



National Energy Board

Reasons for Decision

Westcoast Energy Inc.

GH-5-90

September 1990

Facilities

National Energy Board

Reasons for Decision

In the Matter of

Westcoast Energy Inc.

Application dated 6 June 1990
for the McMahon Plan Expansion Project

GH-5-90

September 1990

Minister of Public Works and Government Services
Canada 1994

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Abbreviations

the <i>National Energy Board Act</i>	Act
Bcf	billion cubic feet
BC Gas	BC Gas Inc.
the Board	National Energy Board
CanWest	CanWest Gas Supply Inc.
CPA	Canadian Petroleum Association, The
EARP Order	Environmental Assessment and Review Process Guidelines Order
EMPR	Ministry of Energy Mines and Petroleum Resources of British Columbia
Encor	Encor Energy Corporation Inc.
Esso	Esso Resources Canada Ltd.
Expansion Shippers	Shippers who have signed the Service Agreements underpinning this application
GJ	gigajoule
GSC	Geological Survey of Canada
ha	hectare
Home Oil	Home Oil Company Limited
km	kilometre
kW	kilowatt
LDCs	Local Distribution Companies
m	metre
M3	cubic metres
mm	millimetre
m ³ /d	cubic metres per day
MMcfd	million cubic feet per day

NEB	National Energy Board
NGL	natural gas liquids
Norcen	Norcen Energy Resources Ltd.
Northwest	Northwest Pipeline Corporation
Ocelot Chemicals	Ocelot Chemicals Inc.
O.D.	outside diameter
Petro-Canada	Petro-Canada Inc.
PPBRs	Plans, Profiles and Books of Reference
Pursuit Resources	Pursuit Resources Inc.
Rules	The draft NEB Rules of Practice and Procedure
t/d	metric tons per day
Tcf	trillion cubic feet
U.S.	United States of America
Wainoco	Wainoco Oil Corporation
Westcoast	Westcoast Energy Inc.

Recital and Appearances

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

AND IN THE MATTER OF an application dated 6 June 1990 by Westcoast Energy Inc. for a certificate of public convenience and necessity pursuant to section 52 of the Act for an expansion of the McMahon Plant, and for an order pursuant to section 58 of the Act exempting certain additional facilities from the provisions of paragraph 30(1(a) and section 31 of the Act;

AND IN THE MATTER OF National Energy Board Directions on Procedure GH-5-90, as amended.

HEARD at Fort St. John, British Columbia on 20 and 21 August 1990.

BEFORE:

R.B. Horner, Q.C.	Presiding Member
W.G. Stewart	Member
D.B. Smith	Member

APPEARANCES:

J. Lutes	Westcoast Energy Inc.
R.G. Panchuk	Canadian Petroleum Association
J.A. Snider	Independent Petroleum Association of Canada
W. Jobe	Alberta & Southern Gas Co. Ltd.
M.F. Shoemaker	BC Gas Inc.
F.C. Basham	BP Resources Canada Limited
J.M. Pelrine	CanWest Gas Supply Inc.
C.B. Woods	Mobil Oil Canada
G. Houston	British Columbia Ministry of Energy, Mines and Petroleum Resources
D. Burse	National Energy Board

Chapter 1

The Application

1.1 Sequence of Events

On 6 June 1990, Westcoast Energy Inc. ("Westcoast") applied to the National Energy Board ("the Board") pursuant to section 52 of the Act, for a certificate to construct additional gas processing and sulphur recovery facilities at the existing McMahon Plant. In conjunction with that request, Westcoast applied to the Board for an order, pursuant to section 58 of the Act for exemption from paragraph 30(1)(a) and section 31 of the Act for certain associated facilities. These facilities consisted of additional compressor facilities, pipelines and related facilities to be located on the Fort St. John raw gas transmission system. The two sets of facilities were proposed to expand the capacity of the McMahon Plant and the Fort St. John raw gas transmission system both forming part of the Westcoast system. The description and cost of the applied-for facilities are shown on Table 1-1. Their location is shown on Figure 1-1.

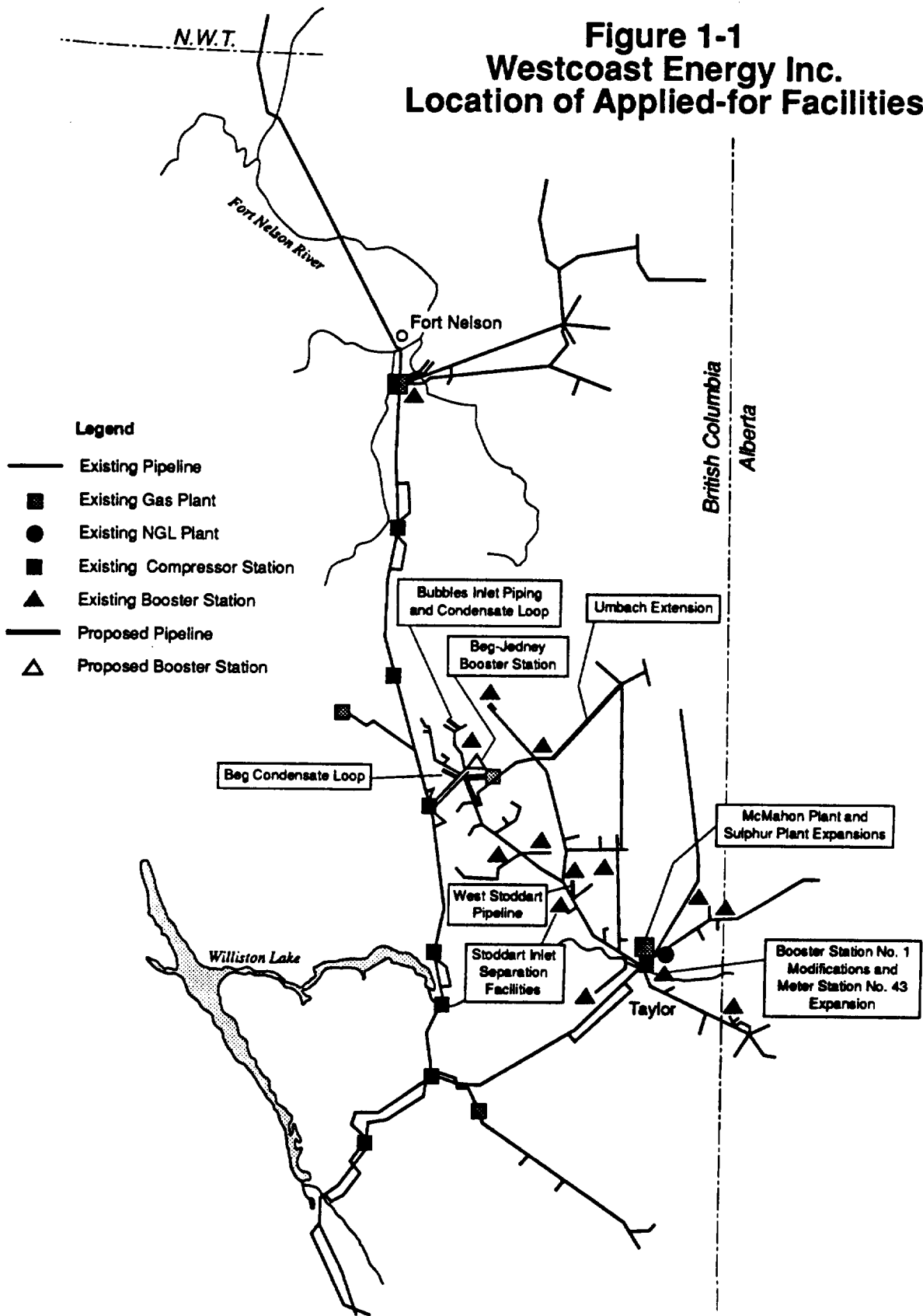
Table 1-1

Description and Cost of Applied-For Facilities

Project Summary		Westcoast's Estimated Capital Cost (1990 base) (\$000)
McMahon Plant Expansion Facilities:		85,900
Modification to operating configuration of existing inlet separators;	N/A ¹	
New amine train including a new amine contractor and amine still with associated heat exchangers, piping and controls;	N/A	
New hydrocarbon and water dew point control unit;	N/A	
New condensate stabilizer;	N/A	
New hydrocarbon liquids fractionation unit and associated storage and loading facilities;	N/A	
Modification of the existing sulphur recovery trains;	N/A	
New sulphur recovery unit;	N/A	
New tail gas clean-up unit; and	N/A	
New or modifications to the waste water treatment facilities	N/A	
Modifications and additions to the existing steam, water, air, electrical and fuel gas system.	N/A	
Compressor Stations, Pipelines and Related Facilities:		21,970
Beg-Jedney Booster Station	9,300	
West Stoddart Pipeline	1,900	
Umbach Extension	7,100	
Meter Station no.43 (Taylor) Expansion	350	
Condensate Loops and Booster Stations Modifications	3,320	
Total Estimated Project Cost		107,870

¹ Individual estimated costs were not available at the time the hearing took place.

**Figure 1-1
Westcoast Energy Inc.
Location of Applied-for Facilities**



The McMahon Plant is located at Taylor in northeastern British Columbia and comprises a gas processing plant and a sulphur recovery plant, both owned and operated by Westcoast. Adjacent to the site of the McMahon Plant, there is also a refinery owned and operated by Petro-Canada Inc. ("Petro-Canada") and a natural gas liquids ("NGL") plant owned equally by Petro-Canada and Westcoast and operated by Westcoast.

The Fort St. John raw gas transmission system feeds sour natural gas to the McMahon Plant and two lines - the Boundary Lake Line and Alberta Mainline - feed sweet natural gas directly into the Westcoast main transmission line. The Fort St. John raw gas transmission system also extends into the province of Alberta by way of two branches crossing the British Columbia/Alberta border near Boundary Lake and at Dawson Creek.

On 10 July 1990, the Board issued Hearing Order GH-5-90, setting down Westcoast's application for hearing commencing 20 August 1990 in Fort St. John. The order provided a list of issues to be considered at the hearing. On 1 August 1990, the Canadian Petroleum Association ("CPA") requested that the Board add toll methodology as an issue but that consideration of the issue be delayed until the Board's decision in the GH-5-89 proceeding¹ is rendered. Further to this request, on 3 August 1990, the Board added toll methodology to the list of issues but denied CPA's request to postpone its consideration. A copy of the amended list of issues appears as Appendix 1.

The public hearing was conducted in Fort St. John, British Columbia on 20 and 21 August 1990.

The Board's decision and reasons therefor are included in this report.

1.2 Details of Application

Request for a Section 52 Certificate

In its application, Westcoast requested a certificate pursuant to section 52 of the Act for additional facilities required to expand the capacity of its McMahon Plant located at Taylor, British Columbia in order to accommodate the level of Firm Service (Contract Demand Treatment Service) at the McMahon Plant requested by shippers as referred to in Table 1-2.

