they were concerned that some provisions could distort the operation of a competitive market in Alberta for NGLs, in particular ethane. Although these parties requested that the Board disallow certain provisions of Alliance's tariff, for the most part, their concerns related to the potential impacts on the Alberta petrochemical industry rather than on the justness and reasonableness of the proposed tolls per se.

NOVA Chemicals and the CCPA stated that Alliance will transport both lean natural gas and NGLs. The CCPA argued that these commodities constitute different "traffic" within the meaning of section 62 of the *NEB Act* and that it would be unjust and unreasonable to charge the same toll for transporting different types of traffic. It was also argued that Alliance would be providing a bundled service that would be discriminatory, since shippers would not be allowed to maintain ownership of their liquids unless they also happen to be owners.

NOVA Chemicals and the CCPA argued that a volumetric toll would result in cross-subsidization of the transport of NGLs by the transport of natural gas because NGLs would get a free ride while lean gas would bear the cost. Several intervenors argued that thermal tolls would be preferable to volumetric tolls. The CCPA argued that thermal tolls would reflect the value of the service provided, recover a fair proportion of the costs incurred in transportation, and avoid cross-subsidies between different streams. Further, it was argued that the proposed AOS would be unfair because it would provide a service at almost no cost.

NOVA Chemicals stated that, in the U.S., the use of energy or thermal units in contracts has been well established for many years and is accepted as the appropriate and necessary methodology. NOVA Chemicals also noted that the FERC had denied a request by Alliance Pipeline L.P. for a waiver from having to state its rates in thermal units.[1] In the Canadian context, NOVA Chemicals noted that the Canadian GISB Implementation Group has recommended a process for implementation of GISB standards (including thermal tolls) on Canadian pipelines, and that TCPL had already obtained NEB approval to make a conversion to a thermal basis effective 1 November 1998.

As noted in section 3.3, ANG argued that the provisions of the Alliance pro forma Precedent Agreement and Transportation Service Agreement respecting liquids discriminate between owner-shippers and other shippers.

Views of the Board

Pursuant to sections 62 and 67 of the *NEB Act*, the Board must ensure that Alliance's tolls are just and reasonable, and that there is no unjust discrimination in tolls, service, or facilities.

---

[1] The GH-3-98 hearing record indicated that Alliance Pipeline L.P. applied to the FERC for a re-hearing on this issue.

The Board notes that the tariff and resultant tolls were negotiated between Alliance and its shippers, and that none of the shippers objected to the proposed toll methodology. Furthermore, pursuant to the proposed toll methodology, shippers have agreed to pay demand charges amounting to some $8.2 billion over the first 15 years of the pipeline's operation (including for the U.S. segment of the pipeline). The Board considers this strong evidence that the shippers are satisfied with the proposed tariff and tolling methodology.

Given the cost-of-service nature of the Alliance Pipeline, the Board considers that the toll methodology should reflect the principle of cost causation. The Board finds that Alliance's proposed volumetric tolling methodology best respects the principle that tolls should reflect the cost of the service provided. As noted in section 5.1.2, the evidence indicates that transportation costs on Alliance will not increase with the heat content of the gas being transported; therefore, in this case, thermal tolls would depart from the principle of cost causation.

The Board also finds the proposed AOS to be an innovative approach to dealing with the variability of available capacity on a natural gas pipeline. By putting control over available capacity in the hands of the shippers, the proposed AOS removes a potential conflict between the pipeline's owners and the shippers over the right to earn additional revenue from unused capacity.

The Board also notes that none of the shippers objected to the tariff provisions which require them to relinquish their ownership of liquids delivered to the Alliance system. The tariff does not require shippers to deliver liquids to the system; the design of the Alliance Pipeline does, however, provide shippers with another option for marketing their liquids.

The proposed tariff and tolling methodology will provide many unique advantages to shippers, and will diversify the service offerings available to shippers on Canadian natural gas transportation systems. The tolling methodology provides long-term certainty and stability for shippers, while AOS maximizes the control by shippers over available capacity.

In conclusion, the Board finds that Alliance's proposed tolling methodology would result in tolls that are just and reasonable, and that there would be no unjust discrimination in tolls, service, or facilities.

6.2 Method of Regulation

Views of the Applicant

Alliance applied to be designated as a Group 2 company for purposes of toll and tariff regulation. Alliance argued that the toll structure and toll methodology in the Precedent Agreements were the result of a collaborative effort by Alliance and its shippers to reduce the regulatory costs normally associated with the determination of tolls. Although Alliance does not expect any disputes with its shippers, the Company stated that complaints would be brought before the Board. Alliance argued

that the need for active regulatory oversight would be minimal and that the Group 2 method of regulation would be appropriate.

Views of Intervenors

Cochin was of the view that Alliance, as a large gas pipeline, should pay its fair share of Board cost recovery, as do similar large gas pipeline companies.

Foothills submitted that Alliance should not be exempt from the regulatory oversight accorded to similar-sized companies regulated by the Board. NUL also argued that Alliance, as a large gas pipeline, should be regulated as a Group 1 company.

TCPL was opposed to Alliance's application for Group 2 regulation. It maintained that Alliance should be treated as a Group 1 company for cost recovery purposes. In addition, TCPL submitted that Alliance would have an unfair competitive advantage if it did not have to make public its financial information to the same degree as Group 1 companies. The RMEC also argued that Alliance would gain a competitive advantage if it did not have to file similar financial information as its competitors.

Views of the Board

For administrative purposes, and in accordance with its *Memorandum of Guidance on the Regulation of Group 2 Companies* ("Memorandum of Guidance"), most recently issued on 6 December 1995, the Board categorizes the pipelines that it regulates as Group 1 or Group 2. The larger pipelines, which typically have many shippers and require ongoing financial regulatory monitoring, are designated Group 1. Group 2 pipelines are regulated on a complaint basis and are generally subject to a lower level of regulatory monitoring.

Since the issuance of the initial Memorandum of Guidance in 1985, the distinction between Group 1 and Group 2 companies with respect to reporting requirements has lessened. In the light of negotiated settlements, certain of the Group 1 companies have been relieved from filing certain reports such as Quarterly Surveillance Reports and Performance Measures. These settlements have also led to a sharp drop in the number of Part IV hearings for Group 1 companies.

Although the Memorandum of Guidance does not identify specific criteria for determining Group 1 or Group 2 status, certain factors have been found relevant when making this determination. These include: (i) the size of the facilities, (ii) whether the pipeline transports commodities for third parties, and (iii) whether the pipeline is regulated under traditional cost-of-service methodology.[1]

On the basis of these criteria, the Board has concluded that Alliance should be designated as a Group 1 company. The Alliance Pipeline would be one of the largest under the Board's jurisdiction. It would transport natural gas for a large number of third party shippers and its tolls would be set on a cost-of-service basis. The Board

[1] These criteria were previously cited in the Joint Public Review Panel Report dated October 1997 on the Sable Gas Projects (at page 67).

has also decided that it would be appropriate to relieve Alliance from the requirement to file Quarterly Surveillance Reports and Performance Measures.

The share of the Board's cost recovery expense that Alliance will be required to pay pursuant to the *National Energy Board Cost Recovery Regulations* is established by the operation of law and the Board has no discretion to exercise in respect of this matter. The Board notes that there is no direct link between the Group 1 or Group 2 designation of a company for regulatory purposes and the classification of a company for cost recovery purposes.

Chapter 7

Disposition

The foregoing chapters constitute our Reasons for Decision in respect of the application heard by the Board in the GH-3-97 proceeding. The Board is satisfied that the proposed Alliance Pipeline Project is and will be required by the present and future public convenience and necessity, provided that the terms and conditions which are outlined in Appendix V are met. Therefore, subject to the approval of the Governor in Council, Alliance will receive a certificate of public convenience and necessity pursuant to Part III of the *NEB Act*. The Board has also issued Order TG-7-98, pursuant to Part IV of the *NEB Act*, respecting Alliance's tolls and tariffs (Appendix VII).

