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Docket Nos. CP75-96, et al.

Alaskan Arctic Pipeline Company, et al.

FPC JUDGE RECOMMENDS APPROVAL OF ARCTIC GAS'

\$8.5 BILLION ALASKAN GAS PROJECT

Federal Power Commission Administrative Law Judge Nahum Litt today recommended approval of an \$8.5 billion trans-Canada pipeline system proposed by an Arctic Gas Study Group to bring large volumes of Alaskan natural gas to lower 48 U.S. markets.

Judge Litt in his 430-page decision found the proposal superior in almost every respect to two competing applications, by El Paso Alaska Company and Alcan Pipeline Company (see fact sheet, FPC release No. 22869, for details of all three proposals).

Arctic's project, the largest private undertaking in the country's history, will make more gas available sooner, result in less impact on the environment, at less cost to the consumer than either of the competing proposals, Judge Litt concluded. It would be built during the winter seasons, employing 2,400 at its peak, and initially carrying from 2 to 2.5 billion cubic feet of gas daily beginning in 1982 or 1983.

This initial decision is the first step in FPC consideration of the matter. The full Commission will now review the action of the Administrative Law Judge under the special procedures established under the Alaska Natural Gas Transportation Act of 1976. An FPC recommendation regarding the transportation system will be submitted to the President by May 1, 1977.

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In a separate order issued concurrently with Judge Litt's decision, the Commission noticed suspension of the Natural Gas Act proceedings, established further procedures for Commission review and responded to earlier procedural petitions by Arctic Gas and El Paso. The Commission said that the procedures adopted will give parties adequate opportunity to rebut factual matters while enabling it to discharge expeditiously its duties under that Act.

Hearings on the proposals began May 5, 1975, and continued almost uninterrupted until November 1976. An official inspection was made in August 1976 of the sites of the proposed major facilities and pipeline routes of all three applicants. The record consists of 253 volumes of transcripts and about 1,000 exhibits. The second-stage proceeding is not likely to begin before early 1978, and construction would not begin before late 1978 or '79. The second-stage proceeding would address producer sales contracts and again review rates, marketability, financeability and other matters.

The transportation cost per million btu's for the Alaskan Arctic gas in the fifth year of operation, based upon unescalated 1975 data, will be about \$1.60, compared to \$2.15 for El Paso's proposal and \$1.91 for Alcan.

Judge Litt recommended rolled-in pricing, where all the pipelines' customers help pay for the project gas, but cited one witness' conclusion that gas marketed through the Alaskan Arctic project will be competitive whether priced incrementally or rolled in.

Making a number of assumptions, the average rolled-in price at the city gate would be \$1.50 per thousand cubic feet, based on a field price of \$1 per thousand cubic feet. On an incremental basis, meaning only those consumers who actually receive the gas pay for it, the average price will be \$2.41. These prices are substantially lower than the price of fuel oil and electricity for all metropolitan areas except California and New York, where there is parity with fuel oil, Judge Litt said.

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Even with a 20 percent construction cost overrun, which is not improbable, Judge Litt said, the Arctic Gas deliveries are still economically competitive, while the El Paso project gas would be only marginally so.

Alaska's North Slope encompasses an 80,000-square-mile area extending about 500 miles from the Canadian border up to the Arctic Ocean. Exploration there has only begun, but Judge Litt said all parties agree that proved saleable reserves are around 22 trillion cubic feet.

Most of the proved reserves on the North Slope are in the Prudhoe Bay field, discovered in 1968. Those reserves are the largest yet discovered on the North American continent, representing about 10 percent of proven 1975 U.S. natural gas reserves and more than a year's supply for all U.S. consumers.

The applications were filed prematurely from any rational regulatory point of view, Judge Litt said, and the Commission's determination to try the cases without an essential ingredient represents a regulatory boldness normally not seen. The important missing ingredient was sales contracts by any of the 13 producers who hold interest in Prudhoe Bay reserves. Their failure to sign sales contracts was a chief impediment throughout the hearings, Judge Litt said, since many things depend on the amount of gas available, such as the size of the pipeline, financing, and marketability.

The Commission, with some misgivings, set the applications for hearing without the sales agreements because the national interest demanded expedited consideration, Judge Litt said. The only conclusion possible, he stated, is that for the producers the national interest "lies somewhere below their own economic interest. The producers, like G.B. Shaw's dinner-time companion, have a price at which they would sell their 'service,' and all their protestations to the contrary cannot hide that they are mainly dickering over price," Judge Litt said.