¹ The GH-5-89 proceeding relates to an application by TransCanada PipeLines Ltd. for additional facilities in 1991-92. That proceeding also includes toll methodology as an issue.

Table 1-2

**Service Agreements Underpinning the
6 June 1990 Application**

Shippers	Contract Term Ending¹	Contract Demand (10³ cubic metres/day) ("10³m³/d")	(million cubic feet/day) ("MMcfd")
CanWest Gas Supply Inc. ("CanWest")	31 Oct. 2004	1 391.1	49.1
Encor Energy Corporation Inc. ("Encor")	31 Oct. 2001	186.0	6.6
Esso Resources Canada Ltd. ("Esso")	31 Oct. 2001	49.8	1.8
Home Oil Company Limited ("Home Oil")	31 Oct. 2001	99.5	3.5
Norcen Energy Resources Ltd. ("Norcen")	31 Oct. 2001	142.0	5.0
Ocelot Chemicals Inc. ("Ocelot Chemicals")	31 Oct. 2001	430.0	15.2
Pursuit Resources Inc. ("Pursuit Resources")	31 Oct. 2001	50.0	1.8
Wainco Oil Corporation ("Wainoco")	31 Oct. 2001	283.0	10.0
TOTAL		2 631.4	93.0²

1 Westcoast's obligation to provide service under these Agreements commences on the later of (a) the date Westcoast advises the shipper it is capable of providing the services described in the Agreements or (b) 1 November 1991.

2 Westcoast testified that two Agreements are to be amended so that the total quantity contracted for will be 2 422 10³m³/d (85.5 MMcfd) which is the size of the facility expansion applied for after providing for an allowance for transportation fuel.

The facilities applied for by Westcoast were as follows:

- i) a modification of the inlet facilities including construction of approximately 500 metres ("m") of 609.6 millimetres ("mm") O.D. raw gas piping from the inlet compressor station to the raw gas coolers and modification of the piping and controls on the existing raw gas separators;
- ii) a new amine contactor and amine still together with associated heat exchangers, piping and controls;
- iii) a new hydrocarbon and water dew point control unit;
- iv) an additional condensate stabilizer;
- v) a hydrocarbon liquids fractionation unit and associated storage and loading facilities;
- vi) a modification of the existing sulphur recovery trains including the replacement of the 'B' train waste heat boiler, catalyst replacement and associated piping and control changes¹;
- via) a new Claus sulphur recovery unit;
- viii) a new tail gas clean-up unit; and
- ix) modifications and additions to the existing steam, water, air, electrical and fuel gas utility systems.

Request for a Section 58 Exemption Order

Westcoast requested an order under section 58 of the Act for exemption from the provisions of paragraph 30(1)(a), and section 31 for certain additional compressor facilities, pipelines and related facilities required to expand the capacity of the Fort St. John raw gas transmission system. The facilities applied for by Westcoast pursuant to section 58 of the Act were as follows:

- i) a new field compressor station known as the Beg-Jedney Booster Station to be constructed at the junction of the Westcoast's existing Beg and Jedney pipelines rights-of-ways;
- ii) a new 8.7 kilometre (km) of 168.3 mm O.D. raw gas pipeline, known as the West Stoddart pipeline, to be located adjacent to Westcoast's 660.4 mm O.D.B.C. Trunk pipeline;
- (iii) a new 25.3 km of 273.1 mm O.D. raw gas pipeline, known as the Umbach Extension, to extend from the junction of Westcoast's existing Silver and Dahl pipelines to the end of Westcoast's existing Umbach pipeline;
- (iv) two additional meter runs at Meter Station 43 (Taylor) to accommodate the increased residue gas volumes produced by the expanded McMahon Plant;
- v) modification of piping at the inlet of Booster Station 7 (Bubbles) to connect Westcoast's existing Jedney pipeline to the suction side of the station;

¹ On 1 August 1990, Westcoast informed the Board that the 'B' train waste heat boiler did not require replacement.

- vi) a condensate loop known as the Bubbles condensate loop to be installed at Booster Station 7 (Bubbles);
- vii) additional condensate handling capacity at Booster Station 10 (Stoddart) to handle the condensate from the West Stoddart pipeline;
- viii) approximately 400 m of 406.4 mm O.D. pipe to be installed to connect Westcoast's Milligan-Peejay pipeline to the inlet of Booster Station 1 (Taylor); and
- ix) a condensate loop, known as the Beg-Jedney condensate loop, to be installed at the proposed Beg-Jedney Booster Station.

The total estimated capital cost of the proposed facilities is \$107,870,000 of which, \$85,90,000 is for the expansion of the McMahon Plant and \$21,970,000 for the expansion of the Fort St. John raw gas transmission system.

Chapter 2

Gas Supply

2.1 Reserves

Westcoast provided estimates of both established gas reserves and potential gas reserves in the Fort St. John area of British Columbia available to support its McMahon Plant expansion project. As shown in Table 2-1, the Board's estimate of established reserves is approximately 14 percent lower than that of Westcoast. The Board's estimate of potential reserves is also 14 percent lower than that estimated by Westcoast.

Table 2-1

**Westcoast and NEB Estimates of Remaining
Established Gas Reserves and Undiscovered
Potential Gas Reserves**

Billion cubic metres, "10⁹m³"
(Trillion cubic feet, "Tcf")¹

Supply	Westcoast	NEB
Remaining Established Reserves	90.2 (3.2)	78.0 (2.8)
Undiscovered Potential	<u>109.3 (3.9)</u>	<u>94.4 (3.3)</u>
	199.5 (7.1)	172.4 (6.1)

¹ As of 1 January 1990

Established Reserves

In its analysis of Westcoast's gas supply, the Board recognized approximately 520 pools in the Fort St. John supply area. Most of these pools are found in the Cretaceous Bullhead Group and Triassic Baldonnel, Charlie Lake and Halfway Formations. Some pools are also located in the Mississippian Debolt Formation.

The Monias Field's Halfway Main pool accounts for approximately 15 percent of the Board's estimate of remaining established reserves. Approximately 35 percent of the Board's estimate of remaining established reserves is found in 32 other pools having initial marketable reserves in excess of 1 000 10⁶m³ (35 billion cubic feet ("Bcf")). Significant production has occurred in most of these pools and the Board's estimates of reserves are generally in agreement with those provided by Westcoast.

The Board notes that approximately 60 percent of the pools having initial marketable reserves less than 1 000 10⁶m³ (35 Bcf) have never produced, yet these pools comprise a significant portion of both the Board's and Westcoast's estimates of remaining reserves. The Board's estimate of

established reserves is lower than Westcoast's estimate, primarily due to the cumulative effect of different interpretations of reservoir parameters such as net pay, gas saturation and area in many of these smaller pools.

Potential Reserves

In addition to the established reserves described above, Westcoast estimated the undiscovered gas potential within the Fort St. John supply area available to be processed at the McMahon Plant at a total of $109.3 \times 10^9 \text{m}^3$ (3.9 Tcf).

In developing its estimate of potential reserves available to the McMahon Plant, Westcoast relied initially on a study by the Geological Survey of Canada ("GSC")¹ which subdivided northeastern British Columbia into a number of geological play types and estimated the ultimate potential for each. The British Columbia Ministry of Energy, Mines and Petroleum Resources ("EMPR") also utilized these play types in subsequent studies of ultimate potential.² Westcoast divided the play types used by GSC and EMPR into gas plant supply areas in order to develop its estimate of potential reserves available to the McMahon Plant. The ultimate potential estimate of $295 \times 10^9 \text{m}^3$ (10.5 Tcf) for the McMahon Plant supply area reflects adjustments to exclude the Dry Gas supply area (Boundary Lake and fields on the Pouce Coupe pipeline) and reserves in the Ring-Border area which are not expected to be processed at the McMahon Plant. Given that $95.5 \times 10^9 \text{m}^3$ (3.4 Tcf) have been produced to date and remaining established reserves are estimated at $90.2 \times 10^9 \text{m}^3$ (3.2 Tcf), Westcoast estimates undiscovered potential reserves to be $109.3 \times 10^9 \text{m}^3$ (3.9 Tcf).

The Board also developed an estimate of potential gas reserves in the McMahon Plant supply area. The Board's estimate is based both on the analysis presented by Westcoast and on independent assessment of potential for each of the play types. The Board's analysis involved the use of data available on a zone by zone basis (including areal distribution of proven pools, pool sizes, success rates and the type of structural and/or stratigraphic trap) for areas which have been explored and developed to estimate the potential in undrilled areas.

The Board's total estimate of undiscovered gas potential of $94.4 \times 10^9 \text{m}^3$ (3.3 Tcf) is lower than that of Westcoast primarily due to lower estimates of potential assigned to the Montney-Doig and Stoddart play types. The limited number of pools discovered in these play types to date and the small reserves assigned to those discoveries that have been made suggest to the Board that Westcoast's estimate of undiscovered potential may be somewhat optimistic, and in particular for these plays.

Although the Board has adopted an estimate of undiscovered potential for the McMahon Plant supply area of $94 \times 10^9 \text{m}^3$ (3.3 Tcf), it recognizes the uncertainty associated with estimates of this nature. The Board considers a reasonable range for estimates of undiscovered potential for the area to be from $80 \times 10^9 \text{m}^3$ (2.8 Tcf) to $110 \times 10^9 \text{m}^3$ (4 Tcf) and notes that Westcoast's estimate falls within this range. The Board's range of estimates is based on differing expectations as to the number and size of pools remaining to be discovered for each of the play types.

¹ GSC Open File #817 "Resources of Northeast British Columbia".

² EMPR submission to the Govier Inquiry.

2.2 Productive Capacity

Westcoast estimated that productive capacity from the area could satisfy the full expanded capacity for 12 years (1992-2003), with increasing shortfalls thereafter. This estimate was based on a 75 percent load factor throughout the projection period.

Westcoast's forecast of productive capacity comprises three categories of gas reserves: proven producing, proven non-producing and potential gas reserves. The forecast of productive capacity from proven producing gas reserves was based upon existing contract rates and performance. The forecast of productive capacity from non-producing reserves was based on the assumption that these reserves would be produced at a rate of 1:5750 held flat for five years and would then decline at a five percent per year. The majority of these reserves (70 percent) were connected in the first year of the forecast. The remainder were phased in over the next five years. Westcoast indicated that this connection schedule was reasonable, as 90 percent of these reserves were within 4.5 km from a pipeline.

Westcoast projected future reserves additions on the basis of an analysis of historical gas reserves additions, which have remained relatively constant, averaging $5.6 \times 10^9 \text{ m}^3$ per year. It was assumed that the rate of reserves additions will decrease as the cumulative reserves approach the ultimate potential and the historical growth of reserves additions was matched to the ultimate potential by assuming a five percent per annum decrease in additions. The reserves additions were assumed to be connected in the second year following discovery and were then produced in the manner described above for the non-producing reserves.