K.W. Vollman
Presiding Member

A. Côté-Verhaaf
Member

C.M. Ozimy
Member

November 1998
Calgary, Alberta

Appendix I

Project Details

The Project would include a number of laterals in northwestern B.C. and northeastern Alberta, along with associated compression and metering facilities. The majority of the receipts would enter the mainline between the Gordondale Station and the Windfall Compressor Station. The first 345 km of the mainline would consist of 1067 mm (42 inch) diameter pipe, designed to operate at a maximum operating pressure of 8 275 kPa (1,200 psi). At the Windfall Compressor Station, the pressure would be increased to 12 000 kPa (1,740 psi) and the size of the mainline pipe downstream of this point would be 914 mm (36 inches) in diameter. A total of seven mainline compressor stations would be located in Canada at approximate 193 km (120 mile) intervals. The mainline compressor stations are proposed to be installed at the locations outlined in Table I-1.

Table I-1
Mainline Compressor Station Particulars

Station No.	Kilometre Post	Station Name/ Province	No. of Units per Station	ISO (MW) per Unit	Estimated Power Line Length
3-A	421.5	Windfall, AB	3 (2 in series & 1 spare)	30	60 m
5-A	628.4	Morinville, AB	1	23	570 m
7-A	818.4	Irma, AB	1	23	8.0 km
9-A	1010.0	Kerrobert, SK	1	23	1.6 km
11-A	1205.7	Loreburn, SK	1	23	4.5 km
13-A	1398.2	Estlin, SK	1	23	14 km
15-A	1589.9	Alameda, SK	1	23	8.0 km

The Gordondale location would mark the beginning of the 1067 mm diameter mainline. A number of laterals would combine at this site. As such, pig receiving and launching facilities, as well as a slug catcher, would be installed at this location. Storage/tankage facilities would also be required at all mainline compressor stations which have filter/scrubbers.

Mainline block valves would be installed at a spacing of approximately 32 km (20 miles). SCADA facilities would be located at each block valve to enable remote monitoring and operation of the block valve and other equipment and instrumentation.

The Alliance lateral system would include pipe sizes from approximately 114 mm to 610 mm (4 to 24 inches) in diameter as illustrated in Table I-2 (reference Figure 1-3 and accompanying legend for geographic context).

The system would include 26 lateral compressor stations, which are designed to allow for varying levels of installed compression in order to facilitate relocation of lateral compression in response to changing shipper receipt location preferences. Lateral valves would be installed at all receipt point locations and mainline tie-in points, and all lateral receipt points would include custody transfer metering. The particulars are provided in Table I-3.

The pipeline would be designed with full pigging capability and an impressed current cathodic protection system, and all line pipe would be mill coated with external fusion bond epoxy coating. Also, Alliance would use internal coating on the mainline and on all laterals 406 mm (16 inches) in diameter and over. The internal coating would enable Alliance to use smaller compressors, and the combination of smaller compressors and the internal coating would result in lower fuel consumption.

Table I-2
Lateral System Pipeline Sizing

Lateral Name	Pipe Segment		Diameter (mm)	MOP (kPa)	Length (km)
	From	To			
Highway	BC 01	BC 02	508	12 000	9.65
Aitken Creek	BC 02	Taylor Junction	508	12 000	131.43
Taylor	BC 03 / BC 04	Taylor Junction	219	8 275	4.89
Boundary Lake	AB 07	AB 05	219	8 275	21.30
Boundary Lake	AB 05	Taylor Junction	324	8 275	29.60
Pouce Coupe	AB 11	Taylor Lateral	168	9 930	0.81
Fort St. John	Taylor Junction	Gordondale Site	610	9 930	75.34
Peace River	AB 10	AB 09	219	9 930	12.00
Peace River	AB 09	AB 14	273	9 930	34.21
Peace River	AB 14	Mainline	273	9 930	0.79
Gordondale W.	AB 13	AB 12	406	8 275	5.09
Gordondale W.	AB 12	Gordondale Site	406	8 275	0.80
Whitburn	AB 15	AB 16	168	8 275	9.17
Whitburn	AB 16	Mainline	324	8 275	0.39
Valhalla North	AB 17	Mainline	114	8 275	0.12
Valhalla S. Con.	AB 20	Mainline	168	8 275	0.10
Spirit River	AB 23	Wembley Comp	406	8 275	19.37
Teepee Creek	AB 21	Wembley Comp	168	10 690	47.19
Hythe	AB 26	AB 24 / AB 26 JNCT	324	8 275	0.56
Hythe	AB 24	AB 24 / AB 26 JNCT	273	8 275	26.50
Hythe	AB 24 / AB 26 JNCT	Wembley Comp	324	8 275	16.24
Wembley Con.	AB 27	Wembley Comp	273	8 275	0.10
Wembley Con.	Wembley Comp.	Mainline	508	8 275	0.10
Elmworth	AB 27A	Mainline	324	9 930	29.97
Wapiti	AB 29	Mainline	168	9 930	6.66
Gold Creek	AB 30	Mainline	219	8 275	0.29
Karr	AB 31	Mainline	219	8 275	1.66
Simonette	AB 32	Mainline	114	8 275	2.24
Ante Creek	AB 34	AB 35	168	8 275	11.18

Lateral Name	Pipe Segment		Diameter (mm)	MOP (kPa)	Length (km)
	From	To			
Ante Creek	AB 35	Mainline	219	8 275	13.17
Bigstone	AB 37	Mainline	219	9 930	19.55
Fox Creek	AB 40	Mainline	219	9 930	18.23
Kaybob	AB 41	Mainline	406	8 275	4.76
Edson West	AB 43	Edson Lateral	168	9 930	16.29
Kaybob South	AB 45	Edson Lateral	406	9 930	7.86
Edson	AB 44A	AB 44	219	9 930	40.89
Edson	AB 44	Edson West JNCT	406	9 930	8.18
Edson	Edson West JNCT	Kaybob South JNCT	406	9 930	51.48
Edson	Kaybob South JNCT	AB 46	610	8 275	28.90
Edson	AB 46	Mainline	610	8 275	12.50
Two Creeks	AB 38	Mainline	114	8 275	18.62
Carson Creek	AB 47	Mainline	114	13 100	11.77
Whitecourt	AB 48	Mainline	168	12 000	0.34
Paddle River	AB 49	Mainline	168	12 000	2.09
Cherhill	AB 50	Mainline	168	12 000	2.71
Fort Saskatchewan	AB 53 / AB 54	Mainline	273	12 000	1.79

Table I-3
Details of Permanent Lateral Facilities

Station	Location Name for Compressor Stn. or Meter Stn.	Compressor Station Location Name	Meter Station	Compressor Station	Pigging Facilities	Total kW on Site
BC01	Highway		x		x	
BC02	Aitken Creek	Aitken Creek	x	x		4 860
BC03	McMahon		x		x	
BC04	Younger		x			
T. BOOSTER		Taylor Booster		x	x	2 400
AB05	PetroCan Boundary Lake		x		x	
AB07	Rigel Boundary Lake S		x		x	
	Gordondale				x	
AB09	Canrock Fourth Creek		x		x	
AB10	Rigel Josephine		x		x	
AB11	Star Pouce Coupe	Pouce Coupe	x	x		300
AB12	CNRL Pouce Coupe	Pouce Coupe 2	x	x		150
AB13	WC Gordondale		x		x	
AB14	Canrock Gordondale	Canrock	x	x	x	3 140
	AB14 Junction to Mainline				x	
AB15	Suncor Progress		x		*	
AB16	Norcen Progress	Progress	x	(1)	*	1 200
AB17	Can Ab. Valhalla	Valhalla	x	x		150
AB20	Crestar Valhalla	Valhalla 2	x	(1)		300
AB21	Talisman TeePee Creek	TeePee Creek	x	x	*	600
AB23	AEC Sexsmith		x		x	
AB24	AEC Hythe/Brainard	Hythe	x	x	x	600
	Junction of AB24 to AB26 Lateral				x	

