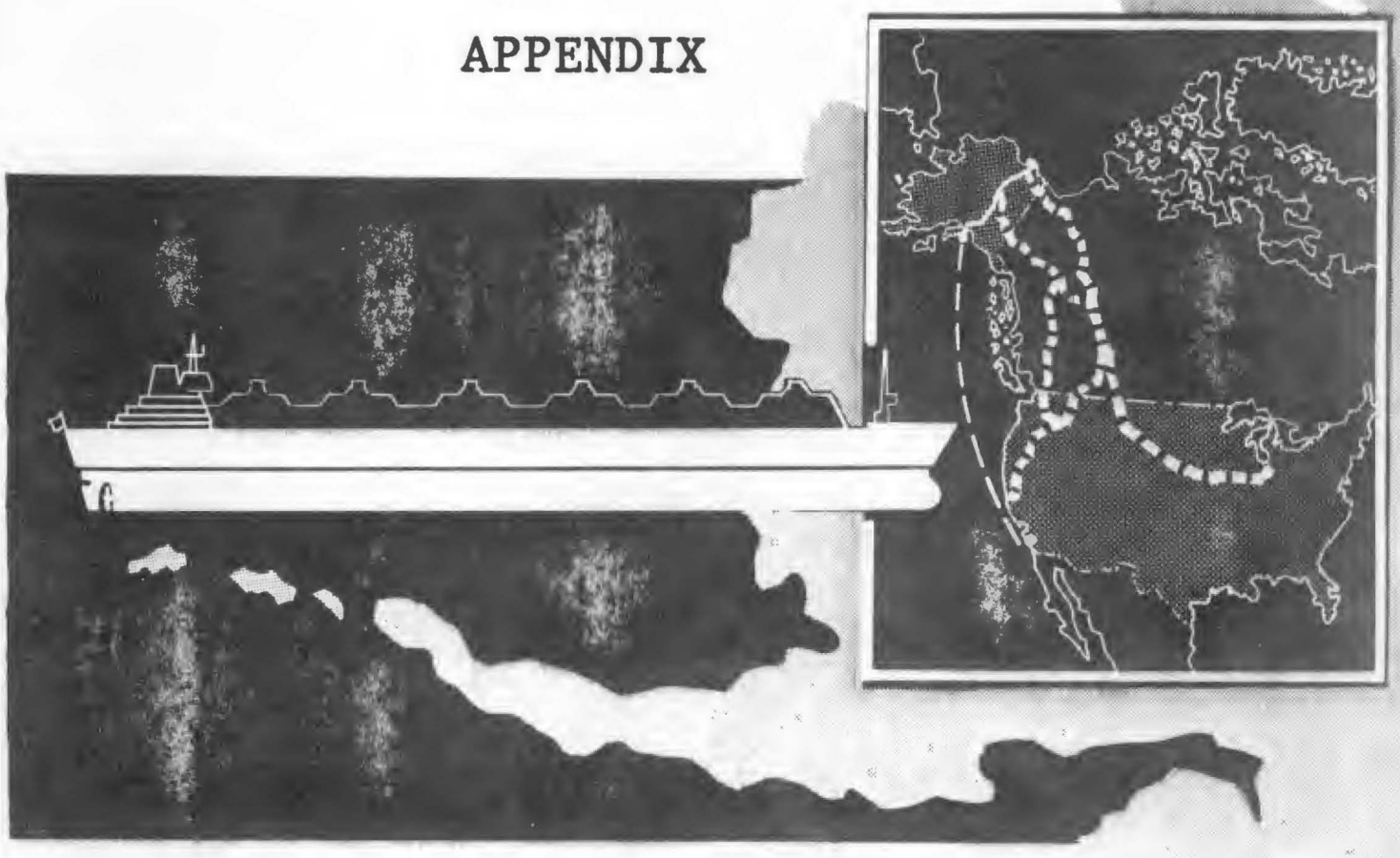
EL PASO ALASKA COMPANY
DOCKET NO. CP 75 - 96, ET AL.

INITIAL DECISION ON PROPOSED ALASKA NATURAL GAS TRANSPORTATION SYSTEMS

APPENDIX



UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

FEBRUARY 1, 1977

APPENDIX

APPENDIX A

SUMMARY DESCRIPTIONS AND MAPS OF PROPOSED TRANSPORTATION SYSTEMS

A. ARCTIC GAS SYSTEM

1. Basic Proposal

a) Location of Facilities and Companies Involved

The basic concept of the Arctic Gas System is the construction of a buried overland natural gas pipeline extending from northeastern Alaska and northwestern Canada to market areas across both Canada and the United States. The proposed pipeline would extend for approximately 4,512 miles from Prudhoe Bay to termination points in the conterminous United States located near Chicago and San Francisco. The following six companies, four American and two Canadian, have made application to appropriate agencies to obtain permits to construct and operate this system: Alaskan Arctic Gas Pipeline Company (Alaskan Arctic), Canadian Arctic Pipeline Company Limited (Canadian Arctic), Northern Border Pipeline Company (Northern Border), Pacific Gas Transmission Company (PGT), Pacific Gas and Electric Company (PG&E), and Alberta Natural Gas Company Ltd. (Alberta Natural).

Alaskan Arctic would own and operate a 48-inch diameter chilled gas 1/ pipeline extending from Prudhoe Bay on the Beaufort Sea coast of northern Alaska along the coastal plain to the Alaska-Canada border, approximately 195 miles to the east. Maximum allowable operating pressure would be 1,680 psig.

1/ The pipeline in Alaska would be operated as a chilled gas pipeline. By installing refrigeration chillers at the discharge side of the compressor stations, the temperature of the gas would be maintained between 32°F and -10°F.

From the Alaska-Canada border, a similarly designed 48-inch diameter pipeline constructed by Canadian Arctic would continue east along the Beaufort Sea coast and cross the outer Mackenzie Delta, where it would interconnect at Tununuk Junction with a 19 mile, 48-inch supply line running south from Richards Island. (The Delta crossing would employ twinned 36-inch lines) From Tununuk Junction, the 48-inch main line would extend south via Thunder River, Northwest Territories, to a point near Caroline Junction, Alberta. At Caroline Junction the line would divide, with a 30-inch western leg running south to the Alberta-British Columbia border and there connecting with expanded facilities of Alberta Natural which continue south to Kingsgate, British Columbia, near the Idaho Border; and and eastern leg to Monchy, Saskatchewan on the Montana border (48-inch to Empress, Alberta, and 42-inch from Empress to Monchy). This section of the Arctic Gas System would total 2,305 miles in length.

To carry arctic gas to the U.S. Midwest and East and regions south of there, six U.S. pipeline companies have created the Northern Border Pipeline Company. This partnership 1/ originally proposed to construct and operate a 1,619 mile long, 42-inch to 24-inch diameter pipeline extending from the Canadian border southeast through Montana, the Dakotas,across Minnesota, Iowa, Illinois, Indiana, Ohio, and West Virginia to a terminus at Delmont, Pennsylvania, However, Northern Border has withdrawn its original request for certificate authority for that portion of its system lying east of a point near Dwight, Illinois, and now proposes the delivery of gas through displacement for areas originally to be served by that section of the pipeline being eliminated. Numerous connection points would remain to be installed along the 1,138-mile pipeline from the U.S.-Canadian border to near Dwight in order to facilitate delivery of gas to companies serving areas east of the Rocky Mountains.

There were originally two applications before the Commission to move Prudhoe Bay gas to areas of the United States west

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1/ It is anticipated that the partners would be subsidiary corporations of the sponsoring natural gas pipeline purchasers.

of the Rocky Mountains. One system originally proposed to be built by PGT and PG&E would extend for 917 miles from near Kingsgate, British Columbia, on the U.S.-Canadian border, through Idaho, Washington, Oregon and California to a terminus at Antioch, California, near San Francisco. This pipeline would extend along an existing pipeline system route owned and operated by PGT and PG&E.

The second west coast pipeline, originally proposed by Interstate Transmission Associates Artic (ITAA), would also enter the United States near Kingsgate, British Columbia, on the U.S.-Canadian border and would extend through Idaho, Washington, Oregon, Nevada, and California to a terminus at Cajon, near Los Angeles. However, ITTA has filed a notice of withdrawal of its application to transport Prudhoe Bay gas in the lower 48 states. The gas originally to be transported by ITAA would now be transported by the pipeline system proposed to be constructed and operated by PGT and PG&E.

In accordance with the withdrawal of the ITAA proposal and a revision in the quantities of gas expected to be made available from the Prudhoe Bay Field, PGT/PG&E has revised their originally proposed pipeline design. Although various alternative designs have been considered on the record, the alternative now preferred and urged by PGT/PG&E would consist of the complete looping (with 36-inch diameter pipe) of their existing 917-mile pipeline. Such a system would use existing right-of-way and would not require the construction of any new compressor stations. In order to make designated volumes of gas available to markets in the Los Angeles area using this design, PG&E would then need to construct additional facilities in southern California to connect to existing pipeline facilities.

b) Total Reserves and Volumes to be Transported

According to DeGolyer and McNaughton, which testified for Artic Gas, the Prudhoe Bay Field contains a proven gas reserve of 22.5 trillion cubic feet (Tcf) while the Richards Island and Parsons Lake areas of the Mackenzie Delta region contain proven reserves of approximately 3.6 Tcf. According to the Department of the Interior, the State of Alaska also estimates a speculative resource of 41.8 Tcf of gas on the North Slope and an additional 46.5 Tcf in offshore deposits in the adjacent Beaufort and Chukchi Sea provinces.

Planned gas delivery from the Alaska North Slope reserves is 2 Bcf/d after 1 year of operation and 2.25 Bcf/d after 5 years. With the addition of compression, the Alaskan Artic line would have an ultimate capacity of 4.5 Bcf/d, which would also fill the Canadian Artic 48-inch line. However, since it is expected that up to approximately one-half of the capacity of

the Canadian line could be utilized to transport Canadian gas supplies, as they develop, to Canadian markets, deliveries of Alaskan gas to the lower 48 states at levels in excess of 2.25 Bcf/d on a long-term basis might require looping on the Canadian line. Requested authorization by Alaskan Artic is presently limited to 2.25 Bcf/d.

As presently proposed, the delivery capacity of the Northern Border leg to the midwestern and eastern sections of the United States would be 1.5 Bcf/d. The capacity of the PGT/PG&E pipeline, if completely looped with the existing pipeline, and if no compressor station horsepower additions were made, would be 659,000 Mcf/d. Therefore, the probable combined delivery capacity of the pipelines in the 48 conterminous states would be 2.159 Bcf/d. If additional gas volumes are made available, these system capacities could be increased by additional compression and/or pipeline looping.

c) Related Facilities

Pipeline laterals and other gas collection facilities, including compressors and chillers, in the Prudhoe Bay area would be constructed by the oil companies. No compressor facilities would be constructed on the 195-mile long, 48-inch diameter gas transmission pipeline in Alaska by Alaskan Artic until available gas volumes increased beyond 2.25 Bcf/d. At that time, Alaskan Artic would install four compressors and gas chillers on the pipeline. Other ancillary facilities required for the pipeline in Alaska include 7 material stockpile sites (4 of which would be located at possible future compressor station sites), 2 seaport areas in addition to the Prudhoe Bay port facilities, 16 aircraft facilities, approximately 250 miles of temporary snow-ice roads, field operating headquarters at Prudhoe Bay, and operations headquarters in Anchorage. The Alaskan Artic system would require the use of approximately 4,630 acres of land with 3,720 acres being permanently required for the life of the project.

Along their 1,619-mile pipeline, Northern Border originally proposed to construct 12 compressor stations, 11 offline delivery taps, and 87 communication sites. Northern Border originally indicated that land requirements for its system would total 21,250 acres with 11,740 acres being permanently retained for use for the life of the project. With their present commitment to withdraw their application for construction and operation of 481 miles of pipeline east of Dwight, Illinois, these facility requirements would probably be modified. The exact facilities needed on a 1,138-mile long pipeline are not known at this time.

If PGT/PG&E decide to loop their entire 917-mile long pipeline system, they would need to construct 873.5 miles of 36-inch diameter pipeline loop. The remaining sections of loop were installed as secondary river crossings for pipeline system security purposes in 1970. This pipeline design would utilize existing pipeline rights-of-way and would use existing compressor facilities. PGT/PG&E would require the acquisition of an additional 1,743 acres of land for its presently proposed system with 1,201 acres being permanently retained for use for the life of the project. To accommodate the increased flow rate, additional metering facilities would be installed at the Malin, Oregon metering station located on the Oregon-California border.

d) Construction Schedule

Most companies propose to start construction approximately 1 year after final approvals are received. Construction would be conducted concurrently on all pipelines with the timing of approval and construction of the Canadian segment a critical factor in any overall projection of delivery.

According to Artic Gas, the construction of the gas pipeline in Alaska, including related facilities, would be phased over a 3-year period. Most construction work is planned to occur during the winter months, from November to April, and snow roads would be used to provide access throughout the pipeline construction area.

In Canada, the construction of the pipeline and related facilities and supply lines would be phased over several years. Actual pipeline construction would begin late in the second construction year and be completed in the fifth construction year. Flow of the Prudhoe Bay gas at 2 Bcf/d would start at that time.

The Northern Border portion of the line would be completed in approximately 26 months. No winter construction is contemplated, and most work is proposed to be accomplished between May and November. It is anticipated that construction may be curtailed during March and April because of vehicle weight restrictions imposed on roads in this area during the spring season.

The general plan for PGT/PG&E would be to start construction after approvals are received and at a time scheduled from 18 to 24 months prior to initial flow of gas.

2. Arctic Gas System Route and Pipeline Size Alternatives

a) Alaskan Arctic Route Alternatives

Various alternative route corridors have been considered or proposed by Alaskan Arctic for the routing of the pipeline through Alaska. These alternatives would affect both the pipeline location in Alaska and its subsequent entrance into northern Canda.

One alternative, the Offshore Route, would involve an offshore corridor that would include the installation of a 151-mile long section of underwater pipeline roughly paralleling the Alaskan coastline north of the Arctic National Wildlife Range. Such a route would avoid the Arctic National Wildlife Range, thereby resulting in a reduction in impacts on the Porcupine Caribou herd, as well as avoidance of the wilderness area. However, the technical feasibility of such a route is highly questionable at this time.

A second alternative, designated as the Interior Route, would roughly parallel the southwestern boundary of the Arctic National Wildlife Range. This route would tie into the prime proposed route just north of Fort McPherson, Northwest Territories. This route is preferred by the applicant as an alternative should its prime route be found unacceptable.

The Fort Yukon Corridor Route, a third alternative, would follow the Alyeska oil pipeline route south for about 100 miles, proceed southeast toward the Fort Yukon area, and then rejoin the proposed prime route near Windfall, Alberta. This alternate route would involve construction of approximately 495 miles of pipeline in Alaska. This route through the Yukon Valley could affect three areas presently being considered by Congress as nationally significant conservation areas as nominated by the Secretary of the Interior in the Alaska Conservation Act of 1975. These three proposed areas are a Yukon Flats National Wildlife Refuge, a Porcupine National Forest, and the Yukon-Charley National Rivers which would be a unit of the National Park System. The Fort Yukon Corridor Route alternative would require the construction of a Richards Island Canadian gas supply line extending for 475 miles from Richards Island on the Beaufort Sea coast to near Dawson, Yukon Territory.

The fourth alternative, designated as the Fairbanks Corridor Route, would follow the Alyeska pipeline route south for 460 miles. From there it would pass northeast of Fairbanks and then follow the Alaska Highway into Canada, past Whitehorse, to Watson Lake, Yukon Territory, where it would join with the Fort Yukon Corridor and eventually rejoin the prime proposed route at Windfall, Alberta. This alternative would require the

construction of a Richards Island Canadian gas supply line extending for 760 miles from Richards Island on the Beaufort Sea coast to Whitehorse, Yukon Territory, where it would join the Fairbanks Corridor.

b) Canadian Route Alternatives

Prior to adoption of its preferred cross-Delta prime route variant in the northwest portion of its system, Canadian Arctic had proposed a "circum-Delta" prime route configuration which would skirt the western and southern edges of the Delta via Fort McPherson to Travaillant Lake Junction where it would interconnect with a 143-mile supply lateral running south from Richards Island before extending on to Thunder River and thence to Caroline Junction.

Several proposed alternative routes through southern Canada have also been considered by Arctic Gas. A description of these alternatives may be found in the Staff FEIS. (Vol. I, p. B-22)

c) Northern Border Route Alternatives

Several alternatives to the prime route proposed by Northern Border have been suggested, and are described in the Staff FEIS. To the extent necessary, these routes are discussed in this decision only in connection with environmental considerations.

d) West Coast Route Alternatives and Pipeline Size Alternatives

Because the route proposed by PGT and PG&E would follow along existing rights-of-way for its entire length, with the exception of a 21.4 mile relocation in the John Day River area of Oregon, no major route alternatives have been proposed by the applicant.

PGT/PG&E have submitted various alternate pipeline size designs for moving Prudhoe Bay gas to market.

To move minimum volumes of gas, PGT/PG&E had proposed an "1180 Design" which would require the construction of 485.4 miles of 36-inch diameter pipeline loop at 17 locations along their existing 917-mile long pipeline extending from the U.S. - Canadian border to Antioch, California. No compressor station horsepower additions would be required for this proposal. This system would transport 200,000 Mcfd of gas.

PGT/PG&E have also proposed three alternative pipeline designs which could be constructed to carry larger volumes of gas. Their "1830 Design" would require the construction of 917 miles of 36-inch diameter pipeline parallel to the existing system. This design would require the addition of four compressor stations and would have a capacity of 850,000 Mcfd.

The second alternative proposed for transporting large volumes of gas would require 917 miles of 42-inch diameter pipeline installed parallel to the existing pipeline. This system would also require four compressor stations and would have a flow capacity of 1.2 Bcfd.

Their third and now preferred alternative, the "1580 Design," would require construction of 873.5 miles of 36-inch diameter pipeline thus completing the looping of the 917-mile system. No additional compression would be installed. This system would transport 659,000 Mcfd of gas.

(The preceding summary is based primarily upon the Staff FEIS dated April 1976, Alaskan Arctic's applications brief dated June 11, 1976, and Alaskan Arctic's reply brief on the western leg issue dated October 7, 1976.)

B. EL PASO ALASKA SYSTEM

1. Basic Proposal

The system proposed by El Paso Alaska Company (El Paso Alaska) would transport natural gas from the Prudhoe Bay Field through approximately 809 miles of 42-inch chilled gas pipeline to a gas liquefaction plant and terminal located on Prince William Sound at Point Gravina, Alaska. There, the gas would be converted to liquid natural gas (LNG) and then shipped via cryogenic tankers, 1,900 miles south, to a receiving terminal and regasification facility on the southern California coastline near Point Conception in Santa Barbara County. From there the revaporized gas would be transported by a pair of proposed 142-mile, 42-inch parallel pipelines to existing mainline delivery facilities at Arvin Station, California, and then from Arvin Station via a proposed 109-mile, 42-inch pipeline to Cajon, California, for further distribution. The Point Conception terminal and related pipeline facilities would be constructed by the Western LNG Terminal Company (Western).

The proposed pipeline through Alaska would essentially follow the pipeline corridor delineated for the Alyeska oil pipeline from Prudhoe Bay to a point north of Valdez. It will

commence at the discharge side of the producers' Prudhoe Bay plant facilities. The pipeline will proceed south across the North Slope of Alaska and into the Brooks Range through Atigun Pass and follow the valleys of the North Fork Chandalar, Middle Fork Koyukuk, and Dietrich Rivers. As the rivers turn westward, the pipeline will continue south across the drainage pattern and through upland country to the Yukon River. It will pass east of Fairbanks and continue up the Tanana River Valley to the Delta River. The pipeline will again turn southward, following the Delta River to the Alaska Range, which it will cross through Isabell Pass. From the Alaska Range, the pipeline will proceed south between the Gulkana and Gakona Rivers, across the Gulkana River, down the Copper River drainage to the Tonsina River, and into the Chugach Mountains. It will follow the Richardson Highway through Thompson Pass and Keystone Canyon to a point near the head of Valdez Arm, where it will turn and cross the Chugach Mountain crest to a point of termination at the proposed LNG plant.

Although both pipelines would be located in a common "utility corridor" they would not be located within a common right-of-way. As a result, the El Paso Alaskan route would traverse non-impacted terrain, with 85 percent of the route being located within 3,000 feet of the existing oil pipeline. The remainder of the proposed route and the LNG terminal would be located in sections of the essentially undistrrbed Chugach National Forest in Alaska.

The proposed Point Conception terminal would be located in a relatively undisturbed area of the southern California coastline.

2. 3.2 Bcfd Case

a) Gas Volumes to be Transported

The proposed El Paso Alaska Pipeline would receive 3.190 billion cubic feet of natural gas per day (Bcfd) at Prudhoe Bay and would deliver 3.103 Bcfd to the liquefaction plant at Point Gravina. The proposed revaporization facility at Point Conception would subsequently receive approximately 2.809 Bcfd and revaporize at a rate of 2.803 Bcfd with an additional peaking capacity of 0.30 Bcfd. This 2.803 Bcfd of gas would then be delivered to existing mainline pipeline systems via the proposed pipelines to be constructed to Arvin Station and Cajon, California.

b) Related Facilities

The proposed 809-mile pipeline through Alaska would

have a maximum operating pressure of 1670 psig. It would require 14,712 acres of land for construction right-of-way with 5,247 acres being permanently affected for the life of the project. Additional acreage would be required for the construction of the 12 proposed compressor stations and additional appurtenant facilities. Each station would have 46,800 installed gas compressor horsepower. In addition, 11 of the 12 stations would have necessary refrigeration facilities and compression.

The proposed gas liquefaction facility and tanker terminal to be constructed at Gravina would require approximately 450 acres of land. The LNG plant would be composed of four operational facilities:

1) A gas treating facility.

2) A gas dehydration facility.

3) A refrigeration and compression facility to condense the gas to liquid form.

4) LNG product storage and handling facilities to accumulate and then transfer the LNG product to carriers.

The LNG plant will contain eight independent parallel processing trains, each having an inlet design flow rate of 421.88 MMcfd, adequate to process the 3.103 Bcfd feed gas deliveries to the plant. Such processing will result in LNG deliveries to the carrier fleet equivalent to 2.864 Bcfd of gas. The process known as the "Phillips Optimized Cascade Cycle" will be used to liquefy the gas. Four 550,000 barrel cryogenic storage tanks will hold the LNG until it is loaded onto the carrier fleet.

El Paso Alaska modified its LNG plant design over the past 18 months to effect an anticipated 34.1% fuel savings in plant operation. This design, sometimes called "MOD POD," if effective, would reduce plant fuel consumption from 289.25 billion Btu/d to 190.70 billion Btu/d, and would permit a lesser amount of natural gas to the LNG plant to produce the same volume of LNG.

The proposed LNG tanker terminal at Gravina would be located 1,200 feet offshore in Orca Bay. At this location, Orca Bay is approximately 6 miles wide with waters in the immediate vicinity of the site ranging in depth from 50 to 300 feet. This terminal would be constructed to handle the loading of two LNG tankers at one time.

El Paso Alaska proposes to build 11 165,000-cubic meter double-hull LNG carriers. These tankers would be equipped

with either free standing or membrane tanks insulated to carry the LNG cargo. Each of the carriers will have an average service speed of 18.5 knots and should be capable of completing the round trip voyage of 3,804 nautical miles between the marine terminal and California in approximately 11.5 days. With each ship operating 330 days per year, the fleet would transport 308 shiploads of LNG annually to the proposed regasification plant at Point Conception, about 60 miles north of Oxnard and 120 north of Los Angeles. Each of the 11 ships will be constructed in American yards.

The regasification facility would be constructed by Western and would require 227 acres of land. The facilities proposed here would be designed to receive LNG transported by ship, unload and transfer it into double-walled insulated storage tanks, and withdraw and revaporize it for delivery into proposed gas transmission pipelines.

The marine berthing and unloading facilities at Point Conception, occupying 31 acres of leased subtidal land, would be located about 4,600 feet offshore and would accommodate and simultaneously unload two LNG ships of up to 165,000 cubic meters capacity.

A cryogenic LNG transfer system would be required to carry the LNG from the ships to the onshore storage tanks. This system would consist of two parallel type 304 stainless steel 36" diameter insulated cryogenic lines and one 20" diameter vapor return line. This system would be approximately 6,000 feet long; 4,600 feet would be mounted on a trestle in the offshore area, and 1,400 feet would be installed above ground on the plant site.

The terminal would have a design baseload sendout rate of 2.803 Bcfd with a 3.103 Bcfd peaking capacity. Western has proposed to construct a pair of 142.3-mile long, 42-inch diameter parallel pipelines from Point Conception to Arvin, California, and a 108.9-mile long, 42-inch diameter pipeline from Arvin to Cajon, California, to transport the revaporized LNG to existing mainline gas transmission systems owned by Pacific Gas and Electric Company and Southern California Gas Company. The construction of these pipelines would require the clearing of 2,250 acres of land with 1,300 acres being permanently maintained for the life of the project.

In addition to the facilities described above, El Paso Alaska has described in detail its proposal that would be necessary in order to transport, directly and by displacement 2.06 Bcfd of the 3.1 Bcfd available as a peak day supply from the

Western LNG terminal to markets east of the Rocky Mountains. Applications to construct such facilities have not yet been filed with the Commission.

c) Construction Schedule

According to El Paso the construction of the pipeline across Alaska and the LNG facility at Gravina would require an estimated 6½ years to complete. Two years would be required for accumulation of engineering design data, procurement of materials, and preparation for construction, while the actual construction work would span 4½ years.

Again, according to El Paso, the overall construction period for the Point Conception facilities would require 48 months. Those months would be devoted to final design and procurement while actual construction would require 39 months. Initial plant operation can commence after 44 months. Total time to construct the related pipelines would be less than 26 months.

3. 2.4 Bcfd Case

On the assumption that gas pipeline deliveries in Prudhoe Bay may initially be substantially less than 3.2 Bcfd, El Paso Alaska filed an alternative showing which described the facilities which would be required for the transportation and liquefaction of 2.4 Bcfd. The required pipeline facilities are essentially the same as those in the 3.2 Bcfd case, with the exception of that the number of compressor stations is reduced by two, and the installed horsepower in each of the remaining 10 stations is reduced by half to 23,400. Auxiliary systems remain the same. The reduced natural gas flow also reduces refrigeration load requirements.

The only significant difference in the LNG plant is that it becomes a six-train plant compatible with an inlet volume of 2.327 Bcfd, with no change in design of individual trains. The six-train alternative design is readily expandable to the 3.2 case eight-train LNG plant design. Each of the six independent, parallel processing trains will have an inlet design flow rate of 421.88 MMcfd. The resulting total plant inlet design flow rate of 2.531 Bcfd is adequate to process the 2.327 Bcfd of feed gas delivered to the plant by the Alaskan pipeline, and would permit LNG deliveries to the LNG carrier fleet equivalent to 2.147 Bcfd of natural gas.

The Alaskan marine terminal facilities required for the 2.4 Bcfd case remain unchanged. With respect to fleet operations, El Paso proposes to use only eight carriers of the same design.

Each carrier would operate 330 days per year and a total of 232 shiploads of LNG would be transported annually from Gravina Point to Point Conception, California. Based on LNG plant production of 2.147 Bcfd, the fleet would deliver the LNG equivalent of 2.106 Bcfd with a heating value of 1160.2 Btu/cf.

4. Realignment Case

El Paso Alaska has also filed evidence in support of the realignment of its Alaskan pipeline facilities so as to bring its proposed line closer to the existing Alyeska haul road and facilities. This submission was "prompted" by testimony of the Pipeline Coordinator for the State of Alaska stating that that office "preferred" to see the gas pipeline more closely adjacent to the oil pipeline to lessen environmental impact.

As a result of the realignment, the gas pipeline would be about 13.8 miles longer. Other than relocation, there are no changes in the design of any of the compressor stations. No changes have been made in the LNG plant, the Alaskan marine terminal or in the LNG carrier fleet. The realigned pipeline can be utilized for either the 3.2 Bcfd or the 2.4 Bcfd throughout. Unless certain waivers are received from the U.S. Department of Transportation's Office of Pipeline Safety, a portion of the pipeline would have to be operated at decreased pressure, or thicker walled pipe would have to be installed (169/27,826 et seq.)

(The preceding summary is based primarily upon the Staff FEIS dated April 1976, as amended in part by El Paso Alaska's comments thereon appearing at 248/43,062, and on El Paso Alaska's Application brief dated June 10, 1976.)

C. ALCAN SYSTEM

1. Basic Proposal

The applications of Alcan Pipeline Company (Alcan) and Northwest Pipeline Corporation (Northwest) are part of a joint U.S. - Canadian project which would deliver natural gas from the Prudhoe Bay area of the North Slope of Alaska to markets in Alaska and in the lower 48 states. As proposed, 2.4 Bcfd of gas would be delivered to Alcan at a point in the Prudhoe Bay area by producers and would then be transported by Alcan approximately 730 miles through a new 42-inch diameter pipeline to the Alaska-Yukon Territory (Canada) border. There, the volumes of gas, less the amount delivered to Alaskan markets (approximately 45,000 Mcfd) or utilized in transmission, would be delivered to a Canadian company, Foothills Pipe Lines Ltd. (Foothills), or an affiliate thereof, which would transport the volumes of gas through a new 42-inch diameter pipeline for approximately 509

miles to a point on the Yukon Territory-British Columbia border near Watson Lake. There, the volumes would be delivered, less that utilized in transmission, to Westcoast Transmission Company Limited (Westcoast) which would transport the volumes of gas for approximately 259 miles through a new 42-inch diameter pipeline to a point of interconnection with their existing facilities at Fort Nelson, British Columbia. At Fort Nelson, approximately 30 percent of the gas would be transferred into existing and additional new facilities for transmission by Westcoast for approximately 791 miles to a point of interconnection with existing facilities of Northwest at Sumas, Washington, where approximately 669,000 Mcfd would be delivered. From Sumas, the gas would be transported approximately 359 miles south and east through existing and additional new Northwest facilities to an interconnection with Pacific Gas Transmission Company (PGT) at Kent, Oregon.

The remaining volumes of gas (approximately 70 percent) would be transported by Westcoast from Fort Nelson through a new 36-inch diameter pipeline for approximately 97 miles to a point of interconnection with new facilities of the Alberta Gas Trunk Line (Canada) Limited /AGTL (Canada)/ at the Alberta-British Columbia border. AGTL (Canada) would then transport the volumes of gas received from Westcoast through a new 36-inch diameter pipeline for approximately 50 miles to a point of interconnection with the existing facilities of the Alberta Gas Trunk Line Company Limited (AGTL) near Zama Lake, Alberta. The existing AGTL facilities in Alberta would be expanded by AGTL (Canada) to increase transmission capacity, and the volumes of gas would be transported for approximately 520 miles to a point in the vicinity of Caroline Junction, Alberta, where a division of the gas volumes would be made for delivery to two different points on the Canadian-United States border. One portion would be transported approximately 190 miles to a point of interconnection with the existing facilities of Alberta Natural Gas Company, Limited (ANG) in the vicinity of Coleman, Alberta. These volumes would then be transported by ANG to a point of interconnection with the existing facilities of PGT on the Canadian-United States border at Kingsgate, British Columbia, for redelivery to western United States' markets. The gas volumes delivered at this point would total approximately 191,000 Mcfd.

The remaining volumes of gas at Caroline Junction would be transported for approximately 233 miles to the Alberta-Saskatchewan border in the vicinity of Empress, Alberta, where the gas would be delivered to Foothills. Foothills would transport the gas through a new 36-inch diameter pipeline for approximately 160 miles to the Canadian-United States border at Monchy, Saskatchewan, where approximately 1.342 Bcfd of natural gas would be delivered to the proposed facilities of Northern

Border Pipeline Company (Northern Border) for redelivery to eastern and midwestern United States' markets.

2. Alaska - Prudhoe Bay to Delta Junction

Alcan estimates recoverable reserves to be 26.01 trillion cubic feet at an annual average day deliverability of 2.4 Bcfd after a 2-year buildup period. The Alaskan section of the proposed Alcan project would ultimately transport approximately 2.4 Bcfd of natural gas from Prudhoe Bay on the Alaskan North Slope to the Alaskan-Yukon border by means of a 731.4-mile long 42-inch diameter pipeline. The 539-mile section from Prudhoe Bay to Delta Junction would, with minor deviations, proceed south generally closely paralleling the Alyeska oil pipeline.

a) Proposed Facilities

The proposed 42-inch diameter pipeline would have a wall thickness of 0.600 inch, and would have a specified minimum yield strength of 65,000 pounds per square inch (psi) and a maximum allowable operating pressure of 1,337 psig. The proposal is to operate it at 1250 psig.

The pipeline will be chilled, and will be buried except at selected locations due to construction requirements and at compressor stations. Eleven compressor stations would be constructed and spaced so that the horsepower requirements at all stations would be approximately equal. Each station would be equipped with one 26,500-hp. gas turbine single-stage centrifugal compressor unit. Gas chilling equipment would be installed at all 11 compressor stations, and other ancillary facilities would be constructed along the pipeline route.

Land requirements for the proposed system are about 12,100 acres. Additional land would also be required off the right-of-way on a temporary basis for main distribution points for pipe, double-joint yards at Prudhoe Bay, Valdez, and Fairbanks, pipe storage yards, and construction camps. Along the Prudhoe Bay to Delta Junction section of the pipeline, Alcan, like El Paso, hopes to utilize facilities previously established by Alyeska for these purposes.

b) Construction Procedures

Alcan estimates that five years would be required from the date of project authorization to the date the system would be capable of operating at full design flow; the proposed schedule provides that the pipeline would be operational three years after all requisite authorization and permits were granted.