Under cross-examination Westcoast agreed that a higher load factor or a lower estimate of potential would reduce the flat life of the forecast.

The Board's forecast of Westcoast's productive capacity is very similar to that of Westcoast and indicates that the expanded plant capacity will be fully utilized until 2004, with increasing shortfalls thereafter. This capacity forecast is also based on a 75 percent load factor throughout the projection period.

Productive capacity for proven producing and non-producing gas reserves was determined using reserves and deliverability data for individual pools and assuming a contract rate of take of 1:5750. This capacity forecast is somewhat higher than that of Westcoast initially but is very comparable over the projection period as shown in Figure 2-1.

The Board projected future reserve additions using its estimates of ultimate potential and assuming that the finding rate would decline from the current level to zero at the ultimate potential. The Board also assumed that the current level of activity (approximately 100 wells per year) would be maintained. Westcoast's connection rate and production profile were applied to these reserves additions to produce the forecast of productive capacity for potential reserves. The Board investigated the effect of less aggressive connection rates than those assumed by Westcoast but found that they resulted in only minor differences in the productive capacity forecast.

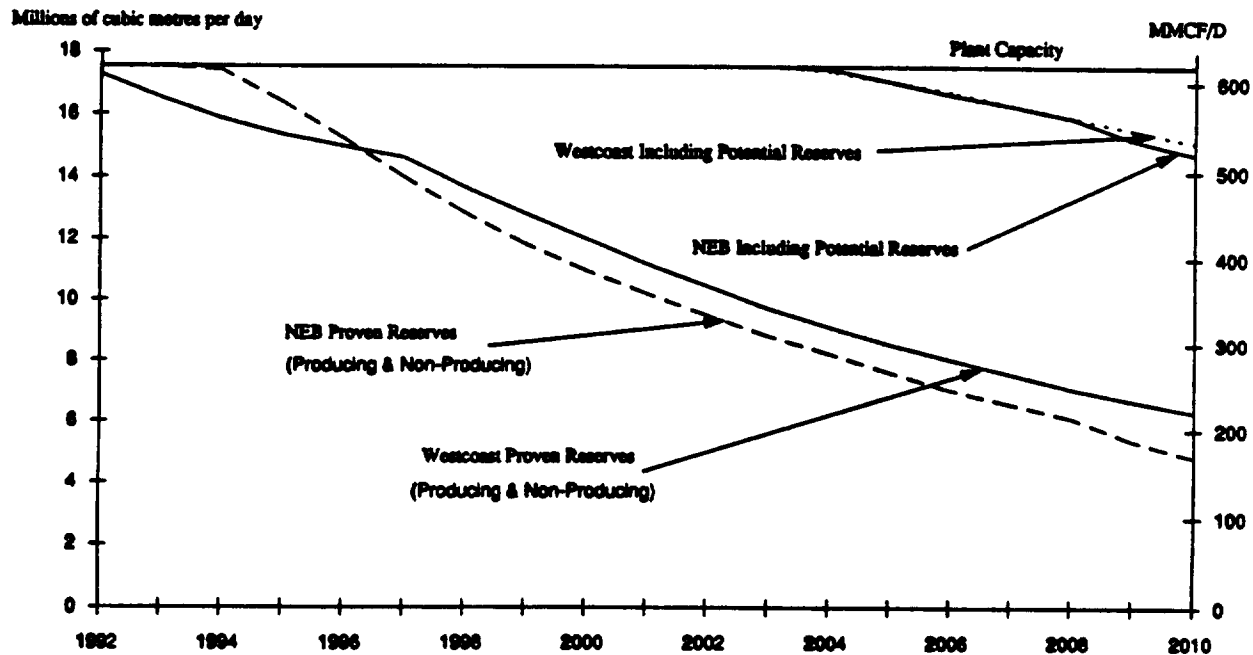
Views of Interested Parties

Both the CPA and BC Gas Inc. ("BC Gas") voiced concerns regarding the adequacy of supply to support the proposed expansion. CPA and BC Gas did not, however, provide specific data or analysis in support of their views.

BC Gas was concerned that Westcoast's forecast of deliverability was less than capacity by the year 2004 and that the shortfall could occur earlier if trend gas did not materialize or if the load factor for the McMahon Plant was greater than 75 percent.

Figure 2-1

COMPARISON OF ESTIMATES OF PRODUCTIVE CAPACITY FOR THE FORT ST JOHN SUPPLY AREA



Views of the Board

The Westcoast and Board estimates of supply from proven reserves are very similar, as are the estimates of supply from potential reserves. The Board notes that the expansion of the McMahon Plant is largely reliant on potential reserves, which are by nature speculative, both in terms of volumes that will be found and the composition of the gas that is found.

Westcoast's estimate of potential, although somewhat higher than that of the Board, falls within a range the Board considers reasonable. However, the Board notes that even if the finding rates are lower than forecast, a modest growth in drilling activity would be sufficient to achieve the projected level of reserve additions and maintain full utilization of the Plant.

A substantial increase in the acid gas or liquids content of the inlet gas stream at the McMahon Plant could have a detrimental impact on both capacity and efficiency. Westcoast submitted that on average the gas content in the future would remain within Plant specifications. Although there exists a high degree of uncertainty in forecasting future gas compositions, the Board believes that Westcoast's assumption is reasonable.

Although the Board raised a concern regarding producers processing their own gas at field plants rather than utilizing the McMahon Plant, the Board agrees with evidence presented by Westcoast at the hearing indicating that there is little likelihood of this occurring.

The Board also notes that there was no substantive opposition to Westcoast's supply evidence. Although CPA and BC Gas both identified general concerns relating to Westcoast's supply, neither party provided specific data or analysis in support of their position. Additionally, producer support for the project was provided in the form of signed processing contracts.

Chapter 3

Requirements

In support of its application Westcoast indicated that it had:

- (a) received executed Firm Service Agreements for Contract Demand Treatment Service with several shippers totalling 2 422.0 $10^3\text{m}^3/\text{d}$ (85.5 MMcfd), for ten years commencing 1 November 1991 (i.e. the "Expansion Shippers"); and,
- (b) prepared an overall assessment of present and future domestic and export markets served, or expected to be served, through the Westcoast system which it believes demonstrates the need for the additional gas processing capacity for which it had applied.

3.1 Service Agreements

Westcoast submitted that by April 1990 it had received executed Firm Service Agreements totalling some 3 870.7 $10^3\text{m}^3/\text{d}$ (136.6 MMcfd) for incremental capacity at the McMahan Plant. This compares to requests in the queue for service totalling 4 612.8 $10^3\text{m}^3/\text{d}$ (162.8 MMcfd). Based upon its forecast of gas deliverability available to the McMahan Plant and given that some 60 percent of the existing Firm Service Agreements expire on or before 31 October 1991¹, Westcoast elected to restrict the McMahan Plant Expansion Project to 2 422.0 $10^3\text{m}^3/\text{d}$ (85.5 MMcfd).

In support of its application, Westcoast filed executed Firm Service Agreements (i.e. Contracted Demand Treatment Service) for service at the McMahan Plant totalling 2 631.4 $10^3\text{m}^3/\text{d}$ (93.0 MMcfd), as identified in Table 1-2 in Chapter 1 of these Reasons. During the hearing, Westcoast testified that two of these contracts will have to be amended so the total will actually be 2 422.0 $10^3\text{m}^3/\text{d}$ (85.5 MMcfd).

The Agreements also provide for Contract Demand Raw Gas Transmission Service and Contract Demand Liquids Recovery Service.

Westcoast acknowledged that it has not done an assessment of the markets to be served by the Expansion Shippers to determine whether these markets are long-term and secure. Westcoast did not furnish additional market details since the Expansion Shippers are not required to provide Westcoast with such information. In executing the Service Agreement, an Expansion Shipper warrants that it has either firm supply or firm markets for the term of the Agreement. Westcoast indicated that it does not believe that a detailed description of the domestic and/or export markets to be served by the Expansion Shippers would in any event be meaningful since a large number of shippers currently having gas

¹ Article 2.02 of the Westcoast General Terms and Conditions Service provides that a shipper who has entered into a Firm Service Agreement has the right to extend the term of the Agreement from time to time provided it, among other things, provides Westcoast with notice not less than six months prior to the term of the Agreement (i.e. on 1 May 1991).

treated at the McMahon Plant are presently contracted on a one-year basis. Therefore, Westcoast believes that, given the short-term nature of many of these Service Agreements and the uncertainty as to whether these will or will not be renewed, the only meaningful way to evaluate the need for the applied-for facilities was to do so on a macro basis (i.e. to review the overall domestic and export gas demand off the Westcoast system to ensure that there is sufficient overall demand to justify the incremental facilities).

Given the current competitive market environment, Westcoast expects that, as gas sales contracts expire, there will be competition among gas suppliers wishing to supply those contracts. As a result, Westcoast thought that there could be a shift from other gas supplies to the additional gas processed at the McMahon Plant. Westcoast does not believe that this should be of concern since it expects that it would be in the displaced gas suppliers' economic interest to seek alternative gas markets for any of the gas displaced.

3.2 Overall Market Requirements

Westcoast provided a domestic and export gas market forecast for gas to be served off the Westcoast system for the ten-year period ending 31 December 2000, which demonstrated that:

- (a) total gas deliveries are anticipated to increase from $11\,836.7\ 10^6\text{m}^3$ (417.8 Bcf) to $18\,162.6\ 10^6\text{m}^3$ (641.2 Bcf), or 4.9 percent on an average annual basis;
- (b) total domestic gas deliveries are anticipated to increase from $7\,139.9\ 10^6\text{m}^3$ (252.0 Bcf) to $9\,862.5\ 10^6\text{m}^3$ (348.2 Bcf), or 3.7 percent on an average annual basis.
- (c) total export gas deliveries are anticipated to increase from $4\,696.8\ 10^6\text{m}^3$ (165.8 Bcf) to $8\,300.1\ 10^6\text{m}^3$ (293.0 Bcf), or 6.5 percent on an average annual basis.

Westcoast indicated that its domestic market forecast is based upon: historical gas market data; its review of available domestic gas market forecasts; and, upon the medium and long term gas market forecasts supplied by, and reviewed with, BC Gas (Inland and Lower Mainland Divisions), Pacific Northern Gas Ltd., and Pacific Coast Energy Corporation.

Westcoast indicated that the export market forecast is based upon Northwest Pipeline Corporation's ("Northwest") throughput volume and an assessment of the share of the United States of America ("U.S.") gas market accessible to the Westcoast system by exports at Huntingdon, British Columbia. The traditional, "on-system" Northwest market forecast is based upon the demand forecasts furnished by the U.S. Local Distribution Companies ("LDCs") connected to the Northwest system and serving the States of Washington, Oregon, Idaho, and Nevada. In addition, the export forecast took account of the U.S. Pacific Northwest electric generation and California markets and the share of those two markets that could be served by exports of Canadian-sourced gas off the Westcoast system at Huntingdon, British Columbia.