Station	Location Name for Compressor Stn. or Meter Stn.	Compressor Station Location Name	Meter Station	Compressor Station	Pigging Facilities	Total kW on Site
AB26	Rigel Knopcik		x		x	
AB27	Crestar Wembley	Wembley	x	x	x	3 140
AB27A	Can. Hunter Elmworth	Elmworth	x	x	x	900
	AB27A Junction to Mainline				x	
AB29	Ulster Wapiti	Wapiti	x	x	*	900
	AB29 Junction to Mainline				*	
AB30	PetroCan Gold Creek	Gold Creek	x	x		750
AB31	Can. Hunter Karr		x		x	
	AB31 Junction to Mainline				x	
AB32	Encal Simonette	Simonette	x	x	*	150
	AB32 Junction to Mainline				*	
AB34	Rio Alto Ante Creek		x		*	
AB35	Rio Alto Waskahigan	Waskahigan	x	x	*	1 200
	AB35 Junction to Mainline				*	
AB36	Petromet Bigstone		x		x	
AB37	Amoco Bigstone	Bigstone		x	x	900
	AB37 Junction to Mainline		x			
AB38	Summit Two Creeks	Two Creeks	x	x		150
Windfall					x	
AB40	PetroCan Kaybob	Kaybob	x	x		1 420
	AB40 Junction to Mainline				x	
AB41	Amoco Kaybob	Kaybob 2	x	x	x	450
	AB41 Junction to Mainline				x	
AB43	Ranger Galloway		x		x	
	Junction of AB43 to Edson Lateral				x	
AB44	Talisman Edson		x		x	
AB44A	Poco Wolf South	Wolf South	x	x	x	600
AB45	Chevron Kaybob South		x		x	
	AB45 Junction to Mainline				x	
AB46	Amoco West Whitecourt	West Whitecourt	x	x	x	5 600
AB47	Mobil Carson Creek	Carson Creek	x	x		600
AB48	PetroCan Whitecourt	Whitecourt	x	x		1 345
AB49	Can-Oxy Paddle River	Paddle River	x	x	*	1 420
	AB49 Junction to Mainline				*	
AB50	Chauvco Cherhill	Cherhill	x	x	*	1 200
	AB50 Junction to Mainline				*	
AB53	Chevron Fort Sask.		x		*	
AB54	Dow Fort Sask.		x		*	
	AB53/54 Junction to Mainline				*	

* Tie-in capabilities so that transportable pigging facilities could be attached for line sizes NPS 4 and NPS 6.

(1) - denotes that a Compressor Station would be necessary at ultimate volumes (but not at design volumes).

Appendix II

List of Issues

The list of issues appearing in Hearing Order GH-3-97 was as follows:

1. The economic feasibility of the proposed Alliance Pipeline Project having regard to, among other things:

   (a) the outlook for the long-term supply of natural gas available to be transported on the proposed pipeline;

   (b) the outlook for the long-term demand for natural gas in the markets proposed to be served by the proposed pipeline; and

   (c) the ability of Alliance to provide competitive transportation services for natural gas and to successfully attract natural gas to its system over the long term.

2. The potential commercial impacts of the proposed Alliance Pipeline Project.

3. The adequacy of the public consultation process.

4. The potential environmental effects and socio-economic effects of the proposed Alliance Pipeline Project, including a consideration of those factors outlined in the Board's scope decision dated 19 June 1997 in respect of the environmental assessment to be conducted pursuant to the *CEAA*.

5. The routing and location of the proposed facilities and the land rights acquisition.

6. The design of the proposed facilities.

7. The terms and conditions to be included in any certificate which may be issued.

8. The proposed toll methodology and tariff.

9. The method of toll and tariff regulation, including the request by Alliance that it be regulated as a Group 2 company (as described in the Board's Memorandum of Guidance dated 6 December 1995 on the Regulation of Group 2 Companies).

Appendix III

Text of Accord

The full text follows of the ''Agreement on Natural Gas Pipeline Regulation, Competition and Change to Promote a Competitive Environment and Greater Customer Choice'' that was signed on 7 April 1998 by the Canadian Association of Petroleum Producers, NOVA Corporation, NOVA Gas Transmission Ltd., the Small Explorers and Producers Association of Canada, and TransCanada PipeLines Limited.

AGREEMENT ON NATURAL GAS PIPELINE REGULATION, COMPETITION AND CHANGE, TO PROMOTE A COMPETITIVE ENVIRONMENT AND GREATER CUSTOMER CHOICE

BETWEEN:

Canadian Association of Petroleum Producers ("CAPP")

and

NOVA Corporation ("NOVA")

and

NOVA Gas Transmission Ltd. ("NGTL")

and

Small Explorers and Producers Association of Canada ("SEPAC")

and

TransCanada PipeLines Limited ("TCPL")

collectively referred to as the "Parties"

IN RECOGNITION OF the dynamic nature of the Canadian natural gas pipeline industry and the broader interests of all stakeholders therein, the signatories hereto are intent upon promoting a competitive environment and greater customer choice. The Parties also recognize the importance of maintaining their alignment of interest, good communication and a spirit of good faith.

TO THIS END the Parties endorse the following guiding principles:

First, their support for competition and greater customer choice;

Second, the need to construct competitive incremental pipeline capacity from the Western Canadian Sedimentary Basin ("WCSB") by both new competitors and existing pipelines alike in a timely, safe and cost effective manner; and

Third, the need to effect regulatory changes that will provide existing and new pipelines equal opportunity to compete, recognizing that such competition is desirable and in the best interests of all industry stakeholders.

The Parties agree to immediately pursue these guiding principles in the following action areas, and as more fully described within each of the terms and conditions which follow.

1. Competitive Environment

1.01 Competition is a driving force in today's natural gas industry. Our industry and regulatory policies should not only promote and sustain competition, but provide all participants with the equal opportunity to provide greater customer choice, provide incentives for pipelines to build incremental transportation capacity, promote competitive pricing and technological and service innovations, and to make the WCSB an even stronger competitor in North America.

1.02 The Parties agree to support the construction of competitive incremental gas pipeline capacity from the WCSB in a timely, safe and cost effective manner. It is anticipated that new competitive capacity will emerge in this environment.

1.03 The Parties also recognize the need for regulatory changes to provide existing pipelines with the appropriate tools necessary to ensure the competitive environment will function effectively.

2. Interconnection Policy

2.01 The Parties agree that pipeline to pipeline competition may appropriately lead to the creation of additional pipeline capacity and that the duplication of certain facilities can be minimized through the adoption of interconnection policies.

2.02 The purpose of an interconnection policy is to provide shippers with the option of fair and reasonable access to competing transmission systems. Interconnection policies are intended to facilitate the ease of access to markets, the efficient utilization of facilities and involve the following:

a. Pipelines will negotiate in good faith with shippers, the receipt and delivery transportation services and prices to and from points of interconnection (if suitable provisions are not already contained in the tariff). If a pipeline is requesting the transportation service then the pipeline is the shipper. Current transportation services and pricing may be redefined into new service packages (unbundling) as required. Unbundling is not intended to affect existing contractual arrangements, except by mutual agreement by the parties.

b. This interconnection policy shall be reciprocally applied to all interconnecting pipelines.

c. Interconnecting pipelines will enter into an agreement or agreements defining the obligations and commitments of the parties, and filing same with the appropriate regulator upon execution. (The Parties contemplate that in a changed regulatory framework such filing might not be required.)

2.03 Interconnection Agreements provide operationally for the delivery of gas from one pipeline system and the receipt of that gas into the interconnecting pipeline.

a) The interconnecting parties will co-ordinate their facilities to the extent practicable to minimize duplication of facilities. An Interconnection Agreement will define all aspects of the interconnection including, but not limited to:

i) location(s) of interconnects,
ii) additional facilities required and ownership,
iii) operating arrangements for gas flow and exchange,
iv) volume, quality and composition of gas being exchanged, and
v) accountability for owning and operating costs of facilities required to effect the interconnection.

b) An Interconnection Agreement must enable pipelines to continue to meet their contractual commitments and service obligations and to maintain their physical and operational integrity and reliability. This would include, but not be limited to, agreement on operational and business transactional procedures such as:

i) custody transfer metering,
ii) gas quality monitoring and specifications,
iii) balancing agreements,
iv) curtailment provisions,
v) pipeline operations,
vi) pressure and flow control,
vii) reporting of shipper operational information, and
viii) information delivery mechanisms.

2.04 The price and service terms for the transportation service to or from the interconnect shall be established having regard for such factors as:

a) the owning and operating costs of the facilities required to effect the transportation service, and

b) the prevailing toll methodology and undue discrimination principles, and relevant market value considerations (as noted above, unbundling of prices and services may be required).

2.05 Other matters to be addressed in either an Interconnection Agreement or transportation agreements with shippers, which impact (either positively or negatively) the operating efficiency of the pipeline systems include, but are not limited to:

a) reduced capacity, reduced compressor efficiency, and/or the need for additional facilities, and

b) differences in gas quality, energy content and composition of the gas being exchanged between the interconnecting pipelines.