However, he continued, the lack of sales contracts was not fatal to the case since there is little dispute over the
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recoverable reserves at Prudhoe Bay. There is no such agreement on the size of the Mackenzie Delta reserves though, which are critical since the Arctic Gas proposal is directly dependent on delivery of at least 1 billion cubic feet a day the first year of operation. The Mackenzie Delta, located in Canada's Northwest Territories, is 15,000 square miles in size. There are benefits of building one project to transport both Canadian and U.S. gas rather than two separate transportation systems, he said, not the least of which is fewer environmental effects.

Judge Litt rejected Alaska's claim that the FPC does not have jurisdiction over the Alaska gas because the State is performing those activities within the state which Congress wanted regulated. The Commission clearly has full jurisdiction over producer wellhead sales in interstate commerce, transport of the gas within Alaska, and transport and sale within the lower 48 states, Judge Litt said.

The Arctic Gas proposal calls for over 4,000 miles of pipeline extending from Prudhoe Bay through Alaska and Canada to termination points in the lower 48. The 48-inch line to be built between Prudhoe Bay and Caroline Junction in Alberta will be the largest ever used to transport gas, and the operating pressure used to force the gas through the pipeline will exceed the thrust of any line now in existence in North America. The projects would all be built using known technology, with adaptation or "scale-up" as necessary to improve that which is known, such as construction of chilled gas pipelines in permafrost (ground that is frozen year-round), or fabricating a ditching or snow-making machine larger than any built before.

Arctic Gas' heavy reliance on winter construction, it was argued, subjects it to billion-dollar risks if construction is delayed. Arctic has made clear its willingness to incur additional costs to avoid delay, Judge Litt pointed out, but maintains it will not be necessary. All in all, he continued, there is little reason to believe Arctic Gas will not be able to meet its logistic build-up schedule prefatory to each winter construction season. It plans to barge most of its equipment and supplies to stockpile sites before the construction begins, with air support as needed. Although Arctic contemplates six years between certification and

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commencement of flow, actual construction would not begin until the winter of the fourth year.

Judge Litt said that, as to the environmental effect of the proposed projects, seldom has a decision-making body been favored with so substantial a body of salient information on which to draw in reaching a decision. The staffs of the FPC and the Department of Interior each wrote detailed environmental impact statements assessing the "worst case" risks of all three proposals and numerous alternatives. In addition, reports were filed by the parties and voluminous evidence submitted by numerous expert witnesses.

The most significant environmental concern as expressed through testimony was Arctic's crossing of the 14,000-square-mile Alaskan Wildlife Range. The line would cross the entire Range in an east-west direction, with about 2,650 acres permanently dedicated to it. Most of that acreage is right-of-way, however, which would be revegetated.

The Range is part of a large ecosystem, Judge Litt said some of which has not been substantially despoiled by man. Its protection from significant degradation is therefore important and has been so considered by all parties, he said. He accepted, however, Arctic's belief that the impact will be small, of limited duration and not disruptive of even a small area. Judge Litt pointed out that the Range, while remote, is not unimpacted by man, who will continue to use the area regardless of whether a pipeline is approved or not. In addition, he noted, the Range is not legally designated as a "wilderness area" and there is therefore no legal impediment to authorizing a pipeline across it.

It is clearly in the public interest to exploit hydrocarbon reserves in the Range, Judge Litt said, and unless prohibited by Congress, incursion into the Range for this purpose must be considered a virtual certainty. The Arctic Gas project then becomes a benefit because it lessens the environmental cost of attaching the reserves, he said.

A primary environmental concern of the cross-Mackenzie Delta route in Canada was effect on migratory snow geese. Mitigative construction measures can greatly reduce the impact, Judge Litt said. Aircraft overflights, the most
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serious hazard, will be kept well below the least acceptable rate of one every two hours. Judge Litt said, however, that while the FPC can consider the impacts of the pipeline on the MacKenzie Delta, two Canadian tribunals must also rule on the issue, with ultimate authority to deny, license or condition as they see fit.

Judge Litt rejected the argument that Arctic's knowledge of the environmental effects along its proposed route is woefully deficient. The research effort Arctic has made is impressive, he said, and its specific knowledge of the fauna and flora exceeds that held by its competitors.

Another key environmental criticism of Arctic's proposal is its alleged inability to build snow roads when needed in an environmentally acceptable manner or to build a pipeline from them in winter conditions of extreme cold and long periods of darkness. Judge Litt found that the snow road plan is both feasible and effective and can be accomplished with a minimum of environmental harm.

The 915 miles of snow road and work pad will be built in sensitive permafrost using snow collected by snow fencing, harvesting from frozen lakes, or manufactured snow using standard ski-slope technology. Timing is the critical element, he noted. Snow fences would be erected in October, and construction would begin in late October or early November as soon as five to ten miles of snow road is completed.

