



National Energy Board

Reasons for Decision

**Interprovincial Pipe Line
Limited**

OH-3-85

April 1986

National Energy Board

Reasons for Decision

In the Matter of

Interprovincial Pipe Line Limited

In the Matter of An Application Under Section
44, Part III of the *National Energy Board Act*

OH-3-85

April 1986

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Canada 1994

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Abbreviations

barrel	1 barrel is approximately equal to 0.159 m ³
bpd	barrels per day
Board	National Energy Board
Cochin	Cochin Pipe Lines Ltd.
Dome	Dome Petroleum Ltd.
EIL	Environmental Issues List
IPAC	Independent Petroleum Association of Canada
IPL	Interprovincial Pipe Line Limited
km	kilometre
kPa	kilopascal
kp	kilometre post
Lakehead	Lakehead Pipe Line Company Inc.
m	metre
m ³	cubic metre
m ³ /d	cubic metres per day
mm	millimetre
NGL	In this report, natural gas liquids include propane, butanes and pentanes plus.
O.D.	Outside diameter of a pipeline

Recitals and Appearances

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

IN THE MATTER OF an application by Interprovincial Pipe Line Limited for a Certificate of Public Convenience and Necessity for the construction and operation of certain additional oil pipeline installations on its Lines 1 and 3 in Western Canada.

HEARD in Ottawa, Ontario on: 24, 25, 26, 27 and 28 February 1986

BEFORE:

Mr. R.F. Brooks	Presiding Member
Mr. W.A. Scotland	Member
Mr. J. Farmer	Member

APPEARANCES:

Mr. E.G. Sheasby	Interprovincial Pipe Line Limited
Mr. R.P. Smith	
Mr. M. D. Levenson	

Mr. F.M. Saville, Q.C. Canadian Petroleum Association

Mr. A.S. Hollingworth Independent Petroleum Association of Canada
Ms. J. Snider

Mr. H.D. Williamson A.G. Pipe Lines (Canada) Ltd.

Mr. R.S. O'Brien, Q.C. Airlines (Air Canada, C.P. Air, Nordair Ltd.)

Mr. D.A. Holgate Amoco Canada Petroleum Company Ltd.

Mr. D.G. Hart, Q.C. CanStates Energy

Mr. R.C. Muir Cochin Pipe Lines Ltd.

Mr. F.M. Saville, Q.C. Dome Petroleum Limited

Mr. L. Ricchetti Dow Chemical Canada Inc.

Mr. J.D. Brett ICG Manitoba Pipelines Ltd.

Mr. H. Newton Imperial Oil Limited

Ms. E.S. Dector Petro-Canada Inc.

Mr. T.M. Hughes Polysar Limited and Polysar Hydrocarbons Limited

Mr. R. Riegert Shell Canada Limited

Ms. A. Bigué Mr. R. Bédard	SOQUIP
Mr. M.W.P. Boyle	Trans Mountain Pipe Line Company Ltd.
Mr. E.B. McDougall	Trans-Northern Pipelines Inc.
Mr. D. Moyse	Minister of Energy for Ontario
Mr. J. Giroux	Procureur général du Québec
Mr. R.W. Graw	National Energy Board

Executive Summary

Interprovincial Pipe Line Limited (IPL) applied to the Board on 15 November 1985 for authorization, pursuant to section 44 of the *National Energy Board Act*, to increase the design capacity of Line 1 by 10 000 m³/d and Line 3 by 5 000 m³/d, to meet its forecast throughput requirements for 1988.

Facilities proposed in the application included a new 508 mm O.D. Line 1, some 538 km in length from Regina, Saskatchewan to Gretna, Manitoba and some 2 km of 457 mm O.D. pipe between Gretna and the International Boundary, together with additions and modifications to existing pump stations and the extension of five, 1 219 mm O.D. loops on Line 3. The cost of these facilities is estimated at \$235 million and the increased capacity is intended for service by the last quarter of 1987.

The application was set down for public hearing under Directions on Procedure OH-3-85. Nineteen (19) notices of intervention and twelve (12) letters of comment were received.

Prior to the commencement of proceedings, the Board requested that IPL serve a separate notice upon all landowners giving them the opportunity of contacting the Board if they had concerns; the Board received no such contacts.

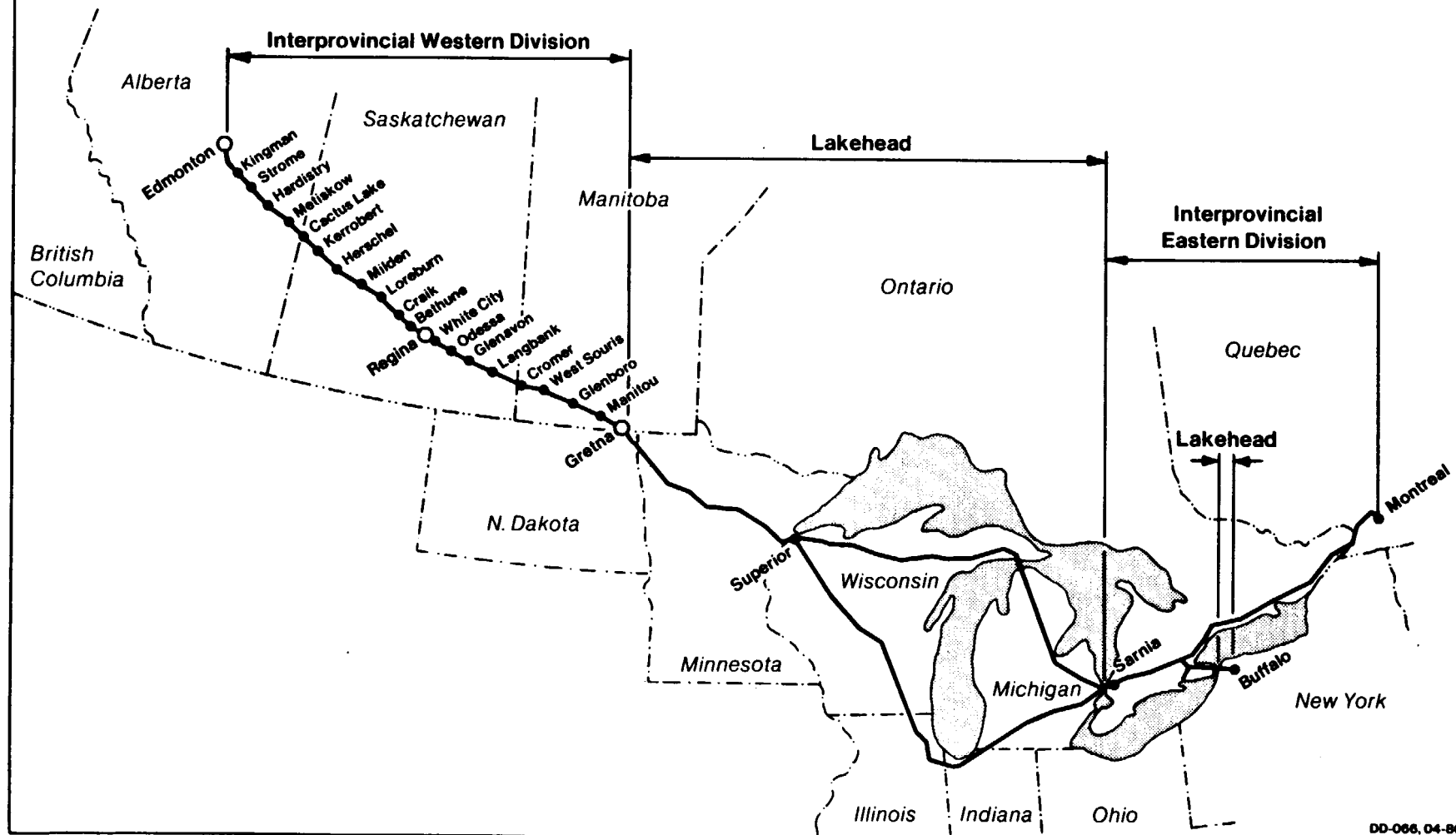
The Board considered the application, heard the evidence of the seven parties of record who submitted testimony and heard the arguments of IPL and all parties beginning 24 February 1986 and closing 28 February 1986. The evidence in these proceedings, in addition to the application, covered such other matters as a proposed arrangement whereby IPL would effectively increase its capacity by leasing pipeline capacity on the Cochin Pipe Lines Ltd. (Cochin) system, the requirements for NGL breakout storage facilities at Superior, Wisconsin, on the Lakehead Pipe Line Company Inc. (Lakehead) system, the delivery of high vapour pressure products from Sarnia to Montreal and the potential effects of declining world oil prices on the subject application. The Applicant's evidence was particularly directed to the forecast pumping requirements for 1988 and beyond and the need for the increased capacity in its system.

