CANADA

National Energy Board

Reasons for Decision

Trans Mountain Pipe Line Company Ltd.

OH-1-87

July 1988

National Energy Board

Reasons for Decision

In the Matter of

Trans Mountain Pipe Line Company Ltd.

Application under Parts III and IV of the National Energy Board Act

OH-1-87, as amended

July 1988

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Abbreviations

Act / NEB Act	*National Energy Board Act*
Amoco	Amoco Canada Petroleum Company, Ltd.
API 650	American Petroleum Institute Standard 650 *Welded Steel Tanks for Oil Storage*
APMC	Alberta Petroleum Marketing Corporation
B.C.	British Columbia
BCA	Burnaby Citizens' Association
Board/NEB	National Energy Board
BP Resources	BP Resources Canada Limited
CERL	CERI Energy Research Ltd.
Chevron	Chevron Canada Limited
Gulf	Gulf Canada Resources
GVRD	Greater Vancouver Regional District
H_2S	Hydrogen sulphide
Husky	Husky Oil Operations Ltd.
Imperial	Imperial Oil Limited
IPAC	Independent Petroleum Association of Canada
IPL	Interprovincial Pipe Line Limited
IPL Decision	The Board's June 1987 IPL Reasons for Decision
km	kilometre
kW	kilowatt
m^3	cubic metre
m^3/d	cubic metres per day
mm	millimetre
MTBE	methyl tertiary butyl ether

Murphy	Murphy Oil Company Ltd.
NGL	natural gas liquids
North Burnaby Group	North Burnaby Residents, Landowners and Petitioners, a group later named "North Burnaby Residents Against Pipeline Expansion"
Northridge	Northridge Petroleum Marketing Inc.
Petro-Canada	Petro-Canada Inc.
Shell	Shell Canada Limited
the Airlines	Air Canada, Canadian Airlines International Ltd.
the District	The Corporation of the District of Burnaby
Trans Mountain/ the Applicant/ the Company	Trans Mountain Pipe Line Company Ltd.
U.S.	The United States of America

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* and the Regulations made thereunder; and

IN THE MATTER OF an application by Trans Mountain Pipe Line Company Ltd., dated 21 September 1987, for an order exempting certain proposed additional pipeline facilities from the provisions of certain sections of the Act pursuant to Section 49 thereof; and for orders under Part IV of the Act with respect to the methodology of toll calculation for its pipeline system; filed with the Board under File No. 1755-T4-25; and

IN THE MATTER OF National Energy Board Hearing Order OH-1-87, as amended.

HEARD in Vancouver, British Columbia on 1, 2, 3, 4, 5, 8, 9, 10,11, 12 February 1988, in Ottawa, Ontario on 29 February and 1 March 1988, and in Burnaby, British Columbia on 11, 12, 13, 14 April 1988.

BEFORE:

R. Priddle	Presiding Member
W.G. Stewart	Member
A.B. Gilmour	Member

APPEARANCES - Vancouver:

G.K. Macintosh, Q.C G.A. Irving M.W.P. Boyle	Trans Mountain Pipe Line Company Ltd.
D. Fairey	North Burnaby Residents, Landowners and Petitioners
D.B. Macnamara	Canadian Petroleum Association
J.A. Snider A.S. Hollingworth	Independent Petroleum Association of Canada
R.S. O'Brien, Q.C.	The Airlines: Air Canada, Canadian Airlines International Ltd.
D.A. Holgate V.J. Carson	Amoco Canada Petroleum Company Ltd.
C.W. Sanderson A.W. Carpenter G.M. Salloum	Chevron Canada Limited
G.S.Thoms	Gulf Canada Resources Limited
B.F. Thurgood R. Phillips	Husky Oil Operations Ltd.

J.B. Ballem, Q.C.	Imperial Oil Limited
D.J. Jenkins D.B. MacDermott G. Sheasby	Interprovincial Pipe Line Limited
J.R. Smith, Q.C.	Murphy Oil Company Ltd.
P.R. Murray	PanCanadian Petroleum Limited
D.G. Hart, Q.C.	Petro-Canada Inc.
E.S. Decter R. Riegert	Shell Canada Limited
S.B. Campbell	TransCanada PipeLines Limited
R.H. Kline	Unocal Canada Limited
A.R. Androsoff	Westcoast Transmission Company Limited
L.L. Manning S.F. McAllister	Alberta Petroleum Marketing Commission
M.J. Shelley	The Corporation of the District of Burnaby
R.J. Bauman	Greater Vancouver Regional District
L. Keough D. Bursey	National Energy Board

APPEARANCES - Burnaby:

G.K. Macintosh, Q.C. M.W. P. Boyle	Trans Mountain Pipe Line Company Ltd.
D. Fairey	North Burnaby Residents Against Pipeline Expansion
R. Rainey	Burnaby Citizens' Association
J.B. Jones, M.L.A.	Constituents of North Burnaby
C. Boothroyd	On her own behalf
K.R. Boyce	On his own behalf
L.A. Boland	On his own behalf
A. Callaghan	On her own behalf

A.W. Carpenter	Chevron Canada Limited
F.H. Fleming	On his own behalf
D. Goodman	On his own behalf
J.B. Ballem, Q.C. M. Ward	Imperial Oil Limited
I.M. Gordon	On her own behalf
M. Kosi	On his own behalf
J.R. Reimer	On his own behalf
C. Rudd	On her own behalf
E.S. Decter	Shell Canada Limited
D. Dattani G. Harvie	The Corporation of the District of Burnaby
R.J. Bauman	Greater Vancouver Regional District
L. Keough D. Bursey	National Energy Board

Summary

(**Note**: This summary is provided solely for the convenience of the reader and does not constitute part of this Decision or the Reasons, for which readers are referred to the detailed text and tables.)

Introduction

Trans Mountain Pipe Line Company Ltd. (Trans Mountain) applied to the Board on 21 September 1987 for a two-stage expansion of its facilities. It also applied for a number of modifications to its existing toll design.

Board staff held a pre-hearing conference in Vancouver on 14 January 1988. Interested parties to the hearing were invited to attend to discuss various procedural matters related to its conduct.

A public hearing was held in Vancouver from 1 to 12 February 1988 followed by argument in Ottawa on 29 February and 1 March 1988. The hearing was reconvened in Burnaby from 11 to 14 April 1988 to hear additional evidence relating to environmental and socio-economic concerns. Written argument on the additional evidence was completed in May 1988.

Facilities

Stage 1

The proposed Stage 1 expansion includes additions to seven pump stations and the construction of two new pump stations and five new storage tanks. The expanded facilities, which are expected to be completed in 1990, will increase the system capacity leaving Edmonton to 27 000 m^3/d, based on the forecast throughput which includes 6 000 m^3/d of heavy crude oil. The cost of Stage 1 is estimated to be $56.9 million dollars.

The Board is satisfied that the proposed Stage 1 expansion is in the public interest and has authorized construction of the facilities.

Stage 2

The proposed Stage 2 facilities include the construction of three new pump stations and the recommissioning of two existing 762 mm diameter loops, each 80.5 km in length. This stage was designed to accommodate additional throughputs of MTBE and methanol, heavy crude oil, or a combination thereof, and would have resulted in an increase in system capacity of 3 000 m^3/d. The cost of the applied-for Stage 2 facilities was estimated to be $27.4 million dollars.

The Board did not authorize construction of the Stage 2 expansion for the reasons set out in Chapter 2.

Toll Matters

Roll-In of Applied-for Facilities

The Board approved the Applicant's proposal to roll the capital and operating costs of the Stage 1 facilities into a common rate base and revenue requirement.

Capacity Surcharges/Credits

A modified version of the alternate pipeline approach suggested by Trans Mountain was found to be appropriate for estimating capacity surcharges and credits on the Trans Mountain system. The Board directed that a five percent capacity surcharge be applied to heavy crude oil as of 1 January 1989 and further found that a zero percent capacity credit is appropriate for refined and semi-refined products.

Fuel and Power Surcharge/Credits

The Board accepted the 15 percent fuel and power surcharge for heavy crude oil as proposed by Trans Mountain and directed that it be implemented starting 1 January 1989. The Board also directed Trans Mountain to use an incremental cost approach to estimate the appropriate level of fuel and power credits for refined and semi-refined products.

Rolling-in of Special Charges

Refined products special charges have been eliminated for:

(1) receiving facilities located downstream and inclusive of the custody transfer meter;

(2) delivery facilities located upstream and inclusive of the custody transfer meter; and,

(3) certain transportation facilities previously allocated only to the refined products streams.

The capital and operating costs associated with the 406 mm delivery line used exclusively by Shell will remain specially charged to Shell. However, the Westridge dock line, previously surcharged at 50 percent to Shell, and the capital and operating costs of the control equipment and instrumentation equipment will now be rolled into the basic transportation service rate base and cost pool.

The Board denied the Applicant’s request to roll in the costs associated with the Edson gathering system,

Tankage Credits

The Board directed Trans Mountain to develop a methodology for determining tankage credits for those shippers who do not use receipt or delivery tankage owned by the Company.

Chapter 1
The Application

Trans Mountain Pipe Line Company Ltd. (Trans Mountain, the Applicant or the Company) owns and operates a pipeline system which extends from Edmonton, Alberta to Burnaby, British Columbia (B.C.) and connects near Sumas, B.C. to a pipeline owned by a wholly-owned American subsidiary, Trans Mountain Oil Pipe Line Corporation. Trans Mountain operates as a common carrier and transports light and heavy crude oil as well as a variety of refined and semi-refined products. Its system consists primarily of a single 610 mm pipeline with eight intermediate pump stations along the pipeline route and extensive tankage and terminalling facilities at Edmonton, Kamloops, and Burnaby. It also includes a condensate gathering facility at Edson, Alberta.

By an application dated 21 September 1987, Trans Mountain applied, under Parts III and IV of the *National Energy Board Act* (the Act or NEB Act), for:

1. orders pursuant to section 49 of the Act which, if granted, would permit the Applicant to construct certain additional pipeline facilities in British Columbia and Alberta. The proposed facilities, to be constructed in two stages, consist mostly of new pumping facilities at various locations along the pipeline route as well as new tanks at the Burnaby and Edmonton terminals; and

2. orders pursuant to Part IV of the Act to:

   (i) approve the application of the rolled-in method of cost allocation and toll design to the applied-for Stage 1 and Stage 2 facilities;

   (ii) modify the surcharges applicable to the transport of heavy crude oil; and

   (iii) roll into the basic pipeline system rate base and cost of service the special facilities charges currently identified for the transport of refined and semi-refined petroleum and petroleum gathering service at Edson.

By Order No. OH-1-87 the National Energy Board (the Board or NEB) set the application down for public hearing. The hearing commenced on 1 February 1988 in Vancouver, British Columbia. The evidentiary portion of that sitting lasted until 12 February 1988 at which time the hearing was adjourned.

Final argument was heard in Ottawa on 29 February and 1 March 1988. As part of its submission in final argument, a North Burnaby residents' group outlined a number of the concerns it had related to the expansion of Trans Mountain's facilities in Burnaby and asked, *inter alia*, that the Board re-hear the application in Burnaby. The Vancouver District Labour Council took a similar position.

In response to the concerns raised, the Board re-convened the hearing in Burnaby on 11 April 1988 to hear evidence from the concerned parties on the environmental and socio-economic impacts of Trans Mountain's application. The Burnaby sitting lasted four days, during which the Board heard evidence from the Applicant, individual local residents, resident groups, and elected and governmental officials.

Final argument on the Burnaby portion of the hearing was in writing and was completed in May 1988.

Chapter 2
Stage 2 Facilities

Trans Mountain applied to expand its facilities in two stages. The Stage 1 facilities are described in Chapter 4 of this report.

The proposed Stage 2 facilities were estimated to cost $27.4 million and included three new pump stations - one at Hinton, Alberta and one at each of Rearguard and Kingsvale in British Columbia. Also included were the retesting and recommissioning of two existing 762 mm diameter loops - each 80.5 km in length. Stage 2 was designed to transport 3 000 m^3/day of methyl tertiary butyl ether (MTBE)[1] and methanol, or heavy crude oil or a combination of shipments of these products.

Trans Mountain sought conditional approval of the Stage 2 expansion so that the partners of the MTBE consortium[2] would have assurance that there would be sufficient capacity to transport their product on Trans Mountain's system. The Company requested that construction of the Stage 2 facilities be approved subject to Trans Mountain satisfying the Board at a later date that the forecast volumes would materialize. The Applicant indicated that a time limit of one year to provide evidence of the throughput would be reasonable. Most shippers supported the conditional approval of these Stage 2 facilities.

During the Vancouver sitting, Trans Mountain indicated that some additional facilities would be required at Burnaby and Edmonton to transport MTBE and methanol, but the Company did not elaborate on the scope of these facilities. During the Burnaby sitting, Trans Mountain explained that three new tanks would have to be constructed at Burnaby, at a cost of roughly $22 million, before MTBE and methanol could be transported. The number of tanks required at Edmonton was not discussed. These additional facilities would be the subject of another application to the Board.

While Trans Mountain acknowledged that its filed evidence should have been clearer on the matter of the additional tanks required for MTBE and methanol, it did not think that the necessity for another facilities application should affect the approval of Stage 2 as filed. Trans Mountain maintained that Stage 2 should be regarded only as an expansion of the mainline capacity and not necessarily related to MTBE and methanol. Trans Mountain indicated that, if the Stage 2 expansion were only used to transport heavy crude oil, no additional tanks would be needed. Although the Company's forecast of heavy crude oil throughput for 1990 could be accommodated without the Stage 2 expansion, Trans Mountain suggested that the forecast was conservative and that more volumes would likely materialize.

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1 MTBE is an octane blending agent for motor gasolines.

2 Nest Oy, Celanese Canada Inc., Hoechst-Celanese, and Trans Mountain are members of a consortium which is studying the feasibility of constructing an MTBE manufacturing plant at Edmonton.

The North Burnaby Residents Against Pipe Expansion (North Burnaby Group)[1] objected to the late submission of evidence on the tankage required for MTBE and methanol. It stated that parties had been misled in this matter and that the assessment of the scope and impacts of this part of the project was inadequate.

Chevron Canada Limited (Chevron) originally supported the Stage 2 project, conditional upon adequate throughput agreements being in place. However, in view of the new evidence regarding the need for MTBE and methanol storage tanks which was presented during the Burnaby sitting, it was less supportive. Chevron argued that the reduction in the economies of scale of the revised Stage 2 expansion would have a more substantial negative impact on existing shippers should the volumes not materialize. According to Chevron, this added further weight to its argument that throughput agreements should be required.

Decision

The Stage 2 expansion was premised, for the most part, on the increase in throughput which Trans Mountain expects by 1990 as a result of new MTBE and methanol shipments. However, before Trans Mountain could transport those volumes, additional terminalling facilities would be needed at Burnaby and Edmonton. Those facilities would be the subject of a separate facilities application in the future.

While not wishing to discourage the MTBE consortium from proceeding with the project, the Board is not persuaded that there is sufficient justification for approving what is, in fact, only part of the facilities required to transport and methanol. Conditional approval does not resolve the Board's concern because regular shipments of MTBE and methanol are not likely unless the subsequent application for additional facilities is also approved. Therefore, the application for the Stage 2 expansion, as it relates to MTBE and methanol, is premature and would best be dealt with in a proceeding where all the necessary facilities could be considered together.

