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Fairbanks
ALASKA
YUKON
Inuvik
Northway Jct.
Whitehorse
NORTHWEST TERRITORIES
Fort Simpson
Yellowknife
Hay River
Ft. Nelson
Westcoast
CANADA
Edmonton
Calgary
A.G.T.L.
Regina
Winnipeg
A.N.G.
T.C.P.L.
Great Lakes
Montreal
U. S. A.


Fairbanks
ALASKA
YUKON
Inuvik
FOOTHILLS PROPOSAL
NORTHWEST TERRITORIES
Northway Jct.
Whitehorse
Fort Simpson
Yellowknife
Ft. Nelson
Hay River
Westcoast
CANADA
Edmonton
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A.G.T.L.
Regina
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T.C.P.L.
Great Lakes
Montreal
U. S. A.


ALASKA (USA)
Inuvik
Norman Wells
YUKON
NORTHWEST TERRITORIES
Fort Simpson
Yellowknife
Hay River
ARCTIC GAS PROPOSAL
Westcoast
CANADA
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Calgary
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Calgary
A.G.T.L.
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Montreal
U. S. A.

TESTIMONY SUBMITTED BY:

S. ROBERT BLAIR
PRESIDENT AND CHIEF EXECUTIVE OFFICER
THE ALBERTA GAS TRUNK LINE COMPANY LIMITED

for the joint hearings of the

INTERIOR AND INSULAR AFFAIRS COMMITTEE

and

COMMERCE COMMITTEE OF THE U. S. SENATE

regarding

# THE FOOTHILLS OR "MAPLE LEAF" PROJECT FOR TRANSMISSION OF MACKENZIE DELTA GAS

- - -

## THE ALTERNATIVE METHODS FOR TRANSMISSION OF PRUDHOE BAY GAS

(1) FAIRBANKS - ALASKA HIGHWAY ALL-PIPELINE ALTERNATIVE

(2) GAS TO METHANOL CONVERSION ALTERNATIVE

March 24, 1976

Mr. Chairman Jackson;
Mr. Chairman Magnuson;

My name is Robert Blair and I reside in Alberta, Canada. I am here today through invitation of a letter from Senators Magnuson and Jackson and offer to describe to you as background information, the Maple Leaf Project for connection of Canadian gas from the Mackenzie Delta/Beaufort Sea area. Also I agree to respond to the request of the Joint Committee for information with my views with respect to the transportation of Alaska gas across Canada via a Fairbanks Corridor - Alcan Highway system or its marketing through a methanol conversion system.

My principal job is President and Chief Executive Officer of The Alberta Gas Trunk Line Company Limited (Alberta Gas Trunk). That Company was formed in 1954, by special act of the Alberta Legislature, to provide the residents of Canada's principal petroleum-producing province with a medium for direct investment as shareholders in the petroleum industry then emerging. Alberta Gas Trunk gathers and transmits about 70% of the natural gas produced in Canada and is also engaged in other natural gas business and in petrochemicals and manufacturing.

I serve also as President and Chief Executive Officer of Foothills Pipe Lines Ltd. (Foothills), an applicant Company incorporated by special act of the Parliament of Canada which is proceeding, sponsored by Alberta Gas Trunk and Westcoast Transmission Company Limited (Westcoast), through regulatory

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procedures and parliamentary review in Canada. Westcoast gathers and transmits the gas produced in the province of British Columbia and so handles another 20% of the natural gas produced in Canada. The Chairman and Chief Executive Officer of Westcoast is also the Chairman of the Board of Foothills and the President of Westcoast is also a Vice President and Director of Foothills and so these two of the three major gas pipeline companies in Canada are joined in sponsorship of Foothills. Westcoast, Alberta Gas Trunk and Foothills propose to constitute the gas transmission service arrangement called the "Maple Leaf Project".

Foothills' one and only application is to install a pipeline for the new frontier gas being developed in the Mackenzie Delta and Beaufort Basin in Canada, to connect to the main existing systems in Canada and provide gas to the communities in the Mackenzie Valley and Great Slave Lake areas.

The pipeline design proposed by Foothills represents the best assessment of Westcoast and Alberta Gas Trunk of the most orderly, economic and manageable route and sizing for connection of the Mackenzie Delta gas.

In response to the Committee's Questionnaire dated January, 1976, Foothills, and its sponsors filed a submission with your Committee on February 11, 1976. My remarks today will first summarize the material contained in that submission, if you approve, Mr. Chairman.

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The application by Foothills is to construct an entirely Canadian-owned and operated natural gas pipeline of 42 inch diameter from the Mackenzie Delta/Beaufort Sea area south through the Mackenzie Valley to a delivery point near the 60th parallel (northern boundary of the Provinces of Alberta and British Columbia). From this point, interconnections will be made with the mainline facilities of Westcoast and of Alberta Gas Trunk. The gas will then be transported through the present western Canadian transmission companies facilities, much of it to a point of interconnection near the Alberta/Saskatchewan border with TransCanada PipeLines Limited (TransCanada). The gas will then be transported by TransCanada to the markets east of Alberta. A map is attached at the end of this testimony.

Presently, the applications of Foothills and Canadian Arctic Gas Pipeline Ltd. (Arctic Gas) for construction of their respective pipelines are pending before the National Energy Board. A hearing of those applications, which commenced on October 27, 1975, has been effectively terminated by a decision of the Supreme Court of Canada which held that the Chairman of the Panel hearing those applications should not hear the applications.

At the date of the preparation of these remarks, the National Energy Board had appointed a new panel to hear the applications but had not fixed a new date to commence a new hearing, although

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I expect such a hearing might commence during the latter part of April. The hearing will have to start from the beginning and it is my view that they will continue well into 1977. The report to be made by the National Energy Board as a result of the hearing will then be forwarded to the Canadian Cabinet, which has committed to referring the entire matter to the Canadian Parliament for debate.

In addition to the proceedings before the National Eenrgy Board, there is a concurrent hearing being held by Mr. Justice Thomas Berger to inquire into and report to the Canadian Government upon the terms and conditions that should be imposed in respect of any right of way that might be granted by the Canadian Government for the purposes of a Mackenzie Valley pipeline. It is my expectation that this hearing will not conclude until late in 1976, at which time Mr. Justice Berger's recommendations will go forward to the Government for its consideration. In addition to these proceedings, there are transactions involving definition of the future lands entitlements and political rights of the native and other residents of the entire Northwest Territories which must also proceed before construction of any main pipeline there.

Therefore, while Foothills' requirements for authorizations are simple, and its engineering and construction plan is completed, it is acknowledged that considerable time is still needed for regulatory and government decisions. The first

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production of gas in the Mackenzie Delta is presently scheduled nominally for 1981 by the producers. It is not known yet whether the overall development will achieve that schedule. Foothills itself is ready to proceed at whatever time a gas pipeline service is in fact required.

In this forum today I am supposing that you will not want a review of every reason for the difference between the Maple Leaf and Arctic Gas projects. That comparision is occurring on record in Canada and is available to your staffs. May I just present to you in that respect that we know the situation in Canada, are natural gas pipeline operators by trade, and are committed very earnestly and optimistically to Foothills' project. I will just summarize some major differences between the Maple Leaf project and the Arctic Gas project, insofar as the Canadian public interest is concerned. First, rather than construct an entirely new express system through Canada as Arctic Gas would do, Foothills proposes to utilize existing Canadian pipeline facilities to the fullest extent possible with resulting benefit to other users. Secondly, by this same approach, we are able to hold our initial capital requirements down so as to avoid a depletion of financial resources needed for other worthy projects. Third, since the initial capital requirements are minimized and spread over several operations, financing can be achieved with less

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difficulty. Fourth, our project provides for complete share ownership by Canadians. Fifth, the Maple Leaf project offers Canada a project which will be subject to present and future regulation by only one sovereign jurisdiction. Sixth, the Maple Leaf project can be financed without government funds. Seventh, our project relies upon pipe produced in Canada and is more cautious in its construction plan and operating pressures.

Another major point of contention is sufficiency of Mackenzie reserves. The latest estimate of reserves in the Mackenzie Delta/Beaufort Sea area on a most likely basis, made by Foothills, was 6.2 trillion cubic feet (Tcf). The designation "likely", or "most likely", refers to that quantity of gas which, on an engineering basis, will ultimately be produced from a reservoir. This is the nomenclature gaining preference for frontier sources by other organizations, including the Geological Survey of Canada. Foothills' consultants believe that it is still unrealistic to use conventional designations such as "proved, probable, and possible" insofar as reserves in the Mackenzie Delta are concerned, since delineation drilling, which is required to make a final evaluation of reserves on this basis, will not be sufficiently advanced until after a pipeline is certificated.

Drilling activity during the 1975/76 drilling season has resulted

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in a significant gas find by Sun Oil Canada Ltd. at their Sun Gary location, and delineation drilling by Gulf Oil Canada Ltd. at Parsons Lake has resulted in increased reserves for that reservoir. Foothills expects that once the well information on these successes is made available, reserves in the Mackenzie Delta area will be approximately 7.7 Tcf on a most likely basis at this date, excluding gas which may be added as a result of other exploratory wells now being drilled.

Foothills' consultants have estimated the ultimate potential for the Mackenzie Delta area, including the offshore to a water depth of 600 feet, to be 39.1 Tcf. This is the most conservative estimate of ultimate potential made to the National Energy Board (NEB) of Canada during its 1974/75 supply-requirements hearings. Estimates ranged from 39.1 Tcf by Foothills to 110 Tcf by the Canadian Petroleum Association.

Representatives of the Arctic Gas consortium have frequently asserted that Canadians have no choice other than to "piggy-back" their Mackenzie Delta reserves on top of Alaskan gas being transported through Canada. Mackenzie Delta reserves alone, it is argued, are not sufficient to finance and economically justify an all-Canadian pipeline. Foothills, Alberta Gas Trunk, and Westcoast strongly disagree with this claim. The construction of the Foothills pipeline to deliver 1.2 billion cubic feet of gas per day requires only 2 billion dollars. This provides

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a complete 42-inch line with four compressor stations. Later expansion from that level to a capacity of 2.4 billion cubic feet per day is accomplished by the addition of more compressor stations and the money for this expansion can come from internal cash flow and normal financing by the established companies. Therefore, at the time the project is financed - and it looks now as if this will be not earlier than late 1978 for equity and late 1979 for debt -- it will only be necessary to show that there are enough reserves to sustain a flow of 1.2 billion cubic feet per day, or less, for sufficient years to pay out the line. This is calculated to require from 7 to 8 trillion cubic feet.

Threshold volumes to build the pipeline are, therefore, not 15 to 18 trillion cubic feet as some people have publicly claimed; they are more like 7 to 8 trillion cubic feet.

With regard to cost of service, or unit cost of transportation, the claim has been made that the unit cost of delivering Mackenzie Delta gas to Canadian markets through the Maple Leaf project will be too high, and that for this reason, also, Delta gas must be "piggy-backed" on top of Alaskan gas in a 48 inch line to obtain acceptable unit costs. This is not so. We are completely familiar with normal economies of scale which make unit costs somewhat lower as line sizes get larger but, in this case, there are some offsetting factors. Main among these is

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that the Maple Leaf project makes use of conventional materials and present organizations and facilities to transport the gas south through Alberta and British Columbia instead of having a wholly new organization and new facilities for this section. This Alberta section amounts to about half the total distance between the Mackenzie Delta and the delivery point to Trans-Canada at the Alberta-Saskatchewan border.

When the Arctic Gas project was originally conceived, it was anticipated that substantial quantities of natural gas from the Mackenzie Delta would be declared "surplus" to Canadian requirements, and, therefore, would be made available for additional export to the United States. It is now generally recognized, however, that Canada will need the Delta reserves to satisfy its own growing demand. In fact, the National Energy Board of Canada has recently issued a report finding that:

> "Without substantial supplies from Canada's Frontier areas, growing domestic requirements could not be satisfied beyond 1984 even if all exports were diverted to domestic markets as required. Without substantial further development of the conventional producing areas they could not be satisfied beyond 1979 even with exports diverted to domestic markets as required to meet domestic deficiencies."

Another topic closely associated with the northern pipeline project is the native land claims issue. Foothills is sympathetic to native land claims and would prefer to have them settled

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before construction of a pipeline begins. Because of regulatory requirements, Foothills believes there is time for this to happen. Foothills is also aware of the growing need in eastern Canada for the energy from the north. This need must be weighed against the need for time to settle northern affairs. The Maple Leaf group is actively attempting to find a solution to these divergent requirements by working diligently on a program to increase the supplies of gas from Alberta over the interim period until the northern pipeline can be completed. There is definite probability of this being accomplished.

Foothills' construction schedule can be tailored to suit Canadian needs for thorough regulatory proceedings and settlement of native land claims. Arctic Gas's construction schedule cannot be tailored to meet Canadian requirements because of the urgent need of the United States for the Alaska gas.

Foothills and its sponsor companies, Alberta Gas Trunk and Westcoast, fundamentally believe that United States - Canadian relations will be strengthened through the construction of separate and distinct Arctic transmission systems. Accordingly, we are differing from the joint project which has been proposed by the Arctic Gas consortium.

Above all, the Congress should not labor under the impression that Canada needs the Arctic Gas project in order to gain access

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to its Mackenzie Delta reserves. The Maple Leaf project offers Canadians an opportunity to own, operate, and manage their own Arctic transmission system for their own total benefit.

In Canada we are therefore considering some of the same problems which you are considering for United States gas. Your invitation asked for our views on alternative approaches for the delivery of Alaskan gas to its intended markets.

In Alberta Gas Trunk and with Westcoast, we have made some assessment of such alternatives. We are certainly not presuming any responsibility or initiative. Our interest occurs so far partly because we have business friends and other contacts in the United States who have raised the question with us of whether there is not something more that we could contribute to a difficult situation over and above our present actions to maintain the present export deliveries from Canada to the United States. Another interest is from our realization that if there is any main development coming our way as a matter of natural self protection we had better keep our heads up and size it up and see what it might do to us. One thing plain to all of us is that each and any arctic gas pipeline project has the potential to really rock our whole natural gas service industry and shake up regional industrial economy and even our Canadian economy by requirement of capital, materials and construction forces; and could quite possibly rock our political environment through

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focusing of international, provincial and territorial government issues. In light of past Canadian pipeline experience we would be foolish not to see that such impacts are there potentially so we do try to keep all of the main possibilities under continuing review.

Whichever choices of routes and specific service objects may exist, we do believe consistently in the practices of identifying a manageable project design, keeping the initial capital cost as modest as we can correlate with long-term unit cost advantages and above all in watching out for public and political concerns at all levels. Our companies are large in western Canada but they are not large enough to afford to share in any serious international investment or utility mistake.

In this atmosphere, we have not been surprised to receive inquiry from business and government people in the United States in a direction very similar to that which we expound within Canada. It has been suggested to us that compared to the present applications there may occur a somewhat smaller initial production of the oil-associated natural gas from Prudhoe Bay than advertised, a more gradual or at least a less certain build-up of those production quantities in the early years of operation, more accommodation of the State of Alaska's positions on gas routing and more utilization of existing transportation installations. We have considered what our views would be about a deliberate plan to minimize and also spread out the initial capital cost of

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transmission facilities for Alaska gas until more information becomes available. We would have some immediate cautions about Canadian participation that I'll note shortly. However we have made an estimate of the cost of carrying Alaska gas from the Alaska-Yukon Border near Northway Junction along the Alaska highway to Fort Nelson and thence through Westcoast's and Alberta Gas Trunk's systems to the 49th parallel in southern B.C. and Alberta; the gas destined for the western United States to go through Westcoast's system and that destined for the eastern United States to go through Alberta Gas Trunk's system. Our estimate was based on a 42 inch diameter pipeline being built along the Alaska highway from Northway Junction to Fort Nelson to carry an initial volume of 1 billion cubic feet per day, rising over 4 years to 2.4 billion cubic feet per day. At Fort Nelson the gas was assumed to split approximately 30% through Westcoast's system and 70% through Alberta Gas Trunk's system by gradual expansion of these systems as required. I should point out that our estimates are of a preliminary nature but have been done with enough care so that we are confident they give reasonably accurate results.

In addition, in order to be able to get an idea of the total cost of delivering Prudhoe Bay gas to the 49th parallel we have made an estimate of the costs of a 42 inch pipeline across Alaska from the North Slope along the route of the Alyeska pipeline to Delta Junction and thence from Delta Junction along

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the Alaska highway to Northway Junction. This estimate must be considered less reliable than the estimate we have made for Canada.

The Joint Committee's invitation to file testimony in advance has developed on brief notice to us and my colleagues are using the days before my appearance on March 24 to work up our most current figures which I will be able to give at the time of the appearance. I will provide the information we have.

Such study of a Fairbanks - Alaskan Highway Corridor is probably worthy because, besides the assumptions mentioned above, attention has been called by others to its relatively low environmental sensitivity, good construction logistics, good operations access, prompt lands claims settlement and other favourable factors. However, I emphasize that a real business response to this kind of arrangement could only occur if there was an initiative from the United States to seek such a service and also if the governmental authorities in Canada let us know that it was their choice that we endeavour to work out such an alternative. I just mean to underline from my own limited base of authority in Alberta Gas Trunk that while we are far from "isolationalist" and do act energetically to market commodities or services to the United States, whenever we can develop new business at arm's length and obtain a satisfactory return and value added in Canada, for this Alaska situation we are not

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ourselves sponsoring or proposing a new project. We are just explaining our reaction now to a future possibility which has been raised. We could only go further if there were an American request and Canadian government request and sanction and also if there were the express endorsement of our close partner Westcoast.