All of the parties of record and those submitting letters of comment supported IPL's application as filed.

The Board is satisfied that the Applicant has demonstrated the need for increased pipeline capacity to meet its throughput needs for 1988 and beyond, and to provide greater operational flexibility. Moreover, the Board is satisfied that the other issues raised are not such as to change its decision that the proposed facilities are needed.

This document sets out the reasons for the Board's approval of the proposed expansion.

Interprovincial Pipe Line Limited And Lakehead Pipe Line Co. Inc. Systems



Chapter 1

The Application

Interprovincial Pipe Line Limited operates a pipeline system which extends from Edmonton, Alberta to Gretna, Manitoba and from Sarnia, Ontario to Montreal, Quebec. At Gretna and Sarnia, IPL's pipeline interconnects with its wholly owned United States subsidiary, Lakehead Pipe Line Company Inc. (Lakehead). IPL transports refined and high vapour pressure products on Line 1. Lines 2 and 3 of IPL's system transport light, medium and heavy crude oil. A map of IPL's system is shown on the preceding page.

1.1 Phase I

Prior to the current application IPL applied to the Board in September 1984 to increase the capacity of Line 2 to handle increasing volumes of heavy crude oil. The facilities included six new pump stations, each having an additional 2500 HP, together with piping modifications and crossover pipe to tie in an additional 50 km of 864 mm O.D. pipe. The associated capacity increase was 5 000 m³/d ex Regina and 3 000 m³/d ex Cromer. Moreover the capacity of Line 3 was to be increased as a result of the displacement of heavy crude oil to Line 2. The cost of those facilities was estimated at \$22.5 million. The Board approved that application in November 1984, and the increased capacity was available in the last quarter of 1985.

1.2 Phase II

IPL applied to the Board in February 1985 to increase the capacity of Lines 2 and 3 by 25 000 m³/d based on a forecast increase in pumping demand for 1987 and beyond. Line 2 was to be dedicated to light crude service and Line 3 to light, medium and heavy crude. Facilities included replacement pipe for 14.5 km of Line 3, crossover piping to tie in sections of 864 mm O.D. pipe to Line 2, pump replacements and modifications and additional tankage at Cromer. The cost of those facilities was estimated at \$87 million. The Board approved that application in May 1985, and the increased capacity is to be available in the fourth quarter of 1986.

1.3 Phase III

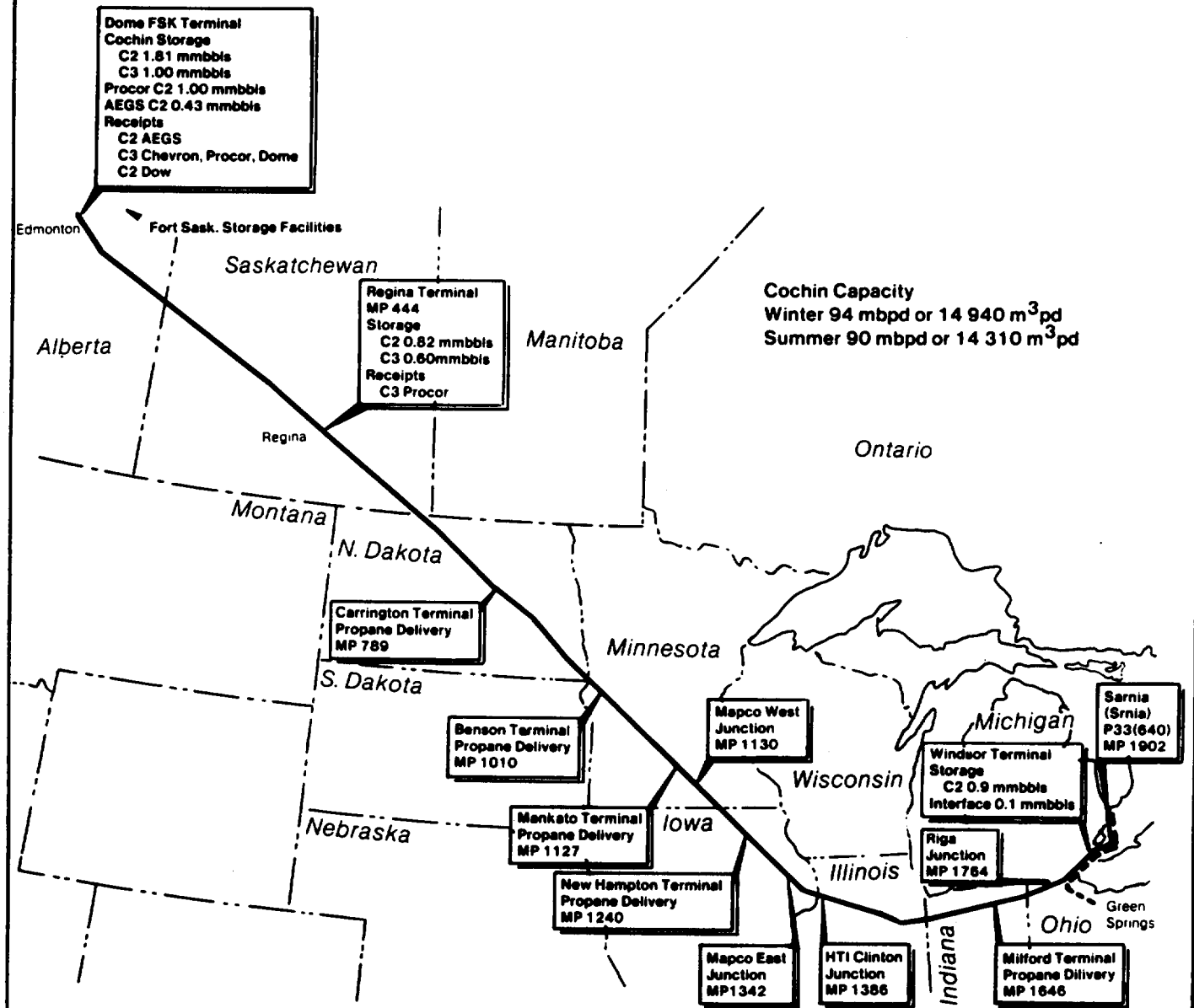
In the current application dated 15 November 1985, IPL proposes to increase the capacity of Line 1 by 10 000 m³/d and Line 3 by 5 000 m³/d to meet its forecast throughput requirements in 1988. Facilities proposed include the replacement of the existing 406 mm O.D. Line 1 with a new 508 mm O.D. line, 538 km in length between Regina, Saskatchewan and Gretna, Manitoba, the replacement of the existing 457 mm O.D. line from Gretna to the International Boundary with some 2 km of 457 mm O.D. line, additions and modifications to existing Line 1 pump stations and five extensions to the existing 1 219 mm O.D. Line 3 loops, totalling 8.4 km in length. To complement this proposal, Lakehead, a wholly-owned subsidiary of IPL, proposes to construct some 21 km of 1 219 mm O.D. loop extensions together with pump station modifications, between the international boundary and Superior, Wisconsin.

