Decision and Report to Congress on the Alaska Natural Gas Transportation System

Executive Office of the President
Energy Policy and Planning

September 1977

TO THE CONGRESS OF THE UNITED STATES:

Natural gas has become the Nation's scarcest and most desired fuel. It is in our interest to bring the reserves in Alaska to market at the lowest possible price. Consequently, I am today sending the Congress my decision and report on an Alaska Natural Gas Transportation System.

The selection of the Alcan project was made after an exhaustive review required by the Alaska Natural Gas Transportation Act of 1976 determined that the Alcan Pipeline System will deliver more natural gas at less cost to a greater number of Americans than any other proposed transportation system.

The Alcan proposal, taken together with the recently signed Agreement on Principles with Canada, demonstrates that our two countries working together can transport more energy more efficiently than either of us could transport alone.

Unnecessary delay would greatly increase the total cost of the pipeline system. I urge the Congress to act expeditiously to approve this important project.

Jimmy Carter

THE WHITE HOUSE,
September 22, 1977

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OVERVIEW

In the winter of 1967-68 a wildcat rig drilling Prudhoe Bay State Well No. 1. struck a formation that, when later delineated, proved to be the largest petroleum reserve on the North American continent. The Prudhoe Bay field contains over 20 trillion cubic feet of saleable natural gas and more than 9 billion barrels of recoverable oil. This gas represents approximately 10 percent of the known gas reserves in the United States.

In 1969, the State of Alaska held a lease sale and received almost $1 billion in lease bonuses. Shortly thereafter, the three major leaseholders in the Prudhoe Bay Oil Pool announced their intention to build an oil pipeline through Alaska from Prudhoe Bay to a site on the Gulf of Alaska. After an initial flurry of activity, the Trans-Alaskan Pipe Line System (TAPS) became entangled in legal disputes until November of 1973, when the Congress and President approved the plan and provided for expedited procedures. Construction was started immediately thereafter and the first flow of oil through the pipeline commenced on June 20, 1977.

Another set of studies began in 1969 which eventually resulted in applications to the Federal Power Commission (FPC) in the U.S. and the National Energy Board (NEB) in

Canada for a certificate to construct a pipeline to move Alaskan and Mackenzie Delta gas to United States and Canadian markets, respectively, by Arctic Gas (Alaskan Arctic Gas Pipeline Company and Canadian Arctic Gas Pipeline Limited) in March 1974.

In September 1974, El Paso Alaska Company filed an application to transport Prudhoe Bay gas by a pipeline adjacent to TAPS to the Gulf of Alaska, liquify it, and ship it to California by LNG tanker. There the LNG would be regasified and provided to its purchasers either directly or by displacement through existing pipeline facilities.

Under the Trans-Alaska Pipeline Act Congress had authorized and requested the President to determine the willingness of the Government of Canada to authorize a natural gas pipeline for Alaska gas across Canada and whether intergovernmental agreements would be needed to achieve that end. After discussions, the Government of Canada indicated they were prepared to consider an agreement of general applicability as opposed to an agreement on a specific pipeline. Negotiations on a Transit Pipeline Treaty were undertaken, and a treaty was finally signed on January 28, 1977, and entered into force on September 19, 1977. It will govern all existing and future transit pipelines in the two countries for thirty-five years.

On April 7, 1975, a proceeding before FPC Administrative Law Judge Nahum Litt was initiated and over 45,000 pages of testimony and more than 1000 supporting exhibits were compiled before it was concluded. Similar hearings were held by the NEB in Canada.

On July 9, 1976, Alcan Pipeline Company and Northwest Pipeline Company (Alcan) filed the third application with the FPC for a certificate to transport Alaskan gas. The Alcan plan, as modified in March 1977, calls for a pipeline following existing utility corridors from Prudhoe Bay through Canada to the U.S. markets.

Recognizing the shortages of natural gas, the large reserves of natural gas in Alaska, the benefits resulting from the expeditious construction of a transportation system for that gas, and the potentials for delay inherent in the normal regulatory approach to a project of this magnitude, on October 22, 1976, Congress passed the Alaska Natural Gas Transportation Act of 1976 (ANGTA). Designed to draw upon all relevant governmental, public and private expertise in reaching a Presidential and Congressional decision on construction of the best possible Alaska natural gas transportation system, if any, the statute established a unique process for reaching an expedited decision.

This Decision and Report on an Alaska Natural Gas Transportation System meets the statutory decision-making requirements of the Alaska Natural Gas Transportation Act and represents the culmination of the Executive Branch function in the process established by the Bill.

The Act's Statement of Purpose clearly sets out the Congressional objectives:

> "Sec. 3. The purpose of this Act is to provide the means for making a sound decision as to the selection of a transportation system for delivery of Alaska natural gas to the contiguous States for construction and initial operation by providing for the participation of the President and the Congress in the selection process, and, if such a system is approved under this Act, to expedite its construction and initial operation by (1) limiting the jurisdiction of the courts to review the actions of Federal officers or agencies taken pursuant to the direction and authority of this Act, and (2) permitting the limitation of administrative procedures and effecting the limitation of judicial procedures related to such actions. To accomplish this purpose it is the intent of the Congress to exercise its Constitutional powers to the

fullest extent in the authorizations and directions herein made, and particularly with respect to the limitation of judicial review of actions of Federal officers or agencies taken pursuant thereto."

Shortly after the passage of ANGTA, Judge Litt concluded the FPC hearing and on February 1, 1977 issued the Initial Decision favoring the Arctic proposal. According to the provisions in the Act, on May 2, 1977, the FPC made its Recommendation to the President in which it recommended an overland route through Canada but divided 2-2 on the choice between Alcan and Arctic Gas.

As required in the Act, comments on the Recommendation of the FPC were made to the President on July 1, 1977, by ten interagency task forces and a wide spectrum of non-Federal government officials and other interested persons. While generally supportive of the FPC Recommendation, they raised important questions regarding virtually every major element of the Recommendation.

On July 4, 1977, Canada's NEB made its decision regarding an overland pipeline system through Canada. It found the Arctic Gas proposal "environmentally unacceptable" and stated it was prepared to certify Alcan conditioned upon several modifications of the Alcan system recommended

by the FPC. Within a few weeks, an interagency group of U.S. negotiators began meeting with Canadian officials to explore the boundaries of the Canadian option to enable the President to make an informed decision under the Act.

On September 1, the President announced a deferral in transmitting the decision to the Congress to complete negotiations with the Canadians. After intensive negotiations, President Carter and Prime Minister Trudeau announced in Washington on September 8, that both countries had reached an agreement in principle on a joint project for the transportation of Alaskan and Canadian gas. The President and Prime Minister noted the superiority of a joint project to any unilateral undertaking by either government. In addition to announcing an intention to sign a formal Agreement on Principles concerning the project, both governments pledged to seek approval from their respective legislatures of expedited provisions for project construction and operation.

With the signing of the Agreement on Principles applicable to a Northern Natural Gas Pipeline in Ottawa on September 20, 1977, the President transmitted the Decision favoring the Alcan project to the Congress for its approval. The Congress has sixty legislative days within which to act upon a joint resolution of approval.

The Agreement on Principles, as incorporated in the Decision of the President, provides the framework for a clearly specified, economically efficient, and environmentally superior means of transporting both U.S. and Canadian gas to markets through a joint pipeline system. Approval of the Decision, which incorporates the Agreement on Principles, will provide the same type of commitment by the United States to this undertaking as will result from passage of the implementing legislation which Prime Minister Trudeau has announced will be submitted to Parliament in October.

This Decision is supported by a strong record and recommendation from the FPC, substantial comments from all parties of interest and a clear and cogent agreement with the Canadian government that provides significant benefits for both countries.

* * * * *

The proposed Alcan system will deliver Alaska gas at the lowest cost-of-service to U.S. consumers -- probably below the cost of imported oil and substantially below the costs of other fuel alternatives. The average price of distillate from imported oil over the life of the project

is expected to be in excess of $3 per million btu's (mmbtu) in constant 1975 dollars. The average delivered price of Alaska gas for the same period will be substantially less even with a significant allowance for cost overruns. The Alcan system will deliver Alaskan gas at the lowest cost to U.S. consumers, but will do so directly to both the Midwest and West Coast markets. Furthermore, the Alcan system will increase the ability of Canada to develop its own frontier gas reserves, particularly in the Mackenzie Delta, through connection of the proposed Dempster Highway lateral pipeline with the Alcan mainline from Alaska. If Mackenzie Delta gas is brought to Canadian markets, U.S. consumers might also benefit from the enhanced availability of Canadian supplies.

Under almost all criteria, the Alcan system is clearly superior to the proposal by the El Paso Alaska Company to liquefy Alaska gas and ship it to the West Coast. Over a 20-year period, the Alcan system would deliver Alaska gas to U.S. consumers at a significantly lower average cost-of-service than El Paso. In 1975 constant dollars the 20-year average cost of service for Alcan is estimated to be $1.04 per mmbtu, and $1.21 per mmbtu for El Paso. This $.17 difference represents ultimate savings of $6 billion for

American consumers over the life of the Alcan project. Alcan also can move the same volume of gas with a higher fuel efficiency, and will have much lower annual operating costs than the El Paso LNG system.

Alcan also has a markedly greater Net National Economic Benefit (NNEB) than El Paso. The calculation of the NNEB compares the present value of real resource expenditures for a project with the present value of future benefits. Alcan has an estimated NNEB of $5.77 billion, more than $1.1 billion higher than the estimated NNEB of El Paso.

In addition to these economic advantages, Alcan has significant technical and resource advantages over El Paso. These include:

- the superiority of pipeline transportation over LNG transportation for the safest and most reliable delivery of gas, and for expansibility of capacity to deliver increased volumes from reserves other than the Prudhoe Bay Pool;
- the substantial advantage of pipeline facilities over LNG facilities in having a useful life of over 40 years;

- the need to anticipate future shipment of natural gas from the Gulf of Alaska which may require LNG deliveries to the West Coast, thus preserving LNG delivery potential on the West Coast.

Furthermore, virtually all Federal agencies and private parties that compared the two projects determined that the Alcan system is environmentally superior to El Paso.

The Agreement with Canada on the Alcan system assures the cost-of-service advantages of the Alcan proposal. The Agreement provides that the Alcan pipeline will follow the original Alcan Highway route, without the route diversion required by the NEB. This provision alone saves the U.S. consumer up to $600 million in initial construction costs, plus interest, or the 6 cents in cost of service that would have been added by the route diversion. In return, the U.S. agreed to pay a portion of the cost for an extension of the Dempster Lateral from Dawson to Whitehorse in the Yukon -- if and when the lateral is built. This limited extension, or "spur," would connect the Dempster line with the main Alcan system. A higher capacity, more efficient system will be installed south of Whitehorse, with costs shared on a volumetric basis, to carry U.S. and Canadian volumes.

Significantly, under the Agreement, the U.S. share of costs for the "spur" from Dawson to Whitehorse is tied to the percent of actual cost overruns on the construction of the Alcan main line in Canada. This element of the Agreement creates a formidable incentive for Canada to minimize cost overruns on the construction of the Alcan line in Canada. In addition, the Agreement protects the Alcan pipeline from unfair or discriminatory taxes that might threaten the cost of service advantages of Alcan for U.S. consumers. The provisions in the Agreement provide a ceiling on the imposition of Yukon taxes, and supercede the previous NEB recommendation for a $200 million impact assistance payment from U.S. consumers to the Yukon. Any advance payment of tax by the pipeline will be treated as a loan to the government, to be paid back with interest from future tax revenues, but in no event will the loan affect the cost of service to U.S. consumers. The fixed level of overall tax is only a modest increase above the level of tax included in the original estimates for Alcan's cost of service, and has been fixed with reference to the tax regime applicable in Alaska.

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In this Agreement, the United States and Canada both improved their positions from the original NEB decision, and achieved a reduction in the cost of service price of both Alaskan gas and Canadian gas from the Mackenzie Delta. The modified Alcan system will also:

- assist Canada to continue supplying gas exports under existing contracts by providing it with access to substantial Mackenzie Delta reserves;
- provide the opportunity to obtain additional gas at an earlier date by early construction of portions of the southern Canadian and lower 48 sections of Alcan, with delivery of gas from Alberta (where there is temporary excess supply) in advance of the delivery of Alaska gas;
- encourage exploration for new reserves and stimulate expansion of the gas industry in Canada, which might ultimately benefit U.S. consumers through the enhanced potential of Canadian supplies.

Furthermore, this joint U.S.-Canadian undertaking could result in significant cooperation with Canada on a variety of other energy issues, such as oil exchanges, pipelines and strategic reserves.

The Alcan project will be one of the largest -- if not the largest -- privately financed international business ventures of all time. The minimal risk of non-completion will be borne by the private financial markets. There will be no Federal debt guarantees, and consumers will not be required to bear any portion of the risks of non-completion.

The Federal Government, however, will have an expanded and significant role in monitoring and overseeing the construction of the project. By enforcement of the terms and conditions proposed herein and to be later specified, the Federal Inspector for the construction of the project will coordinate Federal involvement with the project, minimizing cost overruns, preventing management abuses, and facilitating the timely completion of construction. The U.S.-Canadian Agreement provides additional incentives to minimize cost overruns on construction in Canada. The Decision, including the Agreement, seeks to ensure that U.S. consumers will have the enormous benefit of new Alaskan gas supplies at a price significantly below that of alternative energy sources.

A superior project has now been selected as a result of a thorough decision making process involving all the resources of the Federal Government and a spirited competition between private alternatives. The nation sorely needs new sources of economically competitive natural gas. Now is clearly the time to approve the decision to undertake the final planning and construction of this cost-efficient system for bringing critical supplies of Alaska natural gas to U.S. markets.

DECISION ON AN ALASKA NATURAL GAS TRANSPORTATION SYSTEM

PREFACE - STATUTORY REQUIREMENTS FOR A DECISION ON AN ALASKA NATURAL GAS TRANSPORTATION SYSTEM

Section 7(a)(4) of the Alaska Natural Gas Transportation Act of 1976 (ANGTA) states:

> If the President determines to designate for approval a transportation system for delivery of Alaska natural gas to the contiguous States, he shall in such decision-
>
> (A) describe the nature and route of the system designated for approval;
>
> (B) designate a person to construct and operate such a system, which person shall be the applicant, if any, which filed for a certificate of public convenience and necessity to construct and operate such system;
>
> (C) identify those facilities, the construction of which, and those operations, the conduct of which, shall be encompassed within the term "construction and initial operation" for purposes of defining the scope of the directions contained in Section 9 of this Act, taking into consideration any recommendation of the Commission with respect thereto; and
>
> (D) identify those provisions of law, relating to any determination of a Federal officer or agency as to whether a certificate, permit, right-of-way, lease, or other authorization shall be issued or be granted, which provisions he finds (i) involve determinations which are subsumed in his decision and (ii) require waiver pursuant to Section 8(g) in order to permit the expeditious construction and initial operation of the transportation system.

As part of these determinations, an Agreement on Principles concluded with the Government of Canada prescribes various terms and conditions applicable to the construction and operation of the pipeline. The Agreement on Principles is attached hereto as Section 7 of this Decision and made an integral part of the Decision by this reference.

With the incorporation of the aforesaid Agreement, and the finding that it is in the national interest to expeditiously undertake to construct an Alaska Natural Gas Transportation System, the system designation and related statutory determinations are as follows:

SECTION 1 - DESIGNATION OF PERSON TO CONSTRUCT AND OPERATE THE SYSTEM

The Alcan Pipeline Company, now a wholly owned subsidiary of Northwest Pipeline Corporation[1/], or its successor, is hereby designated to construct and operate the portion of the system within the State of Alaska.

The Northern Border Pipeline Company, a partnership consisting of subsidiaries or affiliates of Columbia Gas Transmission Corporation, Michigan-Wisconsin Pipeline Company, Natural Gas Pipeline Company of America, Northern Natural Gas Company, Panhandle Eastern Pipe Line Company, and Texas Eastern Transmission Corporation, or its successor, is hereby designated to construct and operate the portion of the system from the United States-Canada border near Monchy, Saskatchewan, to a point near Dwight, Illinois.

The Alcan Pipeline Company, or its successor, and the Northern Border Pipeline, or its successor, shall be publicly held corporations or general or limited partnerships, open to ownership participation by all persons

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1/ Northwest Pipeline owns and operates a 4,300-mile pipeline system for transporting gas in the states of Colorado, Idaho, Nevada, Oregon, Utah, Washington, and Wyoming. Northwest Pipeline is a wholly-owned subsidiary of Northwest Energy Company, a holding company whose principal asset is all the outstanding common stock of Northwest Pipeline.

without discrimination, except producers of Alaskan natural gas.

The Pacific Gas Transmission Company is hereby designated to construct and operate the portion of the system from the United States/Canada border near Kingsgate, British Columbia, to the border between the States of California and Oregon.

The Pacific Gas and Electric Company is hereby designated to construct and operate the portion of the system from the border between the States of California and Oregon through the State of California.

SECTION 2 - DESCRIPTION OF THE NATURE AND ROUTE OF THE APPROVED SYSTEM

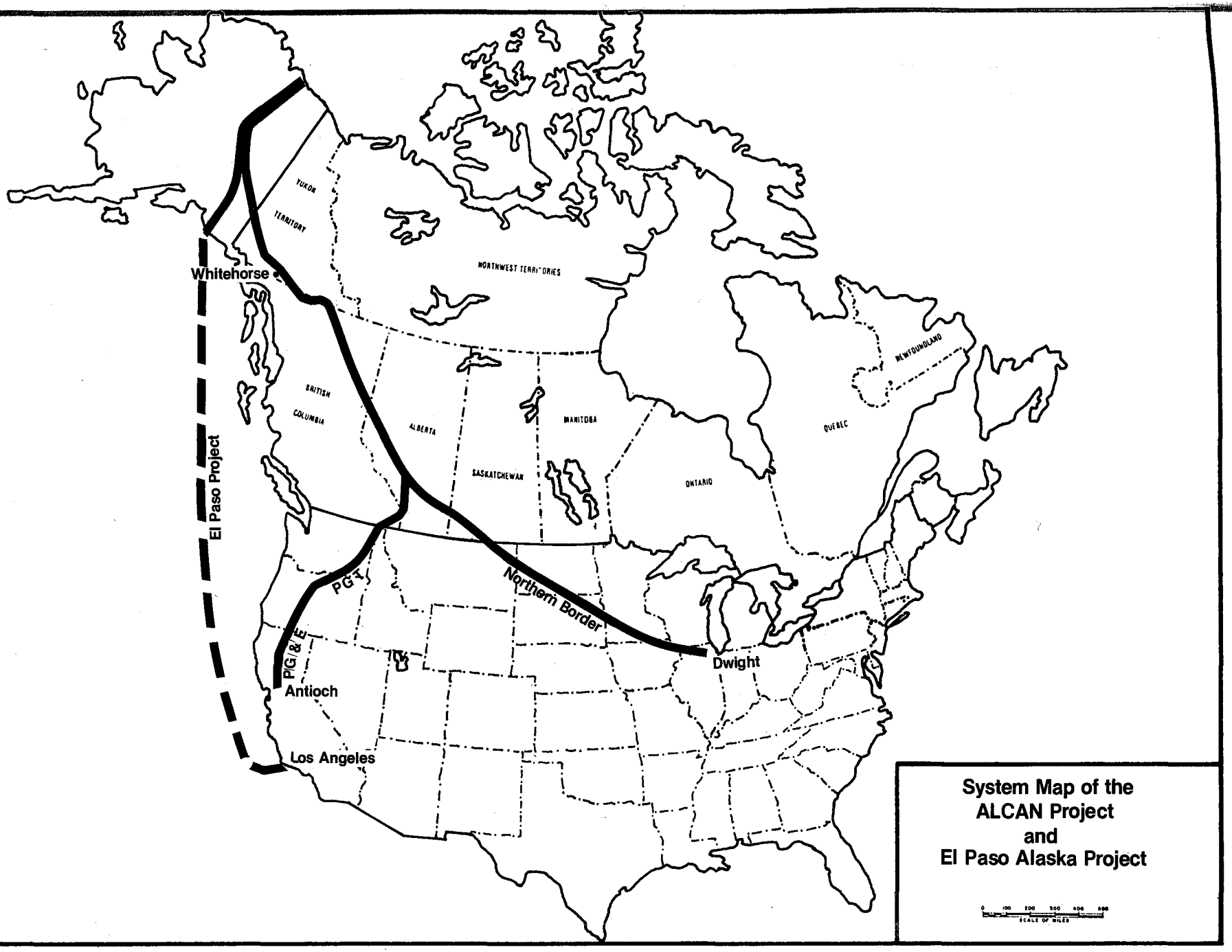
The Alcan system is an overland pipeline system to transport natural gas from the Prudhoe Bay area of Northern Alaska through Alaska and Canada into the Midwest and Western sections of the contiguous United States. See Exhibit 1.

The expected volume of gas to be available initially from the Prudhoe Bay field is 2.0 to 2.5 billion cubic feet per day (bcfd). The system described herein is designed to handle this throughput volume. The capacity of the system could be increased in the future to accommodate additional volume throughput by construction of additional facilities.

Alcan Pipeline Route in Alaska

The proposed Alcan pipeline will commence at the discharge side of the gas plant facilities in the Prudhoe Bay field. The pipeline will parallel the Alyeska oil pipeline southward from the North Slope of Alaska, cross the Brooks Range through the Atigun Pass, and continue on to Delta Junction.

At Delta Junction, the Alcan Pipeline will diverge from the Alyeska oil pipeline and follow the Alaska Highway and the Haines oil products pipeline right-of-way, passing near the towns of Tanacross, Tok, and Northway Junction


YUKON TERRITORY
NORTHWEST TERRITORIES
NEWFOUNDLAND
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
Whitehorse
El Paso Project
PG&E
PGT
Northern Border
Dwight
Antioch
Los Angeles
System Map of the
ALCAN Project
and
El Paso Alaska Project

in Alaska. The right-of-way of the Haines oil products pipeline is at present approximately fifty feet wide and is closely parallel to the Alaska Highway. The Alcan pipeline will then connect with the proposed new facilities of Foothills Pipe Lines (South Yukon) Ltd. at the Alaska/Yukon Territory border.

From Prudhoe Bay to Delta Junction, Alcan expects to construct its line approximately eighty feet from the Alyeska oil pipeline. As proposed by Alcan, construction will be carried out by extending the existing Alyeska work pads. However, Alyeska advised Alcan that its "preliminary general guidelines" indicate that the Alyeska and Alcan lines must be separated by 100 to 200 feet where blasting to build the pipeline trench would occur (approximately 350 miles of pipeline length). Additional studies will determine the minimum distance between the Alyeska oil pipeline and the Alcan line that is necessary to permit safe construction and operation.

Alcan Pipeline Route Through Canada

The Canadian portion of the Alcan Project will commence at the Alaska/Yukon border in the vicinity of the towns of Border City, Alaska and Boundary, Yukon.

From the Alaska/Yukon border, the Foothills Pipe Lines (South Yukon) Ltd. pipeline will proceed south until it

reaches the White River (milepost 44), where it will take a more eastward course across the Yukon Territory. The pipeline will cross the Territory generally parallel to the Alaska Highway. Along most of the pipeline route through the Yukon, the separation between the pipeline route and highway route will be approximately one mile. There will be several points, however, where the pipeline route will divert substantially from the route of the Alaska Highway. These departures from the Alaska Highway route will permit the pipeline to continue on a more direct course than if it were to follow the Alaska Highway.

At approximately milepost 246, the pipeline will be routed north of Whitehorse and cross the Yukon River near the intersection of the Alaska and Klondike Highways. Near this intersection, approximately 9 miles northwest of Whitehorse, the pipeline will be constructed to permit a later connection with the proposed Dempster Line from the Mackenzie Delta, if and when the Dempster Line is constructed.

After it crosses the Yukon River north of Whitehorse, the pipeline will turn southeast and again travel parallel to the Alaska Highway, entering British Columbia at approximately milepost 397 and reentering the Yukon Territory at approximately milepost 435. The pipeline will continue

to follow the Alaska Highway eastward through the Yukon Territory and again cross the border into British Columbia, approximately twelve miles southwest of Watson Lake, Yukon. At this point, the Foothills Pipe Lines (South Yukon) Ltd. pipeline will terminate, and the Foothills Pipe Line (North B.C.) Ltd. interconnecting pipeline will commence.

After it passes the British Columbia border, the pipeline will proceed generally southeast across the northeastern part of the Province to the British Columbia/ Alberta border, crossing the existing Westcoast Transmission Company Ltd. main line some 35 miles south of Fort Nelson. At Boundary Lake on the British Columbia-Alberta border, the pipeline would connect with the Foothills Pipe Lines (Alta.) Ltd. pipeline. In Alberta, the Foothills Pipe Lines (Alta.) Ltd. pipeline will proceed generally southeast from Boundary Lake to Gold Creek Junction. After Gold Creek Junction, the pipeline will follow the existing Alberta Gas Trunkline Co., Ltd. (AGTL) pipeline right-of-way to James River Station.

From James River Station, the western leg of the pipeline will proceed separately to the south, approximately following the existing AGTL right-of-way to the Alberta/ British Columbia border near Coleman, Alberta. It will then connect with the Foothills Pipelines (South B.C.)

Ltd. pipeline, continue to the southwest across British Columbia, and finally connect with the Pacific Gas Transmission (PGT) pipeline at the United States/Canada border near Kingsgate, British Columbia. The pipeline route through southern British Columbia will generally parallel the existing pipeline route of Alberta Natural Gas Company Ltd.

For the eastern leg from the James River Station, the pipeline will proceed generally to the southeast until it reaches the Alberta/Saskatchewan border near Empress, Alberta. The eastern leg will then connect with the Foothills Pipe Lines (Sask.) Ltd. pipeline. The pipeline will then continue to the southeast across Saskatchewan and join with the Northern Border Pipeline system at the United States/Canada border near Monchy, Saskatchewan.

Alcan Pipeline Route in the Contiguous United States

On the western leg, the Alaska gas will be transferred at the United States-Canada border near Kingsgate, British Columbia, to the PGT system. The PGT system will transport the gas through northern Idaho, southeast Washington, and central Oregon. At the Oregon/California border, the gas will be transferred to enter the Pacific Gas and Electric Company (PG&E) system and will then be transported throughout California.

On the eastern leg the Alaska gas will be transferred at the Saskatchewan/Montana border from the Canadian-owned portion of the Alcan system to the Northern Border Pipeline system. The Northern Border Pipeline system will then transport the gas across the northeast corner of Montana, the southwest section of North Dakota, the northeast section of South Dakota, the southwest corner of Minnesota, and the northeast section of Iowa, and finally bring the gas just south of Chicago to Dwight, Illinois.

Exhibit 2 on the following page illustrates the respective routes of the eastern and western legs of the Alcan system and their relationship to the existing gas pipeline network in the United States.

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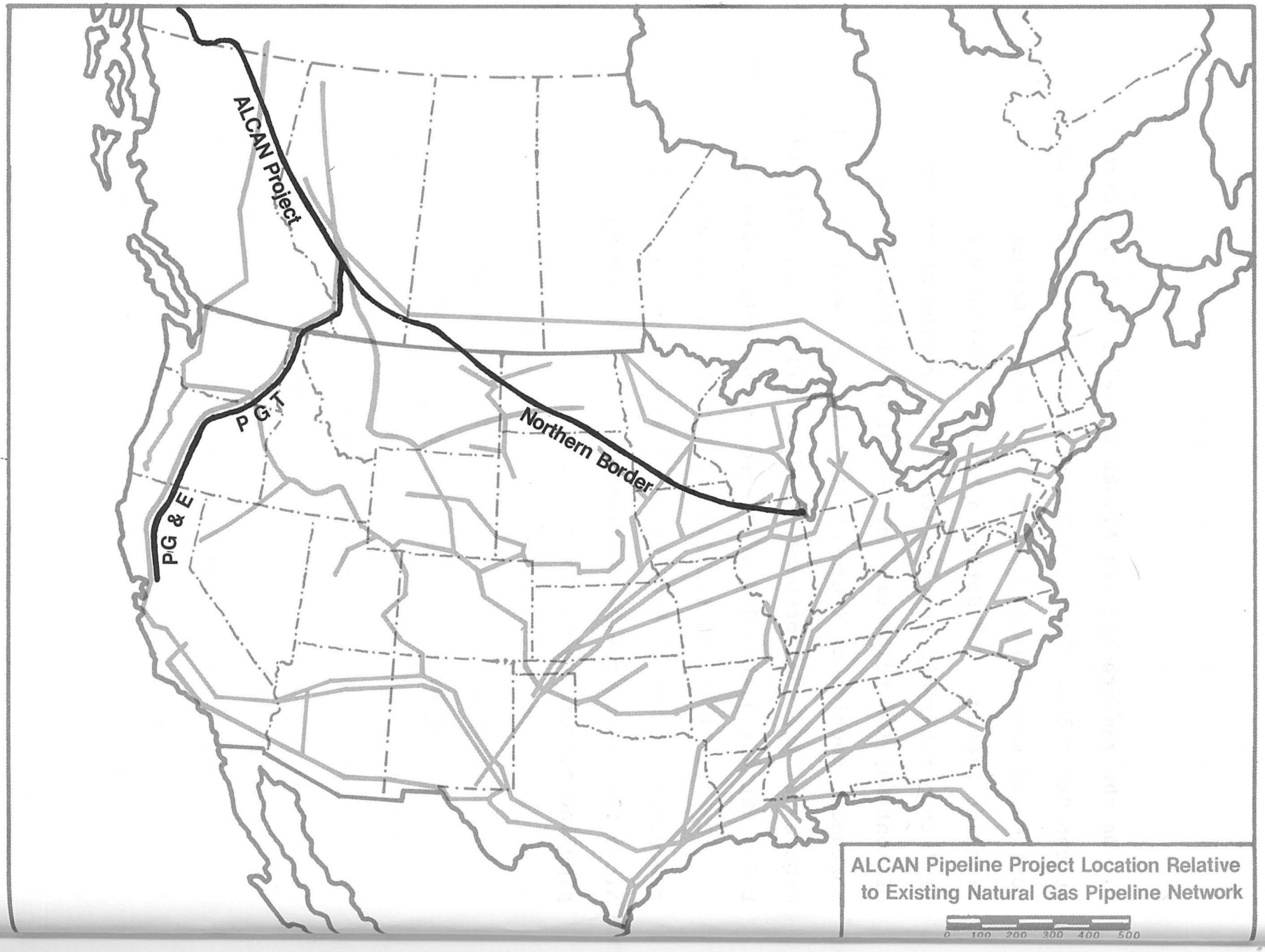
ALCAN Project
PGT
Northern Border
PG & E
ALCAN Pipeline Project Location Relative
to Existing Natural Gas Pipeline Network
0 100 200 300 400 500

SECTION 3 - IDENTIFICATION OF FACILITIES INCLUDED WITHIN "CONSTRUCTION AND INITIAL OPERATION"

General Project Description

This section identifies the facilities for the Alcan project which will be entitled to the expedited authorization process prescribed in Section 9 of ANGTA. The facilities which are to be covered are those in the U.S. which are adequate for a throughput of up to 2.4 bcfd and are included in the revised Alcan filing submitted to the Federal Power Commission (FPC) in March 8, 1977. If any modifications to those facilities are required by the Agreement on Principles between the U.S. and Canada, those modified facilities will also be entitled to the expedited authorization process in Section 9.

Uncertainties remain as to the future level of gas exports from Canada's historical gas supply sources. The actual division of Alaska gas among the various regions of the contiguous United States awaits conclusion of gas sales contracts. Routing and design work should be sufficiently complete to allow final certification in late 1978 or early 1979. The final design and location of the facilities, however, will be within the general description set forth.

The gas transportation system will utilize a 48-inch diameter pipeline from Prudhoe Bay to James River, Alberta.

From James River, gas destined for the midwestern and eastern states will be transported through a 42-inch diameter pipeline to Monchy, Saskatchewan, and gas destined for the western states will be transported through a 36-inch pipeline to Kingsgate, British Columbia. PGT and PG&E will complete looping[2/] as necessary of their existing pipeline systems from the Idaho-British Columbia border to Antioch, California (near San Francisco) with a 36-inch diameter pipeline.

All of the pipeline in Alaska and the first forty-one miles of pipeline in the Yukon lie in the continuous and discontinuous permafrost region.[3/] This section will be operated in a chilled state (i.e., below 32°F.) to prevent degradation of the permafrost regime. Gas chilling

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2/ "Looping" is construction of a pipeline parallel to and interconnected with an existing pipeline. Looping may extend to part or all of an existing line.