Construction of compressor stations would begin in the first year. By the end of the third year, three stations would be completed (compression and chilling) while six others would be capable of chilling the gas only. During the following two years, under the plans, the remaining compression and refrigeration would be added as gas production increases. All 11 stations would be fully developed by the end of the fifth year.

The maximum width of the pipeline right-of-way proposed by Alcan would be 120 feet. Since the proposed route would parallel closely the Alyeska oil pipeline to Delta Junction, the existing haul road and workpad would be utilized to a great extent. Construction operations on this section of the pipeline would be accomplished from April 15 to September 30, with the exception of clearing and grading operations which would be scheduled for the preceding spring, summer and fall.

3. Alaska -- Delta Junction to Alaska-Yukon Border

At Delta Junction the proposed pipeline would deviate from the Alyeska pipeline route and proceed eastward along the Alaska Highway-Haines Pipeline right-of-way to the Alaska-Yukon border near Beaver Creek.

a) Proposed Facilities

This 192-mile long section of the proposed route would parallel the Alaska Highway and utilize the Haines Pipeline right-of-way. Proposed facilities for this section of the route would be similar to those discussed previously for the Prudhoe Bay to Delta Junction section, and would include four compressor stations containing equipment similar to those previously discussed.

b) Construction Procedures

The schedule indicates that by the end of the third project year, one of the four compressor stations proposed for this section of the route would be completed while the remaining three would be capable of chilling the gas only. During the following two years, these three stations would be completed.

4. Canada -- Alaska-Yukon Border to Fort Nelson to Zama Lake

The primary purpose of this section of the proposed Alcan Pipeline is to transport approximately 2.276 Bcfd of natural gas from the Alaska-Yukon border near Beaver Creek to Fort Nelson, British Columbia, and Zama Lake. Alberta, from which points the gas would ultimately be delivered to markets in the lower 48 states.

The Yukon Border to Zama Lake section of the proposed Alcan Pipeline would follow, in general, the Alaska Highway between the border and Fort Nelson in British Columbia. From Fort Nelson, it would extend eastward to Zama Lake in northwestern Alberta. Three separate companies proposed to build sections of this 914.3 mile-long pipeline. Foothills proposes to build the westernmost 508.8 miles between the Alaska-Yukon border near Beaver Creek and the Yukon-British Columbia border near Watson Lake. From the British Columbia border to the Alberta border, Westcoast proposes to build 355.5 miles of transmission facilities. The easternmost 50 miles of pipeline and related facilities between the British Columbia-Alberta border and Zama Lake would be constructed by AGTL (Canada).

a) Proposed Facilities

The 508.8-mile Foothills segment of pipeline would be comprised of two distinct sections, one chilled and the other non-chilled. The chilled portion of the pipeline, traversing approximately 105 miles between the Alaska-Yukon border and Compressor Station 3, would be 42 inches in diameter with a wall thickness of 0.600 inch. The pipe would have a specified minimum yield strength of 65,000 psi. The non-chilled portion between Compressor Station 3 and the Yukon-British Columbia border near Watson Lake would be 42 inches in diameter, have a wall thickness of 0.540 inch and a specified minimum yield strength of 70,000 psig. Pipeline design pressure is 1,440 psig, but initial operating pressure will be 1,250 psig.

Additional facilities along the Foothills section of the route would include 10 compressor stations, and ancillary facilities. The first three stations would be rated at 26,500 hp, and the easternmost seven stations would all be rated at 38,000 hp.

Westcoast proposes to construct an approximate 356-mile long segment of the Alcan Pipeline extending between the Yukon-British Columbia border and British Columbia-Alberta border. The westernmost 259 miles of the line would be 42 inches in diameter, have wall thicknesses of 0.520 and 0.625 inch, and an operating pressure of 1,250 psig. The remaining 97 miles lying east of Fort Nelson would be a 36-inch diameter line with thicknesses of 0.450 and 0.540 inch and a maximum operating pressure of 1,250 psig. The specified minimum yield strength for both diameters would be 70,000 psig.

Additional facilities along the Westcoast section of the route would include ancillary facilities and either 6 or 7 compressor stations. Two stations would be rated at 32,000 hp,

and the remaining stations at 48,000 hp.

AGTL (Canada) proposes to construct an approximate 50-mile long segment of the Alcan Pipeline extending between the British Columbia-Alberta border and existing AGTL facilities near Zama Lake. The proposed pipeline would be 36 inches in diameter, have a wall thickness of 0.402 inch, and a maximum operating pressure of 1,250 psig.

In addition to the pipeline facilities, a compressor station would be constructed at the point where the proposed 50-mile segment ties into AGTL's existing system near Zama Lake. The station would be rated at 30,000 hp.

b) Construction Procedures

Foothills estimates that 4 years would be required to complete their portion of the proposed project. The pipeline could be operational about 40 months after all requisite authorizations and permits were granted. Major construction activities would essentially take place during the summer (February to April and June to October), except for approximately 100 miles through muskeg and at most river crossings where winter construction would take place.

Pipeline construction is scheduled to begin in February of the third project year, while construction of compressor stations is scheduled to begin in the fall of the second project year. All 10 stations would be fully developed by early in the fourth project year.

Westcoast estimates that 4 years would be required to complete their portion of the proposed project. Major construction activities would take place virtually all year-round (December through March and June through October), with the exception of river crossings which would be accomplished during the January through March periods.

Pipeline construction is scheduled to begin in December of the second project year, with construction of compressor stations scheduled to begin in August of the third project year. Only two stations would be required to receive the initial volumes of Prudhoe Bay gas.

AGTL (Canada) proposes to do its right-of-way clearing during the winter of the first project year, construction of the pipeline during the winter of the second project year, and construction of the compressor station during the summer of the fourth project year.

5. Canada -- Mackenzie Delta to Zama Lake

As an "adjunct" to the Alcan project, Foothills has an independent application before the National Energy Board of Canada to bring Mackenzie Delta gas to Canadian markets. Known as the Maple Leaf project, this proposal calls for the construction of 817 miles of 42-inch diameter pipeline in a southeasterly direction, from Richards Island in the Mackenzie River Delta off the north slope of Canada, to a point south of Fort Simpson, Northwest Territories, near the Alberta and British Columbia borders. In addition to the main line, Foothills will construct a 30-inch diameter supply lateral extending 15 miles from a point east of Parsons Lake to a point of interconnection with the main line about 51 miles south of Richards Island, and 460 miles of delivery laterals off the main line to provide service to communities in the Northwest Territories.

From the southern terminus of the main line near Fort Simpson, Westcoast will construct a 30-inch diameter line southwesterly about 140 miles to a point of interconnection in northern British Columbia with its existing transmission system. AGTL (Canada) will install 81 miles of 42-inch diameter line from the Foothills line southward to Zama, Alberta, to interconnect with the existing system of AGTL.

In addition to the pipeline facilities described above, the project calls for the construction of 18 compressor stations and other appurtenant facilities. Further, to the extent necessary to accommodate Mackenzie Delta volumes, the existing systems of Westcoast and AGTL will be expanded by pipeline looping, and it is anticipated that the existing system of TransCanada Pipelines Limited, which is interconnected with the AGTL system at Empress, Alberta, will be expanded in order to transport a portion of the gas to eastern Canadian markets.

To the extent that the Arctic Gas project proposes to transport Mackenzie Delta gas through facilities to be constructed by Canadian Arctic, its application before the NEB is competitive with the Maple Leaf project.

6. Canada -- Fort Nelson to Sumas, Washington

Westcoast's existing system consists essentially of a 30-inch main line extending from northeastern to southwestern British Columbia, a portion of which has been previously looped with 36-inch diameter pipe. Westcoast proposes to add numerous sections of 36-inch diameter pipeline loops totalling 403 miles to the existing system in order to increase capacity to carry about 700,000 Mcfd of Prudhoe Bay gas. Compression would be added at each of 11 existing mainline compressor stations and

appurtenant facilities would be installed.

Construction of the pipeline loops would be completed late in the second construction year.

7. Canada -- Zama Lake to Caroline Junction to Kingsgate to Monchy

AGTL (Canada) proposes to transport gas received at Zama Lake, Alberta to Caroline Junction, and thence to the southwestern Alberta border at Coleman and the southeastern Alberta border at Empress. From Coleman, 191,000 Mcfd of Alaskan gas would be transported through British Columbia by the existing system of Alberta Natural Gas Lines, Ltd. to the U.S. border near Kingstate, B.C.; and from Empress, 1,342 MMcfd of Alaskan gas would be transported to the U.S. border near Monchy, Saskatchewan by about 160 miles of new pipeline to be constructed by Foothills.

AGTL (Canada) will accomplish the proposed transportation to Coleman and Empress by expanding the existing system of its parent, AGTL, by adding 925 miles of 36-inch and 42-inch diameter pipeline loops and adding 444,700 hp. of compression at 7 new and 10 existing compressor stations. The system would be designed to operate at a maximum pressure of 1,250 psig. The Foothills facilities to Monchy will consist essentially of 159.8 miles of 36-inch diameter line and 5 compressor stations with total compression of 138,000 hp.

The AGTL (Canada) program would be constructed over a 3½ year period, and the Foothills section will be built in the fall of the third construction year and the summer of the fourth.

8. Lower 48 States -- Sumas, Washington to Kent, Oregon

Northwest will construct facilities to transport an annual average daily volume of about 669,000 Mcfd, received from Westcoast at the Canadian border near Sumas, to markets in the Pacific Northwest, the intermountain states, and markets in northern and southern California.

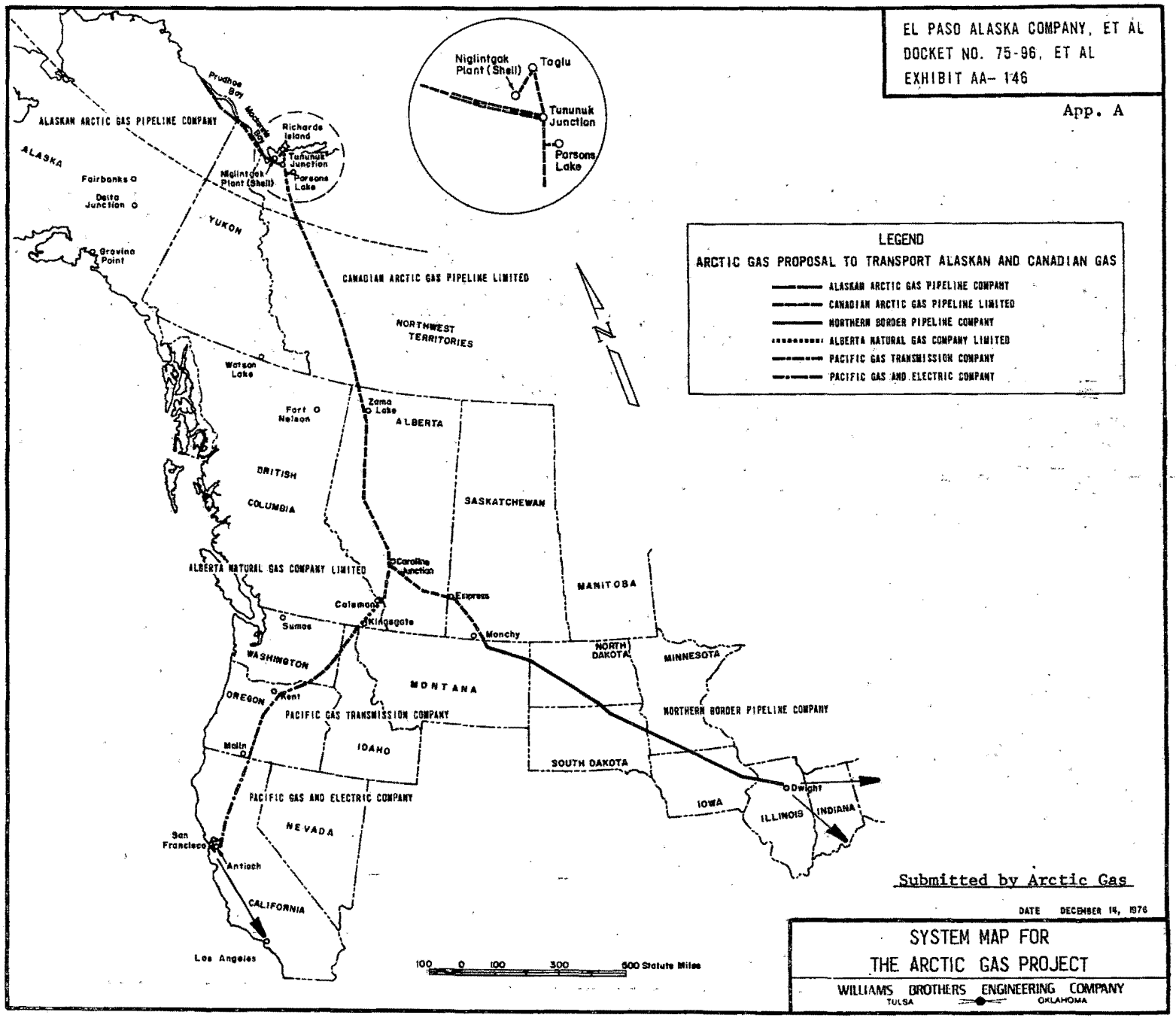
Northwest will install 309.1 miles of 30-inch diameter pipeline loops along its existing pipeline system between Sumas and Goldendale, Washington and will build a new 49.5 mile, 30-inch diameter line from Goldendale south to Kent, Oregon to the point of interconnection with facilities of PGT. Other additional facilities will include added compression of 63,335 hp. at existing compressor stations and a new 11,000 hp. station. The proposed pipeline would have a wall thickness of 0.334 to 0.480 inch, operated at a maximum pressure of 960 psig. Heavier walled pipe would be used at river crossings.

Northwest has indicated that construction of the proposed facilities would require 3 years with work being carried out from May to December of each year.

(The preceding summary is based primarily on the Staff FEIS dated April 1976, as amended in part by Alcan's comments thereon appearing at 242/42,245, and on Foothill's application brief dated June 11, 1976.)

EL PASO ALASKA COMPANY, ET AL
DOCKET NO. 75-96, ET AL
EXHIBIT AA- 146

App. A

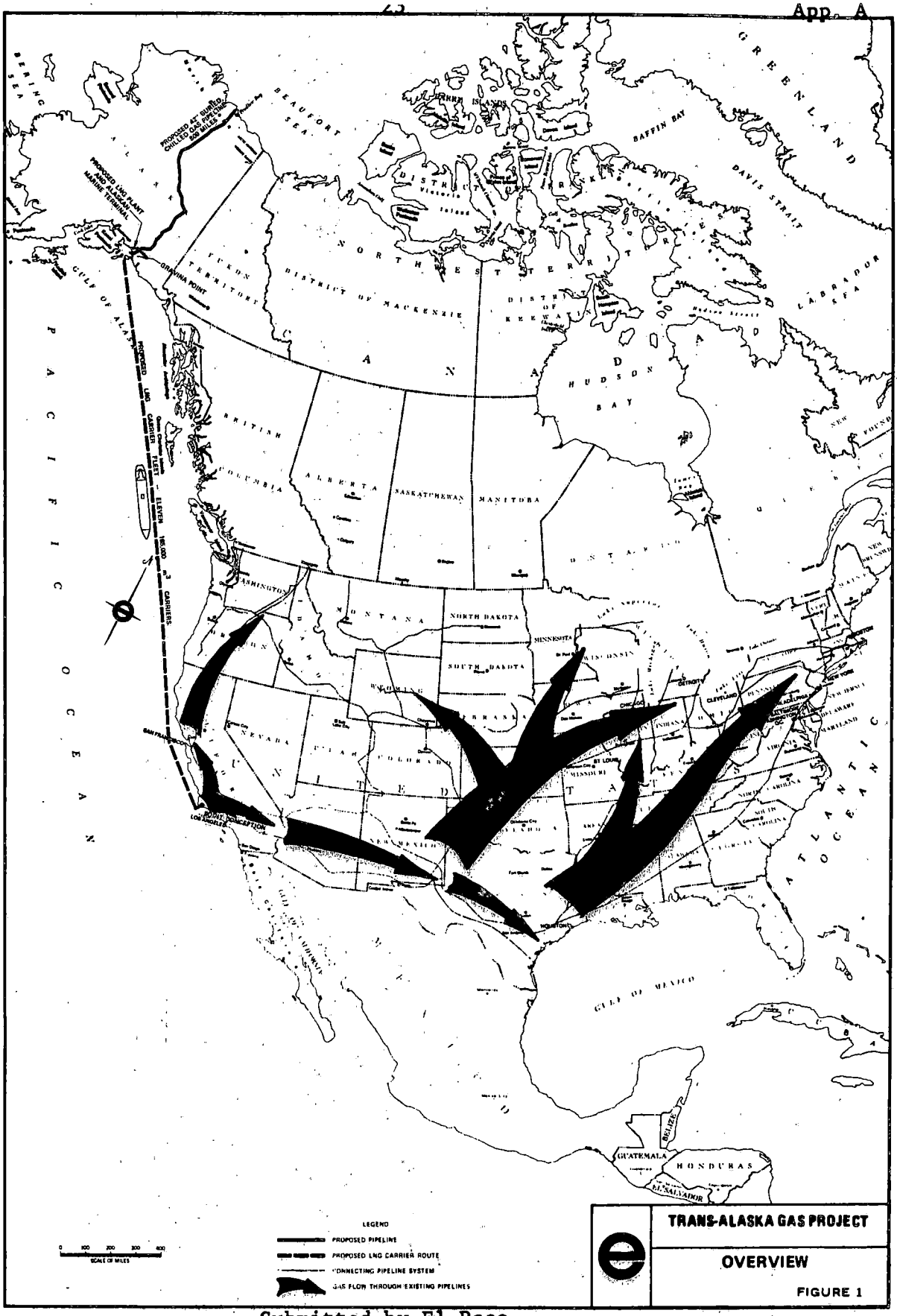


Submitted by Arctic Gas

DATE DECEMBER 14, 1976

SYSTEM MAP FOR
THE ARCTIC GAS PROJECT

WILLIAMS BROTHERS ENGINEERING COMPANY
TULSA OKLAHOMA



Submitted by El Paso

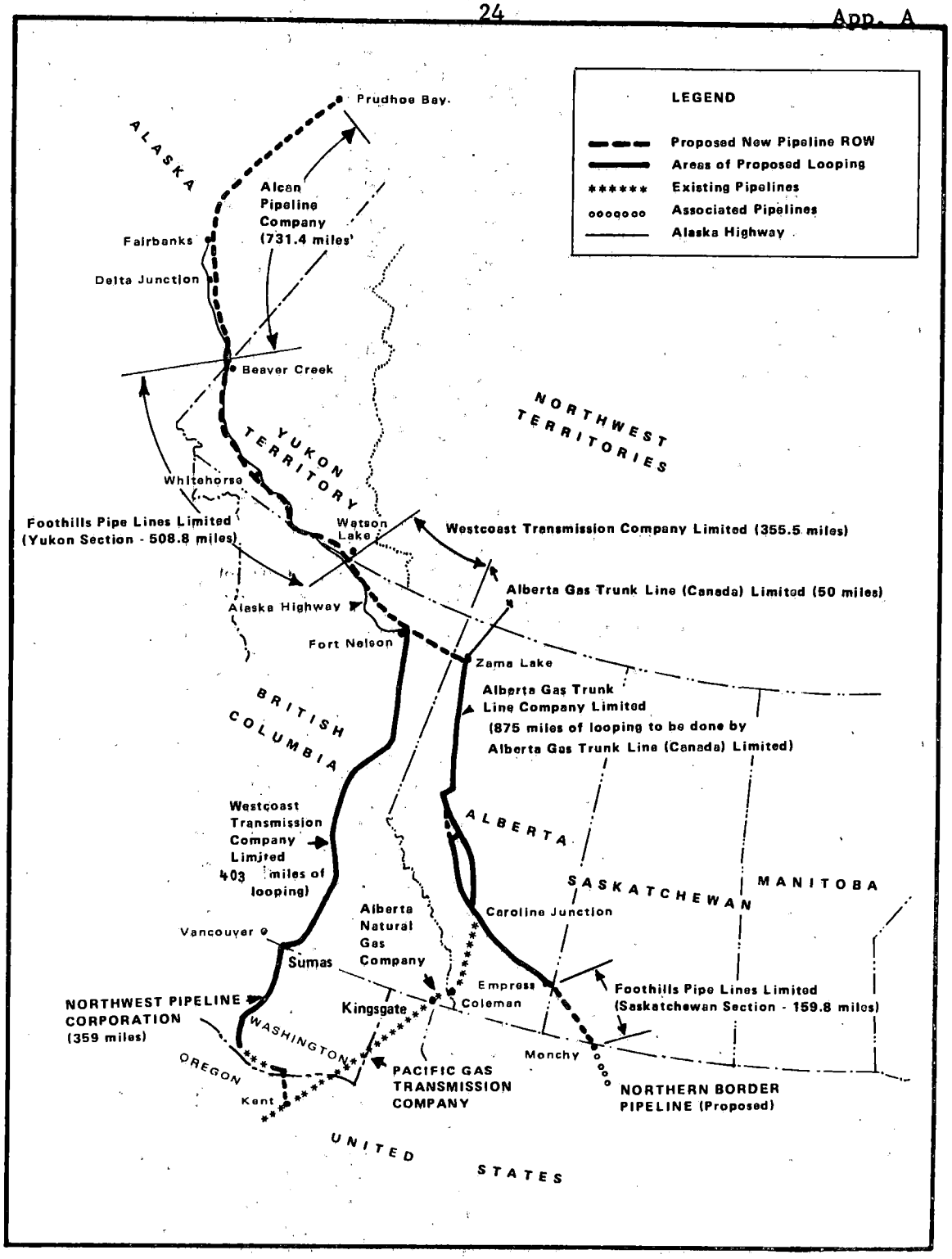
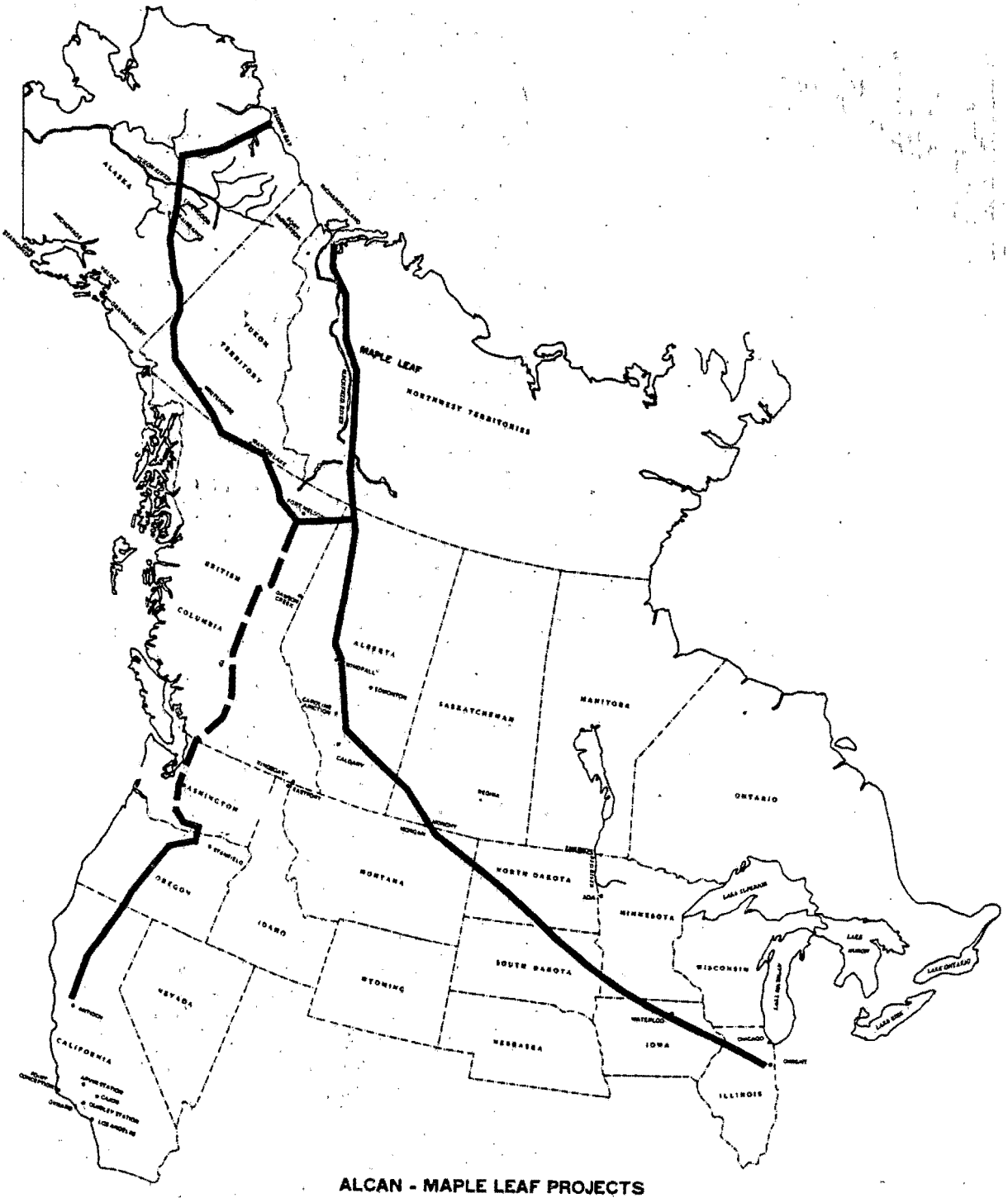


Figure 1. Overall System Map - Alcan Pipeline Project.



ALCAN - MAPLE LEAF PROJECTS

(From Staff Brief)

APPENDIX B

ORDERS GRANTING INTERVENTION IN THE FOLLOWING CONSOLIDATED PROCEEDINGS

Orders	Docket Numbers
May 13, 1974	CP74-239, et al
July 8, 1974	CP74-239, et al
August 27, 1974	CP74-292, et al
September 23, 1974	CP74-290, et al
December 19, 1974	CP74-239, et al
	CP74-290, et al
	CP71-182
January 23, 1975	CP75-96, et al
February 12, 1975	CP75-96, et al
March 26, 1975	CP75-96, et al
April 16, 1975	CP75-96, et al
June 11, 1975	CP75-96, et al
November 19, 1975	CP75-96, et al
May 19, 1976	CP75-96, et al
July 12, 1976	CP75-83, et al
July 23, 1976	CP75-96, et al
July 29, 1976	CP75-96, et al

APPENDIX C

SUMMARY OF TECHNICAL REPORT ON PRODUCERS' PROPOSED PLAN OF OPERATION OF THE PRUDHOE BAY FIELD

On August 18, 1976, a draft of the proposed Prudhoe Bay Unit Agreement was presented by the producers to the Alaska Department of Natural Resources. The draft included a summary of the producers' recommended plan of operations for the Prudhoe Bay Field. Subsequently, the producers prepared and submitted to the Alaskan authorities a technical report on the recommended operating plan. The report (Exhibit ALA-33) sets forth the results of the comprehensive technical studies conducted independently over the past several years by the major producers to develop long range operating plans for the Field. The following is a summary of that report.

According to the report, oil production is planned to commence in mid-1977 at a rate of 600,000 B/D, increasing to about 1,200,000 B/D by the end of 1977. Completion in 1978 or 1979 of field facilities necessary for the purpose will permit a further planned production increase to about 1,500,000 B/D when pipeline capacity is available. Such rate of oil production can be maintained for about 8 years by additional development drilling.

Until a gas pipeline and gas conditioning plant are approved and constructed, currently estimated to be 4½ to 5 years after the start of oil production, produced gas in excess of fuel requirements (1.8 to 2.0 Bcfd) will be injected into the gas cap without adversely affecting ultimate oil recovery. The gas conditioning plant will be needed to bring the gas to pipeline quality including CO_2 removal, extraction of gas liquids for hydrocarbon dew point control, dehydration, and compression and cooling to pipeline pressure and temperature. Preliminary estimates made several years ago indicate that the plant will require 4 to 6 years to design, fabricate and construct, and will cost about $1 billion (1975 costs).

Once the necessary pipeline and conditioning plant are in place, gas pipeline deliveries of at least 2.0 Bcf/D will commence. Delivery at this level will require gas production of 2.7 to 2.8 Bcf/D to allow for fuel requirements, shrinkage and CO_2 removal. The 2.0 Bcf/D planned rate is a conservative volume which can clearly be supported by the reservoir, and initial gas pipeline deliveries of up to 2.5 Bcf/D may be justified, without affecting ultimate oil recovery.

Planned pipeline deliveries will substantially increase domestic energy supplies. For instance, through year 2,000, pipeline deliveries of 2.0 Bcf/D, beginning 5 years after the start of oil production, add the energy equivalent of 2 billion barrels of oil to the nation's energy supply. In addition, such gas deliveries reduce fuel consumption, eliminate unnecessary costs for compression, injection, and "double production" of gas, and provide a measure of correlative rights protection for the Oil Rim and Gas Cap participating area owners.

In the Main Area Sadlerochit reservoir, the natural recovery mechanism of the field will permit oil recovery predicted in the range of from 32% to 35% of the original oil in place. The current operating plan calls for the injection of produced water into the Sadlerochit when volumes become significant, increasing recovery to 33% to 36%. Studies indicate further potential for increasing ultimate oil recovery to a level of 39% to 40% of original oil in place by implementing a properly designed source water injection program within about 5 to 9 years after the start of oil production. Two or more years of production performance history and testing data will be necessary to confirm the additional recovery potential before the final decision is made to commit approximately $1 billion for source water injection facilities. It is estimated that oil recovery will be achieved over a period of 25 to 30 years. Ultimate gas recovery, expected to be in the range of 75% to 80% of total gas-in-place, will be recovered over a period of about 35 years.

It is expected that significant volumes of gas cap gas will be produced through oil wells. If this gas is not delivered to a pipeline, it will be necessary to reinject an estimated 15 to 20 Tcf of gas into the gas cap. Although the return of such gas is not detrimental to reservoir performance, compression and injection of this volume would require about 600 to 800 Bcf of fuel gas, or the energy equivalent of more than 100 million barrels of oil. Moreover, the extraction of liquids required to condition the gas for pipeline delivery will provide for an additional 10 million barrels per year of gas liquids. All liquids extracted will be used without waste; either to displace fuel gas or be transported through the oil pipeline with the crude oil and condensate. 1/

1/ A gas cap gas condensate yield of about 35 barrels per MMcf of separator outlet gas is expected initially from the separator facilities.

In its conclusions, the technical report reiterates that effectuation of planned pipeline deliveries "will immediately increase current energy to the consumers and current income to the owners, eliminate fuel requirements and unnecessary costs for reinjecting produced gas, and provide for a measure of protection for the correlative rights of owners in the Oil Rim and Gas Cap participating areas of the proposed Prudhoe Bay Unit" (p. 45).

APPENDIX D

Public Law 94-586
94th Congress

An Act

To expedite a decision on the delivery of Alaska natural gas to United States markets, and for other purposes.

Oct. 22, 1976
[S. 3521]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

Alaska Natural Gas Transportation Act of 1976.

SECTION 1. This Act may be cited as the "Alaska Natural Gas Transportation Act of 1976". 15 USC 719 note.

CONGRESSIONAL FINDINGS

SEC. 2. The Congress finds and declares that— 15 USC 719.

(1) a natural gas supply shortage exists in the contiguous States of the United States;

(2) large reserves of natural gas in the State of Alaska could help significantly to alleviate this supply shortage;

(3) the expeditious construction of a viable natural gas transportation system for delivery of Alaska natural gas to United States markets is in the national interest; and

(4) the determinations whether to authorize a transportation system for delivery of Alaska natural gas to the contiguous States and, if so, which system to select, involve questions of the utmost importance respecting national energy policy, international relations, national security, and economic and environmental impact, and therefore should appropriately be addressed by the Congress and the President in addition to those Federal officers and agencies assigned functions under law pertaining to the selection, construction, and initial operation of such a system.

STATEMENT OF PURPOSE

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. 15 USC 719a.

89-139 (497) O - 76

DEFINITIONS

15 USC 719b.

SEC. 4. As used in this Act:

(1) the term "Alaska natural gas" means natural gas derived from the area of the State of Alaska generally known as the North Slope of Alaska, including the Continental Shelf thereof;

(2) the term "Commission" means the Federal Power Commission;

(3) the term "Secretary" means the Secretary of the Interior;

(4) the term "provision of law" means any provision of a Federal statute or rule, regulation, or order issued thereunder; and

(5) the term "approved transportation system" means the system for the transportation of Alaska natural gas designated by the President pursuant to section 7(a) or 8(b) and approved by joint resolution of the Congress pursuant to section 8.

FEDERAL POWER COMMISSION REVIEWS AND REPORTS

Proceedings, suspension. 15 USC 719c. 15 USC 717w.

SEC. 5. (a)(1) Notwithstanding any provision of the Natural Gas Act or any other provision of law, the Commission shall suspend all proceedings pending before the Commission on the date of enactment of this Act relating to a system for the transportation of Alaska natural gas as soon as the Commission determines to be practicable after such date, and the Commission may refuse to act on any application, amendment thereto, or other requests for action under the Natural Gas Act relating to a system for the transportation of Alaska natural gas until such time as (A) a decision of the President designating such a system for approval takes effect pursuant to section 8, (B) no such decision takes effect pursuant to section 8, or (C) the President decides not to designate such a system for approval under section 8 and so advises the Congress pursuant to section 7.

(2) In the event a decision of the President designating such a system takes effect pursuant to this Act, the Commission shall forthwith vacate proceedings suspended under paragraph (1) and, pursuant to section 9 and in accordance with the President's decision, issue a certificate of public convenience and necessity respecting such system.