It is a fact of life that pipelines do a great deal more for the highly populated areas that they go to than for the country through which they pass. For the large capital investment needed the region traversed gets relatively small benefits in cases in which the transmission operation is strictly an express-through job. This is a matter requiring the greatest of attention by the State of Alaska. This is also the reason Foothills proposes certain accommodations to the Northwest Territories through which our pipeline will pass. And it is a weighty factor my Company has to consider in agreeing to carry any foreign gas across the Province of Alberta.

For under $50 million of capital investment Alberta Gas Trunk and a partner have installed enough methanol manufacturing capacity in this province to change Canada from being a 90% importer of methanol into being self-sufficient in this supply plus having about 75% more than Canadian requirements available for export sales until the Canadian market grows to need it all.

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In the matter of priorities I would have, I feel more interested in investing $50 millica that way than in investing $250 million to express Alaskan gas through Alberta, frankly. The demands of capital investment as well as management and engineering-construction would quite outweigh the commercial gain in transmission business. So while as a utility operation it is not in our policy to refuse any help to a neighbour with a problem I have wanted to emphasize that my own judgment is that any such help should be partial and supplementary and that in no way are we out selling ourselves into seeking the whole job and responsibility.

We have given some thought to the kind of cautionary provisions which we should point out early in any such discussion and in our view they are as follows:

1. That in any application by a pipeline company in Canada to provide transmission services for some of the gas to be produced from Alaska there be particular recognition, expressed in the application and any forms of contract, that besides the commercial undertakings for transmission there needs to be also a future decision of principle by the Government of Canada. The principle is whether to confer a long-term transmission service access for Alaskan gas to U.S. markets through routes crossing

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western Canada by 1500 miles or more, subject to Canadian regulatory authority.

2. Similarly, that there be particular recognition that there must be decisions by the provinces of Alberta and British Columbia and the National Energy Board that the gas pipeline companies providing service for gas produced in those provinces may integrate through their systems a further service for the transmission of Alaskan gas to U.S. markets.

3(a) That the arrangements for transmission of some Alaskan gas across western Canada be accompanied with other long-term arrangements to move other Alaskan gas intrastate and also interstate as by liquefaction and ocean transport within the U.S. jurisdiction, so that Canadian companies shall not inherit complete responsibility for all future investment in providing and expanding transmission capacity for future gas production from the North Slope of Alaska.

(b) That the design of the new 800-mile pipeline connection in Canada not exceed the size and specification of pipe available tried and true from Canadian and other North American pipe mills nor exceed the project scale capable of orderly financing without financial contribution or guarantee by governments in Canada.

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4. That transmission services to move Alaskan gas a further 700 miles to 800 miles through British Columbia or Alberta to delivery points from those provinces across the 49th parallel or through TransCanada to points of delivery eastward, be provided on terms to United States shippers of Alaska gas which are not more favourable to such shippers than to concurrent terms of service to Canadian users.

.. That Canadian pipeline operators transmitting Alaska gas shall exercise similar rights and responsibilities in the operational use and handling of the gas as for Canadian gas in their possession.

After having pointed out all these serious conditions which must be considered I would like to point out that in our opinion this overall scheme could have some definite advantages.

One extremely important point is that it removes several uncertainties about construction. The construction in Alaska can take place along the route of the Alyeska oil line, it can be built off the same gravel pad. From Fairbanks to Fort Nelson it follows the Alaska highway which provides excellent access for materials and construction. From Fort Nelson south, it is merely expansion of existing systems. Along the whole route of the pipeline there are excellent airstrips providing quick access. Construction of all sections of the line would

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therefore be by conventional methods and this should not only reduce the initial capital costs but substantially reduce the possibility of cost overruns. The fact that there would be excellent all-year access to all sections of the line would eliminate the possibility of lengthy interruptions of service and could eliminate the need for an all events tariff.

If this project could be started shortly after the completion of the Alyeska line all the equipment, and camps, and all the manpower mobilization and administration associated with that project could be utilized for the gas line project, thus effecting substantial savings.

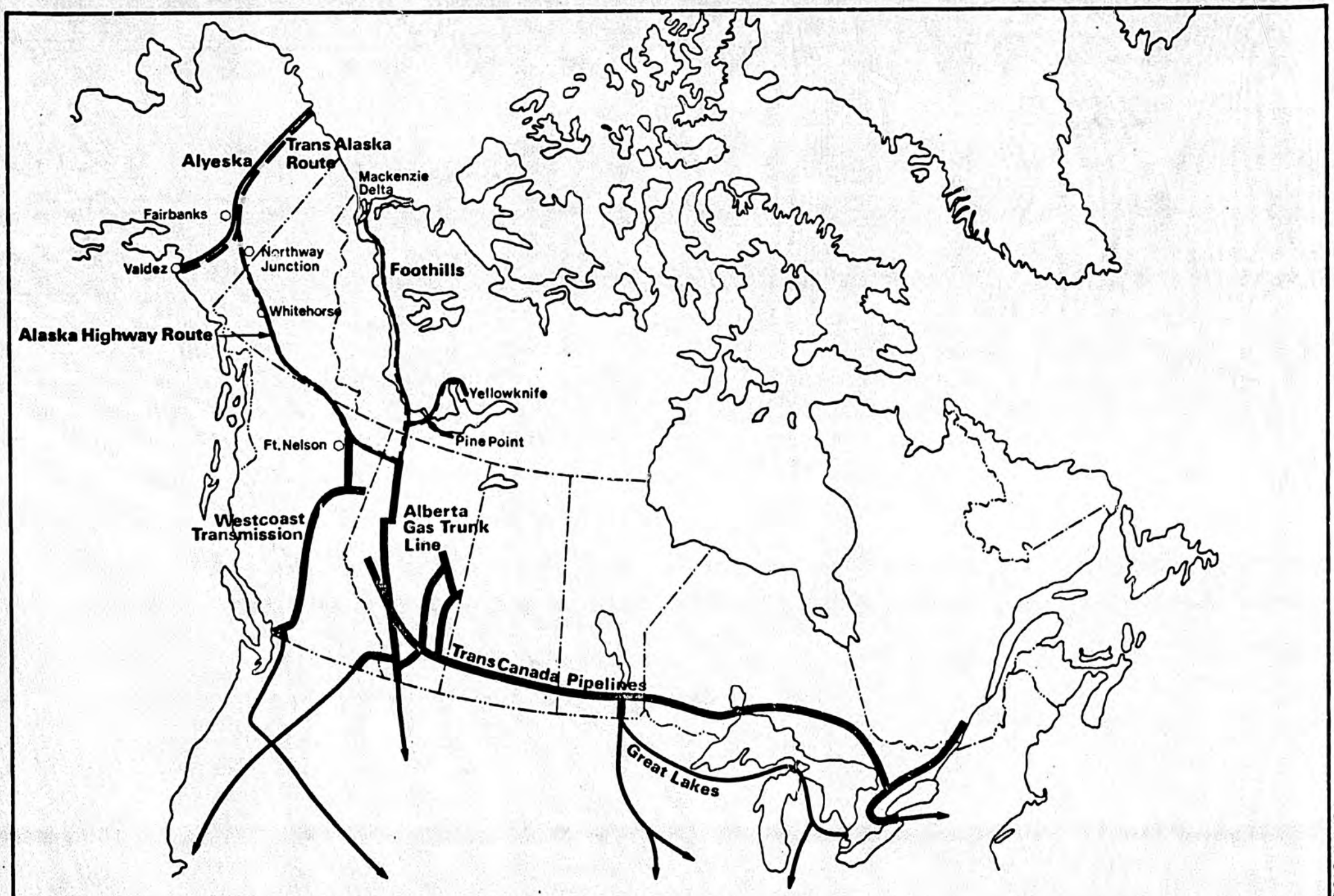
There is the other alternative which we have been asked about because of our recent installation of two world-scale methanol manufacturing plants in Alberta, which is that quantities of natural gas be converted to methanol and moved to market as a liquid energy source. We have had a brief look at that alternative and have two immediate reactions. The first is that some of the factors which have caused us to move aggressively in Alberta in the manufacture of chemical grade methanol probably exist in Alaska too. The merits of developing industrial benefits for the producing state or province by adding value through processing locally, using some of the raw hydrocarbon for locally based and owned industry, are bound to come up in Alaska too and personally I cannot do anything but

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enthuse about those purposes. It doesn't take much gas to make methanol or ammonia-based petrochemicals and we maintain that while exporting all those jobs to other more populated areas through a pipeline, it is just plain right to keep a bit of a supply at home and give the local economy a share of the action.

However, as to converting all of the natural gas produced into methanol, as an energy transportation mode, our people are very negative. I admit of course that because we have become one of the larger producers and marketers of chemical-grade methanol in North America, we would have a clear conflict with the sudden appearance on the market of new methanol in quantities which, for each 1 BCFD converted, would be equal to three times the United States requirement in 1973 - 74, even if its cost-base were much higher than ours. So please don't consider us to be detached as to business interest.

My methanol-expert colleagues have been asked about the possible feasibility of this alternative and judge that it would be both too expensive and too inefficient in terms of energy conversion to stand comparison with pipeline transmission as the means of moving the main gas stream from Prudhoe Bay. I have asked them for their latest figures and estimates and for their appraisal of the Institute for Energy Analysis Report dated November 1975 and will report our information and views when I appear as a witness.


Alyeska
Trans Alaska Route
Mackenzie Delta
Fairbanks
Valdez
Northway Junction
Foothills
Whitehorse
Alaska Highway Route
Yellowknife
Pine Point
Ft. Nelson
Westcoast Transmission
Alberta Gas Trunk Line
Trans Canada Pipelines
Great Lakes

PLAN. 0100-0

ADDENDUM TO THE TESTIMONY SUBMITTED
BY
S. ROBERT BLAIR TO THE
JOINT HEARINGS OF THE
INTERIOR AND INSULAR AFFAIRS COMMITTEE
AND
COMMERCE COMMITTEE OF THE U.S. SENATE

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However, we have also completed estimates of the capital costs and transmission service charges for a pipeline connection for Prudhoe Bay gas across Alaska and Western Canada to the head ends of the existing transmission systems in Western Canada, and by using those systems, to delivery points along the 49th parallel. The total capital investment required to place this system in operation for 1981 is just under $4.0 billion, in escalated dollars. The system estimated would employ 42" diameter pipe for the whole of the route of the new connection, to carry about 1 billion cubic feet per day initially, increasing to 2.4 Bcf per day with progressive expansion of capacity by adding compressor stations. Of the initial investment about $1.9 billion would be invested in the State of Alaska along the route of the Alyeska pipeline shown yellow on the attached map, $1.6 billion would be invested in the new main line connection within Canada as shown in green along the Alaska Highway on the attached map, and $0.5 billion would be investment in expansion of the existing systems of Westcoast Transmission in the Province of British Columbia and

of Alberta Gas Trunk Line Company Limited in the Province of Alberta. When the system is expanded to full capacity the cumulative escalated capital investment would be about $5.4 billion and the total costs of service to move the Alaskan gas to points on the International boundary would run about $1.12 per million Btus. We have confidence in the accuracy of these estimates within Canada and believe that our approximation of the costs in Alaska is reasonably indicative. We conclude that as far as engineering and construction factors are concerned such a system is manageable and even rather superior in its practicality. If approved by all concerned, it could apparently provide the capacity to move the Alaskan gas to the lower 48 states at a unit cost favorably comparable with any other project or proposal submitted.

For these estimates our engineering and construction management staffs assumed that 30% of the Alaskan gas would go down to the State of Washington through the Westcoast Transmission system and the remaining 70% would go to U.S. companies taking delivery from the south end of the Alberta Gas Trunk Line system or to TransCanada Pipeline, for further transmission to the midwestern and northwestern states. I should also mention that in these overall estimates we have covered the costs of all of the systems shown on the map, except that eventual gas pipeline from the Fairbanks area to Valdez also shown in yellow on the map, about which I will comment shortly in explaining our basic policies about this whole proposition.

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My company's Planning and Development Department has reviewed carefully a copy of a report by the Institute for Energy Analysis and perhaps I can most effectively summarize their conclusions by comparison with the conclusions of the Institute's report, which I know have been submitted to this Committee. Our people believe that the conversion efficiency of methanol synthesis in arctic manufacture would be lower, 49% rather than 63%, that capital costs would be about double those estimated by the Institute and that it would be appropriate to assume substantially higher field gas prices; we used $1.70 per MMbtu compared to the Institute's 50¢. We also believe it appropriate to use a faster depreciation rate and to assume that the tariff for the Alyeska Pipeline would apply to the methanol as much as to the oil. When all of these major estimating changes are applied our people have calculated that the cost of methanol F.O.B.-Los Angeles would be about 66¢ per gallon or $10.91 per million Btu's. That compares to 25¢ per gallon of methanol, equivalent to $3.69 per million Btu's as estimated by the Institute. On this basis the alternative mode of conversion to methanol appears beyond economic feasibility as a means to market the main Prudhoe Bay gas stream.

The report which I have received on this particular subject was prepared by our Department in conjunction with the President of the affiliate company through which we participate in methanol manufacturing and marketing. The company, Alberta Gas Chemicals

Ltd., has two methanol manufacturing plants and ranks fourth in methanol production capacity within North America. The report has been prepared especially for today's testimony and, Mr. Chairman, is available for the record or staff use or for such purpose as you wish.

AGENDA

GAS PIPELINE IMPACT COMMITTEE
MARCH 31

Rutherford

1:00-- Foothills Pipeline Co./ Westcoast Transmission.

Canadian industry to discuss feasibility of gasline down Alcan corridor. They are not sponsoring an AlCan routing.

3:00-- Northwest Energy Co.

Possible sponsors of an AlCan route. They might be willing to be US applicants if they can obtain some State royalty gas. Joe Bancroft

4:00--Response from Arctic Gas and El Paso to proposed routing.

Foothill - 80% Albert Da Trackler
Bob Blair
Ron Rutherford
20% West coast Transmission
opposite B.P. Pres Ed Phillips
Northwest says yes no if Jet yes
Joe Bancroft

ADDRESS BY - R. M. RUTHERFORD
EXECUTIVE VICE-PRESIDENT, FOOTHILLS PIPE LINES LTD.
TO

THE ALASKAN GAS PIPELINE IMPACT COMMITTEE
MARCH 31, 1976

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Mr. Chairman and members of the Alaskan Gas Pipeline Impact Committee - We are delighted to have been invited to appear before you to describe our Foothills - Maple Leaf Project.

My name is Ron Rutherford, and I am Executive Vice-President - the senior full time officer - of Foothills Pipe Lines Ltd. I bring you regrets from Mr. Robert Blair, the President of Foothills and also the President and Chief Executive Officer of The Alberta Gas Trunk Line Company Limited - one of Foothills' sponsors - that he could not be here. He was looking forward to coming but was called overseas to handle a crisis in one of Trunk Line's other subsidiary companies. It is really too bad that you did not have the pleasure of hearing Bob Blair, rather than me - because he is a giant in the gas industry in Canada. He is either President, Chairman, or Director of many Canadian companies, including Alberta Gas Chemicals Ltd., Alberta Gas Ethylene Company Limited, Grove Valve and Regulator Company, The Bank of Montreal, Canron Limited, Burns Foods and The Canadian Enterprise Development Corporation. He is also a member of the Economic Council of Canada, the Canadian Institute of International Affairs and the Canadian-American Committee.

He has also pioneered a great deal of the research into gas pipelining in the far North. His company has been actively involved in these efforts since early 1970. As operator of the original Gas Arctic Systems Study Group, AGTL initiated and supervised extensive studies in 1970, 1971 and 1972 to determine the feasibility of a major pipeline to connect Arctic supply areas with southern markets. Following the merger between that group and the Northwest Project Study Group in 1973 to form Canadian Arctic Gas Study Limited (CAGSL), AGTL continued to actively participate in similar studies as a member of CAGSL. When that group eventually established its own payroll in early 1974, by far the largest number of its technical staff were people who had been transferred from AGTL. By September, 1974, however, AGTL concluded that vital Canadian objectives, interests and timing were not being accorded sufficient recognition by the Study Group. As a result, AGTL withdrew from the Arctic Gas Consortium and soon thereafter launched, as an alternative, the Maple Leaf Project, which is an all-Canadian proposal to construct and operate a pipeline system that will connect the Mackenzie Delta supply area with Canada's existing transmission systems.

My own background is exclusively in the utility business and particularly in the gas utility business. I have both Engineering and Commerce Degrees, have been a senior officer in several gas transmission and distribution companies and for seven years worked world wide, out of San Francisco, as a consulting engineer for Bechtel Corporation. I have been involved in

several previous schemes designed to bring a project from the grass roots phase, right through to construction and operation. I came to Foothills from Westcoast Transmission Company Limited, where I was a Vice-President of the parent company and President of an operating subsidiary transmission and distribution company.