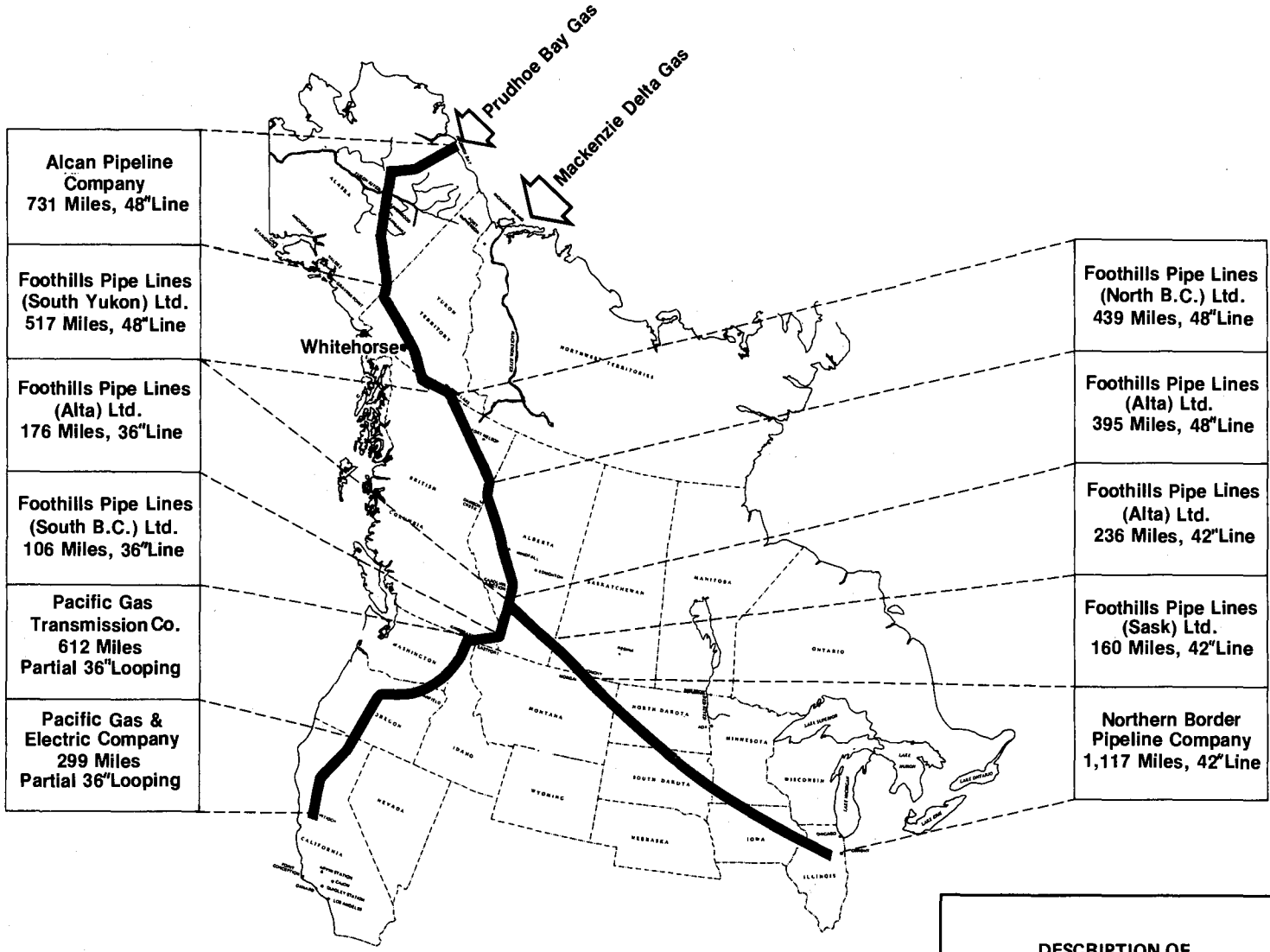
3/ By definition, permafrost consists of soil, rock, or other earth material, the temperature of which remains at or below 32°F. (0°C) continuously for two or more years. Its distribution is not uniform. Factors controlling the distribution of permafrost include the glacial and climatic history of the area, thermal properties of the earth material, ambient temperature, insulation properties of overburden, and amount of exposure to sun (e.g., shading caused by orientation of topographic features). The permafrost would be continuous along approximately the first 240 miles of the pipeline (to near the South Fork of the Koyohuk River). Along the remaining pipeline route to the Yukon border, the permafrost would be discontinuous.

will be accomplished by propane refrigeration systems at all compressor stations in Alaska.

The length of the various pipeline segments will be as follows:

Company	Location	Length (Miles)
Alcan Pipeline Company	Alaska	731
Foothills Pipe Lines (South Yukon) Ltd.	Yukon	517
Foothills Pipe Lines (Sask.) Ltd.	Saskatchewan	160
Foothills Pipe Lines (North B.C.) Ltd.	Yukon/B.C. Border to B.C./Alberta Border	439
Foothills Pipe Lines (South B.C.) Ltd.	Coleman to Kingsgate	106
Foothills Pipe Lines (Alta.) Ltd.	B.C./Alberta to James River	395
	James River to Colemen	176
	James River to Empress	235
Total Alaska and Canada		2,759
Pacific Gas Transmission Co.	Kingsgate to Malin	612
Pacific Gas & Electric Co.	Malin to Antioch	299
Northern Border Pipeline Co.	Monchy to Dwight	1,117
Total Contiguous States		2,028
Total System Length		4,787

Exhibit 3 on the next page identifies and locates the various pipeline segments.



DESCRIPTION OF

ALCAN PIPELINE PROJECT

Peak-day capacity utilizing nine compressor stations (see item 4 below) will be 2.6 bcfd, with an average daily volume of 2.4 bcfd. By installation of intermediate compressor stations, the system could be increased to 3.4 bcfd peak capacity, with an average day capacity of 3.2 bcfd. The system capacity could be further increased by addition to the compressor horsepower at each station.

Alcan Compressor Stations and Refrigeration Facilities in Alaska

Centrifugal compressors, powered by natural gas-fueled turbine engines, will be used on the Alcan system. In order to minimize thawing of the permafrost soil, the discharge gas at each compressor station in Alaska will be chilled by a propane refrigeration plant. The following describes the required compression and refrigeration facilities. All of these facilities are required for construction and initial operation.

Station	Milepost	Number of Gas Compressors	Total Installed Horsepower(ISO) Gas Compression	Gas Refrigeration
AL-1	75.0	1	26,500	7,660
AL-2	133.0	1	26,500	7,660
AL-3	242.3	1	26,500	13,830
AL-4	331.8	1	26,500	13,830
AL-5	418.8	1	26,500	13,830
AL-6	504.7	1	26,500	13,830
AL-7	589.9	1	26,500	13,830
AL-8	673.4	1	26,500	13,830
	TOTAL	8	212,000	98,300

Other Alcan Pipeline Facilities in Alaska

Metering facilities for the measurement of gas flow and gas quality will be required in Alaska at the Prudhoe Bay receipt point, at the Fairbanks sales point, and at the transfer point on the Alaska-Yukon border.

A central operating center, located in Fairbanks, will monitor and control all compressor station operations.[4/]

Alcan will utilize staging areas established for the Alyeska oil pipeline at Prudhoe Bay, Fairbanks, and Valdez. Material storage sites will be located at Anchorage, Seward, and Whittier, and at selected locations along the pipeline route.

Existing transportation and communication facilities will be utilized to the fullest extent practicable. Short lateral roads will be constructed to pipeline facilities as required.

Permanent bases for operating and maintaining the system will be selected and located after defining areas in which common problems may occur due to similarities of terrain and

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4/ The compressor stations will be automated for remote control of all normal functions, including discharge gas temperature.

climate. The bases will be located at or near compressor stations to avoid duplication of permanent above-ground facilities. Materials and various spare parts will be located at the bases to facilitate maintenance and repair operations.

All of these facilities will be required for construction and initial operation.

Lower 48 Facilities

For purposes of this part of the Decision, the facilities described generally below are deemed necessary for construction and initial operation, and will be entitled to expedited issuance of authorizations pursuant to Section 9 of ANGTA, provided that the final certification of such facilities shall be determined by reference to the size necessary to provide the transportation capacity certified to the FPC[5/] by the Secretary of Energy, as set forth in the terms and conditions section.

[5/] The final certification function currently resides with the Federal Power Commission under the Natural Gas Act. On October 1, 1977, the Department of Energy will be activated pursuant to the Department of Energy Organization Act, Public Law 95-91, and the functions of the FPC under the Natural Gas Act will be transferred in part to the Federal Energy Regulatory Commission (FERC). Therefore, where reference is made herein to future actions of the FPC, they will be carried out by either the Secretary or the FERC, as the case may be, as of October 1, 1977.

In order to deliver gas contemporaneously to points both east and west of the Rocky Mountains in the lower continental United States, the Alcan system will bifurcate at James River, Alberta and form a Western Leg and an Eastern Leg. First, the Western Leg is described below, and then the Eastern Leg.

Western Leg

Alaskan gas will be transferred at the Canada/United States border near Kingsgate, British Columbia, to Pacific Gas Transmission Company (PGT). PGT will transport the gas through Idaho, Washington, and Oregon. At the Oregon/California border, the gas will enter the intrastate facilities of Pacific Gas and Electric Company (PG&E). The gas will be transported throughout much of California through existing and expanded intrastate gas pipelines.

The additional Western Leg facilities which are part of the Alcan project are those covered by the "1580 Design." The major component of this expansion will add approximately 873 miles of looping and result in complete looping of the 917-mile PGT/PG&E system from the Canada/United States border to Antioch, California (near San Francisco). The two parallel lines will be operated as a single system. Various modifications to the existing compression facilities will be required. However, the increase in system

capacity of 659 mmcfd could be achieved without installation of additional compression horsepower or increase of compression fuel usage. A minor addition of facilities south of Antioch may be made at a later date, depending on conditions prevailing at that time. All Western Leg facilities which are part of the Alcan project are subject to Section 9 of ANGTA.

The Eastern Leg

The Alcan system will transport Alaskan gas for delivery to Midwestern and Eastern markets in the lower continental United States through an Eastern Leg. The Eastern Leg will commence at the bifurcation point of the main express line at James River, Alberta and terminate at Dwight, Illinois (near Chicago). Total length of the Eastern Leg will be 1,352 miles, including 235 miles in Canada and 1,117 miles in the United States. All pipeline for the Eastern Leg will be 42 inches in diameter.

Alaskan gas will be transferred at the Saskatchewan/Montana border from the Canadian-owned portion of the Alcan system to the Northern Border Pipeline system (Northern Border). The Northern Border system will travel diagonally across Montana, North Dakota, South Dakota, Minnesota, and Iowa, and terminate near Chicago, Illinois. Along this

route, direct deliveries of gas will be made by Northern Border into the systems which cross the pipeline: Natural Gas Pipeline Company of America, Northern Natural Gas Company, and Michigan-Wisconsin Pipeline Company. Other purchasers will receive Alaska gas by displacement.[6/]

The specific facilities that will be required to interconnect the various pipelines to receive gas from the Northern Border system, either by direct delivery or by displacement, will be determined when gas sales contracts have been executed. Final design of the required facilities will depend upon the division of Alaskan gas among the various pipeline companies and various regions of the contiguous States. Final design will be complete at the time of final system certification in late 1978 or early 1979. All facilities which are part of the Northern Border system are necessary for construction and initial operation, and all facilities which are part of the Northern Border system as finally certified by the FPC are subject to Section 9 of ANGTA.

6/ "Displacement" of gas is a method by which gas may be supplied to a purchaser from close by in exchange for gas sold to the purchaser elewhere. Displacement, which is a commonly used method in the gas industry, eliminates the cost of physically transferring gas between markets.

SECTION 4 - DELINEATION OF PROVISIONS OF LAW THAT ARE SUBSUMED IN THIS DECISION AND REQUIRE WAIVER

Under Section 7(a)(4)(D) of ANGTA, the President shall

> identify those provisions of law, relating to any determination of a Federal officer or agency as to whether a certificate, permit, right-of-way, lease, or other authorization shall be issued or be granted, which provisions the President finds (i) involve determinations which are subsumed in his decision and (ii) require waiver pursuant to section 8(g) in order to permit the expeditious construction and initial operation of the transportation system.

At this time, however, there are only two statutory provisions that involve determinations subsumed in this decision and require waiver pursuant to section 8(g) of ANGTA.7/

Under Section 3 of the Natural Gas Act (15 U.S.C. 717b), the Federal Power Commission must issue an order to authorize any export of natural gas; such an order shall

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7/ Section 8(g)(1) of ANGTA states that the President will have the opportunity at a later date to identify and seek waiver of additional provisions of law. This subsection states:

> At any time after a decision designating a transportation system is submitted to the Congress pursuant to this section, if the President finds that any provision of law applicable to actions to be taken under subsection (a) or (c) of section 9 require waiver in order to permit expeditious construction and initial operation of the approved transportation system, the President may submit such proposed waiver to both Houses of Congress.

issue unless the Commission finds that the export is not consistent with the public interest.

In addition, under Section 103 of the Energy Policy and Conservation Act, the President is required to promulgate a general rule prohibiting exports of natural gas from the U.S., except that he may permit those exports which he determines to be consistent with the national interest and with the purposes of the Act (Section 103(b)(1)). To make such a determination, Section 103(d)(1) directs the President to take into account the need to leave uninterrupted or unimpaired "exchanges in similar quantity for convenience or increased efficiency of transportation with persons or the government of a foreign state."

As a result of the recent Agreement on Principles between the United States and Canada, Alcan will be required to make available limited quantities of Alaskan gas to communities in the Yukon Territory and the western provinces, subject to provision of replacement gas downstream in Canada. This transaction will be an export requiring separate authorizations under the above mentioned two statutes.

The requirements arising under Section 3 of the Natural Gas Act and under Section 103 of the Energy Policy and Conservation Act could be met without waiver of these provisions, but additional, and unnecessary, FPC and Presidential action would be required. Accordingly, both of these statutory subsections shall be waived for the exchange of gas mentioned herein.

SECTION 5 - TERMS AND CONDITIONS AND ENFORCEMENT

To ensure the proper management and timely completion of the construction of the designated transportation system, the following general terms and conditions shall be appropriately incorporated into any certificate, right-of-way, lease, permit or authorization directed to be made by any Federal officer or agency.

As described more fully below, these terms and conditions will be followed by a set of stipulations establishing general standards of environmental and construction performance, and the procedures for the submission and approval of construction plans and environmental safeguards, and then by site specific terms and conditions issued prior to actual construction of any pipeline segment. The terms and conditions described here are not meant to limit or foreclose the adoption of such stipulations and terms and conditions but are intended to begin the process by which a set of effective and workable safeguards are evolved. There is contemplated cooperative action by the Federal and Alaska State Governments in the development and enforcement of stipulations and site specific terms and conditions. Similar cooperative action is contemplated with the governments of all affected states.

Under the proposal made at the end of this section for the organizational involvement of the Federal Government with the successful applicant, the Federal Inspector for construction of the transportation system shall have supervision authority over the enforcement of these terms and conditions subject to the ultimate authority of the Executive Policy Board described below.

Terms and Conditions

The terms and conditions proposed for inclusion into this Congressional authorization are set forth, by category, as follows:

I. Construction Costs and Schedule Management and Organization

1. Prior to the issuance of the certificate, the successful applicant shall provide a detailed overall management plan, to be approved by the Federal Inspector, for the preconstruction and the construction phases of the transportation system project. The successful applicant shall define its relationship with the execution contractors, and shall give consideration to various management approaches -- such as Fast Track, Stage Design, and other management

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approaches -- that will facilitate the cost-effective, environmentally sound, and timely construction of the project.

2. The successful applicant may not use cost-plus type contracts with execution contractors, except where the Federal Inspector determines that special conditions warrant this type of contract. Otherwise, the applicant shall use fixed-price contracts, including the firm fixed-price, the fixed-price with escalation, and fixed-price incentive type of contract.

3. The successful applicant shall specify for approval of the Federal Inspector the insurance, bonding, and any other prequalification requirements for all consultants and execution contractors.

Construction Cost and Schedule Control Techniques

4. Prior to the initiation of construction, the successful applicant shall provide a detailed analysis and description of its proposed cost and schedule control techniques. The applicant shall give particular consideration to cost and manpower control and manpower estimating techniques.

5. Prior to the initiation of construction, the successful applicant shall develop and submit to the Federal Inspector a final design, design-cost estimate, and construction schedule. This design cost estimate and schedule must represent a construction design of at least 70 percent (or greater) of the total system, and the remainder may not represent any one contiguous or specific type of construction or geologic situation (e.g., river crossings, discontinuous permafrost, or elevated pipeline). The Federal Inspector may relax the above specified minimum percentage requirement, with the consent of the Executive Policy Board, if he finds there are extenuating circumstances that warrant such an action.

General Operating Strategies

6. The successful applicant shall develop and submit to the Federal Inspector cost-effective and feasible methods for supplying general and specialized equipment, as well as repair facilities and spare-part inventories, to the execution contractors. The applicant

shall give consideration to various techniques of equipment provision, including use of equipment pools, equipment leasing or buy-backs.

7. Prior to the initiation of construction, the successful applicant shall supply detailed information to the Federal Inspector on its labor relations procedures, and indicate the proposed means to address and resolve disputes arising under collective bargaining agreements.

8. In entering into contracts with execution contractors, the successful applicant shall seek to incorporate techniques for resolving disputes arising under such contracts without recourse to litigation.

Quality Assurance and Control Procedures

9. The successful applicant shall provide to the Federal Inspector a detailed description of quality assurance and control procedures that will be implemented prior to the start of construction. Such a description must at least include provisions for quality assurance and control procedures for environmental protection, corrosion, pipeline and compressor-station

welds, pipeline placement, equipment and other appropriate matters.

Procedures for Enforcement of Terms and Conditions

10. The successful applicant may not initiate activity on any aspect of the pipeline until authorization to proceed with construction, including site-specific terms and conditions for that aspect of the pipeline, has been issued and procedures for enforcement of terms and conditions have been established by the appropriate Federal officers.

Minority Business Enterprise Participation

11. The successful applicant shall develop and submit to the Federal Inspector for approval a plan for taking affirmative action to ensure that no person shall on the grounds of race, creed, color, national origin or sex be excluded from receiving or participating in contracts for management, engineering design or construction activity. The successful applicant shall require each of his contractors and subcontractors having contracts valued at $150,000 or more to develop similar plans providing the assurances specified in the preceding sentence.

II. Safety and Design

1. The successful applicant shall construct, operate, maintain and terminate the pipeline in accordance with Federal gas pipeline safety regulations. The applicant shall ensure that construction and operating specifications are in accordance with good engineering practice, both to maintain the safety and the integrity of the pipeline and to protect the health and safety of project personnel and the general public.

2. The successful applicant may not begin construction of any pipeline segment until the Federal Inspector has approved the design of that segment, including technical construction specifications, having had sufficient time to review the design.

3. The successful applicant shall establish a procedure for briefing the Federal Inspector, or his designated representative, on a regular basis concerning the status of the project during the design, construction, testing and start-up phases.

4. The successful applicant shall establish a procedure to ensure access to all project facilities by the Federal Inspector, or his designated representative, in the performance of official duties.

5. The successful applicant shall submit a plan or procedure for conducting its own inspections of project facilities during construction, to be approved by the Federal Inspector.

6. The successful applicant shall provide a seismic monitoring system, to be approved by the Federal Inspector, and shall ensure that there are adequate procedures for the safe shut-down of the project under severe seismic conditions.

III. Environment

1. The successful applicant shall construct, operate, maintain and terminate the pipeline with maximum concern for the protection of environmental values. A set of stipulations containing the general standards of environmental and construction performance, and the procedures for the

submission and approval of construction plans and environmental safeguards will be developed by the concerned government agencies and must be accepted by the applicant as a condition of his right to proceed over public lands. Additional "site-specific" terms and conditions will be incorporated in authorizations to proceed with construction issued by the appropriate Federal agency, into particular certificates, rights-of-way, permits and other authorizations to protect and enhance environmental values during the design, construction and operation of the pipeline. These additional "site specific" terms and conditions will be issued as appropriate to minimize disturbance from construction and operation of the pipeline to rivers and other water bodies and adjacent land and vegetation; to protect wildlife and endangered species and maintain forest, agricultural and other resource productivity; to control the risks of pipeline ruptures, leaks and hazards; to maintain air and water quality values; to make provision for control and disposal of sewage, garbage, wastes

and toxic substances; and take other measures necessary for protection of the environment during the design, construction and operation of the pipeline.

2. The successful applicant shall prepare a plan of operations which integrates environmental protection with the proposed schedule of construction and operations, the proposed supervisory and technical staffing, the proposed quality control programs, and the proposed quality assurance programs. In preparation and implementation of this plan, the successful applicant shall provide for timely integration of environmental mitigation and restoration practices with the activity which creates the need for the restoration or mitigation.

3. The successful applicant shall develop and submit to the Federal Inspector an effective plan for implementation of specific environmental safeguards through an educational program for field personnel prior to and during construction, operation, maintenance and termination of the pipeline.

4. The successful applicant shall establish an effective pipeline-performance monitoring system of inspection and instrumentation to insure performance in keeping with environmental concerns.

IV. Finance

1. The successful applicant shall provide for private financing of the project, and shall make the final arrangement for all debt and equity financing prior to the initiation of construction.

2. If the direct capital cost estimates excluding interest during construction for the overall project in 1975 constant dollars filed with the FPC immediately prior to certification, adjusted to reflect design changes to increase capacity that result from the Agreement on Principle between the United States and Canada, materially and unreasonably exceed the comparable capital cost estimates filed by Alcan with the Federal Power Commission on March 8, 1977, Section 6, page 2, the FPC may not issue a certificate for the project. If these final capital cost estimates are not excessive under the above standard, the FPC may use these final estimates for the U.S.

segments as the basis for fixing a variable rate of return on equity that will reward the applicant for project completion under budgeted cost and penalize the applicant for project completion above budgeted cost. The variable return shall be set to provide substantial incentives to construct the project without incurring overruns. These final capital cost estimates need not be the design-cost estimates based on the system design which must subsequently be submitted to the Federal Inspector. The applicant shall, however, submit to the FPC for approval on a timely basis all components of construction work in progress.

3. Neither the successful applicant nor any purchaser of Alaska gas for transportation through the system of the successful applicant shall be allowed to make use of any tariff by which or any other agreement by which the purchaser or ultimate consumer of Prudhoe Bay natural gas is compelled to pay a fee, surcharge, or other payment in relation to the Alaska

natural gas transportation system at any time prior to completion and commissioning of operation of the system.

4. The Alcan Pipeline Company, or its successor, and the Northern Border Pipeline, or its successor, shall be publicly held corporations or general or limited partnerships, open to ownership participation by all persons without discrimination, except producers of Alaskan natural gas.

V. Antitrust

1. The successful applicant shall exclude and prohibit producers of significant amounts of Alaska gas, or their subsidiaries and affiliates, from participating in the ownership of the Alaska natural gas transportation system, except that such producers may provide guarantees for project debt. The aforesaid producers of Alaska gas may not be equity members of the sponsoring consortium, have any voting power in the project, have any role in the management or operations of the project, have any continuing financial obligation in relation to debt guarantees associated

with initial project financing after the project is completed and the tariff is put into effect, or impose conditions on the guarantees of project debt permitted above which may give rise to competitive abuse, including power to veto pro-competitive policies.

2. All agreements for the sale of Alaska gas made between the aforesaid producers and purchasers who are shippers through the Alaska natural gas transportation system shall be fully disclosed to the Federal Power Commission, and all collateral agreements made between the same parties with respect to the sale of Alaska gas shall also be fully disclosed. All contracts for sale of Alaska gas, for all collateral agreements to these contracts, shall be submitted for approval by the Federal Power Commission.

VI. Certification of Facilities

1. Prior to the issuance of a certificate of public convenience and necessity to Northern Border Pipeline or to Pacific Gas Transmission Company, the Secretary of Energy shall certify to the Federal Power Commission whether there

has been any material change in the facts regarding future potential gas supplies for the East or West since the date of this Decision that would warrant certification of such facilities at a different rated capacity than authorized herein. If the Secretary certifies that there has been a material change in the facts, he shall instead certify to the Commission the capacity at which he has determined a certificate of public convenience and necessity should be issued and the reasons therefor, which capacity shall be determined in a manner that is as consistent as possible with the reasons for the initial authorization, as set forth in the Report submitted to the Congress pursuant to Section 7(b) of the Alaska Natural Gas Transportation Act, Public Law 94-586. The certificate issued by the FPC shall be consistent with the Secretary's determination.

Enforcement

To enforce the terms and conditions proposed above, and to carry out the duties of the office assigned and set forth by section 7(a)(5)(A)-(E) of ANGTA, an appropriate and qualified individual shall be appointed by the President

to serve as the Federal Inspector, with the advice and consent of the Senate. Upon approval of the Presidential designation of an Alaska natural gas transportation system, the Federal Inspector shall:

(A) establish a joint surveillance and monitoring agreement, approved by the President, with the State of Alaska similar to that in effect during construction of the trans-Alaska oil pipeline to monitor the construction of the approved transportation system within the State of Alaska;

(B) monitor compliance with applicable laws and the terms and conditions of any applicable certificate, rights-of-way, permit, lease, or other authorization issued or granted;

(C) monitor actions taken to assure timely completion of construction schedules and the achievement of quality of construction, cost control, safety, and environmental protection objectives and the results obtained therefrom;

(D) have the power to compel, by subpoena if necessary, submission of such information as he deems necessary to carry out his responsibilities; and

(E) keep the President and the Congress currently informed on any significant departures from compliance and issue quarterly reports to the President and the Congress concerning existing or potential failures to meet construction schedules or other factors which may delay the construction and initial operation of the system and the extent to which quality of construction, cost control, safety and environmental protection objectives have been achieved.

In addition to these duties and responsibilities, the President will submit to Congress, upon approval of the Presidential decision, a limited executive reorganization plan to transfer to the Federal Inspector field-level

supervisory authority over enforcement of terms and conditions from those Federal agencies having statutory responsibilities over various aspects of an Alaska natural gas transportation system. The respective Federal agencies would retain their existing statutory authority pursuant to section 9(a) of ANGTA, to issue on an expedited basis the necessary certificates, permits, rights-of-way and other authorizations, and to prescribe any appropriate terms and conditions that are permissible under present law. The Agency Authorized Officers would directly represent the statutory authority of the respective Federal agencies in the field on all matters pertaining to construction of the pipeline. However, the Federal Inspector would have the necessary field-level supervisory authority to overrule the enforcement action of an Agency Authorized Officer, whenever the Federal Inspector determined that such a decision was warranted.

The President's supervision of the Federal Inspector will be carried out by an Executive Policy Board. The Board would be made up of the Secretaries of the Interior, Energy, Transportation, the Administrator of the Environmental Protection Agency, and the Chief of the Army Corps of Engineers, or their Deputies (or senior officers who have

been delegated authority over gas pipeline matters), as well as the Federal Inspector, who is the non-voting Chairman of the Board. The Board will provide policy guidance to the Federal Inspector, and act as an appellate body to resolve differences among the agencies and the Federal Inspector, including differences that may arise when the Federal Inspector overrules an enforcement action of an Agency Authorized Officer. The Board shall expeditiously resolve any such appeal with a limited period of time that shall be prescribed. The President will authorize by Executive Order the creation of the Executive Policy Board pursuant to his power under Section 301 of Title 3, and will delegate the necessary authority to the Board to carry out its functions. The Board shall be paramount for policy-making purposes on all matters pertaining to construction of an Alaskan natural gas transportation system; the Federal Inspector shall shall be the agent or conduit of the Board in such matters, and shall also have the necessary supervisory power over field level decisions.

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SECTION 6 - PRICING OF ALASKA GAS

Final financing for an Alaska natural gas transportation project cannot be arranged until the producer-owners of the Prudhoe Bay gas execute sales contracts. Without such contracts, no gas can be transported, and financing consequently would be unobtainable. Producers cannot be expected to negotiate sales contracts until a price has been established with a reasonable degree of certainty. If this project is to proceed expeditiously, the field price of the gas should be established as soon as possible.

Because no contracts for gas sales in interstate commerce have been concluded and submitted to the FPC for approval, the FPC has not, to date, attempted to determine the costs of providing the gas in order to establish what might be a just and reasonable (cost-based) wellhead price. The FPC, in fact, has excluded the Alaska gas from its national rate proceedings; Alaska costs and related reserve data have been excluded from all statistics underlying FPC rate determinations.

Alaska gas is produced in association with oil; therefore, it is impossible to determine precisely the costs of finding, developing and producing only the gas. Cost allocation and, therefore, cost-based pricing is

somewhat arbitrary. Because of the difficult and arbitrary nature of the allocation problem, the FPC in recent years has priced gas on the basis of the cost of only non-associated gas in each producing area, and then allowed the same price to be paid for associated gas produced in that area as well. Were the FPC to initiate a price proceeding under the Natural Gas Act, it is expected that its procedures and subsequent litigation over cost allocation and other matters would likely exceed a period of 18 months.

The Administration's proposed National Energy Act is before the Congress. That Act provides a basis for moving from cost-based pricing to commodity-value pricing. That transition is essential to restoring the balance between natural gas supply and demand. Under the gas pricing provisions in the National Energy Plan, Alaska gas would be classified as "old gas under a new contract" subject to a $1.45 per mcf ceiling price.

If, on the other hand, proposals to deregulate natural gas prevail, serious uncertainties and delays concerning the development of any Alaskan natural gas transportation

project could result. If producers are inclined to insist on prices of $2.00 per mcf or higher, questions concerning the saleability of the gas and the financeability of the project will arise. Such price levels could result in an additional $20 billion in consumer charges, as well as the added costs of any delays in project construction.

This decision, therefore, calls for enactment of a gas pricing approach similar to that contained in the National Energy Plan. That approach also provides a mechanism for allocating the cost of more expensive supplies to lower-priority users, rather than the residential and commercial users who have less capacity to convert to other fuels. The gas pricing policies which are part of the National Energy Plan are fair and equitable, and should apply to both the production and sale of Alaska gas.

SECTION 7 - AGREEMENT BETWEEN THE UNITED STATES OF AMERICA AND CANADA ON PRINCIPLES APPLICABLE TO A NORTHERN NATURAL GAS PIPELINE

The Government of the United States of America and the Government of Canada,

Desiring to advance the national economic and energy interests and to maximize related industrial benefits of each country, through the construction and operation of a pipeline system to provide for the transportation of natural gas from Alaska and from Northern Canada,

Hereby agree to the following principles for the construction and operation of such a system:

1. Pipeline Route

The construction and operation of a pipeline for the transmission of Alaska natural gas will be along the route set forth in Annex I, such pipeline being hereinafter referred to as "the Pipeline". All necessary action will be taken to authorize the construction and operation of the Pipeline in accordance with the principles set out in this Agreement.

2. Expeditious Construction; Timetable

a) Both Governments will take measures to ensure the prompt issuance of all necessary permits, licenses, certificates, rights-of-way, leases and other authorizations

required for the expeditious construction and commencement of operation of the Pipeline, with a view to commencing construction according to the following timetable:

- Alaska - January 1, 1980
- Yukon - main line pipe laying January 1, 1981
- Other construction in Canada to provide for timely completion of the Pipeline to enable initial operation by January 1, 1983.

b) All charges for such permits, licenses, certificates, rights-of-way, leases and other authorizations will be just and reasonable and apply to the Pipeline in the same non-discriminatory manner as to any other similar pipeline.

c) Both Governments will take measures necessary to facilitate the expeditious and efficient construction of the Pipeline, consistent with the respective regulatory requirements of each country.

3. Capacity of Pipeline and Availability of Gas

a) The initial capacity of the Pipeline will be sufficient to meet, when required, the contractual requirements of United States shippers and of Canadian shippers. It is contemplated that this capacity will be 2.4 billion cubic feet per day (bcfd) for Alaska gas and 1.2 bcfd for northern Canadian gas. At such time as a lateral pipeline

transmitting Northern Canadian gas, hereinafter referred to as "the Dempster Line", is to be connected to the Pipeline or at any time additional pipeline capacity is needed to meet the contractual requirements of United States or Canadian shippers, the required authorizations will be provided, subject to regulatory requirements, to expand the capacity of the Pipeline in an efficient manner to meet those contractual requirements.

b) The shippers on the Pipeline will, upon demonstration that an amount of Canadian gas equal on a British Thermal Unit (BTU) replacement value basis will be made available for contemporaneous export to the United States, make available from Alaska gas transmitted through the Pipeline, gas to meet the needs of remote users in the Yukon and in the provinces through which the Pipeline passes. Such replacement gas will be treated as hydrocarbons in transit for purposes of the Agreement between the Government of Canada and the Government of the United States of America concerning Transit Pipelines, hereinafter referred to as "the Transit Pipeline Treaty". The shippers on the Pipeline will not incur any cost for provision of such Alaska gas except those capital costs arising from the following provisions:

i) the owner of the Pipeline in the Yukon will make arrangements to provide gas to the communities of Beaver Creek, Burwash Landing, Destruction Bay, Haines Junction, Whitehorse, Teslin, Upper Liard and Watson Lake at a total cost to the owner of the Pipeline not to exceed Canadian $2.5 million;

ii) the owner of the Pipeline in the Yukon will make arrangements to provide gas to such other remote communities in the Yukon as may request such gas within a period of two years following commencement of operation of the Pipeline at a cost to the owner not to exceed the product of Canadian $2500 and the number of customers in the communities, to a maximum total cost of Canadian $2.5 million.

4. Financing

a) It is understood that the construction of the Pipeline will be privately financed. Both Governments recognize that the companies owning the Pipeline in each country will have to demonstrate to the satisfaction of the United States or the Canadian Government, as applicable, that protections against risks of non-completion and interruption are on a basis acceptable to that Government before proof of financing is established and construction allowed to begin.

b) The two Governments recognize the importance of constructing the Pipeline in a timely way and under effective cost controls. Therefore, the return on the equity investment in the Pipeline will be based on a variable rate of return for each company owning a segment of the pipeline, designed to provide incentives to avoid cost overruns and to minimize costs consistent with sound pipeline management. The base for the incentive program used for establishing the appropriate rate of return will be the capital costs used in measuring cost overruns as set forth in Annex III.

c) It is understood that debt instruments issued in connection with the financing of the Pipeline in Canada will not contain any provision, apart from normal trust indenture restrictions generally applicable in the pipeline industry, which would prohibit, limit or inhibit the financing of the construction of the Dempster Line; nor will the variable rate of return provisions referred to in subparagraph (b) be continued to the detriment of financing the Dempster Line.