2.06 Where agreement cannot be reached, the use of an arbitrated dispute resolution mechanism may be utilized.

2.07 Alternately, or additionally, any party believing this Interconnection Policy is not being complied with through good faith negotiations or who has been unable to reach a satisfactory agreement can take the matter to the appropriate regulator for resolution.

2.08 The Parties agree that this Interconnection Policy is an essential element of a competitive gas transportation infrastructure system and agree to implement this policy in conjunction with the development of a new regulatory framework as agreed to in Section 5 of this Agreement. The Parties agree to the desirability of the adoption of this policy by all pipelines operating out of the WCSB.

3. Unregulated Gas Gathering, Processing, and Marketing Activities

A. Codes of Conduct

3.01 TCPL and NOVA acknowledge industry's concerns with the adequacy of the separation between their regulated gas transportation businesses (the "Regulated Businesses") and their respective non-regulated businesses, such as gas marketing, gas gathering and processing and NGL marketing (the "Non-Regulated Businesses"). Among other issues, industry is concerned with respect to cross-subsidies, information exchanges, asset transfers and preferential or discriminatory treatment between the regulated and non-regulated activities.

3.02 TCPL and NOVA agree to work with CAPP, SEPAC and other industry stakeholders to review their existing codes of conduct and, on a mutually acceptable basis, make the necessary modifications or establish new codes of conduct for dealings between TCPL's and NOVA's respective Regulated Businesses and Non-Regulated Businesses to include the following principles:

a) adequate and effective separation;

b) no preferential treatment nor suggestion of such;

c) timely and equal treatment of all, in respect of:

i) requests for service,
ii) access to service,
iii) provision of service,
iv) administration of tariffs,
v) operation of the systems, and
vi) provision of information (including available capacity and expansion plans);

d) no disclosure of shipper specific confidential information without consent;

e) services provided to affiliates to be on a contractual market based fee-for-service basis and/or regulator approved cost allocation principles;

f) any regulated assets acquired by a Non-Regulated Business from a Regulated Business will be done in accordance with a process approved by the appropriate regulator;

g) employee compliance policy (with recognition of seriousness, timely corrective action including discipline);

h) senior responsible officer;

i) a satisfactory complaint resolution process with appropriate and definitive timelines for the ultimate disposition of the complaint. For example, a Regulated Business shall undertake to respond in writing to each complaint under its Code of Conduct within ten (10) business days;

j) periodic reviews with industry of continuing effectiveness of codes. All requests for review or modification of the codes will be dealt with in a timeframe similar to that established for the complaint resolution process.

3.03 These principles will be reflected in codes of conduct governing the flow of information, assets and/or services from TCPL's and NOVA's Regulated Businesses to their respective Non-Regulated Businesses.

3.04 Nothing herein contained is intended to diminish the ultimate authority of the applicable regulator or the right of any party to seek regulatory review.

3.05 NOVA confirms its intention to divest Pan-Alberta Gas.

B. Netback Steering Committee

3.06 TransCanada Gas Services ("TCGS"), as agent for TransCanada PipeLines Limited, will send a letter to its Netback producers asking for candidates that are willing to serve on a Netback Steering Committee. The producer candidates will decide among themselves an appropriate structure and division of responsibilities. The Committee will, in turn, establish, resource, monitor and provide working guidance to an Audit Subcommittee and a Restructuring Subcommittee. CAPP and SEPAC agree to assist the Netback Steering Committee in finding candidates to serve on both subcommittees, if required.

3.07 The Audit Subcommittee and the Restructuring Subcommittee agree to work with TCGS on a collective and concurrent basis to:

Audit Subcommittee

a) have an historical audit of the TCGS Netback pool conducted by independent auditors. Without limitation to the generality of the foregoing, the Subcommittee will be responsible for negotiation with TCGS of the time frame, terms of reference, scope of the audit and selection of auditors. The Subcommittee will also provide management oversight to the Netback audit.

Agreed upon terms of reference, scope, time frame and estimated costs will be put to ballot for approval by the Netback pool producers.

It is also contemplated that the Subcommittee may manage ongoing reviews and/or audits of the performance of the TCGS Netback pool.

Restructuring Subcommittee

b) engage in good faith discussions with TCGS aimed at restructuring the TCGS Netback pool. CAPP and SEPAC agree to have its representatives

and pool producers participate in the Subcommittee. The intent is to determine the feasibility of modifying the existing Netback structure and arrangements to provide improved pricing options to producers, including individually tailored prices, pricing points, pricing terms etc. The new arrangements may also see the elimination of Netback pricing as it is presently calculated, and may provide for physical and financial swaps, and for more delivery options.

One of the areas of responsibility for the Restructuring Subcommittee shall be to work with TCGS to develop a code of conduct governing the operation of the Netback pool business.

As a part of the code of conduct, it is confirmed that TCGS will only engage in the sale of natural gas from the Netback pool to the TCGS margin/trading business in those circumstances where:

i) the sale of natural gas from the Netback pool to the margin/trading business has been specifically identified and is approved by producer ballot;

ii) for administrative or operational reasons the pool supply to balloted markets needs to be sold, at a transparent market transfer price less actual costs incurred, to a TCGS affiliate in order to facilitate the sale of natural gas to a pool market (e.g. sales to an affiliate with DOE and/or FERC import certificates where the gas is to be sold in the United States); and/or

iii) the sale of pool gas was made to a balloted market that is or was subsequently acquired, in whole or in part, by TCGS and/or its affiliates.

4. Merger Benefits

4.01 The Parties recognize an alignment of interests on the expected benefits of the merger of TCPL and NOVA. More specifically:

a. The Parties desire a net benefit to flow to the customers of their respective regulated businesses as a result of the merger.

b. TCPL and NGTL intend to deliver a net benefit to the customers of their respective regulated businesses as a result of the merger.

4.02 The existing incentive settlements in place for TCPL and NGTL provide for the alignment of interests with, among other things, the

incentive to deliver cost savings. The Parties understand that the existing incentive settlements and past regulatory decisions provide for:

a. an appropriate mechanism for allocation of the net benefits from the merger between the merged companies' regulated and non-regulated businesses in accordance with accounting policies and practices that have been approved by TCPL's and NGTL's respective regulators;

b. an appropriate sharing mechanism for the net benefits from the merger; and

c. the appropriate accountability.

4.03 TCPL and NGTL will work with their respective industry task forces on:

a. the mechanics to ensure proper matching of costs with benefits, giving consideration to amortizing costs over time;

b. the process to ensure an appropriate allocation of costs and benefits between the customers of TCPL's and NGTL's regulated businesses; and

c. a process for regular reporting on the progress towards the achievement of the net benefits from the merger, with appropriate information on the costs and benefits.

4.04 NOVA will, on behalf of the industry, donate the sum of $1,250,000 for post secondary educational purposes. The specific recipient(s) will be determined by an advisory committee comprising representatives of NOVA, CAPP, and SEPAC.

4.05 In the event that the merger contemplated herein does not, for whatever reason, proceed to conclusion, the sum of $2,000,000 shall be paid by TCPL to benefit the industry in a manner to be determined at such time by mutual agreement of TCPL, CAPP, and SEPAC.

5. Regulatory Change

5.01 The Parties recognize and accept that existing pipelines facing the emergence of actual pipeline to pipeline competition should have appropriate tools by which they also have the flexibility to compete. Therefore the Parties agree that changes in existing regulatory practices will be required and, to that end, agree to negotiate a proposal for a new framework for the regulation of each of NGTL and TCPL, appropriate for an increasingly competitive environment. The Parties recognize and accept that current toll

and tariff structures of the AEUB and the NEB do not contemplate the changing risk/reward balance of the emerging competitive environment.

It is acknowledged that these initiatives are of importance to a broad range of stakeholders. Therefore, dialogue with other stakeholders is contemplated.

Such a proposal would then be jointly advocated to all other stakeholders for broad industry acceptance and any necessary regulatory approval(s).