(3) In the event such a decision of the President does not take effect pursuant to this Act or the President decides not to designate such a system and so advises the Congress pursuant to section 7, the suspension provided for in paragraph (1) of this subsection shall be removed.

Recommendation, submittal to President.

(b)(1) The Commission shall review all applications for the issuance of a certificate of public convenience and necessity relating to the transportation of Alaska natural gas pending on the date of enactment of this Act, and any amendments thereto which are timely made, and after consideration of any alternative transportation system which the Commission determines to be reasonable, submit to the President not later than May 1, 1977, a recommendation concerning the selection of such a transportation system. Such recommendation may be in the form of a proposed certificate of public convenience and necessity, or in such other form as the Commission determines to be appropriate, or may recommend that no decision respecting the selection of such a transportation system be made at this time or pursuant to this Act. Any recommendation that the President approve a particular transportation system shall (A) include a description of the nature and route of the system, (B) designate

a person to construct and operate the 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) if such recommendation is for an all-land pipeline transportation system, or a transportation system involving water transportation, include provision for new facilities to the extent necessary to assure direct pipeline delivery of Alaska natural gas contemporaneously to points both east and west of the Rocky Mountains in the lower continental United States.

(2) The Commission may, by rule, provide for the presentation of data, views, and arguments before the Commission or a delegate of the Commission pursuant to such procedures as the Commission determines to be appropriate to carry out its responsibilities under paragraph (1) of this subsection. Such a rule shall, to the extent determined by the Commission, apply, notwithstanding any provision of law that would otherwise have applied to the presentation of data, views, and arguments. Rule.

(3) The Commission may request such information and assistance from any Federal agency as the Commission determines to be necessary or appropriate to carry out its responsibilities under this Act. Any Federal agency requested to submit information or provide assistance shall submit such information to the Commission at the earliest practicable time after receipt of a Commission request. Cooperation.

(c) The Commission shall accompany any recommendation under subsection (b) (1) with a report, which shall be available to the public, explaining the basis for such recommendation and including for each transportation system reviewed or considered a discussion of the following: Report, public availability.

(1) for each year of the 20-year period which begins with the first year following the date of enactment of this Act, the estimated—

(A) volumes of Alaska natural gas which would be available to each region of the United States directly, or indirectly by displacement or otherwise, and

(B) transportation costs and delivered prices of any such volumes of gas by region;

(2) the effects of each of the factors described in subparagraphs (A) and (B) of paragraph (1) on the projected natural gas supply and demand for each region of the United States and on the projected supplies of alternative fuels available by region to offset shortages of natural gas occurring in such region for each such year;

(3) the impact upon competition;

(4) the extent to which the system provides a means for the transportation to United States markets of natural resources or other commodities from sources in addition to the Prudhoe Bay Reserve;

(5) environmental impacts;

(6) safety and efficiency in design and operation and potential for interruption in deliveries of Alaska natural gas;

(7) construction schedules and possibilities for delay in such schedules or for delay occurring as a result of other factors;

(8) feasibility of financing;

(9) extent of reserves, both proven and probable and their deliverability by year for each year of the 20-year period which

begins with the first year following the date of enactment of this Act;

(10) the estimate of the total delivered cost to users of the natural gas to be transported by the system by year for each year of the 20-year period which begins with the first year following the date of enactment of this Act;

(11) capability and cost of expanding the system to transport additional volumes of natural gas in excess of initial system capacity;

(12) an estimate of the capital and operating costs, including an analysis of the reliability of such estimates and the risk of cost overruns; and

(13) such other factors as the Commission determines to be appropriate.

(d) The recommendation by the Commission pursuant to this section shall not be based upon the fact that the Government of Canada or agencies thereof have not, by then rendered a decision as to authorization of a pipeline system to transport Alaska natural gas through Canada.

Transportation system, recommendation, submittal to President.

(e) If the Commission recommends the approval of a particular transportation system, it shall submit to the President with such recommendation (1) an identification of those facilities and operations which are proposed to be encompassed within the term "construction and initial operation" in order to define the scope of directions contained in section 9 of this Act and (2) the terms and conditions permitted under the Natural Gas Act, which the Commission determines to be appropriate for inclusion in a certificate of public convenience and necessity to be issued respecting such system. The Commission shall submit to the President contemporaneously with its report an environmental impact statement prepared respecting the recommended system, if any, and each environmental impact statement which may have been prepared respecting any other system reported on under this section.

15 USC 717w.

Environmental impact statement, submittal to President.

OTHER REPORTS

Comments, submittal to President.
15 USC 719d.

Public availability.

SEC. 6. (a) Not later than July 1, 1977, any Federal officer or agency may submit written comments to the President with respect to the recommendation and report of the Commission and alternative methods for transportation of Alaska natural gas for delivery to the contiguous States. Such comments shall be made available to the public by the President when submitted to him, unless expressly exempted from this requirement in whole or in part by the President, under section 552(b)(1) of title 5, United States Code. Any such written comment shall include information within the competence of such Federal officer or agency with respect to—

(1) environmental considerations, including air and water quality and noise impacts;

(2) the safety of the transportation systems;

(3) international relations, including the status and time schedule for any necessary Canadian approvals and plans;

(4) national security, particularly security of supply;

(5) sources of financing for capital costs;

(6) the impact upon competition;

(7) impact on the national economy, including regional natural gas requirements; and

(8) relationship of the proposed transportation system to other aspects of national energy policy.

(b) Not later than July 1, 1977, the Governor of any State, any municipality, State utility commission, and any other interested person may submit to the President such written comments with respect to the recommendation and report of the Commission and alternative systems for delivering Alaska natural gas to the contiguous States as they determine to be appropriate. Comments, submittal to President.

(c) Not later than July 1, 1977, each Federal officer or agency shall report to the President with respect to actions to be taken by such officer or agency under section 9(a) relative to each transportation system reported on by the Commission under section 5(c) and shall include such officer's or agency's recommendations with respect to any provision of law to be waived pursuant to section 8(g) in conjunction with any decision of the President which designates a system for approval. Report to President.

(d) Following receipt by the President of the Commission's recommendations, the Council on Environmental Quality shall afford interested persons an opportunity to present oral and written data, views, and arguments respecting the environmental impact statements submitted by the Commission under section 5(e). Not later than July 1, 1977, the Council on Environmental Quality shall submit to the President a report, which shall be contemporaneously made available by the Council to the public, summarizing any data, views, and arguments received and setting forth the Council's views concerning the legal and factual sufficiency of each such environmental impact statement and other matters related to environmental impact as the Council considers to be relevant. Report to President.

PRESIDENTIAL DECISION AND REPORT

SEC. 7. (a)(1) As soon as practicable after July 1, 1977, but not later than September 1, 1977, the President shall issue a decision as to whether a transportation system for delivery of Alaska natural gas should be approved under this Act. If he determines such a system should be so approved, his decision shall designate such a system for approval pursuant to section 8 and shall be consistent with section 5(b)(1)(C) to assure delivery of Alaska natural gas to points both east and west of the Rocky Mountains in the continental United States. The President in making his decision shall take into consideration the Commission's recommendation pursuant to section 5, the report under section 5(c), and any comments submitted under section 6; and his decision to designate a system for approval shall be based on his determination as to which system, if any, best serves the national interest. 15 USC 719e.

(2) The President, for a period of up to 90 additional calendar days after September 1, 1977, may delay the issuance of his decision and transmittal thereof to the House of Representatives and the Senate, if he determines (A) that there exists no environmental impact statement prepared relative to a system he wishes to consider or that any prepared environmental impact statement relative to a system he wishes to consider is legally or factually insufficient, or (B) that the additional time is otherwise necessary to enable him to make a sound decision on an Alaska natural gas transportation system. The President shall promptly, but in no case any later than September 1, 1977, notify the House of Representatives and the Transmittal to Congress, delay. Notice to Congress.

Senate if he so delays his decision and submit a full explanation of the basis of any such delay.

(3) If, on or before May 1, 1977, the President determines to delay issuance and transmittal of his decision to the House of Representatives and the Senate pursuant to paragraph (2) of this subsection, he may authorize a delay of not more than 90 days in the date of taking of any action specified in sections 5 and 6. The President shall promptly notify the House of Representatives and the Senate of any such authorization of delay and submit a full explanation of the basis of any such authorization.

Notice to Congress.

(4) 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 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.

Chairman, appointment.

(5) After a decision of the President designating an Alaska natural gas transportation system takes effect under section 8, the President shall appoint an officer of the United States, with the advice and consent of the Senate, or designate a board (consisting of such an officer, so appointed with the advice and consent of the Senate, as chairman and such other individuals as the President determines appropriate to serve on such board by reason of background, experience, or position) to serve as Federal inspector of construction of such transportation system, except that no such individual or officer may have a financial interest in the approved transportation system. Upon enactment of a joint resolution pursuant to section 8 approving such a system the Federal inspector shall—

Joint surveillance and monitoring agreement, establishment.

(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 under section 9;

(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 subpena 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.

(6) If the President determines to designate for approval a transportation system for delivery of Alaska natural gas to the contiguous States, he may identify in such decision such terms and conditions permissible under existing law as he determines appropriate for inclusion with respect to any issuance or authorization directed to be made pursuant to section 9.

Transmittal to Congress.

(b) The decision of the President made pursuant to subsection (a) of this section shall be transmitted to both Houses of Congress and shall be considered received by such Houses for the purposes of this section on the first day on which both are in session occurring after such decision is transmitted. Such decision shall be accompanied by a report explaining in detail the basis for his decision with specific reference to the factors set forth in sections 5(c) and 6(a), and the reasons for any revision, modification of, or substitution for, the Commission recommendation.

Financial analysis.

(c) The report of the President pursuant to subsection (b) of this section shall contain a financial analysis for the transportation system designated for approval. Unless the President finds and states in his report submitted pursuant to this section that he reasonably anticipates that the system designated by him can be privately financed, constructed, and operated, his report shall also be accompanied by his recommendation concerning the use of existing Federal financing authority or the need for new Federal financing authority.

(d) In making his decision under subsection (a) the President shall inform himself, through appropriate consultation, of the views and objectives of the States, the Government of Canada, and other governments with respect to those aspects of such a decision that may involve intergovernmental and international cooperation among the Government of the United States, the States, the Government of Canada, and any other government.

(e) If the President determines to designate a transportation system for approval, the decision of the President shall take effect as provided in section 8, except that the approval of a decision of the President shall not be construed as amending or otherwise affecting the laws of the United States so as to grant any new financing authority as may have been identified by the President pursuant to subsection (c).

CONGRESSIONAL REVIEW

15 USC 719f.

SEC. 8. (a) Any decision under section 7(a) or 8(b) designating for approval a transportation system for the delivery of Alaska natural gas shall take effect upon enactment of a joint resolution within the first period of 60 calendar days of continuous session of Congress beginning on the date after the date of receipt by the Senate and House of Representatives of a decision transmitted pursuant to section 7(b) or subsection (b) of this section.

(b) If the Congress does not enact such a joint resolution within such 60-day period, the President, not later than the end of the 30th day following the expiration of the 60-day period, may propose a new decision and shall provide a detailed statement concerning the reasons for such proposal. The new decision shall be submitted in accordance with section 7(a) and transmitted to the House of Representatives and the Senate on the same day while both are in session and shall take effect pursuant to subsection (a) of this section. In the event that a resolution respecting the President's decision was defeated by vote of either House, no new decision may be transmitted pursuant to this subsection unless such decision differs in a material respect from the previous decision.

(c) For purposes of this section—

(1) continuity of session of Congress is broken only by an adjournment sine die; and

(2) the days on which either House is not in session because of an adjournment of more than 3 days to a day certain are excluded in the computation of the 60-day calendar period.

(d)(1) This subsection is enacted by Congress—

(A) as an exercise of the rulemaking power of each House of Congress, respectively, and as such it is deemed a part of the rules of each House, respectively, but applicable only with respect to the procedure to be followed in that House in the case of resolutions described by paragraph (2) of this subsection; and it supersedes other rules only to the extent that it is inconsistent therewith; and

(B) with full recognition of the constitutional right of either House to change the rules (so far as those rules relate to the procedure of that House) at any time, in the same manner and to the same extent as in the case of any other rule of such House.

"Resolution."

(2) For purposes of this Act, the term "resolution" means (A) a joint resolution, the resolving clause of which is as follows: "That the House of Representatives and Senate approve the Presidential decision on an Alaska natural gas transportation system submitted to the Congress on ————, 19 , and find that any environmental impact statements prepared relative to such system and submitted with the President's decision are in compliance with the Natural Environmental Policy Act of 1969."; the blank space therein shall be filled with the date on which the President submits his decision to the House of Representatives and the Senate; or (B) a joint resolution described in subsection (g).

42 USC 4321 note.

Referral to congressional committees.

(3) A resolution once introduced with respect to a Presidential decision on an Alaska natural gas transportation system shall be referred to one or more committees (and all resolutions with respect to the same Presidential decision on an Alaska natural gas transportation system shall be referred to the same committee or committees) by the President of the Senate or the Speaker of the House of Representatives, as the case may be.

(4)(A) If any committee to which a resolution with respect to a Presidential decision on an Alaska natural gas transportation system has been referred has not reported it at the end of 30 calendar days after its referral, it shall be in order to move either to discharge such committee from further consideration of such resolution or to discharge such committee from consideration of any other resolution with respect to such Presidential decision on an Alaska natural gas transportation system which has been referred to such committee.

(B) A motion to discharge may be made only by an individual favoring the resolution, shall be highly privileged (except that it may not be made after the committee has reported a resolution with respect to the same Presidential decision on an Alaska natural gas transportation system), and debate thereon shall be limited to not more than 1 hour, to be divided equally between those favoring and those opposing the resolution. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to. Debate limitation.

(C) If the motion to discharge is agreed to or disagreed to, the motion may not be made with respect to any other resolution with respect to the same Presidential decision on an Alaska natural gas transportation system.

(5)(A) When any committee has reported, or has been discharged from further consideration of, a resolution, but in no case earlier than 30 days after the date of receipt of the President's decision to the Congress, it shall be at any time thereafter in order (even though a previous motion to the same effect has been disagreed to) to move to proceed to the consideration of the resolution. The motion shall be highly privileged and shall not be debatable. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

(B) Debate on the resolution described in subsection (d)(2)(A) shall be limited to not more than 10 hours and on any resolution described in subsection (g) to one hour. This time shall be divided equally between those favoring and those opposing such resolution. A motion further to limit debate shall not be debatable. An amendment to, or motion to recommit the resolution shall not be in order, and it shall not be in order to move to reconsider the vote by which such resolution was agreed to or disagreed to or, thereafter within such 60-day period, to consider any other resolution respecting the same Presidential decision.

(6)(A) Motions to postpone, made with respect to the discharge from committee, or the consideration of a resolution and motions to proceed to the consideration of other business, shall be decided without debate.

(B) Appeals from the decision of the Chair relating to the application of the rules of the Senate or the House of Representatives, as the case may be, to the procedures relating to a resolution shall be decided without debate.

(e) The President shall find that any required environmental impact statement relative to the Alaska natural gas transportation system designated for approval by the President has been prepared and that such statement is in compliance with the National Environmental Policy Act of 1969. Such finding shall be set forth in the report of the President submitted under section 7. The President may supplement or modify the environmental impact statements prepared by the Commission or other Federal officers or agencies. Any such environmental impact statement shall be submitted contemporaneously with the transmittal to the Senate and House of Representatives of the President's decision pursuant to section 7(b) or subsection (b) of this section. 42 USC 4321 note. Submittal to congressional committees.

(f) Within 20 days of the transmittal of the President's decision to the Congress under section 7(b) or under subsection (b) of this section, (1) the Commission shall submit to the Congress a report commenting on the decision and including any information with regard to that decision which the Commission considers appropriate, Report, submittal to Congress.

Hearings. Report, submittal to Congress.

and (2) the Council on Environmental Quality shall provide an opportunity to any interested person to present oral and written data, views, and arguments on any environmental impact statement submitted by the President relative to any system designated by him for approval which is different from any system reported on by the Commission under section 5(c), and shall submit to the Congress a report summarizing any such views received. The committees in each House of Congress to which a resolution has been referred under subsection (d)(3) shall conduct hearings on the Council's report and include in any report of the committee respecting such resolution the findings of the committee on the legal and factual sufficiency of any environmental impact statement submitted by the President relative to any system designated by him for approval.

Congressional committee hearings.

Waiver, submittal to Congress.

(g)(1) 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.

(2) Such provision shall be waived with respect to actions to be taken under subsection (a) or (c) of section 9 upon enactment of a joint resolution pursuant to the procedures specified in subsections (c) and (d) of this section (other than subsection (d)(2) thereof) within the first period of 60 calendar days of continuous session of Congress beginning on the date after the date of receipt by the Senate and House of Representatives of such proposal.

(3) The resolving clause of the joint resolution referred to in this subsection is as follows: "That the House of Representatives and Senate approve the waiver of the provision of law ( ) as proposed by the President, submitted to the Congress on , 19 ." The first blank space therein being filled with the citation to the provision of law and the second blank space therein being filled with the date on which the President submits his decision to the House of Representatives and the Senate.

(4) In the case of action with respect to a joint resolution described in this subsection, the phrase "a waiver of a provision of law" shall be substituted in subsection (d) for the phrase "the Alaska natural gas transportation system.".

AUTHORIZATIONS

15 USC 719g.

SEC. 9. (a) To the extent that the taking of any action which is necessary or related to the construction and initial operation of the approved transportation system requires a certificate, right-of-way, permit, lease, or other authorization to be issued or granted by a Federal officer or agency, such Federal officer or agency shall—

(1) to the fullest extent permitted by the provisions of law administered by such officer or agency, but

(2) without regard to any provision of law which is waived pursuant to section 8(g) issue or grant such certificates, permits, rights-of-way, leases, and other authorizations at the earliest practicable date.

(b) All actions of a Federal officer or agency with respect to consideration of applications or requests for the issuance or grant of a certificate, right-of-way, permit, lease, or other authorization to which subsection (a) applies shall be expedited and any such application or

request shall take precedence over any similar applications or requests of the Federal officer or agency.

(c) Any certificate, right-of-way, permit, lease, or other authorization issued or granted pursuant to the direction under subsection (a) shall include the terms and conditions required by law unless waived pursuant to a resolution under section 8(g), and may include terms and conditions permitted by law, except that with respect to terms and conditions permitted but not required, the Federal officer or agency, notwithstanding any such other provision of law, shall have no authority to include terms and conditions as would compel a change in the basic nature and general route of the approved transportation system or those the inclusion of which would otherwise prevent or impair in any significant respect the expeditious construction and initial operation of such transportation system. Terms and conditions.

(d) Any Federal officer or agency, with respect to any certificate, permit, right-of-way, lease, or other authorization issued or granted by such officer or agency, may, to the extent permitted under laws administered by such officer or agency add to, amend or abrogate any term or condition included in such certificate, permit, right-of-way, lease, or other authorization except that with respect to any such action which is permitted but not required by law, such Federal officer or agency, notwithstanding any such other provision of law, shall have no authority to take such action if the terms and conditions to be added, or as amended, would compel a change in the basic nature and general route of the approved transportation system or would otherwise prevent or impair in any significant respect the expeditious construction and initial operation of such transportation system.

(e) Any Federal officer or agency to which subsection (a) applies, to the extent permitted under laws administered by such officer or agency, shall include in any certificate, permit, right-of-way, lease, or authorization issued or granted those terms and conditions identified in the President's decision as appropriate for inclusion except that the requirement to include such terms and conditions shall not limit the Federal officer or agency's authority under subsection (d) of this section.

JUDICIAL REVIEW

SEC. 10. (a) Notwithstanding any other provision of law, the actions of Federal officers or agencies taken pursuant to section 9 of this Act, shall not be subject to judicial review except as provided in this section. 15 USC 719h.

(b)(1) Claims alleging the invalidity of this Act may be brought not later than the 60th day following the date a decision takes effect pursuant to section 8 of this Act.

(2) Claims alleging that an action will deny rights under the Constitution of the United States, or that an action is in excess of statutory jurisdiction, authority, or limitations, or short of statutory right may be brought not later than the 60th day following the date of such action, except that if a party shows that he did not know of the action complained of, and a reasonable person acting in the circumstances would not have known, he may bring a claim alleging the invalidity of such action on the grounds stated above not later than the 60th day following the date of his acquiring actual or constructive knowledge of such action.

(c)(1) A claim under subsection (b) shall be barred unless a complaint is filed prior to the expiration of such time limits in the United States Court of Appeals for the District of Columbia acting as a

Special Court. Such court shall have exclusive jurisdiction to determine such proceeding in accordance with the procedures hereinafter provided, and no other court of the United States, of any State, territory, or possession of the United States, or of the District of Columbia, shall have jurisdiction of any such claim in any proceeding instituted prior to or on or after the date of enactment of this Act.

(2) Any such proceeding shall be assigned for hearing and completed at the earliest possible date, shall, to the greatest extent practicable, take precedence over all other matters pending on the docket of the court at that time, and shall be expedited in every way by such court and such court shall render its decision relative to any claim within 90 days from the date such claim is brought unless such court determines that a longer period of time is required to satisfy requirements of the United States Constitution.

USC prec. title I.

(3) The enactment of a joint resolution under section 8 approving the decision of the President shall be conclusive as to the legal and factual sufficiency of the environmental impact statements submitted by the President relative to the approved transportation system and no court shall have jurisdiction to consider questions respecting the sufficiency of such statements under the National Environmental Policy Act of 1969.

42 USC 4321 note.

SUPPLEMENTAL ENFORCEMENT AUTHORITY

Compliance order or civil action. 5 USC 719i.

SEC. 11 (a) In addition to remedies available under other applicable provisions of law, whenever any Federal officer or agency determines that any person is in violation of any applicable provision of law administered or enforceable by such officer or agency or any rule, regulation, or order under such provision, including any term or condition of any certificate, right-of-way, permit, lease, or other authorization, issued or granted by such officer or agency, such officer or agency may—

(1) issue a compliance order requiring such person to comply with such provision or any rule, regulation, or order thereunder, or

(2) bring a civil action in accordance with subsection (c).

(b) Any order issued under subsection (a) shall state with reasonable specificity the nature of the violation and a time of compliance, not to exceed 30 days, which the officer or agency, as the case may be, determines is reasonable, taking into account the seriousness of the violation and any good faith efforts to comply with applicable requirements.

Civil penalty.

(c) Upon a request of such officer or agency, as the case may be, the Attorney General may commence a civil action for appropriate relief, including a permanent or temporary injunction or a civil penalty not to exceed $25,000 per day for violations of the compliance order issued under subsection (a). Any action under this subsection may be brought in any district court of the United States for the district in which the defendant is located, resides, or is doing business, and such court shall have jurisdiction to restrain such violation, require compliance, or impose such penalty or give ancillary relief.

Jurisdiction.

EXPORT LIMITATIONS

15 USC 719j. 15 USC 717w.

SEC. 12. Any exports of Alaska natural gas shall be subject to the requirements of the Natural Gas Act and section 103 of the Energy

Policy and Conservation Act, except that in addition to the requirements of such Acts, before any Alaska natural gas in excess of 1,000 Mcf per day may be exported to any nation other than Canada or Mexico, the President must make and publish an express finding that such exports will not diminish the total quantity or quality nor increase the total price of energy available to the United States. 42 USC 6212. Presidential finding, publication.

EQUAL ACCESS TO FACILITIES

SEC. 13. (a) There shall be included in the terms of any certificate, permit, right-of-way, lease, or other authorization issued or granted pursuant to the directions contained in section 9 of this Act, a provision that no person seeking to transport natural gas in the Alaska natural gas transportation system shall be prevented from doing so or be discriminated against in the terms and conditions of service on the basis of degree of ownership, or lack thereof, of the Alaska natural gas transportation system. 15 USC 719k.

(b) The State of Alaska is authorized to ship its royalty gas on the approved transportation system for use within Alaska and, to the extent its contracts for the sale of royalty gas so provide, to withdraw such gas from the interstate market for use within Alaska; the Federal Power Commission shall issue all authorizations necessary to effectuate such shipment and withdrawal subject to review by the Commission only of the justness and reasonableness of the rate charged for such transportation.

ANTITRUST LAWS

SEC. 14. Nothing in this Act, and no action taken hereunder, shall imply or effect an amendment to, or exemption from, any provision of the antitrust laws. 15 USC 719l

AUTHORIZATION

SEC. 15. There is hereby authorized to be appropriated beginning in fiscal year 1978 and each fiscal year thereafter, such sums as may be necessary to carry out the functions of the Federal inspector appointed by the President with the advice and consent of the Senate under section 7. 15 USC 719m.

SEPARABILITY

SEC. 16. If any provision of this Act, or the application thereof, is held invalid, the remainder of this Act shall not be affected thereby. 15 USC 719n.

CIVIL RIGHTS

SEC. 17. All Federal officers and agencies shall take such affirmative action as is necessary to assure that no person shall, on the grounds of race, creed, color, national origin, or sex, be excluded from receiving, or participating in any activity conducted under, any certificates, permit, right-of-way, lease, or other authorization granted or issued pursuant to this Act. The appropriate Federal officers and agencies shall promulgate such rules as are necessary to carry out the purposes of this section and may enforce this section, and any rules promulgated under this section through agency and department provisions and rules which shall be similar to those established and in effect under title VI of the Civil Rights Act of 1964. Discrimination, prohibition. 15 USC 719o. Rules. 42 USC 2000d *et seq.*

REPORT ON THE EQUITABLE ALLOCATION OF NORTH SLOPE CRUDE OIL

Report to Congress. 43 USC 1651 note.

SEC. 18. Within 6 months of the date of enactment of this Act, the President shall determine what special expediting procedures are necessary to insure the equitable allocation of north slope crude oil to the Northern Tier States of Washington, Oregon, Idaho, Montana, North Dakota, Minnesota, Michigan, Wisconsin, Illinois, Indiana, and Ohio (hereinafter referred to as the "Northern Tier States") to carry out the provisions of section 410 of Public Law 93-153 and shall report his findings to the Congress. In his report, the President shall identify the specific provisions of law, which relate to any determination of a Federal officer or agency as to whether to issue or grant a certificate, permit, right-of-way, lease, or other authorization in connection with the construction of an oil delivery system serving the Northern Tier States and which the President finds would inhibit the expeditious construction of such a system in the contiguous States of the United States. In addition the President will include in his report a statement which demonstrates the impact that the delivery system will have on reducing the dependency of New England and the Middle Atlantic States on foreign oil imports. Furthermore, all Federal officers and agencies shall, prior to the submission of such report and further congressional action relating thereto, expedite to the fullest practicable extent all applications and requests for action made with respect to such an oil delivery system.

43 USC 1651 note.

ANTITRUST STUDY

Report to Congress. 15 USC 719 note.

SEC. 19. The Attorney General of the United States is authorized and directed to conduct a thorough study of the antitrust issues and problems relating to the production and transportation of Alaska natural gas and, not later than six months following the date of enactment of this Act, to complete such study and submit to the Congress a report containing his findings and recommendations with respect thereto.

EXPIRATION

15 USC 719 note.

SEC. 20. This Act shall terminate in the event that no decision of the President takes effect under section 8 of this Act, such termination to occur at the end of the last day on which a decision could be, but is not, approved under such section.

Approved October 22, 1976.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 94-1658, Pt. 1 (Comm. on Interstate and Foreign Commerce).
SENATE REPORT No. 94-1020 (Comm. on Commerce and Comm. on Interior and Insular Affairs).
CONGRESSIONAL RECORD, Vol. 122 (1976):
July 1, considered and passed Senate.
Sept. 30, considered and passed House, amended.
Oct. 1, Senate agreed to House amendments.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 12, No. 44:
Oct. 22, Presidential statement.

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ALASKA NATURAL GAS TRANSPORTATION ACT OF 1976

Mr. STEVENSON. Mr. President, I ask the Chair to lay before the Senate a message from the House of Representatives on S. 3521.

The PRESIDING OFFICER laid before the Senate the amendment of the House of Representatives to the bill (S. 3521) to expedite a decision on the delivery of Alaska natural gas to U.S. markets, and for other purposes.

(The amendment of the House is printed in the proceedings of the House of September 30, 1976.)

Mr. STEVENS. Mr. President, I have a question for the Senator from Washington, the chairman of the Committee on Interior and Insular Affairs, with regard to the meaning of section 18 of the bill. It is my understanding that section 18 is not a directive or command to any Federal officer or agency, but rather, expresses the sense of the Congress that administrative action should be taken expeditiously to help alleviate the forthcoming west coast crude oil surplus. It is also my understanding that this section does not express a congressional preference for any particular pipeline route. I would ask the gentleman if my understanding is correct.

Mr. STEVENSON. Mr. President. The Senator from Alaska is indeed correct in his understanding of section 18. Section 18 is merely a reaffirmation of the sense of the Congress expressed in section 410 of Public Law 93-153, that either directly or indirectly the benefits of North Slope crude oil should be shared equitably by all regions of the country. Whatever pipeline route or routes are ultimately utilized to transport North Slope crude oil from the west coast, section 18 expresses the will of Congress that Federal administrative actions, within the context of existing laws, be taken expeditiously to permit crude oil to be transported from the west coast to other points in the United States.

Mr. STEVENS. I thank the Senator.

Mr. STEVENSON. Mr. President, S. 3521 establishes a procedure for expediting a decision on construction of facilities to transport natural gas from the North Slope of Alaska to the gas-starved Lower 48 States.

This legislation passed the Senate unanimously on July 1, after more than 7 months of consideration by the Senate Commerce and Interior and Insular Affairs Committees. Rather than select a system proposed by one of the applicants before the Federal Power Commission, the Senate reached a bipartisan consensus that a neutral process bill would best serve the public interest. This approach recognized the urgency of reaching a balanced and environmentally sound decision.

On September 22 and September 29, the House Interstate and Foreign Commerce and the Interior and Insular Affairs Committees reported modified versions of S. 3521. Yesterday, the House of Representatives passed the Senate bill with an amendment.

The Senate bill established a timetable calling for a recommendation by the FPC as to whether a project should be built, and, if so, which one; a period for comment on the FPC decision by Federal agencies, States and other interested parties, a final decision by the President, subject to approval by the Congress, and an abbreviated judicial review of claims challenging the constitutionality of the legislation or the legality of acts taken under it. The process contemplated a final decision by either late 1977 or early 1978.

At the request of the administration and our Ambassador to Canada, the House amendments moved the timetable established in the Senate bill back 3 months in order to allow the President more time and flexibility for negotiations with Canada. The House amendments also required the Council on Environmental Quality to report to the President on the legal and factual sufficiency of the FPC's environmental impact statement.

As part of his recommendation to the Congress, the President was also required to spell out those provisions in existing law which he felt it necessary to waive in order to expedite actual construction of the project.

Many of the changes in the Senate-passed bill further insure the quality and environmental soundness of the ultimate decision, while preserving the bill's focus on an expedited, neutral process.

Some of the House provisions, however, cause me concern. If there was time to go to conference, I would oppose the amendments concerning delivery of Alaska natural gas to eastern and western markets, the separation of the vote on a transportation system from the vote on the necessary waivers of law to expedite construction, and the treatment of Alaska royalty gas.

Due to the lateness of the hour, however, I believe on balance the house-passed bill would be far superior to no bill this session. I, therefore, urge my colleagues to concur in the House amendment to S. 3521.

In my judgment, it will be more difficult—if not impossible—to enact such expediting legislation in the next Congress. Early next year the administrative law judge is likely to make his rec-

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ommendation to the Federal Power Commission, and by mid-year at the latest, the full Commission is expected to render its opinion. Once a decision becomes a matter of public record, it is unlikely that the bipartisan consensus of Senators from all regions of the country which has supported S. 3521 will be inclined to support another neutral bill. And without such a bill, any successful applicant would face years in court while project costs rose by millions of dollars a day.

S. 3521, as amended by the House, avoids such costly delays by marshaling and coordinating the appropriate resources of the executive, legislative, and judicial branches of Government behind a timely and sound decision on a transportation system for Alaskan natural gas.

Mr. President, a few words of explanation are in order with respect to the so-called Western leg amendment adopted yesterday in the House. Section (b)(1) of the bill as amended by the House provides that—

Any recommendation that the President approve a particular transportation system shall . . . (C) if such recommendation is for an all land pipeline transportation system or for a transportation system involving water transportation, include provision for new facilities to the extent necessary to assure direct pipeline delivery of Alaska natural gas contemporaneously to points both east and west of the Rocky Mountains in the lower continental United States.

We believe this language maintains neutrality with respect to the current proposals before the Federal Power Commission. It provides flexibility to the Commission to recommend the best possible system for approval. The Commission need not require the construction of new facilities except "to the extent necessary." In addition, direct pipeline delivery of Alaska natural gas is also required only "to the extent necessary" to contemporaneously deliver to points both east and west of the Rocky Mountains and the lower continental States. There is no specification of the size and extent of such deliveries to both sides of the mountains, but what is required is that some direct delivery of Alaska natural gas using new facilities to the extent necessary occur to both sides of the Rocky Mountains.

Of course, this language does not mean that if an Alaska-liquefied natural gas water transportation system is selected, that such a system must build a new pipeline from the west coast to a point east of the Rocky Mountains. Nor does this language prevent reliance on displacement to supplement and extend direct deliveries under the bill.

Similarly, if an all-land pipeline system is constructed, it does not mean that if it is uneconomic or contrary to the national interest to build a large diameter direct-delivery pipeline from the Northern United States to the South, that such a system must be recommended by the Commission.

Finally, contemporaneous delivery to points both east and west of the Rocky Mountains does not necessarily mean instantaneous simultaneous delivery on both sides, but that the initial project provide for delivery of Alaska natural gas to eastern and western regions of the United States. The purpose of this provision is to assure that a natural gas glut similar to the forecast glut of west coast Alaskan oil does not develop in either eastern or western regions of the United States, but that a natural gas transportation system be developed to assure that Alaska natural gas can be made available to eastern and western portions of the United States.