Westcoast noted that the electric generation market forecast assumes shortfalls in U.S. conventional electricity supplies. Firm gas deliveries to that market are forecast to commence in November 1992 at $354.0\ 10^3\text{m}^3/\text{d}$ (12.5 MMcfd) and increasing to $2\,833.0\ 10^3\text{m}^3/\text{d}$ (100 MMcfd) by 2000. Starting in mid-1992, Westcoast is forecasting firm exports deliveries into the California market at

4 533.0 10³m³/d (160.0 MMcfd), increasing to 5 949.0 10³m³/d (210.0 MMcfd) by 1994-95 and remaining at that level to the end of the forecast period.

Westcoast testified that 1989 was the first full year in which Northwest operated as an "open-access" pipeline system. This, coupled with Northwest's apparent willingness to construct additional facilities, was cited by Westcoast as creating considerable potential for additional throughput on the Northwest system to service the Pacific Northwest and California markets.

In summary, Westcoast argued that its overall market assessment and the execution of the new Firm Service Agreements support the McMahon Plant facilities expansion at this time. As well, Westcoast pointed to both the existence of the long-term Firm Service Agreements for processing well in excess of the additional capacity applied for and to the ever-increasing queue of shippers requesting service. In this regard, Westcoast noted that demand for firm processing service at the McMahon Plant has been in excess of the current plant capacity consistently during the past several years.

Views of Interested Parties

The CPA, while supporting the need for the McMahon Plant facilities expansion, argued that the application was premature and incomplete. Specifically, the CPA suggested that Westcoast has not provided the required market information in accordance with the draft NEB Rules of Practice and Procedure ("the Rules") and that Westcoast has not sought leave of the Board relieving it of the requirement to furnish such market information. The CPA questioned the quality of the market research done by Westcoast to determine whether the Expansion Shippers' markets are long-term and secure.

BC Gas expressed concerns in relation with the terms of the contracts underlying the proposed project and whether the market served by these contracts would be new or incremental services.

Views of the Board

The Board concurs with Westcoast that given the short-term nature of the Service Agreements currently in effect for service at the McMahon Plant and given the shippers' right to renew those short-term Agreements upon giving six-months notice, the appropriate way to assess the market demand off the Westcoast system is to do so on a macro level. In that light, the Board finds Westcoast's overall market forecast, and Westcoast's approach in developing that forecast, to be reasonable. In particular, the evidence adduced by Westcoast demonstrates that reasonable estimates of growth in the markets served by Westcoast's system support the need for the incremental production that this expansion will make available. The evidence further demonstrates that this need is over and above current production capacity available from the other processing plants on Westcoast's system, most of which are expected to be fully contracted by 1992.

In assessing the need for the expansion facilities, the Board is satisfied that Westcoast has exercised adequate caution and has recognized, in the determination of the size of the incremental capacity, that short-term Service Agreements for service at McMahon Plant may not be renewed. This conservative approach is reflected in the fact that

although Westcoast received executed firm Service Agreements totalling 3 870.7 $10^3\text{m}^3/\text{d}$ (136.6 MMcfd) for service at the McMahon Plant, it has chosen to restrict the applied-for facilities to 2 422.0 $10^3\text{m}^3/\text{d}$ (85.5 MMcfd). In this regard, the Board has also noted that the queue for capacity at the McMahon Plant, as of 30 July 1990, included requests for service totalling 4 612.8 $10^3\text{m}^3/\text{d}$ (162.8 MMcfd).

While the queue alone does not provide reliable evidence as to the firmness of the demand for the capacity requested, the fact that such a large percentage of those in the queue were willing to execute 10-year firm service contracts does indicate a strong demand for additional capacity. This has been the case for a number of years and the evidence suggests that it will continue even after this expansion. Given this demand, the Board is of the view that it is reasonable to assume that the plant will remain fully contracted as it is likely that most of the existing short term contracts will be renewed and, for those that are not, there are enough potential shippers in the queue who are prepared to step in to contract for the released capacity.

Regarding the concern raised by the CPA that Westcoast has failed to fully comply with the market data filing requirements of the Rules, it should be noted that those information requirements are guidelines that the Board may modify in the circumstances of an application. In this case, for the reasons given earlier, the Board is satisfied that Westcoast has provided sufficient information to demonstrate the need for the expansion facilities.

Although the Board has been persuaded by the evidence presented by Westcoast, the Board does share certain of the CPA's concerns regarding the difficulty in assessing market requirements in the absence of specific market evidence from the shippers underpinning the expansion. The Board would have found it helpful if those shippers had come forward in the hearing to speak to the need for the expansion or had furnished Westcoast with market evidence to do so on their behalf.

Chapter 4

Facilities

4.1 Specific Facilities

4.1.1 McMahon Plant Facilities

The facilities proposed by Westcoast to expand the capacity of the McMahon Plant include:

- modification to operating configuration of existing inlet separators;
- one new amine train including a new amine contactor and amine still with associated heat exchangers, piping and controls;
- one new hydrocarbon and water dew point control unit;
- one new condensate stabilizer;
- one new hydrocarbon liquids fractionation unit and associated storage and loading facilities;
- modification of the existing sulphur recovery trains;
- one new sulphur recovery unit;
- one new tail gas clean-up unit; and
- modifications and additions to the existing steam, water, air, electrical and fuel gas utility system.

The following Table 4-1 provides the actual and proposed capacities at the McMahon Plant on a raw gas, residue gas and contractable basis. The contractable capacity is the remaining residue gas capacity after providing for an allowance for transportation fuel.

Inlet Liquids Stabilizer

The proposed condensate stabilizer unit would remove the hydrogen sulphide, the methane and the ethane from the liquids before sending them to storage.

Westcoast testified that the proposed stabilizer unit would completely replace the stabilization process which is currently performed at the adjacent PetroCanada refinery. During the hearing, Westcoast explained that the existing Petro-Canada stabilizer does not have the capacity to treat the additional liquids volumes associated with the McMahon Plant expansion project. Westcoast also testified that it was its understanding that PetroCanada was not interested in expanding or changing their existing facilities at the moment.

**Table 4-1
Actual and proposed capacity at the McMahan Plant**

Basis			Actual Proposed		Net Increases	
	(10³m³/d)	(MMcfd)	(10³m³/d)	(MMcfd)	(10³m³/d)	(MMcfd)
Raw Gas	16 282	575	19 255	680	2 973	105
Residue Gas	15 008	530	17 560	620	2 552	90
Contractable	14 258	503.3	16 680	588.8	2 422	85.5

In addition, Westcoast testified that although it did consider the possibility of sharing the incoming liquids flow between the Petro-Canada refinery and the Westcoast facilities, the conclusion was that the sharing would not be an acceptable operational approach. Westcoast estimated the cost of the inlet stabilizer system for the proposed full capacity at approximately \$4 million. Under the sharing option, Westcoast estimated the cost of the system sized for the incremental capacity at \$3 million plus an estimated amount between \$500,000 and \$1 million for the regulation and control system.

Westcoast also testified that the operation of two stabilizer units as required by the sharing option would be less efficient than the operation of a single system since both systems must be maintained hot which increases the steam consumption. In addition, Westcoast testified that the operation of two systems in parallel would be more prone to upset which would reflect upon the plant availability.

Westcoast testified that it had considered two other options to even out the flow of liquids into the McMahan Plant which would render unnecessary the construction of the stabilizer unit. The first option consisted in increasing the frequency of pigging of the raw gas transmission lines. However, Westcoast testified that it was not possible, mainly for safety reasons, to change the current pigging schedule. The second option consisted in extending at the inlet of the McMahan Plant, the existing condensate loop, which is used to hold the liquids and even out the liquids flow into the plant. Westcoast testified that the condensate loop had already been expanded in 1990 and it would not be economical nor practical to further increase the length of the condensate loop.

Dehydration and Hydrocarbon Dewpoint Control

Westcoast testified that the hydrocarbon content of the gas currently processed at the McMahan Plant is controlled by the existing lean oil absorption system. The extracted liquids are sent to the Petro-Canada refinery for handling, fractionation and shipment to the market.

Westcoast proposed to construct a new dewpoint unit to control the water and hydrocarbon contents of the additional gas volume involved in the application. The proposed design basis includes fractionation facilities to process the hydrocarbon liquids recovered in the dewpoint unit. The proposed fractionation facilities would also include product storage and loading equipment.

Westcoast submitted that it was considering two additional liquids processing options for dewpoint control and liquids fractionation described below:

- (i) utilization of the existing NGL plant facilities located adjacent to the McMahon Plant; and
- (ii) utilization of fractionation facilities forming part of the Petro-Canada refinery also located adjacent to the McMahon Plant.

At the hearing, Westcoast testified that the PetroCanada refinery does not have any additional fractionation capacity, other than for the liquids extracted by the lean oil absorption system. Westcoast was still, however, exploring the NGL plant option and, a final design of the dewpoint control unit and liquid fractionation facilities would be completed by the end of September 1990.

Water Effluent Treatment

Westcoast submitted that the existing water effluent treating facility would possibly need to be expanded and further study was required before a decision could be made. Westcoast stated that for the purpose of the application, the estimated direct cost of the new treatment facilities (\$1.95 million) was included in the proposed total project cost.

Westcoast also testified that, at the present time, it did not know whether the province of British Columbia would impose more stringent requirements regarding the water effluent quality, as discussed in section 5.4.3 of these Reasons. If more stringent requirements were imposed, Westcoast would need to build a new waste treatment plant which would increase the estimated cost of the water effluent treating facilities by \$1 million to approximately \$3 million.

Views of Interested Parties

Encor submitted that it supported the proposed expansion of Westcoast facilities. No other party raised any specific engineering concerns with respect to the proposed facilities. As discussed in section 7.2 of these Reasons, some concerns were, however, expressed by CanWest with respect to the tolling of and the ability to choose the services performed by the stabilizer unit.

Views of the Board

The Board is satisfied with the preliminary design proposed by Westcoast and will include conditions in the order requiring Westcoast to file detailed descriptions of the final design.

4.1.2 Compressor Stations, Pipelines and Related Facilities

Westcoast submitted that the compressor stations, pipelines and related facilities would be required to provide additional raw gas transmission capacity through the Fort St. John raw gas transmission system which is feeding the McMahon Plant. Westcoast proposed to increase the pressure throughout the whole raw gas transmission system in order to transport the additional gas volumes which are sourced at many locations on the Fort St. John raw gas transmission system.