5.02 The Parties agree, with respect to TCPL, that:

a. Details of a term differentiated pricing mechanism will be developed between CAPP and TCPL by May 15, 1998, in which tolls would be linked to contract term with discounts and premiums. Consideration is to be given to incentives for early renewal and the status of existing contracts.

b. The shippers' contract renewal notice period should be changed from 6 months to 12 months (the 1 year minimum term remains the same) and CAPP and TCPL will support the immediate implementation of this change, that is, October 31, 1998 implementation for contracts expiring October 31, 1999.

c. If non-renewals occur during the planned TCPL 1999 expansion resulting (with that expansion) in some uncontracted capacity on the TCPL system, such uncontracted capacity shall be available for discretionary services, (with the associated costs to be included in the firm tolls), and marketed as discretionary service until contracted as longer term firm service.

d. The current expansion shipper filing requirements should be relaxed such that only a minimum 10 year firm transportation contract with appropriate upstream and downstream transportation arrangements will be required, plus an assessment of overall market and supply factors and credit-worthiness. The details of the terms of this relaxation and its implementation shall be developed by May 15, 1998 by CAPP and TCPL.

5.03 The Parties further agree, with respect to NGTL, that:

a. CAPP, SEPAC and NGTL will continue to work together to bring NGTL's products and pricing AEUB filing to a mutually satisfactory resolution, including a review of the 5 year rolling term and receipt point flexibility with necessary amendments to

the filing to reflect such mutual agreement. The parties intend this work to be completed by May 8, 1998.

b. If during the first 5 years from the initial coming into service of the Alliance project, underutilization of the NGTL system is caused thereby, the cost of such underutilized capacity will, for that 5 year period, be included in the cost of service and NGTL's rates. This is subject to NGTL, after Alliance has been certificated, making a good faith offer to Alliance with a view to mutually satisfactory arrangements for service on NGTL facilities. NGTL will during the 5 year period use its best efforts to maximize the utilization of its capacity with a view to increasing the volume applicable to the establishment of rates.

5.04 The Parties further agree that they will negotiate by December 31, 1998, a new regulatory framework proposal that recognizes and accepts the inherent risk in providing competitive rates and services. Development of this new regulatory framework proposal will involve key external stakeholders.

5.06 It is recognized and accepted that ultimately the opportunity to exercise flexibility while accepting the inherent risk in providing competitive rates, tolls, or terms of service is a desirable goal. It is recognized that an appropriate degree of regulatory oversight will continue.

6. Support for Merger

6.01 CAPP and SEPAC will support the approvals required to effect the merger between TCPL and NOVA, providing letters of support to the AEUB no later than April 8, 1998, and not to oppose the merger before other regulators and governmental approving authorities.

7. Steering Committee

7.01 Time is of the essence of this Agreement.

7.02 A steering committee initially comprising Barry Jackson, Norm McIntyre, Ted Newall and George Watson will be established to ensure that the intent of this Agreement is implemented in a timely manner.

7.03 All provisions of this Agreement are subject to the operation of law, including but not limited to the decisions of applicable regulators.

IN WITNESS WHEREOF the parties hereto have executed this Agreement this 7th day of April, 1998.

Canadian Association of Petroleum Producers

Per: _____

NOVA Corporation and NOVA Gas Transmission Ltd.

Per: _____

Per: _____

Small Explorers and Producers Association of Canada

Per: _____

Per: _____

TransCanada PipeLines Limited

Per: _____

Per: _____

Appendix IV

Minister's Letter re Environmental Assessment

Attached is a copy of the Minister of the Environment's letter dated 23 November 1998 to the NEB conveying her decision on the course of action to be taken under section 23 of the *CEAA* in respect of the environmental assessment of the Alliance Pipeline Project.

Appendix V

Certificate Terms and Conditions

General

1. Unless the Board otherwise directs, the pipeline facilities in respect of which this certificate is issued shall be the property of and shall be operated by Alliance Pipeline Ltd. ("the Company") on behalf of the Alliance Pipeline Limited Partnership.

2. Unless the Board otherwise directs, the Company shall:

   (a) cause the approved facilities to be designed, manufactured, located, constructed, and installed in accordance with those specifications, drawings, mitigative measures, and other information or data set forth in its application, in its undertakings made to Fisheries and Oceans Canada ("DFO") and Environment Canada, and as otherwise adduced in its evidence before the Board, except as varied in accordance with paragraph (b) hereof; and

   (b) cause no variation to be made to the specifications, drawings, mitigative measures, or other information or data referred to in paragraph (a) without the prior approval of the Board.

3. Unless the Board otherwise directs, the Company shall submit a report to the Board for approval at least 30 days prior to the commencement of mainline trenching which will:

   (a) demonstrate that the ductile fracture propagation control design for the 914 mm diameter mainline has been validated by full-scale burst testing;

   (b) establish the ductile fracture propagation arrest for the materials which will be ordered for the construction of the 1067 mm diameter mainline (i) on a full-thickness basis without using the Leis analysis and (ii) by using the Leis analysis; and

   (c) set out operating limits or a crack arrestor program, with or without operating limits, for either or both of the 914 mm and 1067 mm diameter sections of mainline, together with technical justification, if the tests described in (a) and (b) are unsuccessful.

4. Unless the Board otherwise directs, the Company shall report on its performance in respect of its First Nations and Métis employment and commercial participation objectives for the construction and operation of the Alliance Pipeline. The reports shall be submitted to the Board on a quarterly basis during construction and annually during the first three years of operation.

5. The Company shall adhere to the seasonal timing of construction activities as described in its application or as otherwise adduced in evidence before the Board in the GH-3-97 proceeding. Seasonal times should differentiate between frozen and non-frozen soil conditions.

6. The Company shall:

   (a) except as varied in accordance with paragraph (c) hereof:

      (i) comply with all the timing and setback restrictions as outlined in Appendices A1-13, A1-15, A1-16, and A1-17 of the *Wildlife Assessment, the Alliance Pipeline Project, Volume 2 - Appendices*, dated June 1997;

      (ii) comply with all the timing and setback restrictions, including those outlined for specific species and construction spreads, as identified by Environment Canada in its letters to the Board dated 29 October 1997 and 29 January 1998; and

      (iii) where the Company proposes construction activities within the timing and setback restrictions for locations KP 1388.5 to 1389, KP 1401.5 to 1402.5, and KP 1639 to 1641.5, the Company shall, at least 15 days prior to the commencement of construction for those locations, file correspondence from Environment Canada indicating its views on whether conditions are suitable in those locations for a waiver of the timing and setback restrictions;

   (b) cause no variation to the construction schedule that would result in conflict with the timing and setback restrictions concerning any species protected under the *Migratory Birds Convention Act*;

   (c) for those wildlife species not covered under the *Migratory Birds Convention Act*, cause no variation to the construction schedule that would result in conflict with the timing and setback restrictions without prior approval of the Board; and

   (d) for any variation sought under paragraph (c), submit to the Board, at least 15 days prior to the commencement of construction in locations affected by the timing and setback restrictions, correspondence from Environment Canada and appropriate provincial authorities identifying any previously unaddressed timing and setback restrictions, and indicating their views on whether conditions are suitable in those locations for an amendment of the restrictions

7. Unless the Board otherwise directs, the Company shall ensure that all work and activities associated with temporary facilities are conducted in accordance with provincial and federal fisheries and wildlife setback and timing restrictions

8. The Company shall apply the following criteria for the siting of all temporary facilities including construction camps, pipe and equipment storage, work areas, warehouse areas,

borrow pits, staging areas, new access and other areas that would be used or disturbed prior to or during construction:

(a) avoid native prairie areas and areas that would require clearing of trees by:

(i) using existing cleared sites in forested areas and agricultural fields in agricultural areas, with preference being given to areas currently experiencing industrial use; and

(ii) using sites in areas of native prairie that have been previously cleared of native vegetation and/or altered for industrial use;

(b) avoid Environmentally Significant Areas unless the site already experiences industrial use and its use during construction will prevent the need to create new clearings elsewhere;

(c) avoid areas with known or high potential for wildlife, and significant habitat for wildlife, with a designated status (COSEWIC and provincial), as well as other sensitive/significant wildlife areas;

(d) avoid areas with known or high potential for plants with a designated status;

(e) avoid watercourses and wetlands;

(f) avoid steep slopes, organic soils and poorly drained areas;

(g) avoid areas with known or high potential for heritage resources; and

(h) select sites that will not be in conflict with existing land uses.

9. The Company shall submit to the Board for approval, at least 30 days prior to the disturbance of any proposed temporary facility site that is not in accordance with the criteria noted in Condition 8:

(a) a description of the site;

(b) the environmental effects and measures that would be used to mitigate these effects and, in the event that measures other than those adduced during the hearing are proposed, an analysis supporting the use of these measures; and

(c) the results of consultations with landowners and the relevant municipal, provincial, and federal government departments and agencies.