In addition, the President also has flexibility in making his determination. Section 7(a)(1) of the House-passed bill requires that the President's designation "shall be consistent with section 5(b)(1)(C) to assure delivery of Alaska natural gas to points both east and west of the Rocky Mountains in the continental United States." The "consistent with" language provides substantial discretion for the President to consider economic, environmental and other specified factors in making his determination as to which system, if any, best serves the national interest.

Mr. President, I hope this explanation has clarified any ambiguities with respect to the western leg amendment adopted by the House. With natural gas supplies dwindling, construction costs escalating, and this session of Congress rapidly drawing to a close, I urge my colleagues to act favorably on S. 3521, as amended by the House.

Mr. STEVENSON. Mr. President, I move that the Senate concur in the House amendment, S. 3521.

The motion was agreed to.

Mr. STEVENSON. Mr. President, I move to reconsider the vote by which the Senate concurred in the House amendment.

Mr. STEVENS. I move to lay that motion on the table.

The motion to lay on the table was agreed to.

APPENDIX E

The FPC Fleet Simulation Model 1/

The fleet simulation model has been developed with the cooperation of the U.S. Maritime Administration. The model is designed to determine the number of tankers required to carry a given size cargo when routes, port delays, weather, channel speeds and the various ship characteristics are considered.

The model is developed in three major sections. First, the type of ship, the route and the weather characteristics along the route must be developed. Second the port routines must be detailed along with the expected cargo sizes and third, these factors must be related to determine the required number of ships. For this analysis, the El Paso 165,000 cubic meter LNG ships are utilized and the 2.4-Bcf base case is used for lifting LNG from Gravina Peninsula to Point Conception, California.

Section I - Speed of Ship

A. Trade Route

The proposed route from Point Conception to Gravina Point is the Great Circle Trade Route. This route is divided into coastal marine areas for meteorological observations. The U.S. Department of Interior collects and publicizes these observations and they are the basis for this analysis.

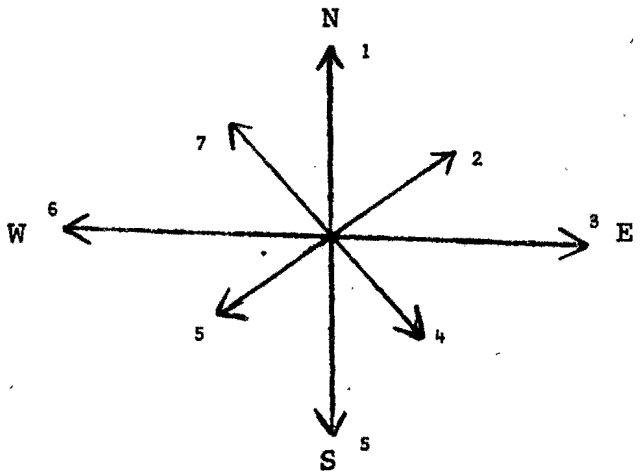
The open sea travel is approximately 1,886 miles and is divided into 10 marine areas. Dividing this route into percentage of miles in each marine area results in the following:

Marine Area No.	Approximate Milage	Percentage of Route
13	114	6.52
12	103	5.43
11	124	6.52
17	290	15.22
16	104	5.43
15	248	13.04
5	145	7.62
14	372	19.57
2	330	17.39
1	56	3.26
TOTAL	1,886	100.00

1/ This model has been developed by personnel from the Bureau of Natural Gas, Systems Operations Division, Federal Power Commission while on detail to the Administrative Law Judge.

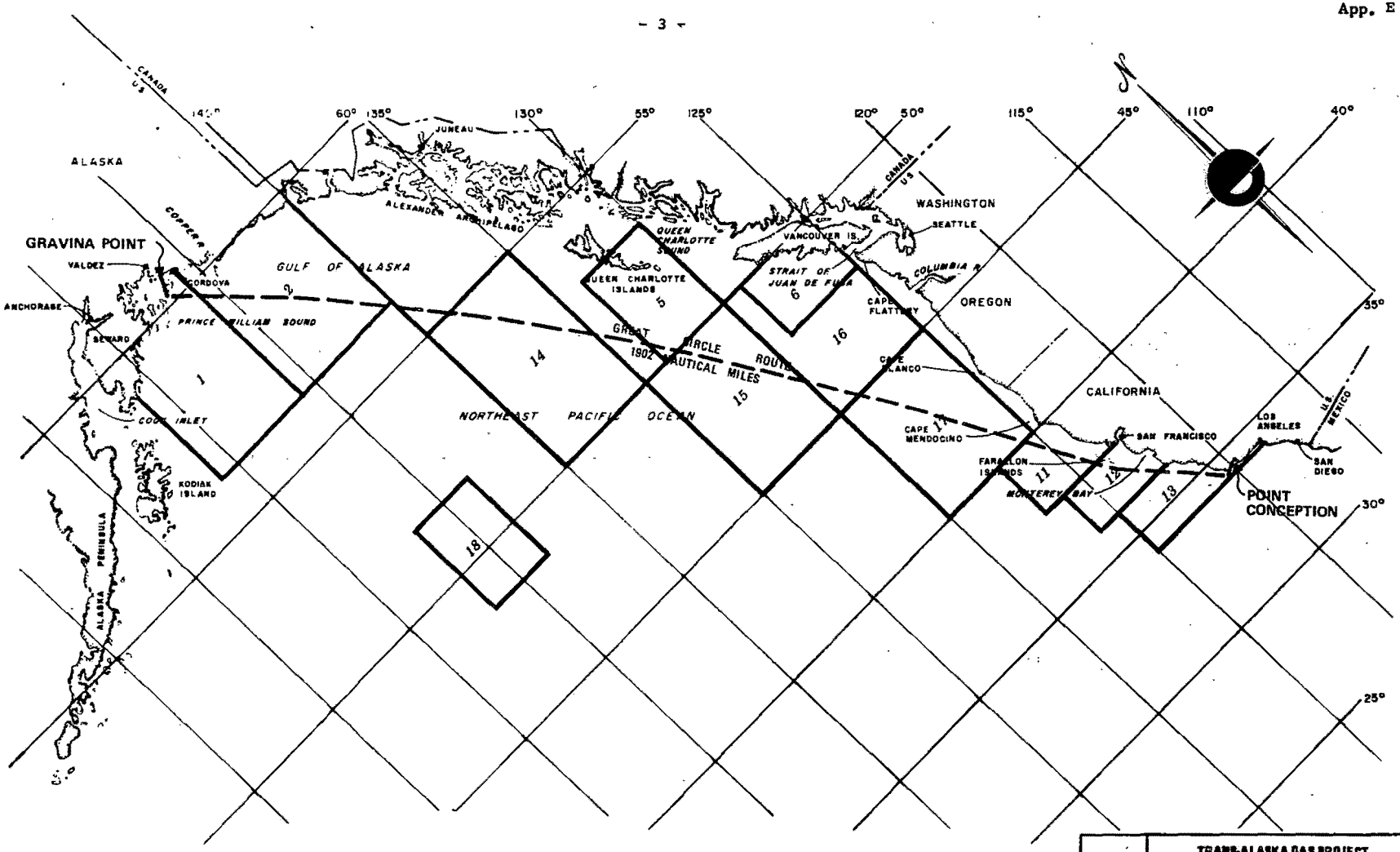
Knowing the milages associated with the various marine areas and assuming that the weather is calm at ports for the purposes of speed calculations, one can then assign a number to each segment of the trip beginning with 1 at Point Conception which is in the channel, segment 2 is marine area 13 up to segment 11 which is marine area 1. The channel at Gravina Point is segment 12 going in and segment 13 going out with segment 14 being marine area 1 traveling south to Point Conception. Segment 23 is marine area 13 south and segment 24 is the channel at Point Conception.

The weather information is given for the wind direction coded as follows:



along with the average wind speed, percent waves greater than 12 feet and percent waves greater than 20 feet. The full weather is given for the ten major segments along the trade route. Utilizing "sea states" as found in the Encyclopedia of Nautical Knowledge, W. A. McEvan and A. H. Lewis, Cornell Maritime Press, Cambridge, Maryland, 1951, p. 483; sea descriptions from the Manual of Seamanship, Vol. II, Admiralty, London, H. M. Stationery Officer, 1952, pp. 717-718; and wind and sea conditions from Practical Methods for Observing and Forecasting Ocean Waves, Plerson, Heumann James, New York University College of Engineering, 1953.

Data taken from these references are as follows:



REFERENCE: DEPARTMENT OF INTERIOR, 1972

TRANS-ALASKA GAS PROJECT

NORTH AMERICA
COASTAL MARINE AREAS USED FOR METEOROLOGICAL OBSERVATIONS

FIGURE 2F.2 – 1

FPC SHIP SIMULATION AND FINANCING MODEL

WEATHER DATA FOR TEN SEGMENTS ALONG TRADE ROUTE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SEGMENT # 2												
WIND DIRECTION	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
AVE WIND SPEED	10.2	10.5	11.8	11.8	11.9	12.5	11.4	11.3	10.3	9.9	10.0	9.9
% WAVES - 12 FT	5.1	3.9	4.0	9.7	5.1	4.4	1.9	1.3	1.4	3.8	3.8	3.0
% WAVES - 20 FT	0.3	0.5	0.3	0.0	0.6	0.2	0.0	0.0	0.0	0.3	0.5	0.0
SEGMENT # 3												
WIND DIRECTION	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
AVE WIND SPEED	12.7	13.1	14.9	15.6	16.1	16.3	14.5	14.5	13.1	13.1	12.5	13.4
% WAVES - 12 FT	8.2	16.3	6.7	12.7	8.4	4.5	3.0	2.8	2.5	5.8	8.0	9.0
% WAVES - 20 FT	0.0	0.8	0.6	2.0	0.8	0.1	0.1	0.0	0.0	0.2	0.5	1.0
SEGMENT # 4												
WIND DIRECTION	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
AVE WIND SPEED	13.7	13.0	13.9	14.7	16.8	17.6	16.9	16.1	13.1	13.3	12.5	13.4
% WAVES - 12 FT	9.7	7.8	8.7	10.7	19.8	9.3	4.7	6.8	3.3	3.6	8.1	8.8
% WAVES - 20 FT	0.6	0.5	0.0	3.7	0.6	0.3	0.0	0.0	0.0	0.0	0.8	1.5
SEGMENT # 5												
WIND DIRECTION	5.0	5.0	7.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0	5.0
AVE WIND SPEED	16.7	15.9	16.1	13.5	13.8	13.5	15.6	14.7	14.1	13.8	15.6	17.2
% WAVES - 12 FT	8.1	8.4	5.3	1.3	1.5	4.6	2.7	1.7	3.6	3.8	6.5	11.4
% WAVES - 20 FT	0.4	0.6	0.3	0.1	0.1	0.5	0.0	0.1	0.1	0.1	0.3	2.9
SEGMENT # 6												
WIND DIRECTION	5.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0	5.0	5.0	5.0
AVE WIND SPEED	17.3	16.0	14.8	13.1	12.0	12.0	11.4	10.6	12.3	14.1	16.7	17.8
% WAVES - 12 FT	9.5	6.1	5.5	6.5	1.4	1.6	0.8	0.9	3.6	5.6	9.3	9.4
% WAVES - 20 FT	0.9	0.9	0.5	0.7	0.1	0.0	0.2	0.1	1.0	1.6	1.2	2.5
SEGMENT # 7												
WIND DIRECTION	5.0	7.0	7.0	7.0	8.0	7.0	8.0	8.0	1.0	5.0	5.0	5.0
AVE WIND SPEED	16.9	18.0	16.0	14.0	12.0	11.8	12.6	12.0	14.2	16.8	17.5	19.1
% WAVES - 12 FT	8.1	7.8	6.5	3.0	1.6	1.0	0.6	0.9	2.6	7.9	10.5	11.4
% WAVES - 20 FT	1.5	0.5	0.9	0.7	0.4	0.0	0.0	0.3	0.3	0.7	1.7	1.6
SEGMENT # 8												
WIND DIRECTION	4.0	5.0	5.0	8.0	8.0	8.0	8.0	8.0	8.0	5.0	5.0	4.0
AVE WIND SPEED	19.4	17.8	17.4	15.1	12.4	12.3	12.0	11.5	13.4	15.5	18.4	19.6
% WAVES - 12 FT	20.6	19.0	19.6	10.6	3.8	5.0	2.6	4.1	4.7	21.7	17.9	22.4
% WAVES - 20 FT	3.2	2.6	2.5	1.7	0.0	1.1	0.0	0.5	0.0	5.0	1.2	1.6
SEGMENT # 9												
WIND DIRECTION	7.0	7.0	7.0	5.0	5.0	7.0	7.0	7.0	7.0	5.0	5.0	5.0
AVE WIND SPEED	20.0	19.4	17.2	15.7	13.7	12.0	12.1	13.3	14.3	18.4	20.3	20.2
% WAVES - 12 FT	16.5	7.4	4.0	4.8	1.2	0.3	0.4	1.7	2.0	11.4	11.4	10.8
% WAVES - 20 FT	5.5	1.0	0.5	0.4	0.3	0.0	0.0	0.0	0.0	2.7	3.2	2.2
SEGMENT # 10												
WIND DIRECTION	3.0	3.0	3.0	7.0	3.0	7.0	7.0	7.0	3.0	3.0	3.0	3.0
AVE WIND SPEED	17.2	18.1	15.5	13.5	12.0	11.5	11.1	11.5	14.6	18.8	18.6	17.8
% WAVES - 12 FT	11.4	18.5	8.7	9.8	5.0	3.7	2.7	2.2	4.7	16.4	8.7	18.3
% WAVES - 20 FT	2.7	1.9	0.0	0.8	0.0	0.0	0.0	0.0	0.0	1.3	1.3	2.3
SEGMENT # 11												
WIND DIRECTION	7.0	3.0	8.0	7.0	7.0	3.0	6.0	6.0	3.0	7.0	3.0	3.0
AVE WIND SPEED	18.4	18.6	18.2	15.2	14.8	11.9	10.5	12.7	15.9	18.0	20.1	10.7
% WAVES - 12 FT	17.4	15.6	15.9	12.1	4.2	3.4	4.5	2.7	12.8	18.3	25.0	22.5
% WAVES - 20 FT	4.0	3.3	2.6	1.3	0.2	0.0	0.0	0.0	2.5	1.7	7.9	5.6

Head and Bow Seas

Sea State	Wave Height	Wind Speed
3	5	16
4	7	19
5	12	24
6	20	28

B. Ship's Speed

The next step is to relate the total thrust to the speed of the ship. The only information available is that filed at the Maritime Administration by El Paso for its 125,000 cubic meter LNG carries. The ship's performance curves for various sea states and at 100 percent and 80 percent power is given. These performance curves are then proportioned to match the ship characteristics of a 165,000 cubic meter LNG tanker.

The speed of the ship in knots is then given by:

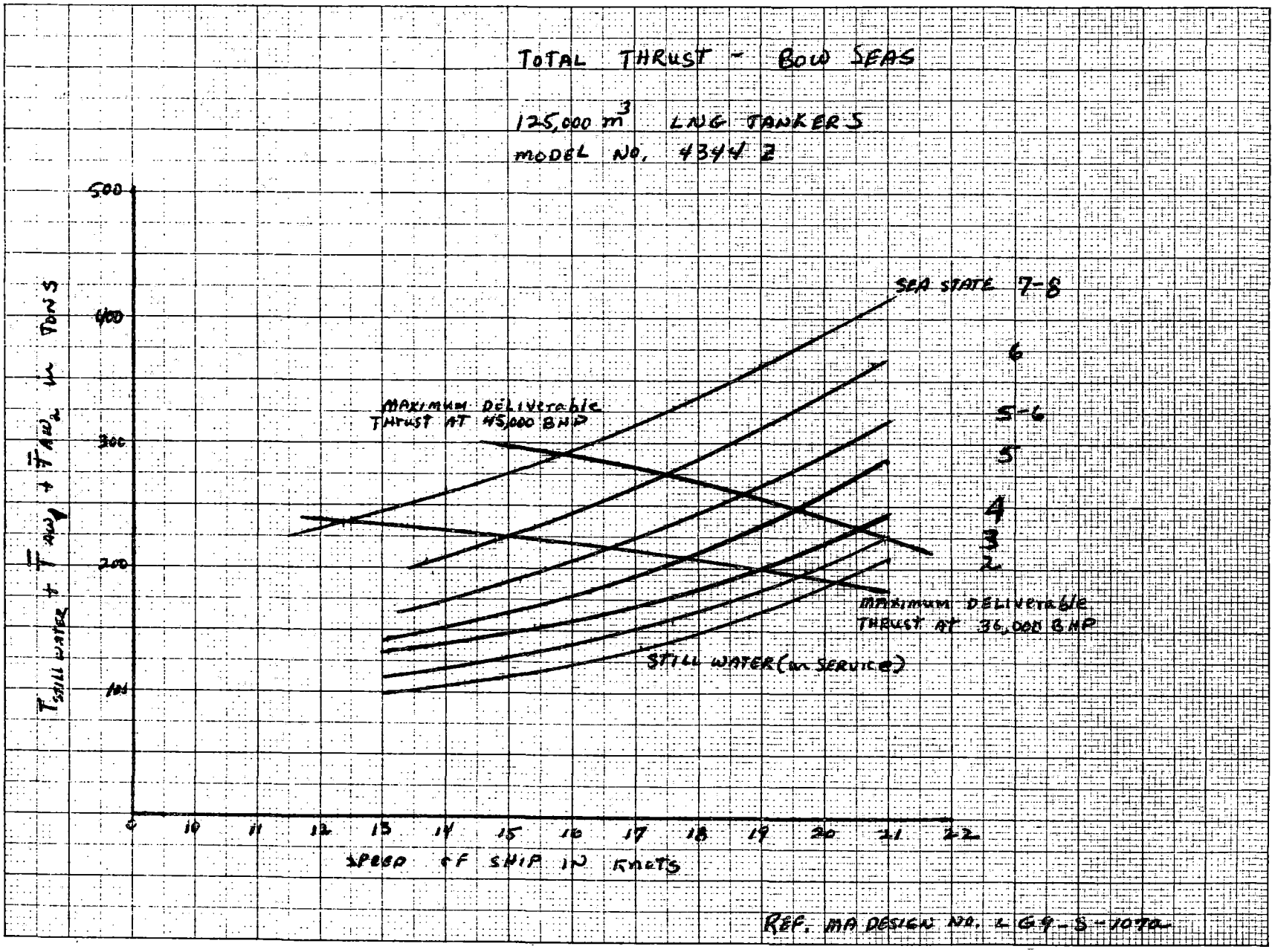
$$S = S_j \sum_{j=0}^{2} f_j + \sum_{j=3}^{6} f_j S_j$$

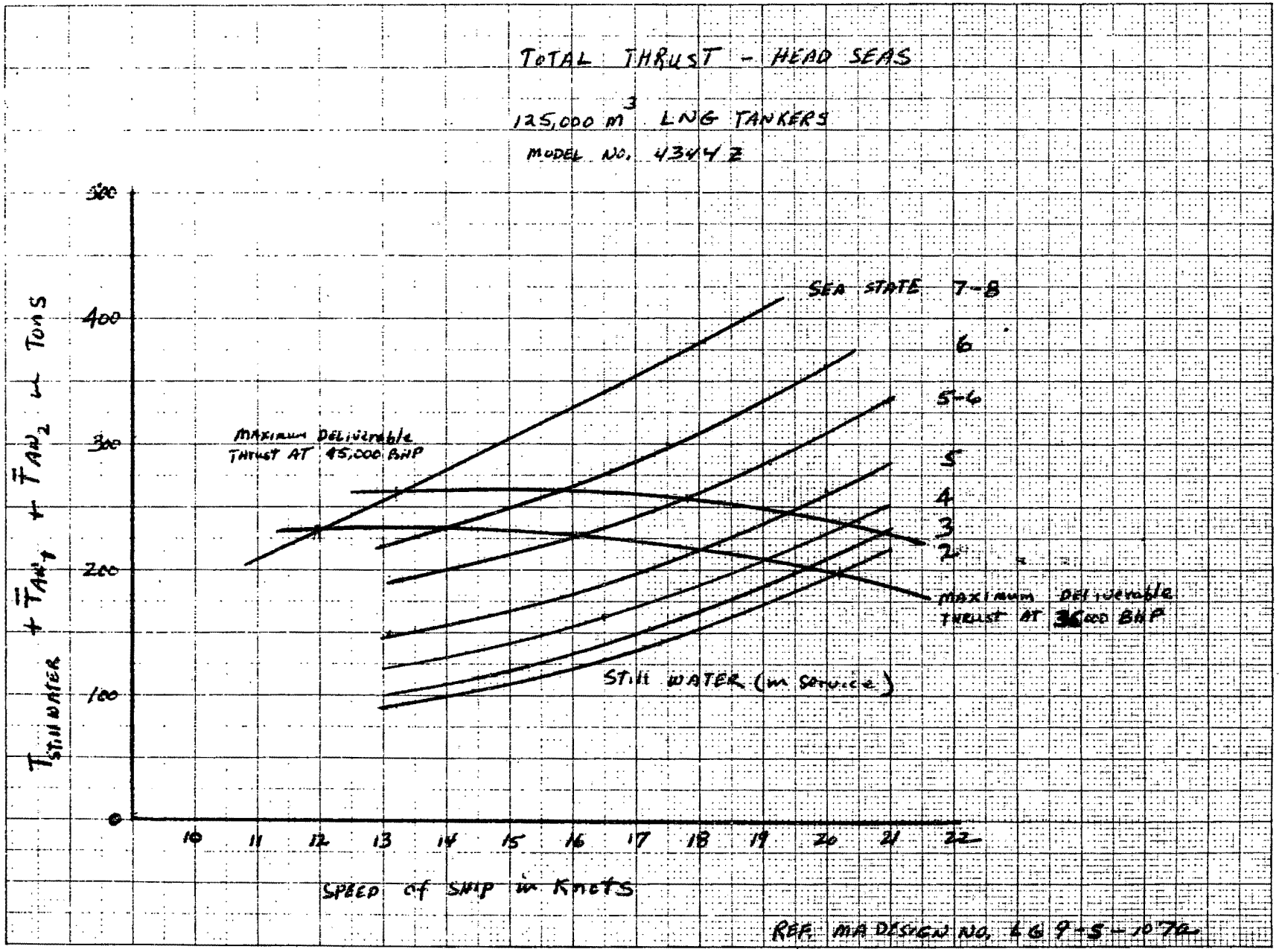
where

S = Speed of the ship
S_d = Service speed
f_j = Frequency of sea state j
S_j = Reduction in percentage of service speed due to sea state j.

Estimates of the various frequencies of sea states 0-4 are based on the monthly mean wind speed. Weighted assignments were made according to the following scheme:

Average Wind Speed	f j=0-2	f j=3	f j=4
0	100%	0	0
11	50%	50%	0
14	25%	50%	25%
17-19.9	0	50%	50%
20+	0	0	100%


TOTAL THRUST - BOW SEAS
125,000 m³ LNG TANKERS
MODEL NO. 4344.2
SEA STATE 7-8
6
5-6
5
4
3
2
MAXIMUM DELIVERABLE THRUST AT 45,000 BHP
MAXIMUM DELIVERABLE THRUST AT 36,000 BHP
STILL WATER (on SERVICE)
T still water + T aw + T aw in TONS
500
400
300
200
100
0
10
11
12
13
14
15
16
17
18
19
20
21
22
SPEED OF SHIP IN KNOTS
REF. MA DESIGN NO. L-G9-S-10TA


TOTAL THRUST - HEAD SEAS
125,000 M³ LNG TANKERS
MODEL NO. 4344 Z
SEA STATE 7-8
6
5-6
5
4
3
2
MAXIMUM DELIVERABLE THRUST AT 45,000 BHP
MAXIMUM DELIVERABLE THRUST AT 36,000 BHP
STILL WATER (in service)
T STILL WATER + T̄AW1 + T̄AW2 in TONS
500
400
300
200
100
0
10
11
12
13
14
15
16
17
18
19
20
21
22
SPEED of SHIP in KNOTS
REF. MA DESIGN NO. 66 9-5-1078

PPC SHIP SIMULATION AND FINANCING MODEL

SHIP SPEEDS IN NAUTICAL MILES PER HOUR BASED ON WEATHER FOR 165000 M3 LNG TANKERS

TRADE ROUTE: PT CONCEPTION, CALIF. TO GRAVINA PT, ALASKA

ROUTE SEGMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE
1	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
2	18.13	18.20	17.92	17.82	17.89	17.91	17.97	17.98	18.27	18.20	18.20	18.23	18.06
3	17.89	17.66	17.59	17.44	17.56	17.65	17.67	17.68	17.96	17.89	17.83	17.80	17.71
4	17.60	17.34	17.84	17.42	17.38	17.30	17.65	17.61	17.94	17.94	17.82	17.79	17.69
5	18.41	18.30	17.75	18.04	18.05	17.97	17.80	17.81	17.79	18.00	18.30	18.30	18.03
6	18.30	18.30	17.75	17.86	17.96	17.98	17.98	18.28	17.90	18.30	18.30	18.30	18.10
7	18.30	17.51	17.72	17.76	17.96	18.05	18.00	17.98	17.88	18.30	18.30	18.30	18.00
8	18.30	18.30	18.30	17.49	17.93	17.87	17.96	17.91	17.92	18.30	18.30	18.30	18.07
9	17.09	17.90	17.56	18.30	18.30	18.06	18.06	18.03	17.81	18.30	18.30	18.30	17.97
10	18.30	18.30	18.30	17.87	18.30	18.00	18.02	18.03	18.30	18.30	18.30	18.30	18.19
11	17.29	18.30	17.13	17.63	17.99	18.30	18.30	18.30	18.30	17.35	18.30	18.30	17.96
12	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
13	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
14	17.90	16.92	17.90	17.90	17.90	17.61	17.90	17.90	17.20	17.90	16.56	17.31	17.57
15	17.02	16.96	17.33	17.90	17.59	17.90	17.90	17.90	17.39	17.00	17.09	16.95	17.41
16	17.90	17.90	17.90	17.37	17.64	17.90	17.90	17.90	17.90	17.02	16.83	16.87	17.59
17	16.66	16.93	16.93	17.90	17.90	17.90	17.90	17.90	17.90	17.00	16.99	16.70	17.39
18	17.10	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.32	17.06	17.05	17.64
19	17.10	17.34	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.33	17.29	17.05	17.62
20	17.33	17.32	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.35	17.01	17.68
21	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90
22	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90
23	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90
24	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

These frequencies are then multiplied by the complement of the wave height frequencies to obtain values for sea states 0 through 4.

It is assumed that the sea direction (wave) is the same as that of the prevailing winds. The loaded trip in this case is SE and ballast is NW. Therefore, head seas are encountered in SE and NW winds respectively and bow seas are encountered in S and E and N and W respectively. The resulting speeds for the 165,000 cubic meter tanker are now calculated in nautical miles per hour based on weather and the 24 segments previously described and are given on page 8 of this section.

Section II - Delays

Delays are given by El Paso as:

LNG CARRIER FLEET

Average Event Times for Port Routines Per Voyage

Event	Gravina Peninsula Alaska (Hours)	(Days)	Point Conception California (Hours)	(Days)
Tie-In Time				
Pick Up Pilot at Pilot Station	1.5		0.5	
Delay in Pilotage Waters	1.0		1.0	
Mooring	1.5		1.5	
Connecting Lines and Cargo Gauging	2.0		2.0	
Average Total	6.0	0.250	5.0	0.208
Pumping Time				
Average	14.6	0.608	14.6	0.608
Cast-Off Time				
Disconnect Lines and Cargo Gauging	2.0		2.0	

Cont'd

LNG CARRIER FLEET

Average Event Times for Port Routines Per Voyage

Event	Gravina Peninsula Alaska (Hours)	(Days)	Point Conception California (Hours)	(Days)
Cast Off	1.5		1.5	
Delay in Pilotage Waters	1.0		1.0	
Drop Pilot	1.0		0.5	
Average Total	5.5	0.229	5.0	0.208

Note: The above average total times are maximum values. A reduction in the total time may be achieved by simultaneous occurrence of some of the scheduled events.

The above events consider a port time at Gravina to be 1.024 days and at Point Conception to be 1.024 days or a total of 2.111 days.

It is estimated that drydocking for annual surveys and repairs would require a total of twenty days. Fourteen days were scheduled for the actual drydocking. Two days were allowed to sail to the yard, gas free, warm up, and inert and aerate the tanks so they can be entered safely for inspection. The four final days of the twenty-day period were scheduled for the carrier to return to its service route and to cool down its tanks in preparation for cargo loading.

It was estimated that unscheduled, out-of-service time will equal fifteen days. These days were allotted for repairs and maintenance not requiring drydocking and for other delays.

Scheduled LNG Plant maintenance was assumed to coincide with carrier drydockings during late spring, summer and early fall. This will minimize energy flow variations when maximum flow is demanded.

For the base case, random port closures were considered to be 0.889 days for a total average port time per round trip of three days. The total flow of LNG equivalent gas to the carrier

is given at 2147.03 mmcf/cd and the total LNG equivalent gas to regasification is 2106.16 mmcf/cd of LNG equivalent for air, an average of 2126.59 mmcf/cd LNG equivalent shipboard. This volume in terms of liquid cargo using 1/593 for the liquid to gas expansion ratio becomes:

$$\text{liquid cargo} = \frac{2126.59 \times 365}{35.3 \times 593} = 37{,}080{,}641 \text{ m}^3\text{/yr.}$$

The average ship size in liquid cubic meters is 165,000 m^3 but due to USCG regulations, the ship fill is 165,000 x 0.98 = 161,700 m^3 maximum. The loaded voyage trip averages 4.4 days with a boiloff rate of 0.15 percent per day or a loss of 1067.22 m^3. The volume for the ship's heel is 4.3 days return plus 1.5 days or 5.8 days times the 0.15 percent per day or 1406.79 m^3. Allowing for 353 cubic meters average returned LNG per ship, the average effective shipment size per ship in liquid cubic meters becomes 161,700 - 1067.22 - 1406.79 + 353 = 159,578.99 m^3.

LNG CARRIER FLEET

Ship Out-of-Service Time

Description		Days/Year
Assumed Operating Year		365
Ship Out-of-Service Time		
Drydock Schedule		
Drydock Time	14	
Voyage to Yard and Gas Free	2	
Return to Service Route and Cool Down	4	
Total Scheduled Drydock Time	20	20
Random Repair and Delay		15
Total Ship Out-of-Service Time		35
Annual Ship Utilization Time		330

Section III - The Number of Ships Required

The number of ships required is based on a modified formula given by the Maritime Administration and is as follows:

$$N = \frac{TC}{\frac{AOD}{\sum_{i=1}^{24} \frac{Di}{24Si} + \sum_{j=1}^{p} pj} \; AC}$$

where

- N = Number of ships required
- TC = Total yearly cargo required in liquid cubic meters
- AOD = Annual operating days per ship
- D_i = Distance in nautical miles for segment i at fixed speed
- S_i = Nautical miles per hour for segment i
- p_j = Port time delay in days for port j
- AC = Average cargo size in liquid cubic meters

Section IV - The Computer Programs

There are two subroutines used to compute the required number of ships. The subroutine WEATH calculates the ship speed over each segment of the trade route based on wind speed and direction and wave heights. The second subroutine SIMUL determines how many tankers are needed to lift a specified volume of LNG over a given trade route. The FORTRAN programs for these two subroutines are presented in this section.