5. Taxation and Provincial Undertakings

a) Both Governments reiterate their commitments as set forth in the Transit Pipeline Treaty with respect to

non-discriminatory taxation, and take note of the statements issued by Governments of the Provinces of British Columbia, Alberta and Saskatchewan, attached hereto as Annex V, in which those Governments undertake to ensure adherence to the provisions of the Transit Pipeline Treaty with respect to non-interference with throughput and to non-discriminatory treatment with respect to taxes, fees or other monetary charges on either the Pipeline or throughput.

b) With respect to the Yukon Property Tax imposed on or for the use of the Pipeline the following principles apply:

i) The maximum level of the property tax, and other direct taxes having an incidence exclusively, or virtually exclusively, on the Pipeline, including taxes on gas used as compressor fuel, imposed by the Government of the Yukon Territory or any public authority therein on or for the use of the Pipeline, herein referred to as "the Yukon Property Tax", will not exceed $30 million Canadian per year adjusted annually from 1983 by the Canadian Gross National Product price deflator as determined by Statistics Canada, hereinafter referred to as the GNP price deflator.

ii) For the period beginning January 1, 1980, and ending on December 31 of the year in which leave to open the Pipeline is granted by the appropriate regulatory authority, the Yukon Property Tax will not exceed the following:

1980--$5 million Canadian

1981--$10 million Canadian

1982--$20 million Canadian

Any subsequent year to which this provision applies--$25 million Canadian.

iii) The Yukon Property Tax formula described in subparagraph (b)(i) will apply from January 1 after the year in which leave to open the Pipeline is granted by the appropriate regulatory authority until the date that is the earlier of the following, hereinafter called the tax termination date:

A) December 31, 2008, or

B) December 31 of the year in which leave to open the Dempster Line is granted by the appropriate regulatory authority.

iv) Subject to subparagraph (b) (iii), if for the year ending on December 31, 1987, the percentage increase of the aggregate per capita revenue derived from all

property tax levied by any public authority in the Yukon Territory (excluding the Yukon Property Tax) and grants to municipalities and Local Improvement Districts from the Government of the Yukon Territory as compared to aggregate per capita revenue derived from such sources for 1983 is greater than the percentage increase for 1987 of the Yukon Property Tax as compared to the Yukon Property Tax for 1983, the maximum level of the Yukon Property Tax for 1987 may be increased to equal the amount it would have reached had it increased over the period at the same rate as the aggregate per capita revenue.

v) If for any year in the period commencing January 1, 1988, and ending on the tax termination date, the annual percentage increase of the aggregate per capita revenue derived from all property tax levied by any public authority in the Yukon Territory (excluding the Yukon Property Tax) and grants to municipalities and Local Improvement Districts from the Government of the Yukon Territory as compared to the aggregate per capita revenue derived from such sources for the immediately preceding year exceeds the percentage increase for that year of the Yukon Property

Tax as compared to the Yukon Property Tax for the immediately preceding year, the maximum level of the Yukon Property Tax for that year may be adjusted by the percentage increase of the aggregate per capita revenue in place of the percentage increase that otherwise might apply.

vi) The provisions of subparagraph (b)(i) will apply to the value of the Pipeline for the capacities contemplated in this Agreement. The Yukon Property Tax will increase for the additional facilities beyond the aforesaid contemplated capacity in direct proportion to the increase in the gross asset value of the Pipeline.

vii) In the event that between the date of this Agreement and January 1, 1983, the rate of the Alaska property tax on pipelines, taking into account the mill rate and the method of valuation, increases by a percentage greater than the cumulative percentage increase in the Canadian GNP deflator over the same period, there may be an adjustment on January 1, 1983, to the amount of $30 million Canadian described in subparagraph (b) (i) of the Yukon Property Tax to reflect this difference. In defining the Alaska

property tax for purposes of this Agreement, the definition of the Yukon Property Tax will apply mutatis mutandis.

viii) In the event that, for any year during the period described in subparagraph (iii), the annual rate of the Alaska property tax on or for the use of the Pipeline in Alaska increases by a percentage over that imposed for the immediate preceding year that is greater than the increase in percentage of the Yukon Property Tax for the year, as adjusted, from that applied to the immediately preceding year, the Yukon Property Tax may be increased to reflect the percentage increase of the Alaska property tax.

ix) It is understood that indirect socioeconomic costs in the Yukon Territory will not be reflected in the cost-of-service to the United States shippers other than through the Yukon Property Tax. It is further understood that no public authority will require creation of a special fund or funds in connection with construction of the Pipeline in the Yukon, financed in a manner which is reflected in the cost of service to U.S. shippers, other than through the Yukon Property Tax. However, should public authorities

in the State of Alaska require creation of a special fund or funds, financed by contributions not fully reimbursable, in connection with construction of the Pipeline in Alaska, the Governments of Canada or the Yukon Territory will have the right to take similar action.

c) The Government of Canada will use its best endeavors to ensure that the level of any property tax imposed by the Government of the Northwest Territories on or for the use of that part of the Dempster Line that is within the Northwest Territories is reasonably comparable to the level of the property tax imposed by the Government of the Yukon Territory on or for the use of that part of the Dempster Line that is in the Yukon.

6. Tariffs and Cost Allocation

It is agreed that the following principles will apply for purposes of cost allocation used in determining the cost of service applicable to each shipper on the Pipeline in Canada:

a) The Pipeline in Canada and the Dempster Line will be divided into zones as set forth in Annex II. Except for fuel and except for Zone 11 (the Dawson-Whitehorse portion of the Dempster Line), the cost of service to each

shipper in each zone will be determined on the basis of volumes as set forth in transportation contracts. The volumes used to assign these costs will reflect the original BTU content of Alaskan gas for U.S. shippers and Northern Canadian gas for Canadian shippers, and will make allowance for the change in heat content as the result of commingling. Each shipper will provide volumes for line losses and line pack in proportion to the contracted volumes transported in the zone. Each shipper will provide fuel requirements in relation to the volume of his gas being carried and to the content of the gas as it affects fuel consumption.

b) It is understood that, to avoid increased construction and operating costs for the transportation of Alaskan gas, the Pipeline will follow a southern route through the Yukon along the Alaska Highway rather than a northern route through Dawson City and along the Klondike Highway. In order to provide alternative benefits for the transportation of Canadian gas to replace those benefits that would have been provided by the northern route through Dawson City, U.S. shippers will participate in the cost of service in Zone 11. It is agreed that if cost overruns on construction of the Pipeline in Canada do not exceed filed costs set forth in Part D of Annex III by more than 35

percent, U.S. shippers will pay the full cost of service in Zone 11. U.S. shipper participation will decline if overruns on the Pipeline in Canada exceed 35 percent; however, at the minimum the U.S. shippers' share will be the greater of either two-thirds of the cost of service or the proportion of contracted Alaska gas in relation to all contracted gas carried in the Pipeline. The proportion of the cost of service borne by U.S. shippers in Zone 11 will be reduced should overruns on the cost of construction in that Zone exceed 35 percent after allowance for the benefits to U.S. shippers derived from Pipeline construction cost savings in other Zones. Notwithstanding the foregoing, at the minimum, the U.S. shippers' share will be the greater of either two-thirds of the cost of service or the proportion of contracted Alaska gas in relation to all contracted gas carried in the Pipeline. Details of this allocation of cost-of-service are set out in Annex III.

c) Notwithstanding the principles in subparagraphs (a) and (b), in the event that the total volume of gas offered for shipment exceeds the efficient capacity of the Pipeline, the method of cost allocation for the cost of service for shipments of Alaskan gas (minimum entitlement 2.4 bcfd) or Northern Canadian gas (minimum entitlement 1.2 bcfd) in

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excess of the efficient capacity of the Pipeline will be subject to review and subsequent agreement by both Governments; provided however that shippers of either countr may transport additional volumes without such review and agreement, but subject to appropriate regulatory approval, i such transportation does not lead to a higher cost of servic or share of Pipeline fuel requirements attributable to shippers of the other country.

d) It is agreed that Zone 11 costs of service allocated to U.S. shippers will not include costs additional to those attributable to a pipe size of 42 inches. It is understood that in Zones 10 and 11 the Dempster Line will be of the same gauge and diameter and similar in other respects, subject to differences in terrain. Zone 11 costs will include only facilities installed at the date of issuan of the leave to open order, or that are added within three years thereafter.

7. Supply of Goods and Services

a) Having regard to the objectives of this Agreement, each Government will endeavor to ensure that the supply of goods and services to the Pipeline project will be on generally competitive terms. Elements to be taken into account in weighing competitiveness will include price, reliability, servicing capacity and delivery schedules.

b) It is understood that through the coordination procedures in Paragraph 8 below, either Government may institute consultations with the other in particular cases where it may appear that the objectives of subparagraph (a) are not being met. Remedies to be considered would include the renegotiation of contracts or the reopening of bids.

8. Coordination and Consultation

Each Government will designate a senior official for the purpose of carrying on periodic consultations on the implementation of these principles relating to the construction and operation of the Pipeline. The designated senior officials may, in turn, designate additional representatives to carry out such consultations, which representatives, individually or as a group, may make recommendations with respect to particular disputes or other matters, and may take such other action as may be mutually agreed, for the purpose of facilitating the construction and operation of the Pipeline.

9. Regulatory Authorities: Consultation

The respective regulatory authorities of the two Governments will consult from time to time on relevant

matters arising under this Agreement, particularly on the matters referred to in paragraphs 4, 5 and 6, relating to tariffs for the transportation of gas through the Pipeline.

10. Technical Study Group on Pipe

a) The Governments will establish a technical study gro for the purpose of testing and evaluating 54-inch 1120 pounds per square inch (psi), 48-inch 1260 psi, and 48-inch 1680 psi pipe or any other combination of pressure and diameter which would achieve safety, reliability and economic efficiency for operation of the Pipeline. It is understood that the decision relating to pipeline specifications remains the responsibility of the appropriate regulatory authorities.

b) It is agreed that the efficient pipe for the volumes contemplated (including reasonable provision for expansion), subject to appropriate regulatory authorization, will be installed from the point of interconnection of the Pipeline with the Dempster Line near Whitehorse to the point near Caroline, Alberta, where the Pipeline bifurcates into a western and an eastern leg.

11. Direct Charges by Public Authorities

a) Consultation will take place at the request of either Government to consider direct charges by public

authorities imposed on the Pipeline where there is an element of doubt as to whether such charges should be included in the cost of service.

b) It is understood that the direct charges imposed by public authorities requiring approval by the appropriate regulatory authority for inclusion in the cost of service will be subject to all of the tests required by the appropriate legislation and will include only

i) those charges that are considered by the regulatory authority to be just and reasonable on the basis of accepted regulatory practice, and

ii) those charges of a nature that would normally be paid by a natural gas pipeline in Canada. Examples of such charges are listed in Annex IV.

12. Other Costs

It is understood that there will be no charges on the Pipeline having an effect on the cost of service other than those:

i) imposed by a public authority as contemplated in this Agreement or in accordance with the Transit Pipeline Treaty, or

ii) caused by Acts of God, other unforeseen circumstances, or

iii) normally paid by natural gas pipelines in Canada in accordance with accepted regulatory practice.

13. Compliance with Terms and Conditions

The principles applicable directly to the construction, operation and expansion of the Pipeline will be implemented through the imposition by the two Governments of appropriate terms and conditions in the granting of required authorizations. In the event of subsequent non-fulfillment of such a term or condition by an owner of the Pipeline, or by any other private person, the two Governments will not have responsibility therefor, but will take such appropriate action as is required to cause the owner to remedy or mitigate the consequences of such non-fulfillment.

14. Legislation

The two Governments recognize that legislation will be required to implement the provisions of this Agreement. In this regard, they will expeditiously seek all required legislative authority so as to facilitate the timely and efficient construction of the Pipeline and to remove any delays or impediments thereto.

15. Entry Into Force

This Agreement will become effective upon signature and shall remain in force for a period of 35 years and thereafter until terminated upon 12 months' notice given in writing by one Government to the other, provided that those provisions of the Agreement requiring legislative action will become effective upon exchange of notification that such legislative action has been completed.

IN WITNESS WHEREOF the undersigned representatives, duly authorized by their respective Governments, have signed this Agreement.

DONE in duplicate at Ottawa in the English and French languages, both versions being equally authentic, this _____ day of _____, 1977.

For the Government
of the United States:

_____

For the Government
of Canada:

_____

The Pipeline Route

In Alaska:

The Pipeline constructed in Alaska by Alcan will commence at the discharge side of the Prudhoe Bay Field gas plant facilities. It will parallel the Alyeska oil pipeline southward on the North Slope of Alaska, cross the Brooks Range through the Atigun Pass, and continue on to Delta Junction.

At Delta Junction, the Pipeline will diverge from the Alyeska oil pipeline and follow the Alaska Highway and Haines oil products pipeline passing near the towns of Tanacross, Tok, and Northway Junction in Alaska. The Alcan facilities will connect with the proposed new facilities of Foothills Pipe Lines (South Yukon) Ltd. at the Alaska-Yukon border.

In Canada:

In Canada the Pipeline will commence at the Boundary of the State of Alaska, and the Yukon Territory in the vicinity of the towns of Border City, Alaska and Boundary, Yukon. The following describes the general routing of the Pipeline in Canada:

From the Alaska-Yukon border, the Foothills Pipe Lines (South Yukon) Ltd. portion of the Pipeline will proceed in a southerly direction generally along the Alaska Highway to

a point near Whitehorse, Yukon, and thence to a point on the Yukon-British Columbia border near Watson Lake, Yukon, where it will join with the Foothills Pipe Lines (North B.C.) Ltd. portion of the Pipeline.

The Foothills Pipe Lines (North B.C.) Ltd. portion of the Pipeline will extend from Watson Lake in a southeasterly direction across the north eastern part of the Province of British Columbia to a point on the boundary between the Provinces of British Columbia and Alberta near Boundary Lake where it will interconnect with the Foothills Pipe Lines (Alta.) Ltd. portion of the Pipeline.

The Foothills Pipe Lines (Alta.) Ltd. portion of the Pipeline will extend from a point on the British Columbia-Alberta boundary near Boundary Lake in a southeasterly direct to Gold Creek and thence parallel to the existing right-of-wa of the Alberta Gas Trunk Line Company Limited to James River near Caroline.

From James River a "western leg" will proceed in a southerly direction, generally following the existing right-of-way of the Alberta Gas Trunk Line Company Limited to a point on the Alberta-British Columbia boundary near Coleman in the Crow's Nest Pass area. At or near Coleman the Foothil Pipe Lines (Alta.) Ltd. portion of the Pipeline will interconnect with the Foothills Pipe Lines (South B.C.) Ltd. portion of the Pipeline.

The Foothills Pipe Lines (South B.C.) Ltd. portion of the Pipeline will extend from a point on the Alberta-British Columbia boundary near Coleman in a southwesterly direction across British Columbia generally parallel to the existing pipeline facilities of Alberta Natural Gas Company Ltd. to a point on the International Boundary Line between Canada and the United States of America at or near Kingsgate in the Province of British Columbia where it will interconnect with the facilities of Pacific Gas Transmission Company.

Also, from James River, an "eastern leg" will proceed in a southeasterly direction to a point on the Alberta-Saskatchewan boundary near Empress Alberta where it will interconnect with the Foothills Pipe Lines (Sask.) Ltd. portion of the Pipeline. The Foothills Pipe Lines (Sask.) Ltd. portion of the Pipeline will extend in a southeasterly direction across Saskatchewan to a point on the International Boundary Line between Canada and the United States of America at or near Monchy, Saskatchewan where it will interconnect with the facilities of Northern Border Pipeline Company.

Zones for the Pipeline and the Dempster Line in Canada

Zone 1 Foothills Pipe Lines (South Yukon) Ltd.
Alaska Boundary to point of interconnection with the Dempster Line at or near Whitehorse.

Zone 2 Foothills Pipe Lines (South Yukon) Ltd.
Whitehorse to Watson Lake.

Zone 3 Foothills Pipe Lines (North B.C.) Ltd.
Watson Lake to point of interconnection with Westcoast's main pipeline near Fort Nelson.

Zone 4 Foothills Pipe Lines (North B.C.) Ltd.
Point of interconnection with Westcoast's main pipeline near Fort Nelson to the Alberta-B.C. border.

Zone 5 Foothills Pipe Lines (Alta.) Ltd.
Alberta-B.C. border to point of bifurcation near Caroline, Alberta.

Zone 6 Foothills Pipe Lines (Alta.) Ltd.
Caroline, Alta. to Alberta-Saskatchewan border near Empress.

Zone 7 Foothills Pipe Lines (Alta.) Ltd.

Caroline to Alberta-B.C. border near Coleman.

Zone 8 Foothills Pipe Lines (South B.C.) Ltd.

Alberta-B.C. border near Coleman to B.C.-U.S. border near Kingsgate.

Zone 9 Foothills Pipe Lines (Sask.) Ltd.

Alberta-Saskatchewan border near Empress to Saskatchewan-U.S. border near Monchy.

Zone 10 Foothills Pipe Lines (North Yukon) Ltd.

Mackenzie Delta Gas fields in the Mackenzie Delta, N.W.T., to a point near the junction of the Klondike and Dempster highways just west of Dawson, Yukon Territory.

Zone 11 Foothills Pipe Lines (South Yukon) Ltd.

A point near the junction of the Klondike and Dempster highways near Dawson to the connecting point with the Pipeline at or near Whitehorse.

Cost Allocation in Zone 11

The cost of service in Zone 11 shall be allocated to United States shippers on the following basis:

i) There will be calculated, in accordance with (iii) below, a percentage for Zones 1 - 9 in total by dividing the actual capital costs by the filed capital costs and multiplying by 100. If actual capital costs are equal to or less than 135% of filed capital costs, then United States shippers will pay 100% of the cost of service in Zone 11. If actual capital costs in Zones 1 - 9 are between 135% and 145% of filed capital costs, then the percentage paid by United States shippers will be adjusted between 100% and 66 2/3% on a straight-line basis, except that in no case will the portion of cost of service paid by United States shippers be less than the proportion of the contracted volumes of Alaskan ga at the Alaska-Yukon border to the same volume c Alaskan gas plus the contracted volume of Northern Canadian gas. If the actual capital

costs are equal to or exceed 145% of filed capital costs, the portion of the cost of service paid by United States shippers will be not less than 66 2/3% or the proportion as calculated above, whichever is the greater.

ii) There will be calculated a percentage for the cost-overrun on the Dawson to Whitehorse lateral (Zone 11). After determining the dollar value of the overrun, there will be deducted from it:

(a) the dollar amount by which actual capital costs in zones 1,7,8 and 9 (carrying U.S. gas only) are less than 135% of filed capital costs referred to in (iii) below;

(b) in each of Zones 2, 3, 4, 5 and 6 the dollar amount by which actual capital costs are less than 135% of filed capital costs referred to in (iii) below, multiplied by the proportion that the U.S. contracted volume bears to the total contracted volume in that zone.

If the actual capital costs in Zone 11, after making this adjustment, are equal to or less than 135% of filed capital costs, then no adjustment is required to the percentage of the cost of service paid by United States shippers as calculated in (i) above. If, however, after making this adjustment, the actual capital cost in Zone 11 is greater than 135% of the filed capital cost, then the proportion of the cost of service paid by United States shippers will be a fraction (not exceeding 1) of the percentage of the cost of service calculated in (i) above, where the numerator of the fraction is 135% of the filed capital cost and the denominator of the fraction is actual capital cost less the adjustments from (a) and (b) above. Notwithstanding the adjustments outlined above, in no case will the percentage of the actual cost of service borne by United States

shippers be less than the greater of 66 2/3% or the proportion of the contracted volumes of Alaskan gas at the Alaska-Yukon border to the same volume of Alaskan gas plus the contracted volume of Northern Canadian gas.

iii) The "filed capital cost" to be applied to determine cost overruns for the purpose of cost allocation in (i) and (ii) above will be:

The Pipeline in Canada (Zones 1 - 9)[1/]	"Filed Capital Cost" Estimates for the Pipeline in Canada (millions of Canadian dollars)
48" - 1260 lb. pressure pipeline -	3,873
or 48" - 1680 lb. pressure pipeline -	4,418
or 54" - 1120 lb. pressure pipeline -	4,234

1/ These filed capital costs include and are based upon (a) a 1260 psi, 48-inch line from the Alaska-Yukon border to the point of possible interconnection near Whitehorse; (b) a 1260 psi, 48-inch; or 1680 psi, 48-inch; or 1120 psi 54-inch line from the point of possible interconnection near Whitehorse to Caroline Junction; (c) a 42-inch line from Caroline Junction to the Canada-U.S. border near Monchy, Saskatchewan; and (d) a 36-inch line from Caroline Junction to the Canada-U.S. border near Kingsgate, British Columbia. These costs are escalated for a date of commencement of operations of January 1, 1983.

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	"Filed Capital Cost" Estimates for the Pipeline in Canada (millions of Canadian dollars)
Zone 11 of the Dempster Line[2/]	
30" - Section of Dempster line from Whitehorse to Dawson -	549
or 36" - Section of Dempster line from Whitehorse to Dawson -	585
or 42" - Section of Dempster line from Whitehorse to Dawson -	705

Details for Zones 1 - 9 are shown in the following table:

2/ The costs are escalated for a date of commencement of operations of January 1, 1985.

Filed Capital Costs for the Pipeline in Canada

Zone	48" 1260 psi $ million (Canadian)	48" 1680 psi $ million (Canadian)	54" 1120 psi $ million (Canadian)
1	707	707	707
2	721	864	805
3	738	850	803
4	380	488	456
5	677	859	813
6	236	236	236
7	126	126	126
8	83	83	83
* 9	205	205	205
Total Zones 1-9	3,873	4,418	4,234

*The last compression station in Zone 9 includes facilities to provide compression up to 1440 psi.

It is recognized that the above are estimates of capital costs. They do not include working capital, property taxes or the provision for road maintenance in the Yukon Territory (not to exceed $30 million Canadian).

If at the time construction is authorized, both Governments have agreed to a starting date for the operation of the Pipeline different from January 1, 1983, then the capital cost estimates shall be adjusted for the difference in time using the GNP price deflator from January 1, 1983. Similarly at the time construction is authorized for the Dempster Line, if the starting date for the operation agreed to by the Canadian Government is different from January 1, 1985, then the capital cost estimate shall be adjusted for the difference in timing using the GNP price deflator from January 1, 1985. The diameter of the pipeline in Zone 11, for purposes of cost allocation, may be 30", 36" or 42", so long as the same diameter pipe is used from the Delta to Dawson (Zone 10).

The actual capital cost, for purposes of this Annex will be the booked cost as of the date "leave to open" is granted plus amounts still outstanding to be accrued on a basis to be approved by the National Energy Board. Actual

capital costs will exclude working capital, property taxes, and direct charges for road maintenance of up to $30 million Canadian in the Yukon Territory as specifically provided herein.

For purposes of this Annex above, actual capital costs will exclude the effect of increases in cost or delays caused by actions attributable to the U.S. shippers, related U.S. pipeline companies, Alaskan producers, the Prudhoe Bay deliverability or gas conditioning plant construction and the United States or State Governments. If the appropriate regulatory bodies of the two countries are unable to agree upon the amount of such costs to be excluded, the determination shall be made in accordance with the procedures set forth in Article IX of the Transit Pipeline Treaty.

The filed capital costs of facilities in Zones 7 and 8 will be included in calculations pursuant to this Annex only to the extent that such Facilities are constructed to meet the requirements of U.S. shippers.

Direct Charges by Public Authorities

*1. Crossing damages (roads, railroad crossings, etc.; this is usually covered in the crossing permit).

*2. Road damages caused by exceeding design load limits.

*3. Required bridge reinforcements caused by exceeding design load limits.

4. Airfield and airstrip repairs.

5. Drainage maintenance.

6. Erosion control.

7. Borrow pit reclamation.

8. Powerline damage.

9. Legal liabilityfor fire damage.

10. Utility system repair (water, sewer, etc.)

11. Camp waste disposal.

12. Camp site reclamation.

13. Other items specified in enviromental stipulations.

14. Costs of surveillance and related studies as required by regulatory bodies or applicable laws.

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* In the case of these items and all other road related charges by public authorities, total charges in the Yukon Territory shall not exceed Canadian $30 million.

British Columbia Statement

The Government of the Province of British Columbia agrees in principle to the provisions contained in the Canada-United States Pipeline Treaty of January 28, 1977, and furthermore British Columbia is prepared to cooperate with the Federal Government to ensure that the provisions of the Canada-United States Treaty, with respect to non-interference of throughput and non-discriminatory treatment with respect to taxes, fees or other monetary charges on either the pipeline or throughput, are adhered to. Specific details of this undertaking will be the subject of a Federal-Provincial Agreement to be negotiated at as early a date as possible. Such Agreements should guarantee that British Columbia's position expressed in its telegram of August 31 is protected.

Alberta Statement

The Government of the Province of Alberta agrees in principle to the provisions contained in the Canada-United States Pipeline Treaty of January 28, 1977, and furthermore, Alberta is prepared to cooperate with the Federal Government to ensure that the provisions of the Canada-United States Treaty, with respect to non-interference of throughput and non-discriminatory treatment with respect to taxes, fees, or other monetary charges on either the Pipeline or thoughput, are adhered to. Specific details of this undertaking will be the subject of a Federal-Provincial Agreement to be negotiated when the Canada-United States protocol or understanding has been finalized.

Saskatchewan Statement

The Government of Saskatchewan is willing to cooperate with the Government of Canada to facilitate construction of the Alcan Pipeline through southwestern Saskatchewan and, to that end, the Government of Saskatchewan expresses its concurrence with the principles elaborated in the Transit Pipeline Agreement signed between Canada and the United States on January 28, 1977. In so doing, it intends not to take any discriminatory action towards such pipelines in respect of throughput, reporting requirements, and environmental protection, pipeline safety, taxes, fees or monetary charges that it would not take against any similar pipeline passing through its jurisdiction. Further details relating to Canada-Saskatchewan relations regarding the Alcan Pipeline will be the subject of Federal-Provincial agreements to be negotiated after a Canada-United States understanding has been finalized.

REPORT ACCOMPANYING A DECISION ON AN ALASKA NATURAL GAS TRANSPORTATION SYSTEM

PREFACE

The Alaska Natural Gas Transportation Act (ANGTA) established a unique and comprehensive process designed to make use of the collective expertise of various branches and departments of government in reaching a final decision on an Alaska Natural Gas Transportation System. By statutory direction, after months of hearings, the Federal Power Commission issued on May 1, 1977, a one-volume report, Recommendation to the President, which urged the designation of an overland pipeline system. After the FPC Report, pursuant to Section 6(a) of ANGTA, ten Federal interagency task forces were organized to report, not later than July 1, 1977, on the impacts and considerations of an Alaska natural gas transportation system. The July 1 Reports submitted by these task forces covered the following subjects:

1. The energy policy impacts of an Alaska natural gas project;
2. Environmental considerations;
3. Sources of financing for capital costs;
4. The impact on competition;
5. Safety and design;
6. International relations;

7. National security, particularly security of supply;
8. Impact on the national economy;
9. Potential cost overruns and time delay; and
10. Socioeconomic impact of the transportation system.

Pursuant to Section 6(d) of ANGTA, the Council of Environmental Quality submitted a report on July 1, 1977, which found that the environmental impact statements submitted by the FPC with respect to Alcan, pursuant to Section 5(e) of ANGTA, are legally and factually sufficient.

In the preparation of this decision, all the inter-agency reports, the FPC Recommendation, and many other submissions and public comments received from Governors, local officials and other interested individuals have been carefully considered. This Report to the Congress on an Alaska Natural Gas Transportation System, as well as the President's decision which precedes it, are the product of this collective study process. As required by the Alaska Natural Gas Transportation Act, this Report explains in detail the basis for the decision favoring the Alcan project.

CHAPTER I - DESIRABILITY OF AN ALASKA NATURAL GAS PROJECT

Natural Gas Supply

United States

There is currently estimated to be a potential natural gas demand in the United States of 25 to 30 trillion cubic feet per year. The U.S. will have to use every source it can to maintain the early 1970 production level of approximately 20 trillion cubic feet per year. As our dependence on foreign sources of energy continues to rise, the nation can use all the reasonably priced domestic natural gas it can produce to displace oil imports. Because of its premium nature, the more gas the U.S. produces, the more it will be able to use.

Looking toward 1990, even under the most optimistic conservation and production assumptions, natural gas shortages are a very real possibility, even with the delivery of Alaska gas. This is so because of the expected tapering off of domestic gas production in the lower-48 states, and a reversal in the decline of natural gas demand when conservation measures have had their full effect and the nation experiences a renewed increase of demand growth from normal economic activity. This situation could be further aggravated by the expiration and nonrenewal of Canadian gas

export contracts through the 1980's. The Alcan project maximizes our chances for avoiding such curtailments.

The most optimistic 1985 projection for U.S. domestic production of gas is 17.5 tcf without Prudhoe Bay gas. This is 15 percent less production than in 1970. Yet during this same period - 1970 to 1985 - it is estimated that total energy demand will increase by over 40 percent. Further, a more pessimistic but still plausible estimate of the domestic resource base would reduce 1985 production of gas by an additional 0.9 tcf per year.

On the demand side, it is apparent that this nation could use all the reasonably priced natural gas it can produce. Even with the ambitious coal conversion program proposed earlier this year by the Administration, projections indicate that Alaska natural gas will be needed to meet demand in the coming decade.

Additionally, such projections do not make any allowance for unusually cold weather, such as that experienced last winter. The increase in gas demand last winter for space heating in the residential sector alone was estimated to be over 0.4 tcf. Under these probabilities, gas shortages are likely in the near future and throughout the 1980's with or without substantial new sources of supply.

In general, there are three economically attractive means to supplement traditional domestic gas supplies by 1985. The first is to accelerate OCS leasing in the Gulf of Mexico, which could produce as much as an additional 0.2 tcf per year by 1985 and 0.6 tcf per year by 1990. The second is to import gas from Mexico, which could be as much as 0.5 tcf per year by 1985 and 0.7 tcf per year by 1990 if the recently-announced gas sales contracts should be completed and approved. The third is to proceed with an Alaska gas project.

Proved saleable gas reserves of 20.6 to 22.8 trillion cubic feet (tcf) in the Main Pool accumulation in the Prudhoe Bay Field represent more than a full year of natural gas consumption at the current consumption rate of about 17.5 tcf per year. Prudhoe Bay production at 2.4 bcfd of gas will include production from other reservoirs which have been identified in the field, the Kuparuk and the Lisburne. Production at that rate would increase domestic gas production by approximately 5 percent in the years when Alaska gas first becomes available. Additional gas discoveries on the North Slope, or in other areas of Alaska through which the pipeline passes, would increase potential deliverability even further.

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The certain increase in supply from an Alaska gas project is estimated to be 0.7 tcf per year (2.0 bcfd) by 1985. By 1990, a volume greater than 0.9 tcf per year (2.4 bcfd) might be produced.

Under the best of circumstances - which assume the most optimistic supply projections, demand reductions and fuel substitutions - the addition of Alaska gas to domestic production will make a substantial contribution toward closing the gap between natural gas supply and demand. Such additional gas supplies could allow some industries with special processes to continue burning natural gas longer, and allow more residential use of natural gas, further displacing oil imports.

By 1990, use of every conceivable supply option under any scenario may still leave us with serious domestic gas shortages. By 1990, oil imports are projected to be 9.6 mmbd, provided that supplemental supply sources can furnish gas in the following volumes:

- 0.9 tcf per year from Alaska gas;
- 0.7 tcf per year from Mexican gas exports;
- 0.6 tcf per year from accelerated OCS leasing in the Gulf of Mexico.

Clearly, each of these gas supply options will become more desirable and important as conventional gas supplies decline in the years after 1990.

Our best efforts will only temporarily stem the decline in conventional onshore gas production in the lower-48 states. The U.S. may increasingly need supplemental sources of gas supply to meet demand. These will include:

- geopressurized methane
- Devonian shale
- deeper, tighter, formations
- coal gasification
- imports of liquefied natural gas (LNG)
- synthetic natural gas (SNG).

Although Alaska gas will add about 5 percent to total domestic gas production, it will be a larger proportion of supply for consumers in the Middle West and on the West Coast. For these regions, it will be between 6 and 10 percent of their supply depending on the distribution which is reflected in the final gas sales contracts. These volumes will be important to the availability of gas in these regions, and should be delivered at a competitive price with other supplemental sources of supply.

Canada

One of the most significant effects of the Alcan project on gas supply will be its effect on Canada's natural gas sales policies. In its July 4th decision on a northern pipeline project, the Canadian National Energy Board (NEB) found that unless the project gave Canadians access to their frontier gas reserves, Canada might not have sufficient supplies available to fulfill its existing gas export commitments to the U.S. If the frontier gas reserves were made available, however, increased supplies would exist to allow continuation of current export levels.

A possibility offered by the Alcan project is the effective availability of Alaska gas to the U.S. before completion of the project through pre-delivery of Canadian gas under existing export licenses. The southern portions of the Alcan project could be constructed first, and deliveries of excess gas from Alberta could reach as much as 1.1 bcfd by the winter of 1979 - 1980. As currently proposed, the pre-deliveries would be repaid by reduced export commitments in the late 1980's, or by time-swaps for Alaska gas. The pre-deliveries would make extra gas available over the next few years when the Nation faces

serious and immediate natural gas shortages, prior to the time when supply stimulation and demand reduction measures under the National Energy Plan have had any effect in helping bring natural gas supply and demand back into balance.

A pre-delivery arrangement involving Alberta gas would provide stimulus to exploration for additional supplies in that province by providing producers with additional markets for their gas. Similarly, agreement on a project which brings a major pipeline effectively within 500 miles of the Mackenzie Delta region should stimulate further exploration activity there. If that additional exploration is undertaken, the possibility of obtaining additional volumes of Canadian gas in future years will be enhanced. The joint project will thus ensure maximum availability of Canadian gas in the near term, through continued exports under existing contracts and possible pre-deliveries. It will also give the U.S. its best chance of obtaining longer-term supplies of Canadian gas by providing the impetus for broad-scale exploration programs.

Economic Considerations

An economic analysis of the Alaska gas projects can be made from both a private market perspective and from a national economic perspective. The utility of the project

from a private market perspective is determined by whether there are less expensive alternative fuels available. This depends on the field price of the gas and the transportation cost. The reliance upon the National Energy Plan (NEP) for setting of a field price is discussed in Section 6 of the Decision. For illustrative purposes here, the $1.45 price that would be set under the NEP is used. The transportation cost of service will be determined by the capital and operating costs of the delivery system. The project applicants have filed cost estimates that produce a 20-year average cost of service which ranges from $.80 to $1.07 per mmbtu (1975 dollars).

The large cost overruns of the Alyeska pipeline have raised new concerns regarding the accuracy of base capital cost estimates for such major projects. For the Alaska gas project, cost overrun assessments have been made which allow for capital cost increases by factors from about 1.3 to 2.0.

The expected 20-year average cost of service for the Alcan project described in the Decision, and including an expected case 40 percent cost overrun, is estimated at approximately $1.04 per mmbtu in constant 1975 dollars.