It is my intention today to describe to you the Foothills - Maple Leaf Project and tell you why we feel our project is in the best interests of Canada. Then I will describe to you the limited studies we have done on the Fairbanks-Alcan Highway Pipeline Route and the assessment AGTL has made of the transportation of Prudhoe Bay gas as methanol. I will be following very closely the outline given in Washington on March 24th by Mr. Blair to the United States Senate Committees on Interior and Insular Affairs and Commerce and I should point out that the material presented on the Fairbanks Corridor and methanol transportation came as a direct result of the Senate Committees' letter requesting such information - not at the instigation of Foothills.

But before I begin, I would like to introduce my colleagues. With me today is John Burrell, Vice-President of Corporate Development of Foothills, Dianne Narvik, Secretary of Foothills and Assistant Secretary of AGTL, and, Mr. Ed Phillips, President of Westcoast Transmission Company Limited, the other

sponsor of Foothills. When I finish I will ask Mr. Phillips to say a few words on behalf of Westcoast and then we will all be available to answer questions.

I have a set of four charts which I would like to hand out, because I will be referring frequently to these charts in my outline.

Firstly, I would like to describe the natural gas industry as it exists in Canada today. Chart 1, shows the existing gas transmission systems in Canada and the areas where gas reserves are located.

You will note that the gas productive areas in Canada - shown in red hatching - are located throughout Alberta; in northern British Columbia and the southern Territories; and along the western boundary of Saskatchewan.

The largest area of gas reserves in Canada is in Alberta where about 72 trillion cubic feet of reserves have been discovered to date, and where remaining reserves amount to 51 trillion cubic feet. Almost all the gas produced in Alberta is gathered and transmitted by The Alberta Gas Trunk Line Company Limited - the network of black lines shown in Alberta on Chart 1 - the only exception being some small portion of gas for local utility use.

The Alberta Gas Trunk Line Company Limited was formed in 1954, by Special Act of the Alberta Legislature, to provide the residents of Canada's principal petroleum-producing Province with a medium for direct investment as shareholders in the petroleum industry then emerging. Alberta Gas Trunk gathers and transmits about 70 per cent of the natural gas produced in Canada and is also engaged in other natural gas business and in petrochemicals and manufacturing.

AGTL transmits the gas produced in Alberta to various locations on the southern boundaries of Alberta for further transmission to markets east of Alberta and to the eastern United States, by TransCanada PipeLines, and south of Alberta into the export market by Alberta Natural Gas Company.

The second largest area of gas reserves in Canada is in northern British Columbia and the southern Territories. In this area some 11 trillion cubic feet of gas has been discovered to date and remaining reserves are approximately 8 trillion cubic feet. Westcoast Transmission Company Limited - the black line shown in B.C. on Chart 1 - gathers all the gas produced in northern British Columbia and the Yukon and Northwest Territories and transmits this gas south through B.C. to serve the B.C. market and to export to the Pacific Northwest. Westcoast handles approximately 20 per cent of the natural gas presently being produced

in Canada.

These are the two main producing areas in Canada. There is a relatively small volume of gas produced in Saskatchewan which is used within that Province and a still smaller volume produced in Ontario.

In the last few years significant volumes of gas reserves have been discovered in the Mackenzie Delta around the town of Inuvik - shown on Chart 1 - and even larger reserves in the far northern Arctic Islands.

Although not in Canada, we have also shown the location of Alaska's Prudhoe Bay gas on our chart. As you know, it is these Mackenzie Delta and Prudhoe Bay reserves which have resulted in the competitive applications for pipelines out of these areas.

I am not going to take the time to describe Gas Arctic's pipeline plan or El Paso's LNG plan in any detail because I am sure you are familiar with those. From time to time I will refer to them however - probably in a disparaging manner - when I am pointing out the superior aspects of our project.

THE FOOTHILLS - MAPLE LEAF PROJECT (Will you please refer to Chart 2)

The Foothills Project is a plan to construct a wholly Canadian owned and operated 42" diameter natural gas transmission pipeline from the Mackenzie Delta/Beaufort Sea area, up the Mackenzie Valley to a point near the 60th Parallel (the southern boundary of the Northwest Territories). This line is shown in red on Chart 2. From this point, a 30" mainline, to be owned and operated by Westcoast Transmission, will branch off and lead generally southwesterly about 140 miles to connect with the existing Westcoast Transmission system. Also, from the point near the 60th Parallel, another 42" mainline, to be owned and operated by The Alberta Gas Trunk Line (Canada) Limited, a Federal subsidiary of AGTL, will continue southward about 80 miles into Alberta to connect with the mainline system of AGTL. Lateral lines will be built to bring natural gas services to a number of the communities in the Mackenzie Valley region of the Northwest Territories.

The intention behind the project is to transport gas from the Mackenzie Delta/Beaufort Sea area through the Foothills' line to its points of connection with the systems of Westcoast and AGTL, thence through those systems and, on the eastward side of Alberta, through the TransCanada PipeLines Limited (TCPL) system to Canadian markets. The whole system to get the gas

to market, including Foothills, Westcoast, AGTL and TransCanada PipeLines is termed the "Maple Leaf Project".

As I have stated, the Foothills' portion of this system will be the 800 mile 42" diameter pipeline built in the Northwest Territories. The size and specifications of the pipe, as well as the compressor stations required thoughout its length, are planned to be standard and conventional. The pipeline design proposed by Foothills represents the best assessment of Westcoast and Alberta Gas Trunk of the most orderly, economic and manageable route and sizing for connection of the Mackenzie Delta gas.

NEED FOR NORTHERN FRONTIER GAS

Foothills' projections of natural gas requirements to meet Canadian markets plus existing export commitments; and supply from conventional sources, show that a shortage of supply will commence in Canada as early as 1977 and increase in severity in subsequent years as production from Alberta and British Columbia declines. This forecast was substantiated by most parties appearing before the National Energy Board in its Supply/Requirements Hearing in 1974, and indeed was confirmed by the Board's report following the hearing. Frontier supplies are therefore required as quickly as they can be attached, and in ever increasing volumes, if Canada is to meet its natural gas requirements.

The Delta of the Mackenzie Valley offers the most appropriate source for first supplies of additional gas. For the interim period, prior to the time that delta gas can be attached, the sponsors of the Foothills' project are attempting to develop a practical method whereby the supplies from Alberta to eastern and western Canadian markets can be increased.

## OWNERSHIP OF FOOTHILLS

Foothills Pipe Lines Ltd. is a joint undertaking of Westcoast Transmission Company Limited and the Alberta Gas Trunk Line Company Limited. At present 80 per cent of the common shares are held by, or for, The Alberta Gas Trunk Line Company Limited and 20 per cent by, or for, Westcoast Transmission Company Limited. The two sponsor companies of Foothills (AGTL and Westcoast) expect other sponsors to join this venture in due course and have resolved that new participants must meet two prime qualifications as conditions precedent to the acquisition of shares in Foothills. Firstly, they must be able to provide substantial aid in getting the Mackenzie Delta gas to Canadian markets and, secondly, they must be Canadian; that is to say, a majority of their issued and outstanding shares must be clearly and demonstrably in Canadian hands. In addition, each must be of substance and have a high degree of financial integrity. As other sponsor companies join as participants, the AGTL percentage of the issued and outstanding shares will be reduced by transfers to the new sponsor companies.

The Chairman and Chief Executive Officer of Westcoast, Mr. Kelly Gibson, if also the Chairman of the Board of Foothills and the President of Westcoast, Mr. Ed Phillips, who is here with us today, is also a Vice-President and Director of Foothills and so these two of the three major gas pipeline companies in Canada are joined in sponsorship of Foothills.

PLAN OF OPERATIONS

Foothills will operate as a transporter for others who purchase the gas, charging for this service on a "cost of service" basis. "Cost of service" studies, based on planned throughput of the Foothills' pipeline, indicate that the Maple Leaf Project is an economically viable means of bringing Beaufort Basin gas to Canadian markets.

STATUS OF HEARINGS

Foothills and other members of the Maple Leaf Project filed applications before the National Energy Board to construct the various sections of the project and hearings commenced before that body on October 27th. At the same time, a companion application was filed with the Department of Indian Affairs and Northern Development and Foothills is presently appearing before Mr. Justice Berger in that regard. The hearing before

the National Energy Board was effectively terminated by a decision of the Supreme Court of Canada which held that the Chairman of the Panel, hearing those applications should not hear the applications. However, the National Energy Board has appointed a new panel to hear the applications and has fixed a new date of April 12th to commence a new hearing.

The hearing will have to start from the beginning and it is my view that they will continue well into 1977. The report to be made by the National Energy Board as a result of the hearing will then be forwarded to the Canadian Cabinet, which has committed to referring the entire matter to the Canadian Parliament for debate.

It is my expectation that the hearing being held by Mr. Justice Thomas Berger to inquire into and report to the Canadian Government upon the terms and conditions that should be imposed in respect of any right-of-way that might be granted by the Canadian Government for the purposes of a Mackenzie Valley pipeline will not conclude until late in 1976, at which time Mr. Justice Berger's recommendations will go forward to the Government for its consideration.

In addition to these proceedings, there are transactions involving definition of the future lands entitlements and political rights of the native and other residents of the entire Northwest Territories which must also proceed before construction of any main pipeline there.

Therefore, while Foothills' requirements for authorizations are simple, and its engineering and construction plan is completed, it is acknowledged that considerable time is still needed for regulatory and government decisions. The first production of gas in the Mackenzie Delta is presently scheduled nominally for 1981 by the producers. It is not known yet whether the overall development will achieve that schedule. Foothills itself is ready to proceed at whatever time a gas pipeline is in fact required.

## CAPITAL COST AND FINANCING PLAN

It is estimated that the capital cost of the Foothills' system, when expanded to full capacity, will be 2.4 billion dollars in escalated dollars. Of this amount 1.9 billion dollars

will be financed and used to construct the pipeline to its initial minimum capacity and the balance of 500 million dollars to expand the system to full capacity will come from internal cash generated during operations.

AGTL will spend 406 million dollars to expand its system to transport first year volumes received from Foothills and progressively spend an additional 415 million dollars on further expansion to carry Foothills' full capacity volumes.

Westcoast will spend 310 million dollars initially expanding progressively by an additional 85 million dollars.

The Maple Leaf Project costs in escalated dollars to the time of construction - excluding expenditures to be made by TransCanada PipeLines to expand its system to carry the gas from Alberta to Eastern Canada - are initially 2.6 billion dollars expanding to 3.6 billion dollars at full capacity.

## ADVANTAGES OF MAPLE LEAF PROJECT

Many advantages will accrue to Canada from the construction of a Mackenzie Valley pipeline and the Maple Leaf Project has many advantages over the rival Canadian Arctic Gas Pipeline Limited plan. Firstly, as far as advantages to Canada are concerned, the pipeline will provide the populated area of Canada

with additional much-needed energy from Canada's own frontier resources. This will be a major contribution towards making Canada self-sufficient in energy. Secondly, with regard to advantages of the Maple Leaf Project over the CAGPL project, the Maple Leaf Project provides Canada with the means by which it can tap its northern resources on its own without the need to be dependent on United States participation. This, in itself, will provide Canada with desirable freedom of action. CAGPL on the other hand has a majority of U.S. sponsors and although it is claimed that it will be 51% owned by Canadians, it will always be influenced by those U.S. companies who will each own large blocks of shares and who will also be either contractual transporters of gas through the pipeline, or producers selling gas for transportation by the pipeline.

A further important advantage of the Maple Leaf Project is that it is manageable and conservative in size and design. It makes use of most of the existing pipeline organizations and facilities in Canada. The only entirely new portion is an 800 miles, 42" line in the Northwest Territories. The balance is merely expansion of capacity of Westcoast, AGTL, and TransCanada's systems.

The Canadian Arctic Gas Pipeline Limited project on the other hand is not, as presently conceived, conservative in size and design and is not a manageable project, in Foothills' view and at this point I would like to refer you to Chart 3

which shows the CAGPL project and invite you to compare Chart 3 and Chart 2. CAGPL has stretched design paramenters to untried limits. It makes no use of existing organizations or facilities in Alberta but bypasses them with a completely new line. We don't believe that the Gas Arctic line can be built in the time and at the cost that they claim. We are very skeptical about the construction productivity their costs are dependent on and feel their construction time will be extended one or two years with tremendous cost overruns.

Nearly all of the requirements of the Maple Leaf Project can be supplied by Canadians. Most of the pipe, valves, fittings and other equipment can be made by Canadian manufacturers. Being conventially sized, the pipeline can be built by Canadian pipeline contractors and will, therefore, make maximum use of Canadian labour and construction capability. The CAGPL project will require much more foreign input. The 48" pipe can potentially only be made by one pipe mill in Canada and although this mill has tooled up to make pipe of this size, it has not carried out production runs as yet. This will mean that the majority of the pipe and other fittings for the CAGPL project will have to come from foreign sources.

One of the most important advantages of the Maple Leaf Project is that its financial requirements are so much less than CAGPL's and are within the capability of Canada. Consequently, the impact upon the Canadian capital market is not so severe

as to deplete resources that will be needed for other worthy Canadian projects. Since the initial capital requirements are minimized and spread over several existing operations with established earnings records, financing can be achieved with much less difficulty.

The financial requirements of the CAGPL project are currently estimated at 5.6 billion dollars. Their financial plan requires a common equity investment of 1.4 billion dollars and an investment by Canadian individuals and companies of over 700 million dollars to obtain 51% ownership. The extra dollars required by CAGPL from Canadians provides no more Canadian gas to Canadian consumers but is merely for the purposes of financing facilities to transport U.S. gas across Canada. As CAGPL's pipeline capacity is increased in the future, by looping, to carry more U.S. gas across Canada, a further drain on Canadian financial resources will be required. CAGPL's financing requires the purchase by Trans-Canada PipeLines, Consumers' Gas, Union Gas, and Northern and Central, of such large blocks of equity that these companies can only comply if they can receive rate base treatment for their respective investments, something which is not presently allowed by regulatory authorities.

On the other hand, if these companies were all to participate in the Foothills' project, the more modest financial requirements could be provided without the necessity of rate base treatment.

The Maple Leaf Project can be financed without government funds. We doubt very much if the CAGPL project can be financed without both Canadian and U.S. government assistance.

With regard to unit costs of transportation of Canadian gas from the Mackenzie Delta to Empress, the filings made before the National Energy Board show that the Maple Leaf Project costs are slightly lower than those of CAGPL. Any economies of scale which might have been expected from CAGPL's use of a 48" line compared to Foothills' 42" line are more than offset by the Maple Leaf Project's use of existing AGTL organization and facilities.

A topic closely associated with the northern pipeline project is the native land claims issue. Foothills is sympathetic to native land claims and would prefer to have them settled before construction of a pipeline begins. Because of regulatory requirements, Foothills believes there is time for this to happen. Foothills is also aware of the urgent need in Eastern Canada for the energy from the North. This need must be weigned against the need for time to settle northern affairs. The Maple Leaf group is actively attempting to find a solution to these divergent requirements by working diligently on a program to increase the supplies of gas from Alberta over the interim period until the northern pipeline can be completed. There is a definite possibility of this being accomplished, and it will have the further beneficial result of removing the pressures presently

on the Canadian government to take precipitous action on the pipeline applications.

Foothills' construction schedule can be tailored to suit Canadian needs for thorough regulatory proceedings and settlement of native land claims. Arctic Gas's construction schedule cannot be tailored to meet Canadian requirements because of the urgent need of the United States for the Alaska gas.

CANADIAN GAS FOR EXPORT

When the ARctic Gas project was originally conceived, it was anticipated that substantial quantities of natural gas from the Mackenzie Delta would be declared "surplus" to Canadian requirements, and, therefore, would be made available for additional export to the United States. It is now generally recognized, however, that Canada will need the Delta reserves to satisfy its own growing demand. In fact, the National Energy Board of Canada has recently issued a report finding that:

> "Without substantial supplies from Canada's Frontier areas, growing domestic requirements could not be satisfied beyond 1984 even if all exports were diverted to domestic markets as required. Without substantial further development of the conventional producing areas they could not be satisfied beyond 1979 even with exports diverted to domestic markets as required to meet domestic deficiencies."

## ANSWERS TO ARGUMENTS PUT FORWARD IN OPPOSITION TO THE MAPLE LEAF PROJECT

The main argument put forward against the Maple Leaf Project is that the reserves in the Beaufort Basin are not adequate to support the project. This argument is not true - its sponsors are confident the Maple Leaf Project can be financed on the reserves that will have been discovered at the time financing takes place. Drilling activity during the 1975/76 drilling season has resulted in a significant gas find by Sun Oil Canada Ltd. at their Sun Gary location, and delineation drilling by Gulf Oil Canada Ltd. at Parsons Lake has resulted in increased reserves for that reservoir. Foothills expects that once the well information on these successes is made available, reserves in the Mackenzie Delta area will be approximately 7.7 trillion cubic feet, excluding gas which may be added as a result of other exploratory wells now being drilled.

There does not seem to be much dispute about the fact that the potential of the area is excellent, and much more gas will be found. Foothills' consultants say 39 trillion cubic feet and, CAGPL, over 50 trillion cubic feet.