FPC SHIP SIMULATION AND FINANCING MODEL

SCENARIO PARAMETERS FOR SIMULATION OF 165000 M3 LNG TANKERS

ANNUAL OPERATING DAYS 330.00

AVE SHIPMENT SIZE IN LIQUID M3 159579.00

PLANNED LNG LIFTED IN ONE YEAR 37080640.0

PORT DELAY # 1 IS 1.087 DAYS
PORT DELAY # 2 IS 1.024 DAYS
PORT DELAY # 3 IS 0.445 DAYS
PORT DELAY # 4 IS 0.444 DAYS

SEG #	DISTANCE	VELOCITY
1	10.00	10.000
2	56.00	18.064
3	330.00	17.715
4	372.00	17.693
5	145.00	18.033
6	248.00	18.102
7	104.00	17.999
8	290.00	18.073
9	124.00	17.967
10	103.00	18.193
11	114.00	17.957
12	6.00	14.000
13	6.00	14.000
14	114.00	17.575
15	103.00	17.411
16	124.00	17.586
17	290.00	17.385
18	104.00	17.544
19	248.00	17.617
20	145.00	17.484
21	372.00	17.930
22	330.00	17.930
23	56.00	17.900
24	10.00	10.000

8.413 SHIPS ARE NEEDED

WITH 8 SHIPS, 35261744.0 CUBIC METERS CAN BE LIFTED IN ONE YEAR
WHICH IS 95.09% OF THE PLANNED QUANTITY

WITH 9 SHIPS, 39669456.0 CUBIC METERS CAN BE LIFTED IN ONE YEAR
WHICH RESULTS IN 93.47% UNDER UTILIZATION

```
FORTRAN IV G1  RELEASE 2.0          WEATH          DATE = 77018          13/27/13          PAGE 0001

0001                  SUBROUTINE WEATH(NSEG,DIST,VEL)                                    00000010
                C                                                                        00000020
                C  THIS SUBROUTINE IS CALLED BY THE SIMULATION SUBROUTINE                00000030
                C  TO EXPAND THE TRADE ROUTE TO INCLUDE THE WEATHER SEGMENTS             00000040
                C  AND THEN CALCULATES THE SHIPS SPEED OVER EACH SEGMENT                 00000050
                C  BASED ON WIND SPEED AND DIRECTION, AND WAVE HEIGHTS                   00000060
                C                                                                        00000070
                C  THE NEW NUMBER OF SEGMENTS, THE ARRAY OF DISTANCES OF                 00000080
                C  OF THE SEGMENTS, AND THE ASSOCIATED SPEEDS ARE RETURNED               00000090
                C  THE MAXIMUM NUMBER OF SEGMENTS IS 50                                  00000100
                C                                                                        00000110
0002                  DIMENSION WEAT(10,12,4),SPDM(12),USPD(2),TEMPS(25),FREQ(5,3)       00000120
0003                  DIMENSION DIST(50),VEL(50),TEMPD(4),TEMPV(4),SLOW(2,5),PER(6)      00000130
0004                  DIMENSION SSPDM(25,12),LABEL(4,4)                                  00000140
0005                  REAL*4 MILES(50),JP(2)                                             00000150
                C                                                                        00000160
0006                  REWIND 10                                                          00000170
                C                                                                        00000180
                C  SAVE THE CHANNEL DISTANCES AND SPEEDS                                 00000190
                C                                                                        00000200
0007                  TEMPD(1)=DIST(1)                                                   00000210
0008                  TEMPD(2)=DIST(3)                                                   00000220
0009                  TEMPD(3)=DIST(4)                                                   00000230
0010                  TEMPD(4)=DIST(6)                                                   00000240
0011                  TEMPV(1)=VEL(1)                                                    00000250
0012                  TEMPV(2)=VEL(3)                                                    00000260
0013                  TEMPV(3)=VEL(4)                                                    00000270
0014                  TEMPV(4)=VEL(6)                                                    00000280
                C                                                                        00000290
                C  READ THE NUMBER OF WEATHER SEGMENTS                                   00000300
                C                                                                        00000310
0015                  READ(10,10)NW                                                      00000320
0016                10 FORMAT(I2)                                                        00000330
                C                                                                        00000340
                C  READ IN THE DISTANCES OF EACH SEGMENT                                 00000350
                C                                                                        00000360
0017                  DO 20 I=1,NW                                                       00000370
0018                20 READ(10,30)MILES(I)                                             00000380
0019                30 FORMAT(F10.2)                                                   00000390
                C                                                                        00000400
                C  READ IN THE LABELS FOR THE WEATHER DATA                               00000410
                C                                                                        00000420
0020                  DO 39 I=1,4                                                        00000430
0021                39 READ(10,38)(LABEL(I,J),J=1,4)                                   00000440
0022                38 FORMAT(4A4)                                                     00000450
                C                                                                        00000460
                C  READ IN THE WEATHER DATA, BY SEGMENT AND BY MONTH AND BY ITEM         00000470
                C                                                                        00000480
```

```
0023                  DO 40 I=1,NW                                                    00000490
0024                  DO 40 J=1,12                                                    00000500
0025                40 READ(10,50)(WEAT(I,J,K),K=1,4)                                 00000510
0026                50 FORMAT(4F8.2)                                                  00000520
                    C                                                               00000530
                    C  OUTPUT REPORT HEADING FOR WEATHER DATA                       00000540
                    C                                                               00000550
0027                  WRITE(7,44)                                                     00000560
0028                44 FORMAT('1',40X,'EPC SHIP SIMULATION AND FINANCING MODEL'//    00000570
                     *35X,'WEATHER DATA FOR TEN SEGMENTS ALONG TRADE ROUTE')         00000580
0029                  WRITE(7,16)                                                     00000590
0030                16 FORMAT(//29X,'JAN',5X,'FEB',5X,'MAR',                        00000600
                     *5X,'APR',5X,'MAY',5X,'JUN',5X,'JUL',5X,'AUG',5X,'SEP',5X,     00000610
                     *'OCT',5X,'NOV',5X,'DEC')                                      00000620
                    C                                                               00000630
                    C  OUTPUT THE WEATHER DATA BY SEGMENT, ITEM, AND MONTH          00000640
                    C                                                               00000650
0031                  DO 45 I=1,NW                                                    00000660
0032                  IS=I+1                                                          00000670
0033                  WRITE(7,47)IS                                                   00000680
0034                  DO 45 J=1,4                                                     00000690
0035                45 WRITE(7,46)(LABEL(J,K),K=1,4),(WEAT(I,M,J),M=1,12)           00000700
0036                46 FORMAT(5X,4A4,3X,12F8.1)                                     00000710
0037                47 FORMAT('  SEGMENT #',I3)                                     00000720
                    C                                                               00000730
                    C  SAVE THE BASE SERVICE SPEEDS OF THE TWO LEGS OF THE TRIP     00000740
                    C                                                               00000750
0038                  BSPD(1)=VEL(2)                                                00000760
0039                  BSPD(2)=VEL(5)                                                00000770
0040                  NSEG=1                                                        00000780
                    C                                                               00000790
                    C                                                               00000800
                    C  OUTPUT REPORT HEADING FOR THE CALCULATED SPEEDS REPORT       00000810
                    C                                                               00000820
0041                  WRITE(7,11)                                                   00000830
0042                11 FORMAT('1',40X,'EPC SHIP SIMULATION AND FINANCING MODEL'//   00000840
                     *20X,'SHIP SPEEDS IN NAUTICAL MILES PER HOUR BASED ON WEATHER',00000850
                     *' FOR 165000 M3 LNG TANKERS')                                 00000860
                    C                                                               00000870
                    C  DETERMINE WHICH CALIFORNIA TERMINAL IS BEING CONSIDERED      00000880
                    C                                                               00000890
0043                  IF(DIST(5).LT.20.)WRITE(7,12)                                 00000900
0044                12 FORMAT(/35X,'TRADE ROUTE: PT CONCEPTION, CALIF. TO',         00000910
                     *' GRAVINA PT, ALASKA')                                        00000920
0045                  IF(DIST(6).GT.20.)WRITE(7,13)                                 00000930
0046                13 FORMAT(/35X,'TRADE ROUTE: OXNARD, CALIFORNIA TO GRAVINA ',   00000940
                     *'POINT, ALASKA')                                              00000950
0047                  WRITE(7,14)                                                   00000960
```

```
0048          14 FORMAT(//20X,'JAN',5X,'FEB',5X,'MAR',                          00000970
                +5X,'APR',5X,'MAY',5X,'JUN',5X,'JUL',5X,'AUG',5X,'SEP',5X,      00000980
                +'OCT',5X,'NOV',5X,'DEC',7X,'AVERAGE')                          00000990
0049             WRITE(7,15)                                                    00001000
0050          15 FORMAT(' ROUTE SEGMENTS')                                      00001010
C                                                                               00001020
C  SET THE CODES FOR THE HEADINGS OF THE BALLAST AND LOADED                     00001030
C  LEG OF THE TRIP                                                              00001040
C                                                                               00001050
0051             JP(1)=8.0                                                      00001060
0052             JP(2)=4.0                                                      00001070
C                                                                               00001080
C  READ IN THE DECREASES IN SPEED DUE TO SIGNIFICANT WAVE                       00001090
C  HEIGHTS   1 IS FOR BOW SEAS AND 2 IS FOR HEAD SEAS                           00001100
C                                                                               00001110
0053             READ(10,51)(SLOW(1,I),I=1,5)                                   00001120
0054             READ(10,51)(SLOW(2,I),I=1,5)                                   00001130
0055          51 FORMAT(5F10.5)                                                 00001140
C                                                                               00001150
C  READ IN THE ASSIGNED FREQUENCIES OF OCCURRENCE OF WAVES                      00001160
C  OF 0 AND 5 AND 7 FT THAT CORRESPOND TO MEAN WIND SPEED                       00001170
C                                                                               00001180
0056             DO 52 I=1,5                                                    00001190
0057          52 READ(10,53)(FREQ(I,J),J=1,3)                                   00001200
0058          53 FORMAT(3F10.5)                                                 00001210
C                                                                               00001220
C  OUTPUT THE FIRST CHANNEL MONTHLY SPEEDS                                      00001230
C                                                                               00001240
0059             DO 54 I=1,12                                                   00001250
0060          54 SPDM(I)=VEL(1)                                                 00001260
0061             WRITE(7,100)NSEG,(SPDM(J),J=1,12),VEL(1)                       00001270
C                                                                               00001280
C  LOOP FOR THE TWO WAY TRIP, AND FOR EACH SEGMENT                              00001290
C                                                                               00001300
0062             DO 90 L=1,2                                                    00001310
0063             DO 60 I=1,NW                                                   00001320
0064             TOTSPD=0.0                                                     00001330
0065             DO 70 J=1,12                                                   00001340
C                                                                               00001350
C  DETERMINE THE SEA DIRECTION AND BRANCH TO -NO EFFECT-                        00001360
C  CALCULATION IF THE DIRECTION IS NOT A HEAD OR BOW                            00001370
C                                                                               00001380
0066             DIR=WEAT(I,J,1)                                                00001390
0067             GO TO (1,2),L                                                  00001400
0068          1  IF(DIR.GT.1.0 .AND. DIR.LT.7.0) GO TO 69                      00001410
0069             GO TO 66                                                       00001420
0070          2  IF(DIR.LT.3.0 .OR. DIR.GT.5.0) GO TO 69                       00001430
C                                                                               00001440
```

```
                 C  CALCULATE THE PERCENTAGES OF OCCURRENCE OF WAVE HEIGHTS
                 C
0071                66 PER(1)=(100.-WEAT(I,J,3))/100.
0072                   PER(5)=(WEAT(I,J,3)-WEAT(I,J,4))/100.
0073                   PER(6)=WEAT(I,J,4)/100.
0074                   IP=1
0075                   IF(DIR.EQ.JP(L)) IP=2
                 C
                 C  DETERMINE WHICH FREQUENCY WILL BE USED FOR SEAS LESS THAN
                 C  12 FT USING MEAN WIND SPEED
                 C
0076                   NF=((WEAT(I,J,2)-8.0)/3)+1
0077                   IF(NF.GT.5)NF=5
0078                   IF(NF.LE.0)NF=1
                 C
                 C  CALCULATE THE PERCENTAGES OF OCCURRENCE OF WAVE HEIGHTS
                 C
0079                   DO 67 M=1,3
0080                67 PER(M+1)=PER(1)*FREQ(NF,M)
                 C
                 C  CALCULATE WEIGHTED NET SPEED BASED ON SEGMENT WEATHER
                 C
0081                   SPD=0.0
0082                   DO 64 M=2,6
0083                64 SPD=SPD+PER(M)*SLOW(IP,M-1)*OSPD(L)
0084                   GO TO 71
0085                65 SPD=OSPD(L)
0086                71 TOTSPD=TOTSPD+SPD
0087                   IF(L.EQ.2)SSPDM(I,J)=SPD
                 C
                 C  SAVE EACH MONTHS SPEED, SUM FOR AVERAGING OVER YEAR, AND
                 C  OUTPUT FULL YEAR SPEEDS
                 C
0088                70 SPDM(J)=SPD
0089                   AVESPD=TOTSPD/12.0
0090                   NSEG=NSEG+1
0091                   IF(L.EQ.1)WRITE(7,100)NSEG,(SPDM(J),J=1,12),AVESPD
0092               100 FORMAT(/7X,I4,5X,12F8.2,F12.2)
                 C
                 C  STORE NEW SPEED AND MILEAGE IN NEXT SEGMENT LOCATION
                 C
0093                   VEL(NSEG)=AVESPD
0094                60 DIST(NSEG)=MILES(I)
0095                   IF (L.EQ.2) GO TO 90
                 C
                 C  SAVE THE NORTHERN CHANNEL DATA IN THE NEXT SEGMENT LOCATIONS
                 C
0096                   NSEG=NSEG+1
```

```
0097            DIST(NSEG)=TEMPD(2)
0098            VEL(NSEG)=TEMPV(2)
0099            DO 61 I=1,12
0100         61 SPDM(I)=VEL(NSEG)
0101            WRITE(7,100)NSEG,(SPDM(J),J=1,12),VEL(NSEG)
0102            NSEG=NSEG+1
0103            DIST(NSEG)=TEMPD(3)
0104            VEL(NSEG)=TEMPV(3)
0105            DO 62 I=1,12
0106         62 SPDM(I)=VEL(NSEG)
0107            WRITE(7,100)NSEG,(SPDM(J),J=1,12),VEL(NSEG)
0108            NH=NSEG
0109         90 CONTINUE
          C
          C  REVERSE THE VALUES FOR THE LOADED LEG TO GET CONTINUOUS ROUTE
          C
0110            DO 91 I=1,NW
0111         91 TEMPS(I)=VEL(NH+I)
0112            DO 92 I=1,NW
0113            VEL(NH+I)=TEMPS(NW-I+1)
0114         92 DIST(NH+I)=MILES(NW-I+1)
0115            DO 93 I=1,NW
0116            LSEG=I+NW+3
0117         93 WRITE(7,100)LSEG,(SSPDM(NW-I+1,J),J=1,12),VEL(LSEG)
          C
          C  SAVE THE LAST CHANNEL SEGMENT DATA IN THE NEXT LOCATION
          C
0118            NSEG=NSEG+1
0119            DIST(NSEG)=TEMPD(4)
0120            VEL(NSEG)=TEMPV(4)
0121            DO 63 I=1,12
0122         63 SPDM(I)=VEL(NSEG)
0123            WRITE(7,100)NSEG,(SPDM(J),J=1,12),VEL(NSEG)
          C
          C  RETURN TO SIMULATION ROUTINE
          C
0124            RETURN
0125            END
```

```
0001            SUBROUTINE SIMUL(VOL,NSHD,NSHU)                                 00000010
                C                                                               00000020
                C  THIS SUBROUTINE IS THE MAIN SECTION OF THE FPC SHIP          00000030
                C  SIMULATION MODEL FOR LNG TANKERS, WHICH DETERMINES           00000040
                C  HOW MANY TANKERS ARE NEEDED TO LIFT A SPECIFIED              00000050
                C  VOLUME OF LNG OVER A GIVEN TRADE ROUTE                       00000060
                C                                                               00000070
                C  IT RETURNS THREE VOLUMES, THAT WHICH IS PLANNED, THAT        00000080
                C  WHICH A UNIT NUMBER OF SHIPS BELOW THE NUMBER NEEDED TO      00000090
                C  LIFT THE PLANNED VOLUME, AND THAT WHICH THE UNIT NUMBER      00000100
                C  OF SHIPS ABOVE THE NUMBER NEEDED TO LIFT THE PLANNED         00000110
                C  VOLUME                                                       00000120
                C                                                               00000130
0002                DIMENSION VAL(3),DIST(50),VEL(50),PTD(10),VOL(3)            00000140
0003                RND(X)=IFIX(X+.5)                                           00000150
0004                DATA YES,YNO/'Y','N'/                                       00000160
                C                                                               00000170
                C  DETERMINE IF THE INPUTS ARE TO COME FROM THE TERMINAL        00000180
                C  OR A DATAFILE                                                00000190
                C                                                               00000200
0005              30 WRITE(6,10)                                                00000210
0006              10 FORMAT(//'  DO YOU WANT TO ENTER INPUTS BY HAND?(Y OR N)') 00000220
0007                 READ(5,20)ANS                                              00000230
0008              20 FORMAT(A1)                                                 00000240
0009                 IF (ANS.EQ.YES) GO TO 40                                   00000250
0010                 IF (ANS.EQ.YNO) GO TO 50                                   00000260
0011                 GO TO 30                                                   00000270
                C                                                               00000280
                C  READ IN THE VALUES FROM THE TERMINAL                         00000290
                C                                                               00000300
0012              40 WRITE(6,44)                                                00000310
0013              44 FORMAT('  ENTER: ANNUAL OPERATING DAYS')                   00000320
0014                 READ(5,39)VAL(1)                                           00000330
0015              39 FORMAT(F12.3)                                              00000340
0016                 WRITE(6,46)                                                00000350
0017              46 FORMAT('  ENTER: AVE SHIPMENT SIZE IN LIQUID M3')         00000360
0018                 READ(5,39)VAL(2)                                           00000370
0019                 WRITE(6,47)                                                00000380
0020              47 FORMAT('  ENTER: ANNUAL PLANNED CARGO IN LIQUID M3')      00000390
0021                 READ(5,39)VAL(3)                                           00000400
0022                 WRITE(6,61)                                                00000410
0023              61 FORMAT('  ENTER: NUMBER OF PORT TIME DELAYS')             00000420
0024                 READ(5,41)NP                                               00000430
0025              41 FORMAT(I2)                                                 00000440
0026                 WRITE(6,62)                                                00000450
0027              62 FORMAT('  ENTER: EACH PORT TIME DELAY')                   00000460
0028                 DO 63 I=1,NP                                               00000470
0029              63 READ(5,39)PTD(I)                                           00000480
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0030                  WRITE(6,66)                                                    00000490
0031               66 FORMAT('  ENTER: EACH SEGMENT DISTANCE AND VELOCITY--',       00000500
                     */'    ENTER A -1 FOR THE DISTANCE AFTER THE LAST ENTRY')     00000510
0032                  DO 67 I=1,50                                                   00000520
0033                  READ(5,43)DIST(I),VEL(I)                                       00000530
0034                  IF(DIST(I).LT.0.0) GO TO 600                                   00000540
0035               67 CONTINUE                                                       00000550
                  C                                                               00000560
                  C  READ IN VALUES FROM A FILE                                   00000570
                  C                                                               00000580
0036                  50 DO 51 I=1,3                                              00000590
0037                  51 READ(1,39)VAL(I)                                         00000600
0038                     READ(1,41)NP                                             00000610
0039                     DO 52 I=1,NP                                             00000620
0040                  52 READ(1,39)PTD(I)                                         00000630
0041                     DO 54 I=1,50                                             00000640
0042                  54 READ(1,43,END=600)DIST(I),VEL(I)                         00000650
0043                  43 FORMAT(2F12.3)                                           00000660
                  C                                                               00000670
                  C  DETERMINE THE BASE NUMBER OF SEGMENTS, AND OUTPUT            00000680
                  C  THE BASE SPEEDS FOR THE TWO LEGS OF THE TRIP                 00000690
                  C                                                               00000700
0044                 600 NSEG=I-1                                                 00000710
0045                  60 WRITE(6,76)VEL(2),VEL(5)                                 00000720
0046                  76 FORMAT(//' BASE SERVICE SPEEDS:',F7.2,'KT  BALLAST'/     00000730
                     *21X,F7.2,'KT  LOADED')                                      00000740
                  C                                                               00000750
                  C  CALL THE SUBROUTINE -WEATH- TO EXPAND THE BASE ROUTE         00000760
                  C  TO INCLUDE WEATHER SEGMENTS, AND TO DETERMINE THE            00000770
                  C  EFFECTS OF THE WEATHER ON THE BASE SPEED OF THE SHIP         00000780
                  C                                                               00000790
0047                     CALL WEATH(NSEG,DIST,VEL)                                00000800
                  C                                                               00000810
                  C  SUM ALL THE PORT TIME DELAYS                                 00000820
                  C                                                               00000830
0048                     TPTD=0.0                                                 00000840
0049                     DO 72 I=1,NP                                             00000850
0050                  72 TPTD=TPTD+PTD(I)                                         00000860
0051                     RAT=0.0                                                  00000870
                  C                                                               00000880
                  C  CALCULATE AND SUM THE TIME NEEDED TO TRAVERSE EACH           00000890
                  C  WEATHER SEGMENT                                              00000900
                  C                                                               00000910
0052                     DO 73 I=1,NSEG                                           00000920
0053                  73 RAT=RAT+(DIST(I)/(24.0*VEL(I)))                          00000930
                  C                                                               00000940
                  C  CALCULATE THE NUMBER OF SHIPS NEEDED ACCORDING TO THE        00000950
                  C  SPECIFIED SCENARIO INPUTS                                    00000960
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                      C                                                                    00000970
0054                       T1=VAL(1)/(RAT+TPTD+TSTOP)                                      00000980
0055                       TSH=VAL(3)/(VAL(2)*T1)                                          00000990
                      C                                                                    00001000
                      C  DETERMINE # OF SHIPS, MAXIMUM LIFTED QUANTITY OF LNG,             00001010
                      C  AND PERCENT CHANGE FROM PLANNED VALUES FOR LOWER BOUND            00001020
                      C                                                                    00001030
0056                       NSHD=TSH                                                        00001040
0057                       XLD=VAL(2)*T1*NSHD                                              00001050
                      C                                                                    00001060
                      C  DETERMINE # OF SHIPS, MAXIMUM LIFTED QUANTITY OF LNG,             00001070
                      C  AND PERCENT CHANGE FROM PLANNED VALUES FOR UPPER BOUND            00001080
                      C                                                                    00001090
0058                       NSHU=NSHD+1                                                     00001100
0059                       XLU=VAL(2)*T1*NSHU                                              00001110
0060                       PERD=(XLD/VAL(3))*100.                                          00001120
0061                       PERU=(VAL(3)/XLU)*100.                                          00001130
                      C                                                                    00001140
                      C  OUTPUT THE RESULTS TO THE TERMINAL FOR THE USER TO                00001150
                      C  EXAMINE AND MAKE ANY CHANGES TO THE INPUTS                        00001160
                      C                                                                    00001170
0062                       WRITE(6,55)VAL(1)                                               00001180
0063                       WRITE(6,56)VAL(2)                                               00001190
0064                       WRITE(6,57)VAL(3)                                               00001200
0065                       DO 81 I=1,NP                                                    00001210
0066                    81 WRITE(6,82)I,PTD(I)                                             00001220
0067                    82 FORMAT(' PORT DELAY #',I2,' IS ',F12.3,' DAYS')                 00001230
0068                       WRITE(6,84)                                                     00001240
0069                    84 FORMAT(/'   SEG #     DISTANCE      VELOCITY'/)                 00001250
0070                       DO 83 I=1,NSEG                                                  00001260
0071                    83 WRITE(6,85)I,DIST(I),VEL(I)                                     00001270
0072                    85 FORMAT(3X,I3,5X,F12.2,F10.3)                                    00001280
0073                       WRITE(6,70)TSH                                                  00001290
0074                    55 FORMAT(/' ANNUAL OPERATING DAYS',F15.2)                         00001300
0075                    56 FORMAT(' AVE SHIPMENT SIZE IN LIQUID M3',F15.2)                 00001310
0076                    57 FORMAT(' PLANNED LNG LIFTED IN ONE YEAR',F15.2)                 00001320
0077                    70 FORMAT(//3X,F12.3,' SHIPS ARE NEEDED'//)                        00001330
0078                       WRITE(6,74)NSHD,XLD,PERD                                        00001340
0079                       WRITE(6,75)NSHU,XLU,PERU                                        00001350
0080                    74 FORMAT(/' WITH ',I2,' SHIPS,',F15.1,' CUBIC METERS',           00001360
                          *'    CAN BE LIFTED IN ONE YEAR'/' WHICH IS ',                   00001370
                          *F6.2,'% OF THE PLANNED QUANTITY')                             00001380
0081                    75 FORMAT(/' WITH ',I2,' SHIPS,',F15.1,' CUBIC METERS',           00001390
                          *' CAN BE LIFTED IN ONE YEAR'/' WHICH RESULTS',                00001400
                          *' IN ',F6.2,'% UNDER UTILIZATION')                            00001410
                      C                                                                    00001420
                      C  CHECK IF A RERUN IS REQUIRED                                      00001430
                      C                                                                    00001440
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0082                 120 WRITE(6,80)                                                          00001450
0083                  80 FORMAT(/'  INDICATE WHICH INPUT YOU WOULD LIKE TO CHANGE,',          00001460
                        */'  (1-4), 5 FOR PORT TIME DELAYS, 6 FOR SEGMENT VALUES,',         00001470
                        */'  OR ZERO TO CONTINUE WITH FINANCING')                           00001480
0084                     READ(5,90)ID                                                        00001490
0085                  90 FORMAT(I1)                                                          00001500
0086                     IF(ID.EQ.0) GO TO 100                                               00001510
0087                     IF(ID.GT.0.AND.ID.LE.4) GO TO 110                                   00001520
0088                     IF(ID.EQ.5) GO TO 130                                               00001530
0089                     IF(ID.EQ.6) GO TO 140                                               00001540
0090                     GO TO 120                                                           00001550
                    C                                                                        00001560
                    C  CHANGE AN INPUT SPECIFIED BY ID                                       00001570
                    C                                                                        00001580
0091                 130 WRITE(6,131)                                                        00001590
0092                 131 FORMAT('  INDICATE WHICH PORT TIME YOU WISH TO CHANGE--#')          00001600
0093                     READ(5,41)JD                                                        00001610
0094                     WRITE(6,132)JD                                                      00001620
0095                 132 FORMAT('  ENTER THE NEW VALUE FOR PORT TIME #',I2)                  00001630
0096                     READ(5,39)PTD(JD)                                                   00001640
0097                     GO TO 101                                                           00001650
0098                 110 WRITE(6,111)ID                                                      00001660
0099                 111 FORMAT('  ENTER THE NEW VALUE FOR VAL(',I1,'):')                    00001670
0100                     READ(5,39)VAL(ID)                                                   00001680
0101                     GO TO 101                                                           00001690
0102                 140 WRITE(6,141)                                                        00001700
0103                 141 FORMAT('  INDICATE WHICH SEGMENT YOU WISH TO CHANGE--#')           00001710
0104                     READ(5,41)JD                                                        00001720
0105                     WRITE(6,142)JD                                                      00001730
0106                 142 FORMAT('  ENTER THE DISTANCE AND VELOCITY FOR SEGMENT #',I2)       00001740
0107                     READ(5,43)DIST(JD),VEL(JD)                                          00001750
0108                 101 WRITE(6,143)                                                        00001760
0109                 143 FORMAT('  ANY OTHER CHANGES? (Y OR N)')                            00001770
0110                     READ(5,20)ANS                                                       00001780
0111                     IF(ANS.EQ.YES) GO TO 120                                            00001790
0112                     IF(ANS.EQ.YNO) GO TO 60                                             00001800
0113                     GO TO 101                                                           00001810
                    C                                                                        00001820
                    C  STORE VOLUMES TO RETURN TO THE MAIN CALLING PROGRAM                   00001830
                    C                                                                        00001840
0114                 100 VOL(1)=VAL(3)                                                       00001850
0115                     VOL(2)=XLD                                                          00001860
0116                     VOL(3)=XLU                                                          00001870
0117                     WRITE(7,200)                                                        00001880
                    C                                                                        00001890
                    C  OUTPUT THE RESULTS WITH APPROPRIATE HEADINGS AND                      00001900
                    C  REPORT TITLES TO THE LINE PRINTER                                     00001910
                    C                                                                        00001920
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0118          200 FORMAT('1',40X,'FPC SHIP SIMULATION',                              00001930
                 *' AND FINANCING MODEL'//30X,'SCENARIO PARAMETERS FOR',             00001940
                 *' SIMULATION OF 165000 M3 LNG TANKERS')                            00001950
0119                WRITE(7,55)VAL(1)                                                00001960
0120                WRITE(7,201)                                                     00001970
0121          201 FORMAT(' ')                                                        00001980
0122                WRITE(7,56)VAL(2)                                                00001990
0123                WRITE(7,201)                                                     00002000
0124                WRITE(7,57)VAL(3)                                                00002010
0125                WRITE(7,201)                                                     00002020
0126                DO 210 I=1,NP                                                    00002030
0127          210 WRITE(7,82)I,PTD(I)                                                00002040
0128                WRITE(7,84)                                                      00002050
0129                DO 220 I=1,NSEG                                                  00002060
0130          220 WRITE(7,85)I,DIST(I),VEL(I)                                        00002070
0131                WRITE(7,70)TSH                                                   00002080
0132                WRITE(7,74)NSHD,XLD,PERD                                         00002090
0133                WRITE(7,75)NSHU,XLU,PERU                                         00002100
0134                RETURN                                                         00002110
0135                END                                                            00002120
```

APPENDIX F

1. FEIS of Department of Interior: Alaskan Arctic

The overview volume of DOL's FEIS discusses the environmental impacts of the proposed action, the mitigating measures suggested, and unavoidable adverse effects. From an analyses of these considerations, the following appears to be the most troublesome long-term impacts of the Trans-Alaskan system as received by the DOL. Essentially there are "worst case" observations.

I. PERMAFROST

The FEIS states that the disturbances in permafrost areas will most likely have long-term effects on the permafrost regime. Damage to the tundra by disturbance or removal of the overlying organic mat will cause underlying permafrost to thaw more deeply in summer. The thawing of permafrost could result in slope failure. Slope instability could cause an accelerated erosion hazard anywhere in the continuous and discontinuous permafrost area (1370 miles of route) where the slope is 3^{o} or more and ice-rich soils are present. Thaw consolidation must be considered an annual event occurring during early summer. Slope instability could occur throughout the life of a project. Any repair work to the proposed pipeline necessitated by such instability would thus have to be carried out when the ground surface is most susceptible to disturbance, thereby further aggravating the situation.

It is stated that the most important unavoidable impact on permafrost will be this differential settling over the pipe and the thermokarst (irregular topography) that will develop. The thermokarst will cause water-filled ditches in the vicinity of the pipeline.

While the FEIS states that the above effect is "unavoidable," it is noted that the extent of the permafrost melting

will depend on the construction schedule and the care of the tundra cover. The applicants have proposed to do all construction from ice and snow roads during the winter when the ground is frozen; gas in the pipeline will be chilled below 32°F; all slopes over 3° will be checked for possible instability; and all repairs during thaw periods will be done from air-cushioned vehicles to preserve the tundra.

Finally, the pipeline may have to be inactive for a period after construction is completed. Unless preventive steps are taken, this will result in deeper thawing over the pipe, with resultant settling of berm and soil erosion.

II. VEGETATION

Vegetation will be totally removed from the part of the right-of-way required for the pipeline ditch, roads, etc. On the remainder of the right-of-way, usually 100' in width, vegetation will be removed or damaged. Approximately 84,000 acres of vegetation will be removed. Revegetation will take place along the entire right-of-way, with losses occurring in the deciduous and coniferous forests, croplands and throughout most of the prairie. However, except for the forests, these losses will be short-term. Long-term losses are anticipated in the desert, chaparral and tundra, but on a regional scale, these losses would not be significant.

Secondary impacts on plant communities are likely to result from drainage and soil compaction. Changes in plant habitat result from such factors. These changes will be limited to the substitution of one community for another within a major biome. Succession tends to be naturally restricted in severe environments, so that an overall loss of primary production may be anticipated.

Of course, impact on vegetation could be severe if emergency repairs are needed, especially if the active layer is thawed.

III. WILDLIFE

The potential for serious impact on wildlife is greatest in the Arctic, where the wildlife populations have been little effected by human activity to date. Human activity is most incompatible with species that are characteristic of wilderness areas. Included in this category are caribou, musk ox, polar and grizzly bear, wolf and wolverine. Impacts can potentially stem from direct mortality from hunting or vehicle collision, deliberate harassment, physical barriers to migration, habitat destruction.

The porcupine caribou stands out as the prime loser. Increased hunting pressure could have a direct effect on the herd, but the facts that the pipeline crosses the calving grounds and migration routes of the caribou might also be detrimental. While the FEIS says that some effect on the herd is unavoidable, it is also stated that control of construction schedules during migration and calving periods could mitigate losses. For example, winter construction would have a minor impact on caribou. Obviously, enforcement of strict hunting laws could also greatly reduce losses.

In fact, the applicants have proposed to: schedule construction to avoid the most sensitive periods of the animals' life cycle; construct barriers and protective fencing; prohibit hunting; avoid fish spawning areas; monitor movements of caribou and halt construction when they come close; avoid barriers in the form of stored pipe and equipment that might restrict caribou migration. However, especially in the wildlife area, there seems to be an underlying suspicion that many of these precautions won't be strictly enforced.

Another underlying concern in this area is that uncontrolled future development presents more potential for harm than anything resulting from the pipeline itself. The FEIS notes that if the gas pipeline was the only factor to affect the environment, it might be argued that affects on wildlife would not be too serious. But, approval of the pipeline could serve as a catalyst to stimulate development. Combined impacts of the gas pipeline and other proposed activities will have serious effects, including disturbance to denning,

reduced productivity of species, and disturbance to food web.

Disturbance of some sensitive periods in birds' life cycles cannot be avoided due to aircraft and human presence. The snow geese are particularly susceptible to fright from aircraft, and there is no practical flight altitude that doesn't frighten them. Also, snow geeese use the Mackenzie River for spring migration and fall staging and use the coastal plain for feeding and staging. Again, the possibility of future development, with its resulting disturbance, is the major environmental impact on birds, however.

There are several possible impacts on aquatic life. Increased sedimentation from construction at river crossings will adversely affect fish populations, although this impact will be temporary. In addition, in the permafrost area there is a possibility that a shortage of water necessary to support winter construction will cause use of water in sensitive overwintering areas for fish. This could cause a decline in fish population, which could be serious since fish regeneration is slow in the Arctic. Also, frost bulbs, developing around the pipe at stream crossings, could form barriers which could hinder upstream runs of the arctic char and grayling. Finally, as in the previous wildlife discussion, the prospect of future development is feared. Fishing pressure could increase in the future, and Arctic stocks are susceptible to overfishing.

IV. NATIVES

The potential impacts on the natives take two forms--impact on available wildlife resources used by the natives and impact on cultural patterns. Subsistence food is still drawn from the land by most natives. In addition, cash revenues are earned from fish, fur and game harvesting. The FEIS states that North American history has shown that sustained pressure on resources is certain once a frontier region is opened. However, this diminution in food sources will not be in the short-term. If the forecast is correct, at least a gradual adaptation to a new lifestyle is possible. Secondly, with influx of outsiders, natives cannot avoid the cumulative effects of a

cultural upheaval. The applicants have suggested counseling the natives on living on a wage-oriented economy, but the most effective way to prevent cultural upheaval is probably to discourage permanent settlement. In this respect, the applicants have proposed to prohibit dependents from accompanying workers to Alaska. Only permanent maintenance and operational crews will create a long-term impact where they settle, but they will be fewer than the temporary construction crews and more spread out.