The cost is estimated at \$235 million for the IPL facilities and \$43 million for the Lakehead facilities. The additional capacity is intended for service in the last quarter of 1987.

Figure 1-1

The Cochin Pipe Lines Ltd. System

The Cochin Pipe Lines Ltd. System



Chapter 2

Summary of Related Matters

2.1 Cochin Pipeline Arrangement

The Cochin pipeline system operates under the Board's regulations and delivers high vapour pressure products from Fort Saskatchewan, Alberta to Sarnia, Ontario. The Cochin system, which began operations in October 1978, transports ethane, ethylene and propane to the U.S. Midwest and Eastern Canadian markets. Volumes are injected into the system at Fort Saskatchewan. A map of the Cochin system is shown on the preceding page. As a result of declining ethane deliveries there is surplus pipeline capacity on the Cochin system. The Cochin owners have attempted to remedy this situation through attracting additional volumes for transmission. Recently, the Cochin system successfully delivered test batches of NGL to Windsor, Ontario thereby demonstrating the feasibility of such movements on the system.

The Applicant stated that Cochin had approached it with a proposal to divert volumes of NGL from IPL to the Cochin system. Discussions were underway but no final agreements had been reached at the time of the hearing. IPL indicated that, upon finalizing any arrangement, the parties would make all necessary applications to the Board and other appropriate regulatory agencies.

The Applicant stated that, under the proposed arrangement, Cochin could make approximately 4 000 m³/d of capacity available to ship NGL to markets that would otherwise be served by IPL facilities. Such an arrangement would begin by mid-1986 and could continue until the third quarter of 1987, during the construction of Phase III facilities. Moreover, the use of the Cochin system could prove advantageous beyond 1988 when further capacity constraints are forecast. IPL stated that batches of NGL would have to be tendered to it for shipment and that IPL would decide which system would transport each batch. Tolls for shipment of the batch would be equal to IPL's Line 1 toll whether the Cochin system or the IPL system were used.

The Applicant stated that, whether or not a short-term or long-term arrangement was negotiated with Cochin, the use of the system would not change its decision to proceed with the current proposal. The short term use of the Cochin system would serve as an interim measure until the proposed Line 1 facilities were in service; any long-term arrangement would provide reserve capacity for NGL delivery and could permit increased shipments of other materials on Lines 1 and 2.

Views of the Board

The transfer of NGL batches from IPL to the Cochin system may alter the product mix on Line 1 and could provide significant increases in operational flexibility for IPL. The Board's view is that, notwithstanding the above and other aspects which were examined in these proceedings, there will be a need for the Line 1 facilities as applied for.

2.2 NGL Breakout Storage

The Lakehead pipeline system interconnects with the IPL system at Gretna, Manitoba and, as one of its functions, transports hydrocarbons to the Superior Terminal at Superior, Wisconsin. At Superior, shipments of NGL are accumulated to be moved as batches on the north line of the Lakehead system to the Applicant's markets in Sarnia, Ontario. This mode of operation requires that NGL volumes be stored at Superior for about three days prior to reinjection for movement to Sarnia.

This matter was of concern to a number of parties in these proceedings. It was submitted that access to the IPL system for prospective new NGL shippers was, in part, contingent upon the provisions for NGL storage which shippers could secure at Superior. The existing NGL storage facilities, owned by Dome Petroleum Ltd. (Dome), are not part of the Lakehead system. Therefore, arrangements for their use by new shippers must be made separately.

Evidence by Dome indicated that, as the sole NGL shipper on Line 1, its throughputs of 12 000 m³/day and requirements for three days of storage meant that its existing 40 000 m³ storage capacity at Superior was fully utilized. Moreover, IPL had advised Dome that, with the proposed facilities in place, arrangements to store five days of NGL throughput would be required. Dome stated that should IPL make use of Cochin facilities, Dome's throughput into Superior could be reduced by 4 000 m³/day and additional NGL storage facilities would not be required.

The Applicant stated that should a specific need arise, Lakehead would construct NGL storage facilities at Superior as part of its common carrier system. Preliminary investigations by the Applicant indicated that approximately 16 000 m³ of capacity might be required at a cost of between \$16 and \$20 million. IPL stated that for these facilities to be available for 1988, and given a likely construction period of approximately 18 months, a decision would have to be taken in the near future.

Views of the Board

The matter of NGL movements through the Superior Terminal is of concern to the Board insofar as it relates to the availability of the IPL system to all shippers. However, with regard to the subject application, it is the Board's view that, although additional NGL storage facilities may be required, this does not diminish the need for the facilities proposed in this application.