The cost of service under similar assumptions for the El Paso project is $1.21 per mmbtu. The "worst case" estimates for both projects result in a 20-year average cost of service of about $1.80 to $2.00 per mmbtu. In addition, the transporters (i.e., the project sponsors) will probably be required to bear a portion of the "conditioning" or processing cost of the gas. When the cost of service price of the Alcan project is added to a wellhead price of $1.45 to $1.75 per mmbtu (depending on the amount the FPC will allow producers for their processing costs), the wholesale or "city gate" price of the gas should be about $2.50 to $2.80 per mmbtu in constant 1975 dollars. The delivered cost of Alcan gas under three different overrun assumptions is:

20 Year Average Alcan Delivered Cost
(1975 Dollars)

	Filed Costs	Expected Cost Overrun	Worst Case Cost Overrun
Field Price	$1.45	$1.45	$1.45
Processing	0 to .30	0 to .30	0 to .30
Transportation	0.80	1.04	1.57
	2.25 to 2.55	2.49 to 2.79	3.02 to 3.32

The conservatively projected costs of imported LNG and other alternative non-conventional gas supplies would be at least $3.25 per mmbtu (in 1975 dollars). SNG would be at least $3.75 per mmbtu. Only if there were a "worst case" cost overrun and high processing costs would Alaska gas be more expensive than imported LNG; it would still be considerably less expensive than SNG. One of the most important objectives of the Federal Government's involvement during the planning and construction period will be to avoid such "worst case" overruns.

Estimates of availability and cost of gas from coal gasification and other unconventional sources must be considered speculative at this time. However, as there are no confirmed estimates which put the city gate price of marketable amounts of gas from these sources below $3.50 to $4.00 per mmbtu, the Alcan project would appear to be competitive for the life of the project.

The measure of the project's value to the nation is the Net National Economic Benefit (NNEB), which compares the present value of real resource expenditures for the project with the present value of its future benefits. The resource expenditures are measured by the capital and operating expenses. The benefits are measured by the costs

of alternate fuel displaced by the gas, such as imported oil or LNG. The benefit value which has been used for evaluating this project is approximately $2.60 per mmbtu (1975 dollars). This analysis shows that both the El Paso and Alcan projects would have net benefits of almost $5.0 billion at the expected overrun cost. This clearly indicates that construction of some project is preferable to the no project option. Significantly, the benefits of either project remain positive, although smaller, at the "worst case" cost overrun level.

Most significantly, the NNEB of the Alcan project is over $1.1 billion more than that of El Paso under the expected overrun case as indicated below:

	"Expected" Costs	"Worst Case" Costs
Alcan Project	$5.7 billion	$1.8 billion
El Paso	$4.6 billion	$700 million

If the resource value assumption is changed to take account of the reasonable potential for an increasing world oil price over the 25 year accounting life of the project, or if the price of supplemental gas supplies such as SNG (now at $3.75 or more per mmbtu) is used,

and if the benefits of the project beyond its 25 year accounting life are included, the expected case NNEB more than doubles.

Conclusion

This analysis indicates the importance and superiority of the Alcan project as compared to either the El Paso project or the no project option. It appears that Alaska gas will be one of our cheapest sources of supplemental gas supply and will assure at least near-term continuation of our access to Canadian gas supplies.

Even if we achieve the ambitious coal conversion, conservation and production goals outlined in the National Energy Plan, Alaska gas provides us with a needed additional resource for helping reduce oil imports while heating more of our homes and running more of our factories with a premium domestically produced fuel. If we fall short of our goals, Alaskan gas is essential in the effort to minimize imports and help fill the gap between natural gas supply and demand.

A realistic assessment of all the supply and demand potentials indicates that Alaska gas delivered by the Alcan system will be an important source of energy. The Alcan

project has a high expected net national economic benefit. It should provide transportation services at a projected cost that will assure the sale of Alaska gas. The Alcan project is both a good investment for the United States as a matter of national energy policy, and a good investment for the private interests that will manage and finance its construction.

Chapter II - FINANCIAL ANALYSIS

Conclusions

As indicated by the terms and conditions in Section 5 of the Decision, the Alcan project is required to be privately financed. As such, it will be the largest privately financed energy project ever undertaken, requiring between $10 billion and $15 billion by the time it is completed. This Chapter addresses the reasons for concluding the project can be privately financed and the conditions under which a private financing is expected to occur.

To effectuate such a private financing, a plan that equitably and carefully balances the project's benefits and risks is required. The following plan to share the risks and benefits of the Alcan project is proposed:

1. The equity investment in the project would be placed at risk under all circumstances and the budgeted equity investment be considered the first funds spent. The rate of return on equity would compensate sponsors for bearing this risk.
2. Producers and the State of Alaska, as direct and major beneficiaries of this project, should

participate in the financing either directly or in the form of debt guarantees.

3. The burden of cost overruns be shared by equity holders and consumers upon completion through the application of a variable rate of return on common equity. This would provide a strong incentive for the project to be constructed at the lowest possible cost.
4. Provision of debt service in the event of service interruption would be borne by consumers through a tariff that becomes effective only after service commences.

Analysis

Given the large volumes of proven reserves in the Prudhoe Bay Oil Pool, the high degree of experience and excellent performance record of gas pipeline transmission facilities, the support and best efforts of Canada, and the clear need for additional natural gas supplies throughout the United States, there is good reason to expect this project will be financed by the capital markets without the use of consumer noncompletion agreements. This determination takes into account the following considerations:

1. The risks associated with the construction and operation of the Alcan project must be assumed by creditworthy parties in order to achieve private financing. There is sufficient credit support capacity among the direct beneficiaries of the project to assure completion of the pipeline without assistance from consumers. Such beneficiaries are the gas transmission companies, gas producers, and the State of Alaska. The benefits of these parties sufficiently outweigh the risks associated with the project so that it is reasonable to expect them to provide support at small additional cost to consumers. Once operation begins, however, consumers must expect to pay the full cost of service based upon certified expenditures.
2. To reduce uncertainty to a minimum, the Federal Government should:
   a) specify clearly the terms and conditions that are to be imposed on the pipeline during its construction and operation prior to commencement of construction;

b) provide a mechanism to coordinate engineering and environmental regulation and permit rapid and unambiguous resolution of any difficulties which may be encountered;

c) provide for timely approval of outlays for incorporation into the project's rate base;

d) provide a mechanism to permit a high degree of cooperation with Canada and rapid resolution of any difficulties which are encountered;

e) allow sufficient time to plan, coordinate and manage procurement, logistics and construction.

3. To hold the total direct cost of the project to a minimum and the project on schedule, it is desirable to:

a) develop a variable rate of return on equity that provides for a realizable high return if actual costs are near or below budget and a reduced return if cost overruns occur;

b) provide for similar treatment of the return on equity in both the U.S. and Canada;

c) provide an incentive to the Canadian Government and its regulatory authorities to achieve

all possible cost savings and promote management efficiency.

The Terms and Conditions in Section 5 of the Decision, along with the Agreement on Principles included as Section 7, provides the requisite processes and assurances for the reduction of both uncertainty and costs.

The conclusion reached here regarding private financing without consumer noncompletion guarantees differs substantially from the position taken by most parties in the Federal Power Commission proceeding and by representatives of El Paso in their most recent statements. These statements were made prior to the significant steps that have been taken in recent weeks to reduce uncertainty and create proper planning, control and incentives. While the fundamental economic potential of the project has not changed, the likelihood of achieving that potential is greater.

Alcan Financial Plan

The Alaska natural gas transportation project proposed by Alcan will involve a large and complex financing which will be arranged prior to the commencement of construction.[1/]

1/ A detailed financial analysis of the competing proposals can be found in Report to the President, Financing an Alaskan Gas Transportation System, Department of the Treasury, Lead Agency, and other participating Agencies: July 1, 1977.

In view of the size of the project relative to the financing capacity of its sponsors, Alcan has proposed that the required capital be raised and secured by means of "project financing" as distinguished from the more traditional "balance sheet financing" used in the gas pipeline industry. That is, a new project entity will be created which will be expected in and of itself to generate sufficient revenues to pay for its operating costs, interest and principal on debt, and a return on, and ultimately a return of, equity to its investors.

It is expected that the equity funds for the project entities will be provided by the sponsoring consortium companies.[2/] Debt capital will come from a variety of lenders.

The basic requirement for a successful financing is the economic viability of the project. In Chapter IV of the Report, the basic economic soundness of the project is demonstrated. Even under extreme cost overruns, the delivered cost of Alaska gas will be economically attractive. Appropriate incentives will encourage the

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2/ For the sake of simplicity, the new interdependent project entities will hereafter be referred to collectively as "the project."

minimization of cost overruns. Pipeline and gas distribution companies can be expected to purchase the Alaska gas from Prudhoe Bay producers under long-term contracts and sign transportation contracts with Alcan.

The conclusion that Alcan can be privately financed is founded on the basic economic desirability of Alaska gas and the viability Alcan transportation system; nevertheless, skillful financial packaging and risk-benefit balancing will be required. It is therefore necessary to explore the boundaries of the financing problem by considering Alcan's likely capital needs and sources, relating those needs to the capital market in general, and reviewing the list of beneficiaries and examining the roles each might be expected to play in the financing.

Capital Requirements and Sources of Funds

Alcan has estimated the capital costs of its system under varying design, route and completion date assumptions. It has also made two capital requirements and source of funds projections under its 48-inch proposal: one was filed with the FPC in March 1977, and was based upon an "express" 1260 psi line carrying no Canadian gas; the other was based upon the July 4, 1977, NEB-recommended modifications of that system to divert to Dawson in order to carry Canadian gas

and make $200 million in socioeconomic payments. Both of these projections assumed delivery beginning October 1, 1981.

The Agreement on Principles with Canada has altered the system from that specified by the NEB. This alteration has little affect on the basic total capital needs of the system as compared with the needs estimated for the system including the NEB recommendations; the capital saved by rerouting from the Dawson diversion back to the prime route is almost exactly offset by the additional cost of installing a higher-capacity pipeline system from Whitehorse to Caroline Junction.[3/] Thus by simply adjusting the Alcan financial plan for the NEB recommended system to reflect a more realistic commencement date of January 1, 1983, a financial plan consistent with the agreed-upon system design, route and commencement date results. Exhibits 1 and 2 display the original and adjusted Alcan plans.

Alcan is expected to require approximately $10.3 billion according to cost estimates filed with U.S. and

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3/ On the basis of filed costs, moving back to the prime route saves $444 million while putting in 1680 psi pipe adds $472 million. The overrun estimate was $630 million for the Dawson diversion and $565 million for the increase in the capacity of the system.

Canadian regulatory bodies, adjusted to reflect commencement of operations on January 1, 1983. The projected sources for these funds are the following:

U.S. Banks	$ 1,233 million
Canadian Banks	542
U.S. Long-Term Debt	5,865
Canadian Long-Term Debt	445
U.S. Common Stock	1,362
Canadian Common Stock	855
	$10,302 million

With cost overruns, the requirements would be higher. For example, if the projected cost overrun percentage detailed elsewhere in this report of approximately 32 percent is used, the total capital requirements would rise to approximately $13.6 billion.

Capital Markets

The capital requirements of the Alcan project are so large that the project cannot be viewed in conventional terms by its pipeline sponsors and other potential investors. At the end of 1976, the total assets of the gas transmission industry were $26 billion. The project must be seen as a corporate entity in itself, capable of issuing and servicing its own debt and equity.

Exhibit 1
Financing Requirements
of Companies Associated with
THE ALCAN PIPELINE PROJECT*
(1978-1982)
(Dollars in Millions)

	1978	1979	1980	1981	1982	Total Basic Requirements
ALCAN PIPELINE						
U.S. Banks	$ -	$ 36	$ 555	$ 279	-	$ 870
U.S. Long Term Debt	-	700	600	450	-	1,750
U.S. Common Stock	-	350	270	260	-	880
	-	$1,086	$1,425	$ 989	-	$3,500
FOOTHILLS GROUP						
Canadian Banks	-	110	300	100	-	510
U.S. Long Term Debt	-	321	1,038	736	-	2,095
Canadian Long Term Debt	75	100	100	-	144	419
Canadian Common Stock	220	172	256	149	7	804
	295	703	1,694	985	151	3,828
PG&E						
U.S. Banks	-	-	-	-	-	-
U.S. Long Term Debt	-	-	-	388	-	388
U.S. Common Stock	-	-	-	-	-	-
				388		388
PG&E						
U.S. Banks	-		-	-	-	-
U.S. Long Term Debt	-	82	205	77	-	364
U.S. Common Stock	-	-	-	-	-	-
		82	205	77		364
NORTHERN BORDER						
U.S. Banks	-	-	-	290	-	290
U.S. Long Term Debt	-	46	410	465	-	921
U.S. Common Stock	-	16	136	250	-	402
	-	62	546	1,005	-	1,613
TOTAL						
Canadian Funds	295	382	656	249	151	1,733
U.S. Funds	-	1,551	3,214	3,195	-	7,960
	$295	$1,933	$3,870	$3,444	$151	$ 9,693

* Assumes "Dawson Re-Routing" and October 1, 1981, gas deliveries.

Source: Documents Submitted by Alcan Project to White House Task Force, August 2, 1977, Tab 4, Schedule B.

Exhibit 2
Adjusted Financing Requirements
of Companies Associated with
THE ALCAN PIPELINE PROJECT*
(1979-1983)
(Dollars in Millions)

	1979	1980	1981	1982	1983	Total Basic Requirements
ALCAN PIPELINE						
U.S. Banks	$ -	$ 38	$ 590	$ 297	-	$ 925
U.S. Long Term Debt	-	744	638	478	-	1,860
U.S. Common Stock	-	372	287	276	-	935
	-	$1,154	$1,515	$1,051	-	$3,720
FOOTHILLS GROUP						
Canadian Banks	-	117	319	106	-	542
U.S. Long Term Debt	-	341	1,103	782	-	2,227
Canadian Long Term Debt	80	106	106	-	153	445
Canadian Common Stock	234	183	272	158	7	855
	314	747	1,800	1,046	160	4,069
PG&E						
U.S. Banks	-	-	-	-	-	-
U.S. Long Term Debt	-	-	-	412	-	412
U.S. Common Stock	-	-	-	-	-	-
				412		412
PG&E						
U.S. Banks	-		-	-	-	-
U.S. Long Term Debt	-	87	218	82	-	387
U.S. Common Stock	-	-	-	-	-	-
		87	218	82		387
NORTHERN BORDER						
U.S. Banks	-	-	-	308	-	308
U.S. Long Term Debt	-	49	436	494	-	979
U.S. Common Stock	-	17	145	266	-	427
	-	68	581	1,068	-	1,714
TOTAL						
Canadian Funds	314	406	697	265	160	1,842
U.S. Funds	-	1,649	3,416	3,396	-	8,460
	$314	$2,055	$4,113	$3,661	$160	$10,302

* Based upon financial plan presented to White House Staff on August 2, 1977, adjusted to reflect one and one-quarter year lag in outlays and 5 percent inflation factor.

While this investment is large for the industry, its importance in terms of aggregate investment or total capital markets is modest. To put these requirements into perspective, U.S. gross private investment in 1976 was $241 billion. Alcan's peak year capital needs for U.S. funds, expressed in 1976 dollars, are only 1.1 percent of total U.S. gross private investment for that year, which was not a particularly good one for the economy.

It is anticipated that most, if not all, of the U.S. common equity will come from U.S. shippers (i.e., U.S. transmission or distribution companies). A broad consortium of companies would have sufficient financial capacity to make the required $1.4 billion investment. The transmission sector of the industry alone had almost double that amount in annual cash flow in 1976. While the industry must continue to make other investments, its internal cash flow, plus the ability to issue new securities, provides ample capacity to fund the necessary equity investment, including the equity portion of potential cost overruns.

The Canadian equity is expected to be provided by the four companies supporting the project in Canada: Westcoast Transmission Company, Ltd., Alberta Gas Trunkline Company,

Ltd. (AGTL), Alberta Natural Gas Company, Ltd., and Trans-Canada Pipelines, Ltd. While the first two companies are the major and previously the only firms in the Canadian consortium, the addition of the latter two in recent weeks has contributed additional financial strength to the Alcan project.4/

As to the debt portion of financing this project, Alcan's impact on the U.S. debt market cannot be considered burdensome. In 1976, non-government long-term debt offerings in the U.S. totaled $62.9 billion. Ignoring the state of the economy in 1976 and not including the likely positive real growth of the long-term debt market from 1976 until the Alcan debt is issued, Alcan's projected total U.S. long-term debt requirement (including the Foothills Group debt sold in the U.S.) in its peak year is only 3 percent of the market (both expressed in 1976 dollars). Over the five year period, 1978 through 1982, the aggregate requirement is less than approximatley 1.4 percent.

4/ The Alcan project is relatively more important to Westcoast and AGTL; together they have total assets of $1.6 billion at the end of 1976. Their equity investment in the project will be a major investment for them.

Similarly, the Canadian long-term debt to be issued by the Foothills group expressed as a fraction of all corporate bonds issued in Canada in 1975 is approximately 5 percent for the peak year and 3 percent overall.5/

It is also worth noting that even though the financing requirements expected for the Alcan system are large in an absolute sense, peak year requirements as a percentage of total market capacity are about the same as the peak year requirements for the Alyeska project in 1975. Yet no question of capital market capability was raised with respect to Alyeska.6/

5/ It is not necessary to restrict the supply to these two domestic markets. Other international capital markets could be utilized. For example, in 1974 Canadian net foreign liabilities reached $3.0 billion in mid-year, up from $1.7 billion one half year earlier, when business loan demand rose abruptly and exceeded domestic liability expansion.

6/ Alyeska's peak year financial requirements, in light of capital market capability, were as follows:

1975 Alyeska Debt Issued	$3.0 billion
1975 Total Corporate Debt Issued	$27.2 billion
Peak Year as a Percent of Total Issues	11.0 percent

The above analysis shows that the Alcan project would not squeeze out most other investment. It is true it will have to compete for funds with different investments in the energy as well as other fields, but if the project offers a competitive return for the perceived risk, its securities will be purchased. The capital markets are probably the most competitive element in our economic system.

Cost Overrun Financing

The question of how to finance cost overruns is closely related to the question of noncompletion. Once sponsor equity is invested, construction has started, and the lenders have committed to the project, it is unlikely that the capital markets would cease to provide funds simply because of higher than expected costs. The real consideration here is not the absolute level of costs, but the probability that the project would be ultimately successful. Analysis of the Alyeska experience shows that although the ultimate cost of the project was not known, as costs escalated lenders increased the amount of funds they were willing to provide on several occasions because they were convinced that the project would deliver oil at competitive prices. As a result, the risk of noncompletion due to cost overruns is insignificant once the project is

under way, and is only a problem at the initial stage of financing. It is at that time that the lenders must be convinced that the sponsoring group will follow the project through to completion. Committing equity funds at the outset provides the basis for that assurance.7/

The project sponsors alone cannot be expected to provide such assurances because of their limited assets, liabilities and cash flows; as a result, it is desirable to include in the sponsor group other beneficiaries as participants in the financing.

Project Participants and Beneficiaries

Tradition and equity suggest that the parties who stand to benefit directly from a transportation system participate in the financing and share the burden of these risks. The direct beneficiaries include the equity investors, namely a consortium of gas transmission companies;

7/ An important element of this financial plan will likely be the commitment of equity capital "up front." In order to provide for the risk-bearing characteristic of having the equity component of budgeted cost be invested before debt, while simultaneously keeping the interest during construction as small as possible, it is contemplated that debt and equity shall be obtained simultaneously in their long-run proportion with equity commitments to be honored even in the event of noncompletion.

the producers of the gas; and the State of Alaska with its royalty interest in the gas.

Equity Investors

The Alcan proposal was initially developed by Northwest Pipeline in conjunction with two Canadian transmission corporations, Westcoast Transmission Company and Alberta Gas Trunk Line and their subsidiary, Foothills Pipe Lines (Yukon) Ltd. Subsequently, the Alcan proposal has acquired the support of many large U.S. and Canadian gas transmission firms. An important advantage of the Alcan project over the El Paso alternative is the equity investment by Canadian transmission companies which will total at least $800 million.

The strength of the sponsoring consortium of gas transmission companies is a significant element of the financing. The consortium must have the ability to provide the sizable equity funds as well as the equity component of any cost overrun requirements. From the outset, Alcan will enjoy a strong consortium with participation by most of the large natural gas transmission corporations in both countries.

After careful study of their financial capacity, the conclusion has been reached that the natural gas transmission industry has ample capacity to provide the requisite equity commitments to the Alcan transportation project. The current members of the Alcan consortium are judged to be capable of meeting the equity requirements as proposed in the financing plan.

Producers of Alaskan Natural Gas

The owners and potential producers of Alaskan natural gas are primarily Exxon, Atlantic Richfield, and the Standard Oil Company of Ohio. These companies stand to benefit directly from the sale of their Prudhoe Bay natural gas reserves. Timely development of the Alcan system is in their best interests.

1. At the NEP price of $1.45 per mmbtu, the producers' constant 1977 dollar value of 23 Tcf of saleable reserves, net of royalty and severance taxes, is more than $30 billion.
2. Because of the time value of money, a field price that escalates more slowly than the amount producers could otherwise earn on the funds makes it more profitable to produce gas now rather than defer production for later.

Producer participation in the financing of the project is warranted due to their beneficiary status and their financial strength. The producing companies have the investment capacity to participate in the financing of a transportation system, especially as full returns from their North Slope oil and the Alyeska pipeline investment are realized. These three companies had total assets of $51.5 billion in 1976 and net income of $3.4 billion. Financial participation by the producing companies, most likely in the form of debt guarantees, can be structured consistent with the terms and conditions placed upon the producers in Section 5 of the Decision.

The State of Alaska

The State of Alaska could realize as much as $7.5 billion (1977 dollars) from the sale of Prudhoe Bay natural gas in the form of royalties and severance taxes. The State would also realize about $50 million per year in property taxes. Furthermore, the State will be able to utilize the pipeline for natural gas distribution and development within the State. Prudhoe Bay gas, including the State of Alaska's royalty gas, will be made available to local Alaskan communities along the route of the Alcan Pipeline System. Installation of additional pipeline facilities connecting

with the Alcan system could provide natural gas to other areas of the State, particularly the Cook Inlet region and southeastern Alaska, and thus supply the energy base required for long-term economic development. The Alcan system also will offer a readily accessible transportation service for a number of potential Alaska gas reserves located in interior Alaska, Cook Inlet and the Gulf of Alaska.

The State of Alaska has indicated a willingness and ability to guarantee up to $900 million of the El Paso project debt, with the final amount depending upon the percentage of royalty revenues that the State Legislature votes to have placed in a permanent capital account that can be used for such purposes. While no comparable commitment has been received from the State for the Alcan project, such participation by the State in the financing would be in the interest of the State, the Nation and the expeditious construction of the project.

Transfer of Financial Risks

Gas Consumers

The issue of gas consumers bearing some or all of the financial risk of this project was widely discussed in the Federal Power Commission hearing and has been carefully

considered in reaching the Decision. The most frequently discussed mechanism for consumer support would involve a consumer financial guarantee through an "all-events" tariff with noncompletion arrangements. The noncompletion guarantee would include a consumer guarantee of at least debt service, and possibly a return of equity, in the event the project was not completed.

The financial advisors and sponsors of the El Paso project continue to believe that consumer guarantees through the "all-events" tariff with noncompletion features is required to finance an Alaska gas transportation project. The Alcan financial advisors and sponsors, however, have stated in correspondence that in their professional opinion the Alcan project can be financed under certain conditions with a more traditional tariff, that is without consumer noncompletion guarantees or Federal financial assistance.[8/] They now propose a tariff arrangement similar to previously approved arrangements for major projects which would provide for maintenance of debt service through consumer charges in

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8/ Memorandum from Mark Millard, Vice Chairman of Loeb Rhoades, dated August 10, 1977, attached to a letter dated August 10, 1977, from John McMillian, President of the Alcan Pipeline Company, to Secretary of Energy, James Schlesinger.

the event of interruption only after the project is completed and initial operation of the delivery system has commenced.

The Agreement on Principles reached with Canada and the terms and conditions imposed in the Decision satisfy the conditions specified by the Alcan financial advisors. Their finding appears supportable and reasonable. Extraordinary consumer guarantees prior to completion of the project are judged to be unnecessary.

Federal Government Financial Assistance

Federal Government support to the project in the form of loan guarantees or insurance has also received extensive scrutiny. The El Paso proposal anticipated approximately $1.5 billion of Federal loan guarantees for the financing of the LNG tanker fleet through the existing Maritime Administration Shipbuilding Program (under Title XI of the Merchant Marine Act of 1936). The Lead Agency Report to the President on financing demonstrated that new and special Federal financing assistance was not necessary.9/ El Paso did not request new forms of Government assistance for this project. The Alcan financial advisors believe there is no need for any Federal financial assistance.

9/ Report to the President, Financing an Alaskan Gas Transportation System; Department of the Treasury Lead Agency, and other Participating Agencies; July, 1977.

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In addition to being unnecessary, Federal financial assistance for this project is considered undesirable for the following reasons:

1. Serious questions of equity result from the transfer of risks to taxpayers, many of whom are not gas consumers or will not receive additional gas supplies as a result of the Alaskan project.
2. Federal financial support substitutes the Government for private lenders in the critical risk assessment function normally performed by private lenders.
3. A subsidy in the form of lower interest rates yields an artificially low price for gas.
4. The incentive for efficient management of the project is reduced.
5. The Government is placed in conflicting roles as guarantor and as regulator of the project.
6. Providing unnecessary Federal assistance to this project would set a precedent with respect to other large energy projects that is misleading and counterproductive.

Variable Rate of Return

Since the tariff will require gas consumers to pay for

all costs except those found unreasonable by the regulatory authority, incentives to minimize cost overruns must be ensured. In order to give sponsors an incentive to control costs, the rate of return on equity should be tied to the size of the cost overruns. Within certain maximum and minimum levels, return on equity would increase were the project to come in at or under budget but decrease were costs to exceed budget. Were the project under budget, consumers would pay a lower price for gas and sponsors would receive a higher return on equity. Were the project over budget, the higher total invested capital would be partially offset by a lower allowed rate of return on that capital, so that equity investors would assume part of the cost overrun. The variable rate of return offers consumers the possibility of lower costs and the sponsors compensation for risking their equity, and may assist in making this project attractive to equity investors. The details of how the variable rate of return will be implemented are left to the FPC and NEB to balance the economic incentive with administrative feasibility.

The combination of an economic project, adequate compensation of risk capital, and contingent financing agreements appear to minimize the risk of cost overruns as it

relates to financing and the delivered cost of gas. With the cost overrun risk reduced to manageable proportions, the project will have a high probability of being successfully financed in the private sector.

Cost to the Consumer

The aspect of the financing plan adopted here which will have the greatest effect on the total transportation cost paid by consumers is the assumption of the entire noncompletion risk by the project sponsors and other beneficiaries. The alternative would be to let consumers or taxpayers bear part or all of that risk through a noncompletion guarantee or through Federal government guarantees.

In the capital markets additional risks are assumed only if additional rewards are provided, and that principle is likely to operate in this instance. If the State of Alaska and the producers provide assurances for cost overrun financing, they would expect to receive some commitment or guarantee fee, although the amount of such fee should be relatively small given the small risk they are bearing.

Insofar as there is any risk, most of it will be assumed by the sponsors as equity capital investors. Under the plan recommended here, their equity would finance the

first $2 billion of investment. They would, therefore, bear what little risk there is of project abandonment.

While it is difficult to give a precise value to this risk-sharing principle, the rate of return on equity used in developing all the numerical analysis has been 15 percent rather than the more normal 12.5 to 14.0 percent found in recent FPC decisions. Thus, for example, the effect of changing the rate of return on equity from 13.5 percent to 15 percent is an increase in the average cost of service of about 4 percent.

This risk-sharing principle, however, provides an important incentive for efficient management and cost control that would be foregone if consumers or the Federal Government were to assume noncompletion guarantees. The effect of this incentive on total project costs may more than offset the direct effect on the rate of return associated with avoidance of consumer completion guarantees. Overall, therefore, the objective of placing the risk of noncompletion on sponsors and beneficiaries other than consumers appears equitable and cost-effective.

Financeability

In its Recommendation to the President, the FPC found:

> El Paso would be the easiest system to finance because of its slightly lower initial cost and because of Federal guarantees of bonds for its tankers under Title XI of the Merchant Marine Act.

This finding is no longer accepted in view of several recent developments. First, while El Paso requires less total initial outlay, approximately 20 percent of Alcan's total capital requirements are now anticipated to be drawn from the Canadian capital market. This sharing of the raising and servicing of Alcan's capital by the strong Foothills group makes the total U.S. capital requirements less for Alcan than El Paso.

Second, the cornerstone of financeability is economic viability. There is no doubt that Alcan's superior economic efficiency (lower operating cost and higher fuel efficiency), which has now been further assured by the Agreement on Principles, will make its financial instruments more attractive than those of the El Paso system.

In general, El Paso's dependence upon Federal Government support for financeability is not a particularly desirable characteristic. Overall, it is reasonable to conclude that Alcan will be at least as easy and probably easier to finance privately than El Paso.

Presidential Finding That the Alcan System Can be Privately Financed

The Alcan sponsors and financial advisors have stated the Alcan project can be privately financed. The financial analysis above supports this conclusion. Therefore, it is reasonable to anticipate that the Alcan project can be financed in the private sector.

Novel regulatory schemes to shift this project's risks from the private sector to consumers are found to be neither necessary nor desirable. Federal financing assistance is also found to be neither necessary or desirable, and any such approach is herewith explicitly rejected.

CHAPTER III - ENVIRONMENTAL AND SOCIOECONOMIC CONSIDERATIONS

The Environmental Advantages of Alcan

It is significant to note that the Alcan proposal was originally presented to the FPC after the preliminary environmental impact statements had been critical of both the El Paso and Arctic Gas proposals. The "environmentally preferred route" suggested by the FPC staff early in the proceeding was followed closely by Alcan in developing its system. The success of the Alcan proposal is in large measure a result of its attention to environmental impact.

The environmental impact of large-scale construction in a northern environment is a particularly sensitive issue. The tundra and permafrost are delicate and slow to heal; the fauna is unaccustomed to the presence of large-scale human activities, and the breeding patterns and survival rate are easily upset. Endangered wildlife species cling precariously to existence; aquatic life is as sensitive as terrestrial life; and native populations must subsist on this fragile environment for their economic and physical well-being.

Many parties in both the U.S. and Canada contended that the Arctic Gas proposal, even if it was, as some claimed, superior on economic grounds, had the potential

for substantial environmental and socioeconomic impact. The Arctic Gas route would not have followed existing utility corridors and would have cut through the Arctic National Wildlife Range in the northeast corner of Alaska. While Arctic Gas proposed mitigating measures that included, among other things, all-winter construction across the North Slope and above the 60th parallel with snow roads and work pads, some parties considered these measures technically unfeasible. The State of Alaska also opposed construction in the Range.

The Canadian National Energy Board found that the Arctic Gas route in Canada was "environmentally unacceptable" because it would have impacts "which could not be avoided, which could not be accepted, and for which mitigative measures are unknown or uncertain of development." This finding of the NEB effectively forced the withdrawal of the Arctic Gas proposal from further consideration.

On environmental and socioeconomic grounds, both El Paso and Alcan are superior to Arctic Gas because they generally follow existing utility corridors where the incremental environmental impacts tend to be small. In this respect, the Alcan proposal is particularly advantageous. The Alcan route follows the Alyeska oil

pipeline in Alaska until it turns to follow along the Alaska Highway into Canada at Delta Junction; from Delta Junction the pipeline will generally make use of the Alaska Highway right-of-way or the now-abandoned Haines-Fairbanks pipeline right-of-way (a line built during World War II to transport oil products to Fairbanks from Haines, which is north of Juneau, Alaska).

The environmental impact of the El Paso proposal, on the other hand, would be more adverse than Alcan's. After departing from the Alyeska corridor near Valdez, the El Paso route would traverse the wild and mountainous Chugach National Forest for about 40 miles, an area of great beauty which supports many forms of wildlife and has no roads. A gravel haul road and LNG plant could affect the bald eagles and Sitka black-tail deer that inhabit the area. Furthermore, El Paso would also have an adverse impact on the marine biota of Prince William Sound from the thermal, chlorine and other toxic material discharge of its LNG plant. The impact of this LNG plant would have to be mitigated by the addition of cooling towers - which have their own environmental impact - at an estimated 1975 dollar cost of $75 million. Similarly, El Paso's California regasification facility also has the potential for adverse impact on marine biota with its cold water

discharge into the Pacific Ocean. By comparison to these impacts, no particular impact of Alcan has been singled out for the same degree of concern.

The environmental impacts of Alcan's eastern and western legs in the lower-48 states have never been considered serious. In the FPC hearing, Alcan showed sensitivity to a myriad of local impacts and suggested mitigative measures that appear adequate.

Finally, Alcan's far superior fuel efficiency means that the system will deliver more units of clean-burning and efficient natural gas than El Paso for the same amount of wellhead deliveries. Alcan is expected to consume only about three-fourths as much gas for fuel as the El Paso system.

Presidential Finding - Environmental Impact Statements

In its Recommendation to the President, the Federal Power Commission found after months of hearings and evaluations of impact statements that "no doubt, the Alcan route promises the least environmental impact." In its subsequent July 1 Report, the Interagency Task Force on Environmental Issues, under the lead of Department of the Interior, concluded that Alcan appeared to have the least environmental impact of the proposed routes, provided that proper mitigative actions are taken. The conservationist intervenors in

the proceedings (Sierra Club, The Wilderness Society, National Audubon Society, and the Alaskan Conservation Society) also stated a clear preference for the Alcan proposal.

Pursuant to Section 6(d) of ANGTA, the Council on Environmental Quality submitted a report on July 1, 1977, which found that the environmental impact statements submitted by the FPC with respect to Alcan, pursuant to Section 5(e) of ANGTA, are legally and factually sufficient.

After four days of public hearings, and extensive study, the CEQ reached the following conclusion: "Alcan is the environmentally preferable route. Its impacts are largely restricted to existing transportation corridors ... and involve no large-scale intrusion into wilderness values." The CEQ also found that the information was insufficient to determine whether the El Paso project is environmentally acceptable. It is clear from the FPC hearings, the environmental impact statements prepared by the FPC and Department of the Interior the certification of those impact statements by the CEQ, and many other submissions from many parties that the Alcan route is clearly the superior system on environmental grounds.

The President hereby determines pursuant to the direction of Section 8(e) of ANGTA, that the required environmental impact statements relative to an Alaska natural gas transportation system have been prepared, that they have been certified by the CEQ and that they are in compliance with the National Environmental Policy Act of 1969.