As an alternative to MTBE and methanol, Trans Mountain argued that the additional throughputs required to support the Stage 2 expansion might be heavy crude oil shipments. Although Trans Mountain maintained that its throughput forecast is conservative, the evidence does not demonstrate that these facilities would be required by 1990 to accommodate an increase in heavy crude oil throughput. Given the relatively short period of time (about one year) needed to implement the Stage 2 expansion to accommodate additional heavy crude oil

[1] A party which originally intervened as "The North Burnaby Residents, Landowners and Petitioners" later changed its name to "North Burnaby Residents Against Pipeline Expansion". In these Reasons, "North Burnaby Group" is used for both names.

volumes, there is insufficient justification for conditionally approving the facilities so far in advance of when they may reasonably be expected to be required.

For these reasons, the Board denies Trans Mountain's application with respect to the Stage 2 facilities. In light of this decision, it is unnecessary for the Board to decide on the other issues related to Stage 2.

Chapter 3
Supply and Demand

3.1 Supply

In support of its crude oil throughput forecast, Trans Mountain provided a forecast of western Canada crude oil supply for the period summarized in Table 3-1. This supply forecast was based on a crude oil price projection of $22 and $27 ($US 1986) per barrel for West Texas Intermediate in 1990 and 1995, respectively.

The Applicant concluded that, by the early 1990s, conventional light crude oil production in western Canada would decline and that this would be only partially offset by an increased supply of synthetic crude oil. Notwithstanding the decline in light crude oil production, the Applicant expected supply of blended heavy crude oil to exceed the combined heavy crude oil throughput capacities of the Interprovincial Pipe Line Limited (IPL), Rangeland Pipeline Company Limited and Trans Mountain pipeline systems based on existing facilities.

The Applicant stated that, to justify the Stage 1 expansion, the supply of blended heavy crude oil to the Trans Mountain system would have to increase by 4 300 m^3/d over current shipments. Several intervenors provided evidence pointing to a Canada-wide increment of blended heavy crude oil supply of about 18 000 m^3/d by the year 1990, from the expansion of currently-operating bitumen projects.

Two major bitumen producers, Imperial Oil Limited (Imperial) and Petro-Canada Inc. (Petro-Canada), indicated support for the Applicant's forecast of future heavy crude oil supply, based on their expansion commitments for the Cold Lake and Wolf Lake projects, respectively.

Chevron argued that the great uncertainty respecting crude oil prices could bring about a considerably different supply than was presented by the Applicant. Chevron suggested that the incremental supply from the expansion of bitumen projects is only a possibility and that, due to high operating costs, development may not be completed as planned if crude oil prices remain low.

Decision

The Board recognizes the uncertainty respecting future crude oil supply, particularly considering recent price volatility. However, the Board is satisfied that the additional supply of heavy crude oil (4 300 m^3/d over current shipments) required to support the proposed Stage 1 facilities is likely to be developed from the planned capacity expansion of several currently operating bitumen projects, even if some of the planned expansions are delayed due to the persistence of low crude oil prices.

Table 3-1
Western Canada Crude Oil Total Supply
(thousands of cubic metres per day)

	1990	1995	2000	2005	2010
Light	144.9	113.9	88.4	69.7	55.2
Pentanes	19.2	15.5	12.1	10.2	7.4
Synthetic	30.6	30.8	47.9	62.3	88.7
Heavy	28.5	38.1	33.8	32.2	32.3
Bitumen	41.3	59.5	69.5	79.5	91.1
TOTAL SUPPLY	**274.5**	**257.8**	**251.7**	**253.9**	**274.7**

3.2 Demand

In support of Stage 1 of the expansion, Trans Mountain provided a forecast of demand as shown in Table 3-2.

Table 3-2
Trans Mountain Demand Forecast
(thousands of cubic metres per day)

	1987	1988	1989	1990[a]
Light Crude Oil to Burnaby	20.8	21.0	21.0	21.0
Refined Petroleum to Kamloops	1.6	2.5	2.7	3.0
Heavy Crude Oil Exports via Westridge[b]	1.7	3.0	3.0	6.0
Light Crude Oil Exports via Westridge	0.7	-	-	-
Light Crude Oil Exports via Sumas	1.9	-	-	-
TOTAL DEMAND	**26.7**	**26.5**	**26.7**	**30.0**

a. Assumes Stage 1 expansion in operation.

b. The throughputs shown for heavy crude oil exports in 1988 and 1989 are the maximum achievable given present tankage availability and assume no unforeseen operating or logistical problems.

Trans Mountain assumed that Vancouver area refineries would continue to rely on the pipeline to deliver their feedstocks and estimated that there would be little change in the current demand of approximately 21 000 m^3/d. While not expecting any refinery closures, the Applicant believed that, if some refiners phased out crude oil movements, finished products or special streams would be shipped instead. The Vancouver area refiners stated that, because of limited supply alternatives, they will continue to be highly dependent on Trans Mountain. Consequently, no party disputed Trans Mountain's estimate of light crude oil deliveries to Burnaby.

Trans Mountain estimated that, based on shippers' forecasts, which ranged from approximately 4 900 to 11 000 m^3/d, heavy crude oil tenders would increase to 6 000 m^3/d in 1990. To verify the reasonableness of the shippers' forecasts, Trans Mountain commissioned CERI Energy Research Ltd. (CERL) to evaluate the market potential for Canadian heavy crude oil and bitumen in the Pacific Rim.[1] CERL concluded that there is a market for up to 16 000 m^3/d of heavy crude oil in the Pacific Rim.

CERL also examined the Wood River, Illinois market which is approximately 360 kilometres south of Chicago. While conceding that netbacks might be marginally higher than those from the Pacific market, CERL believed that penetration of the Wood River market could necessitate discounts on the large volumes of Canadian heavy crude oil already being delivered to United States Northern Tier markets.

CERL also noted that an expanded Trans Mountain system would provide increased market flexibility to domestic producers.
Intervenors such as Husky Oil Operations Ltd. (Husky), Imperial and Murphy Oil Company Ltd. (Murphy) maintained that the traditional market for heavy crude oil (i.e., domestic refineries in and west of Montreal and U.S. refineries in the Northern Tier) is at or near the saturation point. According to these intervenors, as well as Shell Canada Limited (Shell), the Pacific Rim provided the best alternative to the traditional market. Some of these intervenors held this view as a result of their business expertise in the marketing of heavy crude oil. Petro-Canada believed that both the Pacific Rim and Wood River provided potential alternate markets which could be developed concurrently.

With regard to the Wood River refineries, all intervenors agreed that this market is not presently accessible other than via barge movements when the river is navigable. In order to secure entry into this market, one of the two pipelines moving crude oil north to Chicago would have to be reversed or a new pipeline built.

The Applicant provided evidence that heavy crude oil shippers had been restricting their nominations to a maximum of 3 000 m^3/d so that an allocation of pipeline capacity could be avoided. Trans Mountain had no doubt that more heavy crude oil could have been moved in 1987 if the capacity had been available. In support of this, Imperial stated that it had indeed foregone heavy crude oil sales because of the capacity constraint.

Chevron, with support from Air Canada and Canadian Airlines International Ltd. (the Airlines) in final argument, was the only party to seriously question the reasonableness of Trans Mountain's forecast of heavy crude oil throughput. In view of the doubt as to whether the heavy crude oil throughput would materialize, Chevron characterized the expansion project as being a highly speculative endeavour. It

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[1] The Pacific Rim includes South Asia, Japan, Australia and New Zealand.

held the view that CERL had overstated the market value of heavy crude oil at the Pacific Rim refineries. Chevron also indicated that this overstatement obscures the fact that producers would have a substantial preference to sell incremental volumes in the traditional markets, as opposed to the Pacific Rim, so long as there is no capacity constraint on IPL. Chevron did not believe that the delivery of additional volumes to the traditional or Wood River markets would necessarily have a negative impact on producers' netbacks because these markets, which are also supplied from the U.S. Gulf and the Caribbean, are large and diverse, with refineries running a wide variety of crude oils.

Decision

Given their lack of viable supply alternatives, it is highly probable that the Vancouver area refineries will continue to use the Trans Mountain pipeline to transport their feedstock needs. In the event of refinery closures, finished products or semi-refined streams shipped via Trans Mountain would replace existing feedstock movements.

The Board recognizes that actual heavy crude oil deliveries depend primarily on the available supply and the demand in the traditional market from which the highest netbacks are achieved. The Board shares the view of several intervenors that, once the planned expansions of the Co-op (Regina, Saskatchewan) and Koch (Rosemount, Minnesota) refineries are in place, little further growth is expected in the traditional market. Therefore, producers will be looking to penetrate new markets to dispose of expected increments to production. In this regard it is worthwhile noting that exports of heavy crude oil have already been made by tanker out of Montreal via IPL, as well as out of Vancouver via Trans Mountain, to markets less attractive than the traditional markets.

The Board agrees that the Pacific Rim is the next best alternative to the traditional market. It would appear that Wood River is not a particularly attractive outlet for Canadian heavy crude oil in view of the obvious logistical problems associated with its accessibility.

While some intervenors provided estimates indicating that the traditional market would absorb the available supply in 1990, the Board is of the view that heavy crude oil is likely to be available for shipment on Trans Mountain in amounts adequate to justify the proposed additional facilities.

As to the likely demand for this heavy crude oil, the Board notes that there is a record of heavy crude oil shipments via Trans Mountain to the Far East and that

these volumes would likely have been greater if the heavy crude oil shippers had not voluntarily restricted their nominations in view of capacity limitations.

In conclusion, the Board is satisfied that the throughput forecast provided by Trans Mountain in support of the Stage 1 expansion is reasonable.

Chapter 4
Stage 1 Facilities

4.1 Design and Cost

Trans Mountain proposed to increase its capacity to transport heavy crude oil from existing average levels of 1 700 m^3/d to a firm capacity level of 6 000 m^3/d for the year 1990. Total sustainable capacity for the throughput forecast would then be approximately 27 000 m^3/day leaving Edmonton.

The proposed Stage 1 facilities are shown on the map on the following page. The facilities would consist of additional pumps and motors at the seven existing pump stations, as well as two new 3 360 kW electric pump stations in Niton, Alberta and Albreda, B.C. Two new 31 700 m^3 storage tanks would be constructed at Edmonton and three new 23 700 m^3 tanks with vapour recovery systems were proposed for Trans Mountain's Burnaby terminal. The estimated capital cost for these facilities is $56.9 million, as summarized in Table 4.1.

Table 4-1
Cost of Stage 1 Facilities

Additions to seven existing pump stations	$12,465,200
Two new pump stations	$11,725,600
Additional tankage at Edmonton and Burnaby	$28,263,600
Miscellaneous terminally facilities	$4,448,100
	$56,902,500

Trans Mountain noted that the major constraint to increasing heavy crude oil shipments with the existing system is inadequate tankage at Burnaby. Operational problems such as tank-bottom mixing between heavy and light crude oils, scheduling of light crude oil deliveries to the Vancouver area refineries, and dependence on timely heavy crude oil tanker arrivals at Westridge would be alleviated with the addition of the three new tanks at Burnaby. The new tanks would include domed aluminum roofs with vapour-recovery systems to minimize the effect of odours emanating from sour crude oils.

Tankage at Edmonton would also be required to minimize tank-bottom mixing and to allow for proper scheduling and the continuation of structural repairs to several existing tanks. The mainline pumping additions are required to move the forecasted increases in throughput and to provide a reasonable

degree of standby power at key locations. Trans Mountain indicated that the additional unit at Jasper might be electric rather than diesel as originally proposed.

All interested parties who represented the users of the Trans Mountain system, with the exception of the Airlines, generally supported construction of Trans Mountain's Stage 1 facilities. Several parties representing the residents of Burnaby strongly opposed the installation of the three additional storage tanks at the Burnaby terminal. (see Sections 4.2 and 4.3).

Decision

The Board is satisfied that the proposed Stage l facilities are required to provide capacity for the forecast 1990 volumes. Furthermore, the Board finds that the facilities would also provide for the efficient handling and scheduling of deliveries to the Westridge terminal and to the Vancouver area refineries. The estimated cost of these facilities is in line with costs for recent, similar installations added to the system.

The Board requires the Applicant to provide, prior to construction, a detailed cost estimate and a construction schedule based on final design, and to submit an application for any changes to the design contained in the original application. During construction, Trans Mountain will be required to file monthly construction cost and progress reports.

4.2 Earthquake Design of Storage Tanks

The North Burnaby Group, as well as the Corporation of the District of Burnaby (the District), were concerned about the adequacy of Trans Mountain's storage tank design in light of the potential for seismic activity in southwestern British Columbia.

Specific matters which were addressed by one intervenor, Mr. Boyce, included the ability of the existing and proposed containment dikes to handle major oil spills due to tank rupture, and to maintain their integrity during seismic aftershocks. He was also concerned that the geology of the area, with respect to bedrock, soils and a fault line 1.3 km from the terminal, necessitates special design considerations for the tank foundations. Mr. Boyce questioned the ability of ancillary facilities such as piping, valves, pumps and firefighting facilities to function after the effects of a major earthquake. In this context, the North Burnaby Group noted that a comprehensive contingency plan to deal with emergencies had not been put forward.

Mr. Boyce argued that the special circumstances dictate that a site-specific analysis be undertaken for the design of the tanks, foundations, containment dikes and related facilities and that measures be taken which are in excess of those required by the relevant standard, American Petroleum Institute Standard 650 Welded Steel Tanks for Oil Storage (API 650). Mr. Boyce was also concerned about the possible lack of continuity of various individual standards when applied to the integrated facilities at

Burnaby, and the level of experience regarding seismic design available to the Applicant and its consultants.

Mr. Boyce recommended that periodic independent inspections of the Burnaby terminal be undertaken and that a Design Review Panel be established to study future expansions at Burnaby.

In reply to these concerns, Trans Mountain indicated that it will comply with the most recent edition of API 650, which is a standard accepted worldwide. Trans Mountain retained an expert witness from Chicago Bridge and Iron (CBI) Industries, a recognized leader in the construction of storage tanks, to analyse the structural capability of the existing and proposed tanks to withstand seismic activity. The witness testified that because of the squat nature of these tanks, with a low height/diameter ratio, the tank shells would not rupture even under extreme seismic loading conditions. He pointed out that tanks in Japan and Alaska with similar configurations have withstood severe earthquakes.

The Applicant stated that the bearing capacity of the site and the design of the tank foundations will provide more than adequate resistance to earthquake damage. In addition, the site will be studied to ensure foundation stability under both static and dynamic conditions.

Although specific standards for the geotechnical design of containment dikes do not exist, Trans Mountain believes that previous experience and the use of proper design methods will result in a reliable diking system. The low pipeline pressure levels in the terminal also result in relatively high safety factors for piping and components should additional stresses develop from seismic motion.

With respect to the overall geology of the Burnaby area, Trans Mountain stated that the existence of a nearby fault zone would only be a serious problem if it were directly beneath the terminal. The Company maintains that the site is appropriate for the new tanks.