2.3 Markets in Quebec

The IPL system delivers crude oil to Montreal, Quebec on the Sarnia-Montreal line. Concern was expressed about the effects of this proposal on the security of supply of all hydrocarbons to Montreal, the extent to which the hydrocarbon needs of Quebec had been considered by IPL, and the costs of transportation to that market.

SOQUIP, a crown corporation of Quebec, was concerned about the adequacy of the proposed modifications with respect to the present and future needs of Quebec. The Procureur Général du Québec stated that IPL was the sole means of access to Canadian crude oil and NGL for Quebec. The presence of bottlenecks on the system together with increased deliveries to the major markets, all upstream of Sarnia, could make Quebec's access to Canadian hydrocarbon shipments difficult.

The Applicant indicated that by increasing its Line 1 capacity by 10 000 m³/d sufficient capacity would exist to accommodate the incremental NGL volumes required by Quebec. Moreover, the proposed project would eliminate system bottlenecks and provide increased throughputs to Sarnia.

Both the Province of Quebec and SOQUIP expressed their support for the project insofar as it represented a necessary step towards meeting the needs of Quebec markets.

Views of the Board

The Board recognizes that the needs of Quebec, like other markets on the IPL system, have to be considered. The design of the proposed facilities would provide additional capacity to Sarnia which should be beneficial in meeting the needs of Quebec.

Matters relating particularly to the delivery of NGL on the Sarnia-Montreal line are outside the scope of this application.

Chapter 3

Supply and Demand

3.1 Crude Oil and Equivalent

In support of its crude oil throughput forecast, IPL provided estimates of crude oil reserves as of 31 December 1983, reserves additions for the years 1983 to 1997, and productive capacity and demand forecasts for the years 1987 to 1997.

For 1988, the year for which the pipeline facilities are being designed, the Applicant forecasts Western Canadian productive capacity of light crude oil and equivalent to be 194 800 m³/d and of heavy crude and bitumen to be 64 500 m³/d. This productive capacity would come from conventional light and heavy, bitumen, pentanes plus and existing synthetic oil plants. For 1993, the Applicant's forecast also included several major new supply sources including the Beaufort Region, an additional synthetic oil plant and three regional heavy oil upgraders.

The Applicant compared its crude oil productive capacity forecast to the Canadian Petroleum Association forecast of October 1985 and stated that they were virtually the same.

In addressing the effect of changing world oil prices, the Applicant stated that its forecasts anticipated world crude prices of at least \$21 U.S. per barrel and that if crude prices recover to this level during this year, and show signs of increasing, there should be very little effect on the throughput forecast. The Applicant also stated that if prices recover in the next few years, exploration and development could still occur such that forecast throughput requirements in the long-term would not be affected. Both the Applicant and intervenors were of the opinion that current low price levels would not persist for a long period of time.

Imperial Oil Limited (Imperial) indicated that with low oil prices there is a great incentive for every operator to maximize its rate of production and thereby minimize its unit operating cost. Imperial also pointed out that although some marginal conventional production will be shut-in, the amount will be insignificant in terms of this application.

None of the intervenors questioned the reasonableness of IPL's forecast supply of crude oil and equivalent and were generally of the opinion that the availability of hydrocarbons to IPL would not be affected by world crude prices. All of the parties supported the need for the proposed facilities.

IPL projected the demand for Western Canadian crude oil and equivalent in Eastern Canada to be 102 700 m³/d in 1987, gradually declining to 94 600 m³/d by 1997. IPL's forecast of demand for crude oil exports, through its system during the 1987 to 1997 period, ranged from a low of 62 000 m³/d in 1989 to a high of 93 800 m³/d in 1995.

The Applicant maintained that the recent decline in world crude oil prices should not impact, in any significant way, on its projections of Western crude oil requirements. The intervenors generally concurred that, despite the current low world oil prices, there will be adequate markets for crude oil. Imperial stated that the market will be there, because the oil will be priced to be competitive in the market.

3.2 Natural Gas Liquids

In support of its NGL throughput forecast, IPL provided forecasts of demand for Alberta natural gas, forecasts of the liquids yields associated with this gas production, and production and demand forecasts of propane and butanes for the years 1987 to 1997.

The Applicant forecast that propane supply in 1988 from refineries and gas plants in Western Canada would be 26 610 m³/d and for butanes 13 043 m³/d. About 88 percent of this supply is expected to come from gas plants.

All volumes of propane and butanes transported on the IPL system were assumed to be in the form of an NGL mix containing ten percent pentanes plus.

The forecasts of propane and butanes supply were not opposed by any intervenors.

The Applicant projected propane and butanes use in Eastern Canada to increase from 9 721 m³/d in 1987 to 11 767 m³/d in 1997 resulting from growth in the requirements of the petrochemical industry, conventional markets and the transportation sector.

In its application, IPL assumed that any supply of NGL in excess of total Canadian requirements would be exported. Total propane and butane exports from Eastern Canada were assumed to remain at the 1984 level of 5 761 m³/d throughout the projection period.

The Applicant submitted that the current crude oil prices would not materially affect its demand forecast for natural gas liquids.

Most of the intervenors seemed to be in agreement with IPL's projection of NGL demand. However, SOQUIP indicated that the projection did not fully take into account its own forecast of NGL requirements in the Montreal area which had been submitted to IPL. The Applicant stated that these volumes had been considered in its forecast.

3.3 Refined Products

The projected deliveries of petroleum products in the Prairie provinces were forecast by the Applicant to remain relatively flat through the period 1988 to 1997, averaging approximately 14 000 m³/d. None of the intervenors disagreed with the Applicant's forecast of refined product deliveries.

Views of the Board

While supply and demand forecasts are fraught with uncertainties, and particularly so at this time, the Board is satisfied as to the likelihood of supplies of crude oil being available to the expanded pipeline facilities and as to the existence of actual and potential markets which the proposed facilities would supply.

Chapter 4

Financial Matters

The Applicant presented evidence showing the effects of the proposed expansion on tolls, given IPL's current toll design methodology, and the allocation of the facilities' costs among all shippers. The Applicant projected increases in light crude tolls of approximately 20 percent in 1988, \$3.181/m³ to \$3.816/m³, from Edmonton to Sarnia. IPL submitted that the effect on tolls, should the facilities be built and the expected incremental throughputs not materialize, would be approximately \$0.13/m³ on the IPL/Lakehead system.

Intervenors were aware of the impact on tolls projected by IPL and remained generally supportive of the application. Several intervenors expressed a strong preference for the projected increases in tolls rather than have production shut in. However, the Airlines expressed reservations concerning the appropriateness of the methodology IPL had used to assign the costs of the proposed facilities for the purposes of calculating the illustrative tolls.

Views of the Board

The Board is of the view that the effect on tolls of the proposed facilities is not unreasonable.