To sustain the deliverability projected in the Foothills' project of 800 million cubic feet a day in the first year, rising to 2.4 billion cubic feet per day in the fifth year, and maintaining that level thereafter for sufficient years to pay out the pipeline investment, requires about 15 trillion cubic feet of reserves.

So the question becomes not whether enough gas will eventually be found to sustain the daily flow - no one disputes this - but are there sufficient reserves now, or will there be sufficient reserves found soon enough to finance the project?

CAGPL says there will not be sufficient reserves. Foothills says there will be, and for this reason:

> The construction of the Foothills' pipeline to a capability of delivering 1.2 billion cubic feet of gas per day requires only 1.8 billion dollars. This provides a complete 42" line with four compressor stations. The expansion from that level to a capacity of 2.4 billion cubic feet per day is accomplished by the addition of compression and the money for this expansion comes from internal cash flow. Therefore, at the time the project is financed - and it looks now as if this will be in late 1978 for equity and late 1979 for debt - it need only be shown that there are enough reserves to sustain a flow of 1.2 billion cubic feet per day, or less, for sufficient years to pay out the line. Foothills calculates this to require from 7 to 8 trillion cubic feet.

If Foothills had to run its pipeline at a level of 1.2 billion cubic feet per day for twenty years, or for sufficient years to pay out the line, the cost of service would be about 25¢ per MCF higher than running at 2.4 billion cubic feet per day. This would not change the price to the consumer - because, by government edict, the consumer is now going to pay the commodity value, independent of the cost of delivery - but it would flow back 25¢ per MCF less to the wellhead; that is, to the producer and the government. Operating at these reduced flows, the project would still be viable - but Foothills does not intend to operate at a level of only 1.2 billion cubic feet per day. This exercise is merely to demonstrate how financing can be obtained on the basis of the reserves that have been found. As more reserves are found - and they will be - the throughput will be increased to the volumes as filed in Foothills' application. Foothills is convinced that, if these extra reserves are not found by the time of financing, they will be available by the time the pipeline is completed in 1980 or 1981.

Threshold volumes to build Foothills' pipeline are, therefore, not 15 to 18 trillion cubic feet as some people have publicly claimed - they are more like 7 to 8 trillion cubic feet.

I would like to close this discussion about Foothills with the remark that the U.S.A. should not labor under the impression that Canada needs the Arctic Gas project in order to gain access to its Mackenzie Delta reserves. The Maple Leaf Project offers Canadians an opportunity to own, operate, and manage their own Arctic transmission system for their own total benefit.

FAIRBANKS - ALCAN HIGHWAY ROUTE

Now, I would like to turn to the topic of the Fairbanks-Alcan Highway route for a gas pipeline across Canada. Acting as a consulting arm of Westcoast and AGTL, Foothills has made some assessment of such an alternative. AGTL and Westcoast did this only because business friends and other contacts in the United States asked whether we could suggest some way that the gas from Prudhoe Bay could get to market at a far less initial capital cost. It was suggested to us that some other way must be found because initial volumes from Prudhoe Bay might be lower than originally supposed and that the capital costs of the present proposals might escalate to where the projects would never be built. It was suggested that a plan might be devised which would make more use of existing transportation facilities in Western Canada, would start at lower volumes and gradually increase, and would embrace more accommodation of the State of Alaska's position that any gas line to carry gas out of Alaska should cross that State. Following these verbal requests we received a letter from Senators Magnuson and Jackson requesting that we appear before their Senate Committee to give our views on such a route.

Could I now refer you to Chart 4, but before proceeding to describe our study, I would like to point out that Foothills has not applied for such a project in Canada. Foothills' one and only application is to install a pipeline for the new frontier

gas being developed in the Mackenzie Delta and Beaufort Basin in Canada, to connect to the main existing systems in Canada and provide gas to the communities in the Mackenzie Valley and Great Slave Lake areas.

However, we have made an estimate of the cost of carrying Alaska gas from the Alaska-Yukon Border near Northway Junction along the Alaska highway to Fort Nelson - shown by the red line on Chart 4 - and thence through Westcoast's and Alberta Gas Trunk's systems to the 49th parallel in southern B.C. and Alberta; the gas destined for the western United States to go through Westcoast's system and that destined for the eastern United States to go through Alberta Gas Trunk's system. Our estimate was based on a 42" diameter pipeline being built along the Alaska highway from Northway Junction to Fort Nelson to carry an initial volume of 1 billion cubic feet per day, rising over 4 years to 2.4 billion cubic feet per day. At Fort Nelson the gas was assumed to split approximately 30% through Westcoast's system and 70% through Alberta Gas Trunk;s system by gradual expansion of these systems as required. I should point out that our estimates are of a preliminary nature but have been done with enough care so that we are confident they give reasonably accurate results.

In addition, in order to be able to get an idea of the total cost of delivering Prudhoe Bay gas to the 49th parallel we have made an estimate of the costs of a 42" pipeline across Alaska from the North Slope along the route of the Alyeska

pipeline to Delta Junction and thence from Delta Junction along the Alaska highway to the Yukon border near Northway Junction - as shown in green on Chart 4. This estimate must be considered less reliable than the estimate we have made for Canada.

The total capital investment required to place this system in operation for 1981 is just under $4.0 billion, in escalated dollars. Of the initial investment about $1.9 billion would be invested in the State of Alaska, $1.6 billion would be invested in the new main line connection within Canada and $0.5 billion would be investment in expansion of the existing systems of Westcoast Transmission in the Province of British Columbia and of Alberta Gas Trunk Line Company Limited in the Province of Alberta. When the system is expanded to full capacity the cumulative escalated capital investment would be about $5.4 billion all of which additional capital could come from internally cash generated during operation, and the total unit cost of transportation to move the Alaskan gas from Prudhoe Bay to points on the 49th parallel would be about $1.12 per million BTU's. We conclude that as far as engineering and construction factors are concerned such a system is manageable and even rather superior in its practicality. If approved by all concerned, it could apparently provide the capacity to move the Alaskan gas to the lower 48 States as a unit cost favorably comparable with any other project or proposal being considered.

I should mention that in these overall estimates we have

covered the costs of all of the systems shown on Chart 4, except the eventual leg from the Fairbanks area to Valdez - shown in green on the chart, about which I will comment shortly in explaining our basic policies about this whole proposition.

Now having given you the results of our study, I would like to quote verbatim from Mr. Blair's testimony to the Senate Committee about such a project.

First he stated:

> "We would have some immediate cautions about Canadian participation that I'll note shortly."

Then later:

> "I emphasize that a real business response to this kind of arrangement could only occur if there was an initiative from the United States to seek such a service qnd also if the governmental authorities in Canada let us know that it was their choice that we endeavour to work out such an alternative. I just mean to underline from my own limited base of authority in Alberta Gas Trunk that while we are far from 'isolationalist' and do act energetically to market commodities or services to the United States, whenever we can develop new business at arm's length and obtain a satisfactory return and value added in Canada, for this Alaska situation we are not ourselves

sponsoring or proposing a new project. We are just explaining our reaction now to a future possibility which has been raised. We could only go further if there were an American request and Canadian government request and sanction and also if there were the express endorsement of our close partner, Westcoast."

So while as a utility operation it is not in our policy to refuse any help to a neighbour with a problem I have wanted to emphasize that my own judgment is that any such help should be partial and supplementary and that in no way are we out selling ourselves into seeking the whole job and responsibility.

We have given some thought to the kind of cautionary provisions which we should point out early in any such discussion and in our view they are as follows:

1. That in any application by a pipeline company in Canada to provide transmission services for some of the gas to be produced from Alaska there be particular recognition, expressed in the application and any forms of contract, that besides the commercial undertakings for transmission there needs to be also a future decision of principle by the Government of Canada. The principle is whether to confer a long-term transmission service access for Alaskan gas to U.S. markets through routes crossing

western Canada by 1500 miles or more, subject to Canadian regulatory authority.

2. Similarly, that there be particular recognition that there must be decisions by the provinces of Alberta and British Columbia and the National Energy Board that the gas pipeline companies providing service for gas produced in those provinces may integrate through their systems a further service for the transmission of Alaskan gas to U.S. markets.

3(a) That the arrangements for transmission of some Alaskan gas across western Canada be accompanied with other long-term arrangements to move other Alaskan gas intrastate and also interstate as by liquefaction and ocean transport within the U.S. jurisdiction, so that Canadian companies shall not inherit complete responsibility for all future investment in providing and expanding transmission capacity for future gas production from the North Slope of Alaska.

(b) That the design of the new 800-mile pipeline connection in Canada not exceed the size and specification of pipe available tried and true from Canadian and other North American pipe mills nor exceed the project scale capable of orderly financing without financial contribution or guarantee by governments in Canada.

4. That transmission services to move Alaskan gas a further 700 miles to 800 miles through British Columbia or Alberta to delivery points from those provinces across the 49th parallel or through TransCanada to points of delivery eastward, be provided on terms to United States shippers of Alaska gas which are not more favourable to such shippers than to concurrent terms of service to Canadian users.

5. That Canadian pipeline operators transmitting Alaska gas shall exercise similar rights and responsibilities in the operational use and handling of the gas as for Canadian gas in their possession.

After having pointed out all these serious conditions which must be considered I would like to point out that in our opinion this overall scheme could have some definite advantages.

One extremely important point is that it removes several uncertainties about construction. The construction in Alaska can take place along the route of the Alyeska oil line, it can be built off the same gravel pad. From Fairbanks to Fort Nelson it follows the Alaska highway which provides excellent access for materials and construction. From Fort Nelson south, it is merely expansion of existing systems. Along the whole route of the pipeline there are excellent airstrips providing quick access. Construction of all sections of the line would

therefore be by conventional methods and this should not only reduce the initial capital costs but substantially reduce the possibility of cost overruns. The fact that there would be excellent all-year access to all sections of the line would eliminate the possibility of lengthy interruptions of service and could either eliminate the need for al all events tariff or at least reduce the severity of such a tariff.

If this project could be started shortly after the completion of the Alyeska line all the equipment, and camps, and all the manpower mobilization and administration associated with that project could be utilized for the gas line project, thus effecting substantial savings.

There is the other alternative which AGTL was asked about because of AGTL's recent installation of two world-scale methanol manufacturing plants in Alberta, and that is that quantities of natural gas be converted to methanol and moved to market as a liquid energy source.

AGTL's Planning and Development Department has reviewed carefully a copy of a report by the Institute for Energy Analysis and perhaps I can most effectively summarize their conclusions by comparison with the conlusions of the Institute's report, which was submitted to the Senate Committee and must be available to your Committee. AGTL's people believe that the conversion efficiency of methanol synthesis in arctic manufacture would be lower, 49% rather than 63%, that

capital costs would be about double those estimated by the Institute and that it would be appropriate to assume substantially higher field gas prices; $1.70 per MMbtu. compared to the Institute's 50¢. AGTL also believe it appropriate to use a faster depreciation rate and to assume that the tariff for the Alyeska Pipeline would apply to the methanol as much as to the oil. When all of these major estimating changes are applied AGTL has calculated that the cost of methanol F.O.B. - Los Angeles would be about 66¢ per gallon or $10.91 per million BTU's. That compares to 25¢ per gallon of methanol, equivalent to $3.69 per million BTU's as estimated by the Institute. On this basis the alternative mode of conversion to methanol appears beyond economic feasibility as a means to market the main Prudhoe Bay gas stream.

The report which AGTL's people prepared on this particular subject was prepared in conjunction with the President of the affiliate company through which AGTL participates in methanol manufacturing and marketing. The company, Alberta Gas Chemicals Ltd., has two methanol manufacturing plants and ranks fourth in methanol production capacity within North America.

# Northwest Pipeline Corporation

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March 26, 1976

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Department of Natural Resources
Pouch M
Juneau, Alaska 99811

Dear Commissioner Martin:

Northwest Alaska Company, an affiliate of Northwest Pipeline Corporation, proposes to contract for a portion of the State of Alaska's royalty gas which will emanate from the Prudhoe Bay Oil Pool upon completion of an Arctic gas transportation system.

We have attempted to formulate a proposal which meets your criteria of being "respons[ive] to changing conditions and interests in the State of Alaska". We are willing to consider any variations which you believe appropriate.

Northwest Pipeline Corporation is the sole supplier of natural gas to the States of Washington, Oregon, and Idaho, and also provides a substantial portion of the gas available to the States of Colorado, Wyoming, and Utah.

The Pacific Northwest is the market with the greatest geographic, economic and social relationship to Alaska. Not only does continuing such historical and geographical affinity make good economic sense, but we believe such affinity could have a significant impact on matters ranging from the price we can pay for gas, to the nature and extent of the support we believe can be generated from members of the communities served in our market area and their elected and appointed representatives. We think it an important economic fact that the less cost incurred in moving the gas to market, the greater the available proceeds for distribution to the owner of the gas at the wellhead.

Our effort, in support of a trans-Alaska pipeline delivery system, which will be outlined to you in greater detail in our initial meeting on this proposal, will include the probable support of many of our congressional delegation, the support of our distributors in the local market areas, and the support of our various state regulatory bodies. To ensure that a maximum effort will be made, we propose to accept a penalty in terms of reserve commitment if a trans-Alaskan route is not approved.

The principal features of our proposal follow:

I. The State's Royalty Gas Commitment to Northwest Alaska

(a) A total commitment of 2.5 trillion cubic feet of gas would be committed by Alaska to Northwest Alaska.

(b) We are willing to enter into a contractual arrangement which provides the penalty of automatically reducing the volume of gas to be sold to us from 2.5 trillion cubic feet to 1.5 trillion cubic feet if one of the following three general routes is not adopted for transporting Prudhoe gas to the "lower 48" states:

i. Prudhoe to Fairbanks and then through Canada;
ii. Prudhoe to Gulf of Alaska;
iii. Prudhoe to Cook Inlet.

(c) We are also willing to contractually assume the risk of total loss of our rights to Alaskan Royalty Gas by permitting the State to terminate if legislation mandating a routing other than set forth in Item (b) becomes effective.

(d) In addition, the State shall give Northwest Alaska a first call on future State of Alaska royalty gas as may be necessary to replace the volumes reserved by the State, below. Such additional commitment would be applicable to any area in Alaska accessible to a gas delivery system.

II. The State's Reservation of Committed Gas

The State shall reserve up to thirty percent (30%) of the daily royalty volumes available from the reserves committed under either I(a) or I(b), above. Said reservation may be exercised as follows:

(a) The State shall have the right to have up to one-half (1/2) of the reserved volume delivered to it, on a daily basis, at a mutually agreeable point or points on the trans-Alaska pipeline system during the first ten years of the contract and all of the reserved volumes delivered, on a daily basis, during the remainder of the contract. The State shall notify Northwest by July 1 of each year, of the amount of reservation gas it intends to take during the following calendar year, up to the maximum amounts specified herein.

(b) Northwest shall have the right to purchase all of the State's reserved gas not taken from time to time; provided, however, Northwest shall not be obligated to maintain capacity in its facilities from the point of liquefaction, and downstream therefrom, to accommodate variable quantities of State royalty gas. Northwest shall be obligated to purchase the amount

of reservation gas which the State elects not to take upon five years prior written notice given at any time during the contract term.

(c) The State shall reimburse Northwest for the cost-of-service incurred by Northwest in all operations incident to the redelivery of the gas including, but not limited to, gathering, treating, dehydration, compression, and transmission, including a reasonable rate of return on all investments and any costs incurred for service provided by third parties.

(d) It is recognized that Northwest may be required to provide, or to arrange for, all or part of the services enumerated in (c) above incidental to the redelivery of the State's royalty gas. It is anticipated, then, that Northwest will provide for the necessary capacity in all gathering and transmission phases to handle the full volumes committed in I(a) above, including the State's reserved gas. To the extent such facilities and capacity are provided by Northwest, the State's reservation gas shall be committed to this service for the life of the contract so that the project has sufficient certainty that financing can be reasonably obtained.

(e) Northwest contemplates the future acquisition of gas reserves in South Alaska. To the extent such reserves are available, Northwest would agree to negotiate an exchange of reserves controlled in South Alaska for the State's reserved royalty gas flowing into the "lower 48" via the trans-Canadian pipeline. The provision will provide the State with important additional assurances that volumes of Alaskan Prudhoe Royalty Gas will be available to the bulk of Alaska's population regardless of pipeline routing.

(f) The State shall commit all future royalty gas available to a gas transportation facility in Alaska to Northwest up to the total amount reserved to the State in this proposal. In other words, the State shall agree to no long term commitment of presently uncommitted or future royalty gas until such time as the gas can be declared surplus to the State's projected needs during the term of this proposed agreement. Any long term commitment shall immediately terminate the State's reservation of gas hereunder, at least to the extent of such commitment on a reserves or daily volume basis, and Northwest shall have the option of purchasing the State's reserved gas to the extent it thus becomes available.

III. Delivery Point

Northwest will provide the portion of the facilities (downstream from the delivery point) necessary for gathering and conditioning all of the State's Royalty Gas.