Consequently the enactment of a joint resolution approving the Decision shall be conclusive as to the legal and factual sufficiency of the final environmental impact statements as provided by Section 10(c)(3) of ANGTA.

Socioeconomic Impact

The socioeconomic impacts of both systems are roughly the same in Alaska. Under either proposal, the royalty, severance tax, property tax and income tax revenues to the State of Alaska will increase substantially. The Department of Commerce's Report on Socioeconomic Impacts found the El Paso proposal would provide a greater impetus to the Alaskan economy, but if factors such as adverse effects on native communities and local lifestyles are given primary importance, the Department concluded that the El Paso proposal would then suffer in comparison with Alcan.

On the basis of relative growth, Cordova, 13 miles southeast of Gravina Point, will suffer the most change with the El Paso project. Because of LNG plant and construction, the population would be expected to fluctuate from 2400 in 1977 to 9100 in 1979 to 4100 in 1982. As a result, the character of the town itself might change from a fishing village to an industrial town. The State of Alaska has noted that the socioeconomic costs to small communities will be greatest for the El Paso project.

Otherwise, it should be noted that both proposed pipelines follow existing utility corridors; the native communities near these corridor have already been affected by the pressures created from major construction activity. Accordingly, the socioeconomic impact of Alcan's construction, which more closely follows these corridors, should not be as great as El Paso's.

Conclusion

To sum up, environmental values have been extensively considered and evaluated throughout the certification and decision process. In the future, Federal oversight of design and construction of the Alcan system should strengthen and implement the environmental priorities established in this decision process. Significantly, both the Administrator of the Environmental Protection

Agency and the Secretary of the Interior will be represented on the Executive Policy Board. The Board, as discussed in Chapter VI of the Report and specified in Section 5 of the Decision, will provide policy direction through the Federal Inspector to the Agency Authorized Officers, including those from the EPA and Interior, who will directly represent and exercise the statutory authorities of their respective agencies. The strong representation of EPA and Interior on the Executive Policy Board will help ensure the protection of environmental interests through the enforcement activities of the Federal Inspector.

As required by ANGTA, environmental concerns have been paramount in the study and decision process, and will be translated into a responsive permitting and enforcement mechanism for implementation of the Decision. Federal oversight will seek to avoid "trade-offs" between protection of environmental priorities and construction economics by seeking through advance planning by the Government and the applicant for the coordinated enhancement of both.

CHAPTER IV - ECONOMIC CONSIDERATIONS

Potential for Cost Overruns and Time Delay

The cost overruns that occurred in construction of the Alyeska oil pipeline naturally raise questions about the potential of any Alaskan natural gas transportation system for cost overruns. Such overruns can result from poor initial cost estimates, waste, institutional delays, inflation, low construction productivity, or management inefficiency. While it is difficult to assess the likelihood of such problems prior to the start of construction, they provide a useful basis on which to compare the respective projects. The major causes of cost overruns appear to be the following:

1. Incentives to make a low initial cost estimate. In projects where institutional approval must be obtained prior to the start of construction, the project applicant may try to increase the chances for approval by conservative estimates of the project costs.

2. Use of new complex technology or scaled increases in design size. Technologically uncomplicated systems are less expensive and have fewer uncertainties that increase capital costs.

3. Labor productivity and equipment capacity. There is a well-recognized inverse correlation between productivity and the increasing utilization of the capacity in an industry. As the use of labor capacity, equipment capacity, or management availability approaches 100 percent, productivity begins to decline rapidly. Furthermore, the more complex the project, the greater the loss in productivity or efficiency as the project capabilities are reached or exceeded. When large-scale projects experience equipment and material shortages, they generate their own internal, demand-pull inflation, resulting in an increase in equipment and material costs.

4. Cost of service tariffs and cost-plus contracts. Cost increases during construction of public utility projects merely expand the rate base of the utility; absent a variable rate of return, they do not result in any loss to investors. The same effect occurs from use of cost-plus contracts; the contractors' profit will not be adversely affected by cost overruns.

5. Construction schedule pressure. In most situations, accelerated construction schedules can be accomplished only at a high premium in cost.

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6. Long delays after project start-up. Large scale projects are frequently delayed because of litigation, labor grievances, and cumbersome bureaucratic actions or regulations.

7. Remote areas or inhospitable environments. Remote locations create severe logistical problems and magnify the costs of poor planning. Breakdown of equipment that would cause only minor delays in well settled areas may result in considerable delays in remote areas. Furthermore, new techniques, methods, and materials are frequently required when work is done in an inhospitable environment. Such conditions often cause on-site modifications of equipment or design.

8. Unforeseen geotechnical factors. Even to experienced geologists, the earth holds many surprises -- especially in the Arctic. Unexpected water flows or earth movements can create severe construction problems and cause expensive delays. The unstable permafrost soils in the Arctic regions are particularly troubling for large-scale construction.

Comparisons with Alyeska

Both the Alcan and El Paso projects would encounter these problems to one degree or another. Like Alyeska, they have the potential for significant cost overruns. But when

the Alyeska experience is examined, a convincing case can be made that the cost overruns for Alcan and El Paso would not be as great. The major problems described above provide a useful framework for comparison.

1. Low cost estimates. The early cost estimates by Alyeska were made for a system smaller than the one Alyeska finally built. Alyeska had no appreciation at the time of these estimates for the vast changes in construction techniques that would be required for arctic construction by subsequently enacted environmental laws. Alyeska also had no experience with the logistics problems and low labor productivity characteristic of arctic construction. By 1974, Alyeska had become aware of the increased costs of environmental requirements, but still had no data on labor or contractor productivity in arctic conditions. By mid-1975, when Alyeska submitted its first design cost estimate of $6.3 billion, it had developed considerable experience with pipeline construction.

El Paso's cost estimates for Alaska construction of its 2.3614 bcfd case were submitted to the Federal Power Commission in late 1975 and Alcan's estimates were submitted in mid-1976. Thus, El Paso and, to an even greater degree,

Alcan had the opportunity to factor into their cost estimates the Alyeska experience. While there are valid reasons to expect both Alcan's and El Paso's estimates to be conservative, there is little reason to expect that their initial estimates are as grossly under-estimated as the early estimates of Alyeska. Both projects had too much data and experience available to them to have made large errors, and excessive underestimates would have been challenged by competitors.

2. New technology and increases in scale. While El Paso and Alcan involve some new technology and increases in scale, the problems from these factors will be of an order of magnitude less than Alyeska's. The large capacity systems of both projects require an increase in operating pressures. DOT has concluded, however, that subject to testing to be conducted by the applicant in conjunction with the U.S. and Canadian governments, such increases are within current technological capability and safety standards.

In addition, no scale-up in construction equipment (e.g., building equipment to handle 48-inch pipe) will be required for the gas pipeline. The problems of scale-up were mostly solved by Alyeska. Thus, El Paso with its

42-inch pipe, or Alcan, with its 48-inch pipe, would have the benefit of using field-proven equipment.

The Alyeska pipeline also required a large amount of automated and sophisticated equipment. Remotely controlled "topping plants" (i.e., miniature refineries) and storage areas at pumping stations were used to provide the turbine fuel to drive the pumps. A separate gas pipeline was constructed to bring the fuel to the northernmost pump stations. In addition, Alyeska could not bury a hot oil line in the thaw-unstable permafrost. It had to employ considerably sophisticated and advanced technology to design the vertical support members and heat exchangers necessary to insulate the oil line from the surrounding environment. Approximately 400 miles or 50 percent of the line is elevated.

By contrast, a natural gas pipeline is a far more simple, less sophisticated system. Fuel for the compressor turbines is drawn directly from the gas stream, and controls are simple and easily automated. The chilled gas pipeline is compatible with the permafrost environment even in a buried mode. There are uncertainties regarding the best design and engineering to eliminate frost heave potential in discontinuous permafrost areas. However, this problem is not comparable in complexity or size with the problem of adapting a hot oil pipeline to the arctic environment.

Scale-up problems might generate cost overruns during construction of the El Paso natural gas liquefaction plant. The proposed LNG plant would require a significant scale-up from existing plants and involves lower fuel usage than has heretofore been achieved in practice. In addition, the techniques proposed to protect the proposed plant and storage tanks from earthquake damage would also require a size scale-up. Consequently, the LNG plant and terminal appear to have a potential for significant cost overruns.

3. Labor and equipment capacity. The Alyeska project is a classic example of a construction project that exceeded its predetermined labor and equipment capacity. Alyeska was forced to use inexperienced labor and contractors, and thereby incurred significant increases in the size of management and engineering staffs. This resulted in low productivity, management inefficiency, and created the project's own internal demand-pull inflation for some critical items.

Construction of a gas pipeline in Alaska should present fewer problems. Less labor is required for a continuous buried mode of construction and the Alyeska experience expanded the pool of skilled workers and contractors available for arctic construction.

The Alcan project may encounter skilled-labor shortages in Canada. Anticipated shortages in skilled labor and experienced subcontractors could reduce productivity and raise costs. However, training programs and proper project planning would mitigate this problem.

Alcan has been criticized because it will not have an overall project manager. The Canadian companies, however, can control construction in their respective segments of the system without the large increases in management or engineering required for a single project. In addition, the companies will be using control and accounting procedures with which they are familiar. It is reasonable to expect that Alcan will not suffer from the management and control inefficiencies that plagued Alyeska.

4. Incentives to minimize construction costs. The El Paso and Alcan projects would have stronger incentives to control costs than are normally present in a public-utility type project. The variable rate of return will link the earnings of equity investors directly to the cost control performance of management. In Canada, the costs to Canadian consumers for Canadian gas will be materially dependent upon the level of cost overruns in the main Alcan line, providing Canadian regulatory agencies with an incentive to control costs.

One of the terms and conditions contained in the decision will limit the use of cost-plus contracts unless approved by the Federal Inspector. Contractors will thus have incentives to hold down costs. The magnitude of the project investment and the generally limited availability of capital at present will also create financial constraints that should act to minimize costs. Furthermore, the managements of the various gas companies also have a substantial incentive to show that a major arctic project can be constructed with relatively minor cost overruns.

5. The time factor. With a simpler construction mode, fewer environmental problems, a more experienced labor force available, and more favorable terrain in most of Canada, construction of the Alcan system should pose fewer problems, and have a longer lead time to deal with them. While Alyeska had a long delay from 1969 to late 1973, there is little evidence that intensive planning occurred during that period. After Congressional approval came in late 1973, Alyeska carried out its final planning and construction in three and one-half years. The final planning and execution period for either gas project is at least five years and the overrun analyses herein have allowed for six to six and one-half years.

6. Delays. The Alyeska project suffered excessive delays because of strict new environmental laws enacted after it had initially ordered the pipe and some construction equipment. Government agencies required considerable time to write regulations and to staff operations. In addition, after construction started, numerous government inspectors monitored contractors and subcontractors, occasionally shutting down construction.

Conditions should be considerably better during construction of the gas pipeline. First, the government itself is now more knowledgeable about the inspection process and can be expected to make fewer errors. The Office of Federal Inspector is designed to achieve greater coordination of the government monitoring and enforcement process. The occasionally conflicting orders given by different departments or agencies during construction of the Alyeska project will be avoided. Second, contractors have learned to some extent to adapt to the government inspection process. Third, the gas line will raise fewer environmental problems. Overall, delays resulting from environmental regulations and government oversight and inspection should be much less during construction of a gas pipeline.

The projects will also be much less constrained by institutional delays of the type that confronted Alyeska from 1969 until enactment of the TAPS Act in 1973. Similar to the TAPS Act, Section 11 of ANGTA contains tight restrictions on judicial review of the authorization and certification process. While private litigants can still challenge Government actions, such claims must be brought within 60 days of such action, and filed only in the U.S. Court of Appeals for the District of Columbia. This Court will act as a Special Court with exclusive jurisdiction over such matters. There are no specific limitations on judicial review of Federal enforcement actions, but it is not foreseen that such litigation will result in injunctions or restraining orders that increase the potential for delays and cost overruns.

El Paso and Alcan each face institutional barriers other than potential judicial delays. For El Paso, the problem of siting an LNG facility in California has high potential for delay. The Western LNG Terminal Company has been investigating proposed locations for approximately two years, and no final decision has yet been reached. Recently, an offshore LNG facility has been receiving consideration, but gas companies and State officials estimate

that 8 to 10 years of design development and construction work would be required before it could be operational.

For Alcan, the problem of resolving native claims in the Yukon Territory in Canada had once threatened to delay construction. However, the Government of Canada has recently assured the U.S. that resolution of these claims will not delay construction and will not result in any monetary cost or claim against the Pipeline. Under the Agreement, it is expected that construction in the Yukon will commence by January 1, 1981.

In general, the magnitude of these projects virtually ensures some delay in the start of full operations -- either because of material supply, logistics, reduced labor productivity or other problems. Therefore, this Report estimates that commencement of full operations for Alcan could be delayed to January 1, 1984, and for El Paso to July 1, 1984. By comparison, the Task Force Report on Cost Overrun and Construction Delay estimated a starting date of July 1984 for Alcan and February 1985 for El Paso.

7. Remote and inhospitable location. Both projects would experience many of the same problems associated with remote locations as did Alyeska. The benefit of the Alyeska experience, however, should assist in coping more

successfully with these problems. The most tangible benefit of the Alyeska experience is the existence of the infrastructure -- e.g., roads, camps, communications -- created by Alyeska. In Canada, the southern portions of the Alcan system would be in less remote locations and present fewer problems.

8. Geotechnical considerations. Alyeska encountered many unexpected geotechnical conditions, but had done relatively little advance coring and soil testing which could have reduced the unexpected problems that arose later and allowed for improved engineering design and scheduling of work requirements.

Either of the gas pipeline projects will be able to reduce its number of site-required design changes by using the construction data generated by Alyeska and by carrying out a more extensive coring and soil testing program prior to construction. In addition, the site-specific design changes that were required will probably be less expensive.

Unexpected geological conditions could significantly increase the cost of constructing an El Paso LNG plant and shipping terminal. Similarly, Alyeska experienced significant cost overruns in constructing the Valdez terminal.

El Paso probably would escape such problems if, as expected, it finds shallow bedrock at the Gravina Point terminal site. If not, El Paso could duplicate or exceed the Valdez terminal cost overrun.

Cost Overrun Estimates Under Expected Conditions

Comparison of the El Paso and Alcan projects under expected conditions with Alyeska indicates that both projects would be able to avoid or minimize many problems that led to high cost overruns for Alyeska. Cost estimates of both projects appear to be based on much more reliable data and experience. There are also fewer uncertainties than were associated with Alyeska's early estimates, or even its estimates made as late as 1974 or early 1975. In addition, several problems that significantly contributed to cost overruns on the Alyeska project will not be as serious for these projects. While overruns can be expected, they will be of relatively lower magnitude than Alyeska's.

Obviously, any prediction of future cost overruns is highly judgmental. Specifically, it depends on judgments about future productivity, future supply-demand relationships, and geological and technical problems. But despite these uncertainties, for the purpose of this analysis some judgments must be made.

Overall, it has been estimated that cost overruns of 30 percent or more should be expected in Alaska and Canada for construction of a gas transportation system. But in many areas, the managers of a gas transportation project should benefit from the Alyeska experience and hold down overruns. This conclusion is based on careful comparison with the Alyeska experience and proceeds from the findings of the July Task Force Report on Cost Overruns and Construction Delays.

Certain distinctions, however, should be drawn between Alcan and El Paso with regard to cost overruns. For Alcan, the cost estimates in Canada are substantially lower than the cost estimates for equivalent work done in Alaska. These estimates are highly uncertain. Alcan offers several explanations for the significant differential between costs to do the same job in Alaska and Canada. It contends that wage rates in Canada are about one-half the level in Alaska and that the productivity of labor in Canada has historically been higher. Furthermore, with the exception of the Yukon section, the Canadian terrain is typically much better. Below the 60th parallel, the requirement for gravel work pads is minimal. As the line moves into British Columbia and Alberta, the Alcan construction conditions will not vary

materially from those encountered in the Northern United States, and lower construction costs can be expected.

On the other hand, the NEB closely examined Alcan's costs in Canada and concluded that cost overruns in the range of 20 to 30 percent were "not unlikely". Furthermore, it is significant that the Alcan productivity estimates for Alberta are substantially higher than the estimates of Arctic Gas for comparable terrain. The Alcan cost estimates must be substantially adjusted to enable a realistic comparison between Alcan and El Paso. Therefore, the cost estimates used herein provide for a 40 percent increase in the filed costs of Alcan for Canada.

The cost estimates of El Paso are in turn, subject to two major uncertainties. The first is El Paso's cost estimates for pipeline construction in Alaska. El Paso estimated these costs, including interest during construction, at $2.204 billion ($1975) -- $242 million less than Alcan's Alaska estimates of $2.446 billion. The relation between the El Paso cost estimates and the Alcan cost estimates is simply not consistent, however, with the physical plant requirements, but may be partially explained by the fact that the El Paso estimates were made several months earlier.

The higher Alcan estimates represent 731 miles of pipeline in Alaska, 9.6 percent less mileage than El Paso's 809 miles.10/ While Alcan would use a larger diameter pipe (48-inch for Alcan, 42-inch for El Paso), it would also have a thinner wall (0.60 inch for Alcan, 0.752 inch for El Paso). Consequently, Alcan would require about 17 percent less pipe steel in Alaska than El Paso. This differential is reflected in the respective cost estimates of the parties. The El Paso estimated materials cost for pipe was $805 million. Alcan estimated $659 million, or some 18 percent less. Finally, El Paso could have 10 compressor station sites in Alaska; Alcan would have only 8 sites. El Paso would have 234,000 installed compressor horsepower; Alcan would have 212,000 horsepower.

On the other hand, Alcan would have more installed refrigeration horsepower than El Paso, and installation costs for 48-inch pipe would be slightly higher than those for 42-inch pipe. The following Exhibit summarizes the comparisons.

10/ There would be 831 miles for the realignment which El Paso now proposes to build. The comparisons here consider only the base cases of El Paso and Alcan. El Paso estimated the realignment to have a net cost of about $70 million additional.

EXHIBIT 3

Comparison of El Paso & Alcan Pipeline Facilities in Alaska

	El Paso (2.4 Bcfd)	Alcan (2.4 Bcfd)	%
Miles (L)	809	731	-9.6%
Pipe	42" (D) x .75 (T)	48" (D) x .60 (T)	
Relative Steel Factor (π DTL)	8.006	6.614	-17.4%
Pipe Material Est.	$805,171,000	$659,239,000	-18.1%
Compressor Stations	10	8	-20.0%
Compressor HP Installed	234,000	212,000	-9.4%
Refrigeration Comp. Installed	53,690	84,470	+57.0%

By way of further comparison, Alcan and El Paso propose virtually identical alignments for the first 539 miles in Alaska. The overall costs of the two systems should be comparable to that point. At Delta Junction, the Alcan line departs from the Alyeska corridor and proceeds southeast along the Alcan Highway. The El Paso line continues along the Alyeska corridor to a point about 40 miles from Gravina Point, from which it creates a new right-of-way through the mountainous Chugach National Forest. From the common point of Delta Junction southward, Alcan would traverse 192 more miles in Alaska, while El Paso would traverse about 265 miles and some significantly more difficult terrain.11/ There is no readily apparent reason that the 192 miles of Alcan pipeline should cost significantly more than the 265 miles of El Paso pipeline.

The proper relationship between El Paso and Alcan is reflected in the recently released Aerospace, Inc., study of June 1977 that was prepared for the Department of the Interior. The direct cost estimates therein for the El Paso pipeline in Alaska are $1.963 billion. The cost estimate for a

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11/ The El Paso realignment case has about 285 miles beyond Delta Junction.

48-inch, 1680 psig[12/] pipeline along the Alcan base route in Alaska is $1.812 billion.

To allow for cost overruns the El Paso estimates were escalated by the same amount used by the Cost Overrun Task Force to arrive at $2.5 billion in direct costs (1975 dollars) or $2.85 billion (1975 dollars) including interest during contruction (IDC). The overrun case for Alcan used here is $2.38 billion in direct costs, $2.67 billion including IDC. These figures provide a better comparison between Alcan and El Paso in Alaska.

The second major uncertainty for El Paso is the cost of the LNG liquefaction plant and marine terminal on Prince William Sound, Alaska. The scale up factor and the geotechnical uncertainties create a high risk of substantial cost overruns. The Cost Overrun Task Force estimated the cost of these facilities to be $2.0 billion. The Aerospace, Inc., study estimated $1.59 billion. The estimates here used allow for $1.8 billion, plus $75 million to cover cooling towers that would likely be required to minimize the thermal pollution of Prince William Sound.

12/ This would be more expensive than Alcan's 48-inch, 1260 psi system because of more pipe steel.

El Paso would also construct eight LNG tankers of 165,000 to 175,000 cubic meter capacity (m^3) with roughly 125,000 tons displacement.[13/] El Paso estimates the LNG tanker cost at $1.365 billion. The Cost Overrun task force estimated $1.65 billion; Aerospace, Inc. uses $1.234 billion. The evidence submitted by Arctic Gas in the FPC proceeding shows an 8.8 percent overrun or $1.485 billion, and in fact, the most probable estimate is $1.45 billion.

In the lower 48 States, the facilities for El Paso and Alcan present no unique construction problems. Therefore, the cost overrun case used herein assumes only a few percent overrun for these facilities.

The following table sets forth the estimated capital costs for the base and overrun cases. The capital cost or the gross plant in service is a dominant element in the cost of service and net national economic benefit calculations.[14/]

13/ The ultimate size of the El Paso ships would be determined by the siting of the regasification facility in California. For example, if Point Conception was the site, 165,000 m^3 would be adequate. If Oxnard was the site, 175,000 m^3 would be required. See FPC, Recommendation to the President, pp. VIII - 26-28.

14/ NNEB calculations, however, use only the direct capital costs, without interest during construction.

Capital Costs
(Billions of Dollars)

	Base Case[2] (Current $)	Overrun Case (Current $)	Overrun Case (1975 $)
ALCAN[1]			
Alaska	3.335	4.147[3]	2.673
Canada	4.365	6.501	4.191
Northern Border	1.427	1.573	1.014
PGT, PG&E	.914	.983	.634
Subtotal	10.041	13.204	8.511
U.S. Share of Dempster Line	.431	.653	.382
Subtotal	10.472	13.857	8.893
Less Canadian "Share"	(1.000)	(1.489)	(.960)
U.S. "Share" of Capital Cost	9.472	12.368	7.933
EL PASO			
Alaska Pipeline	3.050	4.419	2.849
Alaska LNG	2.385	3.289	2.120
Ships	2.027	2.285	1.473
Regas Plant	.542	.674	.434
Lower-48	.991	1.032	.665
Total	8.995	11.699	7.541

1/ Based on a 48 inch 1680 psi system between Whitehorse and James River capable of transporting 3.6 bcfd. If a 54 inch 1120 psi system was constructed, the capital costs could be slightly less.

2/ Derived from the 1975 Direct Capital Costs submitted by the applicant.

3/ The Base cases assume completion one year earlier than the overrun cases which accounts for a portion of the difference.

The foregoing table includes all capital costs in Canada in which the U.S. shares. If the Dempster Line is never constructed, the capital cost on the main line in the overrun case would be $6.111 billion (1984 dollars) because of the reduced compression horsepower requirements. Total U.S. share of capital cost would be $12.767 billion.

Cost of Service

The cost of service advantage of the Alcan overland pipeline system is substantial and constitutes a crucial element of this decision. Cost of service is perhaps the principal factor in determining the value of the project to individual consumers. If the cost of service is not sufficiently low enough to ensure that the delivered cost of the gas will be below the cost of alternative fuels, the value of the project is greatly reduced.

A cost of service calculation generally includes all transporation charges other than fuel expense. The major categories of expense include the return on invested capital (interest and dividends), return of invested capital (through annual depreciation charges), Federal and State income taxes, other taxes, and operating and maintenance expenses (O&M). While annual depreciation charges are constant

throughout the depreciable life of the project and O&M expenses tend to increase with the rate of inflation, the other items decline over time as the amount of net invested capital (gross plant less accumulated depreciation) falls.

These declining items usually result in a project cost of service that decreases steadily over time, with the extent of the decrease dependent upon the rate of inflation. Although this decreasing cost of service is customary, a downward-sloping service charge to the consumer over the life of the project is not essential. Payments from consumers can be adjusted to a more constant or stable level over the accounting life of the project.

However, to compensate investors for deferral of their return in the early years of the project, and to cover the resultant increase in the total interest burden, the average delivered cost of the gas to consumers must be increased substantially; a complete leveling would increase the average cost about 20 percent over the life of the project. The decision whether to "level out" the tariff must be made by the FPC in the context of the actual financing and tariff proposals made by the applicants prior to final certification.

Alcan and El Paso: Cost of Service Comparison

The fundamental difference between El Paso and Alcan is that an overland pipeline system is inherently more efficient than an LNG transportation system. The liquefaction process involves significant energy losses that have a multiplying adverse effect upon cost of service. First, the direct cost[15/] for the natural gas consumed by El Paso is 34 percent higher than Alcan or equivalent to 3 cents per mmbtu (1975 dollars). Second, the volumes of gas delivered are reduced thus leaving a 3.4 percent smaller base over which to spread the capital costs. The increase in cost of service for this volume differential is about 4 cents per mmbtu. The El Paso system also has 100 percent higher operating costs, or the equivalent of another 9.5 cents per mmbtu increase in the cost of service. This operating cost differential is attributable to the added labor required to operate the Alaska LNG plant and the LNG tankers. In sum, the Alcan pipeline system has a 16.5 cent direct advantage apart from capital cost of financing consideration.

15/ Consistent with practice throughout the Report the fuel cost is assumed to be $1.00 per mmbtu (1975 dollars). This unquestionably is lower than actual cost will be. A higher fuel cost would increase El Paso's cost of service to a relatively higher degree than Alcan's.

The El Paso cost of service would approach the Alcan cost of service only if the more technologically complex El Paso system could be constructed for about 25 percent less than the portion of the Alcan system attributable to the U.S. There is no basis for such a conclusion. No reasonably plausible independent assessment of capital costs, suggests that to be a possibility[16/]. On the basis of filed costs, the El Paso 20-year average cost of service is $1.09 per mmbtu; Alcan's is $.81 per mmbtu[17/], or $.28 less. The Cost Overrun task force "expected case" cost of service was $1.26 for the El Paso system and $1.09 for the Alcan system, or $.17 less.

As indicated in the following Table, the overrun cases used in the Decision and Report place the cost of service at $1.21 for El Paso[18/] and $1.04 for Alcan.[19/] This is a $.17 difference. Over the first 20 years alone, the overland pipeline system will save consumers conservatively about

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16/ The overrun case used herein places El Paso 5 percent lower; the July 1 task force "expected case" placed El Paso 4.2 percent lower, of course, not including the adjustments resulting from the Agreement on Principles with Canada.

17/ Not including a U.S. share of the Dawson Spur which on filed costs would be $.0479.

[Footnotes continued]

COMPARATIVE SYSTEM COST ECONOMICS
COST OVERRUN CASE

	El Paso	Alcan[a]	Alcan[b]
Direct Cost ($1975)	$6.800 billion	$7.166 billion	$8.011 billion
Interest During Construction	0.740	0.767	0.882
Total Capital Cost ($1975)[c]	$7.540 billion	$7.933 billion	$8.893 billion
Annual O&M Costs ($1975)	$ 168 million	$ 84 million[d]	
Annual Fuel Cost @ $1/mmbtu	106 million	79 million	
Annual U.S. Delivered Volumes[e]	888 Tbtu	918 Tbtu	
Fuel Efficiency	89.1%[f]	92.1%	
Average U.S. Cost of Service ($1975)			
First 5 years	$ 1.84	$ 1.71	
Second 5 years	1.28	1.13	
Third 5 years	.95	.77	
Fourth 5 years	.77	.57	
Twenty year average	1.21	1.04	
Net National Economic Benefit	$ 4.63 billion	$ 5.77 billion	

a/ Direct and total capital costs are complete Alaska and lower-48 costs plus the U.S. share of these costs for the section of the system in Canada plus 83.3% of the Dawson-to-Whitehorse section of the Dempster line.

b/ The direct and total capital costs are the complete cost of the entire system, including the Canadian section of the main line in its entirety, plus 83.3% of the Dawson-to-Whitehorse section of the Dempster line.

c/ In current dollars, at an assumed inflation rate of 5%, the total capital costs are $11.7 billion for El Paso and $12.4 and $13.9 billion for the U.S. allocated and total Alcan system, respectively. See p. 157.

d/ Based on U.S. share of costs in the sections of the system carrying both U.S. and Canadian volumes, plus 83.3% of O&M costs on the Dawson-Whitehorse section of the Dempster line.

e/ Based upon 2.4 bcfd at 1138 Btu/cf input at Prudhoe Bay and each system's fuel efficiency. The El Paso system as filed is designed to transport and liquify slightly lower volumes (2.3614 bcfd) at slightly lower Btu content (1130).

f/ Excludes bunker oil consumption by El Paso tanker fleet which would further reduce overall system energy efficiency to 87.5%.

$6 billion (nominal), an average of $300 million per year. Further, savings will continue long into the future. The prudhoe Bay field is expected to produce gas in significant volumes for more than 25 years. The pipeline facilities will have a useful life in excess of 40 years.

Alcan Cost of Service Pursuant to the Agreement on Principles

The Alcan cost of service must be analyzed from the perspective of both the Canadian National Energy Board (NEB) Decision and the Agreement on Principles between the United States and Canada.

(continued from page 160)

18/ Apart from cost overruns, the principal variable in the El Paso cost of service is financing costs. The $1.21 per mmbtu cost of service is based upon 8.5 percent cost of debt for the LNG tankers on the assumption that the MARAD guaranteed loans be available. The return on equity for the ships is 17 percent calculated on a discounted cash flow basis, as filed by El Paso. The overall cost of the remainder of the capital is dependent upon the debt-equity ratio assumed and whether and how much preferred stock could be used. These matters have been the subject of considerable debate thrugh the proceeding. The capital structure used here is the same as that assumed for Alcan, 75-25 debt-equity ratio, 15 percent return on equity, 10 percent cost of debt. Under various other assumptions,the cost of service could be between $1.19 and $1.21.

19/ Including the cost of the U.S. share of the cost of the Dawson Spur.

The NEB decision provided for a rerouting of the Alcan main line through Dawson City, Yukon, to facilitate the transportation of up to 1.2 bcfd of Mackenzie Delta reserves. That rerouting would have compelled the expenditure of $600 million at least two to three years prior to the time it would be needed and would have added further interest costs of $150 to $240 million. If Canada did not construct the Dempster Line, the U.S. consumer would have paid more than $2 billion over the life of the project for no reason.

If the Dempster Line had been constructed, and 1.2 bcfd of Canadian gas flowed, the U.S. cost of service would have increased from $1.07 to $1.12 per mmbtu because of system inefficiencies. The amount of natural gas delivered to the U.S. would have decreased by about 40 Tbtu annually. As a result of these lost volumes and inefficiencies, the cost to American consumers would still have been $2 billion more over the first 20 years than the project which emerged from the Agreement on Principles.

The project authorized in the Agreement on Principles also represents one of those unique, rare negotiating results in which both parties can justifiably claim to have

improved their position over the starting point - the original NEB decision. This is apparent from the following comparison.

	Agreement on Principles		NEB Decision	
	U.S.	Canada	U.S.	Canada
Dempster Line Not Constructed				
Cost of Service[a/]	1.00	-	1.07[b/]	-
Fuel Usage	6.1%	-	6.7%	-
Dempster Line Constructed				
Cost of Service	1.04	1.23	1.12	1.43
Fuel Usage	7.7%	7.3%	11.2%	9.7%

a/ U.S. cost of service is the 20-year average in 1975 dollars. Canadian cost of service is for 1985, in nominal dollars.

b/ Including the $200 socioeconomic payment recommended by the NEB.

The Agreement on Principles contemplates that a higher capacity system[20/] will be constructed from Whitehorse to the James River. If Canada does not construct the Dempster Line, the United States would bear the full additional cost of the higher capacity system. The cost of service data contained in this analysis is based upon a 48-inch, 1680 psi system from Whitehorse to James River. The 1680 psi system is slightly more efficient in the 3.6 bcfd range than the 54-inch, 1120 psi system. Thus, if the 54-inch system ultimately is installed, the U.S. cost of service would be higher by about 1 percent in all cases except where Canada does not construct the Dempster Line.[21/]

If a 1680 system is installed and Canada does not build the Dempster Line, the 20-year average U.S cost of service would be about $1.00. The system would have lower fuel and operating expenses than a 1260 system but the savings would not be quite sufficient to offset carrying charges on the increased capital outlays. On the other hand, the system

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20/ Either a 48-inch, 1680 psi or a 54-inch, 1120 psi are the most likely alternatives. The selection will be determined after a joint testing program is completed.

21/ At 2.4 bcfd, the 54-inch, 1120 psi system would be slightly more economically efficient. It has a lower initial capital cost.

does provide a large amount of inexpensive expansibility that would be used in the event significant new finds of natural gas are made in Alaska.

If Canada builds the Dempster Line and deliverability from the Mackenzie Delta is 1.2 bcfd, the cost of service will vary with the level of cost overruns on the mainline system in Canada and on the Dawson Spur. From a 0 to 35 percent cost overrun, the U.S. would pay 100 percent of the Whitehorse to Dawson section. At the expected 40 percent case, the U.S. would pay 83 1/3 percent or the ratio of U.S. to joint volumes at Whitehorse, whichever is higher. At 45 percent and over the U.S. would pay 66 2/3 percent, or the ratio of U.S. to joint volumes at Whitehorse, whichever is higher.

In the cost overrun range of 35 to 45 percent, the U.S. share would vary linearly from 100 percent to 66 2/3 percent, unless the actual volumes of U.S. gas in the line commit the U.S. to provide a greater share.