Trans Mountain presently has a contingency planning manual which addresses procedures to be followed in the event of an emergency at Burnaby and other locations on its system. An updated version of that plan will be ready for the fall of 1988.

Decision

The Board is satisfied that Trans Mountain's undertakings, including its commitment to comply with the latest edition of API 650, will provide for safe and reliable operation of the Burnaby tank farm. While the Board is not persuaded that further study of seismic design for these tanks is necessary, it will, as a condition of the authorization, require Trans Mountain to submit, prior to commencement of construction, final tank and containment dike design drawings and specifications, and calculations to demonstrate that the tank designs conform to the seismic criteria of API 650.

Trans Mountain will also be required to submit an updated comprehensive contingency planning manual to the Board by 31 October 1988. This manual should include the Company's plans and procedures for dealing with major incidents, including earthquakes, at the Burnaby terminal. Subsequent to receipt

of the manual by the Board, a procedure will be established for intervenors to comment on the document.

Much evidence was heard regarding the ten existing tanks at Burnaby. Although the condition of these tanks is not directly relevant to the proposed installation of the new tanks, the Board notes that the evidence presented during the hearing, and the operational history of the terminal, do not demonstrate any short-comings in their structural integrity. In this respect, Board staff will continue to monitor Trans Mountain's inspection and maintenance programs and related records, and to periodically conduct inspections on behalf of the Board.

4.3 Fire Safety

Some intervenors raised concerns regarding potential hazards associated with the proposed domed-roof tanks, due to the concentration of volatile gases between the inner floating roof and the geodesic dome. Trans Mountain indicated that the vapour-collection systems and the increased protection from lightning-induced ignition provided by the domed roofs will result in the new tanks having an enhanced level of safety.

The adequacy of Trans Mountain's existing fixed foam fire-fighting systems was also questioned, primarily by the Burnaby Citizens' Association (BCA) who referred to problems associated with the inflexibility of such a system involved in a petroleum tank fire in Nanaimo, B.C. in 1977. Trans Mountain testified that its foam firefighting equipment at Burnaby consists of a fixed delivery system for the tank rim supplied by a foam-generating fire truck. This vehicle provides enough flexibility to cope with fires anywhere on the terminal site. Trans Mountain also has access to eleven other vehicles equipped for fighting petroleum fires through its involvement with a mutual aid cooperative for the area's oil industry.

The BCA also questioned the reliability of the security system at Burnaby, noting that an arsonist was responsible for the Nanaimo fire. Trans Mountain testified that a perimeter fence, adequate lighting and a guard on duty 24 hours a day represent a reasonable degree of security.

Decision

The Board is satisfied that the proposed domed-roof tanks are no less safe than the existing floating-roof tanks. Trans Mountain has demonstrated that it has taken all reasonable steps to ensure that its firefighting capabilities are satisfactory. The Board will continue to monitor the Company's activities at Burnaby through periodic site inspection and review of its contingency planning manual.

Chapter 5
Environmental Matters

Environmental issues arising from the evidence at both the Vancouver and Burnaby sittings are addressed in the following subsections. Environmental issues raised by interested parties were related only to Trans Mountain's facilities at Burnaby.

5.1 Control and Monitoring of Odour Emissions at the Burnaby Terminal

Some intervenors were concerned that the increased volume of crude oil to be shipped through Burnaby would, of necessity, increase the potential for odour emissions. They were also concerned that the most odorous crude oils should be stored only in those tanks equipped with vapour-treatment facilities.

Trans Mountain submitted that it fully intended to store the more odorous crude oils in those tanks equipped with vapour-treatment systems, and that only in unusual circumstances would it deviate from that practice. In view of the proposed method of storage and the anticipated efficiency of the vapour scrubbers, Trans Mountain believed that the expansion would result in a cleaner environment, with an overall reduction in odorous emissions. Trans Mountain anticipated that at least 95 percent, and up to 99 percent, of total hydrogen sulphide (H_2S) would be removed by the proposed scrubbers.

Trans Mountain indicated that it uses an odour intensity index developed by the consulting firm B.C. Research to classify and rank crude oils for odour potential. It was further stated that laboratory tests would be conducted on all crude oils transported through its system to determine each one's potential for causing odours.

Although there would be an increase in the total volume of crude oil to be shipped, the expansion would not result in increased volumes of odorous oil. In fact, Trans Mountain anticipates an overall decrease in the total quantity of odorous oil shipped. Generally Trans Mountain has found that heavy crude oil is relatively low in odour potential when compared to light crude oil. In Trans Mountain's expansion proposal, it is heavy crude oil which is expected to displace the more odorous light crude oil. In view of that displacement, the Applicant believes that the new tanks will provide ample storage capacity for odorous crude oils.

The Corporation of the District of Burnaby requested that the Board establish specific requirements to protect local communities from odour emissions which might result from storing sour crude oils in tanks without vapour-treatment equipment. The District further requested that an air-monitoring program be established at the Applicant's tank farm to monitor the efficiency of the scrubbers from start-up. The District believed that the program should monitor H_2S and mercaptans.[1]

[1] Mercaptans are organosulphur components which are derivatives of hydrogen sulphide and are found in some crude oils.

The Greater Vancouver Regional District (GVRD) supported Trans Mountain's proposed methods for odour control and monitoring, and believed that the proposed equipment could control odorous emissions.

The Applicant indicated that it had accepted, subject to the Board's direction, the District's proposal that Trans Mountain provide funds for a third-party air-monitoring program . Trans Mountain further indicated that it had signed a Memorandum of Understanding with the GVRD, agreeing to the full exchange of information to assist in the control of both air and effluent emissions at the Burnaby and Westridge Terminals.

Decision

The Board is satisfied that storing the more odorous oils in the three new tanks equipped with vapour-treatment systems will be a positive step in reducing odour emissions and therefore, will require Trans Mountain to operate its tankage to that end, as set out in condition 8 of Order XO-1-88 (see Appendix I).

The Board accepts the Applicant's undertaking to fund a third party air-monitoring program and directs Trans Mountain to submit the details of the monitoring program in accordance with conditions 7(ii) and 9(i) of Order No. XO-1-88. The agreement between Trans Mountain and the GVRD respecting an exchange of information is viewed as a positive step in dealing with the ongoing issue of odour emissions.

5.2 Control and Monitoring of Hydrocarbon Emissions at the Burnaby Terminal

Mr. Wituschek of Environment Canada and Mr. Smith of the GVRD, indicated that, although there are no objectives established by government regarding total hydrocarbon levels for ambient air quality, certain guidelines for engineering design are prescribed with a view to minimizing hydrocarbon emissions. It was further indicated that suitable techniques for measuring total hydrocarbon levels are not yet available and that the proposed tanks would be a relatively small source of hydrocarbon emissions in any case. The entire issue of hydrocarbon emissions in the Greater Vancouver area is the subject of an ongoing study by federal, provincial and regional governments.

The Applicant stated that it would be technically possible to add a hydrocarbon treatment system to the proposed vapour scrubbers, and indicated a willingness to do so if it became necessary.

Decision

Given the relatively low emission levels contributed by storage tanks such as those proposed by Trans Mountain, the Board is not persuaded that it should require Trans Mountain to conform to guidelines in excess of industry requirements. The Board will monitor the situation to ensure that Trans Mountain complies with applicable requirements as they are developed.

5.3 Increased Vessel Traffic at the Westridge Terminal

The application indicated that the proposed Stage 1 expansion would result in a total of 48 vessels per year, comprising 24 tankers and 24 barges, using the Westridge Terminal.[1] According to Trans Mountain, the Vancouver Port Corporation did not foresee any significant problems arising from the forecast number of vessels.

Some intervenors were concerned about the increased risk of oil spills arising from the higher level of vessel traffic. The North Burnaby Group also raised the related concern of possible adverse impacts on the surrounding unique and sensitive environment, referring specifically to the proposed development of Barnet Beach Park. Mr. Sherwood of Environment Canada stated that the risk of a major oil spill would remain relatively small even with the traffic levels forecasted. However, he believed that there might be additional operational spills as a result of increased vessel loading activity. He further indicated that such operational spills would be minor and largely controllable.

Trans Mountain presented witnesses from the Vancouver Port Corporation, the Canadian Coast Guard and Burrard Clean.[2] The representatives from the Vancouver Port Corporation and the Coast Guard provided detailed information on existing emergency response plans, as well as on the Vessel Traffic Service which controls ship movements in and around the Vancouver Harbour. Mr. Green of Burrard Clean provided information on that company's responsibilities and capabilities with respect to emergency response services for industrial oil spills. He further testified that Trans Mountain was a member of the industrial co-operative which retained the services of Burrard Clean.

Decision

The regulation of vessel traffic in the Vancouver area is not under the jurisdiction of the NEB. The evidence of the authorities which do regulate this matter is that the existing Vessel Traffic Service and Vancouver Port facilities are capable of handling the 48 ships per year. This evidence is uncontradicted and is accepted by the Board. The risk of a major spill is not significantly increased as a result of the expansion and while there may be an increase in the very small number of minor operational-type spills experienced in the past, the Applicant, in co-operation with Burrard Clean, is well equipped to deal with such incidents.

5.4 Control and Monitoring of Odour Emissions at Westridge

Many intervenors were concerned about the odours emanating from the Westridge Terminal operation. Mr. Smith, a GVRD witness called by the North Burnaby Group, indicated that there were numerous emission sources in the Westridge area, owing to the presence of several refineries nearby.

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1 Trans Mountain provided historical data on vessel traffic levels at Westridge, indicating the total number of tankers and barges which have used the terminal since 1956 (Exhibit B6, p. 28-2). For recent years at Westridge, the following levels of vessel traffic have occurred: 16 vessels in 1983, 7 in 1984, 6 in 1985, 13 in 1986, and 17 in 1987 (to 1 December).

2 Burrard Clean is a company retained by an industrial co-operative to handle spills at its members' facilities in Burrard Inlet and the outer harbour of the Port of Vancouver.

Trans Mountain proposed to use a dockside scrubber[1] for the abatement of any odorous emissions that might occur. The dockside scrubber would be connected for each loading, so long as the ship was properly equipped and the ship's master consented to the procedure.

Intervenors maintained that a dockside scrubber should be used for every oil loading, regardless of constraints imposed by the ship's master.

The Applicant also indicated that it had started discussions with barge and tanker operators to provide for the retrofitting of vessels using the Westridge Terminal, thereby enabling connection to a dockside scrubber. Recent meetings with Crowley Maritime, the company supplying barge services to Westridge, had provided Trans Mountain with some confidence that barges would be retrofitted.

In addition, Trans Mountain described how its current barge-loading procedures minimize odorous emissions by reducing the total number of tank hatches open at any one time. Because most of the odorous emissions are released towards the end of a loading, steps are taken to have loading rates slowed down at that time, thereby reducing the intensity of the vapours being released.

Decision

The Board does not have the authority to order that vessels arriving at Westridge be connected to the dockside scrubber. Trans Mountain's efforts with respect to arrangements to have barges retrofitted for eventual hook-up to the dockside scrubber are seen as a positive step in resolving this issue. The Board encourages the Applicant to expedite the installation of the dockside scrubber and to continue discussions with vessel operators, with a view to eventually having a standardized procedure for vessels using the scrubber. Trans Mountain is also expected to continue using its existing procedures for reducing odorous emissions during vessel loadings.

5.5 Control of Hydrocarbon Emissions from Vessels at the Westridge Terminal

During the Burnaby sitting, the North Burnaby Group raised the issue of hydrocarbon emissions from vessels at Westridge and related concerns of nearby residents.

The Applicant stated that vessel exhaust emissions, including hydrocarbons, would only be a concern when a vessel was off-loading and the engines were providing power to the vessel's pumps for that off-loading. Trans Mountain maintained that such emissions would not be a problem because vessels would only be receiving, not off-loading, oil: on-loading of oil does not require the vessel's engine power for pumping and, therefore, emissions would be minimal.

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[1] The installation of a scrubber was approved by the Board on 27 January 1988 under order No. XOM-1-88.

Decision

The issue of hydrocarbon emissions from vessels at Westridge is not within the Board's jurisdiction. Based on the evidence presented during the hearing, Transport Canada and Environment Canada would have responsibility for certain aspects of this issue.

5.6 Control of Effluent Emissions at the Burnaby Terminal

Concerns were raised respecting the disposal of spent scrubbing liquors from the operation of the proposed vapour scrubbers at the Burnaby Terminal. Trans Mountain filed a copy of a Memorandum of Understanding with the GVRD, agreeing to the exchange of information on both air and effluent emissions.

The District was particularly concerned that its municipal watercourses be protected from any environmental damage and indicated that its by-laws allow only natural storm water drainage to enter Burnaby's watercourses.

Trans Mountain planned to dispose of all spent scrubbing sludges and liquors in accordance with provincial requirements. The Applicant indicated that the waste scrubbing liquors would either be neutralized on-site for release to the Greater Vancouver Sewerage and Drainage District sanitary sewer, or transported to a provincially-approved disposal site.

Decision

The Board accepts Trans Mountain's undertaking to dispose of all waste scrubbing liquors according to provincial standards. The planned exchange of information with the GVRD will assist in monitoring the adequacy of this proposal The Board directs the Applicant to submit its final procedures for the disposal of waste scrubbing liquors in accordance with Condition No. 7(i) of Order XO-1-88.

5.7 Control of Surface Water Quality at the Burnaby Terminal

During construction of the three new tanks at Burnaby, Trans Mountain would test all water discharges leaving the site to determine the level of suspended solids. Although there was no specific maximum provincial limit established for suspended solids in its discharges, Trans Mountain stated that sediment traps would be set up, if necessary, to keep the suspended solids level below the range of 10 to 20 parts per million.

The issue of iron bacteria in streams leaving the Burnaby Terminal was identified as a concern by certain intervenors. Mr. Wituschek, called as a witness by the North Burnaby Group, indicated that the

presence of iron bacteria represented a relatively innocuous aesthetic problem insofar as drinking water quality was concerned.

The Applicant indicated that the source of the bacteria was being investigated and that steps would be considered to correct the problem. According to Trans Mountain, the Stage 1 expansion would not worsen the situation in any case, because the streams are located away from the proposed site of the new tanks.

Decision

The Board accepts the Applicant's undertaking to employ sediment traps and further directs that, during construction, the Applicant report to the Board on the concentration of suspended solids in water discharged from the tank farm property. That report should include the information set out in Condition 5 of Order No. XO-1-88.

Regarding the issue of iron bacteria, the Board encourages Trans Mountain to continue its ongoing research with a view to locating the source of the bacteria and improving the aesthetic quality of the affected streams.

5.8 Control of Noise

The Applicant indicated that increased noise levels resulting from the proposed additional pump units at locations in Alberta and British Columbia would not have any significant environmental impacts and that, in certain cases, existing background noise from local traffic or railways would mask increased station noise.

Although no pumping equipment would be installed at Burnaby, the District was concerned about the potential for noise in the vicinity of the tank farm, and submitted evidence regarding its by-law restrictions on noise during construction and operations.