10. The Company shall submit to the Board and Environment Canada, as soon as available, a copy of the Company's action plan under the federal Voluntary Challenge and Registry Program to deal with greenhouse gas emissions arising directly from the operation of the pipeline.

11. For all watercourse crossings undertaken in winter which would have the potential to impact any sensitive watercourse, the Company shall ensure proper long-term control of erosion and sedimentation through the appropriate use of erosion protection and sediment control measures as described in Table 4-8 of the Comprehensive Study Report.

Prior to the Commencement of Construction

12. Unless the Board otherwise directs, Alliance shall, prior to the commencement of construction, submit an affidavit to the Board confirming that transportation service agreements have been executed for the subscribed capacity.

13. Prior to the filing of the plans, profiles, and books of reference pursuant to section 33 of the *National Energy Board Act*, the Company shall submit to the Board, for approval, notice of any known modifications that require a deviation from the proposed specific route as described in the application. Each filing shall include:

    (a) the results of public consultation, the identity of any affected landowners, and the status of land acquisition (where appropriate);

    (b) an airphoto (where the modification is greater than 50 metres); an environmental issues list identifying all relevant effects of the re-routes on the environment (e.g. soils, vegetation, wildlife, hydrology, and archaeological information); and

    (c) the associated mitigation measures to render those environmental effects insignificant, and in the event that measures other than those adduced during the GH-3-97 proceeding are proposed, an analysis supporting the use of such measures.

14. The Company shall submit to the Board, at least 30 days prior to the commencement of construction of the Alliance Pipeline Project, a construction schedule identifying major construction activities, such as river crossings, and shall notify the Board of any modifications to the schedule as they occur.

15. Unless the Board otherwise directs, the Company shall submit to the Board for approval the construction safety manual required by section 26 of the *Onshore Pipeline Regulations* at least 30 days prior to the commencement of construction.

16. The Company shall provide any comments received from Environment Canada and the British Columbia Ministry of Environment, Lands and Parks ("MELP") on the results of the emissions modelling using the USEPA (1997) ISC3-OLM Model for the Morinville, Estlin, and Taylor Compressor Stations including the need for further modelling or monitoring in respect of these stations.

17. Unless the Board otherwise directs, the Company shall submit to the Board for approval its program for monitoring and reporting COSEWIC listed raptor mortality resulting from the new power lines associated with the Project facilities, the measures that the Company will take to reduce raptor mortality, and the criteria that the Company will use in applying these measures.

18. The Company shall:

(a) submit to the Board for approval, and to DFO-Habitat, at least 30 days prior to the commencement of construction, a detailed environmental inspection plan for construction identifying the environmental inspectors, their respective qualifications, and their geographic and topical areas of responsibility; and

(b) notify the Board of any changes to the environmental inspection plan described in paragraph (a), when any such changes are made.

19. The Company shall, at least 30 days prior to the commencement of construction of each construction spread (as identified in the application), submit to the Board, for each previously identified site with a plant species with a designated status and each previously identified significant vegetation community:

(a) the mitigative option selected for that site (from the list of options provided in the GH-3-97 evidence); and

(b) a description of the appropriateness of that option based on site-specific conditions and the suitability of the option for the species or community.

20. For any watercourse crossings to be undertaken in winter which would have the potential to impact any sensitive watercourse, the Company shall submit to the Board, at least 15 days prior to commencement of construction of such watercourse crossings:

(a) a water quality monitoring program to be undertaken immediately prior, during, and after construction of the crossings;

(b) a contingency plan detailing the criteria for any measures that would be implemented as a result of monitoring undertaken pursuant to paragraph (a); and

(c) evidence as to whether DFO-Habitat is satisfied with any programs derived pursuant to paragraph (a) and the measures described in paragraph (b).

21. The Company shall submit to the Board, at least 15 days prior to commencement of construction at the Wapiti River, confirmation of the crossing technique to be used, a detailed construction schedule for the crossing, and any undertakings which the Company has made to DFO in respect of the crossing.

22. The Company shall submit to the Board and DFO-Habitat, prior to the commencement of construction on each spread, evidence that all required authorizations, permits, or approvals for the conduct of watercourse crossings along the subject construction spread have been obtained.

23. The Company shall submit to the Board for approval, at least 30 days prior to the conduct of pre-construction wildlife surveys:

(a) the proposed survey methodologies;

(b) for the surveys to be conducted in respect of rare and endangered species, a comprehensive list of survey locations, which also identifies the species for which each survey is being undertaken; and

(c) comments from Environment Canada regarding the survey methodologies

24. The Company shall submit to the Board for approval, at least 30 days prior to the commencement of construction activities for each spread included in the pre-construction wildlife survey:

(a) the results of the survey;

(b) any additional measures that the Company intends to use to minimize any additional effects identified as a result of the survey; and

(c) comments from Environment Canada on the results of the survey and any additional measures proposed by the Company.

25. The Company shall:

(a) conduct a pre-clearing grizzly den site survey in suitable denning habitat locations prior to clearing activities taking place in those locations;

(b) submit to the Board, at least 60 days prior to clearing in grizzly habitat areas, the methodology (including timing and locations) for the pre-clearing grizzly den site survey; and

(c) submit to the Board at least 10 days prior to clearing, the results of the pre-clearing grizzly den site survey including the results of consultations with the provincial biologist(s) and the identification of any additional mitigation measures the Company would undertake.

26. The Company shall submit to the Board, at least 30 days prior to the commencement of construction of each lateral compressor station, an ambient noise assessment for the proposed lateral compressor station site.

27. With respect to archaeological, palaeontological, and heritage resources, Alliance shall, at least 30 days prior to the commencement of construction:

(a) file with the Board confirmation that consultations with the local historical society and school board regarding the mitigation at site EfN1 10, school house memorial have been completed and provide a description of the mitigation proposed;

(b) advise the Board in writing how concerns at the following sites have been resolved:

(i) site HfRm 8 on the Highway Lateral;

(ii) sites HdRh t3, HdRh t5, HcRg t20, HcRg t21, HbRe t34, and HbRe t35 on the Aitken Creek Lateral;

(iii) sites HaRc t32, HaRc 10, HaRc t34, HaRc 11 and GIRb 2 on the Fort St. John Lateral; and

(iv) site HbRa 1 on the Boundary Lake Lateral;

(c) provide the Board with a copy of any revisions or amendments to the Historical Resource Impact Assessment/Archeological Impact Assessment ("HRIA/AIA") reports for the provinces of British Columbia, Alberta, and Saskatchewan;

(d) advise the Board in writing as to whether the HRIA/AIA reports, including any revisions or amendments thereto, and any recommendations contained therein are acceptable to the Cultural Facilities and Historical Resources Division of Alberta Community Development, the Saskatchewan Heritage Branch, and the Archaeological Branch, British Columbia Ministry of Small Business, Tourism and Culture;

(e) provide the Board with any comments received from the above-noted provincial agencies in respect of the reports, including any further mitigation; and

(f) confirm whether Alliance will comply with the mitigative measures and recommendations set out in the reports referred to in paragraph (c) and any further mitigation identified in response to paragraph (e).

28. The Company shall submit to the Board, at least 30 days prior to the commencement of construction of each compressor and meter station, a description of the measures that would be incorporated in the design to address the visual impact of the station including:

(a) the rationale for proposing those measures; and

(b) the results of consultations undertaken with respect to those measures and an indication as to whether the persons consulted are satisfied with the use of those measures.

29. Unless the Board otherwise directs, the Company shall file with the Board, at least 30 days prior to the commencement of construction:

(a) confirmation that identification of issues of concern in respect of traditional use sites has been completed with First Nations communities including, but not limited to, Doig River, Blueberry River, and Halfway River, and including:

(i) a listing of issues by First Nation;

(ii) the measures proposed to mitigate the issues identified in response to (i); and

(iii) any comments from the respective First Nations on the measures identified in response to (ii); and

(b) confirmation that the following consultations regarding traditional use sites have been completed and a description of the mitigation proposed:

(i) with the Chief and Council of the Sturgeon Lake First Nation regarding the mitigation at sites GdQn T1, Otin Meta wiwin, GdQn T3, moose lick, GcQj T1, pack trail, Sardine Lake, and Little Smoky Village;

(ii) with the Sturgeon Lake and the Kelly Lake First Nations regarding land use practices which may be affected by the construction of the pipeline; and

(iii) with the Saskatchewan Federation of First Nations in respect of monitoring burials potentially encountered during ditching operations.