IV. The State's Reservation of Liquid Hydrocarbons

The State shall retain a call on the extractable hydrocarbons (ethane and heavier hydrocarbons) contained in the royalty gas stream sold to Northwest and shall

have the right to construct an extraction facility at a mutually agreeable location on Northwest's facilities in Alaska or at a mutually agreeable location on Northwest's facilities in the "lower 48" if the gas is delivered through Canada. We would propose the following additional specific points relative to processing:

(a) If the State does process the gas stream, it shall reimburse Northwest for the loss of gas, for which it has paid, attributable to the fuel and shrinkage occurring in processing plant operations and shall further reimburse Northwest for its cost-of-service in delivering the fuel and shrinkage to the plant location.

(b) Northwest is agreeable to negotiating with the State to determine an acceptable basis on which Northwest would be obligated to construct a plant and to perform the processing service giving the State a first call on all liquids produced; to arrange for delivery of liquid products to Alaskan distribution points and to provide marketing services into other areas from products surplus to the needs of the State.

(c) If the State actively seeks outside assistance in the exploitation of its processing opportunity, and in an effort to maintain continuity and compatibility in operations, Northwest requests that it be given a preferential right to join the State in the extraction and distribution of liquids from its royalty gas stream. We think this can be mutually advantageous, particularly in view of the fact that we are presently a substantial producer and marketer of liquids and, of course, would be in the best position to insure a processing operation complementary to our transmission operations.

V. <u>The Gas Price</u>

(a) The price to be paid for gas delivered and sold to Northwest shall be the higher of (1) the price permitted by the Federal Power Commission, or successor regulatory body having this jurisdiction, for the sale of the State's Prudhoe Bay royalty gas to be delivered to the "lower 48" States or (2) in the absence of regulation over the price to be received by the State, the estimated commodity value of natural gas at the time of initial deliveries in Northwest's market less the applicable costs of bringing the gas to this market. "Commodity value" shall reflect the value of natural gas in our market area based upon the price of competitive fuels with due allowance for the premium qualities and uses of natural gas. Due to the economic proximity of Northwest's market to Prudhoe Bay under any proposed transportation system, the "commodity value" approach under Northwest's contract could be a very valuable feature to the State.

(b) The price shall be redetermined annually, in the absence of regulation, to reflect any changes in the "commodity value" of gas in Northwest's market.

VI. Governmental Regulation

The definitive contract shall be subject to receipt and acceptance of all necessary governmental permits and authorizations required for the service contemplated thereby including the ability of Northwest to include in its rate base accounts the investments required, excluding any processing plant investments, or to include in its cost-of-service accounts any charges or tariffs required to be paid to others for any increment of service required by the contract and the purchased gas costs of the royalty gas.

VII. Natural Gas Storage

Northwest Pipeline has developed competency in the area of natural gas storage, both underground and above-ground LNG storage. The Company would be pleased to assist the State in reviewing the opportunities for natural gas storage in southern Alaska. Development of storage capacity would measurably aid the State in fully utilizing the gas available to its royalty interests from time to time. Gas that otherwise might go into the export market on a seasonal or even annual basis could be stored and produced as required.

Northwest Pipeline is prepared to commence immediately to negotiate to conclusion the necessary agreement with the State, along the lines outlined above. Whatever manpower and decision-making capability that may be required will be at the State's disposal until a formal agreement is completed.

Respectfully submitted,

John G. McMillian

JGM/ds

PROPOSAL TERMS
TENNESSEE GAS TRANSMISSION CO.

1. Advance payment.
   Three equal annual payments, amount to be specified later, payable first quarter of each calendar year beginning in 1977.

2. Recovery of payment.
   Repayment commences first day of month 3 years subsequent to each scheduled payment. Tenneco recovers each month for a 5-year period an amount equal to 1/60 of the amount of the scheduled payment. Repayment is made from proceeds of any hydrocarbon production attributable to Alaska's royalty interest.

   In the event the sale of hydrocarbon production has not commenced when repayment is due, repayment will commence first day of the month following sale of hydrocarbons in equal monthly amounts so that each scheduled payment is recovered in full within 8 years, provided that each monthly amount shall not exceed 25% of gross revenue from hydrocarbon production of area of interest.

3. Support Trans Alaska Gas Pipeline System.
   Tenneco will cooperate with Alaska and other interested parties to support Alaskan route. Alaska has right to terminate agreement if route across Alaska to southern coast of Alaska is not approved.

4. Commitment.
   Tenneco has exclusive right to purchase all of Alaska's interest in the natural gas production from the reserves of the area of interest.

5. Recall.
   Alaska has right to reserve up to 10% of its interest in gas production from area of interest during initial 5 years. If Alaska reserves less than 10% initially, each upward revision in percentage of production requires prior written notice of 1 year.

   During the second 5 years of gas deliveries, Alaska may reserve up to an additional 10% of its interest in gas production and during the remainder of the contract the percentage of its gas production actually being sold or used by Alaska plus up to an additional 10% of its interest in the area of interest. Revisions require prior written notice of 1 year.

6. Terms and provisions of contract.
   a. Quantity - Tenneco takes all of daily production from Alaska's interest in reserves in area of interest as made available and not used or sold by Alaska.
   b. Price (1) Regulated - highest price permitted by F. P. C.
      (2) Deregulation - price effective first day of seventh calendar month after deregulation, equal to average of 3 highest prices paid 6 months after deregulation paid by interstate pipeline purchases for gas from area of interest of same quality and quantity.
      (3) Unregulated - not mentioned.

   c. Point of delivery - at tailgate of gas treating plant located on acreage overlying area of interest.
   d. Dedication - all gas production attributable to Alaska's royalty interest in area of interest.
   e. Term - 20 years from initial date of delivery.
   f. Processing - Alaska retains processing right, but must not remove more than 10% of volume provided for delivery by Alaska to Tenneco and Alaska will reimburse Tenneco for transportation charges attributable to volume removed by processing including fuel and shrinkage.
   g. Quality - gas delivered to Tenneco shall be pipeline quality with gross heating value of 1000 btu per cubic foot at 14.73 psia and 60o F., water vapor less than 6 pounds per million cubic feet at standard conditions.

7. Other provisions:
   a. Consideration for right of recall
      (1) Alaska shall exercise option of recall if sufficient gas is available for Alaska's needs but outside area of interest at a price equal to FPC permitted gas producers for like sales. Alaska shall sell its gas at no less than the maximum price permitted by FPC for similar sales plus charge paid by Alaska for transporting such gas.

      (2) Tenneco has exclusive right to purchase gas production attributable to Alaska's interest and surplus to Alaska's needs outside area of interest and north of Arctic Circle.

This gas would be purchased under same contract terms except in absence of gas treating plant, the point of delivery shall be as mutually agreed upon by the parties.

Upon execution of this gas purchase contract, the subject oil and gas leases become part of the area of interest.

(3) Alaska will cooperate with Tenneco in making supplemental gas available to Tenneco; Alaska will not unreasonably withhold granting of gas and oil leases outside area of interest and will take all steps necessary including exercise of the right to take royalty gas in kind, so as to be able to seel supplemental gas to Tenneco.

b. Term of agreement:
Agreement is in full force and effect as long as Alaska, and/or its successors or assigns, owns an interest in the oil and gas leases located in the area of interest.

Contract terminates if gas pipeline route across Alaska to southern coast of Alaska is not approved.

If contract is terminated, Alaska agrees to refund to Tenneco, the full amount of any advance payments received by Alaska from TEnneco, together with interest at effective prime interest rate (Chase Manhattan Bank, NA) existing at time of each scheduled payment plus 1%.

Mcl 30

AGREEMENT

THIS AGREEMENT, made and entered into this ___ day of _____, 1976, between (Tenneco subsidiary) hereinafter referred to as "Tenneco" and the STATE OF ALASKA, hereinafter referred to as "Alaska."

W I T N E S S E T H T H A T:

WHEREAS, it is in the interest of the State of Alaska and of the United States that a pipeline to deliver gas from the North Slope of Alaska to markets in the contiguous forty-eight (48) states of the United States be built entirely within the State of Alaska to supply gas for liquefaction in Alaska and delivery to United States ports in United States flag vessels; and

WHEREAS, such delivery system totally under the jurisdiction of the United States provides certain advantages:

a) A trans-Alaska system can be completed and in operation a minimum of three years earlier than a delivery system that requires a pipeline to extend across Canada.

b) The construction and operation of a trans-Alaska system will provide an increased number of jobs in many segments of U. S. industry, to citizens of the United States, far in excess of such jobs provided through construction and operation of a pipeline across Canada.

c) A trans-Alaska system will provide a reliable and secure basis for delivering known gas reserves as well as for delivering future

gas discoveries on the North Slope of Alaska to all markets in the contiguous forty-eight (48) states, including those in the midwestern United States.

d) Financing for construction of a trans-Alaska system, the capital costs for such being essentially the same as for a system extending across Canada, can be arranged more easily than for construction of a system extending across Canada.

e) A trans-Alaska system will result in a lesser adverse environmental impact since it will follow the general route of, and be benefitted by the experience gained in the building of, the trans-Alaska oil pipeline as well as utilize an extensive number of the same support facilities utilized by the oil pipeline.

f) A trans-Alaska system will provide revenues for Alaska as well as the opportunity for increased domestic use of gas and for industrial development in Alaska.

g) A trans-Alaska system will provide the contiguous 48 states of the United States with additional long term flexibility to import liquefied natural gas from all areas of the world as well as from known and future gas discoveries in Alaska; and

WHEREAS, it is in the interest of Tenneco to purchase natural gas in Alaska and to support construction of a trans-Alaska gas pipeline so as to, at the earliest possible time, increase the supply of natural gas available to customers of its affiliate, Tennessee Gas Pipeline Company, a Division of

Tenneco Inc. (Tennessee). Tennessee serves customers in the states of Texas, Louisiana, Arkansas, Mississippi, Alabama, Tennessee, Kentucky, West Virginia, Ohio, Pennsylvania, New York, New Jersey, Massachusetts, New Hampshire, Rhode Island, and Connecticut and, through affiliated interstate natural gas pipeline companies, customers in Virginia, Illinois, Indiana, Minnesota, North Dakota, and Wisconsin.

WHEREAS, Alaska has notified the producers of its intent to take in kind its gas to be produced from the Sadlerochit formation underlying leases located in the Prudhoe Bay Field, Alaska, located within the area delineated on Exhibit "A" attached hereto and made a part hereof, hereinafter referred to as "Area of Interest"; and

WHEREAS, Alaska and Tenneco have considered present and projected future demand and supply of natural gas in Alaska and believe it is desirable to reach an agreement regarding the sale of Alaska's gas from the Area of Interest whereby the following objectives are met: (1) Alaska is assured of a future secure supply of natural gas sufficient to meet its expanding domestic requirements and to support industrial development in Alaska and (2) Tenneco is assured of an increased supply of natural gas for the customers of its affiliated interstate natural gas pipeline companies, which assurance encourages the purchase of Alaska's gas and the support of a trans-Alaska gas pipeline route; and

WHEREAS, Alaska desires to retain the flexibility to encourage and facilitate development of industry in Alaska, which industry, to a large extent,

will require the availability of substantial volumes of natural gas liquefiables; and

WHEREAS, Tenneco is agreeable to allowing Alaska to retain the right to have its gas processed within the boundaries of the State of Alaska so as to recover such natural gas liquefiables; and

WHEREAS, the Federal Power Commission should certificate a pipeline system extending across Alaska so as to hasten recovery from the economic impact in the United States of curtailment of customers in the contiguous forty-eight (48) states by virtually all major interstate natural gas pipeline companies; and

WHEREAS, Alaska has authority to enter into this Agreement pursuant to Chapters 5 and 6 of Title 38, Alaska statutes; and

WHEREAS, Tenneco is authorized to enter into this Agreement pursuant to its articles of incorporation and to the laws of the State of _____.

NOW, THEREFORE, Tenneco and Alaska, in consideration of the foregoing, do hereby mutually covenant and agree as follows:

I. Trans-Alaska Facilities.

Tenneco agrees that it will, in cooperation with Alaska and other interested parties, support official authorization --- by means of certification by the Federal Power Commission, by decision within the executive branch of the Federal government, by legislation, or otherwise --- of a project to transport gas from the Area of Interest to the contiguous forty-eight (48) states of the United States, which project includes a pipeline which extends from the

Area of Interest across the State of Alaska to the southern coast of Alaska (hereinafter sometimes referred to as "the Pipeline"). With respect to the sale of gas by Alaska to Tenneco, Tenneco's support will exclude any and all action with respect to any claim or assertion by Alaska, made in any forum, with respect to the jurisdictional status ~~thereof~~ of the State.

II. Commitment and Reservation.

Alaska agrees that Tenneco shall have the exclusive right to purchase all of Alaska's interest in the natural gas production from the reserves in the Area of Interest; provided however, Alaska shall retain an option to reserve for use in Alaska a certain portion thereof as set out below. It is expressly agreed and understood that Alaska shall exercise its option only for that volume to be used within the boundaries of the State of Alaska.

Section 1. Alaska shall have the right during the initial five (5) years of gas deliveries under the Gas Purchase and Sale Agreement, hereinafter referred to as "Contract," to be entered into between Tenneco and Alaska to reserve for use in Alaska up to twenty-five percent (25%) of its interest in the natural gas production from the Area of Interest.

Section 2. Alaska shall be entitled to exercise its option as set out in Section 1 of this Article II at the time of execution of the Contract. In the event Alaska elects initially to reserve less than twenty-five percent (25%) of its interest in production from the Area of Interest, then upward changes thereafter during the initial five (5) year period in the percentage of production reserved shall require prior written notice to Tenneco of one (1) year.

Section 3. Alaska shall be further entitled to exercise an option to reserve (a) during the second five (5) years of gas deliveries under the Contract the percentage of its natural gas production actually being used or sold by Alaska at the end of the fourth year of the Contract plus up to an additional twenty-five percent (25%) of its interest in the natural gas production from the Area of Interest, (b) during the third five (5) years of gas deliveries under the Contract the percentage of its natural gas production actually being used or sold by Alaska at the end of the ninth year of the Contract plus up to an additional twenty-five percent (25%) of its interest in the natural gas production from the Area of Interest; and (c) during the remainder of the Contract the percentage of its natural gas production actually being used or sold by Alaska at the end of the fourteenth year of the Contract plus up to an additional twenty-five percent (25%) of its interest in the natural gas production from the Area of Interest.

Section 4. Alaska shall exercise its option as set out in Section 3(a) of this Article II at the commencement of the fifth year of gas deliveries under the Contract to be effective at the commencement of the sixth year of gas deliveries under the Contract, as set out in Section 3(b) of this Article II at the commencement of the tenth year of gas deliveries under the Contract to be effective at the commencement of the eleventh year of gas deliveries under the Contract, and as set out in Section 3(c) of this Article II at the commencement of the fifteenth year of gas

deliveries under the Contract to be effective at the commencement of the sixteenth year of gas deliveries under the Contract. In the event Alaska elects at such times to reserve less than the additional twenty-five percent (25%) to which Alaska is then entitled, then upward changes thereafter in the percentage of production reserved shall require prior written notice to Tenneco of one (1) year.

Section 5. To assure the maximum efficiency of the total delivery system, Alaska will provide Tenneco at the beginning of each year its best estimate of volumes to be used or sold by it during each year of the next succeeding five (5) years.

Section 6. Tenneco will, in cooperation with Alaska and other interested parties, support authorization --- by means of certification by the Federal Power Commission, by decision within the executive branch of the Federal government, by legislation or otherwise --- for Alaska to arrange to have transported in the [~~natural gas system~~ Pipeline] authorized to transport natural gas from the Area of Interest and to have delivered for the account of Alaska at delivery points mutually agreeable to Tenneco and Alaska the percentage of production reserved by Alaska (less volumes attributable to fuel and unaccounted for volumes) pursuant to this Article II, which transportation will be under terms and conditions negotiated between Alaska and the owner(s) of said pipeline system.

Section 7. Alaska and Tenneco will cooperate to minimize any charges levied [~~as a result of the reservation, under the terms and conditions~~

~~of this Article II, of gas volumes by Alaska~~] on gas liquefied and transported to the lower forty-eight (48) states as a result of the reservation of gas volumes by Alaska under the terms and conditions of this Article II,

III. Terms and Provisions of Contract

Tenneco and Alaska shall, within ninety (90) days after receipt of authorization for a trans-Alaska project, which authorization is satisfactory to Tenneco and Alaska, or, alternatively, at such time as the Federal Power Commission requires executed contracts for the purchase of gas in order to go forward with then pending proceedings, enter into a Contract. Said Contract shall include the following general provisions and such other provisions that may be contained in contracts for gas sold in interstate commerce from the Area of Interest.

(a) Quantity: Tenneco shall take, on a daily basis, all of Alaska's interest in production from the reserves in the Area of Interest to the extent such production is made available to Tenneco and is not used or sold by Alaska.

(b) Price: The contract price shall initially be the highest price then being permitted to producers by the Federal Power Commission for gas of like quality produced from the Area of Interest and sold in interstate commerce to pipeline purchasers for resale under conventional certificates. Tenneco agrees that such price provision shall include all the price adjustment provisions permitted by the Federal Power Commission at the time of contract.