During the Vancouver sitting, Trans Mountain indicated that it was prepared to review projected noise levels with the District and to comply with the requirements of the District's noise by-law during both construction and operations.

With reference to the Burnaby Terminal, Trans Mountain did not anticipate any excessive noise resulting from the operation of the vapour-scrubbing equipment, and further undertook to monitor noise levels to ensure that they conformed with the District's noise by-law.

Decision

Trans Mountain's estimates of operational noise levels are within an acceptable range. The Board, therefore, does not anticipate any adverse impacts due to noise as a result of the proposed Stage 1 expansion.

The Board is satisfied with Trans Mountain's undertaking to comply with the requirements of the District's noise by-law and directs Trans Mountain to report to the Board on noise levels at the Burnaby Terminal in accordance with Condition 9 (ii) of Order No. XO-1-88.

5.9 Site Aesthetics at the Burnaby Terminal

Several intervenors expressed concerns about the visual appearance of the proposed new tanks. Submissions by the North Burnaby Group and by Barry Jones, M.L.A., emphasized concerns over deteriorating scenic views.

The Applicant has agreed to cooperate with the District to minimize the visual impact of the proposed new tanks on surrounding residential areas. Trans Mountain indicated that the new tanks would be painted green to blend with the existing landscape and that the height of the containment dikes could be increased to reduce the apparent height of the new tanks when viewed from below the terminal. In addition, the Applicant indicated that it would be working with the District to find other ways of camouflaging the geodesic domes.

Decision

The Board is of the view that the proposed measures for reducing the visual impact of the three new tanks will be helpful in harmonizing the site with the surrounding environment. The Board expects Trans Mountain to continue its discussions with the District regarding site aesthetics at the Burnaby Terminal.

5.10 Contingency Planning

The application stated that environmental protection measures would be incorporated into Trans Mountain's construction specifications and that inspectors would ensure the correct implementation of those measures. It was further indicated that Trans Mountain's construction specifications would include containment measures for any hazardous construction materials.

The Applicant stated that, where necessary, containment dikes would be built on sloped areas to confine any oil spills to the station property. It was further indicated that Trans Mountain's system contingency plans were being revised in accordance with the Board's requirements. Those plans would be filed with the Board for approval in October 1988.

Trans Mountain indicated that its revised plans would include emergency measures for the Burnaby and Westridge Terminals. The Applicant added that, for safety and environmental protection, containment dikes, such as those around the existing tanks, would be built around the new Burnaby tanks in accordance with the standards of the National Fire Code. Each dike would have a containment capacity of 1.1 times the individual tank volume.

Trans Mountain provided additional information on the measures currently used to prevent damage to the environment during loading operations at Westridge. For example, containment booms are used to encircle vessels as they load, thereby isolating the area should a spill occur. As well, Trans Mountain retains the services of Burrard Clean for the purpose of responding to such emergencies.

Trans Mountain discussed its plans to install fixed, rigid loading arms at Westridge to increase the safety of loading procedures. Trans Mountain also provided details on its existing emergency response measures and described its staff-training programs, as well as its existing equipment for spill and fire control.

Certain interested parties, in particular the North Burnaby Group and Mr. K.R. Boyce, argued that the Board should not approve the application without first having Trans Mountain's updated contingency plans available.

Decision

Trans Mountain's existing contingency plans address safety procedures for the entire system, including the Burnaby and Westridge Terminals. Those plans were designed to deal with operational emergencies which might occur at Trans Mountain's facilities. The proposed additional facilities at Burnaby will not change the type of potential operational incidents from those already addressed in Trans Mountain's existing contingency plans. Therefore, while Trans Mountain has undertaken to file revised plans in October 1988, the Board is of the view that the existing plans are adequate for its assessment of the proposed expansion. As discussed in section 4.2, Trans Mountain will be required to file its updated plans by 31 October 1988, and interested parties will be afforded an opportunity to comment.

5.11 Requirement for a Comprehensive Environmental Impact Assessment

As part of the Burnaby proceedings, interested parties raised the issue of the requirement for a comprehensive environmental impact assessment regarding Trans Mountain's proposal to add three new tanks. Witnesses from Environment Canada indicated that although several other review processes are in place, such as the federal Environmental Assessment and Review Process (EARP) and the Code of Recommended Standards for the Prevention of Pollution in Marine Terminal Systems (TERMPOL), those processes would not apply to Trans Mountain's present application before the Board.

Decision

The Applicant has met the requirements of section 49 of the NEB Act, including the applicable paragraphs of Part VI (Environmental Information) of the Schedule to the Rules of Practice and Procedure. The application contains all of the information required by the Board to evaluate the environmental impacts of the project. Therefore, the Board does not require further environmental information from Trans Mountain.

5.12 Requirement for the Consideration of Further Studies

Some intervenors voiced concerns regarding the potential health hazards associated with Trans Mountain's proposal and the necessity, therefore, to consider the results of ongoing studies such as a tri-level government inquiry into the transportation of dangerous goods, and a federal-provincial-regional study of hydrocarbon emissions and ozone levels in the Greater Vancouver area. Other studies mentioned for consideration included studies by the U.S. Coast Guard into emission control at marine loading terminals, and the Burnaby Health Department's research, conducted by Dr. Clyde Hertzman of the University of British Columbia, into the health effects of hydrocarbon emissions.

Decision

The Board is not convinced that the referenced ongoing studies are essential to its review of Trans Mountain's application. Developments pertaining to these studies will be monitored to ensure that Trans Mountain complies with the most current standards.

5.13 Long-Range Planning and Community Involvement

The issue of development planning was also noted as a concern. The North Burnaby Group described the potential conflict between Trans Mountain's facilities and developments such as nearby residential areas, Barnet Beach Park and a possible commuter rail service. Several groups and individuals called for the submission of a long-range development plan by Trans Mountain, as well as the eventual phasing-out and relocation of Trans Mountain's Burnaby facilities.

Some interested parties also requested an opportunity for further involvement between Trans Mountain and the local community. For example, the Burnaby Citizens' Association indicated that Trans Mountain did not sufficiently involve the public before filing the application.

Decision

The issue of long-range development planning was not thoroughly examined in the context of the new facilities at Burnaby proposed by Trans Mountain. The Board, however, expects Trans Mountain to keep the District of Burnaby advised of any of its plans which might have an impact on local communities. With respect to the requirement for community involvement, the Board notes the Applicant's current initiatives in this regard, for example the efforts to increase the accessibility of its new Burnaby Terminal office by constructing the building outside the terminal's security fence. The Board would encourage Trans Mountain to keep local communities informed on any of its activities which might affect residents.

5.14 Clarification of the Board's Jurisdiction

Several participants at the hearing expressed frustration at the difficulty in determining which governmental agency has responsibility for dealing with air and water pollution problems in the North Burnaby area. They asked that the Board clarify its jurisdictional responsibilities for regulating emissions to the air and water from Trans Mountain's facilities in North Burnaby.

Under the NEB Act, the Board regulates the construction and operation of interprovincial and international pipeline facilities. When considering an application to construct and operate facilities, the Board may have regard to any public interest that in the Board's opinion may be affected by the granting or refusing of the application. This includes a consideration of possible environmental concerns relating to the construction and operation of the proposed facilities. The Board's Rules of Practice and Procedure set out the information to be filed in support of an application and this includes information to enable the Board to address environmental matters. To ensure that certain standards or practices are followed during construction and operation and to minimize adverse effects on the environment, the Board may impose conditions in any authorization which it grants. In addition, the Board has the authority, with the approval of the Governor in Council, to make general regulations which provide for the protection of the environment and the safety of the public and to which all pipeline companies must conform.

In the context of Trans Mountain's operations in the North Burnaby area, the Board has jurisdiction to deal with emissions to the air and water only insofar as these relate to the construction and operation of Trans Mountain's interprovincial pipeline facilities.

Other governmental bodies such as Environment Canada, Canadian Coast Guard, the B.C. Ministry of the Environment and Parks, the GVRD, the Corporation of the District of Burnaby, and the Vancouver Pod Corporation have various responsibilities for monitoring air and water quality in the North Burnaby area and regulating related emissions. Certain of those agencies have general responsibilities while others have more specific authority related to one or more issues. As with the Board, their responsibilities are determined by the legislative mandates under which they operate. Although the Board exercises its powers independently, it does have appropriate regard to the standards and guidelines of other agencies, and maintains a dialogue with these agencies in order to keep informed on any changes in their standards or guidelines, or in the way they exercise their mandates.

Chapter 6
Economic Matters

6.1 Economic Benefits

Trans Mountain submitted a social cost-benefit study of the proposed Stage 1 expansion. Under the base case assumptions it was estimated that the project would yield net benefits of $405 million (figures in 1987 dollars discounted at a real rate of 8 percent).

The Applicant also submitted a sensitivity analysis of the Stage 1 project assuming 5, 10, and 15 percent reductions in the incremental throughput volumes of heavy crude oil. This analysis indicated that, even if export volumes turned out to be 15 percent lower than assumed in the base case, the project would yield net benefits of $315 million.

No intervenors provided evidence or argued that the project would not yield economic benefits to Canada. Concern was expressed, however, that the costs of the potential negative environmental impacts were not taken into account in the analysis.

Decision

The Board has examined the cost-benefit analysis submitted by the Applicant. The Board recognizes that this analysis is necessarily based on many assumptions and long-range forecasts and that, consequently, the economic effects of the project may turn out to differ significantly from those estimated by the Applicant.

Nonetheless, given the size of the projected net benefits, the Board is satisfied that even if conditions turned out to be much less favourable than assumed by the Applicant, the Stage 1 expansion would still yield significant economic benefits to Canada.

The Board notes that Trans Mountain has not included any potential environmental costs in the cost-benefit analysis. While a cost-benefit analysis should take into account all environmental costs, in this case, the quantification of the potential environmental costs would be extremely difficult. Nevertheless, under reasonable assumptions the potential environmental costs would be small in relation to the calculated net benefits.

6.2 Socio-Economics

Trans Mountain submitted a study that estimated the economic and employment impact of the proposed facilities expansion on the District of Burnaby and the Greater Vancouver Regional District. The study concluded that the Trans Mountain expansion project would add about $16 million (1987 dollars discounted at a real rate of 8 percent) to the local economy.

The study estimated that the project would directly generate 70 man-years of local employment during the construction phase and 12 man-years continuing over the 21-year life of the project. In addition, it was estimated that the project indirectly would create 13 man-years of employment.

Based on these estimates, the Applicant argued that the Burnaby/Vancouver area would benefit from the project.

Two intervenors, Irene M. Gordon and Lawrence A. Boland, argued that the local economic impact study was unreliable. They maintained that the study was based on incomplete or arbitrary assumptions and that possible negative impacts on local residents were disregarded.

Decision

In evaluating the economic desirability of a project, the Board generally relies on a cost-benefit analysis rather than on an economic impact analysis. The reason is that a cost-benefit analysis attempts to quantify whether undertaking a project would result in an efficient use of resources and be in the economic interests of the country. An economic impact assessment, however, does not measure efficiency. It merely shows how an injection of funds will generate economic activity. Under this type of analysis all expenditures on capital and labour are shown as "benefits", whereas, more appropriately, these should be considered to be economic costs.

This notwithstanding, where a project would have a severe economic impact on a community, the Board may want to place some weight on the results of a local economic impact study. Such is not the case for Trans Mountain's application. Although the Board finds that the economic impact assessment presented by Trans Mountain suffers from the defects outlined by the intervenors who questioned Trans Mountain's witness, this is not critical because the Board has not given the assessment any weight. To assess the economic effects of the project the Board has relied on the cost-benefit analysis referenced in section 6.1.

Chapter 7
Financing

In its application, Trans Mountain indicated that it planned to finance the construction of the proposed additional facilities through the use of internally-generated funds and interim bank financing which would be replaced by long-term debt. In support of its position, the Company submitted copies of letters from the Canadian Imperial Bank of Commerce and Gordon Capital.

During the hearing, a Trans Mountain witness testified that financing would be available provided that the Board approved construction of the facilities and approved a reasonable return on the investment.

The intervenors did not challenge the Company's position in this matter.

Decision

The Board believes that Trans Mountain will be able to obtain the necessary financing for the proposed facilities and that its proposed method of financing the project is reasonable.

Chapter 8
Decision on Stage 1 Facilities

The Board finds that the proposed Stage 1 facilities are required and appropriate to transport the 1990 forecast throughput volumes. The Board is satisfied that the facilities can be constructed and operated safely and with minimal adverse environmental impact.

Therefore, the Board finds the proposed Stage 1 expansion to be in the public interest. Order No. XO-1-88, included in Appendix I of these Reasons, authorizes Trans Mountain to construct the Stage 1 facilities. This order will be subject to the conditions contained therein.

Chapter 9
Toll Design

9.1 Introduction

Trans Mountain's approved toll design methodology is comprised of three components: a basic light crude oil transportation toll (basic toll); special charges applicable to specific hydrocarbon streams and to the Edson gathering facility; and a surcharge for heavy crude oil shipments. The basic toll, which is determined on a volume-distance basis, is based on a combined cost of service for receipt, transportation and delivery.

The special charges for refined petroleum products and the Shell special stream are fixed monthly charges, while the Edson gathering toll is determined on a volumetric basis. The heavy crude oil surcharge is presently set at 15 percent of the basic toll and is intended to cover both increased operating costs and capacity reduction effects.

In its application, Trans Mountain proposed that the heavy crude oil surcharge be revised to 21 percent when the Stage 1 facilities are placed in service. The 21 percent would consist of a 15 percent fuel and power surcharge and a 6 percent capacity surcharge. Trans Mountain did not apply for fuel and power or capacity surcharges or credits for refined and semi-refined products.

The toll issues before the Board in these proceedings were as follows:

(i) the appropriateness of rolling the capital and operating costs of the applied-for Stage 1 and 2 facilities and the current special facilities into the basic transportation service rate base and cost of service used to determine the basic toll;

(ii) the appropriate methodologies for calculating heavy crude oil surcharges to reflect capacity utilization and fuel and power costs; and

(iii) the need for and appropriate methodologies for calculating credits or surcharges to be applied to the transportation of refined and semirefined products to reflect capacity utilization and fuel and power costs.

9.2 Applied-for Facilities

9.2.1 Toll Treatment of Applied-for Facilities

Trans Mountain applied to roll the costs associated with the applied-for Stage 1 expansion into the existing basic transportation service rate base and cost of service.

Trans Mountain suggested that, because the pipeline is a mature system and, therefore, substantially depreciated, a stand-alone treatment of the applied-for facilities would be inappropriate. Trans Mountain stated that the stand-alone approach is based on a recognition of the historical position of shippers and would result in an uneconomic charge to the new shippers. Trans Mountain presented evidence which indicated that if tolls for the applied-for Stage 1 facilities were set on an incremental

or stand-alone basis for heavy crude oil shippers, the result would be a heavy crude oil surcharge of more than 100 percent in the early years of the expansion.

The evidence also indicated that rolling the facilities into the basic transportation service cost pool would result in an increase in the basic toll of less than two cents per cubic metre for 1990. Trans Mountain forecast that the basic toll would be $7.560 per cubic metre in 1990, assuming that the Stage 1 expansion was approved and that the projected throughput forecast for heavy crude oil materialized. If the expansion were not approved and there were only 1 300 m^3/d of heavy crude oil and 24 000 m^3/d of light crude oil, Trans Mountain forecast that the 1990 light crude oil toll would be $7.546 per cubic metre.