Westcoast proposed to construct a new booster station, known as the Beg-Jedney Booster Station, consisting of one 671 kilowatt ("kW") unit and including liquid handling facilities.

Westcoast proposed to construct approximately 8.7 km of 168.3 mm O.D. pipeline, to be known as the West Stoddart pipeline. The pipeline would run parallel to the existing 660.4 mm B.C. trunk pipeline and connect to the inlet of the existing Stoddart Booster Station. The West Stoddart pipeline would be required to meet contract delivery pressure specifications for existing production. Additional liquids handling facilities would also be required at the Stoddart Booster Station to handle additional liquids expected with the installation of the West Stoddart pipeline.

Westcoast also proposed to construct approximately 25.3 km of 273.1 mm O.D. pipeline to connect the existing Silver pipeline to the Umbach pipeline. The proposed pipeline would be required to alleviate the high pressure on the Silver-Dahl lines located at the far end of the raw gas transmission system by off-loading Silver gas to the Nig Creek pipeline. The Nig Creek pipeline could handle the additional load because it formerly carried Laprise gas which is now diverted to the Aitken Creek Plant.

Other facilities such as the expansion of the existing meter station 43 (Taylor), the Bubbles condensate loop, some inlet piping modifications at the Booster Station 7 (Bubbles) and Booster Station 1 (Taylor) would also be required to accommodate the additional gas volumes associated with the McMahon Plant expansion.

Views of Interested Parties

No party expressed any specific concerns with respect to the Compressor Stations, Pipelines and Related Facilities.

Views of the Board

The Board is satisfied with the preliminary design proposed by Westcoast and will include a condition in the order requiring Westcoast to file prior to construction detailed drawings for these facilities.

4.2 Cost Estimates

Westcoast submitted that the overall expected accuracy of the cost estimates is ± 20 percent for the Compressor Stations, Pipelines and Related Facilities and ± 30 percent for the McMahon Plant facilities. The accuracy of the cost estimates thus indicates that the cost of the project could vary by \pm \$30 million.

Westcoast testified that it is more likely that the estimated costs, particularly those associated with the McMahon Plant facilities would rise instead of decline but that it does not expect that the cost would increase beyond the estimated level of accuracy of the cost estimates.

Westcoast explained that the high level of inaccuracy in the cost estimates is related to the preliminary development stage of the project. Westcoast testified that more accurate cost estimates based on a definitive design of the McMahon Plant expansion would be available in December 1990.

Westcoast submitted that, in order to meet the desired in-service date of 1 November 1991, it would have to meet an extremely tight construction schedule, which includes the start of civil and structural work at the McMahon Plant in mid-September 1990. Westcoast testified that, depending on the market conditions, fast-tracking of the project could result in higher costs, mainly caused by overtime, than if a more paced approach were to be followed.

Views of Interested Parties

The CPA was concerned with respect to the lack of accuracy of the cost estimates and argued that the fast-track construction basis was the cause of uncertainties in the cost estimates and would normally cause extra costs to be incurred. The CPA was of the view that the approval of the application should be postponed until the designs and cost estimates were more complete.

BC Gas was also concerned by the lack of accuracy of the cost estimates of the project as well as the possibility of cost overruns.

Views of the Board

The Board was concerned by the lack of accuracy of the cost estimates, which is attributable in part to the uncertainties in the design, and is aware that significant cost overruns may be incurred. The Board also shares the CPA concerns in relation with the impact of the costs of the fast-tracking approach. The Board therefore cautions Westcoast that future applications should only be presented when the design and costs estimates are more developed.

However, the Board does not consider that it is appropriate, in this case, to delay its decision until finalized designs and more accurate cost estimates are available. Waiting until the designs are finalized would not add significantly to the record on the need for these facilities, but a delay would further compress the construction schedule and there exacerbate the cost control problems. As is explained in section 4.3. of these Reasons, the Board's approval of the application is subject to certain conditions that will ensure that final designs are submitted for approval before the relevant phases of construction are commenced. In addition, the cost of the project, including any overruns, will be subject to review pursuant to the Board's responsibilities under Part IV of the Act before being authorized for inclusion in the rate base.

Westcoast recognized that the Board may disallow from inclusion in rate base any costs found to be imprudently incurred. In this regard, the Board intends to be vigilant in the subsequent Part IV proceeding to verify that Westcoast has used all possible measures to prudence of the costs that Westcoast will seek to have included in rate base.

4.3. Technical Conditions of the Section 58 Order

Westcoast was requested to comment on the appropriateness of certain technical conditions which might be included in any order or certificate that the Board may issue. These conditions relate to the following:

- (i) the submission of a detailed description of the proposed effluent treating facility and of the dew point control unit and liquids fractional facilities for Board approval;
- (ii) the submission of the drawings of the product storage facilities and certain elements of the Compressor Stations, Pipelines and Related Facilities for Board approval;
- (iii) the submission of a detailed construction schedule;
- (iv) the submission of construction alignment drawings, construction drawings and specifications;
- (v) the submission of updates to the construction schedule during construction, if required;
- (vi) the submission of monthly construction cost reports;
- (vii) the submission of monthly construction progress reports; and
- (viii) the submission, within six months of putting the facilities into service, of a cost report providing a breakdown of the costs incurred during construction, including reasons for significant differences from pre-construction estimates.

Westcoast expressed some concerns with respect to the submission of drawings related to the McMahon Plant expansion prior to the start of the construction. Westcoast testified that if it received approval of the project, the civil and structural type construction would start in mid-September at which time the drawings of the plant facilities would not be completed. No party expressed any specific concerns with these conditions.

Views of the Board

To enable the Board to adequately monitor and inspect the construction of the facilities and to monitor project costs, the Board is of the view that construction schedules, updates, and construction cost reports should be submitted to the Board. Accordingly, the section 58 order that the Board has issued includes such conditions.

The Board also recognizes Westcoast's difficulties in providing drawings of certain facilities related to the plant expansion prior to any civil and structural work being undertaken. The Board is satisfied that the facilities are required and, therefore, this preliminary work will be required regardless of the final design. Accordingly, the condition that the Board has included in the section 58 order will permit Westcoast to perform the preliminary civil and structural work on these facilities but, before proceeding with further construction on those facilities or parts thereof for which final designs have not yet been filed, Westcoast will have to submit for approval the final designs.

4.4 Leave to Open Requirements

In its application, Westcoast did not seek exemption from leave to open for any of the proposed facilities. It only sought exemption from the need to have a certificate in respect of the Compressor Stations, Pipelines and Related Facilities.

Views of the Board

Although the Board considers that Westcoast should comply with the leave to open requirements of paragraph 30(1)(b) and section 47 of the Act for most of the facilities applied-for, it does not consider that the lines at the McMahon Plant having a maximum operating pressure of less than 700 kPa need be subject to the requirements of the leave-to-open provisions.

The Board will therefore exempt for practical reasons, the low pressure piping at the McMahon Plant from the requirements of leave to open. The Board considers that this exemption will not affect the public safety since the low pressure piping will still have to be pressure tested and Westcoast will still be required to comply with all the applicable requirements of the *Onshore Pipeline Regulations*.

Chapter 5

Land Use and Environmental Matters

5.1 Land Use

5.1.1 Route/Site Selection

Facilities Within Fee Simple Property Owned by Westcoast

Westcoast submitted that the proposed McMahon Plant Facilities would be located within property presently owned by Westcoast.

The proposed construction of two meter runs at Meter Station 43 (Taylor), the additional condensate handling capacity at Booster Station 10 (Stoddart), and the 400 metres of 406.4 mm O.D. pipe to connect Westcoast's Milligan - Peejay pipeline to the inlet of Booster Station 1 (Taylor) would also be located within property presently owned by Westcoast.

Views of the Board

In respect of the above-mentioned facilities, the Board is satisfied with Westcoast's proposed use of its existing fee simple lands and considers those proposals to be acceptable.

Facilities Within Existing Easements

The condensate loops proposed for the new Beg-Jedney Booster Station, the condensate loops and modifications to Booster Station 7 (Bubbles) and the proposed West Stoddart pipeline would be located within existing Westcoast easements. Westcoast has submitted that the acquisition of new easements over Crown and/or private land for those facilities would not be required.

Views of the Board

In respect of the above-mentioned facilities, the Board is satisfied with Westcoast's proposed use of existing easements and considers that the general routes proposed by Westcoast for those pipeline facilities are acceptable.

Facilities Within New Fee Simple Lands/Easements

The construction of the Beg-Jedney Booster Station on a four hectare ("ha") site and the 25.3 km Umbach Extension pipeline would require the acquisition of new land and land rights, respectively. Those proposed facilities would be located on unsurveyed Crown land.

Westcoast submitted that environmental disturbance at the Beg-Jedney Booster Station would be minimal. Relatively little clearing would be required, and no access roads would be constructed. Noise would be generated by the operation of the compressor but there are no settlements in the area,

and little or no effects on wildlife are anticipated. Air emissions and effluent would comply with the permit requirements of the British Columbia Ministry of Environment.

No apparent environmental sensitivity exists at that site. No parties objected to the proposed site during the hearing.

Westcoast submitted that the route of the Umbach Extension pipeline follows existing seismic lines to the greatest extent possible.

Westcoast found that the route of the proposed Umbach Extension pipeline would have minor environmental effects since:

- (a) it is a small diameter pipeline which traverses relatively easy terrain for construction;
- (b) the area is sparsely vegetated with a mixture of deciduous and coniferous stands and extensive bog and muskeg;
- (c) the stream crossings will be designed and timed to minimize impact on fisheries;
- (d) no permanent access will be required; and
- (e) extensive clean-up and revegetation will ensure restoration of ground cover.

The principal environmental concerns with the Umbach Extension pipeline would be the crossings of the Beaton River and Nig Creek. Those stream crossings, however, are typical of the region, and Westcoast submitted that considerable experience has been gained by the Company from the construction of similar stream crossings on other projects on procedures for minimizing fish and wildlife impacts.

No parties objected to the proposed route of the Umbach Extension pipeline during the hearing.

Views of the Board

The Board is satisfied that Westcoast has chosen an appropriate site for the Beg-Jedney Booster Station and an acceptable route for the Umbach Extension pipeline.

5.1.2 Land Requirements

Fee Simple Land

For the proposed Beg-Jedney Booster Station, the application to purchase the four ha site would be made to the British Columbia Ministry of Crown Lands together with an application for a Temporary Permit. The Temporary Permit would enable Westcoast to occupy and construct the Booster Station prior to the legal survey and sale of the land. A Temporary Permit is necessary since a legal survey could not be completed until such time as the facility has been constructed.

Easements

An application for a Statutory Right-of-Way for the proposed Umbach Extension pipeline would also be made to the Ministry of Crown Lands. Since the Statutory Right-of-Way would not be issued until construction of the pipeline had been completed, and the appropriate legal surveys done, Westcoast must apply for a Temporary Permit. That Permit allows the recipient to construct, operate and maintain the pipeline over Crown Lands prior to issuance of a Statutory Right-of-Way.