V. WILDERNESS

Cumulative, long-term adverse effects will arise along 495 miles of wilderness in NE Alaska (National Wildlife Range) and Yukon, Canada. Aesthetic degradation will result from cuts and fill, gravel extraction sites, compressor stations, etc. More importantly, however, additional recreationists will have an impact on the character of the area. Even if recreationists cannot use the temporary access roads, access is bound to increase to the area. Again, future development is feared. The pipeline will provide a catalyst for intensive prospecting of the Beaufort Sea offshore oil and gas province and Marsh Creek anticline. The proposed Mackenzie Highway will further reduce the wilderness status of the area.

To mitigate adverse effects, the applicants propose techniques to screen fore and middle-ground views of the right-of-way. However, intelligent land-use planning seems the most effective way to avoid over-use of the wilderness areas.

VI. HAZARDS AND PIPELINE INTEGRITY

There are two areas of possible adverse effect here - failures associated with a break, and failures associated with repair of the system. In general, the environmental impact of system failure will be greatest in the more forested or populous areas of the lower states, while the impact of the repair process will be greatest in the Arctic and Subarctic regions.

The historical record of pipelines suggests that the catastrophic failure rate is low. The pipeline will cross active faults throughout its route, and it will pass through zones of some seismic activity. However, only one segment in Canada goes through the highest risk zone, and the entire Alaskan segment is in the lowest risk zone.

The burial depth of the pipeline at stream crossings in relation to maximum scow depth is significant. Without the precations of weighting the pipeline and bringing it below scow depth, the pipeline could be floated during a major flood.

If a rupture does occur, adverse environmental effects are virtually assured. The Arctic section of the pipe offers the greatest potential for rupture due to the unresolved engineering questions about the complete integrity of the pipe. It is noted that the applicants have not demonstrated that a buried, chilled pipeline can be operated safely in the permafrost zone. The FEIS also states that, while the design, construction, testing and operation of the pipeline will be in accordance with Title 49 CFR, Part 192, the levels of stress permitted exceeds those allowed by Title 49 CFR, Part 192. Rather, the pipeline design criteria permit "unconservatively" high levels of stress and strain to develop in the pipe under certain combinations of external loadings.

As far as pipeline repair is concerned, repair of a rupture would be most difficult in the north, especially during the spring. It is estimated that a rupture requiring access would occur in the permafrost once every 7½ years, and once every 15 years in the spring and summer seasons.

2. FEIS of FPC: El Paso

The FPC staff basically relied on the FEIS of the Department of Interior for the environmental assessment of the Arctic Gas System. An analysis of the "Comparative Assessment" chapter in Volume I of the FEIS of the FPC, shows the following troublesome long-term impacts of the El Paso System again essentially on a "worst case" basis.

I. PERMAFROST

Disturbance to the permafrost regime is feared, with resultant erosion, subsidence, slumping, gullying and establishment of new drainage pattersn along route. Disturbance of permafrost could cause secondary effects of frost heave, solifluction, deep-seated creep and mass wasting which could subsequently dislodge and possibly rupture buried pipeline.

II. EARTHQUAKES & EROSION

In Alaska, the danger of large-scale earthquakes presents serious hazards to the pipeline and LNG plant. Tsunamis resulting from earthquakes could endanger loading docks and tankers. There is the possibility of the existence of a fault within two miles of the property proposed for LNG facility construction, and this area is on the strike of the major faults involved in the 1964 event.

In California, the proposed pipeline route crosses at least 22 mapped fault traces.

In California, discharge of water for hydrostatic testing could have significant erosional impact if improperly released. Also, such discharges upon the surface in the San Joaquin Valley or Mojave Desert could create problems with expansive and collapsible soils of those areas.

Preconstruction and construction activities in the coastal area of S. California would increase erosion, with resultant impact to immediate offshore water area.

III. WATER RESOURCES

As in the Arctic Gas System, dewatering of streams could result if streamflow was used as a source of water. Also, frost bulbs developing around the pipeline could block groundwater flow, resulting in the development of aufeis. This would result in dewatering of the stream. Finally, the probability of major spills of fuels, lubricants or toxic materials at storage sites and during tanker transport of LNG cannot be discounted. This would be especially serious if fuels or lubricants seeped into groundwater beds where they could remain for extended periods.

IV. VEGETATION

Construction of the 809 mile pipeline in Alaska would require disturbance of 14,712 acres for other facilities. Again, removal of the organic surface layer would result in reduced insulation of the permafrost.

In California, 3,650 acres would be cleared for the pipeline system and LNG site, and 1,550 acres of that would be permanently maintained.

In the arrid, desert areas of the Point Conception route, the vegetation is especially fragile, requiring considerable time to recover.

V. WILDLIFE

In Alaska, pipeline construction and operation could cause interference with caribou migration, resulting in delays or failures of animals to reach traditional calving or seasonal grazing areas. Also, construction of the pipeline to Gravina Point and development there could reduce the habitat for the Sitka black-tailed deer, and make them more vulnerable to hunting through increased access to the area. There could also be a direct effect on Dall sheep from aircraft flights. Pipeline construction and maintenance activity in Franklin Bluffs could harm the peregrine falcon. The terminal at Gravina Point could

result in abandonment of 16 bald eagle nesting sites there. Further, the pipeline and LNG plant have potential for damage to estuarine and migratory fish. The tanker route would cross one of the most productive tanner crab areas in Prince William Sound. At Gravina Point LNG plant, heated seawater discharged into Orca Bay will have an unknown effect on marine organisms. There also will be a discharge of heated brine and chlorine, and additional LNG facility operational impacts in both Alaska and California.

In California, the endangered San Joaquin Kit Fox may be encountered, and there will be adverse effects on the prairie falcon if their nesting sites are encountered. Especially harmful here would be long-term off road vehicle use. The effluent flow from vaporizers at Point Conception will be considerably colder than ambieat seawater temperature. This could inhibit growth and otherwise reduce productivity.

VI. NATIVES

The growing demand for material goods is a major feature that has resulted from exposure of the natives to non-native culture. The natives are thus becoming increasingly dependent on the cash economy. Also, the decline in harvesting of subsistence resources and alterations in the nature and significance of the social institutions derived from that activity is a problem.

VII. LAND-USE

The cumulative land use effects of the LNG facility at Point Conception would be substantial in that the project would involve installation of a major industrial facility in a primarily rural area. The facility could induce future industrial development along the south coast region. In Alaska, the pipeline and LNG plant is in Chagach National Forest, and in California, the pipeline traverses the Los Padres National Forest.

VIII. HAZARDS & PIPELINE INTEGRITY

The largest risk to public safety, according to the FEIS, is the harbor operation of LNG tankers. If a collision and rapid release of the LNG cargo occurred, persons situated up to 7,000' from ships could be subject to methane fire. However, a major accident like this is considered unlikely. Also, bulk handling of LNG involves some risk to public health in terms of potential operational accidents.

Repair activities could cause severe damage, especially in the continuous permafrost region.

3. FEIS of FPC: Alcan

The Supplement volume of FPC's FEIS discusses the potential impacts of the Alcan system. The following appear to be the most significant long-term impact of the project, as viewed by FPC. Again, this is a "worst case" analysis.

I. PERMAFROST

The most significant impact of the proposed construction related to permafrost will be the thermal disturbance to the active layer, primarily resulting in its deepening. Potential imports resulting from this disturbance could include the melting of ground ice, differential subsidence, thermal and other erosion, destructive drainage changes, massive soil sloughing and serious damage to vegetation. These secondary impacts will depend largely on the degree to which the applicants apply available scientific knowledge, good engineering design and careful construction practices.

Degradation of existing permafrost is expected to have a significant environmental impact only where ice-rich permafrost thaws. Thawing of ice-rich permafrost can result in thermokarst topography and slope facture.

Changes in the permafrost regime can pose a hazard to the pipeline in the form of slope instability, frost heave and buoyancy uplift. (For a detailed discussion of permafrost, see Appendix A to the FEIS Supplement)

II. SEISMICITY

From Prudhoe Bay to MP 259, the design earthquake proposed by the USGS is 5.5. It is 7.5 over the rest of the segment to Delta Junction. The proposed route does not cross any known active faults down to Delta Junction, however. Thus, damage caused by faulting is not a major hazard. The level of shaking to be expected along the segment from Delta Junction to the Yukon border is similar to that along the more seismically active portion of the Prudhoe Bay to Delta Junction segment. There may be 3 faults in this area, but they are probably not large.

III. HYDROLOGY

The potential impact of the pipeline on various hydrologic features would depend on its design and construction procedures. Areas of concern would be channel erosion, icings, depletion of streamflow, and drainage disruptions.

IV. VEGETATION

Vegetation would be cleared from the proposed route, access roads, work camp areas, and compression station sites. The direct impact of clearing would be minor, but local and indirect impact upon other vegetation and animal species as a result of clearing would be more critical. Indirect impacts include: permafrost degradation; alteration of existing drainage patterns; change in distribution and type of vegetation along route-of-way, contributing to change in species composition of wildlife; and increased erosion. In Canada, the route would bisect the Laird River Hotsprings Provincal Park, an area of unique habitat.

V. WILDLIFE

(1) Mammals - major impacts would be the alteration or destruction of habitats, adn alteration of animal migration routes. In Alaska, construction activity and road berms might be partial impediment to free movements. Although the inaccessibility of minor habitats may be of little significance, loss of large areas of traditional winter or summer range might be "disastrous". Interference with the timing of spring migration and the arrival of the herds on the calving ground could affect calf survival. Alcan construction could limit the movements of the Central Arctic Herd, and conceivably deflect or delay migration of the Arctic and Porcupine Herds. Dall sheep in the Brooks Range might be imported, and moose movements along river floodplains might be obstructed. The bison watering habitat north of Delta Junction can be considered unique, but proposed construction, while affecting this habitat, should not interfere with other watering areas. Wolves are in high demand as trophies, and would probably be adversely affected during construction. In Canada, the rare Osborne caribou migrates across the proposed route at Burwash Landing (north end of Kluane Lake), and another important migration route is reported near the Swift River. Disturbance to big horn sheep may occur in British Columbia. Several unique habitats exist: Pickhandle Lake region is an important moose production area; sheep ranges and lambing areas exist near Mt. Wallace; Mt. Michie is an important grizzly denning area and wintering area for moose and elk. The project would also impact the proposed Kluane National Park and Game Sanctuary.

(2) Birds - In Alaska, waterfowl nesting and staging would be interrupted near the right-of-way by summer construction. The Franklin and Sagwin Bluffs are peregrine falcon nesting sites. These raptors also nest along the Tanana River. In Canada, the Pickhandle Lake region is an important waterfowl area, and there is a possible peregrine falcon site along the route. Lake area is

also an important waterfowl nesting and staging area traversed by the pipeline. Teslin Lake and Kluane Marsh are staging areas along the route, which will also have compression stations.

(3) Fish - Stream crossings will create disturbances to stream beds, disrupting spawning beds. Siltation will result from trenching and right-of-way erosion. This will be especially harmful to overwintering fish. To facilitate construction or increase the integrity of the pipeline, some streams will be modified by culverts, channelization, riprapping, gravel ponds or diversion. The use of Alyeska gravel sites located in the floodplain of fish-sensitive streams, could cause serious damage to fish habitats. Finally, the possibility exists that sewage and chemical substances will be introduced into the aquatic environment.

APPENDIX G

The House hearings were on H.R. 7045, before the Subcommittee on Fisheries and Wildlife of the House Committee on Merchant Marine and Fisheries, 86th Cong., 1st Sess. (1959). The Senate hearings were on S. 1899, before the Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Interstate and Foreign Commerce, 86th Cong., 1st Sess., Pts. 1 and 2 (1959).

El Paso Excerpts:

Senate Hearings p. 20, S. 1889

> "Mr. Stevens. Yes, sir, Senator, and I would say that this range itself could be established without regard to this bill, but not with the beneficial effects for the mining industry that are provided in this bill. This bill really is to permit multiple uses which are not available under existing law. Existing law does not recognize this multiple use principle we are trying to establish."

House Hearings pp. 140-141

> "The enormous development of the outdoor recreation industry and the growing willingness of vacationers to spend their ever-increasing vacation time on long trips to scenic wild areas indicate that in the future Alaska's outdoor recreation resources may contribute more revenue than any other industry. The wildlife and the wilderness frontiers of Alaska are the basic resources upon which much of the recreation industry is dependent." House Hearings, p. 140.

* * *

> "For the fisherman, hunter, photographer, or mountain climber, certain portions of the Arctic coast and the north slope river valleys, such as the Canning, Hulahula, Okpilak, Aichilik, Kongakut, and Firth, and their great background of lofty mountains, offer a wilderness experience not duplicated elsewhere in our country.

"Although the area included within the proposed range may now be considered remote, with the dramatic increase in population and with improved facilities and equipment for surface and air transportation, the area will cease to be remote sooner than we think.

"Looking ahead 50 years at the unfolding story of Alaska's development, it is clear that the only economically feasible opportunity for maintaining a wilderness frontier large enough for the caribou, the grizzly bear, the Dall sheep, the wolverine, the wolf, and the polar bear--all of which require a sizeable unrestricted range--lies in this northeastern Arctic region of Alaska."

House Hearings p. 143

"Mr. Dingell. . . . Do you propose to administer this as a refuge or in the nature of a national park, or what? How do you propose to preserve and protect the unique character of the area and protect the wildlife from mineral exploitation? We have had difficulty before this committee time after time on this point.

"Mr. Leffler. The primary purpose is to preserve the area for future generations and to prevent the destruction of the surface of this Arctic Wildlife Range."

Arctic Gas Excerpts:

House Hearings p. 155

"Mr. Stevens. No sir; section 3(b) is the primary reason for our being here today, counsel. We could establish this range under existing law and if section 3(b) were eliminated it would leave the decision with the Secretary to either permit mining under a system of laws which allows surface title to pass to mining claimants or to entirely exclude all forms of mining from this 9 million acre area. That is the decision that we did not want to make. We have made our recom-

mendation and that is that mining be permitted under regulations that will protect the surface. And that is our primary reason for being here today.

"Mr. Dingell. Will you tell me where in section 3(b) appears language that states that the Secretary shall consider in issuing regulations the preservation of the area? I do not see anything like that in section 3(b).

"Mr. Stevens. You will notice that section 3(b) refers to a patent issued for such mineral deposits. This is a patent. We are not talking about the mineral leasing laws. Those are already covered by the regulations that we have all agreed to and that would apply to this Arctic wildlife range. However, 'a patent issued for such mineral deposits shall not convey any interest in the surface of the land containing such minerals other than the right of occupation and the use of so much of the surface of the land as may be required for purposes reasonably incident to the mining or removal of such minerals under such regulations as may be issued by the Secretary of the Interior.' That is, under our existing procedure this is an area that would be set aside for the primary purpose of wildlife management. Therefore, these regulations would be for the purpose of protecting that primary purpose while at the same time permitting mining activity.

"Mr. Dingell. In other words, that the specific purpose of the regulations would be to preserve the character of the area, for wildlife and also to preserve the wildlife in the area.

"Mr. Stevens. That is our intent. At the same time we recognize in a 9-million-acre area there can be mining activity which is completely compatible, multiple-purpose use for mining purposes."

House Hearings pp. 142-143

"Mr. Dingell. Under this, what type of mining do you propose to allow in that area? In other words, we are setting up a wildlife range here and is it the intention of the Department to set up regulations which will prevent uses which will be inconsistent with the intelligent management of the wildlife range?

"Mr. Leffler. We would set up regulations similar to the Glacier Bay National Monument regulations in connection with that, which seems to be working out very satisfactorily in Alaska.

"Mr. Dingell. What would that be?

"Mr. Leffler. I am going to ask Mr. Stevens to answer, if I may. He is more familiar with the details of that than I am. If you do not mind, I would like to have him answer.

"Mr. Dingell. Please.

"Mr. Stevens. Mr. Dingell, these regulations would permit the operation under the mining laws--the metalliferous mining laws--except that title to the surface may not be obtained. The patentee gets title to the subsurface minerals.

The patentee has the right to remove the minerals, but there must be an agreement between the Park Service and the subsurface patentee as to the extent of the surface use.

It would be the same system in the Arctic wildlife range.

It is our feeling that the area being so immense--it is 9 million acres, and we do not know what is there--that if ever it will have an economic value for Alaska, it will be in the mining field. For that reason we have decided that we would follow the same system that exists in the Glacier Bay National Monument, which is also a little over 2 million acres, as you know.

"Mr. Dingell. What kind of mining do you intend to allow? Strip mining, hydraulic mining, coal, or what?

"Mr. Stevens. Coal is not metalliferous. Coal would be leased. Under the mining laws we have discretion not to lease. Under the mining laws we have an alternative either permit mining which leads to title to the surface or prohibit all mining for metalliferous metals.

We do not want to give surface title, but we do want to permit the proper exploitation of any mineral deposit found there that is necessary for the development of Alaska.

"Mr. Dingell. What I am trying to find out is, What kind of mining do you intend to allow? Do you intend to allow mining to tear up the surface and destroy the value of the wildlife range?

"Mr. Stevens. It is not our intent to permit such activity if it is incompatible with the primary surface use.

"Mr. Gross. Would the gentleman yield?

"Mr. Dingell. Yes.

"Mr. Gross. I am not quite clear on that answer.

You propose to allow strip mining? Is that pointed out in the term?

"Mr. Stevens. I do not know if there would be any strip mining for metalliferous metals in this area. This is a hard-rock area primarily for gold. On the leasing, I do not think we would lease primary for strip mining.

"Mr. Dingell. Or pit mining? open-pit mining?

"Mr. Stevens. There, again, it is a discretionary matter and would depend upon the circumstances, whether wildlife would be affected, and what the interests are nationally and what minerals would be involved."

APPENDIX H

PART I

A. CANADIAN CONSTITUTIONAL LAW

Various Canadian constitutional law issues are relevant to Canadian Arctic Gas and Alcan. This discussion focuses on the actions which Canadian political entities have the constitutional power to effect. There is no discussion here of the likelihood of these various actions and the inclinations of the governing bodies to take such actions.

The discussion is divided into four parts: federal taxation and regulation, provincial regulation, provincial taxation, and the ad referendum treaty. The treaty will also be discussed in the initial three subsections where it has application.

Four hearing days were devoted to a scholarly discussion of Canadian law. Arctic Gas presented legal opinions of John Geller, Q.C. (AA-85) and John J. Robinette, Q.C. (AA-83A); El Paso introduced a legal opinion by Walter B. Williston, Q.C. (EP-100). These three expert witnesses, eminent attorneys in Canada, were subjected to extensive cross-examination. The Presiding Judge was greatly impressed with their knowledge and erudition. In addition, Alcan presented a scholarly legal opinion by Emilio S. Binavince in the form of a brief, while Arctic Gas, El Paso and Staff also submitted briefs on this issue. The extended discussion of Canadian law, both in the hearing room and on brief, had the effect of substantially narrowing the issues of controversy. In fact, the only significant area of dispute remaining involves provincial taxation, and even here the argument is really one of emphasis. Thus, the rather detailed discussion below is not compelled by disputes among the parties, but rather by the fundamental importance of these issues.

1. Federal Taxation and Regulation

Sections 91 and 92 of the British North America Act of 1867 (BNA Act) delineate the legislative powers of the Canadian federal government and provinces. The "exclusive" legislative authority of the national Parliament extends to:

-- "Regulation of Trade and Commerce" /§91(2)_7

-- "raising of Money by any Mode or System of Taxation" /§91(3)_/

-- "such Classes of Subjects as are expressly excepted in the Enumeration of the Classes of Subjects by this Act assigned exclusively to the Legislatures of the Provinces." /§91(29)_/

The proviso to §91 states "And any matter coming within any of the Classes of Subjects enumerated in this Section shall not be deemed to come within the Class of Matters of a local or private Nature comprised in the Enumeration of the Classes of Subjects by this Act assigned exclusively to the Legislatures of the Provinces."

The powers of the provincial legislatures include:

-- "Direct Taxation within the Province in order to the raising of a Revenue for Provincial Purposes" /§92(2)_/

-- "Property and Civil Rights in the Province" /§92(13)_/

-- "Local Works and Undertakings other than... Lines of steam or other Ships, Railways, Canals, Telegraphs, and other Works and Undertakings connecting the Province with any other or others of the Provinces, or extending beyond the Limits of the Province." /§92(10a)_/

It is clear that, pursuant to §91(3), the taxing power of the federal government is plenary. The federal Parliament has the power to impose any kind of tax on the pipeline, including income, gross receipts, import, export, license, sales, transit or property taxes. The amounts levied for any of these taxes may be legally measured by any appropriate standard selected by Parliament. Moreover, since there is no equivalent to an "equal protection" clause in the BNA Act, the federal government can tax discriminatorily. However, the ad referendum treaty ("U.S.-Canada Transit Pipeline Treaty," initialed by representatives of the United States

and Canada on January 28, 1976) specifically prohibits taxes discriminating among inter-provincial pipelines /III(1)/ and prohibits import, export or transit fees, duties, taxes or other monetary charges on hydrocarbons in transit /III(2)/.

Pursuant to §§91(2), 91(29) and 92(10a) of the BNA Act, it is evident that the Canadian federal government has exclusive authority to regulate the inter-provincial undertakings which are excepted from provincial regulation under §92(10a), and thus are included in the federal jurisdiction under §91(29). Also, once an article enters into the flow of inter-provincial trade, the subject matter and all its attendant circumstances cease to be a matter of local concern and thus are subsumed under §91(2). That federal jurisdiction is exclusive is made manifest by the prefatory paragraph to §91--"exclusive Legislative Authority of the Parliament of Canada"--and the proviso to §91, supra.

The federal government has exercised its authority to regulate inter-provincial pipelines by enacting the National Energy Board Act (NEB Act). There was some discussion on the record whether the provinces could regulate inter-provincial pipelines in the absence of federal regulation. The answer is that they cannot, in that the federal jurisdiction is exclusive. Commission du Salaire Minimum v. The Bell Telephone Company of Canada (1966) S.C.R. 767 (AA-84). However, the fact that the NEB Act does occupy the field makes "anticipatory preemption" irrelevant.

Absent the treaty, the possibility exists under Canadian law for the federal government, through its regulatory power, to discriminate against, appropriate without compensation, or otherwise interfere with the pipeline. This problem has been alleviated by the treaty. See Articles II(1) and IV, (Part III of this Appendix).

It is not clear how the treaty will affect the Energy Supplies Emergency Act of 1974. This Act created the Energy Supplies Allocation Board (ESAB), which may exercise a broad range of powers whenever the Governor-in-Council (Cabinet) declares that a national emergency exists by reason of a petroleum shortage. Under §26 of the Act, the ESAB may direct the NEB to require gas pipelines to provide additional facilities or divert gas for local distribution. If the treaty is enacted into law by the Canadian Parliament, it might well supersede the provisions of the Act (56A/8531).

2. Provincial Regulation

As was established supra, regulation of the pipeline is in the exclusive realm of the federal government. This includes authority over all matters of construction, management and operation. Bell Telephone, supra at 772, states that "all matters which are a vital part of the operation of an interprovincial undertaking as a going concern are matters which are subject to the exclusive legislative control of the federal parliament within §91(29)."

While the provinces may not legislate with respect to inter-provincial trade, they may pass legislation, pursuant to a valid §92 provincial function, which incidentally affects such undertakings. However, the permissible reach of such incidental regulatory authority is relatively insignificant, and in any conflict, federal statutes prevail. For example, witness Williston initially testified that the provinces could legislate with regard to safety and environmental standards, provided these laws did not conflict with any federal standards. Williston later clarified that he was not referring to the kind of safety standards which are an integral part of the construction and operating procedures. Rather, he was referring to regulations like those requiring hard hats.

The Canadian courts will scrutinize provincial legislation to assure that a purported incidental effect is not a guise for provincial regulation of an inter-provincial project. In determining whether the provincial enactment is lawful, the courts will examine the "pith and substance" of the statute. The judicial test, accepted as such by all the parties, was enunciated in Attorney-General for Manitoba v. Manitoba Egg and Poultry Assoc. (1971) S.C.R. 689 (AA-84). In this case, Mr. Justice Martland stated that each regulation had to be examined in relation to its own facts. In determining the validity of the provincial legislation, the issue is not whether it might affect inter-provincial trade, but whether it was made in relation to the regulating of inter-provincial trade. Once a statute aims at regulating matters of inter-provincial trade, it is beyond the competence of provincial legislation.

Although Williston accepted the limitations of provincial jurisdiction specified supra, he nevertheless testified that a province could require local diversion of pipeline gas for local uses, in the event of an "emergent shortage of energy supplies within a province." Williston conceded that this issue had not been directly decided, and mainly relied on dictum discussing the power to declare a debt moratorium in an emergency. Canadian

Banker's Assoc. and Dominion Mortgage and Investments Assoc. v. Attorney-General of Saskatchewan (1955) 4 D.C.R. 736, 752. Williston emphasized that he was referring only to a serious emergency.

It is unclear whether El Paso has since retreated from Williston's position. On brief, El Paso states that it agrees with Arctic Gas that a province has no constitutional power to enact legislation "Interfering in any way so as to diminish or alter the flow of gas through the pipeline or the destination of such gas" (EP Brief, 11). Witnesses Geller and Robinette maintained that even the existence of an emergency energy shortage would not extend provincial legislative jurisdiction so as to enable diversion. Both emphasized that the Canadian courts have strongly protected the scope and exclusivity of federal legislative powers, and the dictum in Canadian Bankers, supra does not support a change in this policy.

The position of Geller and Robinette is obviously more strongly supported than Williston's on the emergency diversion issue. Williston's theory rests on an unclear factual scenario and an unpersuasive legal precedent. In addition, it is possible that any provincial power to declare an "energy emergency" is preempted by the Energy Supplies Emergency Act. One could argue that the Act deals only with "national emergencies," and thus does not preempt the provinces from declaring "provincial emergencies." On the other hand, it can be pursuasively argued that the Act delegated exclusive authority to declare any energy emergencies to the ESAB. Finally, it is possible that Article II(1) of the treaty prohibits provincial as well as federal interference with the pipeline. "Public authority," as used in II(1), is not defined in the treaty, and Geller argued that the term applies to any governmental unit, including a province. Such an interpretation would require the implementation of the treaty by statute and the determination that Parliament, by passing a statute implementing a treaty, can restrict provincial powers. See Railquip Enterprises, Ltd. v. Vapor Canada Ltd. (AA-84), discussed in subsection 4, infra.

3. Provincial Taxation

The taxing powers of the provinces are set forth in §92(2) of the BNA Act, which states that it is within the exclusive jurisdiction of the provinces to legislate in relation to "Direct Taxation within the Province in order to the raising of a Revenue for Provincial Purposes." The taxing powers of the Dominion and the

provinces are concurrent, and there is no constitutional objection to double taxation.

(a) Property Tax (Direct) v. Commodity Tax (Indirect)

The first question which must be discussed is the nature of the tax which may be imposed by the provinces. As a general rule, taxes which have a general tendency to be passed on are viewed as indirect and are ultra vires of provincial legislatures. Over the years, certain taxes have been uniformly characterized as direct and others indirect. It is now accepted that provinces can impose property, income, sales and license taxes, but not commodity taxes. In determining the nature of a tax, the courts will look at its "pith and substance." In other words, taxes will be invalidated that are property taxes in form but commodity taxes in substance.

The parties spent considerable time on the record discussing the proper method of property valuation for property tax purposes. The main question is whether a province may levy a tax on land and/or the pipeline which is measured by the reflected value of the gas carried by the pipeline. Witness Williston initially testified that a valid property tax can be imposed that is measured by reference to the value that attaches to a piece of property by reason of the use to which the property is put. Thus, in the instant case, the value of the property for taxation purposes, it was suggested, can be measured by reference to the value of the pipeline, which in turn could be measured by the reflected value of the gas it carries. Williston cited appeals court cases which upheld property taxes measured by the value of the products on the land. See Attorney-General for British Columbia v. Esquimelt and Nanimo Railway, (1950) A.C. 87 (EP-18); Canadian Pacific Railways v. Attorney-General for Saskatchewan, (1952) 2 S.C.R. 231 (EP-19). However, in both these cases, the products were attached to the land (timber and minerals), owned by the property owners, and taxed as interests in land because they were not severed so as to become commodities. Because of these facts, the value of the products had a direct relationship to the value of the property. Mr. Justice Rand, in Canadian Pacific Railways, supra, stated:

> If the tax is related or relatable, directly or indirectly, to a unit of the commodity, or the price, imposed when the commodity is in course of being manufactured or marketed, then the tax tends to cling as a burden to

> the unit or the transaction presented to the market. However much, in any case, these may be actually "intended" or "expected" to be passed on, it is now settled that they are to be so treated (at 251-252).

Witnesses Geller and Robinette agreed that a property tax may be measured by reference to the value that attaches to the land by reason of the use to which it is put and that the value of such land for taxation purposes may reflect such use. However, they disagreed with Williston's assertion that the value of the land used for pipeline purposes could be measured by the reflected value of the gas carred by the pipeline.

By the time the record closed on this issue, the disagreement among the witnesses was obscured. In fact, any differences that did still exist were probably overstated. Clearly, both Geller and Williston believed that in assessing property for tax purposes, the value of the gas is relevant and may be taken into account. However, the value of the gas may only be considered to the extent it affects the value of the property or the earning potential of the property owner. The imputed value of the product itself cannot be the final calculation (55/8338-47; 165/27,061-068).

(b) Discriminatory Property Taxes

It has already been noted that there is no "equal protection" requirement in Canada. Thus, similar properties or activities can be taxed at different rates. The only requirement is that the provincial legislature act within the taxing authority granted to it by §92(2) of the BNA Act. The significant condition here is that taxation must be aimed at the "raising of a Revenue for Provincial Purposes."

The parties agree that provincial taxation which discriminates against or among inter-provincial pipelines would be viewed as an attempt to regulate inter-provincial trade rather than raise provincial revenues, and be ultra vires. El Paso, clarifying the ambiguous statements of Williston, states on brief that while discriminatory taxation is ultra vires, the results of litigation of such a tax would be "difficult to predict" (El Paso Init. Can. Brief, 22). Arctic Gas agrees that such a scheme is ultra vires, but notes that "where such discrimination occurs, the result is

very easy to predict - the tax is invalid" (Arctic Gas Brief, 21). It is apparent that El Paso, having retreated from its initial suggestion that provincial discrimination might sometimes be valid, is now attempting to raise an issue of uncertainty of litigation. Of course, judicial conclusions are never subject to precise prognostication. However, courts in Canada, like those in the United States, are guided by the rule of stare decisis. Witnesses Geller and Robinette, as well as Mr. Binavince, have demonstrated with abundant clarity that provincial taxation schemes that discriminate against inter-provincial projects are ultra vires, and will be declared as such by Canadian courts. 1/

Two possible forms of discrimination are theoretically possible. First, provinces might attempt to levy taxes discriminating against the inter-provincial pipeline, as compared to intra-provincial pipelines. The courts, in looking at the "pith and substance" of such a statute, would declare this tax invalid as regulation of an inter-provincial project, unless the tax statute is based on reasonable and essential distinctions. Geller testified that discrimination against federal undertakings is so critically examined by the courts as to virtually assure that a discriminatory tax would be viewed as not intended to raise revenues for provincial purposes. In fact, courts would not need to find a gross amount of discrimination before rejecting the legislation. In looking to the substance of the statute, courts will consider extrinsic evidence, including previous legislative enactments of the province, the effect of the statute, and general public knowledge. Second, the province could attempt to levy discriminatory taxes among various inter-provincial pipelines, including the pipeline certificated in the instant case. Such tax is prohibited under the same rationale that invalidates taxes discriminating against inter-provincial lines, supra. In addition, this practice would be prohibited by the ad referendum treaty, Article III(1), if the treaty is implemented by a statute, and it is determined that Parliament can restrict provincial powers by passing a statute implementing a treaty. See sub-section 4, infra.

1/ Under the Canadian constitutional doctrine of "disallowance," the federal government retains the power to annul provincial actions within one year after their passage. This power is presently regarded as reserved for extraordinary situations and was last used in 1943.

(c) "Burdensome" Provincial Taxation

In addition to the limitations specified supra, all parties agree that if the magnitude of a provincial tax is such that it would have the effect of preventing the pipeline from carrying on its business, or is in a practical sense prohibitive, the tax would be held ultra vires as inter-provincial regulation.

El Paso suggests, on brief, that provincial taxes might be heavy. Of course, the provinces could lawfully impose heavy taxes on the pipeline, as long as these taxes are not discriminatory or prohibitive. It is beyond the competence or inclination of this forum to attempt to estimate the magnitude of prospective provincial taxes. Suffice it to note that the Canadian customers of the certificated pipeline would have to share equitably in the costs, and El Paso and Alcan, to a larger extent than Arctic Gas, would be subject to similar tax pressures in Alaska. 1/

4. Ad Referendum Treaty

The U. S.-Canada Transit Pipeline Treaty was initialed by representatives of the United States and Canada on January 28, 1976. (Reproduced as Part III hereto.) The United States government has not yet requested Senate ratification (Arctic Gas Brief, 20). The draft treaty was tabled in the Canadian House of Commons on May 11, 1976 (Alcan Brief, 16). The discussion here relates primarily to the issue of the treaty's effect upon the provincial taxing powers.

It is unclear whether the Canadian Parliament will pass a statute implementing the treaty. In Canadian law, a treaty is binding on Canada in international law when signed by the government. In general, however, a treaty has no domestic force until it is enacted in a statute of Parliament, in which case it is the statute that is controlling. However, an implementing statute is not always necessary. As Mr. Binavince explains in the Alcan Brief, (p. 19):

> Agreements that do not affect private rights, do not involve any modification of the common law or statute law, and do not impose any additional financial obligations, do not require an implementing legislation.