The evidence indicated that, if the Stage 1 expansion occurred but no incremental volumes of heavy crude oil were to flow through the system, the basic light crude oil toll would be about $9.50 per cubic metre.

Intervenors, with the exception of the Airlines, the Independent Petroleum Association of Canada (IPAC) and Chevron, gave their unqualified support to the roll-in of the applied-for facilities for one or more of the following reasons:

(i) the facilities are required to transport the total forecast throughput and are not specifically attributable to any single stream;

(ii) the facilities are of a level and nature of those required for basic transportation service;

(iii) the facilities are for the use of all shippers and are capable of providing service to shippers of all streams; and

(iv) all shippers derive a substantial benefit from not being forced into allocation.

While IPAC acknowledged that the existence of the additional tankage at Burnaby and Edmonton will provide operating flexibility to Trans Mountain and benefits to all shippers, it concluded that the level and nature of the additional tankage at Burnaby exceeds or is inconsistent with the level and nature of tankage provided in basic service for existing shippers. IPAC submitted that the need for the applied-for tankage at Burnaby is caused, in large part, by the much reduced delivery rate that can be accommodated by ocean-going vessels. IPAC recommended that the cost of tankage be rolled in only to the extent that the ratio of tankage volumes to throughput volumes is reasonably similar for all shippers. In support of its position, IPAC noted that, while tanker-bound oil volumes will represent 22 percent of Burnaby deliveries, these volumes would use 45 percent of available tankage.

Imperial did not share IPAC's position, noting that heavy crude oil's use of tanks at Edmonton, on a percentage basis, is considerably less than its share of throughput. Imperial stated that the real question raised by IPAC is whether Trans Mountain should examine the relative use of tankage by each individual product stream and shipper and develop separate charges accordingly. Imperial submitted that such an examination is unnecessary and undesirable.

While Chevron was not opposed to the roll-in of the Stage 1 facilities, it suggested that the approval of the expansion should be subject to certain conditions. A discussion of Chevron's position follows in Section 9.2.2.

Decision

The Board believes that the applied-for Stage 1 facilities, including all of the applied-for tankage at Burnaby, are of a level and nature required for basic transportation service. Accordingly, the Board directs that the cost of the applied-for Stage 1 facilities be rolled into the basic transportation service rate base and cost pool.

9.2.2 Financial Guarantees for the Cost of New Facilities

During these proceedings, various parties addressed the need for some form of financial guarantees or other back-stopping arrangements which would shift the risk of a failure of projected throughputs to materialize onto the parties who stood to benefit from the expansion.

As part of its final argument, Chevron maintained that, as a condition precedent to approving the expansion, the Board must be satisfied that either:

(i) the facilities are reasonable, necessary and not excessive for the legitimate purposes of the utility; or,

(ii) to the extent that this is not the case, adequate safeguards exist to ensure that any proposed facilities that are unreasonable, unnecessary or excessive, are not paid for by the existing captive customers of Trans Mountain.

Chevron contended that, as a shipper of only light crude oil, it would not benefit from the proposed Stage 1 expansion. On the contrary, because of the uncertainty regarding heavy crude oil throughput projections, it would face substantial risk of increased transportation costs if the projected throughputs did not materialize and the expanded facilities were not used. Chevron argued that the Board should impose conditions that would shift that risk onto the heavy crude oil shippers who, in Chevron's view, were the beneficiaries of the expansion. Chevron proposed that Trans Mountain be required to enter into throughput agreements or equivalent back-stopping support arrangements with the heavy crude oil shippers.

In final argument, the Airlines supported the imposition of some form of support arrangement on the heavy crude oil shippers as a condition of approval of the Stage 1 facilities.

The Applicant and several other intervenors argued that the increased capacity provided by the expansion would benefit all shippers in that it would avoid the need to apportion the volumes tendered for transmission. In their view, it would be inappropriate to require the heavy crude oil shippers or Trans Mountain to assume the financial risk of facilities which benefit all shippers. Instead, the Board should satisfy itself that the facilities are necessary before approving them.

Chevron countered that, if faced with the prospect of allocation on an ongoing basis, it had at its disposal various options to protect its domestic market requirements such as applying for priority status under the provisions of Trans Mountain's tariff or increasing its nomination up to its refinery's capacity. Chevron also argued that, even with an expansion of the Trans Mountain system, the

possibility of allocation would re-emerge if producers of heavy crude oil attempted to export greater volumes via Trans Mountain than those required to support the Stage 1 facilities.

Decision

Under Part III of the NEB Act, the Board considers whether the proposed expansion is and will be required by the present and future public convenience and necessity. If the Board were persuaded that any of the applied-for facilities were unreasonable, unnecessary or excessive the Board would simply not approve them. It would be inappropriate for the Board to base its decision regarding these facilities on whether an individual shipper is likely to benefit from the expansion.

Requiring Trans Mountain to enter into throughput agreements or obtain other financial guarantees from the heavy crude oil shippers as a condition precedent to the approval of an expansion to an existing mainline transmission system would be an unusual step. Given that the Board has decided that the throughput forecast is reasonable and that the proposed facilities are necessary to transport the totality of the projected volumes, the Board has concluded that it would not be appropriate to impose such a condition.

9.3 Toll Treatment for Special Facilities

Trans Mountain applied to roll the costs associated with the existing special facilities charges, with the exception of the crude oil loading charges at Westridge Terminal, into the rate base and cost of service used to derive the basic toll.

Trans Mountain contended that the special charges pertain to essential components of the basic transportation of refined and semi-refined petroleum and that the handling of these materials requires facilities essentially identical to those used for the receipt and delivery of light crude oil. The Company further submitted that the imposition of additional special charges for basic transportation services identical to that provided for light crude oil is no longer justified.

Trans Mountain suggested that the special facilities charges may have been appropriate during the period when it was primarily a light crude oil line and when the feasibility of transporting refined and semi-refined products on the system was still being established. However, the Company pointed out that it is now shipping various hydrocarbon streams on a regular basis and that the current circumstances warrant a review of the overall system toll design to ensure consistency in the application of toll-making principles.

Trans Mountain now views itself as a common carrier of a variety of hydrocarbons and therefore believes it has an obligation to provide the same basic transportation service to shippers of different hydrocarbon streams.

Trans Mountain stated that the proposed rolling-in of special charges is non-discriminatory, economically sound, cost-based to the extent practical, fair, easy to administer, and predictable.

Amoco Canada Petroleum Company, Ltd. (Amoco) concluded that the determination of whether a facility should be classified as special or as part of basic transportation service depends, in part, on how the particular pipeline system has developed over time. For example, Amoco stated that it would be unfair to provide delivery service to one shipper as part of basic transportation service while surcharging others for delivery service.

Trans Mountain and Petro-Canada took the position that basic service on the Trans Mountain system should be defined using a functional concept for all streams. They believed that basic service should consist of receiving, transmission and delivery, including tankage, because the facilities associated with these functions are essential elements of basic transportation service.

Petro-Canada stated that rigorous application of the user-pay approach is inconsistent with the reality of Trans Mountain's multi-stream pipeline operation and does not give proper recognition to the basic service concept.

IPAC believed that the concept of basic service, as defined by Trans Mountain for toll design, becomes inappropriate as the requirements for storage, terminalling and transportation facilities evolve uniquely for each shipper. IPAC was of the view that, in the long run, it may be desirable that the basic services such as receiving, transmission and delivery be unbundled for toll-setting purposes.

A number of intervenors submitted that a facility might not fall within the definition of basic transportation service within the existing toll framework if the facility were beyond the level and nature of the service normally provided as part of basic transportation service, or if the cost of the facility were significantly higher than the cost of providing a corresponding facility for an equivalent throughput volume of light crude oil.

Decision

The Board believes that the capital and operating costs of facilities on the Trans Mountain system should be rolled into the common rate base and cost pool if the facilities are of a level and nature required to provide a basic transportation service for a multi-stream pipeline system. This recognizes that the basic toll includes the costs of providing similar services to all hydrocarbon streams.

The Board will apply this test to determine the appropriate toll treatment for each of the special charges currently in effect on the Trans Mountain system.

9.3.1 Refined Product Charges

Trans Mountain applied to roll in the facilities dedicated to serving Petro-Canada and Imperial for the following reasons:

"TMPL is a single pipe batch system. The provision of receipt, transmission and delivery facilities are essential elements of the basic transportation service. Transportation of refined products, which was experimental in 1985, has become a basic service. The special facilities provided in the Petro-Canada and Esso agreements are now basic delivery facilities. The same is true of the Shell facilities.

Rolling in the special facilities is an extension of the rate design adopted in the 1985 NEB decision. Thus rolling in the cost of these facilities is consistent with TMPL's goal and mandate to treat all shippers equitably."[1]

Trans Mountain stated that it was applying to roll in the cost of refined products receiving and,delivery facilities because they are now part of a routine service. Trans Mountain also stated that it was applying to roll in the common refined products facilities because they benefit other shippers on the line.[2]

Trans Mountain indicated that originally the refined products facilities were not rolled in because, with the exception of Petro-Canada, there was no shipper support and, therefore, the service charge concept was initiated in order to assure shippers that they were not carrying undue costs.

Intervenors did not support Trans Mountain's position to roll in all of the refined products special facilities. Some intervenors were of the view that special charges should reflect only the differential costs between facilities normally required for light crude service and those required for the special hydrocarbon streams.

The Board's decisions in respect of rolling in the capital and operating cost of the receiving, transmission and delivery facilities specially charged to refined products are provided separately in the following sections.

9.3.1.1 Dedicated Receiving Facilities

Trans Mountain proposed to roll the two 406.4 mm receiving lines for Petro-Canada and one 508.0 mm receiving line for Imperial into the basic crude oil service. The Applicant was of the view that these receiving lines are part of a basic receiving service provided to any hydrocarbon stream.

Trans Mountain submitted that all facilities owned by it, which are within its property boundaries and which meet the test of being part of basic service, should be rolled in. Trans Mountain also noted that it owns two short lengths of Petro-Canada's receiving lines which are outside the boundary of the Edmonton terminal.

A company witness indicated that Trans Mountain's proposal was consistent with a recent change in company policy requiring that all new pipelines be owned by Trans Mountain at the point where they enter its property. Trans Mountain indicated that the light crude oil shippers historically provided and

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1 Exhibit B-9, Tab 2, pages 2-1 and 2-2.

2 The approved 1988 rate base and revenue requirement for the receiving and delivery facilities specially charged to refined product shippers are $4.9 million and $1.5 million respectively, and for common facilities specially charged to refined product shippers they are approximately $2.5 million and $761,000.

continue to provide their own receiving lines upstream of the custody transfer meter at the Edmonton terminal.

Imperial, Petro-Canada and Shell opposed rolling in the dedicated receiving lines because they are upstream of the custody transfer meters. They were of the view that the refined products receiving lines owned by Trans Mountain at Edmonton should not be rolled in because the crude oil receiving lines are not owned by Trans Mountain. They saw somewhat of an inconsistency if the products lines upstream of the custody transfer meters were rolled into the basic transportation cost pool.

Gulf Canada Resources (Gulf) recognized that receiving and delivery are part of basic service but only within the context of different classes of service. In other words, the capital and operating costs of the receiving and delivery facilities for each hydrocarbon stream within a class could be rolled into the revenue requirement for that class and a separate toll could then be calculated for it.

Amoco originally opposed rolling in the receiving lines but, under cross-examination, indicated that it could accept rolling in these facilities if they came within the definition of basic service and if they were within the normal boundary of Trans Mountain's property.

Decision

Trans Mountain has applied to roll in the receiving lines on a basis which would be consistent with its current corporate policy owning all receiving lines within its property boundary at Edmonton. However, the receiving lines for other hydrocarbon streams which are located upstream of the custody transfer meters are not owned by Trans Mountain. Consequently, the Board believes that to roll in the costs of the receiving lines located upstream of the custody transfer meter for Petro-Canada and Imperial would provide those shippers with a receiving service which is inconsistent with the level of service presently provided to the other hydrocarbon streams.

Accordingly, Trans Mountain's application to roll in the costs associated with the dedicated receiving lines of Imperial and Petro-Canada is denied. The Board directs Trans Mountain to roll in only the capital and operating costs, if any, associated with the special facilities located downstream and inclusive of the custody transfer meters at the Edmonton terminal. The remaining surchargeable capital and operating costs should continue to be recovered through a fixed monthly charge.

9.3.1.2 Common Refined Products Facilities

Trans Mountain proposed to roll in the following transmission-related facilities currently being specially charged to Petro-Canada and Imperial:

(i) metering facilities at Edmonton;

(ii) mainline modifications and additions to minimize contamination and provide for interface detection and automatic scraper launching and bypass; and

(iii) expansion of the central control system to accommodate additional data and the automation of certain refined products facilities.

Trans Mountain took the position that, except for some $32,200 of quality control costs[1] that benefit only the shippers of refined products, the transmission-related special facilities provide a common benefit to all shippers.

Gulf opposed the rolling in of the common facilities. A Gulf witness was not convinced that the facilities required to ensure batch segregation and reduce contamination of the refined products would have been required for the shipment of other hydrocarbon streams.

Imperial looked at the hardware required to provide light crude oil service and determined that, if the refined products facilities were similar, they should be rolled in. On the basis of its test, Imperial would exclude only the colour analyzers and associated control systems.

Amoco would not roll in the modifications for automatic scraper launching and bypass. It took the position that, although the facilities provide some additional benefit, they are not necessary and are really there because of the refined products.

Shell was of the view that the quality control items for refined products should not be rolled in because they are different from those required for crude oil and, therefore, should not be considered as being part of basic service.

Petro-Canada was of the view that most of the mainline modifications such as the installation of interface detection equipment and the removal of dead legs should be included in the basic transportation service rate base because they enhance the efficient operation of the pipeline system for the benefit of all shippers. Petro-Canada also believed that facilities such as scrapers provide a necessary basic service on a multi-stream pipeline system.

However, Petro-Canada believed that the cost of the colour analyzers should be paid by shippers of refined products through a special charge.

Decision

Trans Mountain has changed from a single hydrocarbon stream pipeline to one that handles a multiplicity of streams through a single mainline system. While recognizing that certain modifications to the mainline were initially made in order to allow refined products streams access to the system, the Board has been persuaded that many of these modifications, such as the interface detectors and the facilities and equipment required to minimize cross-contamination, generally enhance the overall efficiency of the system. However, there are certain items or modifications which are related only to the provision of service to Petro-Canada and Imperial.

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[1] Exhibit B-42

Having regard to the changed nature of the operation of the Trans Mountain system, the Board directs that the costs of the common refined product facilities, with the exception of the colour analyzers and the quality control costs identified by Trans Mountain, be rolled into the basic transportation service rate base and cost of service. The capital and operating costs of the remaining specially-charged facilities should continue to be recovered in a fixed monthly charge.