In the lower cost overrun case of 35 percent or below, under which the U.S. would be required to pay the entire cost of the Dawson spur, the cost of service reduction from such overrun savings on the main line would more than offset

any increase in cost of service resulting from increasing to 100 percent the U.S. share of the Dawson to Whitehorse segment. For example, with an overrun of 25 percent in Canada, the U.S. pays 100 percent. In this example, the average U.S. cost of service over a twenty year period would be approximately $1.00 per mcf (1975 dollars), or 4 cents less than the expected overrun case of 40 percent under which the U.S. would pay only 83 1/3 percent of the Dawson spur instead of the 100 percent the U.S. would pay in the 25 percent overrun case.

The agreement also imposes a ceiling on U.S. liability for the Dawson spur of 35 percent above filed costs. The Canadians, in turn, can credit all the cost overrun savings they achieve on the main line system carrying just Canadian gas, and 2/3's (or relative volumes) of such savings on the shared system, against their cost overruns on the Dawson to Whitehorse section. Finally, the U.S. share of the Dawson spur cost of service can never be less than the U.S. percentage of actual volumes at Whitehorse, multiplied by the actual costs of the Dawson spur, notwithstanding the Dawson spur ceiling and the overrun formula. This last condition is only relevant in the case where substantial overruns in excess of 50 percent are experienced on the entire system.

This agreement creates new incentives - on a portion of the project within Canada's jurisdiction and not otherwise subject to our control - which could significantly lower the cost of service to the U.S. and at the same time enhance the project's financeability.

The application of these principles in varying factual situations is illustrated by the following table.

	Main Line Cost Overrun	Dawson Spur Cost Overrun	U.S. Base COS[a/]	Dawson Spur COS U.S.	Total U.S. COS
1.	25%	25%	.9556	.0567	1.0122
2.	30%	30%	.9679	.0601	1.0280
3.	30%	50%	.9679	.0717	1.0396
4.	30%	100%	.9679	.0692	1.0371
5.	35%	35%	.9822	.0606	1.0478
6.	40%	35%	.9927	.0505	1.0432
7.	40%	40%	.9927	.0505	1.0432
8.	45%	35%	1.0047	.0404	1.0451
9.	45%	45%	1.0047	.0436	1.0483
10.	50%	50%	1.0130	.0480	1.0610
11.	50%	100%	1.0130	.0582	1.0712

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a/ Assumes volumes of 2.4 bcfd from Prudhoe Bay and 1.2 bcfd from the Mackenzie Delta.

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Lines 1 and 2 represent 25 percent and 30 percent cost overrun cases for both the main line and the Dawson Spur. Under the Agreement, the U.S. would pay 100 percent of the Dawson spur cost of service.

Line 3 provides an example of the crediting mechanism between the main line and the Dawson spur. The 30 percent cost overrun would result in a capital savings of about $245 million below the 35 percent cost overrun. Assuming that U.S. and Canadian volumes are 2.4 bcfd and 1.2 bcfd, respectively, and all of the cost reduction is on the main line south of Whitehorse, Canada would have a credit of $163 million to apply to the cost of the Dawson Spur. A 50 percent cost overrun on the Dawson spur would be only $81 million greater than a 35 percent cost overrun. Thus, Canada would have a sufficient credit to hold the U.S. share to 100 percent.

The case in Line 4 assumes a 100 percent cost overrun on the Dawson spur.[22/] The Canadian credit here also would be $163 million. The Dawson Spur (DS) adjustment is determined by the following formula:

22/ This assumes a very unlikely occurrence in light of the cost of the main line.

$$\frac{\text{1.35 Filed DS Cost (Base)}}{\text{Actual DS Cost minus Credit}}$$

Applied to this case, the formula is:

$$\frac{733}{1084 - 163} = .7959 \times \text{DSCOS}(.0869) = .0692$$

for the Dawson Spur cost of service.

Note that the U.S. contribution to the Dawson Spur is slightly less in this 100 percent Dawson Spur overrun case than in the 50 percent overrun case. Under the agreement, the U.S. share of the Dawson spur cost of service decreases from 100 percent to 66 2/3 percent in this instance depending on the overrun level of the Dawson Spur. This increase in capital costs of the Dawson spur above a 35 percent overrun level has a greater impact under the formula in reducing U.S. cost of service share than it has in increasing the full Dawson Spur cost of service. This is so because full cost of service contains fixed costs that do not vary with capital cost overruns (e.g., operating and maintenance expenses). The greater the percentage of fixed costs, the less cost the overall cost of service will increase because of a given addition to capital costs.

While this precise effect (i.e., reduction in U.S. share where cost overruns are higher) would not obtain if the system was more capital intensive, e.g., a 36-inch or

42-inch pipe was installed, the general direction would be the same. Cost overruns on the Dawson Spur will not have a significant impact on U.S. cost of service in any case where the 66 2/3 percent floor is not reached.

The case in Line 5 is the "base" case. There are no credits available from main line construction. The Dawson Spur overrun is 35 percent. The U.S. would pay 100 percent of the Dawson Spur.

In the example on Line 6, the U.S. share of the Dawson Spur is at 83 1/3 percent because of the 40 percent overrun on the main line.

In the case represented by Line 7, the base U.S. share is 83 1/3 percent, but the Dawson Spur adjustment operates since Dawson Spur overruns are above 35 percent. The result is:

$$\frac{733}{760} = .9645 \times .833 = .8034 \times .0629 = \$.0505$$

for the Dawson Spur cost of service, and $1.0432 overall.

In Case 8, the U.S. share of the Dawson Spur has declined to 66 2/3 percent (or a volumetric share) because of overruns on the main line.

In Cases 9, 10 and 11, the mainline overruns have caused the U.S. share of the Dawson Spur to decline to 66 2/3 percent. Since the 66 2/3 percent floor has been reached, the U.S. pays that percent of total Dawson Spur cost of service, or .667 x .0650 = $.0436 for the Dawson Spur cost of service in the 45 percent case. In the 50 percent case, the Dawson Spur cost of service would be .667 x .0717 = $.0480. In the 100 percent case, it would be .667 x .0869 = $.0582.

All of the above capital cost and cost of service data assume that the input volumes of gas will be 2.4 bcfd for the U.S. and 1.2 bcfd for Canada. On the basis of present geological information, 2.4 bcfd from Prudhoe Bay is more likely than 1.2 bcfd from the Mackenzie Delta. Deliverability from the presently proved reserves in the Mackenzie Delta more likely would be in the range of .7 to .8 bcfd. A reduction in Canadian volumes would, of course, substantially increase the U.S. share of the system in Canada. However, it would not materially alter the U.S. cost of service. If the joint system was designed for 3.1 to 3.2 bcfd, the capital costs would be lower by about $100 million, the U.S. operating expenses would be lower, fuel consumption would be lower in absolute and relative terms, and

the delivered volumes would be higher. These cost reduction factors would offset the increase caused by the larger U.S. share of the base capital costs of the mainline system. For example, at 1.2 bcfd from Canada with a 40 percent overrun in Canada, the base U.S. cost of service would be $.9927. With the system redesigned for .7 bcfd from Canada, the U.S. cost of service would be $.9950.

The capital cost, operating expenses and delivery factors operate as well with respect to the cost-sharing on the Dawson Spur. To illustrate, the estimated overall U.S. cost of service at 3.6 bcfd (2.4 plus 1.2) in the overrun case is $1.0432. With 3.1 bcfd (.07 bcfd of Canadian gas) the U.S. cost of service would be slightly lower, about $1.035.

Net National Economic Benefit

The net national economic benefit (NNEB) to the United States of the Alcan project also substantially exceeds that from the El Paso project. The NNEB measures the desirability of a project from the public perspective. The NNEB of a project is the present value of the benefits derived less the present value of the resources employed in undertaking the project. The benefit is measured by the value of energy

delivered to the lower-48 states. A value of $2.62 per mmbtu for natural gas in 1975 dollars was used throughout the FPC hearings and is based upon a study done for the Department of the Interior that was market oriented rather than resource oriented. This value also formed the basis of the NNEB calculation contained in the National Economic Impact Task Force Report of July 1977.

To ascertain the reasonableness of this value, the resource cost of the most probable substitute for natural gas, No. 2 distillate, was determined. Based upon a mid-1977 price of $14.50 per barrel for imported oil and plausible assumptions regarding producer taxes and the resource investment that is required to refine crude to obtain No. 2 distillate, $2.60 per mmbtu is a fair measure of the current resource cost of this substitute for natural gas.[23/]

Further, the real value of natural gas is likely to increase over time as the real cost of imported oil increases. If the real value of gas increases at a rate of only 2 percent per year, the value of the gross benefits

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23/ The value of gas is undoubtedly higher since the intrinsic value of gas is greater than that of oil (clean, efficient, etc.) and a continuation of gas supply avoids the capital costs of conversion.

determined herein would increase approximately 35 percent, and the NNEB would approximately double.

There are five general categories of resource costs used in the NNEB calculation: the Prudhoe Bay field costs of conditioning the gas and using water injection in place of reinjected gas to pressurize the field; the initial capital costs of the transportation systems; annual operating and maintenance costs; the costs of public services used to support the project (measured in terms of the property taxes the project will be required to pay); and, in the case of Alcan, the annual cost of service payments to Canada for transporting the gas.24/

The components underlying these benefit and cost factors are displayed in Exhibits 4 and 5, and the NNEB components are summarized in Exhibit 6 for El Paso and Alcan under the cost overrun case herein. Alcan's NNEB exceeds that of El Paso by over $1.1 billion, which is approximately 25 percent of the El Paso NNEB. Most of that difference is attributable to the reduced volumes of gas

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24/ Fuel costs are not included. The U.S. will supply its share of fuel used to transport the gas through Canada and that cost is reflected automatically in the benefit calculation.

Exhibit 4

ALCAN NNEB COMPONENTS

YEAR	DELIVERED GAS (TRILLIONS BTU'S)	FIELD GATHERING & CONDITIONING ($MILLION)	FIELD OPERATION & MAINTENANCE ($MILLION)	U. S. TRANSPORT. FACILITIES ($MILLION)	U. S. WORKING CAPITAL ($MILLION)	U. S. OPERATION & MAINTENANCE ($MILLION)	OTHER U. S. TAXES ($MILLION)	U. S. SHARE CANADIAN COSTS ($MILLION)
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0
1980	0.0	200.0	0.0	240.0	0.0	0.0	0.0	0.0
1981	0.0	344.0	0.0	828.0	0.0	0.0	0.0	0.0
1982	0.0	400.0	0.0	1497.0	0.0	0.0	0.0	0.0
1983	0.0	500.0	0.0	1259.9	0.0	0.0	0.0	0.0
1984	935.5	0.0	8.0	0.0	16.4	37.4	136.4	1330.4
1985	936.1	0.0	8.0	0.0	0.0	39.2	128.7	1239.8
1986	914.7	0.0	8.0	0.0	0.0	41.2	121.2	1174.4
1987	916.0	0.0	8.0	0.0	0.0	43.3	114.2	1109.6
1988	915.9	0.0	8.0	0.0	0.0	45.4	107.6	1051.8
1989	916.7	0.0	8.0	0.0	0.0	47.7	101.3	1019.4
1990	917.4	0.0	8.0	24.3	0.0	50.1	95.4	992.5
1991	918.0	0.0	8.0	18.4	0.0	52.6	79.7	967.7
1992	917.6	0.0	8.0	17.7	0.0	55.2	73.4	944.8
1993	918.3	0.0	8.0	14.1	0.0	58.0	68.2	923.4
1994	918.6	0.0	8.0	0.0	0.0	60.9	63.3	903.5
1995	918.9	0.0	8.0	0.0	0.0	63.9	58.5	885.0
1996	919.0	0.0	8.0	0.0	0.0	67.1	54.0	868.0
1997	919.6	0.0	8.0	0.0	0.0	70.5	49.6	852.2
1998	920.0	0.0	8.0	0.0	0.0	74.0	45.5	837.6
1999	920.6	0.0	8.0	0.0	0.0	77.7	41.4	825.3
2000	920.5	0.0	8.0	0.0	0.0	81.6	37.5	812.6
2001	920.5	0.0	8.0	0.0	0.0	85.7	34.5	812.8
2002	919.7	0.0	8.0	0.0	0.0	89.9	30.6	799.2
2003	919.4	0.0	8.0	0.0	0.0	94.4	26.8	767.1
2004	919.0	0.0	8.0	0.0	0.0	99.2	22.8	736.5
2005	919.0	0.0	8.0	0.0	0.0	104.1	19.0	707.0
2006	919.0	0.0	8.0	0.0	0.0	109.3	15.2	678.7
2007	919.0	0.0	8.0	0.0	0.0	114.8	11.5	651.6
2008	919.0	0.0	8.0	0.0	0.0	120.5	7.7	625.5
2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	22998.0	1444.0	200.0	3949.4	16.4	1783.7	1544.0	22516.4

Exhibit 5

EL PASO NNFB COMPONENTS

YEAR	DELIVERED GAS (TRILLIONS BTU'S)	FIELD GATHERING & CONDITIONING ($MILLION)	FIELD OPERATION & MAINTENANCE ($MILLION)	U. S. TRANSPORT. FACILITIES ($MILLION)	U. S. WORKING CAPITAL ($MILLION)	U. S. OPERATION & MAINTENANCE ($MILLION)	OTHER U. S. TAXES ($MILLION)	U. S. SHARE CANADIAN COSTS ($MILLION)
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.0	80.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	180.0	0.0	0.0	0.0	0.0
1980	0.0	200.0	0.0	530.0	0.0	0.0	0.0	0.0
1981	0.0	344.0	0.0	1275.0	0.0	0.0	0.0	0.0
1982	0.0	400.0	0.0	2375.0	0.0	0.0	0.0	0.0
1983	0.0	500.0	0.0	1880.0	0.0	0.0	0.0	0.0
1984	444.0	0.0	4.0	480.0	0.0	130.3	125.6	0.0
1985	888.0	0.0	8.0	0.0	0.0	273.6	270.8	0.0
1986	888.0	0.0	8.0	0.0	0.0	287.3	260.3	0.0
1987	888.0	0.0	8.0	0.0	0.0	301.6	249.8	0.0
1988	888.0	0.0	8.0	0.0	0.0	316.7	239.3	0.0
1989	888.0	0.0	8.0	0.0	0.0	332.5	228.8	0.0
1990	888.0	0.0	8.0	0.0	0.0	349.2	218.3	0.0
1991	888.0	0.0	8.0	0.0	0.0	366.6	207.8	0.0
1992	888.0	0.0	8.0	0.0	0.0	384.9	197.2	0.0
1993	888.0	0.0	8.0	0.0	0.0	404.2	186.7	0.0
1994	888.0	0.0	8.0	0.0	0.0	424.4	176.2	0.0
1995	888.0	0.0	8.0	0.0	0.0	445.6	165.7	0.0
1996	888.0	0.0	8.0	0.0	0.0	467.9	155.2	0.0
1997	888.0	0.0	8.0	0.0	0.0	491.3	144.7	0.0
1998	888.0	0.0	8.0	0.0	0.0	515.8	134.1	0.0
1999	888.0	0.0	8.0	0.0	0.0	541.7	123.6	0.0
2000	888.0	0.0	8.0	0.0	0.0	568.7	113.1	0.0
2001	888.0	0.0	8.0	0.0	0.0	597.2	102.6	0.0
2002	888.0	0.0	8.0	0.0	0.0	627.0	92.1	0.0
2003	888.0	0.0	8.0	0.0	0.0	658.4	81.6	0.0
2004	888.0	0.0	8.0	0.0	0.0	691.3	71.1	0.0
2005	888.0	0.0	8.0	0.0	0.0	725.9	60.5	0.0
2006	888.0	0.0	8.0	0.0	0.0	762.2	50.0	0.0
2007	888.0	0.0	8.0	0.0	0.0	800.3	39.5	0.0
2008	888.0	0.0	8.0	0.0	0.0	840.3	29.0	0.0
2009	444.0	0.0	4.0	0.0	0.0	441.2	9.2	0.0
2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	22200.0	1444.0	200.0	6800.0	0.0	12746.2	3732.8	0.0

EXHIBIT 6 - NNEB COMPARISON
($ Billions 1975)

	El Paso[a/]	Alcan[a/]
Value of Gas	$10.849	$11.791
Less:		
Field Capital Costs	.873	.873
Transport Facilities	4.074	2.334
U.S. Working Capital	0	.008
U.S. O & M (field and system)	.820	.157
U.S. Other Taxes	.456	.222
Canadian Cost of Service	0	2.431
NNEB	$ 4.626	$ 5.766

a/ Based upon 2.4 bcfd input at 1137.8 Btu/cf.

that El Paso would deliver because of its high fuel consumption. The real resource costs associated with the transportation are nearly equal, with the higher sum of the Alcan facilities, plus Canadian cost of service for Alcan, being offset by El Paso's large operating and maintenance expenditures.

While both projects exhibit the ability to absorb substantial cost overruns without becoming uneconomic, Alcan's ability is greater than that of El Paso. Assuming that the elasticity of cost of service with respect to direct cost overruns is about 0.8, Alcan's direct costs could increase almost 124 percent over the cost overrun case before it would become socially uneconomic; the comparable figure for El Paso is 114 percent.

In conclusion, the economic considerations overwhelmingly favor the Alcan overland pipeline measured against the El Paso LNG transportation system. The cost of service will be significantly less; the net national economic benefits will be significantly higher; the amount of energy delivered will be significantly higher; and the ability to absorb cost overruns is greater.

CHAPTER V - SAFETY, RELIABILITY AND EXPANSIBILITY

Considerations of safety, reliability and expansibility favor the Alcan overland pipeline system in comparison to the LNG system proposed by El Paso.

The safety record for LNG storage and transportation has been excellent during the past quarter of a century. Nevertheless, LNG facilities present marginally higher risks of a major accident than overland pipelines. An LNG project requires a careful approach to facility siting. The United States may need to rely more upon LNG in the future. However, the use of LNG should be chosen where there is no economically and environmentally feasible alternative.

The greater reliability of the Alcan system should be emphasized. The El Paso system is a multiple-mode system that would be sized and operated at very close capacity and operational tolerances, a factor that tends to decrease reliability. Further, the El Paso pipeline would cross several major geologic faults--the Alaska LNG facility and the California regasification facility would be sited in some of the most seismically active areas in the world. Although the faciliites can be designed and constructed to survive structurally a major seismic event, there

inevitably would be interruption in service during repair. By contrast, the seismic risk to the Alcan system is very small. It will approach relatively few seismically active areas and will cross no known active faults in Alaska.

Finally, expansibility of capacity also weighs in favor of the Alcan system. The capacity of a properly designed all-pipeline system can be expanded incrementally up to a point simply by the addition of compression at relatively low capital cost. The capacity of an LNG system, on the other hand, must be expanded in large increments that may be excessive in relation to the actual need.

The specific safety and design areas which have been addressed by U.S. and Canadian authorities and to which Alcan must now properly respond as the project moves forward include:

- Safety of Design and Operation
- Potential for Service Interruption -- Reliability
- Efficiency of Design and Capability of Expansion
- Monitoring Construction and Joint U.S./Canadian Coordination

These safety and design issues, involving new technologies for the Alaska gas system, were reviewed by an Interagency Task Force under the lead of the Department of Transportation (DOT), with participation by the Departments of the Interior and Commerce, the Federal Energy Administration, the Energy Research and Development Administration, and the Environmental Protection Agency.

Safety of Design and Operation

The technical problems in operating a pipeline at high pressures and the transportation of natural gas at chilled temperatures have been carefully considered by government and industry officials. Specific issues include:

- high strength pipe metallurgy,
- the possibility of frost heave effects on the pipeline in permafrost soils,
- the choice of pressure testing methods, and
- development of advanced valve designs.

Final resolution of these technical issues will be needed before there can be site specific approvals of system design and initiation of construction.

Pipe Metallurgy. The principal factors that affect safety of the pipeline system are the type, design, physical properties, the metallurgy of the pipe used, and quality control for the pipe.

Alcan initially proposed to operate its 48-inch system at 1260 psig pressure with the pipeline buried and the gas chilled below 32°F before shipment through permafrost regions. It is probable that Alcan will redesign its system between Whitehorse, Yukon, and Caroline Junction, Alberta, to increase capacity and allow for the economical transportation of Canadian gas from the Mackenzie Delta. The principal alternatives are a 48-inch, 1680 psi system or a 54-inch, 1120 system. In addition, if a 1680 system is installed south of Whitehorse, consideration will be given to installation of a 1680 psi system in Alaska, perhaps with a pipe diameter less than 48-inch. The higher pressure system is generally more economically efficient than lower pressure designs.

To date, the highest pipeline operating pressure has been approximately 1000 psi. From the evidence submitted at the FPC hearings, the DOT and the Safety and Design Task Force tentatively have concluded that the higher operating pressures (1670 to 1680 psi) could be safely achieved with

adequately designed pipe. However, further testing and evaluation will be required. The Agreement on Principles between the United States and Canada provides for a jointly conducted testing and evaluation program to determine which system would offer the highest degree of safety, reliability and efficiency. Upon completion of the testing program, the respective regulatory authorities of each country will make a final decision as to which type of system might be installed in each country.

Another issue pertaining to high pressure pipe is whether special "crack arrestors" will be required to stop fracture propagation in the event a fracture should occur. The Safety and Design task force concluded that the fracture toughness properties designed into the pipe specified by the various operators should be sufficient to prevent the initiation of a propagating crack even at arctic temperatures. It therefore concluded that crack arrestors were merely a precaution to ensure that in the remote chance a crack were to initiate, any resulting propagation would be controlled. The task force also reported that with proper

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design and installation, the arrestors would introduce no problems of corrosion control or stress concentration.

However, if Alcan uses crack arrestors, the particular design and installation plans will be reviewed on a site-specific basis by the DOT to assure that they are consistent with the Federal gas pipeline safety standards.

Alcan plans to use high-strength, grade X-70 pipe. The grade has been rated acceptable in the most recent survey of pipe specifications published by the American Petroleum Institute (API). However, a reference specification for X-70 pipe is not presently incorporated in the Federal gas pipeline safety regulations. Reports of operating experience with X-70 pipe and its approval under liquid pipeline safety standards, as well as in the standards and regulations of many other countries, make it probable that the DOT will incorporate the API X-70 pipe specifications into its regulations before commencement of the construction on the Alaska portion of the system. The economic benefits from the use of X-70 pipe provide an incentive to incorporate it into the design of the Alaska gas system.

Potential for "Frost Heave." The problem of frost heave (i.e., the upward movement of a buried pipeline resulting from freezing and thawing conditions), which pipelines can experience when buried in areas of discontinuous permafrost, must be adapted for the particular conditions encountered on a site-specific basis. Depending upon soil characteristics, some discontinuous permafrost areas are more subject to frost heave than others. Given the time to finalize the route survey, field testing to determine soil conditions, and engineering design capability, Alcan should be able to solve the frost heave problem satisfactorily although costs for doing so may vary from initial estimates.

Alcan has stated that it expects to encounter 80 miles of frost-susceptible soil along its right-of-way. It plans to use a passive system which consists of loose fitting insulation and select backfill. This will be supplemented by cycling flowing gas temperatures, thermistor monitoring of the pipeline to detect frost heave problems for corrective action, and periodic patrol and visual inspection based upon accessibility of its right-of-way.

The DOT will review the frost heave site-specific design approach for the Alaska section to assure that the final

design will provide the required pipe support, and meet the other pertinent provisions of the Federal gas pipeline safety standards in 49 CFR Part 192. Because frost heave problems occur over a period of time, monitoring of the design, construction, and operation of the Alaska gas transportation system by Alcan and government agencies should detect problem areas early and provide the high level of safety and reliability required.

Pressure Testing. Once the pipeline is installed, Federal pipeline safety standards require that pipeline systems be pressure tested before initial operation. Alcan proposes to use a hydrostatic test and preheat the test water to prevent its freezing in the line where buried in permafrost areas. This procedure proved workable on the Alyeska crude oil pipeline. However, the Alyeska pipeline was buried only in areas of thaw-stable material and was designed, from a thermal expansion standpoint, to carry warm oil. The Alcan pipeline, on the other hand, will be buried in varied types of soil conditions and designed to carry chilled gas.

The Task Force on Safety and Design concluded that "the proposed Alcan procedure for hydrostatic testing with heated water would not be appropriate in sections traversing permafrost or discontinuous permafrost unless stringent control

of test water temperatures is maintained and adequate temperature sensing devices are installed adjacent to the buried pipe." That report also concluded that an approach similar to the one proposed by Arctic Gas, i.e., a hydrostatic test using a water/methanol freeze-depressant solution at stress levels approaching 100 percent specified minimum-yield strength, provided the best assurance that any defects present in the pipe will be disclosed prior to placing the line in service.

Extensive studies were performed by Arctic Gas on the procedures to be used, the manpower to be expended, and the equipment and costs associated with both air and methanol/water testing. The proposed Arctic Gas test plan included procedures for disposing of the methanol after testing and safeguards to be used in the event of a pipeline test failure. Reports to the DOT confirm that there are very few test failures on newly constructed gas pipelines. In the remote event of failure, environmental concerns can be alleviated through development of a spill containment contingency plan and proper method of methanol disposal. Alcan should utilize hydrostatic testing research data developed by Arctic Gas; such information should be made available to Alcan.

Valve Design and Performance. If Alcan constructed a 1260 psi system, it would face few problems with regard to design of valves for chilled service. However, if Alcan increases pressure to 1680 psi, either for the Alaska segment of its line alone or for sections in Canada, additional valve design evaluation will be necessary. Valves currently installed in operating pipelines have not had service experience at those higher pressures with chilled gas temperature conditions even though some development and test work has been done at the ranges of pressure which were anticipated for the Arctic Gas and El Paso systems. If higher-pressure service is used, valving plans will be reviewed by DOT on a site-specific basis to assure that the designs are consistent with Federal gas pipeline safety standards.

Correlation Between Canadian and U.S. Gas Pipeline Safety Standards. To assure the overall integrity of the Alaska natural gas transportation system and the continued reliability of service to the U.S., it will be necessary to coordinate specific elements of the Canadian and U.S. gas pipeline safety standards. A review is underway to identify and correlate the various specific features of the Canadian and U.S. standards, and with effective technical liaison between the U.S. and Canadian regulatory

agencies, these slightly differing standards should not create any problems. It will be necessary for those regulatory officials monitoring construction of the U.S. pipeline system to be aware of and resolve differences in design, particularly as they relate to acceptable levels of safety and reliability of service.

Design and Active Seismic Areas. The proposed Alcan route encounters relatively few active seismic areas and the risk of damage to the Alcan system from earthquake activity is small. Alcan crosses no known active faults in Alaska. The Denali fault is approximately 30 miles away at its closest point. In Canada, Alcan traverses the Shakwab fault which is large but not likely to be active. Alcan plans to provide for earthquake protection by wide-shallow ditch design and granular backfill to provide support for the pipe to an 8.5 Richter scale, and to install valves at either side of the fault.

Compressor stations for the Alcan system will incorporate structural design for anticipated earthquake stresses and utilize heavier wall pipe where appropriate.

Potential for Service Interruption -- Reliability

Accessibility of the Alcan route by the Alyeska haul road and existing highways in Alaska and in Canada will

facilitate proper maintenance of the pipeline system. In certain tundra areas where conflicts may arise between requirements of the Federal gas pipeline safety standards and the environmental protection rules of Federal or State agencies, trade-offs between environmental considerations and pipeline safety and reliability will need to be carefully weighed in specific instances.

The FPC concluded earlier that each of the three systems originally proposed could be operated with a reliability acceptable to the gas consumers of the United States. The record of pipelines generally shows that their continuity of service is by far the best of any mode of transportation in the United States, and Canadian experience, including experience with the pipelines, in the far north is comparable.

The FPC and the Task Force on Safety and Design also concluded that repair of a pipeline outage on any of the systems as originally proposed would normally be very rapid. Again, the accessibility of the Alcan route to haul roads, work pads, and existing highways would facilitate rapid repair. Special techniques and equipment will be required for repairs in remote tundra areas during the period of summer thaws. Techniques originally planned to be used by Arctic Gas for such repair should be considered by Alcan in its maintenance and repair plans.

Efficiency of Design and Capability of Expansion

It was also suggested in the safety and design report that for economic reasons, Alcan should consider increasing the operating pressure and wall thickness of its 48-inch diameter pipeline in order to allow for more efficient increases in throughput rate for additional reserves which might be committed to the system from either Alaska or Canadian sources.

These physical factors determine the capacity of a gas pipeline:

- diameter of pipe,
- operating pressure,
- the rate (velocity) at which gas moves through the line.

For any new system the first two items are selected in relation to the expected "throughput" of the gas and are then fixed. Any subsequent increase in the capacity of that pipe requires movement of gas at a higher rate. The velocity of gas is increased by adding compression to the pipeline. Compression requires fuel essentially in proportion to the horsepower added. Thus, as more throughput is

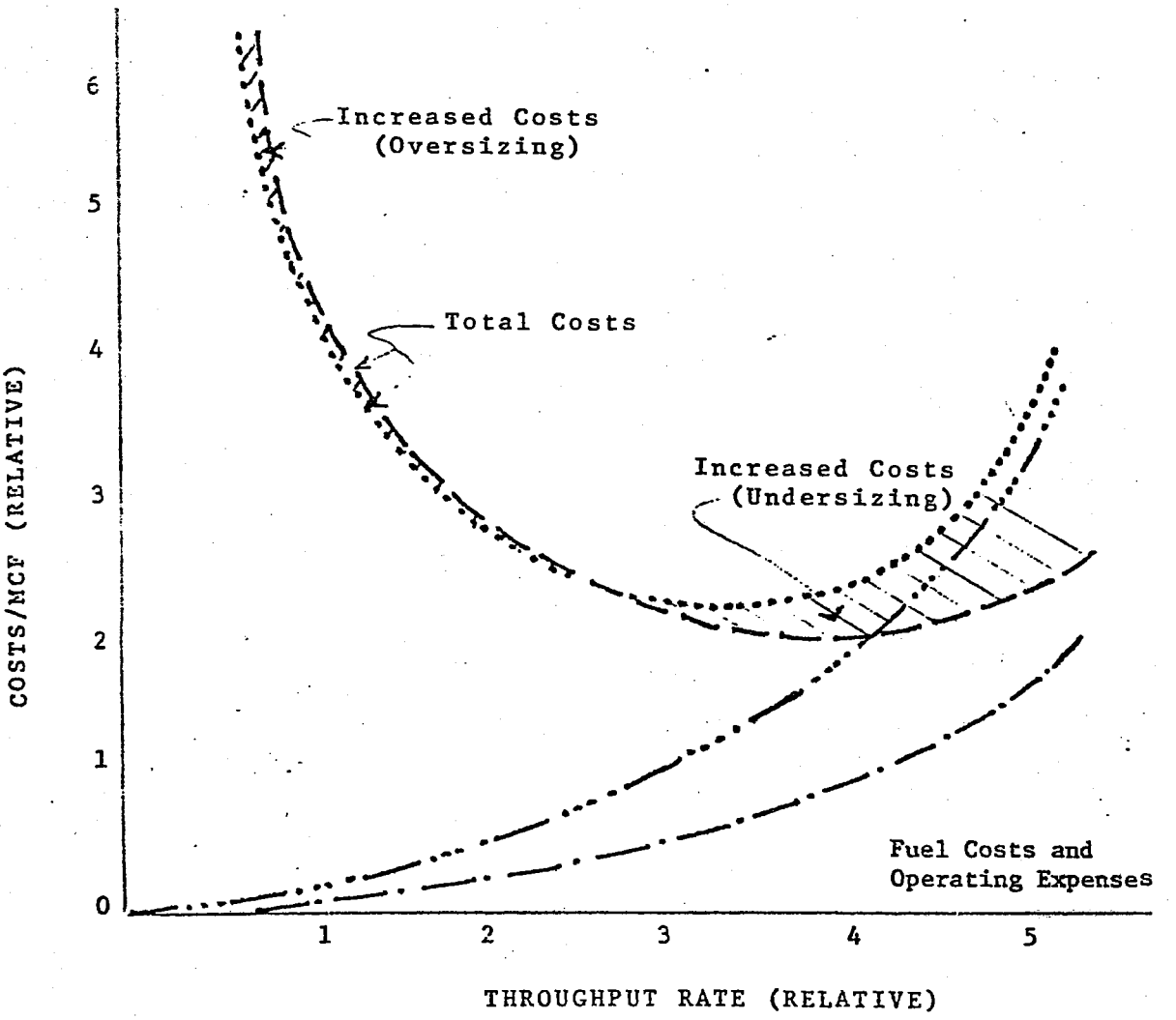
required in an existing pipeline, horse power (capital cost) and fuel use (operating cost) will increase.25/

The introduction of the additional gas also allows the division of fixed costs by more units of throughput. If the line is operating at less than optimal capacity, the decline in unit fixed costs will be greater than the increase in unit costs for additional horsepower and fuel, and the overall unit cost will decrease. On the other hand, if the pipeline is forced beyond its optimal capacity by addition of yet more compression, the reverse is true: horsepower and fuel increases faster than the declining unit fixed costs, resulting in an increase in overall unit cost of service. Exhibit 4 illustrates the problem.

Overall, considering the arctic construction, inflationary impacts, and environmental impacts, the ultimate cost to consumers of providing capacity for increased gas throughput would be much lower if the capacity is provided initially by increasing the diameter or working pressure of the pipe, than if it is provided later by adding compressor horsepower or looping the pipeline.

25/ Horsepower and fuel requirements increase roughly as the the difference between the squares of the relative throughputs. Doubling the throughput would require about 4 times as much fuel.

RELATIVE COST vs RELATIVE RATE
DIFFERENT DESIGN CAPACITY



The routing of the Alcan system provides future access to reserves which might be discovered in the Beaufort Sea or eleswhere on the North Slope. Alcan similarly could transport gas from other areas of Alaska or even from the Gulf of Alaska by means of somewhat longer supply laterals. Further, the Agreement with Canada provides for the use by Canada of the Alcan main line at a throughput up to 1.2 bcfd. Therefore, redesign of the system to enable inexpensive expansibility up to 3.9 to 4.0 bcfd south of Whitehorse, Yukon Territory, is essential.

CHAPTER VI - ORGANIZATION OF FEDERAL INVOLVEMENT AFTER SYSTEM SELECTION

Introduction

A frequently cited problem with construction of the Alyeska pipeline was the multitude of Federal Government agencies that severally prescribed and enforced terms and conditions with only minimal coordination of purpose or effort. Uncoordinated government actions can cause needless construction delays and cost increases. Coordinated Federal oversight of project management and construction would:

- provide coherent and uniform rules, and make them clear to the applicant;
- provide consistent enforcement of the rules;
- avoid rules and bureaucractic procedures that are merely cumulative and would be sources of delay.