Westcoast did not anticipate that any difficulty would be encountered in obtaining the necessary permits for either the Beg-Jedney Booster Station or the Umbach Extension pipeline.

Views of the Board

The Board finds that Westcoast's anticipated requirements for fee simple land and easements are reasonable and justified.

5.2 Government Liaison

Westcoast indicated that, as in the past, it will cooperate with the Provincial Ministries of Environment, Forests, Crown Lands and Culture in complying with government requirements. In particular, Westcoast will have further correspondence with those ministries to discuss the construction of the proposed pipelines, condensate loops and compressor stations.

Westcoast also indicated that it had agreed to comply with all of the requirements of EMPR in respect of air and liquid effluent emissions as well as provincial permits.

Views of the Board

The Board encourages Westcoast to continue its policy of liaison with provincial ministries and to implement similar communications with other affected parties. The Board also accepts Westcoast's undertaking that it would obtain all the required provincial permits and approvals related to the proposed application.

Accordingly, the section 58 order requires Westcoast to submit evidence, that it has complied with all appropriate provincial requirements and that it has received the required permits and approvals prior to commencement of any construction, other than the preliminary civil or structural work in the case of the McMahon Plant Expansion facilities.

5.3 Exemptions from Paragraph 30(l)(a) and Section 31 of the Act

In its application, Westcoast requested, *inter alia*, that the applied-for additional compressor facilities, pipelines and related facilities be exempted, pursuant to section 58 of the Act, from the provisions of paragraph 30(l)(a) and section 31.

Such exemptions would relieve Westcoast from the necessity of having a certificate and of filing plans, profiles, and books of reference ("PPBRs") and, as a consequence from the procedures involved in obtaining Board approval thereof.

Views of the Board

In deciding whether or not to exempt facilities from the provisions of paragraph 30(1)(a) and section 31 of the Act, the Board has been mindful of the rights of the adjacent landowners. The Board is of the opinion that due to the nature of the facilities locations i.e. within property owned by Westcoast or on existing rights-of-way thereto, those landowners would not be adversely affected by the proposed construction.

In order to protect the interests of the province of British Columbia, the owner of the crown lands proposed to be acquired by Westcoast, the Board is prepared to exempt the facilities from the provisions of paragraph 30(1)(a), subsection 30(2) and section 31 of the Act and has included in the section 58 order a condition requiring that all necessary permits, options or easement agreements be executed by the relevant provincial agency prior to the commencement of construction.

5.4 Environmental Matters

5.4.1 Environmental Assessments

Westcoast submitted environmental assessments for the McMahon Plant Facilities and for the Compressor Stations, Pipelines and Related Facilities, and adopted procedures and measures to prevent or mitigate adverse environmental impacts resulting from the projects. Westcoast also undertook to follow the guidelines for environmental protection during right-of-way clearing, construction and reclamation as described in its Procedures Manual for Environmental Engineering, March 1987.

The environmental descriptions, assessments and recommendations contained in Westcoast's Environmental and Socio-Economic Assessments provided information regarding climate, air quality, noise, terrain, groundwater, vegetation, wildlife, soils, aquatic resources, watercrossings, environmental sensitive areas and heritage resources where applicable. A wide range of environmental concerns were identified in respect of the proposed construction.

Procedures for the mitigation of the environmental concerns identified with respect to the various projects were provided by Westcoast.

The consideration of the environmental effects of this application comprised an environmental screening pursuant to the *Environmental Assessment and Review Process Guidelines Order* ("EARP Order"). That screening was done in conjunction with the Board's consideration of the environmental effects pursuant to its mandate under Part III of the Act as it was thought that the Board's public hearing process provided a good opportunity to examine all concerns that may be raised by interested parties or by the Board. During the hearing, no opposition or public concern was advanced.

Views of the Board

After considering the evidence and argument, the Board has determined with respect to Westcoast's application to expand the McMahon Plant that the potentially adverse environmental effects and the social effects directly related thereto are insignificant or mitigable with known technology and therefore, pursuant to paragraph 12(c) of the EARP Order the proposal may proceed provided the proposed mitigative measures are implemented. Accordingly, the Board has made its approval of this application subject to certain conditions, discussed elsewhere in Chapter 5, to ensure that those measures are implemented.

The Board reminds Westcoast of its requirements pursuant to section 58 of the Onshore Pipeline Regulations that it must file with the Board post-construction environmental reports indicating the environmental issues resolved and those unresolved and the measures Westcoast proposes to take in respect of the unresolved issues.

5.4.2 Air Emissions

In its evidence, Westcoast submitted that estimates of air emissions had been made for the proposed expanded facility. Westcoast stated that with the modernization of the gas treatment plant, the proposed sulphur recovery facilities were expected to operate with an efficiency of 98.7 percent with an allowance of 0.3 percent for start-ups, shutdowns and process upsets. As a result of the increased sulphur recovery, emissions from the sulphur plant were expected to decrease 51 percent compared to 1989 in spite of increases in the gas processed and the raw gas H₂S amount. Emissions from the acid gas flare, gas plant flare, and flare pit as well as from the compressor engines at Station 1 would increase because of the increase in raw gas throughput. As a result, Westcoast has determined that the overall decrease in emissions from the gas plant, sulphur plant and Compressor Station 1 would be 44 percent.

Westcoast submitted that the sulphur recovery guidelines for sour gas plants in Alberta (Energy Resources Conservation Board, 1988) had been used as a guide to establish the sulphur plant recovery efficiency for the expanded McMahon Plant. Westcoast stated that it had discussions with EMPR regarding the possibility of the province adopting the Alberta guidelines for sour gas processing plants within British Columbia. Based on the results of those discussions, Westcoast was of the opinion that the province was prepared to adopt those guidelines.

Views of the Board

The Board has studied Westcoast's evidence regarding air emissions from the McMahon Processing Plant, and is of the view that the stated objective reduction in air emissions from the plant is a positive benefit of this expansion project.

The Board has included in the section 58 order a condition requiring Westcoast to file, prior to commencement of any construction for the sulphur recovery facilities, other than the preliminary civil and structural work, evidence that these facilities have been designed to meet the level of sulphur recovery required by provincial guidelines.

5.4.3 Waste Water Treatment

In its McMahon Plant environmental assessment, Westcoast stated that at the present time, all process waste waters from the Westcoast gas processing and Petro-Canada petroleum refining complexes are treated together in a biological treatment system. Westcoast reported that for various technical reasons, difficulties have been experienced since 1988 with the performance of that biological treatment system. As a result, the plant effluent has for various parameters, exceeded the Level B permitted quality levels. Westcoast and Petro-Canada have therefore taken steps to improve the operation of the existing biological treatment system. Two of the modifications presently underway are:

- (i) the installation of filters on the incoming gas streams to eliminate suspended solids that have created foaming problems in the past; and
- (ii) the adjustment of the in-plant corrosion control program to reduce the frequency of vessel cleanings, thereby minimizing waste water volumes.

With the proposed expansion of the McMahon Plant, waste water to the biological treatment system was anticipated to increase by 16.7 percent. That increase in effluent would place a far greater load on that water treatment plant. In order to define the present problems, and determine future waste water treatment requirements, Westcoast reported that it had undertaken two studies. The studies are:

- (i) to identify effluent flow sources and analyze the composition of the various effluents within the existing gas plant's refinery complex; and
- (ii) to conduct performance tests on the existing plant to determine the water effluent treatment capacity.

Based on those studies, Westcoast will determine what additional modifications must be made to ensure that effluent permit requirements are met.

Westcoast has stated that the company was committed to complying with the environmental regulations of the province of British Columbia as well as those regulations of other jurisdictions. Westcoast, at the present time, did not know whether the province would require it to achieve Level A with the effluent treatment plant or whether the province would ask it to continue to achieve Level B. That decision by the province would, according to Westcoast, govern any design changes Westcoast would make to the present plant. It might, Westcoast submitted, cause the company to want to build a new waste treatment plant for the gas processing facility and leave the refinery to operate the existing plant.

Views of the Board

The Board accepts Westcoast's undertakings to treat and dispose of all waste water according to provincial requirements. As mentioned in section 4.3 of these Reasons, the Board requires that, prior to commencement of any types of construction other than the preliminary phases of the civil or structural work, Westcoast file for Board approval, the final design of any new/modified waste water treatment plant.

In addition, the section 58 order contains a condition requiring Westcoast to file with the Board copies of the studies that Westcoast has implemented regarding the waste water treatment plant, prior to the commencement of any types of construction other than the preliminary phases of the civil or structural work.

5.4.4 Heritage Resources

Information provided indicated that there are no known archaeological/heritage sites on the easements required for the Beg-Jedney Booster Station, West Stoddart pipeline, and the Umbach Extension pipeline. Because of the lack of evidence on the existence of archaeological/heritage sites, Westcoast submitted that for the aforementioned projects, it would undertake archaeological heritage surveys prior to construction.

Views of the Board

The Board accepts Westcoast's undertaking to undertake archaeological heritage surveys for those projects. Accordingly, the section 58 order requires Westcoast to file, for Board approval, copies of those archaeological heritage surveys prior to commencement of construction of the Beg-Jedney Booster Station, the West Stoddart pipeline and the Umbach Extension pipeline.

Chapter 6

Economic Feasibility of Expansion

In support of its argument that the proposed facility expansion would be economically feasible, Westcoast submitted an assessment of the following:

- the impact of the proposed expansion on tolls without any cost overruns;
- the impact of the proposed expansion on tolls with cost increases of 20 percent for Compressor Stations, Pipelines and Related Facilities (Zone 1) and 30 percent for the McMahon Plant facilities (Zone 2);
- the long-term markets;
- the adequacy of gas supplies;
- the incremental revenues versus the incremental costs; and
- the environmental benefits.

Westcoast's projection of the estimated toll impact that would result from the proposed expansion shows that, over the 10-year contract period, Zone 1 tolls would decrease by an average of 2.7 percent in each year while Zone 2 tolls would increase by an average 2.7 percent relative to the tolls associated with the existing facilities.

A similar projection was provided with capital cost increases of 20 percent in Zone 1 and 30 percent in Zone 2. Under this scenario, the Zone 1 tolls would decrease by an average of 2.1 percent in each year while the Zone 2 tolls would increase by an average of 5.1 percent relative to the existing facilities.