9.3.1.3 Dedicated Delivery Facilities

Trans Mountain proposed to roll in the following dedicated delivery facilities located at Kamloops: delivery, relief and metering facilities for Petro-Canada and Imperial; land opposite the Petro-Canada terminal; and one 168 mm re-injection line for Imperial.

Trans Mountain's position was that these measurement and delivery facilities are part of the basic delivery service and should be rolled in for that reason.

Consistent with its position regarding receiving lines, Shell indicated that it would include delivery facilities up to and including the custody transfer meter in the basic delivery service.

Imperial took the position that only the delivery, relief and metering facilities for Petro-Canada and Imperial, and the re-injection facilities associated with its re-injection line should be rolled in because they are of a level and nature of facilities provided for light crude oil. However, Imperial would not roll in the re-injection line upstream of the re-injection point.

Petro-Canada would roll in all the dedicated delivery facilities. Petro-Canada would not roll in the re-injection line because this particular facility is not provided as a basic service at any other terminal for any other shipper. It would appear to be a unique service provided for Imperial which should be paid for by Imperial on a special charge basis. However, if there is a meter on the line, Petro-Canada would support rolling the facilities downstream and inclusive of the meter into the basic transportation service rate base.

With respect to the land opposite its terminal, Petro-Canada believed that this land should be included in the common rate base. Petro-Canada noted that relief facilities are located on this land and that Trans Mountain made it clear in evidence that these facilities benefit the entire system.

Amoco originally opposed Trans Mountain's proposal but, under cross-examination, indicated that, if delivery facilities were within the concept of basic service and the norm provided to other shippers, it would not oppose their inclusion in the basic transportation service rate base.

Gulf was of the view that, since the facilities can only be used by one shipper, they should not be rolled in.

Decision

The dedicated delivery facilities, while providing a basic service only to the refined product shippers, are of a level and nature which either would be

required to provide basic crude oil service at Kamloops or are currently required to provide basic crude oil delivery service at Burnaby. Consistent with its decision regarding receiving lines, the Board directs that Trans Mountain include only the capital and operating costs of the refined products dedicated delivery facilities located upstream of and inclusive of the custody transfer meter in the basic service cost pool. The remaining surchargeable capital and operating costs are to be recovered through a fixed monthly charge. Regarding Imperial's re-injection line, all costs, with the exception of those associated with the re-injection point itself, are to be recovered through a fixed monthly charge.

9.3.2 Shell Special Stream Charges

Trans Mountain proposed to roll the capital and operating costs associated with the Shell special stream facilities,[1] as described below, into the basic transportation service rate base and cost of service:

(i) the 610 mm delivery line from the Burnaby terminal to the Westridge terminal (Westridge dock line) located on a right-of-way granted to Trans Mountain (presently 50 percent allocated to Shell special stream service);

(ii) the 406 mm delivery line from Westridge to Shell's refinery;

(iii) the right-of-way; and

(iv) the control equipment and instrumentation.

Trans Mountain stated that allocation of 50 percent of the Westridge dock line to Shell was made when there was little prospect for other use of the line. In view of the current and prospective use of the line for tanker loading, Trans Mountain believed that it is no longer appropriate to allocate 50 percent of the Westridge dock line to Shell.

Regarding the 406 mm delivery line, Trans Mountain acknowledged that this facility is located on property outside its Burnaby terminal. It was of the view that the right-of-way was acquired and the line constructed to provide Shell with a basic delivery service similar to that provided for other hydrocarbon streams.

None of the intervenors supported Trans Mountain's proposal to roll in all of the Shell special stream facilities. IPAC, Imperial, Gulf and Amoco opposed rolling in any of the Shell special stream charges.

Shell stated that it could accept the 406 mm delivery line as a special charge facility, acknowledging that this facility, while within Trans Mountain's property boundaries, is downstream of the custody transfer point at the Burnaby terminal. Shell also understood that Trans Mountain had to acquire additional property rights to build the line and that this additional property is certainly not within the normal boundary of the Burnaby terminal.

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[1] The approved 1988 Shell special stream rate base and revenue requirement are approximately $477,000 and $187,000, respectively.

Petro-Canada supported the rolling in of the 610 mm line because it appears that the dock line is going to be used more frequently and by more shippers. However, Petro-Canada did not support rolling in the other Shell special stream charges.

Decision

The Board recognizes that, at the time Shell and Trans Mountain entered into the agreement whereby Shell agreed to pay 50 percent of the Westridge dock line costs, Shell was expected to be the only user of the line. However, the evidence indicated that, since the agreement was signed, this facility has been and will continue to be used by other shippers. The Board is of the view that the costs of a facility which is in common use by a number of different streams should be rolled into the basic crude oil service. Trans Mountain is directed to include in the basic transportation service cost pool, the capital and operating costs of the Westridge dock line currently surcharged to Shell. As well, the capital and operating costs of the control equipment and the instrumentation facilities are to be rolled into the basic service cost pool.

Because the 406 mm line was built to provide a delivery service to Shell, and is not located within the normal property boundary of the Burnaby terminal, the Board considers that this facility and the right-of-way provide a unique service. Accordingly, Trans Mountain's application to roll the associated capital and operating costs into the basic service cost pool is denied.

9.3.3 Edson Gathering System

Presently, the Company charges the shipper on the Edson gathering system a special charge for gathering services provided by Trans Mountain from the Edson gas plant into Trans Mountain's Edson station. The Company acknowledged that this gathering activity is a service which is not usually considered to be a normal common carrier service and that, in principle, it should continue to have a separate toll. However, because the annual cost of service associated with these facilities is less than $36,000, Trans Mountain was of the view that the service no longer warrants a special charge. It agreed that it would not be a burden to continue calculating a special charge for this system.

In general, intervenors believed that, as a matter of principle, the Edson gathering service should continue to be separately charged. However, Imperial thought that the service could be rolled into the basic service because provision of a separate toll is neither cost-effective nor warranted.

Decision

While the Board agrees that the annual cost of service of these facilities is relatively small, the Board is of the view that the service provided is of a unique nature and beyond the basic service provided to other users of the pipeline

system. Consequently, the Company's application to roll the cost of these facilities into the basic service cost pool is denied.

9.4 Tankage Credits

Petro-Canada and Shell took the position that those shippers who provide their own tankage should be given a credit against the basic light crude oil toll.

Trans Mountain stated that, because the evidence is clear that both companies derive substantial benefit from Trans Mountain's tankage, they should not be entitled to any credit. In support of its position on this issue, Trans Mountain referred to page 31 of the Board's March 1985 Trans Mountain decision wherein the Board stated the following:

> *"Although Gulf refined products do not use the tankage directly, the Board finds that the tanks are essential for the scheduling and efficient operation of the pipeline. The Board believes that it is appropriate for refined products shippers to pay the full crude oil toll as tanks assist in the scheduling which makes the delivery of products possible. The Board is of the view that all shippers receive the benefits and, consequently, all shippers should pay for the cost of tankage."*

Trans Mountain concluded that nothing of significance has changed since the Board made that decision. Trans Mountain stated that the tankage owned by Petro-Canada cannot be utilized by Trans Mountain in its scheduling, and thus is of no assistance to the Company.

Trans Mountain noted that Shell's special stream uses Trans Mountain's Edmonton tankage and that Shell uses Trans Mountain's Burnaby tanks in at least three ways. Firstly, when Shell wants to use its 406 mm line at Westridge for its special stream, crude oil in the 610 mm line to Westridge must be pumped back into the Burnaby tanks in order to clear the line for the special stream. Secondly, because Shell lacks sufficient storage at its own Burnaby facilities, Trans Mountain, from time to time, must hold the excess special stream in its Burnaby tanks. Finally, the interface between the special stream and the light crude oil in the batch goes into Trans Mountain's tanks.

Trans Mountain noted that Imperial did not advance a claim for tankage credits even though it uses the tanks in the same way as Petro-Canada. Imperial's position on tankage credits was based on the Board's March 1985 Trans Mountain decision on this issue. Imperial stated that the evidence in these proceedings supported the conclusion that all shippers enjoy benefits from system tankage and therefore, there appears to be no reason to assign tankage credits.

In IPAC's opinion, a valid argument can be made for providing tankage credits, similar to those provided by IPL, to shippers who do not use system tankage or provide their own.

Gulf believed that there is a reasonable case for having a credit for tankage.

Petro-Canada admitted that it derives a benefit from the Edmonton tanks because they assist in the scheduling of batches and the efficient operation of the pipeline and that it uses Trans Mountain's Burnaby tanks. However, Petro-Canada believed that its own tankage provides the Trans Mountain

system with the same benefits as system tankage. Petro-Canada concluded that it is unjustly discriminatory to charge the same toll to a shipper who provides its own tankage as to one who does not.

Shell noted that Trans Mountain has attempted to establish that all shippers should pay for tankage because system tankage is a benefit to all shippers. Shell submitted that the issue is not one of the receiving or balancing of benefits but one of the provision of basic service and the development of cost-based tolls.

Shell suggested that shippers should receive credits if an element of basic service is not provided to a shipper by Trans Mountain but is provided by the shipper itself. Shell also concluded that, in its case, such a credit should only apply to those volumes that flow directly into Shell's tankage at its Shellburn refinery.

Decision

The Board has been persuaded by the evidence that the issue is not one of the balancing of benefits but one of the provision of basic service. A shipper that does not use an element of basic service, such as tankage, should be entitled to a credit for that service. Therefore, Trans Mountain is directed to develop a methodology for determining such tankage credits for those shippers who do not use receipt or delivery tankage and to include such credits and the methodology in its toll application for the 1989 test year. In the case of Shell, only those volumes that are "tight-lined" directly into the Shell refinery at Shellburn will be eligible for a tankage credit.

9.5 Fuel and Power Surcharges/Credits

Under Trans Mountain's current toll design, relative fuel and power costs for the transportation of heavy crude oil versus light crude oil are reflected in the tolls by applying a surcharge to the light crude oil toll. During the hearing, the appropriate level of the heavy crude oil fuel and power surcharge was examined. As well, the Board considered whether there should be fuel and power credits for refined and semi-refined products transported by Trans Mountain.

9.5.1 Fuel and Power Surcharges for Heavy Crude Oil

Trans Mountain applied for a 15 percent heavy crude oil fuel and power surcharge, to be effective when the Stage 1 facilities are placed in service. It was of the view that a surcharge level of 15 percent best reflects the extra variable costs associated with transporting heavy crude oil. It also stated that the 15 percent could be expected to remain an appropriate level even with varying throughputs.

In estimating the level of fuel and power surcharge for heavy crude oil, Trans Mountain used an incremental cost approach and assumed optimal pump configurations in its computer simulations. Trans Mountain believed that this approach reflects the actual costs which would be incurred in operating the pipeline and that the use of optimal pump configurations captures the true costs associated with different streams without penalizing any stream.

IPAC, the Airlines, BP Resources Canada Limited (BP Resources), and Northridge Petroleum Marketing Inc. (Northridge) generally supported Trans Mountain's approach to estimating the heavy crude oil fuel and power surcharge. Although not advocating any particular methodology, the Alberta Petroleum Marketing Commission (APMC) indicated that it supported a 15 percent fuel and power surcharge.

Imperial expressed concern that Trans Mountain's proposed methodology for estimating the fuel and power surcharge used the incremental cost of power rather than the average cost of power. Imperial argued that it is inappropriate for the heavy crude oil surcharge to reflect incremental unit costs of power because they are inflated by higher electric power demand charges incurred as a result of Trans Mountain's batching operations.

Amoco advocated a methodology which compares average fuel and power costs for light and heavy crude oils. Under this approach, the costs for each hydrocarbon stream are derived assuming that the pipeline is transporting only that crude oil type, at the pipeline's sustainable capacity. According to Amoco, that methodology would result in a heavy crude oil fuel and power surcharge of 2.4 percent, after the Stage 1 facilities are in place. During cross-examination by Trans Mountain, Amoco's witnesses admitted that Amoco's approach assumed higher than forecast flows for both heavy and light crude oil, and that Amoco's calculation of the surcharge used power cost figures which were inappropriate.

Shell argued that no satisfactory method has been found to reflect differential power costs in a fuel and power surcharge. Shell suggested that power cost differentials could be accounted for in the calculation of a capacity surcharge by categorizing power costs as capacity-related, thereby eliminating the need for separate fuel and power surcharges.

Gulf proposed a capacity surcharge methodology which would also eliminate the need for a separate power surcharge.

Trans Mountain indicated that it found the fuel and power surcharge methodologies suggested by intervenors to be deficient in that either flows were not accurately reflected or certain pipeline characteristics were disregarded.

Decision

One of the goals in establishing tolls is to have each hydrocarbon stream pay the costs associated with its transportation. Consequently, any methodology used to estimate fuel and power surcharges should allocate costs on the basis of how different streams actually affect power costs Having considered the various approaches addressed during the hearing, the Board has decided that the incremental cost methodology proposed by Trans Mountain is the most suitable for estimating the appropriate level of fuel and power surcharge for heavy crude oil transported on the system. The Applicant uses essentially the same approach in forecasting its annual fuel and power costs for toll applications.

The Board notes Imperial's concern that the incremental cost methodology proposed by Trans Mountain considers batching operations and thus reflects more than just the differences in properties between light and heavy crude oil. While acknowledging this as a possible shortcoming of Trans Mountain's methodology, the Board nevertheless feels that this methodology is the most appropriate, for the reasons given by Trans Mountain.

The Board therefore finds that a 15 percent fuel and power surcharge on heavy crude oil, as derived by Trans Mountain, is appropriate. Trans Mountain is directed to reflect this surcharge in its tolls effective 1 January 1989.

9.5.2 Fuel and Power Credits for Refined and Semi-Refined Products

Trans Mountain did not apply for fuel and power credits for refined and semi-refined products because it believed that any differential power costs would be small since the physical properties of these products are similar to those of light crude oil. During the hearing, Trans Mountain indicated that fuel and power credits for refined and semi-refined products could be calculated using the same incremental cost methodology that it had proposed for heavy crude oil. Using this methodology, Trans Mountain estimated that the power-cost savings for refined and semi-refined products would be only $10,000 per year in 1990, assuming no expansion. It was the Company's position that such savings for refined and semi-refined products were too small to warrant a separate toll treatment.

In commenting on the appropriateness of fuel and power credits on its system, Trans Mountain contrasted the operation of its pipeline with that of IPL. Trans Mountain pointed out that shippers on the IPL system transport batches which may extend through ten pump stations whereas Trans Mountain transports batches which are too small to extend between adjacent stations. According to the Applicant, the consequence of this is that potential savings for low density materials would not be fully realized on its system. In Trans Mountain's view, any power cost savings for refined products would be very small, even after Petro-Canada begins shipping its energy stream.

Petro-Canada was of the view that, if Trans Mountain's batching operations are suppressing the power cost savings for refined and semi-refined products, the increased volumes of refined products forecast for 1990 would overcome those effects. Petro-Canada advocated that the methodology used by IPL to calculate power cost savings credits for NGL and refined products transported on its system be applied to the Trans Mountain system.[1] Based on that method, Petro-Canada submitted that shippers of refined and semi-refined products on the Trans Mountain system should receive a power cost savings credit of approximately $196,000 per year.