30. Unless the Board otherwise directs, the Company shall submit to the Board at least 60 days prior to the commencement of construction of each construction spread (as identified in the application):

(a) an updated environmental issues list that includes the information specified by paragraph 28(1)(a) of the *Onshore Pipeline Regulations*; and

(b) for approval, an updated environmental protection plan that includes the information specified by paragraph 28(1)(b) of the *Onshore Pipeline Regulations*.

During Construction

31. Unless the Board otherwise directs, the Company shall submit construction progress reports to the Board on a monthly basis and in a form satisfactory to the Board.

32. The Company shall maintain at each construction office a copy of the applicable specifications and drawings, including the welding and nondestructive examination procedures and supporting documentation.

33. The Company shall maintain a file in each construction office containing:

(a) any information relating to applicable environmental undertakings as set out in the application or as otherwise adduced in evidence before the Board in the GH-3-97 proceeding; and

(b) copies of all applicable permits or authorizations containing environmental conditions.

34. Unless the Board otherwise directs, the Company shall:

(a) ensure that the detailed environmental inspection plan submitted to the Board for approval (pursuant to Condition 18) includes the identity, qualifications and experience of the soils specialist(s) that will be responsible for ensuring proper identification of the indicators in (i) through (vi) of paragraph (c);

(b) ensure that the soils specialist(s) identified in paragraph (a) will respond in a timely manner, to the site on any spread where wet soil indicators are likely to occur, and shall have at least equal authority to that of the construction supervisor for matters regarding the implementation of contingencies and shutdown, as well as the recommencement of construction activities following the suspension of work;

(c) implement appropriate wet soils contingency measures as described in its application or as otherwise adduced in evidence, if one of the following indicators occurs:

(i) rutting of topsoil to the extent that admixing may occur;

(ii) excessive wheelslip;

(iii) build-up of mud on tires and around cleats;

(iv) formation of extended puddles on the workspace;

(v) excessive tracking of mud along the road as vehicles leave the right-of-way; or

(vi) any other indicator that may be used to determine the potential for construction to cause an adverse effect on soils in wet condition;

(d) suspend construction in areas of native prairie if one of the above indicators occurs;

(e) suspend construction on cultivated land if one of the above indicators occurs and full-width topsoil stripping has not been undertaken; and

(f) report forthwith to the Board which wet soils contingency measures were implemented, and why they were implemented.

35. The Company shall implement a worker awareness program in regard to the potential for wildlife mortalities along roads, and its workers shall maintain reasonable reduced speeds along the right-of-way, along access roads, and, where feasible, along secondary roads. Off right-of-way traffic shall be prohibited, except for designated access routes.

36. If any previously unidentified significant habitat features, specialized habitat for wildlife with a designated status, or nesting habitat for song birds or raptors are discovered during construction, the Company shall, in consultation with the Board, Environment Canada, and other appropriate regulatory agencies, avoid, relocate, or restore these features or areas in

accordance with the procedures described in its application or as otherwise adduced in evidence before the Board in the GH-3-97 proceeding.

37. If any previously unidentified significant plant communities or plants with a designated status are discovered during construction, the Company shall, in consultation with the Board and other appropriate regulatory agencies, avoid, relocate, or restore these features or areas in accordance with the procedures described in its application or as otherwise adduced in evidence before the Board in the GH-3-97 proceeding.

38. In any fish-bearing watercourses where blasting is to be undertaken, Alliance shall conduct blasting activities in accordance with DFOs 1996 draft document entitled *Guidelines for the Use of Explosives in Canadian Fisheries Waters*.

39. For all water withdrawals from potential fish-bearing waterbodies, Alliance shall screen all water intakes in accordance with the 1995 DFO guideline entitled *Freshwater Intake End-of-Pipe Fish Screen Guideline*.

40. (a) Unless the Board otherwise directs, the Company shall submit to the Board for approval the field joining programs required by section 21 of the *Onshore Pipeline Regulations* at least 21 days prior to their being put into effect.

(b) Notwithstanding the provisions of subsection 21(5) of the *Onshore Pipeline Regulations*, the Company shall submit to the Board for approval the field joining specifications and procedures, the procedure qualification records, and the nondestructive examination procedures for all mainline and lateral pipe having a diameter greater than or equal to 508 mm and a planned maximum operating pressure greater than or equal to 8 274 kPa.

41. Unless the Board otherwise directs, the Company shall submit to the Board for approval the pressure testing manual required by section 34 of the *Onshore Pipeline Regulations* at least 30 days prior to commencement of pressure testing.

42. Where it is necessary to exceed 10 per cent of the flow or volume of a water body when withdrawing water for hydrostatic testing purposes, the Company shall submit to the Board for approval, at least 10 days prior to commencement of water withdrawal, a hydrostatic test water withdrawal plan that, at a minimum, includes the rationale for the required exceedence, the estimated amount of the exceedence, an environmental effects assessment and mitigation plan, and results of consultation with the DFO and appropriate provincial authorities.

43. The Company shall submit to the Board for approval, and to DFO-Habitat, at least 15 days prior to completion of construction on each spread, a detailed reclamation and post-construction monitoring plan for each construction spread. This plan shall include a description of any monitoring program and special measures for post-construction control of erosion and sedimentation at watercourses, particularly those sensitive watercourses for which crossings would be constructed in winter.

Prior to the Commencement of Operation

44. Unless the Board otherwise directs, the Company shall submit to the Board for approval the emergency procedures required pursuant to sections 48 and 49 of the *Onshore Pipeline Regulations* at least 30 days prior to the commencement of operation.

45. (a) The Company shall develop, with input from regulatory agencies, including Environment Canada, and interested persons, an air quality monitoring program.

(b) The Company shall submit to the Board a description of the air quality monitoring program referred to in paragraph (a) together with any comments received from regulatory agencies (including Environment Canada and MELP) and interested persons.

46. Unless the Board otherwise directs, the Morinville Compressor Station and the Taylor Lateral Compressor Station, in addition to the Windfall Compressor Station, shall be subject to the Company's air quality monitoring program. In the event that electric motor drivers are not used at the Bigstone Lateral Compressor Station, the Company shall, at least 15 days prior to the commencement of operation, file with the Board any comments from regulatory agencies, including Environment Canada, and interested persons regarding whether this station should be subject to the Company's air quality program including the Company's response to these comments

47. Alliance shall submit to the Board copies of the reports on the mitigation programs completed at the historical, archaeological, and palaeontological sites encountered during construction together with any comments received on these reports from the Cultural Facilities and Historical Resources Division of Alberta Community Development, the Saskatchewan Heritage Branch, and the Archaeological Branch, British Columbia Ministry of Small Business, Tourism and Culture and the respective First Nations.

Post-Construction

48. The Company shall, in accordance with the reporting schedule to be set out in its air quality monitoring program, submit to the Board the results of its emissions monitoring including a comparison to the modelled values for the stations and any comments received from Environment Canada, MELP, and interested persons regarding the results.

49. Unless the Board otherwise directs, the Company shall:

(a) file with the Board, within 12 months after the commencement of operation of each of the mainline and lateral compressor stations, a monitoring report for each compressor station detailing the results of an appropriate noise monitoring program, including, but not limited to, the noise emission levels at the source, the fenceline, and the three closest residences, or an assessment site within or near 1.5 km from the station if no residences are within this radius, at the maximum operating level;

(b) notify the Board in writing of any noise complaint(s) received in respect of the operation of its compressor stations and apprise the Board of the results of any further noise monitoring undertaken in response and any measures that have been taken to address the complaint(s); and

(c) in the event that the noise complaint identified in response to (b) is substantiated as an increase in noise levels of 5 dBA or more, or is attributed to a specific frequency range, the Company shall undertake remedial measures within four months of receipt of the noise complaint, and in the event that implementation of the measures will take longer, or in the Company's view is not warranted, the Company shall file with the Board its justification and the results of further consultations with the affected person(s).