ANGTA provides for creation of a new Federal officer, the Federal Inspector for construction of an Alaska natural gas transportation system. Under Section 7(a)(5) of ANGTA, this Federal Inspector shall-

> (A) establish a joint surveillance and monitoring agreement, approved by the President, with the State of Alaska similar to that in effect during construction of the trans-Alaska oil pipeline to monitor the construction of the approved transportation system within the State of Alaska;

(B) monitor compliance with applicable laws and the terms and conditions of any applicable certificate, rights-of-way, permit, lease, or other authorization issued or granted;

(C) monitor actions taken to assure timely completion of construction schedules and the achievement of quality of construction, cost control, safety, and environmental protection objectives and the results obtained therefrom;

(D) have the power to complete, by subpoena if necessary, submission of such information as he deems necessary to carry out his responsibilities; and

(E) keep the President and the Congress currently informed on any significant departures from compliance and issue quarterly reports to the President and the Congress concerning existing or potential failures to meet construction schedules or other factors which may delay the construction and initial operation of the system and the extent to which quality of construction, cost control, safety and environmental protection objectives have been achieved.

While the Federal Inspector can "monitor" the enforcement and compliance actions of the various Federal agencies, he does not have any specific enforcement powers. A coordinated regulatory approach will be elusive unless the Federal Inspector has the necessary supervisory authority at the field level over enforcement of terms and conditions to ensure that coordination occurs.

Therefore, as set forth in the Presidential decision, the President will submit to Congress upon approval of the

Decision a limited executive reorganization plan for the very specific purpose of transferring to the Federal Inspector field-level supervisory authority over the enforcement of stipulations and terms and conditions from those Federal agencies having statutory responsibilities over various aspects of an Alaska natural gas transportation system. This coordinated field level authority over compliance and enforcement activities of the respective Federal agencies is essential to avoid project delays and minimize cost overruns.

However, the Federal Inspector will be subject to the ultimate policy direction and supervision of an Executive Policy Board, made up of the Secretaries of Interior, Energy, and Transportation, the Administrator of the Environmental Protection Agency and the Chief of the Army Corps of Engineers. Furthermore, all Federal agencies will retain their existing authorities, pursuant to section 9(a) of ANGTA, to issue original certificates, permits, rights-of-way and other authorizations, and to prescribe any appropriate stipulations and terms and conditions to such authorizations that are permissible under existing law. Finally, the Agency Authorized Officers, who will exercise the delegated

authorities of their respective agencies, will directly enforce the stipulations and terms and conditions--subject to the field-level supervisory direction of the Federal Inspector.

With these organizational proposals, and with the general terms and conditions set forth in the Decision, the Federal Government will have an expanded role in the oversight of project management and construction. The oversight authority conferred by the terms and conditions set forth in the Decision will be far more comprehensive than the limited Federal monitoring effort over Alyeska's project management. If these general terms and conditions are effectively enforced, most of the management abuses associated with the Alyeska project should not recur. The general terms and conditions, however, do not hold the successful applicant to any specific management approach, but merely provide certain minimum standards for cost and quality control and timely completion of construction, which reflect the collective experience and knowledge gained by the various Federal agencies from involvement with the Alyeska project.

The Organization of Federal Involvement with the Alcan Project

As noted above, the Federal Inspector will have the field-level supervisory authority over the Agency Authorized Officers who will be assigned on a full-time basis to administer the authorities of their respective agencies over various aspects of the Alcan project. The Federal Inspector and the Agency Authorized Officers will constitute an Alaskan Natural Gas Pipeline Office.[26/] This Office will consist of administrative and field inspection and monitoring staff working under the direction of the Federal Inspector. The Executive Policy Board will approve the level of staff support, and determine Agency Authorized Officer participation in providing such staff support to the Federal Inspector.

Essentially, the organization of Federal involvement with the Alcan project has three elements:

1. The Federal Inspector. The Federal Inspector will be a Presidential appointee confirmed by the

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26/ The Office should be located in Alaska, at least for the construction phase of the project, and later in reduced form for the operational phase. It is probable that preconstruction planning and design will necessitate an Alaska-based pipeline office (e.g., to coordinate site-specific terms and conditions) even though the size of the Washington, D.C.-based staff will be larger in the earlier phases of the project.

Senate and is an officer independent of other existing Federal agencies. In addition to his statutory duties under section 7(a)(5), the Federal Inspector will have supervisory authority at the field level over enforcement of terms and conditions, and will otherwise coordinate Federal involvement with the pipeline operator during the design and construction phases of the project. The Federal Inspector is designed to be the principal point of contact with the pipeline owners, the contractors, State agencies, and Canadian entities on matters pertaining to Federal oversight of the project. As chairman of the Executive Policy Board, he should be the executor of its policy decisions. The Federal Inspector also has the power to compel information by subpoena and to issue quarterly reports to the President and Congress concerning existing or potential failures to meet construction schedules and other matters.

2. The Executive Policy Board. Presidential supervision over the Federal Inspector will be delegated to an Executive Policy Board. The Board would be made up of the Secretaries of Interior, Energy, Transportation, the Administrator of the Environmental

Protection Agency, and the Chief of the Army Corps of Engineers, or their Deputies (or senior officers who have been delegated authority over gas pipeline matters). The Federal Inspector shall serve as the non-voting chairman of the Board.

The Board will provide policy guidance through the Federal Inspector to the Agency Authorized Officers and will be paramount in all policy matters. It will also act as an appellate body to resolve any differences between the agencies and the Federal Inspector, including differences that may arise when the Federal Inspector overrules an enforcement action of an Agency Authorized Officer. In such cases, the Board shall expeditiously resolve any appeal within a specified time period. Otherwise, the Board shall confine itself to policy-making matters, and the Federal Inspector will be the conduit of the Board in carrying out policy.

3. The Agency Authorized Officers. These officers will represent and exercise the internally delegated authorities of their respective agencies in matters pertaining to the project. Although these authorities can be exercised only by the

respective Agency Authorized Officers, they will be subject to supervision of the Federal Inspector at the field level, and receive policy direction from the Executive Policy Board through the Federal Inspector on enforcement matters.

The Agency Authorized Officers should have no other administrative duties that would require less than full attention to the project, unless the Executive Policy Board consents to waive this requirement in a particular case. It is hoped that the use of Agency Authorized Officers to represent the various agencies will minimize coordination problems between the project applicant and the Federal Government.

Implementation of Organizational Plan

The proposed transfer of field-level supervisory authority to the Federal Inspector should be submitted for approval by Congress in a government reorganization plan, rather than implemented by executive order. This plan will propose a limited, single-purpose transfer of field-level supervisory authority over enforcement of terms and conditions for the duration of the preconstruction and construction phases of the Alcan project. No other transfer of existing authority, or transfer of any coordination function, will be proposed in the reorganization plan.

To avoid the possible overlap with Congressional action on the Presidential decision itself, the reorganization plan will not be submitted to Congress until that decision has been approved. Congress would then have 60 legislative days in which to consider the merits of the plan under the special parliamentary procedures provided by the Reorganization Act of 1977, 5 USC 901 et seq.

The President can immediately issue an executive order creating the Executive Policy Board and by his power pursuant to Section 301 of Title 3, delegate the necessary authority to the Board to carry out its functions. The Board can then make certain initial administrative decisions regarding the Office of Federal Inspector--e.g., the level of staff support for the Federal Inspector, and the possible use of the Army Corps of Engineers for such staff support. In the interim, the Federal Inspector can immediately exercise his responsibilities under existing ANGTA authority to "monitor" compliance by Alcan with applicable laws and authorizations.

Coordination with the States

In addition to the duty of organizing Federal involvement, the Federal Inspector has the substantial responsibility under ANGTA to establish a joint surveillance

and monitoring agreement with the State of Alaska and other affected States. The strengthened field level supervisory authority proposed for the Federal Inspector will be of great assistance in the performance of this statutory responsibility.

The Alcan system will pass through hundreds of miles of land owned by the States, particularly by the State of Alaska. Officials of the State of Alaska have previously declared that the State will issue a right-of-way lease to the gas pipeline for crossing these lands, regardless of which project is approved, and have indicated that environmental terms and conditions will be part of this lease.

The States and the Federal Government share responsibility to ensure that lands, water and wildlife are not unnecessarily disturbed by the gas pipeline and that where disturbed, maximum restoration is carried out. The Federal Inspector and Agency Authorized Officers will therefore work with the State of Alaska and with other States in a cooperative fashion both for the protection of the environment and for the expeditious construction of the pipeline. The terms and conditions and stipulations which pertain to State and Federal lands should be as similar as possible. A reasonable accommodation of State and Federal interests

is expected with the Federal Government having primary responsibility where the pipeline crosses Federal land and private lands, and with the State Governments having primary responsibility where the pipeline crosses State lands. Cooperative agreements based on these principles have been successful in the recent past, and should be the point of departure for further strengthening the Federal and State cooperation during construction of the gas pipeline.

CHAPTER VII - IMPACT ON COMPETITION IN THE NATURAL GAS INDUSTRY

The antitrust and competitive impact effects of an Alaskan natural gas system have been thoroughly studied by the Federal Power Commission and by the Justice Department under Sections 6 and 19 of the Alaska Natural Gas Transportation Act of 1976. Under section 19, the Attorney General prepared and submitted to Congress on July 14, 1977, a detailed analysis of potential antitrust issues and problems. Under Section 6, the Attorney General submitted that same report to the Alaskan Natural Gas Task Force, along with a commentary on the FPC's findings with respect to competitive impact. In addition, the Justice Department submitted a letter on August 9, 1977, which elaborated its views concerning possible participation by the gas producers in financing the transportation system. A copy of the letter is appended to the end of of this Chapter.

Based on these studies, it can be concluded that the Alcan project will have no harmful effect on regional or national competition in the natural gas industry, and that any potential of competitive abuse can be cured by proper proper federal regulation. In addition, consistent with

the Administration's antitrust objectives, producers of Alaskan gas could participate in financing this expensive transportation system through guaranteeing some portion of the project debt.

Gas transmission and distribution industry

The Federal Power Commission and the Justice Department agreed that certification of a transportation system for Alaskan gas will not have a significant impact upon competition in the natural gas transportation and distribution industries.

Based on statistics presented in the Justice Department's Report to Congress, the American sponsors of the Alcan project, including PGT, PGE and the Northern Border companies, transport approximately 40 percent of all the interstate natural gas shipped in the U.S. However, in an industry as heavily regulated as natural gas, indices of concentration tend to overstate the potential for anti-competitive behavior. In the presence of effective regulation, the actual prospect of anticompetitive behavior is minimized, and there is only a small risk that the Alcan sponsoring companies could control national or regional gas markets.

Gas producers

Alcan has no oil companies or subsidiaries of oil companies among its sponsors. This fact in itself sharply reduces potential antitrust concerns.

Nevertheless, since elsewhere in this Report it is urged that the gas producers participate in financing this project, it is necessary to examine the competitive considerations associated with producer participation. The Attorney General concluded that "present Federal Power Commission regulation appears to preclude an opportunity for competitive abuse by the gas producers." However, the Department warned that if wellhead prices were decontrolled or substantially relaxed, some opportunity might arise for producers, if they owned or controlled the transportation system, to transfer profits from the regulated transportation operation to their unregulated upstream production operations.

The Department of Justice indicated that its concern about producer ownership or control of the pipeline does not preclude producer participation in financing the system. For example, consistent with antitrust objectives, producers could be involved in guaranteeing a portion of the project's initial debt or cost overrun debt. To assure

antitrust insulation, any producer role in the management of the transportation system prior to its becoming operational should be the minimum necessary to protect the producers' investment interest but in any event should not permit producers to engage in anticompetitive conduct. In addition, producer debt guarantees should terminate upon completion of the project and commencement of the tariff. Finally, the Federal Power Commission should utilize its approval power over gas purchase contracts, and more generally, over project financing plans, to ensure that any conditions producers impose in exchange for debt guarantees do not create situations which might permit abuses of competition.

Thus, as is urged elsewhere in this report, gas producers could guarantee portions of the project debt consistent with this Administration's antitrust objectives.

* * * * * *

Overall, we conclude that the potential for anticompetitive abuse by either the gas transmission and distribution industry or the gas producers (to the extent they might participate in guaranteeing project debt) is small, especially under a continuing system of price regulation.

Any potential competitive problems can be guarded against through (1) imposing proper conditions in the license to construct the transportation system (including the nondiscriminatory conditions under section 13(a) of the Act); (2) monitoring gas purchase contracts between gas producers and gas transmission companies; (3) requiring the disclosure of any collateral agreements between producers and transmission companies; (4) requiring government scrutiny and approval of any plans for gas reallocation or displacement, and government monitoring of any industry discussions to derive such plans; and (5) imposing regulatory sanctions in any specific cases of abuse that may arise.

EXHIBIT

ASSISTANT ATTORNEY GENERAL
ANTITRUST DIVISION

Department of Justice
Washington, D.C. 20530

August 9, 1977

Mr. Leslie J. Goldman
Assistant Administrator
Energy Resources Development
The White House
Washington, D. C. 20500

Dear Mr. Goldman:

The Attorney General submitted his Reports on the competitive aspects of the Alaska natural gas transportation system to the President and to the Congress on July 14, 1977. One of the conclusions drawn in those Reports was that producers of substantial amounts of natural gas should not be permitted to own any portion of or participate in any manner in the selected Alaska natural gas transportation system.

The Department has been requested by the Alaska Natural Gas Task Force to consider whether this recommendation precludes the participation of the Alaskan natural gas producers in the financing of the selected project. We have been requested to focus our attention on the two routes still under active consideration -- the all-pipeline route proposed by Alcan Pipeline Company and the pipeline-LNG route proposed by El Paso Alaska Company.

The Department's recommendation concerning gas producer ownership and participation was based on the premise that such ownership or participation under a regime of deregulated or relaxed wellhead price regulation could lead to the evasion of effective pipeline regulation and create the opportunity for the earning of monopoly profits through anticompetitive activity. Despite the continuation of wellhead price regulation and the present lack of gas producer ownership or participation in either the Alcan or El Paso projects, we continue to express our concerns on this important issue, since the long term status of wellhead price regulation appears uncertain and it is not now clear who will be the ultimate owners of these projects. However, our concern about gas producer ownership of the projects does not mean that there would necessarily be antitrust objections to participation in project financing on the part of Alaskan gas producers.

From consultation with other members of the Alaskan Natural Gas Task Force, we understand that gas producer participation in the financing of the selected project may be essential to the success of the project. We believe, therefore, that consistent with our recommendations producers could be involved in the guarantee of a portion of the project debt. We view this guarantee as consistent with our recommendations so long as the gas producers would not be equity members of the sponsoring consortium, would not have any voting power, would not have any role in the management or operations of the transportation system once the system would become operational and would be obliged to terminate their guarantor roles upon completion of the project and the tariff's going into effect. Any role in the management of the transportation system prior to the system becoming operational would be minimal and consistent with the size of the guarantee and would not lead to the types of anticompetitive conduct indicated in the Attorney General's Report on the Alaskan natural gas transportation system and in this letter.

Although not opposed to some financial backstopping under these conditions, we reiterate our opposition to any type of financial participation by producers that would enable them to engage in any form of anticompetitive conduct, such as the restriction of pipeline throughput, the denial of access to nonowners, or the resistance or denial of future expansion of pipeline capacity.

The Department recognizes that if the gas producers were to act as debt guarantors they would have the right to request conditions to protect their financial involvement. The Department would not oppose conditions to this effect so long as the conditions would not give rise to the potential for competitive abuse, including the power to veto procompetitive policies, referred to above. In this regard, we would expect to urge the Federal Power Commission, or its successor agency, at the appropriate time, to utilize its approval power over gas purchase contracts and, more generally, over project financing plans, to ensure that producer-imposed conditions do not conflict with the antitrust objectives outlined in the Attorney General's Reports.

In addition, as a further safeguard, the Department suggests that it review all the terms and conditions of any financial guarantee of a portion of the project debt negotiated with the Alaskan gas producers. You are assured

of our willingness to assist in exploring and developing an appropriate method of gas producer financial participation in an Alaskan natural gas transportation system that will not subvert the competitive spirit and intent of the recommendations contained in our Reports.

Sincerely yours,

Hugh P. Morrison Jr

Hugh P. Morrison, Jr.
Acting Assistant Attorney General
Antitrust Division

cc: Roger C. Altman
Assistant Secretary
(Domestic Finance)
Department of the Treasury
Washington, D. C. 20220

CHAPTER VIII - NATIONAL SECURITY

The Department of Defense (DOD) provided a study on the national security implications of the proposed Alaska gas transportation systems both to the Department of Interior, for its report required by the Trans-Alaska (Oil) Pipeline Act (P.L. 93-153)[27/], and to the Federal Power Commission (FPC) for its use in evaluating the proposals. The conclusions of the DOD study were that analysis of military factors alone would not indicate an overriding preference for one route over another.

A DOD representative testified on the study before the FPC and was cross-examined by representatives of both El Paso and Arctic Gas, after direct examination by the FPC's Administrative Law Judge Litt and a staff attorney. As reported by Judge Litt:

> ....the evidence shows each system has its advantages and disadvantages. El Paso's entire pipeline portion of its system is under U.S. control, and thus defense strategy may be facilitated. However, El Paso's project tends to concentrate potential targets, like its liquefaction and regasification plants, whose destruction would present major, long-term outage problems. Similarly, both the oil and gas pipelines would be susceptible to concentrated attack or sabotage on the Yukon River

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27/ "Alaska Natural Gas Transportation Systems, A Report to the Congress Pursuant to P.L. 93-153," U.S. Department of the Interior, December, 1975.

> Bridge. Arctic Gas and Alcan, while not concentrating vulnerable facilites at single locations or subjecting their systems to interdiction at sea, suffer somewhat from the length and location of their pipelines. Moreover, these projects must rely on Canadian security forces for defense over much of their pipeline lengths.[28/]

The consensus was that each of the proposed systems has some national security problems which are peculiar to that system, and that the extremely modest danger due to hostile acts is of some concern, whether such acts are in wartime or are acts of sabotage. However, such danger was considered to to be far less likely to disrupt pipeline operations than system failures of a purely natural or mechanical nature.

DOD also submitted a report to the President on July 1 commenting on the national security implications of the FPC's Recommendation to the President.[29/] In that report, DOD reiterated its conclusion that there is no overriding preference for one route over another when analysis is based on military factors alone. However, the report pointed out that dependence on imported oil presents a grave danger to the national security, and stressed that completion of a transportation system for delivery of Alaska North Slope

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28/ Initial Decision on Proposed Alaska Natural Gas Transportation Systems, Federal Power Commission, February 1, 1977, p. 411.

29/ Recommendation to the President, Federal Power Commission, May 1, 1977.

natural gas to the contiguous 48-states must be considered an important national security objective.

With the Alcan joint project with Canada, we believe Canada will have a major interest in maintaining a uninterrupted flow of gas through the pipeline as well as a treaty obligation to do so under the recently ratified pipeline treaty. First, the Canadian companies which will be the owners of the Pipeline in Canada will have a substantial investment which they will want to have protected. Canadian investors would be adversely affected by any interruption in throughput. Second, remote communities in both the Yukon Territory and the western provinces will be served by the Pipeline, and any interruption in flow will directly affect availability of gas to those communities. Finally, a much larger number of Canadian gas consumers will have a direct interest in uninterrupted throughput when the Dempster Line comes into service from the Mackenzie Delta. The Canadians expect the Dempster Line to be built within several years of initiation of service on the main line.

Provision for access to the Mackenzie Delta reserves will have beneficial effects on the national security of both countries due to decreased dependence on imported oil. Canadian oil import requirements will be directly reduced by availability of gas to Canadian consumers. Access to frontier gas reserves will allow Canada to fulfill its current gas export commitments, preventing an increased degree of U.S. oil import dependence due to curtailment of Canadian gas supplies. Attaching Canadian frontier gas and providing a stimulus to the Canadian oil and gas producing industry may ultimately allow some increase in the level of Canadian gas exports, which would allow even further reduction in oil import dependence.

CHAPTER IX - THE WESTERN LEG

The Authorization of Facilities

There are two basic methods for delivering Alaskan natural gas to the West Coast. The first method is to construct a "Western Leg" to the Alcan system by constructing a new pipeline and some looping in Canada from Caroline Junction to Kingsgate, and by increasing the capacity of the existing Pacific Gas Transmission (PGT) and Pacific Gas and Electric (PG&E) pipeline, also through looping. A fully looped system would cost about $770 million (1975 dollars).

The second method is to deliver the gas to the West by "displacement." The Northern Border section of the Alcan project to Chicago could be sized to deliver all Alaska gas to the Midwest. Natural gas from West Texas and New Mexico that otherwise would flow to the Midwest could then be diverted to the West Coast through the El Paso, Transwestern and Northwest pipeline systems.

As set forth in the Presidential Decision, construction of a Western Leg will be authorized for direct delivery of Alaskan gas to the West Coast. See page 20 of the Decision. The Western Leg facilities proposed by the sponsors in the FPC hearings (i.e.,

the "1580 Design") will be authorized for "construction and initial operation." All such facilities will be entitled to the special mandatory certification and expediting procedures provided by ANGTA.

However, the facilities proposed in the "1580 Design" will be subject to a final review and possible adjustment prior to final certification by the FPC. As in the case of the Northern Border system, the Secretary of Energy shall determine at the time of certification whether the facilities proposed in the "1580 Design" are larger or smaller than necessary to handle the contracted supplies of Alaskan gas and Canadian exports and whether "pre-construction" is necessary to accommodate short-term excess deliveries of Canadian gas from Alberta. The "1580 Design" facilities would be needed to handle exports from Canada continuing beyond current contract expiration dates or if new gas supplies from Alaska are developed. Furthermore, complete delivery by displacement would not be feasible if Mexican gas becomes available and the 30 inch gas pipeline that is part of the El Paso system between Texas and California is converted to an oil pipeline for use in the Sohio project to transport surplus Alaskan crude oil.

At the time of certification, however, when there will likely be better information upon which to project future gas supplies, the "1580 Design" may prove not to be the appropriate size. Therefore, the Decision does not make an irrevocable commitment to construct new capacity that is either too small or too large for the projected needs. Prior to final certification of a Western Leg, the Secretary of Energy shall make the precise determination of facility size and volume to account for material changes in the facts, if any, since the Presidential decision. The Western Leg may also be utilized in connection with short-term deliveries from Canada.

The Western Leg facilities required for direct delivery will depend on several estimates -- the estimated Western share of Alaskan gas, the estimated volume of Canadian exports, the amounts of Mexican gas, and the abandonment of the El Paso gas line in favor of the Sohio oil transport system. These estimates provide the basis for the decision to authorize the Western Leg.

The Western Share of Alaskan Gas

The proportion of natural gas that is distributed to a particular region of the country is ordinarily determined by private contract between the producers, on the one hand,

and the purchasers which are usually interstate pipeline or local distribution companies, on the other.

There is no reason to change these rules for Alaskan gas. A region of the country that is arbitrarily and inequitably deprived of its share of Alaskan gas will have the opportunity to seek relief from the FPC. But, in the absence of such discrimination, regional distribution of Alaskan gas will be made by the usual means of private agreement.

Since contracts for the purchase and sale of Alaska North Slope gas have not yet been executed, it cannot now be determined with precision how much of that gas will eventually be destined for the western states. However, in the absence of sales contracts, it is reasonable to assume that 30 percent of the Alaskan gas will be purchased by parties served by the Western Leg. It is also assumed that deliveries of Alaskan gas to the lower 48 States will begin at 2 bcfd in 1983 and increase to about 2.4 bcfd within a few years. For purposes of this analysis, then, approximately 700 mmcfd will be considered the maximum Western share of Alaskan gas through this period.

Increased and Accelerated Canadian Exports

In its July 4th decision authorizing the Alcan proposal, the Canadian National Energy Board (NEB) assured the continuation of current Canadian supplies to the West. It rejected outright any suggestion that existing Canadian agreements to export gas to U.S. markets not be honored. The NEB also concluded that gas production from the established fields of Alberta and British Columbia would exceed total demand, including exports, by as much as 400 bcf in 1978, and had created a temporary excess supply.

It proposed that the current Canadian "gas bubble" be sold to export customers, either as "predeliveries" on contract volumes that would otherwise be delivered in the 1984-90 period, or under an "ironclad" guarantee that it would be replaced later by Alaskan gas delieved in Canada. And finally, in order to assure the delivery of these additional volumes, it recommended the "preconstruction" of that portion of the total system that would be located in southern Canada.30/

30/ See NEB, Reasons for Decisions: Northern Pipelines, Vol. 1 pp. 1-69 to 1-83, 1-161, June 1977.

The recently signed Agreement on Principles makes it even more likely that there will be an increase or acceleration of gas exports from Alberta. By providing Canada with access to frontier gas reserves in the Mackenzie Delta, the Alcan proposal stimulates the gas industry in Canada, and enhances the availability of Canadian supplies for absolute increases in exports to the United States.

The following sections set forth the analysis of the capacity available in existing pipeline systems to transport these additional volumes of Alaskan or Canadian gas directly or by displacement to the Western States.

Estimated Excess Pipeline Capacity in Existing Systems

Existing Facilities of the Western States

At the present time, the West is provided with most of its natural gas via interstate pipelines from two major producing areas -- the established gas fields of the southwestern United States, particularly in the Permian and San Juan Basins, and the Alberta and British Columbia reserves in Canada. For purposes of this analysis, there are two principal interstate pipeline systems that should be considered in evaluating the capacity requirements of Western States. They are: (1) the Pacific Gas Transmission and

Pacific Gas & Electric systems from Kingsgate, B.C. to Antioch, California, which supply Washington, Oregon and Idaho markets, as well as California, with Canadian gas, and (2) the El Paso and Transwestern systems in the Southwest (referred to collectively hereafter as the Southwest pipeline system), which deliver gas from the Permian and San Juan Basins to California, Arizona and New Mexico. As will be seen below, the full share of Alaskan gas plus additional Canadian supplies could not be delivered directly by the PGT and PG&E systems for at least several years and in the interim might well use up and exceed the capacities of the El Paso and Transwestern systems that would be used for displacement.

Direct Delivery

As noted, the Western Leg proposal would amount principally to looping of the existing pipeline facilities from Alberta to California. The existing system could not itself be utilized for direct deliveries of any Alaskan or additional Canadian gas because it is now being utilized to capacity and will be until at least later 1985.

There are four principal contracts pursuant to which Canadian gas is now delivered via the PGT and PG&E systems

directly to California, their volumes and the expected expiration dates are as follows:

Authorized Average Daily Volume (in mcfd)	Expiration Date
184.9	10-31-85
419.9	10-31-86
205.0	10-31-89
213.0	10-31-93

Thus, even if none of these contracts is renewed -- the likelihood of which is reduced as a result of the Agreement on Principles -- direct delivery of substantial volumes in existing facilities will be impossible for the first three or four years of an Alaskan gas transportation system.

Displacement

Under the "displacement" option, the Western share of Alaskan gas would not be directly delivered to the West but moved there indirectly through exchange arrangements with customers of the Northern Border system.

In order to carry out the displacement scheme, the capacity of the Northern Border system would have to be such as to accomplish the direct delivery of both the East's and West's share of North Slope gas. Full displacement would

require either that the proposed 42-inch Northern Border line south of Empress, Alberta, be fully-powered or that a 48-inch line be constructed over this segment to carry the same volume of gas, at an additional capital cost but with the flexibility to increase capacity.

On the surface, displacement appears to be the most cost effective method. The $770 million (in 1975 dollars) cost of a fully looped Western Leg could be avoided. Increasing the capacity of the Northern Border system would be much less capital intensive; $258 million for fully powering the 42-inch Northern Border System, and $404 million for increasing the pipe diameter to 48-inch. In either case the cost of service for the displacement plan would be about $50 million per year less than direct delivery. However, there are several reasons why displacement is not a desirable long term method in this situation.

(a) Any displacement plan would consume more energy than direct delivery to the West. The West's Alaska gas essentially would move east to Chicago and then back west from the Permian or San Juan basins. By contrast, the looping of the PGT and PG&E systems would increase the overall fuel efficiency for those systems. The difference is about 25 bcf of gas per year, worth $68 million at $2.60 per mmbtu.

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(b) Use of displacement to transport all of the West's Alaskan gas would create capacity constraints on the existing El Paso and Transwestern lines if:

- o one El Paso 30 inch line is converted to an oil line by the Sohio Project;
- o substantial volumes of Mexican gas become available for transportation to the West Coast;
- o there are any advanced or increased deliveries of Canadian gas to the U.S. which would also have to be moved West by displacement; and
- o the Algeria II LNG project is completed on schedule.

For purposes of analysis, all four of these conditions should be regarded as reasonably likely to occur.

While the Federal Government has not specifically endorsed the Sohio Project, it has endorsed generally the need for the expeditious construction of a pipeline to transport surplus Alaskan crude oil from the West Coast to refining markets east of the Rocky Mountains.[31/] Such a system is needed to provide economic and efficient transportation of Alaska North Slope oil to markets in the

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31/ See Executive Office of the President, The National Energy Plan, April 29, 1977, p. 55.

U.S. The conversion of the El Paso pipeline by the Sohio Project, which is assumed in the present analysis, will result in a substantial decrease in overall capacity of the Southwest gas pipeline system.

Recent events have given cause for considerable optimism about increased exports from Mexico which would enter through the Southwestern and El Paso system. Petroleos Mexicanos (Pemex), the government-controlled oil and gas monopoly in Mexico, has recently expressed its intention to construct a 48-inch, 850-mile pipeline from the Reforma fields in Chiapas and Tabasco to the U.S. border near McAllen, Texas. Pemex expects initially to deliver 1 bcfd to the U.S. upon completion of the pipeline (probably not before 1980), and to increase the flow to 2 bcfd by about 1982. On August 3, 1977, Pemex and six U.S. companies signed a memorandum evidencing their intention to enter into supplier-purchaser relationships for 6 years, renewable for another 6-year term if the purchasers meet the best tender Pemex may have for the gas at the end of the first term.

Notwithstanding several remaining uncertainties, it now appears likely that the Mexican Project will soon become a significant new source of gas supply in the Southwest.

Between El Paso and Transwestern, the West could reasonably expect to receive about 220 mmcfd of Mexican gas by 1980 and a total of 440 mmcfd beginning in 1982.

As discussed above and throughout this Decision and Report, the Alcan system will offer the potential for accelerated delivery of Canadian exports under existing contracts; it will also enhance the overall availability of Canadian gas for absolute increases in exports. Since these additional volumes of Canadian gas could not be delivered directly in the PGT and PG&E systems, as noted above, they would also have to be displaced through the El Paso and Southwestern systems for delivery to the West.

Finally, the Algeria II project, El Paso's application for which is pending before the FPC, would deliver up to 325 mmcfd of regasified LNG from the Texas Gulf Coast to the Southwest by as early as 1983 and could deliver a total of 650 mmcfd by the following year.

Under these conditions, delivery of Alaskan gas through the Northern Border system for displacement to the West would preempt all the excess capacity now available in the existing Southwest pipeline system from the Permian and San Juan Basins. Any substantial new supplies from the deep Permian formations -- or increased supplies from coal gasification projects -- would compound the problem.

Indeed, under optimistic assumptions about future gas supplies to the West and the existing capacity to California which would be utilized, there is a serious risk of a capacity shortage for the years 1983-87. This shortage can be determined from the data set forth in Exhibit 1.

The Exhibit indicates that without a Western Leg, a displacement scheme capacity shortage could exist in 1983-85 and would be uncomfortably close in 1986. If current Canadian supply contracts are renewed, as it is hoped they will be, a capacity shortage could exist in 1983 and later years as well.

Finally, it should be noted that full utilization of the Northern Border system for a displacement scheme would preclude the ability to expand the Northern Border system at a low capital cost for additional deliveries to the East if more Alaska gas becomes available.

The Nation's gas delivery system must have the overall flexibility to make a rapid and economic response to many variables - the level of future exports from Mexico, the level of future exports from Canada, the rate at which new supplies of Alaskan gas can become available, and the rate at which LNG and coal gasification projects are developed. Therefore, to ensure sufficient capacity

Exhibit 1

	1981	1982	1983	1984	1985	1986	1987
Capacity (mmcfd)							
El Paso (after abandonment)	3,274	3,272	3,274	3,274	3,274	3,274	3,274
Transwestern	785	785	785	785	785	785	785
Total Capacity	4,059	4,059	4,059	4,059	4,059	4,059	4,059
Supply (mmcfd)							
Permian Basin	1,551	1,448	1,358	1,271	1,190	1,114	1,042
San Juan Basin	1,253	1,247	1,209	1,176	1,144	1,113	1,083
Canadian Short-Term (by displacement)	221	167	112	56	--	--	--
Mexican	220	440	440	440	440	440	440
Algeria II LNG	--	--	325	650	650	650	650
Coal Gas	--	--	--	--	70	140	280
Total Supply	3,245	3,302	3,444	3,593	3,494	3,457	3,495
Excess Capacity	814	757	615	466	565	602	564
Less Alaskan Gas by Displacement	--	--	700	700	700	522[a/]	120[a/]
Capacity Excess (Shortage)	954	757	(85)	(234)	(135)	80	444

a/ Assumes that existing Canadian contracts will not be renewed.

for future supplies to California and other Western States, provision should be made for direct delivery of Alaska gas to the West.

Size and Volume of a Western Leg

The approved facilities for the Western Leg are embodied in the so-called "1580 Design." It would require a 36-inch, 176-mile pipeline, to be constructed by the Alberta Gas Trunkline Ltd. (AGT), from James River Junction in Alberta to Coleman on the British Columbia border, where it would connect with the existing Alberta Natural Gas Company Ltd. (ANG) line in British Columbia. One-hundred and five miles of the existing ANG line, from Coleman to Kingsgate on the U.S. border, would be looped with 36-inch pipe. In the U.S., 612 miles of the PGT line from the Canadian border to Malin, Oregon, and 297 miles of the PG&E line from Malin to Antioch, California, would also be looped with 36-inch pipe. No new compression would have to be added to the existing systems.