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[1] The IPL methodology was described in the Board's February 1984 Reasons for Decision in the matter of a toll application by IPL. The methodology takes an average cost approach and calculates power cost credits for NGL/refined products based on the theoretical ratio of power required to transport NGL/refined products versus light crude oil on the IPL system. This ratio is applied only to the portion of IPL's power costs related to energy.

Trans Mountain was of the view that the approach advocated by Petro-Canada overstated the power cost savings. During cross-examination of Petro-Canada's witnesses, Trans Mountain suggested that adjustments should be made to Petro-Canada's calculation in order to reflect consideration of elevation changes along the pipeline and to remove, from the calculation, costs associated with fixed station loads and the transportation of heavy crude oil. The net effect of making these adjustments would be to reduce the estimated power cost savings to $58,000. Petro-Canada's witnesses did not dispute any of Trans Mountain's figures but were not certain that all of the adjustments suggested by the Applicant were reasonable.

Amoco suggested that the methodology which it proposed for calculating heavy crude oil power surcharges could be applied to refined products. That method would result in a 0.5 percent fuel and power surcharge for refined products, post-Stage 1 expansion.

As they did with respect to the heavy crude oil fuel and power surcharge, Shell and Gulf suggested that power cost differentials be included in the calculation of the capacity surcharge.

Other than Trans Mountain, no party to the hearing opposed fuel and power credits for refined and semi-refined products.

Decision

In principle, the differential in fuel and power costs should be reflected in Trans Mountain's tolls. The evidence indicates that fuel and power costs on the Trans Mountain system are lower for transporting refined and semi-refined products than for transporting light crude oil. Therefore, refined and semi-refined products should receive a fuel and power credit.

The incremental cost methodology for fuel and power surcharges or credits, as discussed during the hearing, provides the best estimate of the actual fuel and power cost differentials associated with the transportation of refined and semi-refined products on the Trans Mountain System. Accordingly, the Board directs Trans Mountain to use the incremental cost methodology to determine the appropriate level of fuel and power credits for refined and semi-refined products.

Trans Mountain is directed to include a fuel and power credit for refined and semi-refined products in its next tell application. This credit is to be expressed as a percentage and is to be calculated using the same incremental cost approach used by Trans Mountain to derive the heavy crude oil fuel and power surcharge.

9.6 Capacity Surcharges/Credits

In its RH-1-86 September 1986 Reasons for Decision regarding Trans Mountain's tolls, the Board indicated that the possible displacement of light crude oil by heavy crude oil was a major concern and noted that the tolls for heavy crude oil should be equitable in the sense of covering their appropriate share of transportation costs. At that time, the Board approved a 15 percent surcharge on heavy crude oil shipments in respect of increased operating costs and capacity reduction effects. The Board emphasized that its decision was designed to cover the shorter-term operating conditions, then currently projected, pending a broader and more comprehensive examination of the issue at a future public hearing.

Trans Mountain applied for a six percent capacity surcharge on heavy crude oil, to be effective after the Stage 1 facilities are placed in service.

9.6.1 Necessity for Capacity Surcharges/Credits

Evidence adduced during the proceedings indicated that the different hydrocarbons flowing on Trans Mountain's system affect capacity of the pipeline in varying manners. The pipeline's capacity generally decreases when light crude oil throughput is displaced by heavy crude oil volumes. However, if lighter hydrocarbons, such as refined products, methanol, or MTBE displace light crude oil, then the capacity of the pipeline tends to increase.

In its application, Trans Mountain proposed that a six percent surcharge be levied on heavy crude oil after the completion of the Stage 1 expansion in order to recognize that it is more expensive to supply capacity for heavy crude oil than for light crude oil. During the hearing, the Company indicated that a zero percent capacity surcharge would be just as appropriate as six percent and that its preference was that there be no capacity surcharge on heavy crude oil. However, Trans Mountain chose not to amend its application to implement a six percent capacity surcharge.

In principle, Trans Mountain did not oppose capacity credits for shippers of refined and semi-refined products on its system. However, the Company felt that such credits would not be appropriate since the physical characteristics of these products are very similar to those of light crude oil and because of Trans Mountain's batching operations.

Interested parties to the proceedings took a wide range of positions regarding the appropriateness of capacity surcharges. IPAC, the Airlines, Gulf, Northridge, Petro-Canada, Shell, and the APMC supported the concept of capacity surcharges and/or credits on the Trans Mountain system. Murphy argued that, if it were possible to derive a cost-based capacity surcharge for heavy crude oil, then it would be reasonable to impose such a surcharge. Amoco and Imperial did not believe that capacity surcharges or credits would be appropriate. Husky thought that the Board should defer any final decision regarding the appropriateness of capacity surcharges on the Trans Mountain system pending further study.

Decision

The evidence shows that the characteristics of different hydrocarbons affect capacity of Trans Mountain's pipeline in different ways. The Board notes that the varying effects on capacity may have cost implications for the pipeline. The

Board, therefore, finds that the toll design for Trans Mountain should reflect the impact of different hydrocarbons on capacity-related costs of the Trans Mountain system.

9.6.2 Methodologies for Determining Capacity Surcharges/Credits

There was much discussion during the hearing regarding methodologies that might be used to determine the appropriate levels of capacity surcharges/credits for the various hydrocarbon streams transported on the Trans Mountain system. The various methodologies proposed for capacity surcharges for heavy crude oil would result in surcharges ranging from 6 to 138 percent after the commissioning of Stage 1 facilities.

In its application, Trans Mountain proposed that calculation of a capacity surcharge for heavy crude oil be based on the concept of an alternate pipeline. Using this approach, Trans Mountain concluded that a six percent heavy crude oil capacity surcharge would be appropriate after the Stage 1 expansion. That level of capacity surcharge was derived from the ratio of capital costs for two notional pipelines:

(i) one designed to transport 30 000 m^3/d of light crude oil; and

(ii) the other designed to transport 30 000 m^3/d of heavy crude oil.

Trans Mountain's approach in deriving the capital costs of the notional pipelines assumed optimal configurations for tankage, receiving, and delivery facilities for each hydrocarbon stream. However, it restricted the diameter of the notional pipelines to that of the existing facilities. The 30 000 m^3/day chosen as the capacity of the notional pipelines is the post-Stage 2 capacity of the Trans Mountain system and represents the maximum economic capacity for heavy crude oil that can be transported with reasonable economic efficiency.

A sensitivity study provided by Trans Mountain indicated that surcharges calculated using its proposed methodology depend on the number of streams assumed to flow and the capacity assumed for the notional pipelines.

In arriving at the proposed six percent heavy crude oil capacity surcharge, Trans Mountain assumed that tankage for the notional all-light and all-heavy crude oil pipelines would be required to accommodate 11 streams of light crude oil and two streams of heavy crude oil respectively, these being the number of streams presently transported on its system. When questioned whether it would be more appropriate to exclude the cost of tankage from the surcharge calculation, Trans Mountain's toll design witnesses indicated that to do so would fail to recognize the number of streams handled by the pipeline.

Trans Mountain's toll design witnesses indicated that the six percent heavy crude oil capacity surcharge determined by its proposed method was intended to remain in place for an extended period of time and that it should remain constant unless market conditions changed or the configuration of the Trans Mountain system changed.

Trans Mountain suggested that, if the Board were to require that a heavy crude oil capacity surcharge be implemented prior to the proposed facilities expansion, Trans Mountain should be requested to compute the appropriate level of surcharge using its alternate pipeline methodology but based on the existing pipeline configuration and capacity.

Trans Mountain indicated that application of the alternate pipeline approach to refined and semi-refined products showed that essentially the same facilities are required to transport those products as are required for light crude oil. Trans Mountain concluded that a zero percent capacity credit would be appropriate for refined and semi-refined products.

Imperial, Murphy, and BP Resources indicated that, if there must be capacity surcharges/credits, then they would advocate using Trans Mountain's methodology.

Evidence showed that, if Trans Mountain's proposed methodology were modified to consider optimally designed pipelines (i.e. with respect to pipe diameters), then a heavy crude oil capacity surcharge of 13.5 percent would result, based on a capacity of 30 000 m^3/d for the notional pipelines. Trans Mountain rejected such a modification arguing that it would be an overly hypothetical exercise which ignores the existing situation. Trans Mountain was of the view that surcharge results become less reliable the more one moves away from the existing system by using hypothetical facilities.

Another approach to determining capacity surcharges/credits, referred to as Methodology 1, was advocated by Shell and the APMC. This methodology, described in Appendix IV of the Board's IPL Decision, compares the capacity of the pipeline with only light crude oil flowing, to the capacity with only heavy crude oil flowing. The difference between the all-light and the all-heavy crude oil capacities is then divided by the heavy crude oil capacity in order to attribute the change in pipeline capacity to heavy crude oil. The surcharge level is then determined by multiplying the capacity factor by the percentage of the revenue requirement which is capacity-related.[1] Shell believed that, if Methodology 1 were used to estimate surcharge/credits on the Trans Mountain system, then there would be no need for fuel and power surcharges or credits.

Amoco suggested a methodology similar to Methodology 1 but using light crude oil capacity instead of heavy crude oil capacity as the denominator of the capacity factor. As well, Amoco, in estimating how much of Trans Mountain's revenue requirement is capacity-related, categorized only the facility-related portion of the revenue requirement as capacity costs.

Both Methodology 1 and Amoco's approach require that a determination be made of the percentage of Trans Mountain's revenue requirement that is capacity-related. The Applicant and a number of interested parties noted that such a determination is subject to considerable judgement and that any resulting surcharge would be volatile, varying with changes in facilities.

The Applicant was asked if its alternate pipeline methodology could be modified so that the surcharge level would be derived by applying the percentage difference in capital costs of alternate pipelines to that proportion of Trans Mountain's revenue requirement which is capacity-related. Trans Mountain's witnesses indicated that such a modification would be inconsistent with Trans Mountain's approach

[1] IPL's approach considered facilities or costs to be capacity-related if they vary when design capacities are maintained while varying the mix of crude oil types with the total number of cubic metres held constant (RH-4-86, Exhibit B-13a). Under that approach, all of IPL's terminalling costs would be classified as non-capacity related.

and that it would imply a level of precision which does not exist. However, Trans Mountain indicated that, if required to derive an estimate of capacity related costs in this manner it would base the modification on the premise that non-capacity costs would include those facilities that are essential just to move one cubic metre of oil.

Gulf proposed an approach which is a variation of Methodology 1 but which does not require the components of the revenue requirement to be classified as capacity and non-capacity related. Gulf's method suggests that the level of a pipeline's tolls is constrained by capacity and that there is a different minimum unit cost which can be achieved when transporting each type of throughput at capacity. The methodology determines surcharges on the basis of the ratio of the unit throughput charges which would occur if each throughput type flowed at capacity. According to Gulf, its methodology would not require a separate fuel and power surcharge.

Trans Mountain indicated that it rejected all methodologies suggested by other parties because the premises used were wrong. More specifically, Trans Mountain indicated that the other approaches discussed do not reflect the number of streams transported by Trans Mountain and assume that the pipeline's capital costs vary in proportion to either sustainable capacity or throughput differences. As well, Trans Mountain noted that most other approaches involve a certain amount of arbitrariness in that the components of the revenue requirement must be categorized as capacity or non-capacity related.

IPAC, Husky, Murphy, Northridge, Saskatchewan Oil and Gas Corporation, and the APMC were of the view that the Board should not make any final decisions at this time regarding methodologies for determining capacity surcharges/credits on the Trans Mountain system. Those parties advocated postponing any decision until after consideration of the IPL study[1], a further study by Trans Mountain, and/or a generic hearing.

Decision

Of the methodologies addressed during these proceedings, the Board finds that the Applicant's approach has the most merit in that it directly addresses the costs associated with transporting different types of hydrocarbons. However, the Board is of the view that Trans Mountain's approach has two shortcomings:

(i) the capital cost estimates generated by Trans Mountain for the alternate pipelines included receipt, delivery, and tankage facilities. As a result, application of the methodology results in capacity surcharges credits which depend on factors (i.e. segregation of streams) other than those which directly affect capacity costs; and

[1] In its IPL decision, the Board directed IPL to submit, by 30 June 1988, a study addressing possible toll methodologies to allocate the capacity-related portion of its revenue requirement to the various streams transported.

(ii) the methodology applies the differential percentage determined by comparing capital costs of alternate pipelines to the system's entire light crude oil toll, which includes components not related to capacity.

The Board believes that Trans Mountain's proposed approach should be modified to remove the above-noted shortcomings. Accordingly, the Board directs that capacity surcharges/credits for hydrocarbons transported on the Trans Mountain system be determined in the following manner:

(1) by removing, from the estimated capital cost of the notional pipelines, all costs related to receipt, delivery, and tankage facilities;

(2) by determining, using the light crude oil notional pipeline as the base, the percentage difference in the adjusted capital costs of the notional pipelines as determined by step (1);

(3) by determining the percentage of the total revenue requirement which is capacity-related; and

(4) by multiplying the percentages in steps (2) and (3) above to derive the capacity surcharge/credit to be applied to the light crude oil toll.

With respect to step (3) above, the Board suggests that the most appropriate methodology for determining the capacity-related portion of Trans Mountain's revenue requirement is the one suggested by IPL in Exhibit B-28 in its last toll proceeding (RH-4-86). However, the Board believes that approach should be modified to classify fuel and power costs as non-capacity related.

The Board has used this modified approach in step (3) and has estimated a capacity surcharge of about five percent for heavy crude oil based on Trans Mountain's projected 1990 revenue requirement and a capacity of 30 000 m^3/d for both the heavy and light crude oil notional pipelines. Appendix III of these Reasons for Decision illustrates the calculation of that surcharge. As discussed in Section 9.6.3 of this decision, Trans Mountain is to include a five percent heavy crude oil capacity surcharge in its tolls effective 1 January 1989.

With respect to refined and semi-refined products, the Board notes that Trans Mountain's evidence indicated that a notional pipeline transporting these products would require one less pumping unit than a notional pipeline transporting only light crude oil. Although the modified alternative pipeline approach would imply that there should be a capacity credit for refined and semi-refined products, the Board notes that the difference in the capital costs of the two notional pipelines would be small and not within the margin of error of the methodology. The Board, therefore, finds that a zero percent capacity credit is appropriate at this time for refined and semi-refined products.

The Board is concerned that, in respect of determining the capacity-related portion of the revenue requirement, application of the modified approach to Trans Mountain's test-year revenue requirements could result in capacity surcharges or credits which might fluctuate significantly from year to year. For example, because Trans Mountain's revenue requirement reflects the Company's largely depreciated rate base, a relatively minor capital addition to either the capacity or non-capacity-related component might lead to a significant variation in the percentage of the Company's revenue requirement which is capacity-related.

The Board notes that intervenors shared similar concerns and invites Trans Mountain and other parties to the next toll proceeding to suggest methods of alleviating this problem. One solution might be to derive a deemed revenue requirement based on the estimated capital cost of the light crude oil notional pipeline, and to determine the percentage of capacity-related costs using that revenue requirement.