(c) Deregulation: If at any time during the term of the Contract, the Federal Power Commission (or any successor agency having jurisdiction)

ceases to have jurisdiction over the prices for sales of gas produced from the Area of Interest for resale, at Alaska's election, the price to be effective on the first day of the seventh calendar month after such cessation date shall be redetermined. The redetermined price shall be the highest price being paid on the first day of the sixth calendar month after such cessation date by pipeline purchasers for gas from the Area of Interest of substantially the same quality and quantity, under contracts for sales for resale containing comparable terms and conditions. The price to be paid by Tenneco to Alaska during the period following the cessation date and prior to the effective date of the redetermined price shall be that price then in effect at the cessation date. Furthermore, the price shall be redetermined on the same basis each two (2) years from and after the aforesaid cessation date.

(d) Point of Delivery: The point of delivery for all gas delivered to Tenneco by Alaska shall be at that point where the working interest owners make available to Alaska its royalty gas free of charges, except cleaning and dehydrating, or at such other point on or off the lease as mutually agreed to by the Parties.

(e) Dedication: Alaska shall commit to the Contract all of the gas production attributable to its interest in the Area of Interest, provided Alaska shall have the right to reserve that portion of the gas subject to reservation as specified in Article II of this Agree-

ment; provided further, Alaska will provide its pro-rata share of volumes of gas needed for line pack.

(f) Term: The term of the Contract executed pursuant to this Agreement shall be for a period not to exceed twenty (20) years from the date of initial delivery.

(g) Processing: Alaska shall retain the right to process the gas, or have same processed, before or after delivery to Tenneco, for the recovery of liquefiable hydrocarbons including the ethane and heavier constituents in the gas stream; provided, however, that such processing will not, including fuel and shrinkage, remove more than ten percent (10%) of the volume of gas provided for delivery by Alaska and purchased by Tenneco daily hereunder at the delivery point(s); provided, Alaska will reimburse Tenneco for transportation charges and for the price paid by Tenneco to Alaska attributable to that volume removed by processing, including fuel and shrinkage and provided, further, that after such processing the gas will continue to be pipeline quality gas.

(h) Quality: The gas delivered to Tenneco shall be pipeline quality gas, and shall have a gross heating value of not less than 1000 Btu per cubic foot at 14.65 psia and 60° F. It shall have been dehydrated for removal of entrained water present therein in a vapor state, and in no event contain more than six (6) pounds of entrained water per million cubic feet, at a pressure base of fourteen and

seven-tenths (14.7) pounds per square inch and a temperature of sixty degrees (60°) Fahrenheit as determined by dew-point apparatus approved by the Bureau of Mines or such other apparatus as may be mutually agreed upon.

IV. Consideration for Reservation.

Section 1. Alaska's right, pursuant to Article II, to reserve certain of its interest in natural gas production from the Area of Interest is expressly made subject to the following:

(a) Alaska shall not exercise its option of Article II in the event sufficient gas for Alaska's needs is available in Alaska, but outside the Area of Interest, for use within the boundaries of the State of Alaska and is available at a price not to exceed the price permitted to producers by the Federal Power Commission for sale of gas of like quality produced and sold in interstate commerce to pipeline purchasers for resale under conventional certificates.

(b) With respect to gas reserved by Alaska pursuant to Article II, the sale of such gas shall be at no less than the maximum price permitted to producers by the Federal Power Commission for sales of gas of like quality and quantity produced from the Area of Interest and sold in interstate commerce to pipeline purchasers for resale under conventional certificates plus the charge paid by Alaska for transporting such gas.

Section 2. Alaska's right, pursuant to Article II, to reserve certain of its interest in natural gas production from the Area of Interest is expressly made subject to Section 1 of this Article IV and is, further, in consideration of the following:

(a) Alaska agrees that, prior to entering into any contract for the sale or other disposition of any gas in interstate commerce, attributable to Alaska's interest and surplus to Alaska's need, produced outside the Area of Interest and delivered into the Pipeline, including expansions thereof, which gas is hereinafter referred to as Supplemental Gas, Alaska will give Tenneco a written notice of its desire to enter into a contract and shall transmit to Tenneco a form of contract reflecting among its provisions the terms and conditions offered. Within ninety (90) days of the date of said notice, Tenneco shall either elect to purchase or not purchase said gas. If Tenneco elects to purchase said gas, it shall execute said contract and return same to Alaska or it shall notify Alaska in writing wherein the terms and provisions of the contract are not in accord with the terms and conditions of Article III hereof. In the latter event, Tenneco and Alaska shall enter into good faith negotiations to determine by agreement terms and provisions which are in compliance with Article III hereof.

i) Upon execution of the Gas Purchase and Sale Agreement for Supplemental Gas, the oil and gas leases from which

production thereunder is delivered shall become a part of the Area of Interest hereunder.

ii) Alaska will cooperate with Tenneco in making Supplemental Gas available to Tenneco, including cooperation in the following respect, without limitation: Alaska will take all steps necessary, including exercise of the right to take royalty gas in kind, so as to be able to sell Supplemental Gas to Tenneco.

V. Term of Agreement.

This Agreement shall remain in full force and effect for as long as Alaska, and/or its successors and assigns, owns an interest in production from the oil and gas leases located in the Area of Interest; provided, however, Alaska shall have the right, but not the obligation, to terminate this Agreement in the event that a pipeline route from the Area of Interest other than a route across the State of Alaska to the southern coast of Alaska is hereafter authorized or approved and construction of such other route is commenced. It is agreed by Alaska that such termination will not prejudice any future attempts by Tenneco or an affiliated company to contract for the royalty gas.

VI. Miscellaneous.

Section 1. This Agreement shall bind and inure to the respective successors and assigns of the parties hereto.

Section 2. All notices hereunder shall be in writing directed to the

party to whom given, made or delivered at such party's address as follows:

Tenneco: Tenneco
P. O. Box 2511
Houston, Texas 77001
Attn: Mr. Robert C. Thomas

Alaska:

or at such other post office address as such party shall from time to time designate as the address for such purpose by registered letter addressed to the other party.

Section 3. Notice of Alleged Breach and Opportunity to Cure. In the event either Alaska or Tenneco alleges that this Agreement has been breached, then the party so alleging must provide written notice to the other specifying the alleged breach. The party receiving the notice shall thereafter have sixty (60) days from, but not including, the date of delivery of the notice within which to cure the alleged breach. If the alleged breach cannot be cured within sixty (60) days, the party receiving notice shall be entitled to such additional time as is necessary to cure; provided that necessary curative actions were undertaken promptly and have been diligently prosecuted; provided further that the additional time to cure shall not exceed ninety (90) days from, but not including, the last day of the initial sixty (60) day period.

Section 4. Arbitration: Any controversy between the parties, arising under this Agreement not resolved by mutual agreement shall be determined

by a board of arbitration upon notice of submission given either by Tenneco or Alaska, which request shall also name one arbitrator. The party receiving such notice shall, within ten (10) days thereafter, by notice to the other, name the second arbitrator, or failing so to do, the party giving notice of submission shall name the second. The two (2) arbitrators so appointed shall name the third, or failing so to do within ten (10) days, the third arbitrator may be appointed by the Chief Judge of the Ninth Circuit Court of Appeals. The arbitrators selected to act hereunder shall be qualified by education, experience and training to pass upon the particular question in dispute. The arbitrators so appointed shall promptly hear and determine (after giving the parties due notice of hearing and a reasonable opportunity to be heard) the questions submitted, and shall render their decision within sixty (60) days after appointment of the third arbitrator. If within said period a decision is not rendered by the board or a majority thereof, new arbitrators may be named and shall act hereunder at the election of either Tenneco or Alaska in like manner as if none had been previously named. The decision of the arbitrators, or of a majority thereof, made in writing shall be final and binding upon the parties hereto as to the questions submitted, and the parties will abide by and comply with such decision. Each party shall bear the expenses of its arbitrator, and the expenses of the third arbitrator shall be borne equally by Tenneco and Alaska except that each party shall bear the compensation and expenses of its counsel, witnesses and employees.

Section 5. No waiver by Tenneco or Alaska of any default of the other under this Agreement shall operate as a waiver of any future default, whether of a like or different character.

Section 6. Governmental Regulations: The terms and provisions of this Agreement are expressly made subject to all existing valid applicable Federal and State laws and orders, and to all directives, rules and regulations of any governmental body or official having jurisdiction, and no party hereto shall suffer a forfeiture or be liable in damages for failure to comply with any provision hereof if such compliance is prevented by, or if such failure results from compliance with, any such laws, orders, directives, rules or regulations; provided, however, nothing contained herein shall prevent either Tenneco or Alaska from questioning any such law, rule or regulation.

Section 7. Effect of illegality. If any provision or clause of this Agreement or application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of the Agreement which can be given effect without the invalid provision or application.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each of which is an original as of the date first above-mentioned.

TENNECO

By _____
Agent and Attorney-In-Fact

STATE OF ALASKA

By _____

EXHIBIT "A"

ATTACHED HERETO AND MADE A PART OF

AGREEMENT

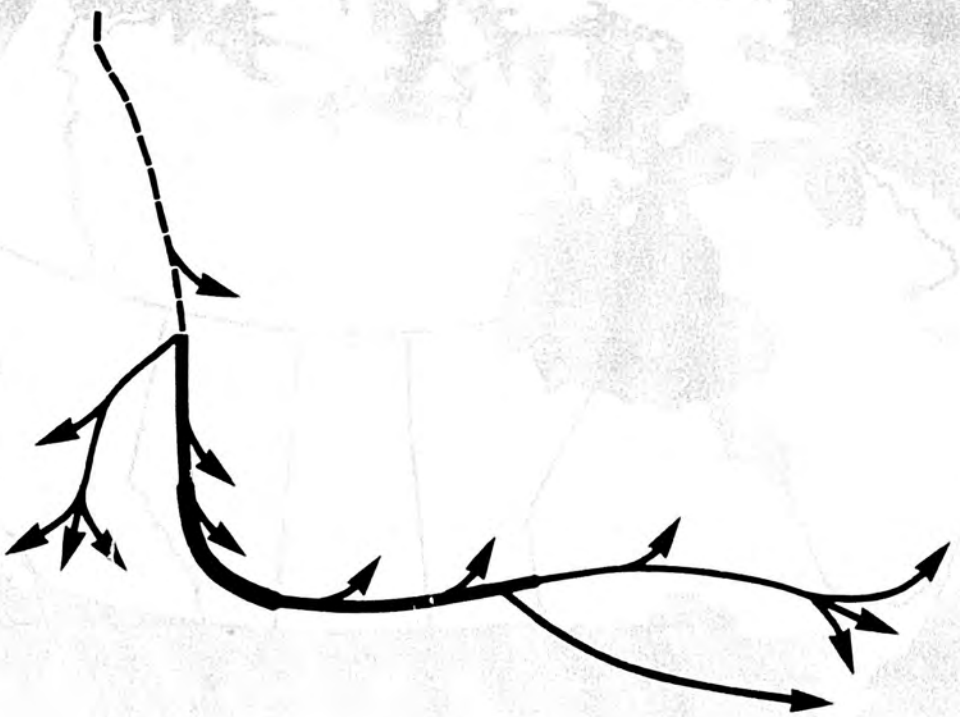
DATED

BETWEEN TENNECO

AND

STATE OF ALASKA

Area of Interest



# FOOTHILLS PIPE LINES LTD.

# and

# THE MAPLE LEAF PROJECT

APRIL, 1975

# FOOTHILLS PIPE LINES LTD.

# and

# THE MAPLE LEAF PROJECT

## THE CANADIAN NATURAL GAS INDUSTRY AND THE NEED FOR NORTHERN GAS

For over 15 years the Canadian Natural Gas Industry has been able to increase gas supply each year in sufficient magnitudes to support very large demand increases in the various consuming sections, both domestic and export. Surpluses to both provincial and national requirements were regularly developed and periodically approved for removal from the producing provinces and Canada for resale elsewhere. To the best professional and technical minds in Canada the continued assurance of long-term supply for Canadian use and export commitments was so evident that it hardly needed to be stated.

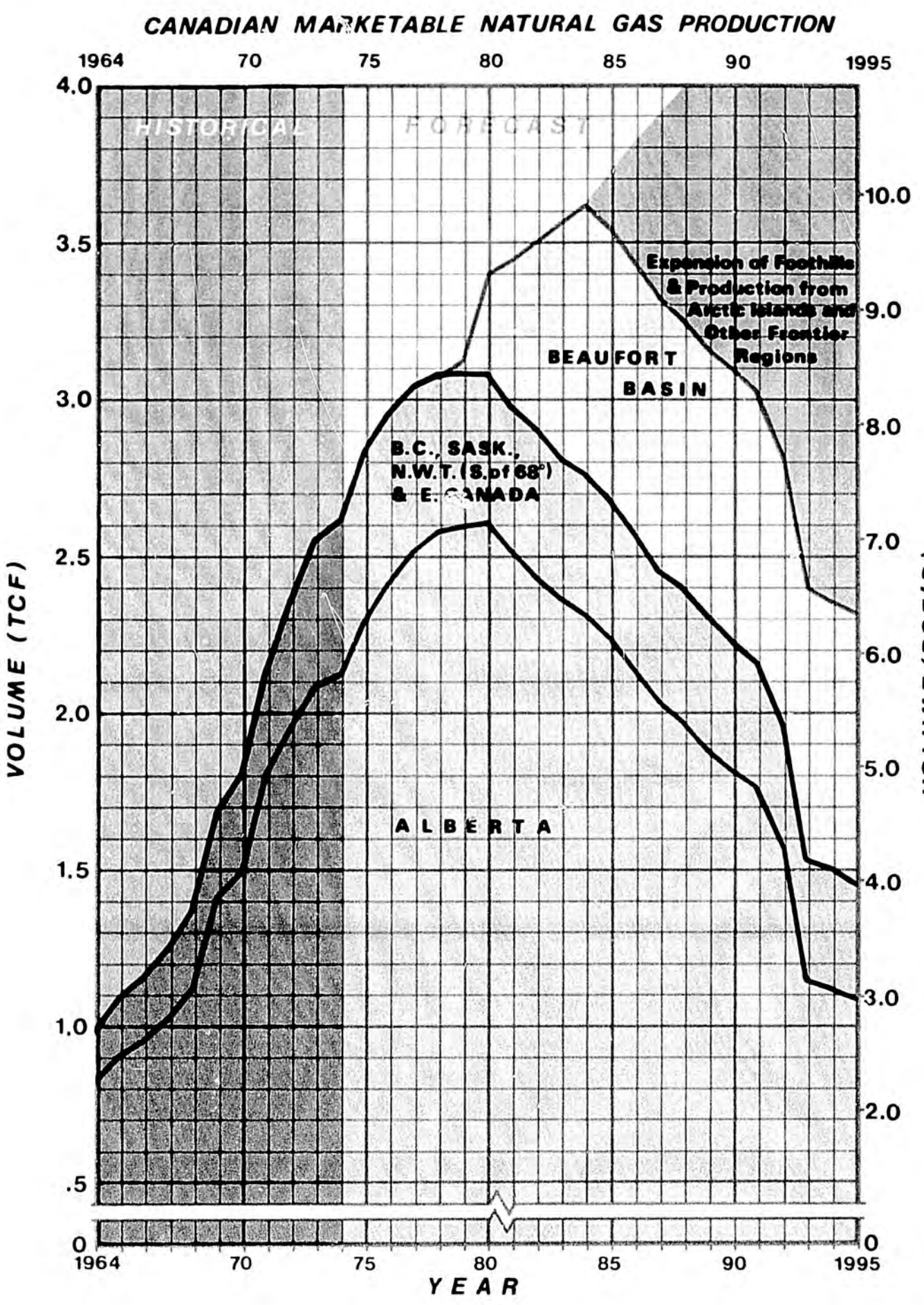
Suddenly, over the brief time span of one year, the atmosphere of confidence in supply was shattered. A number of unforseen events altered the whole supply/requirements relationship in Canada. These events included a startling increase in world crude oil prices commencing in 1973, continuing double digit rates of growth in demand for gas in Canada because of the price differentials between energies, demands for higher returns by resource owners, and a compounding of unfavorable economic factors which discouraged the exploratory and development processes. Coupled with these was the fact that the industry was already experiencing a reduction in volumes of reserves discovered each year. In summary, it has become apparent that the impact of these forces will culminate in an increasing inability of the Canadian Natural Gas Industry to meet requirements in the very near future unless facilities are constructed to obtain access to large gas reserves in Canada's North.

The Alberta Gas Trunk Line Company Limited and Westcoast Transmission Company Limited have joined together to form Foothills Pipe Lines Ltd. which is a part of the Maple Leaf Project. This project will meet the needs of the Canadian Natural Gas Industry by constructing the facilities required to access northern gas. The project is the only alternative advanced that will fulfill these requirements when needed while maintaining the position of being manageable together with the advantages of being more economical and wholly-owned and controlled by Canadians.

## CURRENT FORECASTS OF SUPPLY

The graph on the opposite page presents, in visual form, the most recent Foothills forecast of Canadian marketable natural gas production. Historical experience is shown on the left of the graph. It demonstrates fairly consistent annual production growth for ten years through 1973 continuing to 1978. Production then levels-off for three years before commencing a steady decline in 1981.

Foothills, through the Maple Leaf Project, will bring Beaufort Basin production into supply, as shown on the graph, by the end of 1979. There will be a five-year build-up period to full pipeline capacity by the fall of 1983. Beaufort Basin production is maintained on the graph at the pipeline capacity of 2.4 billion cubic feet per day after 1984. Although not shown on the graph, the supply brought to market by Foothills could be increased through conventional looping of the system in proportion to further northern gas supply availability and/or market requirements.