With this project, 659 mmcfd of North Slope gas could be delivered directly to the western U.S, which is roughly the total expected volume of Alaskan gas delivered to the West. PGT intends to deliver 22 mmcfd of this amount to Northwest Pipeline Company for distribution in the Pacific Northwest, and the remainder would be delivered to California,

where 200 mmcfd would be distributed by PG&E in the North and 437 mmcfd would be distributed by the Southern California Gas Company in the South. Any share of Alaskan gas or additional Canadian gas greater than 659 mmcfd would not require a new facility but could readily be delivered to the West by displacement. There would easily be sufficient capacity in the Southwest system to absorb this relatively small volume of Western gas.

Conclusion

The evidence clearly suggests that the natural gas pipeline capacity available at present will not be adequate to accommodate both the Sohio Project and the movement of Alaskan gas to the West in the mid-1980's and perhaps beyond. While this conclusion is based on optimistic supply projections, it nevertheless is a significant probability on the basis of which a Western Leg Facility should be planned.

There is some risk in authorizing a Western Leg that it or other existing pipeline systems to the West could at some time become somewhat underutilized, perhaps resulting in some increase in per unit costs to gas consumers. But the consequences of not authorizing a Western Leg are even greater. Not only could failure to build a Western Leg under the most reasonable supply projections cause higher direct

costs to the consumer, but it could also greatly reduce the West's flexibility to receive new gas supplies if and when they develop in the future. Indeed, whether gas supplies in addition to what are presently projected will be available from sources like Canada and Mexico may well be dictated by whether gas pipeline capacity is available to transport it. If the almost unamimous comments of their elected officials are any indication, the people of the West are willing to accept whatever additional cost may be involved in order to be assured that pipeline capacity will be adequate to meet all future contingencies.

Prior to final certification of a Western Leg, there may be better information about potential supplies to determine whether the proposed "1580 Design" is over- or under-sized for the anticipated need. Before the issuance of a final certificate of public convenience and necessity, the Secretary of Energy will determine the size and volume of the Western Leg to be certified, as well as review the need for any pre-building to take direct deliveries for the West Coast of any short-term increases in Canadians exports from Alberta. Any deviation from the capacity of the "1580 Design will directly reflect any material changes in gas

supply or pipeline capacity projections that occur between now and the date the certificate is issued. The Secretary's determination shall be communicated to the FPC and shall be binding on it for purposes of its certification.

CHAPTER X - RELATIONSHIP OF THE DECISION TO THE RECOMMENDATION OF THE FEDERAL POWER COMMISSION

Section 7(b) of ANGTA requires a statement of the "reasons for any revision, modification of, or substitution for the Commission (FPC) recommendation."

This Decision is consistent with the FPC recommendation as set forth in its letter of transmittal dated May 2, 1977:

> We recommend that an overland route through Canada be selected, if such a route is made available by the Government of Canada on acceptable terms and conditions.

The condition has been met, and an overland route is selected by this Decision.

Two FPC Commissioners recommended the Alcan system. The other two FPC Commissioners recommended the Arctic Gas system "conditioned upon timely affirmative decisions by the Government of Canada to make the route available," but they said that otherwise Alcan should be approved. There was a failure of that condition with respect to Arctic Gas when the Arctic Gas route was rejected by the Canadian National Energy Board. Therefore, this Decision is in accordance with the specific system recommendation of

all FPC members who participated in the May 2, 1977, Recommendation to the President.[32/]

The Federal Power Commission recommended the deferral for "one to two years the certification of any new facilities for the western leg...." This Decision provides for approval of the western leg facilities subject to the same condition as other portions of the project. The Secretary of DOE is authorized to make a determination of the necessary capacity for both the western and eastern legs at the time of the issuance of the final certificate of public convenience and necessity. This approval is necessary to entitle all such facilities to the expeditious authorization pursuant to Section 9 of ANGTA.

This Decision differs from the Recommendation of the Federal Power Commission in one other material respect. The Commission suggested alternative financing plans - a private risk bearing model and a consumer risk bearing model. In conjunction with private risk bearing, the FPC suggested the use of a "formula" price mechanism whereby

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32/ The only difference between the Alcan system before the Federal Power Commission and the Alcan system herein approved is the contemplated expansion of pipeline capacity south of Whitehorse, Yukon, and a pipeline rerouting near Whitehorse to facilitate any future connection of Mackenzie Delta Reserves.

a city gate market value indicator (MVI) price would be established. The wellhead price would be the difference between the transportation cost and the MVI price.

This Decision requires a private assumption of the risk of noncompletion. However, the determination of the wellhead price should be pursuant to the pricing provisions in the pending National Energy Act. Those provisions, along with the financing proposals made herein, will ensure an equitable sharing of project risks and constitute the best method for securing a private financing of the project.

CHAPTER XI - AGREEMENT WITH CANADA

Issues

There are certain potential risks associated with any project involving more than one country. These derive from complications which arise when a large scale construction project is subject to the jurisdiction of two federal governments, Canada and the U.S., and the interests of the two governments are not always identical. The potential risks involved were explored extensively during the FPC proceedings on Alaska gas, and further in the Senate hearings and debates prior to ratification of the Transit Pipeline Treaty with Canada. These debates served to crystallize the most important of these issues.

An example of the divergence of interests of the two countries was the re-routing of the main pipeline through Dawson which was required by the NEB's July 4th Decision. That re-routing was designed from the Canadian perspective to bring a major gas transportation system within reach of their Mackenzie Delta reserves. From the U.S. perspective, the re-routing was a costly alternative to accommodate an uncertain eventuality - construction of the Dempster Line - which might never occur.

During the course of the negotiations, a compromise was worked out on this point which effectively serves the interests of both countries. In return for routing the main line along the original Alcan route, the U.S. agreed to share the costs of extending the Dempster Highway lateral from Dawson to Whitehorse. Whitehorse will be the point at which the lateral pipeline from the Mackenzie Delta gas fields connects to the main line when and if the lateral is built.

Virtually all of the other issues which were raised in the FPC proceedings and the Senate hearings and debates were the subject of lengthy negotiations with the Canadians. The discussion which follows covers the issues of primary Canadian concern in reaching this decision, along with the resolution of those issues which has been achieved through the negotiations.

Taxes and Impact Assistance

The first risk with a trans-Canada system is unanticipated costs arising from potential Canadian taxes and impact assistance. The FPC proceeding considered the risk of taxes imposed by the Canadian provincial governments, and it was concluded that Canadian legislation or compacts would be necessary to bind the Canadian provinces directly to the antidiscriminatory tax provisions of the Treaty.

The Canadian Government has undertaken to negotiate Federal-Provincial agreements with the three western provinces - British Columbia, Alberta and Saskatchewan - to assure their implementation of the Treaty. The Federal Government has obtained public statements from all three provinces endorsing the principles of the treaty, and those statements are annexed and made part of the Agreement. These statements and subsequent Federal - Provincial Agreements, backing up the unequivocal responsibility of the Canadian Government under the Treaty, will provide adequate assurance on this point.

The degree of practical protection afforded by the Treaty was subject to some question in the Yukon Territory, as there are currently no similar pipelines against which to measure possible discriminatory treatment. Therefore, ad valorem (property) taxation in the Yukon was negotiated as part of the Agreement on Principles. The agreed rate of property taxation is essentially comparable to that in Alaska, and will continue for 25 years or until a similar pipeline is built, at which time the Treaty protections will apply. The only contingency which would change the agreed taxation regime is if the State of Alaska changes its property tax regime.

A related issue was the $200 million socioeconomic impact payment recommended by the NEB in its July 4th decision. There are precedents in the United States for socioeconomic impact assistance. Normally, however, compensation for such impacts has been through federal government loans and subsidies. In negotiations with Canadian representatives, it was strongly urged that this payment be structured as a loan from the pipeline company to be repaid through reduction of future property-tax liability. In fact, such an arrangement has been worked out between the Canadian project sponsors and the Canadian government. As a result, cost of service to U.S. consumers will not be affected by this arrangement.

Native Claims

A source of additional concern is the settlement of Canadian native claims. Some parties have questioned whether the cost of the settlement -- the cost was almost $1 billion in the case of Alaska native claims -- would be imposed on consumers of Alaska gas through some type of transit fee or tax. The Canadian Government has publicly stated on a number of occasions that it considers settlement of native claims as an internal Canadian matter

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to be resolved separately from any trans-Canada pipeline consideration. Canada has also undertaken to assure the United States that no charges against the pipeline related to the settlement of such claims will be levied.

Another concern has been that the uncertain status of a Canadian native claims settlement may affect Alcan's ability to secure financing. Lenders might be reluctant to commit funds without firm assurance on the final schedule for completion of the pipeline.

The Agreement on Principles commits both countries to a timetable which is specified in the Agreement. The Agreement also commits both countries to seek legislation as required to remove any delays or impediments to timely and efficient construction. This legislation, particularly when combined with the incentive scheme to reduce cost overruns in Canada, will provide the strongest possible assurances to lenders that both Governments intend for this project to be completed as quickly, and at as low a cost, as possible.

"Canadian Content" Regulations

It has been argued that the "Canadian content" regulations, issued by the NEB to assure that Canadian

firms and workers receive the maximum economic benefits from pipeline projects in Canada, could increase costs. One part of the Agreement specifically addresses this point, and commits each government to the principle that the supply of good and services will be on generally competitive terms. Specific remedies are included in that section of the Agreement of consideration in the event that the competitive terms of supply which are sought by the Agreement are not being met.

Employment

Finally, a trans-Canada project would have fewer employment opportunities for U.S. workers than the El Paso project. It is estimated that during the construction period, El Paso would account for 324,000 man-years of employment in the United States compared to 221,000 for Alcan. In the year of greatest employment, El Paso would have a 121,000 to 84,000 man-year advantage over Alcan.

The El Paso project is also more labor intensive. Such increased employment opportunities, however, show up in a significantly increased cost of service for the El Paso system. Labor costs in Canada are lower than in the United States, and the operating costs of an all-pipeline system through Canada will be significantly lower

than for the El Paso LNG system. Also, the lower cost and higher fuel efficiency of a trans-Canada pipeline make its NNEB substantially higher than that of El Paso.

The important point is that neither project will solve the unemployment problems of either country. Although the difference in man-years of employment between the two projects is large in an absolute sense, it translates into a 0.035 percent difference in the U.S unemployment rate. This difference would be offset by the unemployment impacts on the U.S. of curtailed Canadian gas deliveries in the event that lack of access to the Mackenzie Delta reserves reduced Canada's ability to meet existing export commitments.

* * *

The Agreement on Principles provides assurances on routes, taxation levels, project delays, and other critical matters. A section-by-section analysis is provided below. This Agreement, along with the Transit Pipeline Treaty, protects the project from unfair or discriminatory charges that would otherwise threaten the savings to U.S. consumers. Canada also has an excellent record of living up to its commitments in similar joint agreements with the U.S. In fact, the kind of assurance on time, taxes, routes, tariffs

tariffs and a host of other issues spelled out in the Agreement on Principles probably exceeds the level of commitment that would have been available at this time on any all-American project.

Analysis of the Agreement with the Government of Canada

Paragraph 1: Pipeline Route

This paragraph defines the Pipeline which is the subject of the Agreement as that which will follow the route described in the first Annex to the Agreement, and requires that all necessary action be taken to authorize the construction and operation of the Pipeline consistent with the principles of the Agreement.

Paragraph 2: Expeditious Construction; Timetable

Subparagraph (a) lays out a timetable for commencement of construction and commits both Governments to take measures to complete issuance of all authorizations in time to allow initial operation of the Pipeline by January 1, 1983. The timetable calls for construction beginning in Alaska by January 1, 1980, and main line pipelaying beginning in the Yukon by January 1, 1981. Although heavy pipeline construction activity in the Yukon cannot start before early 1981, preconstruction activities, such as final routing studies

and highway bridge reinforcement for heavy equipment traffic, can proceed prior to that date.

Subparagraph (b) assures that all charges for routine authorizations, such as licenses and certificates, as well as charges for right-of-way, will just be reasonable and nondiscriminatory. Subparagraph (c) commits both Governments to facilitating expeditious construction of the Pipeline consistent with the respective regulatory requirements of the two Governments, such as those in the areas of worker safety, environmental protection, and quality control.

Paragraph 3: Capacity of Pipeline and Availability of Gas

Subparagraph (a) deals with the initial throughput capacity of the Pipeline, requiring that this capacity be sufficient to meet the contractual requirements of shippers when those requirements arise. The intention is that it would initially be sized for 2.4 billion cubic feet per day (bcfd) of gas from Alaska, with provision for up to 1.2 bcfd of gas from Canada's Mackenzie Delta at the time the Dempster Highway lateral pipeline (called "the Dempster Line") is built to connect those reserves. It is expected that this intention will be carried out by installing larger-diameter or thicker-walled pipe south of the interconnection

point near Whitehorse, then adding additional compressor capacity at the time the Dempster Line is constructed. The choice between larger-diameter and thicker-walled pipe will be made at the conclusion of a testing program to assess the safety and reliability of the two alternatives. The testing program is provided for in Paragraph 10.

Subparagraph (a) also provides that authorizations will be granted, subject to regulatory requirements, for the Dempster Line and any further expansions of capacity (such as that which may subsequently be requested to transport additional Alaska gas).

Subparagraph (b) defines and limits arrangement whereby the Pipeline will provide gas service to remote communities, through or near which it passes. Prior to the time when the Dempster Line is in service, the gas provided will be Alaska gas, subject to contemporaneous replacement by equivalent volumes of Canadian gas being made available for export.

There is a limit of $5 million Canadian on capital costs to be incurred by U.S. shippers for provision of this service. Costs outside that limit will be reflected in the cost of service to the communities involved.

Paragraph 4: Financing

Subparagraph (a) states the understanding of both Governments that the project will be privately financed. It is also recognized that both Governments have to assure themselves that the project can be so financed before construction is allowed to begin.

Subparagraph (b) commits both Governments to use a variable rate of return on pipeline company equity capital as an incentive device to avoid cost overruns and to minimize costs consistent with sound pipeline management. Under this device, a higher-than-usual rate of return on pipeline company equity capital is allowed in the cost of service if the company is able to meet or better its estimates of capital costs for the project. Conversely, a lower-than-usual rate of return on equity is included in the cost of service if the project overruns its capital cost estimates. The base capital cost estimates which will be used for administering the variable rate of return device in Canada are set forth in the Agreement as Annex III.

Although the details of the variable rate of return device remain to be worked out by the Federal Power Commission and the Canadian National Energy Board, it will have the effect of insulating the consumer somewhat from the

effect of cost overruns in project construction. If the amount of capital costs reflected in the cost of service is relatively low, then the return-on-equity component of that cost is allowed to be higher than usual. On the other hand, if the total capital costs are higher than estimated, the increased cost of service can be offset by reducing that portion of it which is included for return on pipeline company equity capital. The overall effect on the cost of service is to narrow somewhat the expected range by trading off return to the pipeline company against performance by the company in holding down capital costs. Additional information on the variable rate of return concept is given in the section of the Decision dealing with financing.

Subparagraph (c) states that neither the variable rate of return on equity nor any unusual provisions in the debt instruments concluded in financing the main line will be allowed to interfere with the financing of the Dempster Line.

Paragraph 5: Taxation and Provincial Undertakings

Subparagraph (a) reiterates commitments of the two Governments under the Transit Pipeline Treaty and attaches statements by the Governments of the three western provinces

expressing their agreement with the principles in the Treaty. In addition to guarantees against interruptions in flow, the Treaty covers fees, duties, taxes or other monetary charges, and assures that such charges will be the same for transit pipelines as for similar pipelines located within the jurisdiction of the responsible public authorities within each country.

As there are no similar pipelines in the Yukon Territory, it was desirable to reach an understanding on the taxation regime applicable to the Pipeline in that Territory. Subparagraph (b) lays out the principles of that taxation regime, which is comparable to that in the State of Alaska. Those principles are as follows:

1. The Yukon Property Tax is defined as property taxes and all other direct taxes[33/] which are levied exclusively or virtually exclusively on the Pipeline. (Clause i)
2. Prior to authorization of initial operation of the Pipeline, the Yukon Property Tax will not exceed the following:

33/ Under Canadian law, the Yukon Territorial Government can impose only direct taxes. Indirect taxes can only be levied by the Canadian Federal Government, and are, therefore, governed adequately by the Transit Pipeline Treaty

1980 - $ 5 million Canadian

1981 - $10 million Canadian

1982 - $20 million Canadian

any year after 1982 during which operation of the Pipeline is not yet authorized - $25 million Canadian. (Clause ii)

3. From the first full year that the Pipeline is authorized to open operation through 2008 (or until the Dempster Line is authorized to open, if that occurs earlier), the Yukon Property Tax will not exceed $30 million Canadian, adjusted for inflation after 1983 using the Canadian Gross National Product price deflator (the GNP deflator). (Clause i)

4. The $30 million maximum level of taxation applies to the Pipeline at a throughput of 2.4 bcfd of U.S. gas and 1.2 bcfd of Canadian gas. If the capacity of the Pipeline is increased for U.S. gas prior to the connection of the Dempster Line, the $30 million base figure could be increased by the same proportion as the increase in gross asset values of the Pipeline facilities. (Clause vi)

5. If at the end of 1987 it is found that the per capita revenues received from property taxes, other than the Pipeline, plus grants to local governmental units, have increased during the period 1983 through 1987 at a faster rate than the GNP deflator, the Yukon Property Tax may undergo a one-time adjustment for the year 1987 to raise the permitted maximum to the level it would have been, had it been increasing at the rate of increase of other YTG per capita revenue. (Clause iv)
6. After January 1, 1988, the Yukon Property Tax is permitted to rise either with the GNP deflator or with the rate of increase in YTG per capita revenue (excluding tax on the Pipeline), whichever is greater. (Clause v)

7. If the Alaska property tax rate on pipelines increases between now and 1983 at a rate faster than the Canadian GNP deflator, an adjustment in the permitted $30 million maximum is allowed; and after leave to open the Pipeline in the Yukon is granted, the permissible Yukon property tax may be adjusted to reflect increases of Alaska property

tax on the Pipeline greater than increases otherwise permitted in the Yukon Property Tax. (Clauses vii and viii)

8. Clause ix provides that the Yukon socioeconomic fund costs will not be reflected in cost of service to U.S. shippers. No other special fund having an effect on cost of service will be permitted in the Yukon unless such a fund is required by the State of Alaska.

9. If the Dempster Line is connected, the Yukon Property Tax will be governed by the tax treatment applied to the Dempster Line, under the terms of the Transit Pipeline Treaty (clause iii). In Subparagraph (c) the Canadian Government will endeavor to ensure that tax treatment of the Dempster Line in the Northwest Territory is reasonably comparable to that in the Yukon Territory. (Clause iii and Subparagraph c)

10. If the Dempster Line is not connected, the permissible limit of the Yukon Property Tax will expire on December 31, 2008 (25 years after the date when the Alaska gas is expected to begin

flowing), at which time it will be renegotiated. (Clause iii)

Paragraph 6: Tariffs and Cost Allocation

Subparagraph (a) outlines the general methods of cost allocation for the portions of the Pipeline in Canada. The Pipeline will be divided into zones (Annex II contains the description of the zones) corresponding to segments of the system delineated by any of the following boundaries:

- gas input and takeout points
- changes in Pipeline ownership.[34/]

Cost of service to each shipper in each zone will be determined by allocating the total costs of constructing and operating the Pipeline in that zone among the shippers transporting gas through it in proportion to the volumes of gas[35/] transported for each shipper.

34/ In order to assure full Federal Government jurisdiction over the Pipeline, the Canadian National Energy Board required the sponsoring companies to restructure their corporate form. The pipeline company sponsors are to form a Federally-chartered umbrella company, Foothills Pipe Lines, Ltd., which will own 51 percent of subsidiaries which will construct and operate segments of the Pipeline within the different provinces. The other 49 percent of each subsidiary will be owned by the respective parent companies of Foothills in their traditional business areas.

35/ Volumes of commingled gas streams will be adjusted to reflect the original Btu content of the source gas and such volumes will be used for allocating costs.

Subparagraph (b) describes the cost allocation method for Zone 11 (the extension of the Dempster Line from Dawson to Whitehorse known as the "Dawson Spur") if and when the Dempster Line is constructed. In general, the cost of service for the Dawson Spur is to be shared by Canadian and U.S. shippers. The proportionate sharing is to be linked to the degree of cost overruns sustained in constructing the Canadian segments of the Pipeline. In no event is the share to be paid by U.S. shippers less than the fraction of the U.S. gas transported by the system after Canadian gas has been connected to the system. The cost of service to U.S. shippers will be affected more by reduced cost overruns than by the U.S. share of the cost of service for the Dawson Spur.

For a case with system transportation of 2.4 bcfd of U.S. gas and 1.2 bcfd of Canadian gas, the U.S. shippers' share of the Dawson Spur cost of service would be two-thirds if cost overruns were 45 percent. If cost overruns are reduced from 45 percent, the U.S. shippers' share of the cost of service increases on a straight-line basis, until at an overrun level of 35 percent, the U.S. shippers' share is 100 percent.

If U.S. gas is a larger proportion than two-thirds of the total gas carried in the Pipeline, the minimum proportion of the cost of service on the Dawson Spur to be paid by U.S. shippers is correspondingly higher. If the system is carrying three-quarters U.S. gas, for example, then the minimum proportion of the cost of service on the Daswon Spur which will be paid by U.S. shippers is 75 percent. From that minimum, the U.S. shippers' share of the cost of service increases with reduced cost overruns until their share reaches 100 percent at the 35 percent cost overrun level. The degree of cost overrun between 35 and 45 percent always corresponds to the same U.S. shippers' share of the cost of service on the Dawson Spur; only the minimum U.S. shippers' share varies with the proportion of total gas transported which is U.S. gas.

This cost-sharing arrangement is intended to provide benefits to transportation of Canadian gas which would have been provided by diverting the Pipeline north through Dawson City and along the Klondike Highway as required by the National Energy Board. Had that diversion been implemented, U.S. shippers would have been paying a volumetric proportion of the cost of service of the main line between Dawson and Whitehorse after the Dempster Line was connected, and all of

the cost of service for that segment if the Dempster Line was never connected. Under the agreed arrangement, U.S. shippers will pay a volumetric proportion of the cost of service on a smaller, less expensive pipeline from Dawson to Whitehorse only after the Canadian gas is connected, and will pay nothing for that segment if the Dempster Line is never built. The agreed arrangement provides the same transportation benefits to Canadian gas at lower cost to both Canadian and U.S. shippers.

The agreed arrangement also imposes a ceiling on U.S. liability for the Dawson Spur at 35 percent above filed costs. The Canadians, in turn, can credit savings achieved on the main line system against cost overruns on the Dawson Spur prior to applying the ceiling. The savings that can be credited against the cost overruns on the Dawson Spur may be either of the following:

- a volumetric proportion of savings achieved in segments through which joint volumes will be transported; and
- 100 percent of savings achieved in segments which will carry only U.S. gas.

However, at a minimum, the U.S. shippers' share of the cost of service on the Dawson Spur will be the fraction of the

total gas carried in the Pipeline which is U.S. gas. More detail on the specifics of cost allocation for the Dawson Spur is given in Annex III to the Agreement.

Subparagraph (c) of this Paragraph in general provides for review and subsequent agreement by both Governments on cost allocation methods in the event that volumes of gas to be shipped exceed the efficient transmission capacity of the Pipeline. Subparagraph (d) limits costs for the Dawson Spur allocated to U.S. shippers to those that would be incurred for installation of a 42-inch system, plus those installed within 3 years of the date when the system commences operation. Subparagraph (d) also requires the system installed for the Dawson Spur to be the same as that for the Dempster Line, in order to prevent loading of costs onto the Dawson Spur.

Paragraph 7: Supply of Goods and Services

Subparagraph (a) ensures that contracting for supply of goods and services to the Pipeline will be on generally competitive terms. This provision is intended to prevent cost overruns and time delays due to Canadian source restrictions on procurement for pipeline projects constructed within Canada.

Subparagraph (b) provides a mechanism for presenting grievances when the objectives with regard to competitive terms in Subparagraph (a) are not being met. Subparagraph (b) also specifies possible actions to be taken in the event of a favorable determination on a plaintiff's grievance including:

- renegotiation of contracts, or
- reopening of competitive bidding.

Paragraph 8: Coordination and Consultation

This paragraph provides for appointment by both Governments of a senior official to represent that Government in periodic consultations on progress in implementing this Agreement. The respective senior officials may, in turn, designate additional representatives to work out any particular problems which may arise in the course of constructing and operating the Pipeline.

Paragraph 9: Regulatory Authorities -- Consultation

This paragraph provides for consultation between the respective regulatory authorities in the U.S. and Canada, primarily the U.S. Federal Power Commission and the Canadian National Energy Board. In particular, the two authorities will need to work out matters relating to financing, tariffs, taxation and cost allocation as they relate to determination of the cost of service for the Pipeline.

Paragraph 10: Technical Study Group on Pipe

The two Governments are agreed that a higher-capacity pipeline system than was proposed by the sponsoring companies is to be installed south of the interconnection point for the Dempster Line at Whitehorse, in order to carry joint gas volumes more efficiently. However, there is some reservation, particularly on the part of the Canadian Government and the Canadian pipeline company sponsors, about the technical feasibility of a higher-pressure system, such as had been proposed by the Arctic Gas consortium. Although Canadian Government representatives are agreed on the need for a higher-capacity system, their preference on the grounds of expected safety and reliability is for larger-diameter pipe, which has many of the same advantages in increased efficiency as the higher-pressure system.

Subparagraph (a) establishes a joint technical study group for the purpose of evaluating the relative merits of the larger-diameter and higher-pressure systems which have been suggested, as well as any other combinations of pressure and pipe size which might achieve objectives of increased efficiency. The 48-inch, 1260 pounds per square inch (psi) design which was proposed by the applicant and

will likely be installed from Whitehorse north to the Prudhoe Bay field will also be evaluated by the group. Final decisions based on the results of the testing program will remain the responsibility of the respective regulatory authorities in the two countries.

Subparagraph (b) states that whatever higher-capacity system is chosen will be installed from the interconnection point near Whitehorse to the point near Caroline, Alberta, where the Pipeline bifurcates into a western and an eastern leg.

Paragraph 11: Direct Charges by Public Authorities

Subparagraph (a) provides that either Government can request consultations in the event that any public authority seeks to impose a direct charge on the Pipeline which might be considered properly the responsibility of the sponsoring company, rather than an item which should be included in the cost of service.

Subparagraph (b) identifies generally the types of direct charges by public authorities which will be permitted to be included in the cost of service. Such charges will include only:

- those considered by the appropriate regulatory authority to be just and reasonable on the basis of accepted regulatory practice, and
- those normally imposed on natural gas pipelines in Canada.

A list of examples of direct charges is attached to the Agreement as Annex IV and includes:

- extraordinary highway maintenance due to heavy vehicle traffic,
- airfield and airstrip repairs,
- drainage maintenance,
- erosion control, etc.

Direct charges will be subject to the tests in the appropriate legislation prior to inclusion in the cost of service.

Paragraph 12: Other Costs

This Paragraph provides that no charges will be considered for inclusion in the cost of service other than those:

- imposed by a public authority under the terms of the Agreement or the Transit Pipeline Treaty,
- normally paid by natural gas pipelines in Canada under accepted regulatory practice, or

- caused by Acts of God or other unforeseen circumstances.

Paragraph 13: Compliance with Terms and Conditions

This Paragraph provides that each Government will implement the principles directly applicable to construction, operation and expansion of the Pipeline through imposition of terms and conditions on the authorizations it issues. In the event that a Pipeline owner does not fulfill one or more of the terms and conditions, the Government will not be held responsible for that non-fulfillment, but will take appropriate action to cause the owners to remedy or integrate the adverse consequences of that non-fullfillment.

Paragraph 14: Legislation

This Paragraph commits both Governments to seek expeditiously all legislative authorities which might be required to implement the Agreement and to facilitate timely and efficient construction of the Pipeline. This provision specifically refers to legislation to remove delays to construction of the Pipeline.

Paragraph 15: Entry into Force

This Paragraph provides that the Agreement will become effective upon signature, and will continue in effect for 35

years and thereafter until terminated on 12 months' notice by either Government. The provisions of the Agreement which require legislative action will become effective when the required legislative action has been completed.

At the end of the Agreement there are several Annexes which append specific information or explain a particular feature of the Agreement in more detail.

Annex I: Description of the Route

(Self-explanatory)

Annex II: Zones for the Pipeline in Canada

This Annex specifically identifies the zones for cost allocation under the method described in Paragraph 6. It gives the boundaries of the zones.

Annex III: Cost Allocation in Zone 11

This Annex describes the cost allocation agreement for the Dawson Spur, which was outlined in Paragraph 6, in more detail. In particular, the computation of the ceiling on U.S. shippers' liability for the cost of service on the Dawson Spur is set forth in some detail.

The Annex also contains detailed specification of the filed capital costs for Canadian portions of the system which will be used to determine cost overruns for the

purposes of cost allocation for the Dawson Spur. Possible adjustments of those costs in limited circumstances are also covered.

Annex IV: Direct Charges by Public Authorities

This Annex is a list of typical direct cost items for use with the limitation on direct charges by public authorities in Canada; the limitation is in Paragraph 11 of the Agreement.

Annex V: Statements by the Provincial Governments

Public statements by the Governments of the three western provinces are attached in which they agree to the principles of the Transit Pipeline Treaty. Each also undertakes to work out with the Canadian Government a Federal-Provincial Agreement.

CHAPTER XII - SUMMARY OF COMMENTS RECEIVED

Throughout the period during which an Alaska natural gas transportation system has been under consideration, many comments concerning the decision have been sent to the various Federal agencies involved in the decision process. Comments have come from all parts of the American public, including private citizens, businesses, labor unions, municipalities, legislators and Governors. They ranged from expressions of support for a specific proposal to suggestions of alternative and often innovative methods of building a gas delivery system.

By far, the majority of comments were received within the past few months in response to a Federal Register notice on June 14, 1977, advising the public of Section 6(b) of the Alaska Natural Gas Transportation Act of 1976 which invites comments from Governors, municipalities, and other interested parties. Letters soliciting comments were written to the Governors of all the States, and meetings were held on several occasions with a committee of State Public Utility Commissioners.

The comments received in the period since the FPC's Recommendation to the President have been of two basic

types -- those supporting a specific proposal, and those commenting on certain aspects of the FPC recommendations. Almost all the letters received favored the delivery of the North Slope gas to the lower-48 states. Very few suggested that construction of a delivery system be significantly delayed or that no system be built.

Comments on Specific Projects

Arctic Gas

The supporters of Arctic Gas most often cited Arctic's claims of lower cost of service and fuel use; ability to connect Prudhoe Bay and Mackenzie Delta reserves with one pipeline; and the opportunity to maintain Canadian gas exports once the Mackenzie Delta reserves were connected.

The unfavorable comments generally concerned the environmental impacts of crossing the Arctic National Wildlife Range (ANWR); higher potential for delay and cost overrun due to winter construction, use of snowroads, and regulation by two countries. The unsettled status of the Canadian native land claims was stressed as a factor which would cause delays or preclude construction.

Before the July 4th Canadian NEB decision, the Arctic Gas proposal received support from municipalities and

businesses in the Midwest and California; the Governors of Arkansas, Kansas, Wisconsin, Minnesota, Massachusetts, Ohio, Maryland, Illinois; and many private citizens from all parts of the country. The Governors of California and Montana also supported an overland route.

El Paso

Support for the El Paso proposal was primarily based on the fact that El Paso would lie entirely within the United States. According to its supporters, this fact would result in greater domestic employment, higher tax payments, better security of supply, and regulatory control by one country. Another favorable point for El Paso cited was that it used the existing Alyeska transportation corridor and facilities.

The principal negative comments concerned El Paso's higher cost of service; the location of its LNG plant in active seismic zones; difficulty of siting the regasification plant in Southern California; and the possibility that it would foreclose delivery of additional Canadian gas supplies.

Support for the El Paso proposal came from various state AFL-CIO offices, maritime labor unions, some private citizens, and the Governors of Alaska, New Mexico, Arizona, Texas, Alabama, New York and Washington.

Alcan

Alcan's supporters often cited this proposal as an example of the success of the National Environmental Policy Act (NEPA) because the proposal developed as an alternative which achieved the economies of scale of a pipeline while avoiding the environmentally sensitive ANWR and Arctic regions. Alcan also received support because it generally follows existing transportation corridors. It seemed even greater after the NEB selected the Alcan proposal and stated that construction of a Trans-Canadian pipeline would facilitate maintenance of Canadian gas exports.

The negative comments on Alcan were that it had a less developed hearing record; would incur more delays by being subject to regulation by two countries; would lack adequate pre-construction planning, would require settlement of Canadian Native claims in southern Yukon; and would need additional environmental studies. Concerns were raised about the conditions imposed by the NEB, such as the socioeconomic impact fund and the requirement to increase capacity to carry Canadian gas in the system.

Support for the Alcan proposal has come from the major environmental organizations and the Governors of Wyoming, Nevada, Oregon, Colorado, and Utah.

Comments on Specific FPC Recommendations

Formula Wellhead Pricing

The producers and the State of Alaska strongly opposed the FPC recommendation for "formula pricing" of the wellhead price. They contended that this approach forced the producers to share the risk of the project -- even if they were not investors. This would serve to inhibit further exploration for gas in northern Alaska. They also argued this proposal would reduce the sponsor's incentive to manage the project properly.

Minimum Throughput Requirements

The producers also opposed this recommendation because contending that throughput should be established by the behavioral characteristics of the reservoir and by the State of Alaska.

Widespread Distribution of Gas

The members of the Arctic Gas Consortium strongly opposed this recommendation. They argued that this requirement would be a disincentive for prospective members to join the consortium; would be unfair and discriminatory to companies who could purchase more than the maximum; and would result in discriminatory treatment of Alaskan gas compared with other fuel sources. Alcan, however, supported the widespread distribution requirement.

Western Leg

The FPC recommendation to delay the decision on the Western Leg was opposed by Arctic, Alcan and the State of California. It was argued that this recommendation is inconsistent with the requirements of Alaska Natural Gas Transportation Act. They also felt that new facilities will be required to deliver Alaska gas to the West.

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