Chapter 5

Economic Benefits

5.1 Net Economic Benefits

The Applicant submitted a social cost/benefit study in which it was estimated that the project, based on crude oil prices of approximately \$26 per barrel for 1986 and falling in real terms to \$24 per barrel in 1989, would provide net benefits to Canada of approximately \$435 million (1985 dollars).

However, because world oil prices had dropped significantly between the date of application and the commencement of the hearing, the Applicant was requested to submit a new estimate of the expected net benefits. Accordingly, IPL submitted a study based on a revised world oil price projection of \$20 per barrel in 1986 and increasing in real terms thereafter, which yielded net benefits of \$358 million.

A further study was made using price sensitivity comparisons based on constant world oil prices of \$20 and \$15 per barrel (1985 U.S. dollars). These comparisons indicated expected net benefits of \$213 million and \$76 million (1985 dollars) respectively.

Views of the Board

The Board recognizes that, if world oil prices were to remain severely depressed for several years, the project might not yield significant economic benefits.

This is so even though the project is expected to provide net economic benefits over a broad range of assumed future oil prices.

The Board believes that, in this case, although there is some risk that the indicated economic benefits may not be realized, it is preferable from the standpoint of the overall public interest to accept this risk rather than to accept the risks associated with insufficient pipeline capacity.

5.2 Canadian Content

The Applicant stated that 100 percent of consulting, engineering, contracting and labour services would be Canadian. The Applicant estimated that the Canadian content of materials would be in excess of 80 percent.

Views of the Board

The Board would require that the Applicant file a report on the actual Canadian content achieved on the project six months after granting leave to open. This report would show total expenditures and the percentage of these expenditures that comprised Canadian content by major cost category.

Chapter 6

Facilities

6.1 Appropriateness of Facilities

According to the Applicant, the proposed facilities would provide the most cost-effective expansion of the IPL system, and would be compatible with any future expansion. The Applicant indicated that sections of pipe which would be deactivated should the facilities be built, could be a significant element in potential future expansions.

IPL stressed that the project would provide accommodation for synthetic crude that could be allocated as required on Lines 1, 2, or 3. As a result, a high degree of operational flexibility would be achieved which could be used to optimize the utilization of available capacity in the system.

In designing the facilities, IPL used operating margins of 10 percent for Lines 1 and 2, and 15 percent for Line 3, thus recognizing that sustainable capacities are invariably less than design capacities. IPL stated that historically, it has used 10 percent margins for all lines and this has been found to be appropriate. According to the Applicant, a 15 percent operating margin was necessary for this new mode of operation on Line 3 because, in this case, that line would become a multiple delivery/receipt line, subject to the difficulties of interacting with shippers' sending and receiving facilities. The estimate of 15 percent for Line 3 was not a calculated quantity, but was based largely on judgement.

The Independent Petroleum Association of Canada (IPAC) pointed out that if the operating margins used in design proved to be larger than actually required, the facilities might have been overdesigned. IPAC expressed concern that the Applicant had not provided a reasonable means of substantiating the 15 percent operating margin. It was the view of IPAC that IPL should document downtime to substantiate operating margins and to identify and possibly correct problems. Correcting such problems could result in operating margins being reduced in future applications. Even so, IPAC supported the application as filed.

The Applicant presented evidence concerning a number of alternative designs which could achieve the 15 000 m³/d increase in system capacity through construction on Line 1:

1. The capacity increase on Line 1 could be obtained with additional pumps so that the line would be fully powered. The Applicant estimated that the capital cost of such a project would be \$5 million less than the proposed project, but that the net present value over ten years would be \$9 million higher because of fuel, power and operating costs. That particular design would require significant capital investment by shippers of NGL and refined products to increase their injection rates.
2. The existing section of Line 1 between Regina and Gretna could be kept in service, and a parallel line of 305 mm O.D. added. Such a design would require breakout facilities at Regina for all NGL and refined products. IPL indicated that such an alternative would be more costly, and would have less flexibility for future expansion than the applied-for facilities.

3. The existing section of Line 1 between Regina and Gretna could be 85 percent looped with 508 mm O.D. pipe and the pipeline fully powered. IPL indicated that such a design would cost \$9 million more than the applied-for facilities, and would lead to contamination problems because of growth in interfaces between batches when passing through crossover connections.
4. Inactive sections of Line 2 could be used on Line 1 with additional pumps. A complementary Line 3 construction program would be required to achieve the 15 000 m³/d capacity increase. That alternative would cost \$29 million more than the applied-for facilities and would also lead to contamination problems.
5. Inactive sections of Line 2 could be joined with pipe of the same diameter. IPL indicated that such a program would provide excess capacity at a higher cost than the applied-for facilities.

The Applicant indicated that it had initiated a number of measures which could be implemented in the short term to achieve capacity increases but that none of them could substitute for the applied-for facilities. Specifically, the Applicant was considering the possibilities of using flow improvers, transferring additional heavy oil into Line 3, and diverting NGL to the Cochin system.

6.2 Other Engineering Matters

The Applicant currently relies on a leak detection system, based upon material balance calculations, which has been used for some time on Line 1. IPL is in the process of developing a more sophisticated computer-based version of such a leak detection system and expected to complete acceptance testing of that system in March 1986.

The Applicant stated that it might be able to obtain the required pumping capabilities with fewer units. It was also evaluating the possibility of modifying the stations at Glenavon, Cromer and Glenboro for use on the proposed Line 1 rather than constructing new stations at those locations as originally planned. Upon completion of final design, the configuration of pump units would be submitted for Board approval. The Applicant believes that the design changes could be accommodated within the cost estimate set out in the application.

6.3 Cost of Facilities

The Applicant provided the following estimate of the costs of the proposed pipeline facilities:

Category	Element (\$000s)			Totals (\$000s)
	Materials	Installation	Lands and Land Rights	
1. Pipelines	82 300	76 000	700	159 000
2. Pumping Stations	31 500	14 500	0	46 000
3. Tankage	1 700	500	0	4 600
4. Metering Stations	1 200	600	0	1 800
Sub Total	116 700	91 600	700	209 000
5. Allowance for Funds Used During Construction (AFUDC)				19 000
6. Engineering, General & Administration				7 000
Total Estimated Capital Cost				\$235 000

Of the \$235 million total cost, \$221.7 million would be spent on Line 1, and the remaining \$13.3 million on Line 3.

The cost estimate provided in the application was based on recent bids and construction costs. The Applicant indicated that an estimate based on the final design should be completed in March 1986. It was the view of the Applicant that the risk of cost overruns would be minimized because all work would be within its control. A project team would be set up to control and monitor costs during design, procurement and construction phases.

6.4 Project Financing

The Applicant indicated that, although no specific plans regarding the permanent financing of the project had been decided upon, it intends to finance the proposed facilities with a combination of long-term debt and internally generated funds. IPL does not anticipate that any new equity financing will be required for this project.