1/ It is recognized that discriminatory rebates would also have to be precluded.

Mr. Binavince submits that, in his opinion, the treaty does not need statutory implementation, since it does not affect private rights and consists of a series of undertakings not to do certain acts. However, it appears to this forum that the treaty would need statutory implementation if it is intended to supersede the Energy Supplies Emergency Act /supra, subsection 1/ or to effectively restrict provincial powers under the doctrine of Railquip, infra.

It has been noted earlier that the treaty has significant provisions regarding federal taxation and regulation of the pipeline. To summarize, federal taxation must be nondiscriminatory and may not burden the hydrocarbons in transit (Article III); federal regulations must be nondiscriminatory and reasonable (Article IV); and interference with the transmission of hydrocarbons is proscribed (Article II).

The effect of the treaty on provincial powers was the subject of heated debate on this record. Articles II, III, and IV of the treaty can all be read as applying to provincial governments as well as the federal government and presumably would have this effect if an implementing statute is passed. However, it is important to reiterate that provincial taxing and regulatory controls over an inter-provincial pipeline are already severely restricted by Canadian constitutional law. The treaty would only have the effect of confirming, not establishing, existing restraints.

It is generally agreed by the expert witnesses that Parliament cannot enact a law under its specified §91 powers that would restrict the authority of the provinces. Thus, for example, Parliament could not, under §91(3), pass legislation impeding the provinces from levying property taxes. There is dispute, however, as to whether Parliament, by enacting a statute implementing an international treaty, can gain authority to restrict provincial powers which Parliament would not otherwise have under the BNA Act. That is, Parliament would have the power to deny a province its rights under §92 of the BNA Act if the courts determined that a separate legislative power to implement treaties exists.

There was considerable disagreement on the record as to whether the recent Supreme Court case of Railquip Enterprise, Ltd. v. Vapor Canada Ltd. (AA-84) should be interpreted to imply that the Court is ready to hold that Parliament does have authority, by implementing a treaty, to restrict provincial powers. The history of the

problem is as follows: in two early Privy Council cases [Aeronautics (1932) A.C. 54 and Radio (1932) A.C. 304] it was held that there was a separate legislative power to implement treaties, and thus to restrict provincial authority. A subsequent decision of the Privy Council, the Labor Conventions case [Attorney-General for Canada v. Attorney-General for Ontario, (1937) A.C. 326, EP-33] purported to explain away the earlier decisions. This case held that the Minimum Wage Act was ultra vires the Parliament because it trespassed on a subject reserved for the provinces. The Privy Council had reversed the Supreme Court, which had held that Parliament had the legislative power to implement the Versailles Treaty and thereby found national authority for the statutes in question. The Privy Council ruled that neither the Aeronautics nor Radio cases warranted a holding that legislation implementing a Canadian treaty is exclusively within the federal power. Geller testified that many lawyers in Canada had felt that Labor Conventions had improperly interpreted the earlier precedents. However, the conventional wisdom had been that Labor Conventions decided the treaty-making power issue.

Geller and Robinette testified that the recent Supreme Court decision in Railquip indicates that the Court is now prepared to reassess the holding in Labor Conventions. 1/ Railquip dealt with the validity of a section of the Federal Trade-Marks Act. One of the arguments in support of the Act was that it was enacted in implementation of a convention obligation of Canada. The Court held that this was not, in fact, the case. However, in both judgments of the Court (accepted by all nine Justices), considerable time was spent discussing the Labor Convention precedent. Although this was dictum, Geller emphasized that it is unusual for the Supreme Court to make "gratuitous" statements of this sort unless the court is seriously considering the matter.

Chief Judge Laskin referred to several law review articles which questioned the holding in Labor Conventions. He concluded (at 39):

> Although the foregoing references would support a reconsideration of the Labor Conventions case, I find it unnecessary to do that here because, assuming that it was open to Parliament to pass legislation

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1/ The Supreme Court, rather than the Privy Council, is now the court of highest appeal in Canada.

> in implementation of an international obligation by Canada under a treaty or convention (being legislation which it would be otherwise beyond its competence), I am of the opinion that it cannot be said that S.7 was enacted on that basis.

He added later (at 41):

> In my opinion, assuming a treaty or convention in relation to matters covered by the treaty or convention which would otherwise be for provincial legislation alone, the exercise of that power must be manifested in the implementing legislation and not be left to inference.

Mr. Justice de Grandpré, concurring in the holding, appears to have assumed that the treaty-making power existed. He analyzed why the Act was not an implementation of the treaty, but did not even refer to Labor Conventions as a possible impediment. Mr. Justice de Grandpré stated (at 4):

> Respondent's other submission, that S.7(e) is legislation enacted by Parliament under the Treaty making power of Canada, at first attracted me. Upon further examination, it seems however that this argument cannot be accepted for the simple reason that the Treaty to which it refers does not deal with unfair competition in a vacuum but only in a context which is not created by the facts in this case.

Geller concluded that it was significant that the Court spent so much time discussing the validity of the Labor Conventions case and the specific provisions of the treaty in issue, when it could have disposed of the respondent's argument by simply stating that the earlier case was controlling. Geller felt that the justices had given a preview of the future of the treaty implementation power. Of course, El Paso sees no value in predicting future Supreme Court decisions based on past dicta, and argues that Labor Conventions is good law (165/27,073-119).

It is impossible for anyone to state with certainty that the end is near for the Labor Conventions case. However, there are undeniable indications in Railquip that the Supreme Court is ready and willing to reasses the question of Parliament's power to implement treaties.

PART II

B. GENERAL SECONDARY CONSIDERATIONS

El Paso Canadian law expert, Walter B. Williston, Q.C., also outlined numerous potential trouble points and possibilities for delay of final approval of a trans-Canada line by appropriate Canadian authorities. Others were raised on the record or became apparent to the Presiding Judge and the parties. For the most part, these are delays which may be anticipated in the normal workings of the Canadian regulatory process. As discussed below, they should not have a significant bearing on the outcome of the case.

1. NEB Approvals

§44 of the NEB Act of 1959 requires a pipeline company seeking to construct an inter-provincial pipeline to obtain a Certificate of Public Convenience and Necessity from the NEB. The NEB decision is reviewed by the Governor-in-Council (Cabinet), and if approved by it, a Certificate is issued.

Basically, the NEB considers the same factors as the FPC in evaluating pipeline applications. Recent amendments to the rules of the NEB require applicants to provide an assessment of the environmental impact and to detail the methods of financing the pipeline, including a description of the "Canadian content" of the proposed project. 1/

1/ Under the NEB rules, "Canadian Content" means

(i) any materials or supplies,

(ii) any services of a professional or non-professional or other nature, or

(iii) the financial arrangements which are or may be purchased, used, required, created, obtained, manufactured, produced, refined, assembled, loaned, secured, assured or hypothecated, as the case may be, in Canada, by or from

(iv) an individual who is a Canadian citizen or a person ordinarily resident in Canada,

(Continued on next page)

On October 27, 1975, the NEB commenced the competitive hearing on the applications of Canadian Arctic and the Maple Leaf Project. Westcoast Transmission and Alberta Gas Trunk Line have also filed for NEB approval. The Department of State reports that the hearings will be completed during 1976 and a decision should be announced by the early spring of 1977. The Maple Leaf Project proposes to carry Canadian gas from the Mackenzie Delta to serve Canadian needs. Various provinces have filed Notices of Intervention before the NEB. Ontario, Quebec and Manitoba neither oppose nor support either pipeline. Saskatchewan has stated that absent public ownership of either line, Maple Leaf would be preferable. British Columbia seems to oppose all the pipeline proposals. Alberta has not intervened.

A principal concern of Williston seems to be the lengthy and uncertain review process that may follow the decision. As stated earlier, the NEB decision must be approved by the Governor-in-Council. All members of this body are leaders of the majority party in Parliament. Parliament has no direct role in the review process, but political pressure, in Williston's view, might force the Governor-in-Council to have the matter debated in the House of Commons.

Judicial review lies in the Federal Court of Appeal, and then, by leave, to the Supreme Court of Canada. The reviewing court is likely to face issues of first impression, since many of the provisions of the NEB Act have not yet been judicially construed. The scope of review received considerable attention in the hearings. Review of the NEB decision can be taken under §18 of the NEB Act

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1/ (Continued from previous page)

(v) a corporation incorporated in Canada that maintains one or more establishments in Canada to which employees of the corporation employed in connection with the business ordinarily report for work, and

(vi) any number of individuals described in sub-paragraph (iv) or corporations described in sub-paragraph (v) or combination of those individuals or corporations, if any one or more of those comprising that number of combination are either individuals who, either alone or jointly, or in concert with one or more other individuals or corporations, control or are in a position to control the conduct of business.

or §§18 or 28 of the Federal Courts Act of 1970 (FCA). Rights of appeal under §18 of the NEB Act are limited to questions of law or jurisdiction. Thus, parties would normally appeal under the provisions of the FCA. §28 of the FCA provides for review on issues of fact or law. Under this section, an NEB ruling can be set aside if there is an error of law, breach of natural justice, or if the NEB based its decision on an erroneous finding of fact that is made in a perverse or capricious manner or without regard for the material before it. This is a limited factual review, amounting to an "any credible evidence" test.

Arctic Gas counsel suggested that §29 of FCA would limit review of the NEB decision to those limited areas provided for in §18 of the NEB Act. §29 of the FCA provides that, notwithstanding §§18 or 28 of this Act, where provision is made by an Act itself for appeal of an agency decision, that decision is not subject to review except to the extent and in the manner provided in that Act. Thus, it was argued that §29 of the FCA would force the parties to seek review under the limited grounds of §18 of the NEB Act. Williston responded that §29 of the FCA has never been interpreted, and there is no real consensus as to its meaning. He argued that, at most, it would only preclude appeal under §28 of the NEB Act on questions of law, which are covered by §18 of the NEB Act (55/8,248-8,256).

Clearly, Arctic Gas' position is that review of an NEB decision is really quite limited. However, in making the apparently novel argument that §29 of the FCA can be used to preclude a factual review, Arctic Gas inadvertently disclosed that the undecided state of the law with regard to the NEB Act and FCA might lead to more litigation. However, even if review did lie under §28 of the FCA, it does not appear that this review would be broader than that provided under the Natural Gas Act.

The NEB also issues licenses for gas imported to and exported from Canada. These licenses would be required for Alaskan gas flowing through the Canadian Arctic pipeline and also the Alcan project. Again, licenses must be approved by the Governor-in-Council, and every license is by statute made subject to any future amendments to the NEB Act or regulations which may be enacted. Besides licensing, the NEB sets the price at which all gas exported from Canada is sold. In his direct testimony, Williston gave examples of the increased self-interest shown by Canada in its export policies. For example, in 1970, the Governor-in Council amended the Regulations of the NEB to provide that any export license be sub-

ject to the additional requirement that the price to be charged may be increased if it is determined that a new and higher price should be established because of higher prices of other gas supplies or alternate energy sources. The NEB has exercised this power by requiring "commodity value" pricing (cost to Americans of alternate fuels) as a condition to export licenses. Moreover, a July 1974 Policy Statement of the Minister of Energy, Mines and Resources recommended further increases in exported gas prices. Finally, Williston cited a 1974 NEB Report, which stated that all export licenses will be for short periods and will be conditioned to assure that Canadian requirements for gas will be met before any gas is exported.

While the discussion concerning Canada's recent changes in export policy is enlightening in regard to Canada's energy policy, it really has little import for this case. Williston admitted that there would be little difficulty in obtaining import and export licenses for the "transit" gas. More importantly, Williston considered it "obvious" that the new price increases for gas exports would not apply to transit gas except in extraordinary circumstances. This is for the simple reason that this gas is not Canadian source gas and is not included in Canada's surplus supply of gas. In fact, it seems probable that when Williston testified concerning export price policy, he was assuming Arctic gas planned to import Canadian source gas (55/8,212-8,215).

2. Berger Hearings and Native Claims

The Mackenzie Valley Pipeline Inquiry (Berger Hearings) was established on March 21, 1974, to inquire into the impacts of granting a right-of-way to a trans-Canada pipeline. Pursuant to §9(f) of the Territorial Lands Act, Canadian Arctic is seeking authorization from the Governor-in-Council to acquire the right-of-way. Mr. Justice Berger's task is to report to the Minister of Indian Affairs and Northern Development regarding the social, economic and environmental impacts of the proposed right-of-way and project and to recommend the terms and conditions that should be imposed. The hearings started in March 1975. The State Department reported that the Berger Hearings will be completed during 1976 and the Governor-in-Council will receive the report by February 1977.

Mr. Justice Berger has established four phases in his inquiry: (1) engineering and construction of proposed pipeline; (2) impact of pipeline and Mackenzie corridor development on the physical environment; (3) impact on the living environment; (4) impact on the human environment.

Mr. Justice Berger has stated that the scope of his study will be large. There was some dispute on the record concerning the extent to which the Inquiry would investigate the native claims problem. It now seems clear that the report, while not deciding the validity of native claims, will make recommendations concerning the granting of the right-of-way so as to ensure that native claims will not be prejudiced by the building of the pipeline. Williston predicted that the report would recommend that the pipeline should proceed in the absence of native claims settlements, provided a forum for settlement is provided. Williston retracted any inference in his direct testimony to the effect that the Berger Hearings would be delayed or stalled pending resolution of the native claims.

Moreover, it is clear that the Berger Hearings and the NEB hearings are completely independent inquiries. Both decisions must be submitted to the Governor-in-Council, which has the final decisionmaking authority.

Native groups claim an interest in lands through which either Mackenzie Delta pipeline would pass. Claims also extend into the producing area of the delta. There are Indian, Metisse and Eskimo claims. Williston testified that the validity of the claims is very certain. The extent of the claims, however, is controversial (56/8,466). Williston testified that there were 11 Indian treaties. In these treaties, natives gave up land claims in exchange for reservations. However, there is considerable doubt that the lands in the Northwest Territories and the Yukon are not covered by treaties, and, therefore, are subject to native claims. Williston testified that the natives have been "militant" in demanding settlement of their claims. Some natives testified before the Berger hearing that "There will be no pipeline until the land claims issue is settled to our satisfaction." Assuming Mr. Justice Berger recommends that native claims be protected in the granting of the right-of-way, the Governor-in-Council is expected to follow the procedures earlier established and negotiate with the natives to gain acceptance of Berger's recommended terms and conditions. Again assuming that all previously described procedures remain in place, pipeline construction would proceed while the Canadian Government negotiates a final settlement.

Williston also stated that any debt financing secured by real estate would be difficult to obtain as long as native claims clouding titles remained outstanding. This seems to be an overstatement. Canadian Arctic would probably obtain the right-of-way with certain terms and conditions pertaining to native claims. Included therein might be conditions requiring future compensation from the pipeline. If this is the case, lenders might well be satisfied if they are assured that these added costs will be covered, e.g. by consumers.

3. Foreign Investment Review Act

The Foreign Investment Review Act of 1973 established the Foreign Investment Review Agency. The function of the Agency is to screen all proposed investment in Canada by "non-eligible persons " and rule in such cases whether a proposal is in the best interests of Canada. The Agency makes recommendations to the Governor-in-Council, which must act favorably or the investment is prohibited. As of October 15, 1975, the Act became effective with respect to new business. With respect to corporations, a "non-eligible person" is a corporation incorporated in Canada or elsewhere that is controlled by persons who are not Canadian citizens, whether the control they exercise is through ownership of shares in another corporation or otherwise. The Act provides that unless the contrary is proven, it is presumed that a corporation is "non-eligible" if 5 percent of its shares are owned by an individual who is not a Canadian citizen. The Act is not triggered by debt financing, but once the Act is triggered, debt financing is examined. The purpose of the Act is to ensure that insofar as businesses in Canada may be controlled by non-Canadians, the activity should be permitted only if it is likely to be of significant benefit to Canada.

Although this Act will affect the Canadian equity financing of Canadian Arctic, it is not likely to affect the ultimate feasibility of the project. First, Maple Leaf will have similar problems in its capitalization plans, although its capital costs will be less. Second, benefit to Canada is a consideration in the analysis of the foreign investment. One of the factors to be considered is: "the compatibility of the acquisition or establishment with national industrial and economic policies..." (§2e). Thus, if the NEB certificates one of the pipelines as serving the public convenience and necessity, this should influence the Foreign Investment Review Agency's determination. It is yet uncertain as to the kinds of conditions that may be applied to companies subject to the Act.

PART III

AD REFERENDUM TEXT OF AN AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF CANADA CONCERNING TRANSIT PIPELINES

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

Believing that pipelines can be an efficient, economical and safe means of transporting hydrocarbons from producing areas to consumers, in both the United States and Canada;

Noting the number of hydrocarbon pipelines which now connect the United States and Canada and the important service which they render in transporting hydrocarbons to consumers in both countries;

Convinced that measures to ensure the uninterrupted transmission by pipeline through the territory of one Party of hydrocarbons not originating in the territory of that Party, for delivery to the territory of the other Party, are the proper subject of an agreement between the two Governments;

Have agreed as follows:

ARTICLE I

For the purpose of this Agreement:

(a) "Transit Pipeline" means a pipeline or any part thereof, including pipe, valves and other appurtenances attached to pipe, compressor or pumping units, metering stations, regulator stations, delivery stations, loading and unloading facilities, storage facilities, tanks, fabricated assemblies, reservoirs, racks, and all real and personal property and works connected therewith, used for the transmission of hydrocarbons in transit. "Transit Pipeline" shall not include any portion of a pipeline system not used for the transmission of hydrocarbons in transit.

(b) Hydrocarbons" means any chemical compounds composed primarily of carbon and hydrogen which are recovered from a natural reservoir in a solid, semi-solid, liquid or gaseous state, including crude oil, natural gas, natural gas liquids and bitumen, and their derivative products resulting from their production, processing or refining. In addition, "hydrocarbons" includes coal and feedstocks derived from crude oil, natural gas, natural gas liquids or coal used for the production of petro-chemicals.

(c) "Hydrocarbons in transit" means hydrocarbons transmitted in a "Transit Pipeline" located within the territory of one Party, which hydrocarbons do not originate in the territory of that Party, for delivery to, or for storage before delivery to, the territory of the other Party.

ARTICLE II

1. No public authority in the territory of either Party shall institute any measures, other than those provided for in Article V, which are intended to, or which would have the effect of, impeding, diverting, redirecting or interfering with in any way the transmission of hydrocarbons in transit.

2. The provisions of paragraph 1 of this Article apply:

(a) In the case of Transit Pipelines carrying exclusively hydrocarbons in transit, to such volumes as may be transmitted to the Party of destination in the Transit Pipeline;

(b) In the case of Transit Pipelines in operation at the time of entry into force of this Agreement not carrying exclusively hydrocarbons in transit, to the average daily volume of hydrocarbons in transit

transmitted to the Party of destination during the 12 month period immediately prior to the imposition of any measures described in paragraph 1;

(c) In the case of Transit Pipelines which come into operation subsequent to the entry into force of this Agreement not carrying exclusively hydrocarbons in transit, to such volumes of hydrocarbons in transit as may be authorized by the appropriate regulatory bodies; or

(d) To such other volumes of hydrocarbons in transit as may be agreed upon subsequently by the Parties.

3. Each Party undertakes to facilitate the expeditious issuance of such permits, licenses, or other authorizations as may be required from time to time for the import into, or export from, its territory through a Transit Pipeline of hydrocarbons in transit.

ARTICLE III

1. No public authority in the territory of either Party shall impose any fee, duty, tax or other monetary charge, either directly or indirectly, on or for the use of any Transit Pipeline unless such fee, duty, tax or other monetary charge would also be applicable to or for the use of similar pipelines located within the

jurisdiction of that public authority, other than intra-provincial or intra-state pipelines.

2. No public authority in the territory of either Party shall impose upon hydrocarbons in transit any import, export or transit fee, duty, tax or other monetary charge. This paragraph shall not preclude the inclusion of hydrocarbon throughput as a factor in the calculation of taxes referred to in paragraph 1.

ARTICLE IV

1. Notwithstanding the provisions of Article II and paragraph 2 of Article III, a Transit Pipeline and the transmission of hydrocarbons through a Transit Pipeline shall be subject to regulations by the appropriate governmental authorities having jurisdiction over such Transit Pipeline in the same manner as for any other pipelines or the transmission of hydrocarbons by pipeline subject to the authority of such governmental authorities with respect to such matters as the following:

a. Pipeline safety and technical pipeline construction and operation standards;

b. environmental protection;

c. rates, tolls, tariffs and financial regulations relating to pipelines;

d. reporting requirements, statistical and financial information concerning pipeline operations and information concerning valuation of pipeline properties.

2. All regulations, requirements, terms and conditions imposed under paragraph 1 shall be just and reasonable, and shall always, under substantially similar circumstances with respect to all hydrocarbons transmitted in similar pipelines, other than intra-provincial and intra-state pipelines, be applied equally to all persons and in the same manner.

ARTICLE V

1. In the event of an actual or threatened natural disaster, an operating emergency, or other demonstrable need temporarily to reduce or stop for safety or technical reasons the normal operation of a Transit Pipeline, the flow of hydrocarbons through such Transit Pipeline may be temporarily reduced or stopped in the interest of sound pipeline management and operational efficiency by or with the approval of the appropriate regulatory authorities of the Party in whose territory such disaster, emergency or other demonstrable need occurs.

2. Whenever a temporary reduction of the flow of hydrocarbons through a Transit Pipeline occurs as provided in paragraph 1:

(a) In the case of a Transit Pipeline carrying exclusively hydrocarbons in transit, the Party for whose territory such hydrocarbons are intended shall be entitled to receive the total amount of the reduced flow of hydrocarbons,

(b) In the case of a Transit Pipeline not carrying exclusively hydrocarbons in transit, each Party shall be entitled to receive downstream of the point of interruption a proportion of the reduced flow of hydrocarbons equal to the proportion of its net inputs to the total inputs to the Transit Pipeline made upstream of the point of interruption. If the two Parties are able collectively to make inputs to the Transit Pipeline upstream of the point of interruption, for delivery downstream of the point of interruption, of a volume of hydrocarbons which exceeds

the temporarily reduced capacity of such Transit Pipeline, each Party shall be entitled to transmit through such Transit Pipeline a proportion of the total reduced capacity equal to its authorized share of the flow of hydrocarbons through such Transit Pipeline prior to the reduction. If no share has been authorized, specified or agreed upon pursuant to Article II, paragraph 2, the share of the Parties in the reduced flow of hydrocarbons shall be in proportion to the share of each Party's net inputs to the total flow of hydrocarbons through such Transit Pipeline during the 30 day period immediately preceding the reduction.

3. The Party in whose territory the disaster, emergency or other demonstrable need occurs resulting in a temporary reduction or stoppage of the flow of hydrocarbons shall not unnecessarily delay or cause delay in the expeditious restoration of normal pipeline operations.

ARTICLE VI

Nothing in this Agreement shall be considered as waiving the right of either Party to withhold consent, or to grant consent subject to such terms and conditions as it may establish consistent with the principles of uninterrupted transmission and of non-discrimination reflected in this Agreement, for the construction and operation on its territory of any Transit Pipeline construction of which commences subsequent to the entry into force of this Agreement, or to determine the route within its territory of such a Transit Pipeline.

ARTICLE VII

The Parties may, by mutual agreement, conclude a protocol or protocols to this Agreement concerning the application of this Agreement to a specific pipeline or pipelines.

ARTICLE VIII

The Parties may, by mutual agreement, amend this Agreement at any time.

ARTICLE IX

1. Any dispute between the Parties regarding the interpretation, application or operation of this Agreement shall, so far as possible, be settled by negotiation between them.

2. Any such dispute which is not settled by negotiation shall be submitted to arbitration at the request of either Party. Unless the Parties agree on a different procedure within a period of sixty days from the date of receipt by either Party from the other of a notice through diplomatic channels requesting arbitration of the dispute, the arbitration shall take place in accordance with the following provisions. Each Party shall nominate an arbitrator within a further period of sixty days. The two arbitrators nominated by the Parties shall within a further period of sixty days appoint a third arbitrator. If either Party fails to nominate an arbitrator within the period specified, or if the third arbitrator is not appointed within the period specified, either Party may request the President of the International Court of Justice (or, if the President is a national of either Party, the member of the Court ranking next in order of

precedence who is not a national of either Party) to appoint such arbitrator. The third arbitrator shall not be a national of either Party, shall act as Chairman and shall determine where the arbitration shall be held.

3. The arbitrators appointed under the preceding paragraph shall decide any dispute, including appropriate remedies, by majority. Their decision shall be binding on the Parties.

4. The costs of any arbitration shall be shared equally between the Parties.

ARTICLE X

1. This Agreement is subject to ratification. Instruments of Ratification shall be exchanged at _____.

2. This Agreement shall enter into force on the first day of the month following the month in which Instruments of Ratification are exchanged.

3. This Agreement shall remain in force for an initial period of thirty-five years. It may be terminated at the end of the initial thirty-five year period by either Party giving written notice

to the other Party, not less than ten years prior to the end of such initial period, of its intention to terminate this Agreement. If neither Party has given such notice of termination, this Agreement will thereafter continue in force automatically until ten years after either Party has given written notice to the other Party of its intention to terminate the Agreement.

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

DONE in duplicate at _____ in the English and French languages, both versions being equally authentic, this _____ day of _____ 1976.

For the Government of the
United States of America

For the Government of Canada

APPENDIX I

FINANCIAL ANALYSIS

The financial opinions and arguments of over 50 financial and policy witnesses were reduced during the hearing to key exhibits filed by the protogonists. Those exhibits were joint efforts between the financial experts and the lawyers, and, for all intents and purposes, were argumentive briefs as well as expert opinions. Final briefing, therefore, was facilitated, and most parties filed financial briefs limited to the substance of their positions. As will be seen below, most of the dispute centers on El Paso's attack on the Arctic Gas plan and Arctic Gas' and El Paso's several attacks on Alcan's plan.

A. Arctic Gas Financing

Of the $7,270-million basic financing required by completion of its construction, Arctic Gas expects to raise $2,768 million from the U.S. long-term debt market (life insurance companies), $850 million from the Canadian long-term debt market ($350 million from life insurance companies and $500 million publicly offered), $635 million from U.S. banks, $500 million from Canadian banks, $1,116 million in equity from U.S. sponsors, $701 million in equity from Canadian investors and sponsors, $500 million in export credits, and $200 million from the Eurocredit bond market. Of course, PGT and PG&E, comprising the sponsorship of the western leg, would need to raise some $508 million in addition, with Trans-Canada raising $743 million, primarily from the Canadian long-term debt market. Altogether then, Arctic Gas and necessarily related entities would have raised $8,521 million by the completion of construction. This includes neither contingency financing nor interim financing.

El Paso on brief and through its exhibit EP-254 makes numerous attacks upon the feasibility of the proposed Arctic Gas financing plan. To rebut these attacks, Arctic Gas introduced its exhibit AA-135. The questions raised by this evidentiary exchange and presently at issue are generally in two categories--market capacity and capital cost. As an overall matter, moreover, El Paso attacks the Arctic Gas plan as overly complex because it would tap numerous U.S., Canadian, and overseas capital markets. While some of the capital costs will most likely be higher than those for an equivalent American borrower using exclusively U.S. capital markets, in part because of the limited capacity of some of these other capital markets, it is found that the financial plan does not outstrip the capacity of any of these markets and that the general plan is feasible.

1. U.S. Long-Term Debt Market

El Paso first raises the specter of the "Canadian basket." On the basis that 74% of the $1,850 million to be raised by Canadian Arctic in the U.S. long-term debt market is contemplated to come from life insurance companies,[1] El Paso contends that Canadian Arctic would outstrip this Canadian basket, especially because the insurance companies had already used 50% of this capacity by the end of 1974, and only 50% of the unused portion is likely to be committed to corporate bonds.[2] El Paso, moreover, is critical of Arctic Gas' assumption (AA-11, p.19) that 50% of the Canadian Arctic bonds to be marketed to U.S. insurance companies would avoid the Canadian basket limits because 50% of the bonds' credit support is expected to come from creditworthy U.S. parties in the form of shipper contracts.[3]

El Paso then assails, seriatim, Arctic Gas' arguments made in AA-135 against EP-254. It first argues that it is unlikely, given the strong financing competition from other Canadian borrowers,[4] that U.S. insurance companies would allocate a greater share of the unused basket to Canadian Arctic than it would otherwise receive from the current pattern (44% investment in corporate bonds in 1975).

1/ Under New York State law, N.Y. Insurance Law § 81 (McKinney, 1966) as amended (Supp. 1975), insurance companies' Canadian investments are limited to 10% of their admitted assets. Since this law applies to all insurance companies doing business in New York, it no doubt applies to most, if not all, of the major U.S. companies.

2/ Of the $7.9 billion of Canadian basket investments actually made by the end of 1974, only $3.9 billion represents corporate bonds. El Paso views the maximum unused basket left for Canadian Arctic to be $3.9 billion. Therefore, Canadian Arctic would have to use at least one-third of that capacity, which El Paso asserts is an unreasonable financial assumption.

3/ El Paso first deprecates the previous applications of this vehicle because official New York State approval was neither requested nor given. Second, El Paso views the shipper contracts with Canadian Arctic as not having a U.S. locus (the contracts designate Ontario law to govern).

4/ These include both Canadian electric utilities, which as a group are expected to increase financing demands by 156% in 5 years and are highly rated because provincial governments guarantee their bonds, and (2) the provincial governments. Toward the end of the hearings, it became apparent that a retrenching of provincial needs might be taking place which would reduce these percentages.

Second, it argues that its 50% figure representing the unfilled portion of the Canadian basket remains valid, for, while that figure applies only to the 15 largest U.S. insurance companies, the remainder of the industry, which absorbs an average of 75% of the unused portion, is comprised of small companies lacking the staff to analyze Canadian bonds and would therefore not invest heavily in Canadian bonds.

El Paso adds a 15% Canadian withholding tax and claims this will be a further impediment to selling bonds. While El Paso recognizes that foreign lenders are currently exempt from the 15% withholding tax on Canadian borrowing, it points out that the exemption expires by its own terms at the end of 1978. El Paso then theorizes that the Canadian government will not renew this exemption because of inflation and balance of payments problems. It concludes therefrom, not surprisingly, that imposition of the 15% tax will occur and that this will be a significant barrier to Canadian Arctic selling bonds in the U.S. long-term debt market.

Finally, El Paso contests Arctic Gas' 0.375% figure for the interest rate premium to be paid by the Canadian borrower in the U.S. market. It asserts that the premium would range between 0.75% and 1.10%. El Paso concludes that, if it had to pay 10% interest on long-term bonds, Canadian Arctic would have to pay between 12.65% and 13.06%, the differential resulting from both the premium and the 15% withholding tax.

Arctic Gas in AA-135, appendix A, responded to El Paso's attack on Canadian Arctic's bond placement in the U.S. market. As a preliminary positive proposition, Arctic Gas views its claimed superiority of its project as incentive for U.S. investors to purchase Canadian Arctic bonds. It views the creditworthiness of Arctic Gas as a whole and the high bond yield to be offered as sufficient inducement for U.S. long-term lenders to fully meet Canadian Arctic's $1,850-million financing needs in that capital market.

Addressing the Canadian basket limitation on U.S. insurance companies, Arctic Gas contends that the portion still available to Canadian Arctic is more than sufficient.[1/] It also eschews El Paso's reliance upon historic patterns of Canadian investments by life insurance companies, pointing out that their allocation of funds among long-term corporate, governmental and mortgage investments fluctuates substantially. Arctic Gas,

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1/ By the end of 1975, 10% of the admitted assets of all U.S. life insurance companies was $27,633,000,000 -- $17,014,000,000 for the 15 largest companies. The unused portion of the entire basket was $16,391,000,000 -- $8,449,000,000 for the 15 largest companies.

moreover, suggests that Canadian Arctic's contracts with U.S. shippers, from which more than 50% of its revenues would be derived, could remove Canadian Arctic bonds from the basket in proportion to these U.S. shippers' contracts under a recently devised U.S. trustee arrangement.1/ In addition, Arctic Gas seeks to minimize the competition for U.S. long-term debt financing which Canadian Arctic will face from provincial governments and Canadian electric utilities by asserting that such competitors will reduce borrowings in the future and that, because of their superior ratings, they generally use public, not private, offerings. It avers, therefore, that there is less direct competition than El Paso asserts, since life insurance companies frequently make private offerings.2/

In addressing El Paso's position that Canadian Arctic would have to pay 0.75% to 1.10% interest premium in the U.S. long-term debt market above that paid by an equivalent U.S. borrower, Arctic Gas cites several examples of private placement of Canadian bonds in which the premium was, at most, 0.375%.

Based upon the record -- in particular exhibits EP-254 and AA-135 -- it is concluded that Canadian Arctic will have more difficulty raising its proposed $1,850 million in the U.S. long-term debt market than would an equally situated U.S. company. Nevertheless, it is also concluded that the capacity of this market appears sufficient to fund this portion of Canadian Arctic's capitalization.

The Canadian basket is a real constraint upon the capacity of the U.S. long-term debt market as it relates to the life insurance industry, and while Arctic Gas minimized it, a fair reading of its position reveals that it is aware of the limitation.

1/ Arctic Gas founds this conclusion upon the following: In several prior cases, U.S. insurance companies avoided the Canadian basket limitation in the same manner; the shipper contracts will be assigned to a U.S. bank as trustee for the U.S. bond-holders, this trustee probably being able to demand direct payment from the shippers to cover principal and interest; the bondholders will have rights against the trustee in U.S. courts.

2/ While Arctic Gas conceded that for the first half of 1976, life insurance companies accounted for two-thirds of the $2.2 billion privately placed in the U.S. by provincial governments, it views this as the exception to the rule, since so long as the provincial borrowers retain their usual high ratings, the life insurance companies will have minor participation. Insurance companies traditionally seek lower ratings to enhance return.