CANADIAN MARKETABLE NATURAL GAS PRODUCTION
1964
70
75
80
85
90
1995
HISTORICAL
FORECAST
Expansion of Foothills & Production from Arctic Islands and Other Frontier Regions
BEAUFORT BASIN
B.C., SASK., N.W.T. (S. of 68°) & E. CANADA
ALBERTA
VOLUME (TCF)
VOLUME (BCF/D)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
0
YEAR

## CURRENT FORECASTS OF REQUIREMENTS

On the opposite page is a graph showing Foothills' most recent forecasts of Canadian requirements and volumes required for export under licences approved in past years.

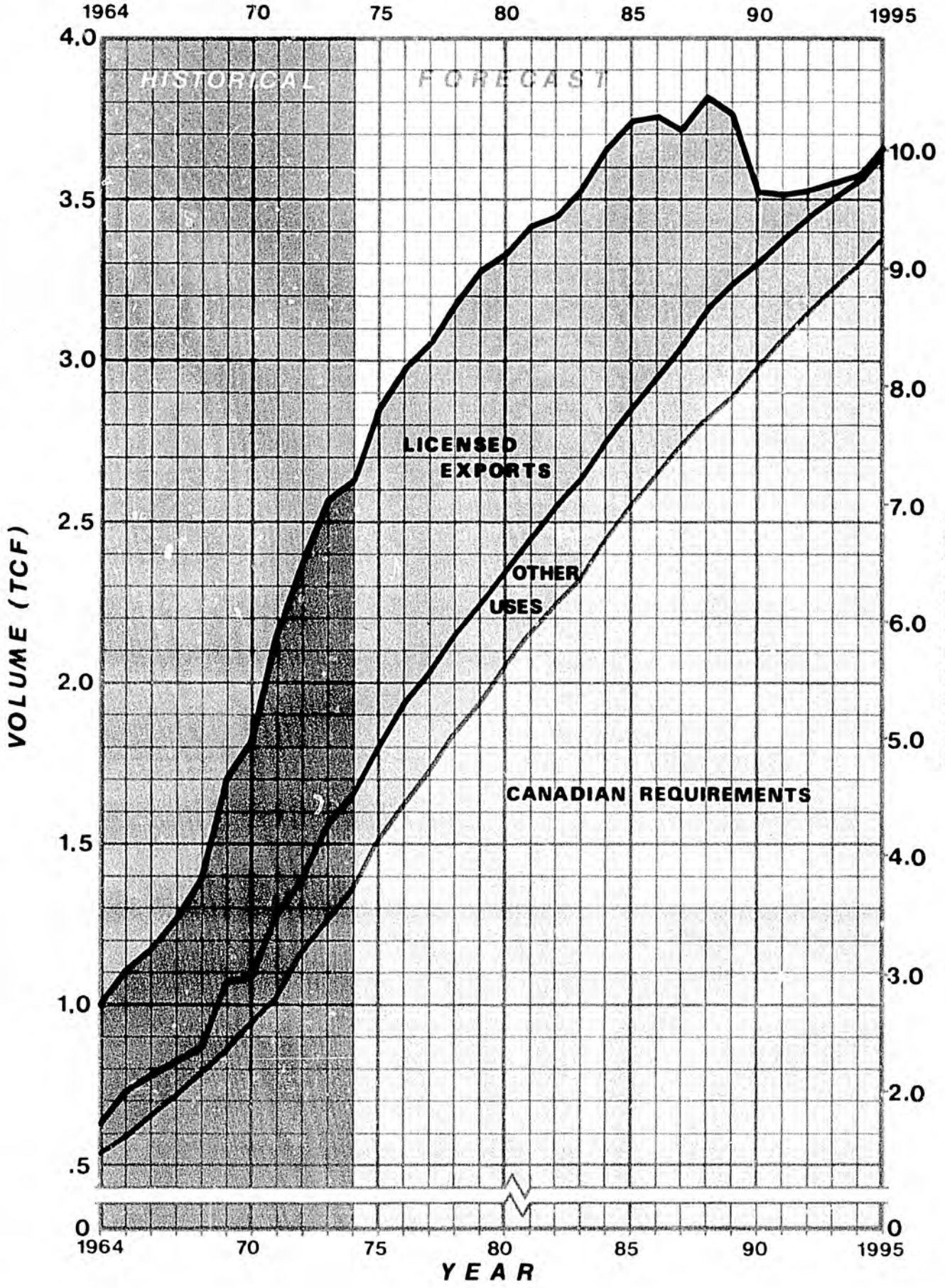
As with the supply graph, historical experience for the years through 1973 is shown on the left while the portion to the right of 1973 represents projections of future requirements.

As can be seen, Foothills is of the view that Canadian requirements will increase in a consistent pattern in the future, not unlike what has occurred in the past.

"OTHER USES" include pipeline compressor fuel, extraction plant consumption and like uses.

The "EXPORTS" requirement assumes that all existing licences for the export of gas from Canada will be honored as to volume and term; that they will not be renewed; and that no new export volumes will be licenced. The leveling-off and decline in total requirements, shown on the graph to occur after 1985, is due to sequential termination of export licences. Virtually all licences will terminate by 1994.

## TOTAL REQUIREMENTS FOR CANADIAN NATURAL GAS



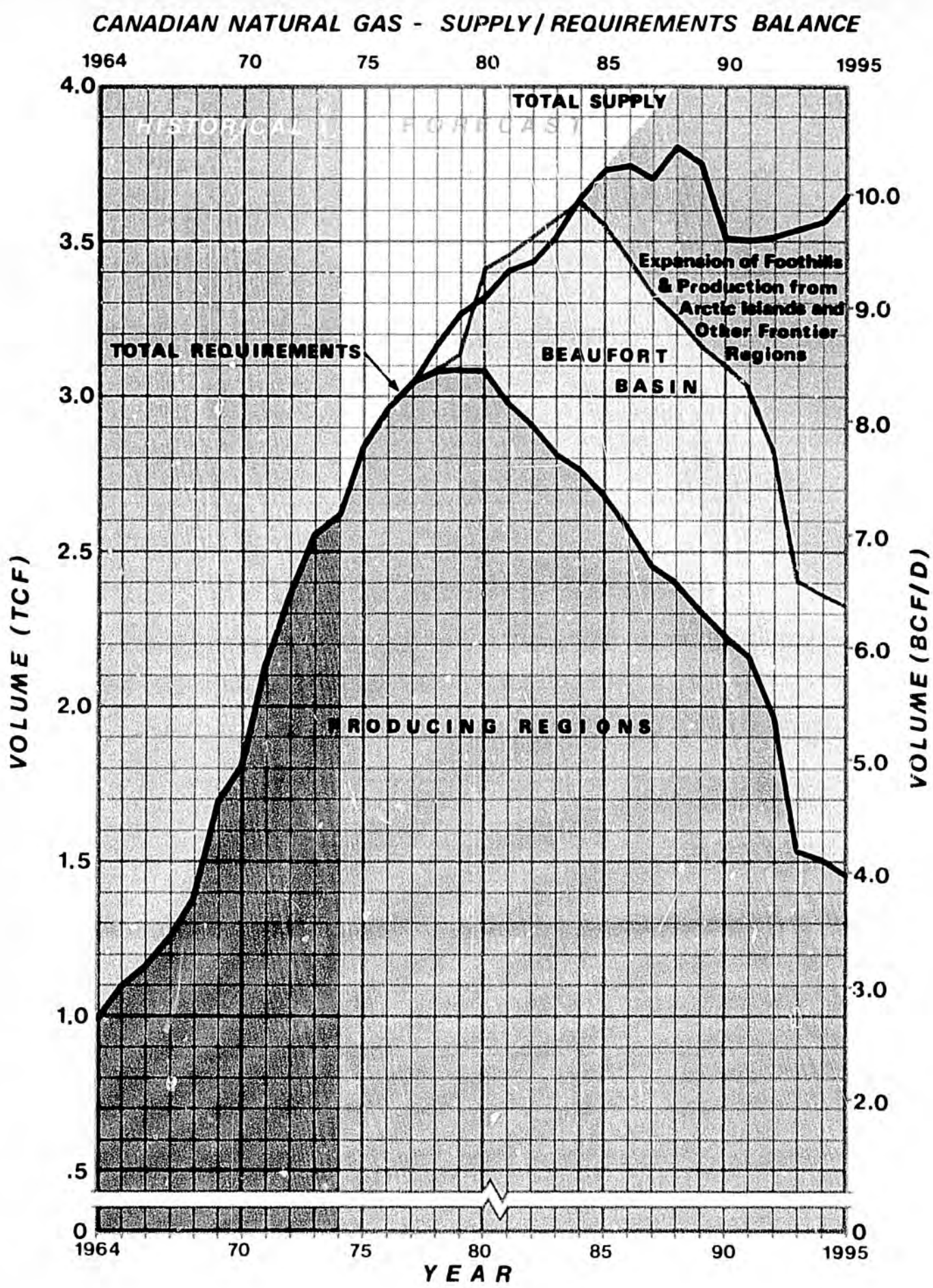
## THE SUPPLY/REQUIREMENTS BALANCE

The graphical presentation on the adjoining page results from superimposing the first preceding graph, "Canadian Marketable Natural Gas Production", on the second preceding graph, "Total Requirements For Canadian Natural Gas". As shown, the black line represents requirements, the red line represents conventional production, and the blue line the production which Foothills will bring into supply from the Beaufort Basin.

It is this graph which demonstrates the extreme urgency of bringing Beaufort Basin gas into Canadian supply as soon as possible. Without it the deficiency between conventional supply and requirements, which begins to develop in 1978 and steadily increases thereafter, will assume alarming proportions as Canadian requirements continue to increase while, at the same time, conventional supply begins rapidly to decline.

In order to avoid the serious consequences which will result if Beaufort Basin production does not reach the markets in 1979 or 1980, it is imperative that wholehearted support, of every practical form, be given to that pipeline project which can meet this kind of timing. Foothills advances the Maple Leaf Project as the only existing practical plan which can meet the target dates.

As can be seen on the graph, even with the addition of gas supply made available by Foothills, further supplies will be required by 1985. It is anticipated that these will be provided by expansion of the Foothills pipeline, production from the Arctic Islands and/or production from other frontier regions.

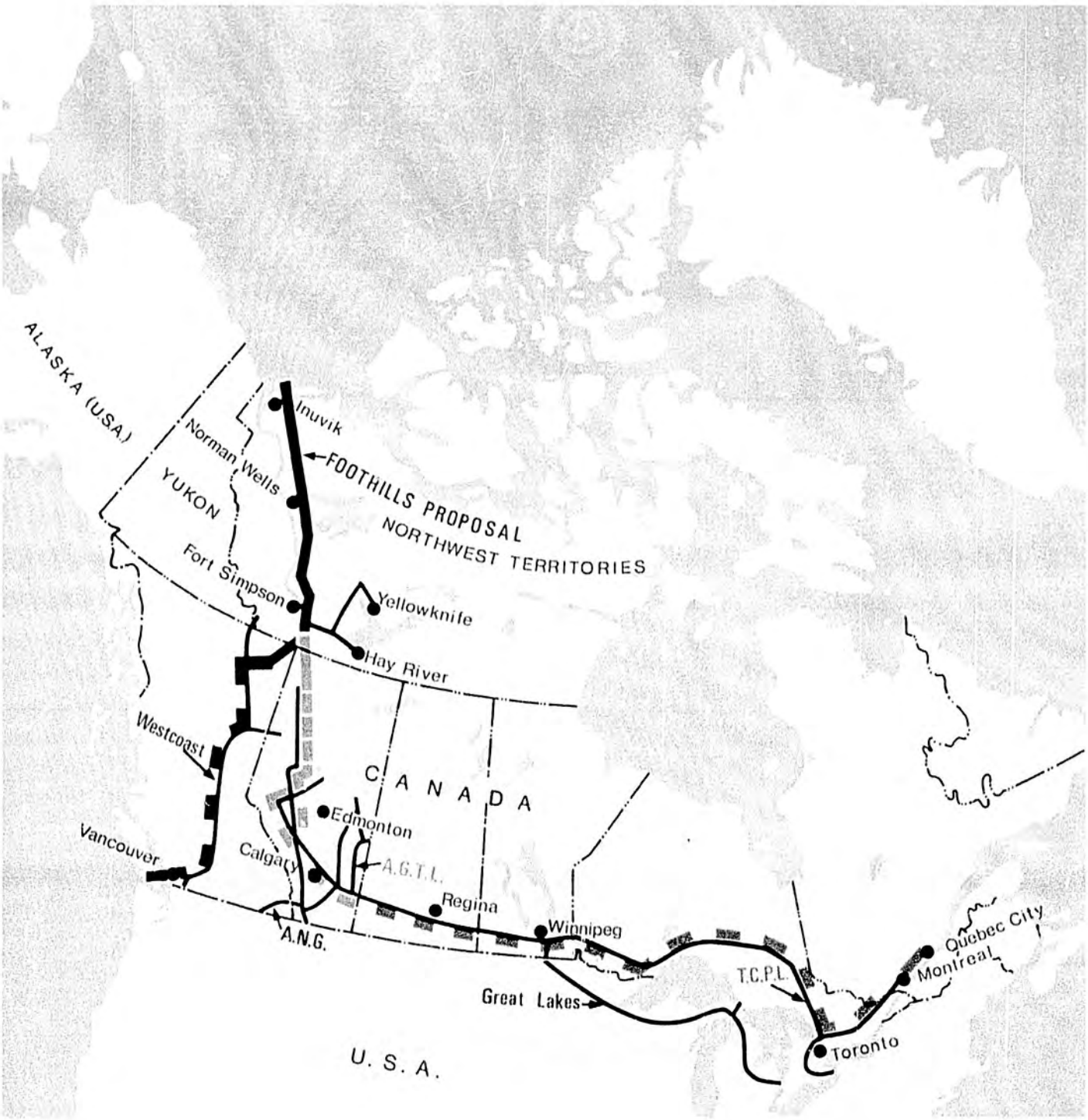

CANADIAN NATURAL GAS - SUPPLY/REQUIREMENTS BALANCE
1964
70
75
80
85
90
1995
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
0
HISTORICAL
FORECAST
TOTAL SUPPLY
TOTAL REQUIREMENTS
Expansion of Foothills & Production from Arctic Islands and Other Frontier Regions
BEAUFORT BASIN
PRODUCING REGIONS
VOLUME (TCF)
VOLUME (BCF/D)
YEAR

## THE MAPLE LEAF PROJECT

The Maple Leaf Project is a plan to construct a wholly Canadian owned and operated natural gas transmission main line from the Mackenzie Delta/Beaufort Sea area, down the Mackenzie Valley to a point near the intersection of the 60th parallel (the southern boundary of the Northwest Territories) with the common boundary of Alberta and British Columbia. A main line will branch off from this point and lead generally southwesterly about 140 miles to connect with the transmission system of Westcoast in northern British Columbia. Another main line will continue southward about 75 miles into Alberta to connect with the main line system of AGTL. Lateral lines will be built to bring natural gas services to most of the communities in the Mackenzie Valley region of the Northwest Territories.

The intention behind the project is to transport gas from the Mackenzie Delta/Beaufort Sea area through the Foothills line to its points of connection with the systems of Westcoast and AGTL, thence through those systems and, on the eastward side of Alberta, through the TransCanada Pipelines Limited (TCPL) system to Canadian markets. There will be available the existing connections to the points of export from Canada to the United States so that if any of the gas from the Mackenzie Delta/Beaufort Sea is at any time surplus to Canadian requirements, the amount which is surplus can be readily exported, although the Maple Leaf Project is not in any way directed to or dependent upon export transactions.

The map on the opposite page generally sets out the route by which Beaufort Basin gas will reach Canadian markets through the Maple Leaf Project.


ALASKA (U.S.A.)
Inuvik
Norman Wells
YUKON
FOOTHILLS PROPOSAL
NORTHWEST TERRITORIES
Fort Simpson
Yellowknife
Hay River
Westcoast
CANADA
Edmonton
Vancouver
Calgary
A.G.T.L.
Regina
Winnipeg
A.N.G.
Quebec City
Montreal
T.C.P.L.
Great Lakes
Toronto
U. S. A.