IPL submitted that, until the necessary long-term debt financing is in place, it intends to meet the cash requirements of the project with internally generated funds and interim financing as required.

Views of the Board

The Board is satisfied that the proposed facilities would provide sufficient capacity to transport the forecast 1988 volumes. Furthermore, the Board agrees with the Applicant that the proposed facilities would allow increased flexibility in operations and would be compatible with future expansions of the IPL system. The Board would require the

Applicant to provide a detailed cost estimate based on final design prior to the start of construction.

The Board shares IPAC's concerns regarding justification of operating margins. However, in this instance, the Board accepts the increased operating margin for Line 3 because of the increased complexity in operations which would occur with that line. In future applications, the Board will expect IPL to provide an analysis of the factors involved in selecting operating margins, based upon operating experience.

The Board is concerned with the adequacy of the existing leak detection system on Line 1. The Applicant would be required to submit to the Board a schedule outlining the implementation and testing of the Line 1 computer-based leak detection system. Prior to receiving leave to open the applied-for facilities, the Applicant would be required to present a report, to the Board's satisfaction, outlining the capabilities of its leak detection system, and the results of tests demonstrating those capabilities.

The Board would require IPL to submit its final designs of all Line 1 stations between Edmonton and Gretna where those designs have been modified since the application dated 15 November 1985.

The Board considers the project to be within the Applicant's financial capability and is satisfied with its financing plan.

6.5 Construction and Operations

The Applicant stated that, in general, construction activities would not be permitted over existing lines. In urban areas where such activities might be necessary, these lines would be padded.

To ensure that construction activities are adequately spaced from existing lines, these lines would be flagged after being located by electronic means and their location verified by probing and exposing the pipe at regular intervals.

When questioned about the spacing between lines, the Applicant explained that, in its 35 years of operation, it had not experienced a failure on one line due to failure of an adjacent line and did not anticipate such an event occurring in the future.

Construction activities would likely occur in three spreads, each having a chief inspector and approximately 16 inspectors reporting to him. An environmental co-ordinator would report to the chief inspector on environmental matters.

The deactivated Line 1 between Regina and Gretna would be physically disconnected from the stations operating on the proposed line using either weld caps or blind flanges. The deactivated sections would be emptied of product, filled with nitrogen, sealed, cathodically protected and subjected to a regular inspection program.

The Applicant clarified the method of transfer of Line 1 pumping units to the new line. New units would be installed and transferred to the new line prior to the transfer of modified and existing units.

Upon completion of Phase III, the Applicant's system into and out of Superior would be balanced and restrictions in product movement would no longer be due to bottlenecks in the Regina-Gretna section. As a result, the limiting sections would then be in the Lakehead system in the United States.

The Applicant confirmed that greater pumping capabilities on the section of Line 1 between Edmonton and Regina would increase the operating pressures at certain locations within that section. Such pressures would still be lower than the maximum operating pressure approved by the Board. The line was successfully hydrostatically retested in 1976 - 1977.

The Applicant stated that an internal inspection of the line is conducted every six to eight years and was last completed on Line 1 in 1980. The Applicant stated that, following that inspection all "medium to heavy" anomalies were "addressed". The Applicant assured the Board that an internal inspection would be completed on the section of Line 1 between Edmonton and Regina by the end of the Phase III construction program. The Applicant believed that the line has a good operating record and that increased stress levels would not affect the integrity of the line.

There was some concern that contamination of materials in IPL's Line 1 might occur should conventional light crudes be added to its throughputs. The Applicant stated that should such crudes be moved through Line 1 in addition to synthetic crudes, NGL and refined products, the size of buffers between conventional crudes and refined products would be increased accordingly. The Applicant emphasized its preference for moving synthetic crudes, if available, rather than conventional crudes. However, if the movement of conventional crudes through Line 1 becomes a necessity, the Applicant confirmed its intention to investigate and adequately address any problems inherent in such movements prior to commencing them. The Applicant would also have discussions with the refined products shippers prior to moving conventional crudes.

Views of the Board

In view of the age of the pipeline and of the increased stress levels at which Line 1 between Edmonton and Regina would be operating, the Board would require IPL to submit results of an electronic internal inspection survey of the line prior to granting leave to open the new stations between Edmonton and Regina.

The Board is satisfied with the Applicant's approach to potential movements of compatible crudes in Line 1 along with NGL and refined products.

The Board would want to monitor the progress of the construction of the project and the evolution of its costs. Accordingly, the Board would require IPL to file information on schedules as well as periodic reports providing updates on costs, progress, and variances of estimates and schedules.

6.6 Right-of-Way

6.6.1 Route Selection

IPL indicated that it intends to use its existing route and right-of-way for the proposed construction. The Applicant's criteria for doing so were:

- (i) the existing route has been in service for over 30 years and is well known to all affected parties;
- (ii) the expanded system would not require new pump station locations; and
- (iii) a new route and right-of-way would alienate more land and increase the amount of land disturbance.

IPL further indicated that it had contacted the appropriate provincial and municipal authorities and agencies to discuss the routing and to identify areas of special concern. IPL testified that during its discussions with those agencies no objections were received with regard to the route.

To ensure that all land owners whose lands would be affected by the proposed expansion were aware of the project, the Board had directed IPL to serve an additional notice on all such parties. The notice indicated that landowners could write or call the Board to discuss any concerns they might have with regard to the project. No contacts were made with the Board as a result of that notice.

Views of the Board

The Board accepts the criteria used for route selection and is of the opinion that the use of the existing right-of-way is appropriate in this case. Moreover, the Board notes that no contacts were made by landowners pursuant to the Board's notice served by IPL.

6.6.2 Land Requirements

IPL indicated that it proposed to locate the 508 mm O.D. pipeline within its existing right-of-way wherever possible. In total, new permanent right-of-way would be required for approximately 85.9 km. To accommodate construction in areas where no right-of-way was to be acquired, IPL would require a 17 m temporary working strip adjacent to the existing right-of-way. In those areas where the existing line of pipe would be too close to the boundaries of the right-of-way to permit the installation of the new line, IPL would acquire a new 18.3 m right-of-way.

With regard to the extensions to each of the five existing 1 219 mm O.D. Line 3 loops, IPL stated that these sections would be located within its existing right-of-way. Similarly, the installation of the 457 mm O.D. pipeline, out of the Gretna station, would occupy existing right-of-way.

The nature and extent of right-of-way requirements, as of the time of the hearing, for the 939 tracts of land between Regina and the Manitoba/North Dakota border, are shown in the following Table.

	Manitoba		Saskatchewan	
	Number	% Obtained	Number	% Obtained
Easements	63	95%	75	93%
Temporary Work Space	470	92%	331	95%
Total	533		406	
Kilometres	300	91%	240	93%

Views of the Board

The Board is satisfied with respect to the right-of-way requirements as set out by IPL. With regard to land acquisition, the Board notes the major extent to which the Applicant has completed negotiations with landowners.