50. The Company shall submit to the Board, DFO-Habitat, and Environment Canada a post-construction environmental report within six months of the date that each approved facility is placed in service. The post-construction environmental report for each approved facility shall set out the environmental issues that have arisen up to the date on which the report is filed and shall:

(a) provide a description of all minor amendments to practices, procedures, and recommendations which have been implemented during the construction process;

(b) provide a summary of all instances when wet soil conditions required implementation of contingency measures or shutdown of construction, specifically identifying:

(i) the date of the decision;

(ii) the indicator(s) used for the decision and the measure/rationale applied to each indicator;

(iii) the location/geographic extent of the construction spread affected, and soil type;

(iv) the nature of work being affected by the decision;

(v) the specific contingency measures that were implemented;

(vi) the date contingency measures were no longer required or construction recommenced and the rationale for the decision; and

(vii) any specific follow-up, reclamation, or monitoring recommended;

(c) indicate those issues which have been resolved and those unresolved;

(d) describe the measures which the Company proposes to take in respect of unresolved issues;

(e) include copies of any as-built reports that are prepared in accordance with undertakings made to DFO, and any comments from DFO in respect of those reports; and

(f) provide a list and suitable map indicating all designated access routes and the location and type of all temporary facilities.

51. The Company shall submit to the Board, on or before December 31st following each of the first two complete growing seasons which occur after the filing of the post-construction environmental report referred to in Condition 50:

(a) a list of the environmental issues indicated as unresolved in the report and any that have arisen since the report was filed; and

(b) a description of the measures which the Company proposes to take in respect of any unresolved environmental issues.

52. Unless the Board otherwise directs, the Company shall submit to the Board, in conjunction with the final report filed pursuant to Condition 51, a videotape or remote sensing imagery of the entire pipeline right-of-way, in a form that is satisfactory to the Board.

53. Unless the Board otherwise directs, the Company shall submit to the Board:

(a) within six months after the commencement of operation of the pipeline, a description of its heat effects monitoring program for vegetation located along the right-of-way downstream of the mainline compressor stations, including the parameters to be monitored, the frequency of monitoring, and the benchmarks to be used for comparison in addition to any comments from landowners and interested persons on the program; and

(b) in accordance with the reporting schedule to be set out in its heat effects monitoring program, the results of the Company's monitoring program including any comments on the results from landowners and other interested persons.

Expiration of Certificate

54. Unless the Board otherwise directs, this certificate shall expire in its entirety on 31 December 2000 unless the construction of the Alliance Pipeline Project has commenced by that date, and shall expire five years from the date of this certificate in respect only of any facilities authorized by this certificate which have not been constructed by that time.

Table V-1
Concordance Between CSR Recommendations and Certificate Conditions

CSR Recommendation	Certificate Condition		CSR Recommendation	Certificate Condition
1	8		22	16
2	9		23	45
3	34		24	46
4	19		25	48
5	37		26	10
6	11		27	26
7	20		28	49
8	21		29	27
9	22		30	47
10	42		31	28
11	38		32	29
12	39		33	44
13	6		34	33
14	5		35	18
15	7		36	43
16	23		37	50
17	24		38	51
18	25		39	52
19	36		40	53
20	35		41	2
21	17			

Appendix VI

Excerpts from Shipper Agreements re NGLs

The following are excerpts from the pro forma Precedent and Transportation Service Agreements for the firm transporation of natural gas on the Canadian portion of the Alliance Pipeline (both of which were filed in conjunction with Alliance's application to the Board) relating to natural gas liquids and liquefiable hydrocarbons:

Precedent Agreement

Article 5.5 - Relinquishment of Rights to Liquids

The Transportation Service Agreement will provide for the full relinquishment by the Shipper of any rights to deliveries of a specific portion of the common stream of Natural Gas transported by the Transporter and the U.S. Transporter, and to rights of natural gas liquids or liquefiable hydrocarbons that may be removed or processed from such common streams and all proceeds, profits and losses derived from or allocable to the removal, processing or sale of such liquids or liquefiable hydrocarbons (collectively, "the relinquishment rights"). The Shipper will, at the time of execution and delivery of the Transportation Service Agreement, or at any time thereafter as required by the Transporter, execute and, if required by the Transporter, cause the execution of by any of its Affiliates or any other Person who has been allocated transportation service on the U.S. Pipeline for volumes of Natural Gas corresponding to the Contracted Capacity any agreements or instruments specifically providing for such relinquishment of rights, in the form required by the Transporter; provided that such agreement or instrument will:

(a) not affect, vary or alter the tolls payable for transportation service under the Transportation Service Agreement;

(b) not affect, vary or alter the entitlement of the Shipper to have deliveries made to it by the U.S. Transporter balanced with its deliveries to the Transporter on a heating value basis, after allowance for line losses and Fuel, at U.S. delivery points.

Transportation Service Agreement

Article 5 - Option to Extract and Purchase Liquids

5.1 Shipper's receipts and deliveries, less Fuel, will be balanced on volume and heating value bases at the Delivery Point in accordance with the Tariff.

5.2 Shipper hereby grants to the Transporter acting solely in its capacity as agent for the parties identified in Schedule B (the "Optionees"), the option, exercisable at any time or times, and for any periods during the term of this Transportation Service Agreement, to extract from the commingled Natural Gas transported by the Transporter and purchase all Natural Gas liquids

or liquefiable hydrocarbons received by the Transporter from the Shipper that Optionees elect to remove or process and herby relinquishes to the Transporter, acting solely in its capacity as agent for the Optionees, all proceeds, profits and losses derived from or allocable to the removal, processing or sale of such Natural Gas liquids or liquefiable hydrocarbons.

5.3 At any time that the Optionees exercise their option, then in consideration for the sale by the Shipper of the extracted Natural Gas liquids or liquefiable hydrocarbons, the Transporter solely in its capacity as agent for the Optionees, shall arrange for the delivery to the Shipper by the U.S. Transporter at delivery points on the U.S. Pipeline of quantities of Natural Gas that have a heating value equal to the heating value of the quantities of such extracted Natural Gas liquids or liquefiable hydrocarbons acquired by the Optionees.

5.4 The Shipper will, at the time of execution and delivery of this Transportation Service Agreement, or at any time thereafter as required by the Transporter, execute, and, if required by the Transporter, cause the execution of by any of its Affiliates or any other person who has been allocated transportation service on the U.S. Pipeline for volumes of Natural Gas corresponding to the Contracted Capacity, agreements or instruments specifically providing for the option created in Section 5.2 or the acknowledgement of such option in the forms required by the Transporter, provided that such agreements or instruments will not:

(a) affect, vary or alter the amounts payable by Shipper for transportation service under this Transportation Service Agreement; or

(b) affect, vary or alter the entitlement of the Shipper to have deliveries made to it by the Transporter at the Delivery Point balanced with its deliveries to the Transporter on a heating value basis, after allowance for Fuel; or

(c) affect, vary or alter the entitlement of the Shipper or its Affiliates or any other Person who has been allocated transportation service on the U.S. Pipeline to have deliveries made to it by the U.S. Transporter at delivery points on the U.S. Pipeline balanced with its deliveries to the U.S. Transporter on a heating value basis, after allowance for fuel.

Appendix VII

Order TG-7-98

IN THE MATTER OF the *National Energy Board Act* ("*NEB Act*") and the Regulations made thereunder; and

IN THE MATTER OF an application dated 3 July 1997 by Alliance Pipeline Ltd. ("Alliance") on behalf of the Alliance Pipeline Limited Partnership for an order pursuant to Part IV of the *NEB Act*, filed with the National Energy Board ("Board") under File 3200-A159-1.

BEFORE the Board on 23 November 1998;

WHEREAS Alliance filed an application dated 3 July 1997 for an order approving the toll methodology and the tariff that is to apply in respect of service provided by Alliance;

AND WHEREAS a public hearing was held pursuant to Hearing Order GH-3-97 during which time the Board heard evidence and argument presented by Alliance and interested persons;

AND WHEREAS the Board's decisions on the application are set out in the GH-3-97 Reasons for Decision dated November 1998 and in this Order;

IT IS ORDERED THAT:

1. Alliance shall, for accounting, toll-making, and tariff purposes, implement the decisions outlined in the GH-3-97 Reasons for Decision and in this Order; and

2. At least sixty days prior to the commencement of operation of the pipeline, Alliance shall file with the Board, and serve on all GH-3-97 full participation intervenors, tariffs (including general terms and conditions) and tolls conforming to the decisions outlined in the GH-3-97 Reasons for Decision and in this Order.

NATIONAL ENERGY BOARD

Michel L. Mantha
Secretary