With regard to long-term markets, Westcoast maintained that there are sufficient markets for gas to be produced and delivered through its system to justify its expansion. As discussed in Chapter 3 of these Reasons, Westcoast argued that an overall assessment of the markets available was appropriate given the uncertainty created by the short-term contracts behind the McMahon Plant. In addition, Westcoast submitted that it has signed contracts from shippers for a minimum term of 10 years which indicates their willingness and commitment to pay its tolls. The evidence indicated that the requests in the queue for contract service at the McMahon Plant exceeded the additional capacity applied-for. However, Westcoast concluded that the size of the expansion should be limited by its analysis of the deliverability of the gas supplies available to the Plant. As summarized in Chapter 2 of these Reasons, Westcoast's forecast of productive capacity from the area indicated sufficient supply to meet the applied-for plant capacity.

Westcoast has estimated the average incremental raw gas transmission and processing costs for the first three full years of the proposed facilities. The average incremental raw gas transmission and processing costs would be \$0.24/gigajoule ("GJ") (1990\$) at 100 percent load factor with no cost

overruns and \$0.29/GJ (1990\$) with cost overruns. Westcoast concluded that under any reasonable assumption with respect to the selling price of gas, the incremental revenues would exceed the estimated incremental cost. Furthermore, as discussed in Chapter 5 of these Reasons, Westcoast further claimed that there would also be environmental benefits resulting from the improvement of the existing sulphur recovery facility.

Westcoast argued that these factors, considered collectively, support the economic feasibility of the project.

Views of Interested Parties

The CPA argued that Westcoast had failed to provide an analysis of economic feasibility of the proposed facilities and that it is Westcoast's responsibility to provide evidence to demonstrate the economic feasibility of the project. The CPA stated that the information provided by Westcoast regarding the market did not demonstrate that the shippers underpinning this application have long-term and secure markets for the gas which they propose to flow through the expanded facilities. The CPA submitted that there is nothing which ensures that the gas going to the markets identified in the application will in fact come from Westcoast's facilities.

Views of the Board

In assessing the economic feasibility of the proposed facilities expansion, the Board considered the following:

- the availability of long-term gas supplies;
- the actual and potential gas markets;
- the potential economic impacts caused by the expansion; and
- the economic gains associated with the proposed expansion.

With regard to the evidence of long-term supply and markets, as discussed previously in Chapters 2 and 3 of these Reasons, the Board is satisfied that adequate supply exists and that the long-term demand in both domestic and export markets support Westcoast's assessment that the proposed facilities will be required over the forecast period. Further, the Board notes that, based on Westcoast's estimates of the toll impact of the project, with and without cost overruns, the proposed expansion would not result in an undue negative impact on the level of the toll.

With respect to Westcoast's suggestion to compare the selling prices of gas and average incremental gathering and processing costs in order to assess economic feasibility, the Board notes that this approach was only raised during final argument and was not sufficiently discussed during the evidentiary phase of the hearing. Therefore, the Board is not prepared to determine the validity of this approach.

In assessing the economic feasibility of a project that is tolled on a rolled-in basis, some argue that the full incremental cost of the expansion may not be reflected in the resulting tolls and, therefore private decisions based on these tolls may not be consistent with an economic use of resources. In the case of the McMahon Plant expansion, however, this is not a concern. After comparing the rolled-in and incremental tolls that would result from aggregating the gathering and processing cost of service associated with the expansion, the Board found that the levelized incremental toll¹ would be approximately equal to the levelized rolled-in toll.

With regard to the evidence of environmental benefits associated with this project, as discussed in Chapter 5 of these Reasons, the Board notes that positive benefits will result from the expansion.

Based on the above, the Board is of the view that in the circumstances of this case, the economic feasibility of the proposed facilities has been demonstrated.

¹ The levelized incremental toll is defined as the present value of the projected increase in cost of service for Zones 1 and 2 divided by the present value of the projected incremental volumes on a residue gas basis. Both the rolled-in and incremental tolls are levelized over a period of 10 years.

Chapter 7

Part IV Matters

7.1 Toll Methodology for Proposed Facilities

In its application, Westcoast requested the Board to confirm that the rolled-in toll methodology would continue to apply to the expanded McMahon Plant facilities in Zone 2, as well as to the associated field compression and raw gas transmission facilities it proposed in Zone 1. According to Westcoast, the tolls for raw gas transmission would decrease, while those for processing would increase if the costs of the new facilities were rolled into the cost of service of the existing facilities in each toll zone. (See Chapter 6 and Appendices III and IV).

Westcoast indicated that it was seeking confirmation of the tolling methodology at this time because the contracts with the shippers are conditional upon the new facilities being tolled on a rolled-in basis. Further, Westcoast indicated that construction would not proceed without a decision on the toll methodology.

Views of Interested Parties

Before the commencement of the hearing, CPA requested that the Board add toll methodology as an issue, but was of the view that consideration of the issue be delayed until after the Board renders its decision in the GH-5-89 TransCanada hearing. While the Board was persuaded that the issue was of sufficient importance to be added to the hearing, it was not persuaded that consideration of the issue should be delayed pending the GH-5-89 decision. The Board stated that while the GH-5-89 decision may have persuasive value in a conceptual sense, the GH-5-89 proceeding is concerned with TransCanada's system not Westcoast's. In final argument, CPA reiterated its position that the Board should defer issuing its decision on this issue until after the Board has provided some guidance as to the appropriate tolling policies in its GH-5-89 decision following which the matter could be dealt with in another venue. In further support of deferral, CPA also referred to the fact that generic expansion policy for processing plants had recently been added as an issue to be dealt with in the upcoming RH-1-90 Westcoast toll proceeding.

Apart from CPA's request to defer the toll methodology decision, no party opposed Westcoast's proposed toll treatment. IPAC and Norcen filed written statements in support of the rolled-in toll treatment.

Views of the Board

The Board was not persuaded by the arguments of CPA that the Board should defer its decision on the appropriate tolling methodology for this expansion pending the GH-5-89 decision or until the facilities expansion policy for gas processing plants is examined in a future Westcoast toll hearing. The Board's views on the merits of waiting for a GH-5-89 decision remain as stated in its 3 August 1990 letter. Similarly, deferring the tolling of this particular expansion of the McMahon Plant until a generic

policy is developed is not warranted. Even if interested parties and the Board were to agree that a generic policy is needed, it may take considerable time to develop an appropriate policy. The Board notes that at a recent toll and tariff task force meeting, the members decided to recommend to the Board that rather than consider the issue in the RH-1-90 proceeding that it be deferred to the task force for further study.

Furthermore, given the Board's mandate under Part III and Part IV of the Act, any general policy would be reviewed in the particular circumstances of an application. The Board is of the view, therefore, that the best opportunity to consider and decide on the tolling of the McMahon Plant expansion is during this proceeding while all other relevant matters under Part III of the Act are also being considered and the full record is before the Board

The Board notes that there was virtually no opposition to the rolled-in toll treatment of the costs associated with the proposed expansion. Furthermore, the Board is satisfied that after this expansion under the rolled-in toll methodology, all shippers will pay a fair price for the services provided in Zones 1 and 2. The Board also notes that the impact on the existing tolls would be minimal. Therefore, in the circumstances of this case, the Board finds the proposed rolled-in toll treatment to be just and reasonable.

Decision

The Board directs that the capital and operating costs of both the applied-for raw gas transmission facilities and the processing plant facilities be rolled-in to the costs associated with the existing facilities in determining the tolls for Zones I and 2, respectively.

7.2. Stabilization Toll

In its application, Westcoast proposed to build an entirely new liquids stabilization unit that would completely replace the stabilization function that is currently performed at the Petro-Canada refinery.

CanWest raised the question of an appropriate toll for the stabilization of liquids and the ability to choose that service on the Westcoast system. Subsequently Westcoast and CanWest agreed that this issue should first be dealt with by the Westcoast Toll and Tariff Task Force before being ultimately considered in a subsequent toll proceeding.

Views of the Board

The Board concurs with Westcoast and CanWest that this issue should first be dealt with by the Westcoast Toll and Tariff Task Force.

7.3. Westcoast's Queuing Procedures

CPA took the position that Westcoast's current queuing procedures yield certain inequitable results. Under these procedures, Westcoast removed from the queue requests for service by those parties that did not commit to a 10-year term in support of this expansion. CPA believed that the procedure

allowed shippers who had requested and signed contracts for 10 years of service to jump ahead of all other shippers in the queue.

On 24 August 1990, CPA requested that the existing Queuing Procedures and Access Criteria be examined in the upcoming toll proceeding. On 31 August 1990, the Board decided to include this issue in the Westcoast RH- 1-90 toll hearing.

Chapter 8 Disposition

As is explained in detail in section 1.2 of these Reasons, Westcoast applied for a section 52 certificate for part of the facilities in the application and a section 58 order for the balance. After having heard the evidence and argument on this application, the Board has decided that the proposed facilities are required by the present and future public convenience and necessity. However, rather than issuing the requested certificate and order, it will issue a section 58 order with respect to all of the facilities.

There are a number of factors which led the Board to the conclusion that a section 58 order alone would be more appropriate in this instance. First, the application facilities fall within the criteria provided in section 58. Second, even though the procedure for considering a section 58 application can be less onerous than a section 52 application, that was not the case in this instance. The consideration of this application was by way of a full public hearing and in accordance with the section 52 criteria as that was the way the application was framed. Third, using section 58 to exempt these facilities from certain of the other remaining Part III requirements does not diminish the regulatory tiny to which the construction and the operation of the facilities are subject. Finally, issuing a section 58 order provides a more timely decision which is necessary for Westcoast to meet its construction schedule.

The foregoing chapters together with Board Order XG-11-90 constitute the Board's reasons for decision on this application.

R.B. Horner, Q.C.
Presiding Member

W.G. Stewart
Member

D.B. Smith
Member

Appendix I

Amended List of Issues

(Exhibit A-5 to the GH-5-90 Proceedings)

PART III MATTERS

- III-1 The appropriateness of the level of the proposed expansion of the McMahon Plant, including the availability of gas to be processed at the McMahon Plant.
- III-2 The adequacy of Westcoast downstream facilities to accommodate the additional gas throughput.
- III-3 The reasonableness of the forecast of requirements for domestic and export sales and transportation service.
- III-4 The reasonableness of construction and material cost estimates having regard to the level of accuracy of the cost estimates and the expected level of construction activity in the pipeline sector in North America in 1990/91.
- III-5 The potential environmental effects, including any directly-related social concerns, of the proposed facilities during and after construction.
- III-6 The appropriate terms and conditions to be included in any certificate or order which may be issued.

PART IV MATTERS

- IV-1 The appropriate toll methodology to be applied to the capital and operating cost of the proposed facilities.

Appendix II

Order XG-11-90

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

IN THE MATTER OF an application, pursuant to Part III of the Act, by Westcoast Energy Inc. ("Westcoast") dated 6 June 1990; filed with the Board under File No. 3200-W5-2.

B E F O R E the Board on 13 September 1990.