## THE MAPLE LEAF PROJECT AND GAS PIPELINE INVESTMENT

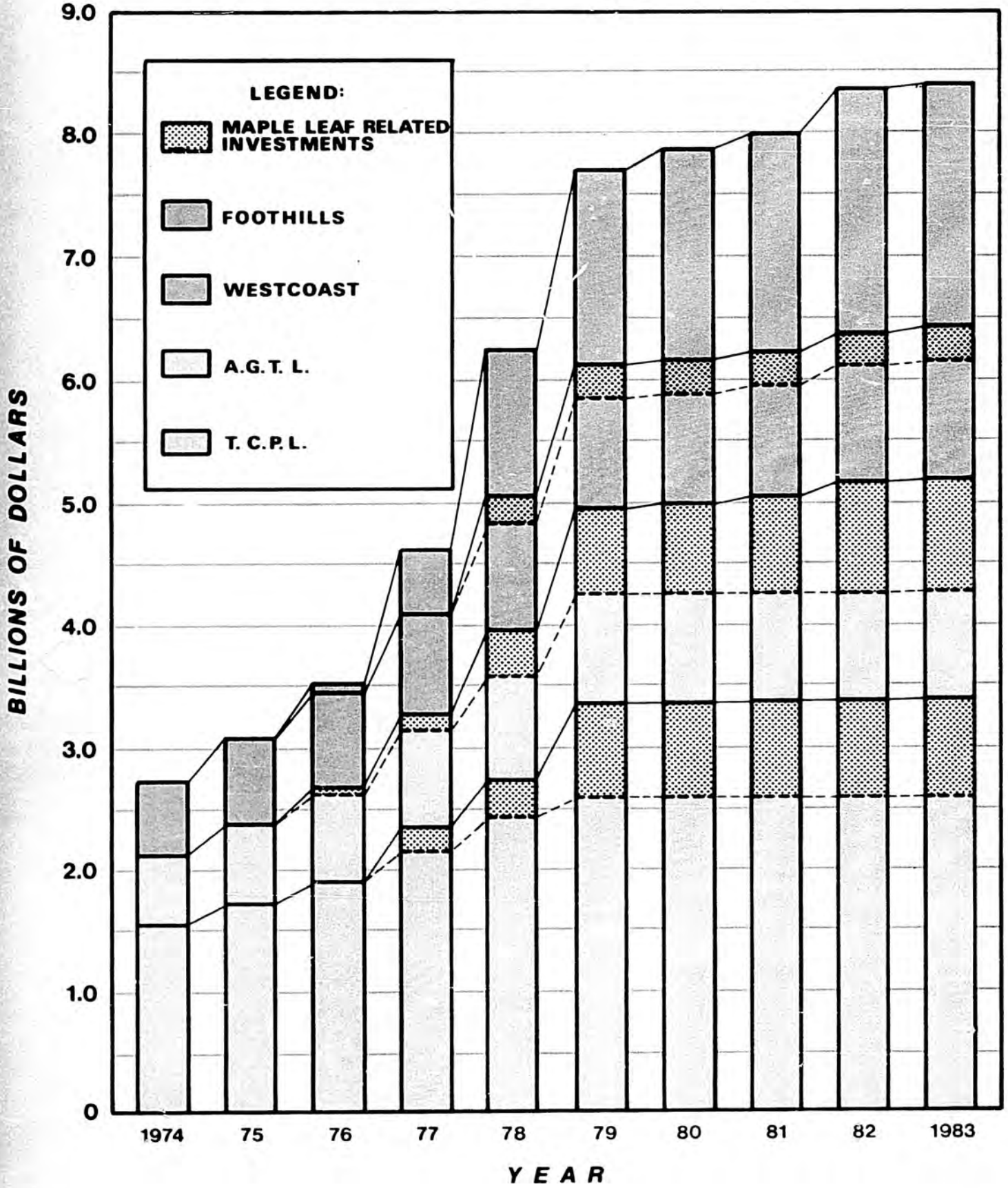
On the opposite page is a bar graph showing the expected capital costs, by year, for the Maple Leaf pipeline system accumulated with present investment and future normal growth of the AGTL, Westcoast and TCPL systems. Maple Leaf related capital costs are shown in the shaded parts of the bars.

Investments commence in 1976 and increase sharply through 1979 as a reflection of two winter construction periods. When Foothills is fully powered, gas pipeline investment in Canada will total some $8.5 billion, an increase of $5.75 billion over 1974 investment of $2.75 billion.

Based on gas reserves potential in southern Canada, existing systems are expected to increase total investment from $2.75 billion in 1974 to $4.4 billion in 1979. Thereafter, annual growth in total investment abates somewhat as a reflection of reserves maturity in southern Canada. By 1983 the total approaches $4.5 billion with no investments included for handling northern gas.

The capital requirements of each of AGTL, Westcoast and TCPL will be the respective responsibilities of those companies. Foothills will be responsible for raising the capital for the Northwest Territories portion of the line; the portion to be owned and operated by Foothills.

## CUMULATIVE GROSS PIPELINE INVESTMENT BY COMPANY



## THE MAPLE LEAF PROJECT
## AND
## SEGMENTS OF OWNERSHIP AND OPERATIONS

As well as the all new pipeline construction required for the line from the Mackenzie Delta to the connections with AGTL in Alberta and Westcoast Transmission in British Columbia, expansion of the AGTL, Westcoast and TCPL systems will be necessary. This is because of the expanding Canadian requirements which, by the time the Beaufort Basin gas is moving, will exceed the present capacity of the existing systems even though there will be some spare capacity in those systems by reason of the decline in supply from provincial sources.

The Maple Leaf Project is considered to embrace the new lines required in the Northwest Territories, British Columbia and Alberta as well as the necessary expansions of the existing systems. The ownership and operation will be comprised of five seperate segments.

First Segment – From Mackenzie Delta to a point just north of the 60th parallel (the southern boundary of the Northwest Territories); to be owned and operated by Foothills Pipe Lines Ltd.

Second Segment – The expansion into British Columbia from the point just north of the 60th parallel and the expansion required to the Westcoast systems in British Columbia; to be owned and operated by Westcoast.

Third Segment – The extension into Alberta from just north of the 60th parallel to the point of connection with the existing AGTL system at Zama; to be owned and operated by an AGTL subsidiary.

Fourth Segment – The expansion required to the AGTL system in Alberta; to be owned and operated by AGTL.

Fifth Segment – The expansion required to the TCPL system through Saskatchewan, Manitoba, Ontario and into Quebec; to be owned and operated by TCPL.

## FOOTHILLS PIPE LINES LTD.

Foothills Pipe Lines Ltd. is a "special act" company, incorporated by statute of the Parliament of Canada. It has the power, within or outside of Canada, to:

> "Construct, purchase, lease or otherwise acquire and hold, develop, operate, maintain, control, lease, mortgage, hypothecate, create liens or other security upon, sell, convey, or otherwise dispose of and turn to account any and all inter-provincial, extra-provincial and/or international pipelines and all appurtenances relative thereto. . .".

Foothills is capitalized at 10 million shares, each of a par value of $5.00. At present there are 4,500 shares issued and outstanding of which 80% are held by, or for, The Alberta Gas Trunk Line Company Limited (AGTL) and 20% by, or for, Westcoast Transmission Company Limited (Westcoast). AGTL and Westcoast are generally known as "the sponsor companies". As other sponsor companies join as participants, the AGTL percentage of the issued and outstanding shares will be reduced by transfers to the new sponsor companies.

The business affairs of Foothills are directed by a Board of Directors composed of:

| | |
|---|---|
| Kelly H. Gibson, Chairman | (Chairman of the Board of Westcoast) |
| S. Robert Blair | (President of AGTL) |
| E. C. Phillips | (President of Westcoast) |
| R. L. Pierce, Q.C. | (Executive Vice-President of AGTL) |
| R. J. Gibbs, Q.C. | (Member of the law firm of McLaws & Company in Calgary) |
| J. R. McCaig | (President of Trimac Limited) |

and by an executive committee composed of Messrs. Gibson, Blair, Phillips and Pierce, and the normal complement of officers headed by S. R. Blair as President and Chief Executive Officer.

## SIZING AND TIMING

Engineering and cost calculations have demonstrated that the appropriate pipeline size for the Foothills line is 42 inches outside diameter. The specifications of the pipe and of the compressor stations necessary throughout its length, as well as this pipe size, are standard and conventional. Proper scheduling of the construction of the new line and expansion of the existing systems will make it possible to have all of the pipe manufactured in Canadian mills and to establish complete manufacturing of compressors and all other equipment in Canada. This would not have been the case if a larger line size had been chosen. Similarly, a carefully prepared construction schedule will enable maximum employment of Canadian construction crews and organizations.

Foothills and its two corporate shareholders are satisfied that, taking into account a reasonable estimate of the time required for regulatory hearings prior to certification, construction of the pipeline could commence at the start of the winter season of 1977. This will enable the first Beaufort Basin gas to reach Canadian markets by late fall of 1979 in the time to offset the forecast deficiencies resulting from the inability of conventional sources of supply to continue to meet Canadian systems requirements and before the deficiencies reach the critical stage. The construction schedule incorporates a buildup over a five-year period so that the maximum volumes possible, without looping, will be carried in 1984. The buildup schedule is also designed to take maximum advantage of spare capacity which will develop in the existing AGTL, Westcoast and TCPL systems as the daily deliverability capacity of the conventional sources of gas declines.

## COST–OF–SERVICE

Foothills will operate as a transporter for others who purchase the gas, charging for this service on a "cost-of-service" basis. "Cost-of-service" studies, based on planned throughput of the Foothills' pipeline, indicate that the Maple Leaf Project is an economically viable means of bringing Beaufort Basin gas to Canadian markets. When the line is at maximum planned capacity, transportation costs will be in the order of 50¢/mcf to the 60th parallel, 70¢/mcf to Empress and $1/mcf to $1.20/mcf to various sections of eastern Canada. Planned pipeline capacities are:

| | |
|---|---|
| November 1, 1979 to November 1, 1980 | 800 mmcf/d |
| November 1, 1980 to November 1, 1981 | 1,200 mmcf/d |
| November 1, 1981 to November 1, 1982 | 1,600 mmcf/d |
| November 1, 1982 to November 1, 1983 | 2,000 mmcf/d |
| November 1, 1983 and thereafter | 2,400 mmcf/d |

## FINANCING

Foothills has sought the advice of persons experienced and expert in the financing of large-scale pipeline projects, and have been advised:

> ". . . We believe Foothills will be able to secure the funds required to complete its proposed pipeline system within the time frame called for from the public sale and private placement of a wide range of conventional securities in Canadian and United States markets, from advantages under loan agreements with Canadian and U.S. banks, from drawdowns under a revolving credit arrangement which we would hope to obtain from a consortium of Canadian, U.S. and international financial institutions and under special loan arrangements which may be concluded with export credit agencies of various countries in which it may be necessary to place orders for some of the material required in the pipeline complex."

and

> "The sheer magnitude of the financial requirements of the Foothills pipeline proposal dictates that:
>
> (i) The financing program be as straight forward and conventional as possible to ensure acceptance and understanding by a broad group of investors;
>
> (ii) Individual classes of securities to be issued to investors, both public and private, be limited to the type of security readily understood and accepted by investors in North America and abroad. First mortgage bonds, debentures, preferred shares (in each case possibly carrying warrants to purchase common shares or convertible into common shares) and common shares all fulfill this requirement;

(iii) Each class of security to be sold at any given moment conform to market standards then prevailing, both as to rate and term, to ensure as broad an appeal as possible;

(iv) The credit strength of the users of the gas be mobilized in a conventional manner in support of the debt securities to be issued to assist in financing the Foothills pipeline;

(v) The financing focus firstly on the viability of the project and secondly on the credit resources of both sponsors and users of gas; and

(vi) All possible means of support of a direct or indirect nature from both federal and provincial governments be explored."

and

". . . We consider it useful to summarize some known attitudes held by institutional investors as they relate to debt securities issued by gas pipeline companies:

(i) A debt/equity ratio of up to 75%/25% is tolerable.

(ii) Total funded debt should not exceed 90% of the gross plant.

(iii) Senior debt of first mortgage bonds should not exceed 2/3 of gross plant (although bonding up to 70% of the cost of property additions is permitted in indentures securing outstanding first mortgage bonds of certain pipeline companies).

(iv) Cost of service basis for payment represents an acceptable method of imparting the credit strength of the user companies to the debt securities of the issuing pipeline."

## RESERVES IN THE PIPELINE SUPPLY AREA

Since doubt has been publicly voiced as to the adequacy of Beaufort Basin gas reserves to serve as a basis for the Maple Leaf Project, the reserves estimates prepared for Foothills by its consultants are detailed on the opposite page. The first column shows presently proven reserves of 7.5 trillion cubic feet and annual additions to 1995 which will increase discovered reserves to 33 trillion cubic feet by that year. The discovered reserves up to the end of 1979, when the gas will commence to flow, will be 19.2 trillion cubic feet.

This type of threshold and annual additions pattern compares very favourably with the reserves circumstances existing at the time when other major Canadian transmission systems were financed, constructed and put into operation.

As well, the pipeline will be traversing an area of hydrocarbon potential in the mainland Northwest and Yukon Territories. Foothills' consultants advise that this area has a potential for discovery of about 5.9 trillion cubic feet of gas. Their forecast of additions in the area is not as large as the Beaufort Basin but, nonetheless, it does offer an attractive addition to potential supplies.

In total, Foothills' supply area is judged to have a potential of 45 trillion cubic feet. By commencement of pipeline operation in late 1979, consultants advise that 20.0 trillion cubic feet of gas will have been discovered in the supply area.

## FORECAST ADDITIONS TO MARKETABLE NATURAL GAS
## BEAUFORT BASIN & MAINLAND NORTHWEST & YUKON TERRITORIES

(BCF @ 14.73 psia & 60°F.)

| | BEAUFORT BASIN | MAINLAND N.W.T. & YUKON | TOTAL |
|---|---|---|---|
| Discovered Reserves @ 12/31/74 | | | |
| Appreciated/Probable | 7,459 | | 7,459 |
| Initial Proved | | | |
| Remaining Probable | 7,459 | | 7,459 |
| Remaining Proved | | | |
| Potential Additions | 31,627 | 5,868 | 37,495 |
| Annual Additions | | | |
| 1975 | 2,354 | 164 | 2,518 |
| 1976 | 2,354 | 164 | 2,518 |
| 1977 | 2,354 | 164 | 2,518 |
| 1978 | 2,354 | 164 | 2,518 |
| 1979 | 2,354 | 164 | 2,518 |
| 1980 | 2,352 | 164 | 2,516 |
| 1981 | 895 | 154 | 1,049 |
| 1982 | 895 | 154 | 1,049 |
| 1983 | 895 | 154 | 1,049 |
| 1984 | 895 | 154 | 1,049 |
| 1985 | 895 | 154 | 1,049 |
| 1986 | 796 | 154 | 950 |
| 1987 | 796 | 154 | 950 |
| 1988 | 796 | 154 | 950 |
| 1989 | 796 | 154 | 950 |
| 1990 | 796 | 154 | 950 |
| 1991 | 597 | 147 | 744 |
| 1992 | 597 | 139 | 736 |
| 1993 | 597 | 139 | 736 |
| 1994 | 597 | 139 | 736 |
| 1995 | 597 | 139 | 736 |
| TOTAL ADDITIONS | 25,562 | 3,227 | 28,789 |
| Cumulative Reserves to 1995 | 33,021 | 3,227 | 36,248 |
| Remaining Undiscovered 1995 | 6,065 | 2,641 | 8,706 |
| Ultimate Potential | 39,086 | 5,868 | 44,954 |

## QUALIFICATIONS OF ADDITIONAL SPONSOR COMPANIES

The two sponsor companies of Foothills (AGTL and Westcoast) expect other sponsors to join this venture in due course and have resolved that new participants must meet two prime qualifications as conditions precedent to the acquisition of shares in Foothills. Firstly, they must be able to provide substantial aid in getting the Beaufort Basin gas to Canadian markets as soon as possible and, secondly, they must be Canadian; that is to say, a majority of their issued and outstanding shares must be clearly and demonstrably in Canadian hands.

In addition, each must be of substance and have a high degree of financial integrity, for, as the Foothills financial advisors point out:

> "The overriding factor that must be evident in the financing plan, and one that cannot be stressed too strongly, is that financial support for Foothills' obligations must flow from Foothills' owners and sponsors as well as from the users of natural gas to be transported by Foothills. Such financial support must be sufficient to ensure the three principal objectives of the financial plan are met, namely that:
>
> (a) The Foothills pipeline system is completed and placed in service;
>
> (b) Foothills revenues are adequate to meet all obligations including interest and sinking fund payments on all debt instruments as well as to provide an adequate return on equity capital invested in the system; and
>
> (c) Interruptions to service, including force majeure interruptions, do not jeopardize Foothills' ability to meet its obligations."

## ADVANTAGES OF THE MAPLE LEAF PROJECT

The advantages which are listed in this part are not meant to be a complete catalogue. Only the most significant are included.

(1) The Canadian gas from the Beaufort Basin area will flow the entire distance, from point of origin to burner tip, through Canadian owned and operated transmission systems.

(2) Spare capacity which develops in existing Canadian systems as provincial production declines will be utilized with consequent savings in unit costs.

(3) Implementation does not depend upon approvals by foreign agencies for the transmission of gas of foreign origin.

(4) No other announced project makes provision for Beaufort Basin gas to be supplied to British Columbia for the requirements of the Westcoast system and the systems of its British Columbia customers.

(5) The capital costs are substantially less and, so far as is known, the unit transmission costs are less than the other announced project.

(6) Because the pipe and other equipment is of conventional design and can be manufactured in Canada, there will be major orders in Canada for steel manufacturers and fabricators.

(7) All of the above factors contribute to a substantial savings in the time required to obtain approvals, construct and put the pipeline into operation.

(8) As all the companies involved in transmission and distribution are Canadian, there will be much greater sensitivity to provincial and national needs and aspirations than there would be if there was a substantial degree of foreign influence and control.