The actual size of the basket is effectively determined by the 15 largest companies, for the remaining companies are too small to seriously assess such a complex international project. This is reflected in their traditionally minor utilization of the basket. Accordingly, a $17-billion basket seems reasonable, with an unused portion of $8.5 billion. Of this latter figure, past investment pattern, while not totally reliable for predictions, indicates that corporate bonds, such as those of Canadian Arctic, will compete for no more than 50%, which means that Canadian Arctic will have access to around $4.25 billion.[1] Canadian Arctic would seek around $1.4 billion from this remaining basket of $4.25 billion. It is apparent on its face that Canadian Arctic can fund this segment of its financial requirements, but given the Canadian basket restriction, the limited basket capacity could well increase the interest rate above that otherwise required. There is more borrowing demand for less long-term debt supply. Quantification of this increased interest rate, if it should occur, is obviously impossible upon this record.

The record also establishes that, in all likelihood, Canadian Arctic will have to pay an interest premium on its bonds sold in the U.S. However, neither El Paso nor Arctic Gas has presented sufficient documentation of their conflicting premium estimates, which range from 1.10% for El Paso down to 0.375% for Arctic Gas, to warrant a definitive finding of the likely interest-rate premium. The impact of the 15% withholding tax upon the interest to be paid by Canadian Arctic to U.S. bondholders is even less concrete. While the potential of this tax cannot be ignored, it cannot be assured that the Canadian government will extend the present exemption beyond 1978. The cost is also not assessable, although the negative aspects to U.S. lenders will apparently be present.[2]

1/ It is neither the time nor the place to second guess whether the New York State Insurance Commission might accept Arctic Gas' legal theory for removing around 50% of the Canadian Arctic bonds to be placed with U.S. life insurance companies from the basket limitation. The pertinent state statute clearly applies to Canadian Arctic bonds, and it would be purely speculative to presume any waiver thereof on the scant evidence in this record of recent devices used to avoid its full impact.

2/ The parties make no mention of any U.S. tax deductions or credit for taxes withheld by a foreign government from interest or dividends.

2. Canadian Long-Term Debt Market

El Paso then turns to the Arctic Gas proposal to raise $850 million for Canadian Arctic in the Canadian long-term debt market. It challenges the private placement of $350 million of Canadian Arctic bonds with Canadian life insurance companies on several grounds: the planned 4-year forward commitment term in these bonds is uncommon in the Canadian market, which assertedly only negotiates commitments from 3 to 12 months prior to take-down;1/ the private placement of $350 million in bonds is unprecedented in this market, the largest previous placement being $70 million of bonds guaranteed by the government; the Canadian life insurance industry will not experience the real future growth rate that Arctic Gas assumed necessary to provide adequate lending capacity;2/ Canadian Arctic would be faced with tremendous borrowing competition in the same capital market from the hydro-electric authorities, which have provincial government guarantees, are highly rated, and plan a 300% increase in borrowings by 1980.

El Paso also attacks the feasibility of Canadian Arctic marketing $500 million of bonds in the public Canadian market. Specifically, it would distinguish the recent examples used by Arctic Gas to demonstrate the capacity of the Canadian public placement market. El Paso concludes by asserting that the cost of borrowing in the Canadian capital market has been and will continue to be higher than in the U.S. capital market.3/

1/ El Paso's arguments here are basically an attempt to distinguish the four examples of such forward commitments by Canadian life insurance companies which were cited by Arctic Gas.

2/ Not only did El Paso question the credibility of Arctic Gas' econometric model used to determine this assumed growth rate, but it also presented evidence to show that, because of inflation, there would be no real growth rate. It concluded therefrom that Arctic Gas' $1,050-million figure for Canadian life insurance industry corporate bond purchases in 1980 is excessive, the more realistic figure being between $553 million and $663 million. Canadian Arctic's $350 million to be drawn down over 4 years is seen by El Paso to constitute an unrealistically large portion of the total market capacity.

3/ El Paso compared U.S. and Canadian government bonds and prime rate, as well as Ontario and Quebec long term bonds selling in the U.S. and Canada, for the period of 1974 through 1976, all of which consistently showed a premium being paid in that Canadian market up to 3%.

Accordingly, El Paso would assign Canadian Arctic greater interest expenses than El Paso asserts it would experience using the U.S. market exclusively.

Arctic Gas, on the other hand, asserts that the Canadian long-term debt market has adequate capacity for the successful funding of Canadian Arctic's $850 million of bonds. It proceeds to defend the 4-year forward commitment (drawdown) provision of the proposed bonds by citing several existing examples of similar forward commitments, although it does concede the need for an annual commitment fee (in one case 0.5%) on the undrawn portion of the commitment. It relies on its study showing that assets for the Canadian life insurance industry will continue to grow at a substantial rate, thereby assuring adequate market capacity for financing the $350 million sought by Canadian Arctic.1/ In addition, Arctic Gas, while recognizing that the provincial hydroelectric authorities' capital requirements for the second half of this decade will exceed those of the first half by 150% to 200%, does not anticipate that the resulting competition for long-term debt will be overwhelming, since other provincial capital requirements will be declining over this same period to offset the hydroelectric authorities' increased sale of bonds.2/

Finally, Arctic Gas agrees with El Paso that long-term debt costs more in the Canadian than in the U.S. market, but it submits that the added cost to Canadian Arctic will be far less than alleged by El Paso. It also states that this increment was considered in the financial plan.3/

While the Canadian long-term debt market is admittedly smaller and more costly than its U.S. counterpart, there has been no showing of inadequate capacity to fund the $850 million to be privately and publicly placed therein by Canadian Arctic. Competition for long-term debt from the rapidly expanding provincial hydroelectric authorities must be recognized, but the market appears large enough. This is especially true in

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1/ Arctic Gas asserts that the Canadian Arctic long-term debt requirement of $350 million to be drawn down over 3 or 4 years accounts for only 8% to 12% of the total Canadian life insurance industry bond purchases. This contrasts with El Paso's 18% to 26% figure.

2/ Arctic Gas notes also that there would not be much direct competition anyway, since corporate borrowers go to life insurance companies and private-sector pension funds, while provincial borrowers alone have access to and primarily rely upon social security funds, public-sector pension funds and other government lenders.

3/ While the cost of Canadian Arctic's long-term debt from Canada and the U.S. was the same in its financial plan, that plan assumed application of the withholding tax on U.S. bond interest.

light of the apparent reductions in provincial government long-term borrowings and the fact that Canadian Arctic would not be competing in the same Canadian capital markets where the hydroelectric authorities raise most of their capital. Nor does it appear that the 3 to 4-year forward commitment of funds contemplated by Canadian Arctic will pose a serious barrier to successful issuance of the bonds. In this regard, such forward commitments, although not the rule when placing bonds with Canadian life insurance companies, have previously been realized by Canadian borrowers. Of course, an added cost for such a commitment will have to be included in Canadian Arctic's cost of long-term capital. Moreover, the real assets of the Canadian life insurance industry should grow during the period in which the Alaskan gas transportation project is being financed, notwithstanding continuation of the current rate of Canadian inflation. It is neither possible nor necessary to ascertain a precise growth rate, because Canadian Arctic's $350-million private placement will have to utilize, at most, 25% of that market. There is even the possibility that as little as 8% of this capacity would be needed, but this appears overly optimistic.

There is no dispute between El Paso and Arctic Gas on the higher premium attached to interest rates paid to Canadian lenders rather than U.S. lenders. However, the record does not permit any definitive quantification of this premium.

3. U.S. Banking System

El Paso calculates Arctic Gas' loan commitments from U.S. banks at $1,817 million. This is more than the $1,813.5 million which El Paso asserts is available under the aggregate policy limit of the 50 largest U.S. banks. This in turn must be contrasted to El Paso's planned 65% use of this policy limit coming from what El Paso claims is the $1,150 million El Paso plans to use from the loan commitments it deems possible from U.S. banks. In addition to criticizing the capacity of the market, El Paso challenges the acceptability to U.S. banks of Arctic Gas' proposed 10-year maximum-term loan maturity. It argues that a 10-year term is the outer limit accepted by U.S. banks and then only during times of available credit, and that in fact the actual maturity for Canadian Arctic bank loans would be more than 10 years.1/

1/ El Paso first increases Arctic Gas' term-loan maturity to 12 years, to account for an Arctic Gas statement before the NEB that such U.S. loans would not be amortized until 7 years after project completion, and then to 14 years to account for its assertion made throughout the hearing that Arctic Gas construction would take up to another 2 years.

El Paso concludes by increasing the cost of U.S. bank loans to Canadian Arctic at least 15% to account for either the expiration by 1979 of the Canadian withholding tax exemption or a finding in any event that such bank loans do not qualify for the exemption (lender cannot require repayment of more than 25% of principal in first 5 years of loan).

Arctic Gas obviously challenges El Paso's figure for U.S. bank borrowings. Instead of $1,817 million, it asserts $1,592 million. 1/ While Arctic Gas agrees with El Paso that U.S. bank guarantees required by foreign banks giving export credits should be included in calculating loan commitments and that the Japanese Export-Import Bank regularly requires such guarantees, it resists El Paso's assignment of such additional commitments because it plans to import substantial material only from Germany. These German purchases would be financed by a group of German banks which have already agreed not to require such U.S. or Canadian bank guarantees. Arctic Gas then condemns El Paso's paultry $1,150 million U.S. bank commitments, for unlike Canadian Arctic's $400 million standby commitment, Arctic Gas asserts that El Paso has no standby bank commitment for cost overruns.

Arctic Gas foresees the estimated aggregate policy lending limit of the 60 largest U.S. banks increasing to $2.3 billion by the end of 1977, thus providing enough capital capacity. Arctic Gas claims it will have access to these funds because the sponsors of Arctic Gas already deal with more than 70 U.S. banks, including over half of the 60 largest banks.

Arctic Gas concludes by defending its 10-year term-loan maturity proposal. In support, it first cites similar maturities accepted in large U.S. bank loans to Sohio and Columbia to finance North Slope exploration and development. In addition, it contends that, by adjusting drawdowns, usage and repayment to suit the different-sized banks in the syndicate, the 10-year maturity will be accepted. Finally, Arctic Gas allows that there is a projected Canadian Arctic cash flow of $1.7 to $1.8 billion in the sixth through tenth years of the term loans and that such cash flow would be available, if necessary, for shorter bank-loan maturities.

1/

Alaskan Arctic term-loan commitment	$250 million
Canadian Arctic term-loan commitment	$350 million
Northern Border term-loan commitment	$192 million
Canadian Arctic standby commitment	$400 million
U.S. bank participation in Eurocredit	$400 million
	$1,592 million

Analysis of the record reveals that Arctic Gas, by requiring U.S. bank-loan commitments of $1,592 million (this includes $400 million for cost overruns), has not put undue strain upon the capacity of the U.S. banking community. By 1977 the estimated aggregate policy lending limit of the 60 large U.S. banks should be, at a minimum, $2 billion. 1/ In addition, while the exact loan terms will not be known until the financing plan is implemented, the 10-year maturity for such U.S. bank term loans appears reasonable in light of past financing endeavors. Of course, if this source of capital were substantially constricted before Arctic Gas negotiated these loans, a shorter maturity would probably be required.

4. Canadian Banking System

El Paso questions the capacity of the Canadian banks to meet the demands to be imposed upon them by Arctic Gas.As elsewhere, El Paso increases the demand from $1,100-$1,200 million to $1,200-$1,300 million, this updated figure coming from Canadian Arctic's financial presentation before the NEB. 2/ El Paso, unlike Arctic Gas, includes in its figure bridge-loan commitments, notwithstanding the fact that they would be paid off by long-term bond purchase commitments. Noting that Arctic Gas had estimated the maximum capital available to it from Canadian banks at $1,300 million, El Paso concludes that this portion of the financial plan is unreasonable, in that it lacks the flexibility needed for cost overruns.

Although El Paso does not contest Arctic Gas' assertion that the Canadian government (Bank of Canada) can and will phase the timing of major projects to control capital demand and facilitate Arctic Gas financing, it questions whether this additional involvement of another government in the Alaskan gas transportation project is in the U.S. interest. El Paso concludes by raising its prior criticisms that the length of maturity (12 years) is the

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1/ The legal lending limit for U.S. commercial banks is set by the Federal Reserve Board and the Comptroller of the Currency. In essence, they limit what a bank can lend to a single borrower to 10% of its capital stock and 10% of its unimpaired surplus funds. Of course most banks also set house lending limits, which are less.

2/

Term-loan commitments	$600 million
Bridge-loan commitments	$200 million
Participation in Eurocredit commitment	$400-$500 million

outer limit of Canadian bank-loan policy and that the cost of Canadian capital will be higher. 1/

Arctic Gas defends the Canadian banking segment of its financing plan by first updating and increasing the estimated capacity available to Canadian Arctic to $1,300 million, which it finds adequate for its capital needs from Canadian banks. It then asserts that the involvement of the Canadian government, including the Bank of Canada, in the timing of major project financing is a valuable asset to its financial plan. Finally, Arctic Gas bases the 12-year maturity contemplated for its Canadian bank borrowings on prior precedent.

As with other segments of its financial plan, Arctic Gas would impose substantial capital demand upon the more limited Canadian banking system, but no finding is warranted that Arctic Gas would be unable to meet the portion of its capital needs which it seeks from the Canadian banks. In addition, while the proposed 12-year bank-loan maturity is based upon limited prior precedents, it appears feasible. The longer-term maturities sought do not appear so unreasonable that the commercial banks called upon to make such commitments would balk. Finally, Arctic Gas will have to incur higher capital costs for its Canadian bank borrowings than would an equivalent U.S. borrower from U.S. banks.

5. International Banking Market

El Paso "updates" Arctic Gas' $1,750 million of international bank loans to $1,975 million, of which $850 million would be from banks other than U.S. or Canadian banks. 2/ Noting that Arctic Gas believes this international banking market has the capacity to lend it only $850 million, El Paso chides Arctic Gas for the inflexibility of this segment of its financial plan. It also finds no Eurocurrency loan history showing applicable precedent for the Arctic Gas financing, the largest previous loan being $300 million, and it proceeds to degrade reliance upon international

1/ While El Paso does not attempt to quantify this higher cost, it does note that, as of December 1976, the prime rate in Canada was 50% above that in the U.S.

2/ Again using materials filed by Canadian Arctic before the NEB.

banks because of their alleged volatility. 1/ El Paso furthermore reiterates its common complaint against the term-loan maturity proposed, in this case 10 years. While El Paso concedes that 10-year maturities have been negotiated in this capital market, it suggests that current financial conditions are not conducive to such maturities and that construction delays should increase the maturity to 12 years.

Arctic Gas vigorously defends its planned utilization of the Eurocurrency banking market, since it is the second largest capital market and includes in its membership several hundred of the largest banks in the world. It stresses the growing significance of Eurocurrency deposits and notes that 70% of the $380 billion of Eurocurrency deposits are U.S. dollars. Likewise, it challenges El Paso's characterization of the Eurocurrency market as volatile by asserting that the market successfully operates absent external regulations and that its total lending continues to increase, presently being $21.5 billion annually. Arctic Gas moreover contests El Paso's pejorative interpretation of the alternative interest rate clause found in Eurocurrency loan agreements. 2/

On the question of Eurocurrency market lending capacity, Arctic Gas asserts that there is more than enough capacity and what is more, the non-North American banks, having to date limited credit exposure in North America, would find Arctic Gas attractive in order to spread their risks, to take advantage of the political and economic stability therein, and to continue their growing preference for project financing.

1/ By volatility, El Paso means that the non-North American Eurocurrency banks do not have a significant dollar deposit base and therefore must purchase dollars to be loaned to Arctic Gas from other banks. Such transactions, it avers, are subject to fluctuations. It views the clause in most Eurodollar loans protecting the lenders when such currency proves unavailable as proof of such volatility. El Paso also contends that these foreign banks will be reticent to lend money to a North American project.

2/ Arctic Gas points out that this clause merely permits the majority of banks in any Eurocurrency syndicate to renegotiate a lending rate which does not reflect the true cost to those banks and that, to its knowledge, it has never been invoked.

Finally, Arctic Gas defends the 12-year maturity as being well within the past practice of Eurocurrency banks. In addition, it reiterates the points made vis-a-vis long maturities and the U.S. banking system, supra, on flexibility of terms and available cash flow to reduce the maturity, if necessary.

This record shows that non-North American Eurocurrency banks could meet Arctic Gas' proposed $850 million of 12-year loans and that there is nothing in either the recent history of this market growth or performance which indicates it would not. The foreign exchange inherent in such borrowing, of course, adds a degree of uncertainty to the exact interest rate; however, that risk does not appear significant.

6. Export Credits

El Paso next directs its attention to Arctic Gas' planned utilization of $500 million of export credits to finance materials purchased in the foreign country in which the lending bank offering the export credit is situated. 1/ In essence, El Paso finds export credits an illusory source of new credit, in that domestic banks, already commiting substantial capital to Arctic Gas, will also be called upon to guarantee (i.e., by letter of credit) these export credit loans. It notes in particular that this is not the policy requirement of the Japanese Export Import Bank. Foreign exchange risk is another liability El Paso attaches to Arctic Gas' planned use of export credit financing, since the loans from these foreign banks will be in the currency of the exporting country, with the borrower risking foreign exchange fluctuations. It points out in this regard that the Canadian Arctic tariff treats foreign currency losses as part of the cost of service, to be borne by the consumer.

While Arctic Gas agrees with El Paso that U.S. bank guarantees required by foreign banks giving export credits should be included in calculating loan commitments and that the Japanese Export-Import Bank regularly requires such guarantees, it resists as unwarranted El Paso's assignment of such additional commitments because it plans to import substantial material only from Germany. As noted previously, these imports would be financed by a group of German

1/ It notes that Arctic Gas raised this to $900 million in its updated financial plan presented to the NEB.

banks which have already agreed not to require such U.S. or Canadian bank guarantees.

Arctic Gas has acted reasonably by including export credit financing in its financial plan. In light of its evidentiary statements that it will import, in all likelihood, substantial materials only from Germany and that a group of German banks has arranged export credits without the need for other guarantees, the export credits received by Arctic Gas should not increase the loan commitments from North American banks which will already have been approved by Arctic Gas for loan commitments.

7. Long-Term Eurodollar Market

The only comment El Paso makes concerning Arctic Gas' planned $200 million of bonds to be placed in the Eurodollar market is that the size of this long-term debt market is volatile because the market's capacity is dependent not only on the degree of U.S. and Canadian currency vacillations, but also on the acceptability of those currencies to that market. No serious challenge has been made to this segment of the Arctic Gas financial plan. Accordingly, no further comment is necessary.

8. Common Equity

El Paso attacks Canadian Arctic's equity sponsorship in Canada in terms of market capacity. Assuming that the Canadian government would require 51% Canadian equity ownership of Canadian Arctic, El Paso doubts that there is adequate Canadian equity capital--especially, it argues, if the Mackenzie Delta producers are considered to be non-Canadian because of their own non-Canadian majority equity ownership. El Paso also asserts that U.S. equity investment in Canadian Arctic would demand a higher rate of return to compensate for the 15% Canadian withholding tax on dividends. It notes that no exemption has been provided for this tax unlike the tax exemption for bond interest.

Arctic Gas does not comment on this El Paso criticism. The details of equity investment in Canadian Arctic remain tentative at best. While it is very possible that Canadian majority ownership of Canadian Arctic would be required by the Canadian government, this cannot be definitively determined at the present time. Assuming for the sake of this analysis that majority Canadian ownership is required, the $700 million of equity investment to be raised in Canada under the financial plan does not appear to exceed

the market capacity. Governmental policy concerning the equity participation of the Mackenzie Delta producers is too imprecise at this juncture to warrant excluding those producers from a market-capacity analysis (84/12,792).

Although El Paso is correct that U.S. equity holders in Canadian Arctic would be subject to the 15% withholding tax, it exaggerates the impact upon these U.S. investors' rate of return which would result when providing a net return equal to that earned by Canadian equity holders. Specifically, this 15% tax is somewhat offset by the lower Canadian income tax. 1/

1/ The combined U.S. and Alaskan income tax rate of 52.89% requires pretax revenues of $212 to provide $100 in after-tax income. On the other hand, the 47% Canadian income tax rate would require $188 of revenues for the same $100 of income, and the addition of the 15% withholding tax (applied to after-tax income) would require $221 of revenue. (248/43, 411-43,412).

B. El Paso

El Paso would assign total capital costs of $6.0 billion (1975 dollars) to its 2.4-Bcfd-case project. 1/ In the aggregate, El Paso would seek $270 million in U.S. bank term loans, $2,345.8 million in long-term debt from U.S. life insurance companies, $1,449.2 million from pension funds and savings banks, $1,686.4 million in equity capital from the project sponsors, and $250 million publicly placed debentures. Under its financial plan, El Paso would fund the several segments of its project (Alaskan pipeline and LNG facilities, cryogenic tanker fleet, Western LNG regasification and pipeline facilities, and El Paso Natural Gas Company's east-of-California facilities) in the following manner:

1. The trans-Alaska pipeline, liquefaction plant, and marine terminal would require $3,551.4 million in capital. El Paso would enter into a $1-billion revolving credit agreement with a syndicate of U.S. banks for the 3-year construction period. Bank borrowings under this arrangement would fluctuate as long-term debt was periodically issued. At the end of construction, the outstanding revolving credit balance of $270 million would be converted into a 3½-year term loan. The remainder of the credit would constitute bridge financing for cost overruns or cash flow shortfalls. In addition, $2 billion of long-term debt (20-year first-mortgage bonds), precommitted for up to 3 or 4 years, would be raised in the U.S.--$1,600 million from life insurance companies and $400 million from pension funds and savings banks. During the first year of partial operation, El Paso would sell publicly $250 million of debentures. The final element of debt would be $350 million of capital notes purchased by the project sponsors. 2/ Equity capital totalling $1,031.4 million would be raised by cash subscription or common stock by the project sponsors. The equity portion of AFUDC would be funded by an unquantified amount of preferred stock purchased by the sponsors, the dividends for which would be paid in the form of additional preferred shares during construction. The purpose of the preferred stock would be to reduce AFUDC accumu-

1/ $6.5 billion, including AFUDC

2/ These capital notes would be subordinated and repayable only from excess cash flow. El Paso favors such an instrument to avoid common equity build-up and permit flexibility financing cost overruns, since delay of repayment would allow additional senior capital to be raised.

lation by offering a lower rate of return. 1/ The preferred stock would have a sinking fund over the life of the project, and the sponsors could publicly or privately sell their preferred stock once the project commenced operations.

2. The eight-ship cryogenic fleet was assigned capital requirements of $1,476.3 million. Long-term debt of $1,049.2 million would be raised by the sale of bonds primarily to U.S. pension funds and savings banks, a capital market El Paso considers accessible because of the anticipated triple-A rating flowing from utilization of U.S. governmental guarantee under Title XI of the Merchant Marine Act of 1936. 2/ El Paso believes Title XI financing provides several benefits: greater marketability in more capital markets, no need for precommitment of the underlying long-term debt, and lowest possible interest rate. Equity financing of $427.1 million is also planned. El Paso foresees shipbuilders, shipping companies, oil producers and construction material suppliers investing in this equity, in part at least via leveraged lease financing (the ship owners purchase the ships with an equity cash downpayment and the issuance of debt securities).

3. The $683.4-million capital requirements of Western LNG are not considered in detail by El Paso. It assumes that the parents of Western LNG--PG&E and Pacific Lighting--have the financial strength and that the same project 25/75 equity-debt ratio will be maintained.

4. The $290.3-million capital requirements for the east-of-California facilities would not be project-financed. El Paso Natural, either by itself or with the help of shippers to be served by such facilities, would finance this segment of the project.

1/ For illustration, El Paso ascribed a 9½% rate of return for the preferred as compared to 15% for the common stock.

2/ 46 U.S.C. § 1271, et seq.

El Paso asserts that its project is financeable. It starts with the $3.8-billion long-term debt and states that, since it will have access to both life insurance companies and pension funds, this requirement will account for, at most, 6.6% of the capacity of these two sources of capital. 1/

Turning to its utilization of the U.S. banking system, El Paso feels confident that its $1,150-million loan requirements will be met by the U.S. banking system ($1 billion revolving credit for Alaskan facilities and $150 million for Western LNG and El Paso Natural). Specifically, the aggregate legal lending limit of the 50 largest U.S. banks was approximately $2.4 billion at the beginning of 1976, to which El Paso applies a factor of 75% to obtain a realistic policy lending limit of $1.8 Billion, of which it would only utilize 63%. It emphasizes that the loan maturity of its U.S. banking plan is superior to the Arctic Gas plan, since its $1-billion revolving credit/term loan would mature in 7½ years, well within the normal practice of U.S. banks.

No serious challenge has been made to the capacity of the capital markets nominated in El Paso's financial plan to meet its financing requirements. Arctic Gas does, however, attack the feasibility of several components of the plan. Specifically, it regards the use of capital notes and preferred stock, proposed by El Paso to reduce the cost of equity capital, as totally unacceptable to any project sponsor. Moreover, Arctic Gas attacks the lack of firm cost overrun and back-up commitments in the financial plan as precluding lenders' acceptance.

The record demonstrates that, in terms of capital market capacity, the El Paso project can be financed. Not only does El Paso avoid the Canadian basket limitation, but Title XI debt financing of the cryogenic tanker fleet would permit El Paso to raise substantial long-term debt from pension funds and savings banks. Of course, Title XI financing is not self-executing: El Paso must convince the Federal Maritime Administration to seek

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1/ Using Federal Reserve Board projections, El Paso forecasts $58 billion of corporate bond purchases by U.S. life insurance companies and pension funds from 1976 through 1980, so that its estimated $3.8 billion of long-term debt requirements only taps 6.6% of this available capital (EP-100, Katzenbach, pp. 8-9). Using Arctic Gas' projection of $80.5 billion of corporate bond purchases (EP-113B, pp.16-24), El Paso's use thereof would be 4.7%.

Congressional approval of the additional appropriations to support the guarantee of at least $1 billion of long-term debt. This would be expected, however, if El Paso were selected under the terms of the 1976 Alaskan Natural Gas Act. Even if El Paso failed to procure Title XI financing and its $3.8 billion of long-term debt had to be raised solely from U.S. life insurance companies, it most probably would not face an inadequate capital supply, for its long-term debt requirements would only constitute around 16% of the corporate bond purchases by the U.S. life insurance industry in the last half of this decade.

Assuming that all three applicants had equivalent projects in terms of risk and economics, El Paso would have the lowest capital-cost rate. It will be subject to neither the premium paid by Canadian lenders for U.S. debt nor the premium paid to borrow capital in Canada. In addition, its lenders and investors run no liability of being assessed a 15% Canadian withholding tax, and no increased costs resulting from foreign exchange rate fluctuations would occur. Furthermore, since El Paso would be tapping markets with a greater capital supply, the interest rates and rates of return needed to attract capital would most likely be less. Finally, Title XI financing for the tanker fleet should result in highly rated bonds which would necessarily result in a lower interest cost thereon.

Notwithstanding the above, El Paso must revise its financial plan. Its portrayal of a reduced cost of equity capital to gain a comparative advantage is unrealistic. The proposed sale of $350 million of capital notes and an unidentified amount of preferred stock to project sponsors is unlikely to receive favorable investor response (176/29,126). While reduction of costs on capital is laudable, there is no reason to expect that these two financial devices would be accepted by the putative sponsor-investors which would not realize the opportunity cost of their equity investment if they acquiesed. Common stock appears the only reasonable vehicle for obtaining capital from the project sponsors.

In addition, El Paso must precommit funds to cover cost overruns and other contingencies. While its proposed $1-billion revolving credit banking arrangement should provide some flexibility to finance cost overruns, specific bank term loans and/or bonds should be precommitted. It is unlikely that lenders and investors would agree to finance this project without adequate assurance that contingencies would definitely have financing. The capacity of the capital markets from which El Paso must obtain precommitments is more than adequate to meet such contingency financing. For example, application of the 20% contingency factor employed by Alcan would only increase El Paso's percentage of U.S. life insurance and pension fund corporate bond purchases from 6.6% to around 8%, and it would leave El Paso's bank borrowings within the $2-billion aggregate policy lending limit.

C. ALCAN

Alcan synthesized in Exhibit AP-15[1/] an overall financial plan from the independent plans of the various Alcan participants. It concluded that the basic financing requirements of the total Alcan project (Alcan, Foothills, Yukon, AGTL, Westcoast, Northwest, PG&E, PGT, and Northern Border) are $9,056 million, split $6,780 million and $2,276 million respectively between U.S. and Canadian funds. Alcan, moreover, estimated total contingency requirements at $1,837 million. In addition it assumed that Foothills' Maple Leaf project would commence Mackenzie Delta gas deliveries 22 months after Alcan began delivering Prudhoe Bay gas, and it ascribed to Maple Leaf financing requirements of $2,560 million, plus contingency requirements of $820 million. As with Arctic Gas' Mackenzie Delta supply, associated with Maple Leaf would be TransCanada Pipe Line construction requiring an additional $743 million. The total financial requirements for Alcan and Maple Leaf, including contingency financing, was put at $14,576 million.

Of the aforementioned $9,056 million of basic financial requirements for all of its components (Alcan, Foothills (Yukon), AGTL, West Coast, Northwest, PGT, PG&E and Northern Border), Alcan would seek to raise $842 million from U.S. banks, $576 million from Canadian banks, $4,565 million from the U.S. long-term debt market (primarily life insurance companies), $965 million from the Canadian long-term debt market (likewise primarily life insurance companies), $1,373 million in equity from U.S. sponsors, and $735 million in equity from Canadian sponsors and investors. It is not possible from Alcan's financial evidence (AP-15, Schedule B) to detail the sources of its $1,837 million of estimated contingency financial requirements. The $3,303 million of basic financial requirements for Foothills (Maple Leaf) and TransCanada (to move Mackenzie Delta gas to eastern Canada) would be accumulated by raising $230 million from U.S. banks, $420 million from Canadian banks, $545 million from the U.S. long-term debt market, $1,419 million from the Canadian long-term debt market, and $689 million from Canadian equity investors. The $820 million of Maple Leaf contingency financial requirements would be raised from all of these same sources.

Arctic Gas on brief and El Paso both on brief and through Exhibit EP-279 level numerous criticisms at Alcan's financial plan. Each concludes that as presently constituted Alcan could not be financed. Alcan rebutted EP-279 with Exhibit AP-21.

1/ Alcan's basic financial requirements presentation reflects costs escalated through the year of construction.

No detailed analysis of the Alcan financial plan or the attacks thereon by El Paso and Arctic Gas is warranted. The demands Alcan and Maple Leaf would place on the various U.S. and Canadian capital markets are substantial, and questions raised respecting the capacity of those markets, and the costs of acquiring capital therein, to fund a bi-national project have been addressed supra with respect to Arctic Gas.1/ Suffice it to say that the weak links in Alcan's plan raised by the other applicants would vitiate the financeability of Alcan if it must be funded contemperaneously with Maple Leaf.

The entire Alcan proposal for financing is predicated on not overlapping the Maple Leaf proposal of its Canadian sponsors. The record clearly reveals, supra, that Alcan and Maple Leaf cannot be financed simultaneously. Yet Alcan's professed 22 months head-start for the Alcan project, or 13 months accepting its professed irreducible minimum for separation, has previously been shown to be unreliable. The dilemma for Alcan is that if any credence is given to anyone's arguments as to possible delays of Alcan or speedup of Maple Leaf, Alcan has trouble. Its only recourse is reestablishment of a several-years' lag between Alcan and Maple Leaf which, while somewhat ameliorating the financial pressure, would require a deferral of Maple Leaf with ultimate higher costs to Canadians. A substantially longer hiatus appears necessary, therefore, before a finding could be made with confidence that the two projects will not be competing for the same capital.

Alcan's Canadian sponsors support Maple Leaf which they want to use as an all-Canadian instrument to bring Canadian gas to Canadian markets. To consider Alcan without Maple Leaf would be irrational: its presence pervades every aspect of the Alcan project and it is the child of its two Canadian sponsors.2/ Recognition of Maple Leaf's first-born status is set forth for all to see in the agreement among the Alcan sponsors and, even toned down as it was before the record closed, it represents an additional set of risks to the American consumer. The priority

1/ Unlike Arctic Gas, Alcan does not propose to resort to markets other than U.S. and Canadian.

2/ The timing of Maple Leaf's birthday, as viewed by its parents, may be a surprise. In the Canadian and Wrap up Briefs, Alcan states that Arctic Gas will not be able to build in the Mackenzie Valley until 10 or 15 years after settlement of native claims. Throughout, however, it is maintained that Maple Leaf is the only way for Canada to expeditiously bring Canadian gas to market.

given Maple Leaf by Westcoast and AGTL over the Alcan project (214/37,113-37,117) would suggest that two of Alcan's major principals would probably opt for commencing Maple Leaf first. This of course would have a serious impact upon the Alcan project for the additional delay, at least two more years if Alcan's earlier 22-month differential is correct, would mean substantial, inflation-related, increased capital costs which the U.S. gas consumer would have to absorb. If Canada, in fact, insisted on an Alcan -- Maple Leaf configuration, with Maple Leaf first, this would be intolerable for the U.S. consumer.

One other matter must be considered here. It is impossible to accept Westcoast's and AGTL's assertions that prospective investors would not look to the whole project and require full precommitments of their needed funds. In light of the magnitude of this project and the interrelation of all participants, both operationally and in the eyes of the capital markets, precommitment of funds is necessary for both AGTL and Westcoast. Unlike PG&E and PGT, on both Alcan's and Arctic Gas' proposals, the enormity of the project investment relative to Westcoast's and AGTL's present capitalization, mandates such precommitment of funds for AGTL and Westcoast even though PG&E and PGT do not have to precommit.