WHEREAS the Board has received an application by Westcoast dated 6 June 1990, respecting certain facilities to be added to its pipeline system;

AND WHEREAS a public hearing was held pursuant to Hearing Order GH-5-90, in the City of Fort St. John, in the province of British Columbia, at which the Board heard Westcoast and all interested parties;

AND WHEREAS pursuant to the Environmental Assessment and Review Process Guidelines Order ("EARP Order"), the Board has performed an environmental screening of the application by considering the evidence and argument presented during the GH-5-90 proceeding;

AND WHEREAS the Board has determined pursuant to paragraph 12(c) of the EARP Order that the potentially adverse environmental effects, including the social effects directly related to those environmental effects which may be caused by the proposal, are insignificant or mitigable with known technology;

AND WHEREAS the Board found that the facilities are required by present and future public convenience and necessity and, therefore, considers it to be in the public interest to grant the relief provided in this order;

IT IS ORDERED THAT the proposed facilities of Westcoast, described in the application as the McMahon Plant Expansion Project and summarized in Schedule A attached to and forming part of this Order are exempt from the provisions of paragraph 30(1)(a), subsection 30(2) and section 31 of the Act with the exception of those facilities where the maximum operating pressure is less than 700 kPa, in which case such facilities are exempt from the provisions of sections 30, 31, and 47 of the Act, upon the following conditions:

1. Westcoast may proceed with the preliminary civil and structural work on the facilities listed in the following table, but Westcoast must file for Board approval the item or items described before proceeding with any further construction of the facilities to which the item relates.

Facilities

Items to be Filed for Board Approval

- | | | |
|----|---|---|
| a) | all facilities identified in Schedule A as the McMahon Plant Expansion Facilities | evidence that Westcoast has complied with all appropriate province of British Columbia requirements; and |
| b) | hydrocarbon and water dew point control unit | a detailed description of the final design |
| c) | liquids fractionation unit | a detailed description of the final design |
| d) | liquids fractionation storage facilities | a detailed description of the final design |
| e) | waste water treatment facilities | i) copies of the final reports on the studies undertaken by Westcoast to determine future waste water treatment requirements; and

ii) a detailed description of the final design |
| f) | sulphur recovery facilities | a detailed description of the final design, including evidence that the design will meet the level of sulphur recovery required by the province of British Columbia |

2. For the following facilities:

- (a) Beg-Jedney Booster Station and Beg-Jedney Condensate Loop;
- (b) Meter Station 43 (Taylor) Expansion;
- (c) Booster Station 7 (Bubbles) inlet piping modification;
- (d) Bubble Condensate Loop;
- (e) Inlet separation facilities at Booster Station 10 (Stoddart); and
- (f) Booster Station 1 (Taylor) inlet piping.

Westcoast shall file, for Board approval, detailed design drawings of the above facilities before construction of the facilities to which the drawing relates.

3. For the Beg-Jedney Booster Station and the Umbach Extension Pipeline, Westcoast shall file, for Board approval, evidence that Westcoast has complied with all appropriate province of British Columbia requirements and that all necessary permits, options or easement agreements

have been executed by the relevant provincial agency before construction of the facilities to which these items relate.

4. For the Beg-Jedney Booster-Station, the West Stoddart pipeline and the Umbach Extension Pipeline, Westcoast shall file, for Board approval, copies of the relevant archaeological heritage surveys, before construction of the facilities to which the survey relates.
5.
 - (a) At least 10 days prior to the commencement of any construction, other than preliminary civil and structural work in the case of the facilities identified in Schedule A as the McMahon Plant Expansion Facilities, Westcoast shall file with the Board a detailed construction schedule or schedules identifying major construction activities.
 - (b) During construction, Westcoast shall file:
 - i) monthly construction cost reports providing a breakdown, by location and facility, of cost incurred during that month, the percentage completion of each activity and an update of projected costs to complete the project;
 - ii) monthly construction progress reports; and
 - iii) updated construction schedules, if any significant changes to the schedules provided pursuant to subsection (a) occur.
 - (c) Westcoast shall, within six months of putting any of the facilities into service, file with the Board a report providing a breakdown of the costs incurred in the construction of the facilities including reasons for significant differences from the pre-construction estimates.
6. Westcoast shall cause the construction and installation of the project described in this Order to be commenced on or before 31 December 1991.

NATIONAL ENERGY BOARD

Marie Tobin
Secretary

Schedule A

Description and Cost of Applied-For Facilities

Project Summary		Westcoast's Estimated Capital Cost (1990 base) (\$000)
McMahon Plant Expansion Facilities:		85,900
Modification to operating configuration of existing inlet separators;	N/A ¹	
New amine train including a new amine contractor and amine still with associated heat exchangers, piping and controls;	N/A	
New hydrocarbon and water dew point control unit;	N/A	
New condensate stabilizer;	N/A	
New hydrocarbon liquids fractionation unit and associated storage and loading facilities;	N/A	
Modification of the existing sulphur recovery trains;	N/A	
New sulphur recovery unit;	N/A	
New tail gas clean-up unit; and	N/A	
New or modifications to the waste water treatment facilities	N/A	
Modifications and additions to the existing steam, water, air, electrical and fuel gas utility system.	N/A	
 Compressor Stations, Pipelines and Related Facilities:		 21,970
Beg-Jedney Booster Station	9,300	
West Stoddart Pipeline	1,900	
Umbach Extension	7,100	
Meter Station no. 43 (Taylor) Expansion	350	
Condensate Loops and Booster Stations Modifications	3,320	
 Total Estimated Project Cost		<hr/> 107,870

¹ Individual estimated costs were not available at the time the hearing took place.

Appendix III

Exhibit B-1 to the GH-5-90 Proceeding

Table a3-1
McMahon Plant Expansion Project
Estimated Toll Impact Assuming NEB Specified Cost Increases

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<u>Zone 1: Raw Gas Transmission</u>												
Fixed Cost of Service (\$000)												
Existing	\$64,069	\$70,584	\$72,257	\$73,767	\$75,140	\$76,429	\$77,833	\$78,644	\$79,867	\$81,095	\$82,342	\$83,618
Existing and Proposed		\$68,607	\$73,930	\$76,372	\$78,436	\$80,238	\$82,021	\$83,111	\$84,537	\$85,914	\$87,269	\$88,622
Allocation Units (10 ³ m ³ /d)												
Existing	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635
Existing and Proposed		38,079	40,297	40,297	40,297	40,297	40,297	40,297	40,297	40,297	40,297	40,297
Average Demand Toll (\$/10 ³ m ³ /d/mon)												
Existing	\$142	\$156	\$160	\$163	\$166	\$169	\$172	\$174	\$177	\$180	\$182	\$185
Existing and Proposed		\$150	\$153	\$158	\$162	\$166	\$170	\$172	\$175	\$178	\$180	\$183
Increase/-Decrease												
Annual		-3.9%	-4.4%	-3.3%	-2.5%	-2.0%	-1.6%	-1.3%	-1.1%	-1.1%	-1.0%	-1.0%
Average: 1991-1996							-3.0%					
Average: 1991-2001												-2.1%
<u>Zone 2: Processing</u>												
Fixed Cost of Service (\$000)												
Existing	\$92,412	\$97,725	\$99,805	\$101,845	\$103,830	\$105,803	\$108,001	\$109,507	\$111,564	\$113,655	\$115,782	\$117,954
Existing and Proposed		\$90,972	\$107,556	\$112,575	\$116,876	\$120,646	\$124,234	\$126,810	\$129,690	\$132,409	\$135,013	\$137,545
Allocation Units (10 ³ m ³ /d)												
Existing	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485
Existing and Proposed		33,889	35,909	35,909	35,909	35,909	35,909	35,909	35,909	35,909	35,909	35,909
Average Demand Toll (\$/10 ³ m ³ /d/mon)												
Existing	\$230	\$243	\$248	\$253	\$258	\$263	\$269	\$273	\$278	\$283	\$288	\$294
Existing and Proposed		\$224	\$250	\$261	\$271	\$280	\$288	\$294	\$301	\$307	\$313	\$319
Increase/-Decrease												
Annual		-8.0%	0.5%	3.1%	5.0%	6.3%	7.3%	8.0%	8.4%	8.6%	8.7%	8.7%
Average: 1991-1996							2.3%					
Average: 1991-2001												5.1%

Appendix IV

Exhibit B-4 to the GH-5-90 Proceeding

Table a4-1
McMahon Plant Expansion Project
Estimated Toll Impact

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<u>Zone 1: Raw Gas Transmission</u>												
Fixed Cost of Service (\$000)												
Existing	\$64,069	\$70,584	\$72,257	\$73,767	\$75,140	\$76,429	\$77,833	\$78,644	\$79,867	\$81,095	\$82,342	\$83,618
Existing and Proposed		\$68,958	\$73,782	\$76,074	\$78,028	\$79,750	\$81,478	\$82,387	\$83,695	\$84,997	\$86,315	\$87,662
Allocation Units (10 ³ m ³ /d)												
Existing	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635	37,635
Existing and Proposed		38,079	40,297	40,297	40,297	40,297	40,297	40,297	40,297	40,297	40,297	40,297
Average Demand Toll (\$/10 ³ m ³ /d/mon)												
Existing	\$142	\$156	\$160	\$163	\$166	\$169	\$172	\$174	\$177	\$180	\$182	\$185
Existing and Proposed		\$151	\$153	\$157	\$161	\$165	\$168	\$170	\$173	\$176	\$178	\$181
Increase/-Decrease												
Annual		-3.4%	-4.6%	-3.7%	-3.0%	-2.5%	-2.2%	-2.2%	-2.1%	-2.1%	-2.1%	-2.1%
Average: 1991-1996							-3.3%					
Average: 1991-2001												-2.7%
<u>Zone 2: Processing</u>												
Fixed Cost of Service (\$000)												
Existing	\$92,412	\$97,725	\$99,805	\$101,845	\$103,830	\$105,803	\$108,001	\$109,507	\$111,564	\$113,655	\$115,782	\$117,954
Existing and Proposed		\$92,623	\$106,351	\$110,706	\$114,497	\$117,878	\$121,171	\$123,088	\$125,501	\$127,903	\$130,306	\$132,730
Allocation Units (10 ³ m ³ /d)												
Existing	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485	33,485
Existing and Proposed		33,889	35,911	35,911	35,911	35,911	35,911	35,911	35,911	35,911	35,911	35,911
Average Demand Toll (\$/10 ³ m ³ /d/mon)												
Existing	\$230	\$243	\$248	\$253	\$258	\$263	\$269	\$273	\$278	\$283	\$288	\$294
Existing and Proposed		\$228	\$247	\$257	\$266	\$274	\$281	\$286	\$291	\$297	\$302	\$308
Increase/-Decrease												
Annual		-6.4%	0.6%	1.4%	2.8%	3.9%	4.6%	4.8%	4.9%	4.9%	4.9%	4.9%
Average: 1991-1996							2.3%					
Average: 1991-2001												2.7%