Chapter 7

Environmental Aspects

7.1 Applicant's Views

The Applicant's environmental consultant prepared an environmental assessment which forms Part IV of the application. IPL adopted that environmental assessment including the measures proposed to avoid or mitigate impacts as a result of the project.

The pipeline route crosses predominantly gentle prairie terrain and only three perennial watercourses - Pipestone Creek and the Souris and Cypress rivers. The new line would be situated in or adjacent to IPL's existing right-of-way.

An Environmental Issues List (EIL) was presented in the report, and included the recommended methods to prevent or reduce major environmental impacts.

7.2 Soil Erosion

Erosion by wind or water may occur along certain portions of the proposed route. The Oak Lake Sand Hills at kp 1010 are particularly sensitive to wind erosion. To reduce such soil erosion, slash from clearing would be retained and placed over sensitive slopes along the right-of-way. Another measure to control wind erosion would be the early establishment of a vegetative cover.

The approach slopes to Pipestone and Deadhorse creeks and the Souris River are susceptible to water erosion. To control that erosion, topsoil and organic material would be salvaged where possible for use in reclamation and properly designed berms would be installed where necessary across the right-of-way.

7.3 Soil Compaction

Soil compaction is a potential problem on clay-rich soils during wet weather conditions. The Morden-Gretna region has the greatest potential for soil compaction. There, topsoil would be salvaged, stored and replaced in an appropriate way. Construction would cease on those soils during wet weather.

Since much of the land crossed by the proposed route is in agricultural production, the choice of topsoil handling procedure would be tailored to the local agricultural practice(s). If topsoil is salvaged and replaced properly during construction and work is shut down during wet conditions, problems such as compaction and rutting, loss or dilution of organic matter and increases in water-soluble salts in the root zone, should not be significant.

7.4 Wildlife

According to the Applicant, no major impacts are likely to occur to ungulates, upland birds or waterfowl as a result of the proposed project. The most sensitive period for those species is avoided by constructing the pipeline during the summer and fall.

7.5 Watercrossings

The Applicant indicated that it had determined the sensitivity of each water course to be crossed by the proposed pipeline. The objectives for environmental protection at those locations are to restore the channel configuration and the banks. The environmental assessment contains a summary of the guidelines for minimizing sediment loads in fish-bearing streams.

Important winter habitat was identified for northern pike at the Cypress River Crossing (kp 1 131). To reduce the potential for negative impacts on aquatic resources in the Cypress River during the crossing, removal or alteration of beaver ponds would be avoided if possible. To reduce the period of impact at all watercrossings, aquatic plant species would be seeded or transplanted where needed.

7.6 Environmental Inspection and Monitoring

The Applicant stated that an environmental inspector would be assigned to the project. His purpose would be to "...provide on-site advice and to audit implementation of environmental inspection measures...." Inspection efforts would concentrate on those areas/sites where environmental issues have been identified. The inspector's duties include the monitoring of watercourse-crossing work, topsoil salvaging and restoration, observing right-of-way clean-up and liaising with Board and other surveillance personnel. The inspector would be responsible also for maintaining records and photographs of construction for use in post-construction monitoring.

The EIL would be used by the Applicant to track the status of the environmental issues after the construction phase of the project and to document the success or failure of the environmental protection measures. The Company's environmental inspector would be responsible for those issues contained in the environmental assessment as well as any unforeseen environmental problems that might arise during construction.

Views of the Board

The Board has considered the environmental information contained in the application and the evidence presented at the hearing. The Board is of the view that the project should cause only local temporary environmental impacts.

The environmental information was clearly set out by the Applicant's use of an EIL. In the Board's view, the proper development and maintenance of that EIL should provide a means to focus inspection efforts during construction and help the Applicant to implement an effective environmental monitoring program after construction.

The Board notes that IPL adopts the environmental assessment and its consultant's recommendations, including the EIL, with only minor exceptions. The minor exceptions do not reduce their effectiveness to any substantial degree. Those measures and recommendations should, if properly applied during construction, result in a high standard of environmental protection and right-of-way reclamation.

To determine whether the environmental objectives have been achieved, the Board would require IPL to file a post-construction environmental report within six months of the date that leave to open is granted. The report would discuss all significant

environmental issues that had been identified up to that point, with a statement of their status (i.e., resolved or unresolved). There would also be a requirement that the report set forth the nature and timing of measures for resolving any outstanding issues.

The Board would also require that IPL file a similar report by 31 December following each of the first two full growing seasons after construction.

Chapter 8

Decision

As set out in the previous chapters of these Reasons for Decision, the Board examined all the evidence and took into account all matters that appeared to it to be relevant. During the hearing the Applicant demonstrated to the Board's satisfaction that there will be a need for increased throughput capacity on its system in the year 1988 and beyond. All interested parties agreed with the need for increased capacity on the IPL system and fully supported this application. All letters of comment received by the Board supported the above position as well.

The Board is satisfied that even with a potential arrangement between IPL and Cochin to divert NGL volumes to the Cochin system, there will still be a need for the facilities as applied for. Further, the Board is of this opinion even though additional NGL storage facilities may be required on the Lakehead system at Superior. The Board is also satisfied that IPL's proposal will provide sufficient capacity upstream of Sarnia to accommodate the currently envisaged near-term needs of Quebec.

IPL and certain of the interested parties at the hearing demonstrated, to the Board's satisfaction, the likelihood of the availability of sufficient supplies of crude oil and the existence of actual and potential markets to warrant the proposed facilities. The Board recognizes the possibility that the world price for crude oil may, at the time these facilities are ready for service, be significantly different from the price existing at the time of this hearing. However, the Board thinks it highly unlikely that oil prices would decrease to such an extent as to invalidate the basis for the current decision to authorize the project.

The Board is satisfied that the impact of this project on tolls will be reasonable and that IPL's financing plans for this project are within its capability. Under the assumptions used by IPL, this project can be expected to provide net economic benefits to Canada. The Board recognizes that these benefits could be eliminated if one assumes very low oil prices for a sustained period. However, weighing that possibility against the cost of being caught with insufficient IPL pipeline capacity, the Board believes this expansion should proceed.

The Board is satisfied with the projections of Canadian content provided by IPL.

The Board is also satisfied that the proposed facilities will provide sufficient capacity to transport the forecast 1988 volumes and will allow for increased flexibility in operation of the system as a whole. The Board accepts that an increased operating margin on Line 3 appears to be reasonable given the increased complexity of its operation.

The Board agrees that the use of the existing right-of-way is appropriate in this case and that the requirements for lands, as set out by IPL, are reasonable. The Board believes that this project will not cause major environmental impacts and considers that, with the proper implementation of IPL's protective measures, a high standard of environmental protection will be achieved.