The Board notes that several intervenors advocated that no decision regarding a capacity surcharge/credit methodology for Trans Mountain should be made before review of the IPL study regarding capacity surcharge methodologies, which is to be filed with the Board by 30 June 1988. As discussed in section 9.6.3 of this decision, the Board feels that implementation of capacity surcharges and credits on the Trans Mountain system should not be delayed. Nonetheless, Trans Mountain is directed to examine the results of the IPL study and to comment, in its next toll application, on whether the capacity surcharge/credit methodology approved by these Reasons for Decision should be modified.

9.6.3 Timing for Implementation of Capacity Surcharges/Credits

Trans Mountain proposed that the heavy crude oil capacity surcharge be effective after the completion of the Stage 1 expansion and indicated that most likely it would be implemented 1 January 1990. During the hearing, Trans Mountain explained that it proposed to delay implementation of the heavy crude oil capacity surcharge until after the expansion because, presently, the level of service provided to heavy and light crude oil shippers is not equal. Trans Mountain indicated that heavy crude oil shippers effectively are allocated space on a disproportionate basis since they are voluntarily restraining their throughput nominations, thereby obviating any need for apportionment. The Applicant also suggested that its alternate pipeline methodology shows that, prior to expansion, there is no incremental cost to provide capacity to heavy crude oil since the methodology would result in a capacity surcharge which is directionally zero prior to the completion of Stage 1.

Imperial, Murphy, and Shell were also of the view that a heavy crude oil capacity surcharge, if required by the Board, should not be implemented until after Stage 1 expansion is completed.

The Airlines, Gulf, Petro-Canada, and the APMC advocated that capacity surcharges/credits be put in place prior to completion of the Stage 1 facilities, although Petro-Canada and the APMC proposed that the surcharges be pro tem and that the issue be further reviewed.

Decision

Trans Mountain's submission that heavy crude oil shippers are voluntarily restricting their nominations is not sufficient reason to delay the implementation of a heavy crude oil capacity surcharge. The Board notes that there are no requirements that shippers restrict their nominations and, therefore, no guarantees that apportionment will not occur prior to the completion of the Stage 1 expansion.

There should be no undue delay in implementing a heavy crude oil capacity surcharge on the Trans Mountain system. However, because the 1988 tolls are already in effect, the Board believes that it would not be appropriate to incorporate the heavy crude oil capacity surcharge in Trans Mountain's tolls until after the 1988 test year. The Board, therefore, directs Trans Mountain to include in its tolls, effective 1 January 1989, a five percent capacity surcharge on heavy crude oil.

9.7 Miscellaneous Toll Design Matters

9.7.1 Number of Hydrocarbon Streams to be Differentiated in Trans Mountain's Tolls

Petro-Canada took the position that hydrocarbon streams should be grouped according to their flow characteristics and that separate tolls should apply to each class of hydrocarbon stream in order to reflect the impact of those characteristics upon system capacity and operation costs. Petro-Canada

suggested, accordingly, that the number of streams differentiated by Trans Mountain's toll design should be expanded to recognize the Shell and Petro-Canada energy streams as being distinct from other refined product streams. (Presently, the Shell and Petro-Canada streams pay the light crude oil toll and, in addition, pay a surcharge for special facilities.)

IPAC agreed with Petro-Canada that the Shell and Petro-Canada energy streams should be treated as distinct classes for toll purposes.

Trans Mountain indicated that it could break out the Shell and Petro-Canada energy streams for toll purposes. However, the Applicant was of the view that the need for additional classes of hydrocarbon streams had not been demonstrated and questioned whether it would be productive to create them.

Decision

The Board is not persuaded that there is a need to increase the number of classes of hydrocarbon streams recognized by Trans Mountain's tariff at this time.

9.7.2 Westridge Loading Charge

In final argument, the Airlines noted that the Westridge loading charge of 25.1 cents per cubic metre had not been examined for some time. Consequently, the Airlines suggested that this charge should be reviewed at the next Trans Mountain toll proceeding.

Decision

The Board notes the Airlines suggestion.

Chapter 10
Disposition

The foregoing chapters, together with Orders No. XO-1-88 and TO-4-88, constitute our Reasons for Decision and our Decision on this matter.

R. Priddle
Presiding Member

W.G. Stewart
Member

A.B. Gilmour
Member

Ottawa, Canada
July 1988

Appendix I

ORDER NO. XO-1-88

IN THE MATTER OF the *National Energy Board Act* and the Regulations made thereunder; and

IN THE MATTER OF an application, pursuant to Section 49 of the *National Energy Board Act* (the Act), by Trans Mountain Pipe Line Company Ltd. (Trans Mountain), dated 21 September 1987, for exemption from the provisions of certain sections of the Act for facilities to be added to its pipeline system, filed with the Board under File No. 1755-T4-25.

B E F O R E

R. Priddle
Presiding Member

W.G. Stewart
Member

on the
18th day of July 1988

A.B. Gilmour
Member

WHEREAS, by application dated 21 September 1987, Trans Mountain applied to the Board for, *inter alia*, certain Orders under Part III of the Act;

AND WHEREAS the Board heard evidence and submissions of Trans Mountain and all intervenors, with respect to the application, at a public hearing held pursuant to Order OH-1-87, as amended;

AND WHEREAS Trans Mountain has demonstrated that the proposed Stage 1 pumping, tankage and pipeline facilities are required to transport crude oil and refined products in its system;

AND WHEREAS the Board has found that the proposed Stage 1 facilities are in the public interest;

IT IS ORDERED THAT pursuant to section 49 of the Act, the Stage 1 facilities described in Schedule "A" attached to and forming part of this Order, are exempt from the provisions of paragraph 26(1)(a), subsection 26(2) and section 27 of the Act upon the following conditions:

1. Prior to commencement of construction, Trans Mountain shall:

   (i) submit for Board approval the final design and configuration of the pipeline facilities where such differ from those submitted in the application, and

   (ii) provide the Board with a detailed construction schedule or schedules identifying major construction activities;

2. Prior to commencement of construction of the three domed storage tanks at Burnaby Terminal, Trans Mountain shall provide the Board with:

(i) design drawings and specifications for the tanks, containment dikes and vapour recovery systems, and

(ii) a site-specific quantitative analysis demonstrating that the tanks will conform with the seismic design criteria of the latest edition of the API Standard 650 *Welded Steel Tanks for Oil Storage*;

3. Trans Mountain shall cause the construction and installation of the Stage 1 facilities described in Schedule "A" to be commenced before 31 December 1989;

4. During construction, Trans Mountain shall file:

(i) monthly construction cost reports providing a breakdown, by location and facility, of costs 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 1(ii) occur;

5. During the construction of the three storage tanks at Burnaby, Trans Mountain shall file, twice each month, reports detailing the observed concentrations of suspended solids in any waters discharged from the terminal property. Should those observed concentrations exceed the range of 10-20 parts per million, Trans Mountain shall also provide a description of the mitigative measures used to reduce the level of suspended solids, including observations on the effectiveness of those measures;

6. Trans Mountain shall submit, by 31 October 1988, to the Board and all interested parties pursuant to AO-1-OH-1-87, a contingency planning manual which includes Trans Mountain's plans and procedures for dealing with major emergencies at the Burnaby and Westridge terminals;

7. Prior to applying for leave to open the three new storage tanks at Burnaby, Trans Mountain shall submit:

(i) a report detailing its final procedures for the disposal of waste scrubbing liquors and sludges, and

(ii) a report outlining the air-monitoring program which is to be funded by Trans Mountain and carried out by a separate party;

8. Trans Mountain shall, to the fullest extent possible, schedule operations at the Burnaby Terminal so that the most odorous crude oils are stored only in those storage tanks equipped with vapour-recovery systems;

9. During the operation of the three new storage tanks at Burnaby, Trans Mountain shall, unless otherwise directed by the Board, submit twice each year:

(i) a report summarizing the results of its air monitoring program, including information on H_2S and mercaptan levels for both the Burnaby and Westridge Terminals, and

(ii) a report summarizing the results of noise level monitoring at the Burnaby Terminal. The monitoring should be carried out in accordance with the requirements of CSA Standard Z107.53-M1982 *Procedure for Performing a Survey of Sound Due to Industrial, Institutional, or Commercial Activities*; and

10. (i) Trans Mountain shall file with the Board a post-construction environmental report within six months of the date that the Board grants leave to open the last of the Stage 1 facilities,

(ii) The post-construction environmental report referred to in subsection 10(i) shall set out the environmental issues that have arisen up to the date on which the report is filed and shall:

(a) indicate the issues resolved and those unresolved, and describe the measures Trans Mountain proposes to take in respect of the unresolved issues, and

(iii) Trans Mountain shall file with the Board, on or before the 31 December that follows each of the first two complete growing seasons after the post-construction environmental report referred to in subsection 10(i) is filed:

(a) a list of the environmental issues indicated as unresolved in the report referred to in subsection 10(i) and any that have arisen since the report was filed, and

(b) a description of the measures Trans Mountain proposes to take in respect of any unresolved environmental issues.

NATIONAL ENERGY BOARD

J.S. Klenavic
Secretary

Attachment: Schedule "A"

SCHEDULE "A"

TRANSMOUNTAIN SECTION 49 APPLICATION

STAGE 1 FACILITIES

	Estimated Expenditure
Add one 1 120 kW pump unit and replace three pumps, Edmonton	$1,609,000
Two 31 700 m^3 tanks, Edmonton	12,201,400
Booster pumps, feeder lines, metering and manifolding, Edmonton	3,939,700
Add one 1 120 kW pump unit and replace two pumps, Gainford	518,100
New pump station with three 1 120 kW units, Niton	5,428,600
Replace three pumps, Edson	562,900
Add one diesel unit, Jasper	2,725,200
New pump station with three 1 120 kW units, Albreda	6,297,000
New residence, Blue River	179,200
Add one 1 120 kW pump unit, replace one pump and convert station to remote control, Darfield	4,778,700
Replace one 1 120 kW motor with 1 500 kW motor and replace one pump, Kamloops	719,600
Add one 1 500 kW pump unit and replace two pumps, Sumas	1,375,500
Three 23 700 m^3 tanks with vapour recovery systems, Burnaby	16,072,200
Manifold connections, Burnaby	508,400
TOTAL	**$56,902,500**

Appendix II

ORDER NO. TO-4-88

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

IN THE MATTER OF an application by Trans Mountain Pipe Line Company Ltd. (Trans Mountain) dated 21 September 1987 for certain Orders under Part IV of the Act, filed with the Board under File No. 1755-T4-25.

BEFORE

R. Priddle
Presiding Member

W.G. Stewart
Member

on the
18th day of July 1988

A.B. Gilmour
Member

WHEREAS, by application dated 21 September 1987, Trans Mountain applied to the Board for, *inter alia*, certain Orders under Part IV of the Act;

AND WHEREAS the Board heard evidence and submissions of Trans Mountain and all intervenors, with respect to the application, at a public hearing held pursuant to Order OH-1-87, as amended;

AND WHEREAS the Board's decisions on the Part IV matters are set out in its Reasons for Decision dated July 1988 and in this Order;

IT IS ORDERED THAT:

1. Trans Mountain shall:

   (a) modify its currently approved toll design to conform with the decisions outlined in the OH-1-87 Reasons for Decision dated July 1988,

   (b) for accounting, toll-making, and tariff purposes, implement procedures conforming with the Board's decision outlined in the OH-1-87 Reasons for Decision dated July 1988, and

   (c) in its toll application for the 1989 test year, file new tolls to be effective 1 January 1989 which are in conformity with the toll design decisions referred to in paragraph 1(a); and

2. Those provisions of Trans Mountain's tariff and tolls or any portion thereof that are contrary to the OH-1-87 Reasons for Decision or this Order are disallowed after 31 December 1988.

NATIONAL ENERGY BOARD

J.S. Klenavic
Secretary

Appendix III

Illustration of Methodologies for Determining Capacity Surcharges/Credits

This appendix illustrates the notional pipeline approach suggested by Trans Mountain (Table 1) and the modified notional pipeline approach adopted by the Board for Trans Mountain (Table 2). In both cases, a capacity surcharge is calculated for heavy crude oil.

TABLE A3-1

ILLUSTRATION OF TRANS MOUNTAIN'S NOTIONAL PIPELINE APPROACH TO THE CALCULATION OF THE HEAVY CRUDE OIL CAPACITY SURCHAGE

COST ITEM		HEAVY CRUDE OIL 2 STREAMS $(000)	LIGHT CRUDE OIL 11 STREAMS $(000)
1.	Easement Costs	30,230	30,230
2.	Pipeline Construction		
	a) Material	211,987	208,212
	b) Construction	369,985	353,456
	c) Administration, Engineering, Overhead	110,798	108,102
3.	Tank Farm, Edmonton	17,450	32,080
4.	Meter Installation, Edmonton	2,500	4,250
5.	Booster Pumps and Distribution Manifold, Edmonton	2,250	3,500
6.	Land Costs and Site Development, Edmonton	12,800	18,800
7.	Tank Farm, Burnaby	25,200	22,575
8.	Meter Installation, Burnaby	2,750	2,800
9.	Booster Pump and Manifold, Burnaby	2,250	1,700
10.	Land Costs and Site Development, Burnaby	20,000	20,000
11.	Station Costs	79,600	30,950
12.	Administation and Maintenance Costs	5,600	5,600
Total Estimated Cost		**$893,400**	**$842,255**

Capacity Surchage = $\frac{\$893,400 - \$842,255}{\$842,255} \times 100 =$ **6.1%**

TABLE A3-2

ILLUSTRATION OF NEB MODIFIED NOTIONAL PIPELINE APPROACH TO THE CALCULATION OF THE HEAVY CRUDE OIL CAPACITY SURCHARGE

Step 1
Estimate the capital cost of the notional pipelines, with all costs related to receipt, delivery and tankage facilities removed.

	COST ITEM	HEAVY CRUDE OIL 2 STREAMS $(000)	LIGHT CRUDE OIL 11 STREAMS $(000)
1.	Easement Costs	30,230	30,230
2.	Pipeline Construction		
	a) Material	211,987	208,212
	b) Construction	369,985	353,456
	c) Administration, Engineering, Overhead	110,798	108,102
3.	Station Costs	79,600	30,950
4.	Administration and Maintenance Costs	5,600	5,600
	Total Estimated Cost	**$808,200**	**$736,550**

Step 2
Using the light crude oil notional pipeline as the base, determine the percentage difference in the adjusted capital costs of the notional pipelines.

$$\frac{\$808{,}200 - \$736{,}550}{\$736{,}550} \times 100 = \mathbf{9.7\%}$$

Step 3
Determine the capacity-related portion of the revenue requirement and express it as a precentage of the total revenue requirement. (Note: Revenue requirement figures ($millions) used are from Exhibit B-8, page 41-5, Approach 1, Do Nothing Case.)

a.	Capacity-related revenue requirment	33.3
b.	Less fuel and power	(3.2)
c.	Capacity-related revenue requirement with fuel and power removed	30.1

d.	Total revenue requirement	59.6
e.	Capacity-related revenue requirement, with fuel and power removed, as a percentage of total revenue requirement = (30.1 / 59.6) x 100 =	50.5%

Step 4
Multiply the percentages determined in steps (2) and (3) to determine heavy crude oil capacity surcharge: 9.7% x 50.5% = **4.9%**