For the reasons set out above and detailed in this report, the Board approves this application and is prepared to issue a certificate of public convenience and necessity for the applied-for facilities upon the terms and conditions set out in Appendix 11.

Ralph F. Brooks
Presiding Member

W.A. Scotland
Member

J. Farmer
Member

Appendix I

Summary of Facilities

Table a1-1
Summary of Facilities
Additions to Existing Line 1 Pipeline

Pipe Size (O.D)	Upstream End	Downstream End	Length (km)
508 mm	kp 704.8 (Regina)	kp 1 242.6 (Gretna)	537.8
457 mm	kp 1 242.6 (Gretna)	kp 1 244.5 (Int. Boundary)	1.9

Table a1-2
Extensions to 1219 mm O.D. Loops to Line 3

Upstream End	Downstream End	Length (km)
kp 275.25	kp 277.05	1.8
456.16	457.96	1.8
636.01	637.41	1.4
854.99	856.59	1.6
1 137.43	1 139.23	1.8
Total		8.4

Table a1-3
Preliminary Selection of
Metering and Meter Proving Facilities

Location	Type	Size	Quantity
Milden	Prover	610 mm	1
Regina	Prover	610 mm	1
	Turbine Meter	168 mm	4
Gretna	Turbine Meter	168 mm	1

Table a1-4
Other Facilities

Location	Facilities
Edmonton	Replacement of booster pumps 11 and 12. Modification of tank lines and addition of Line 1 by-pass around Line 2 booster pumps. Addition of booster pump 22.
Milden	Replacement of back pressure control valve.
Regina	Addition of back pressure control valve.

Table a1-5
Sectionalizing Valves by Location

Location (kp)	Valve Type	Requirement
704.8	RVG	Stn. Discharge/Zone 2
709.1	RVG	Zone 2 (intermediate)
721.3	VC	Zone 2 (White City)
732.7	RVG	White City Stn. Suction
762.1	RVG	Odessa Stn. Suction
789.5	RVG	Zone 2 (Montmartre)
794.0	VC	Zone 2 (Montmartre)
812.3	RVG	Glenavon Stn. Suction
827.1	VG	Sectionalizing
848.9	RVG	Zone 2 (Kipling)
854.1	VC	Zone 2 (Kipling)
875.3	RVG	Langbank Stn. Suction
889.9	RVG	Zone 2 (Vandura)
890.6	VC	Zone 2 (Vandura)
900.0	VG	Sectionalizing
922.9	VG	Sectionalizing
934.3	RVG	Zone 2 (Maryfield)
937.9	VC	Zone 2 (Maryfield)
950.2	VG	Pipestone Crk.
952.4	VG	Pipestone Crk.
959.6	RVG	Cromer Stn. Suction
988.1	VG	Sectionalizing
1 009.2	VG	Sectionalizing
1 031.6	RVG	West Souris Stn. Suction
1 045.3	VG	Sectionalizing
1 072.9	VG	Souris River
1 073.9	VG	Souris River
1 077.2	VC	Sectionalizing
1 103.4	RVG	Glenboro Stn. Suction
1 131.1	VG	Sectionalizing
1 153.7	VG	Sectionalizing
1 165.1	RVG	Manitou Stn. Suction
1 194.4	RVG	Zone 2 (Morden)
1 200.1	VC	Zone 2 (Morden)
1 208.1	RVG	Zone 2 (Schanzenfeld)
1 213.5	VC	Zone 2 (Schandenfeld)
1 242.5	RVG	Gretna Stn. Suction
1 244.6	VC	Zone 2 (Gretna)

Legend: VG - Gate Valve
 RVG - Remotely Operated Gate Valve
 VC - Check Valve

**Table a1-6
Line 1 Pump Stations**

	New Stn.	Modifications to Existing Stn.	Replacement Stn. Or New Stn. (undetermined)
Edmonton		X	
Kingsman	X		
Strome	X		
Hardisty		X	
Metiskow	X		
Cactus Lake	X		
Kerrobert		X	
Herschel	X		
Milden		X	
Loreburn		X	
Craik		X	
Bethune	X		
Regina		X	
White City		X	
Odessa		X	
Glenavon			X
Langbank		X	
Cromer			X
West Souris		X	
Glenboro			X
Manitou		X	
Gretna		X	

Appendix II

Terms and Conditions

Terms and Conditions

- (1) Prior to construction, the Applicant shall submit for Board approval the final design and configuration of the pumping facilities on Line 1 between Edmonton and Gretna, where such designs differ from those in the application dated 15 November 1985.
- (2) Prior to commencement of construction of the 457 mm and 508 mm O.D. pipe replacement sections, the pump station additions and modifications and the 1 219 mm O.D. loop extensions, the Applicant shall provide the Board with a detailed construction schedule or schedules identifying major construction activities.
- (3) The Applicant shall notify the Board of any changes to the schedules referred to in condition (2) hereof prior to the commencement of construction of the facilities.
- (4) Prior to the commencement of construction, the Applicant shall provide the Board with a detailed cost estimate and supporting details based on final design of the facilities.
- (5) Prior to the commencement of construction, the Applicant shall provide the Board with a description of and schedule for the testing to be performed on its new leak detection system for Line 1.
- (6) During construction, the Applicant shall file on a monthly basis construction cost reports providing a breakdown by location of costs incurred during that period, the percentage completion of each activity and an update of projected costs to complete the project.
- (7) During construction, the Applicant shall file on a monthly basis construction progress reports detailing the progress of all construction activities.
- (8) Prior to leave to open, the Applicant shall provide a report outlining, to the Board's satisfaction, the testing of the Line 1 leak detection system and results of that testing.
- (9) Interprovincial shall submit, for Board approval, a Post-Construction Environmental Report within six months after leave to open has been granted. That Report shall include:
 - (i) a list of all environmental issues which have arisen to that point, indicating their status; and
 - (ii) a description of the measures to be taken to ameliorate any unresolved issues.
- (10) By 31 December following each of the first two full growing seasons after the submission of the Post-Construction Environmental Report, Interprovincial shall submit for Board approval:
 - (i) a list of those environmental issues noted as unresolved in the previous report and those which have arisen in the meanwhile, if any; and

- (ii) a description of the measures to be taken on all unresolved issues.
- (11) Within six months of leave to open being granted for the project, the Applicant shall provide the Board with a report on the Canadian content achieved in this project. The report shall:
 - (i) provide separate details on the Canadian content achieved for expenditures by the Cost Categories listed on page 25, Schedule A, Part 1 of the said application; and
 - (ii) include total monies spent and the percent of these totals that represent Canadian content for each Cost Category in total and by the Cost Category Elements materials and installation.

Canadian content shall be defined as set out in the Canadian General Standards Board "Definition of Canadian Content".