The State of Alaska's position on environmental matters clearly has been influenced by economic considerations, Judge Litt stated. The simple fact is, he continued, that the State wants to encourage industrial development in central Alaska and supported the El Paso proposal on economic grounds, bargaining with pipeline purchasers of its royalty gas to release portions of that interstate supply for future intrastate industrial use.

The State embarked early on upon a course designed to maximize the economic benefits it would derive, Judge Litt stated. "This laudable goal for Alaskans, unfortunately, is not always consistent with the public interest of all the people of the U.S.," he said. Besides the fact that the state's

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use of Alaskan gas is speculative at best, Judge Litt stated, there is also a serious question of whether industrial gas use would be compatible with federal natural gas end use policy or environmental sensitivities.

Judge Litt acknowledged that Alaska's views are entitled to substantial weight even where the evidentiary showing may be ambiguous. However, he said, the great bulk, if not all, the Prudhoe Bay gas will be marketed in the contiguous U.S., and those consumers will be paying the costs. The economic ills of a particular state are not a valid consideration in determining pipeline rates or route selection, he said, and this policy has been upheld by the Commission and the courts.

Arctic Gas' pipeline, because it is large-diameter and uses extra-high compression, will use less fuel than the other two proposals --6.87 percent for Arctic gas compared to 11.96 for El Paso. Since gas consumers must pay for the gas consumed as fuel, their unit costs will be lower, Judge Litt said. The annual fuel saving by using the Arctic system exceeds residential consumption in each of a large number of states, he noted.

The Arctic Gas system also has more flexibility and expansibility should volumes exceed those expected. It can handle up to 4.5 billion cubic feet daily with additional compression, and if even more capacity is necessary, looping (new lines paralleling existing ones), would "be a work of joy," Judge Litt said.

The FPC staff contended the west leg of the Arctic Gas system is not the most economic way of moving the gas to those market areas. That leg, as proposed by Arctic Gas, would deliver 659 million cubic feet daily, or roughly 30 percent of total initial flow, to a point on the Idaho-British Columbia border, for delivery to west coast markets. The FPC staff proposed that delivery could be accomplished by using idle western pipeline capacity it expected to result from future declining Canadian gas imports, or by displacement of gas westward using existing pipeline systems.

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Judge Litt said the staff's alternative must be rejected because he does not believe its pessimistic outlook for Canadian gas imports will be fulfilled. Without this occurring, he said, there would be no true saving to consumers. Recent reports issued by the Canadian government contain a considerably more favorable appraisal of its ability to continue exports at present levels. Any curtailments which might occur in the late 1970's or early 1980's should prove temporary, he said, in light of frontier gas which may become available then.

The existence of a nationwide gas shortage is uncontested, Judge Litt said, with the nine interstate pipelines comprising the Arctic Gas group projecting their total supplies will fall short of requirements by 26 percent in 1985. These companies, which marketed about a third of total gas production in the lower 48 in 1975, sell in a substantial majority of the lower 48 states but principally California, Ohio, Michigan, Illinois, Minnesota, New York and Pennsylvania. Without both Alaskan gas and other gas supplies, their 1985 requirements in priorities 1 and 2 cannot be met, Judge Litt said.

While Canada's National Energy Board is considering the proposals, Judge Litt said there is much dispute on political issues such as whether the NEB will act impartially in a timely fashion for U.S. interests, and whether it will allow U.S. and Canadian Mackenzie Delta gas to be transported through the same system.

These political considerations are principally the prerogative of the President, Judge Litt emphasized; the FPC does not make foreign policy for the U.S. However, he said he must assume that the decision to be made by the Canadian government will be made by rational men viewing the pros and cons of the proposals on a wide range of criteria, just as it is assumed rational men here will make the decision.

Given the present state of world energy resources, he stated, it can be assumed that more rapid development of known and substantial resources is as important to Canada

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as to the U.S., and that a time frame for delivering known supplies late into the 1980's is not likely to be a winning position.

Judge Litt agreed with Arctic Gas' contention that a joint project through Canada is not dependent on a U.S. - Canadian treaty. The normal and long-standing relationship of almost 200 years between the two countries is more than a sufficient basis for assuming stability and rational treatment of a mutually beneficial business enterprise. "Even if it is assumed that a Canadian government would come to power predisposed to act unreasonably, such imprudence could be countered with equally unsavory activities on the part of the U.S.," Judge Litt said.

The overwhelming benefit to Alaska will be royalty gas payments and severance taxes. Any of the proposals would net the state a minimum \$135.5 million a year, totalling several billion dollars over the next several decades. The bottom line for the state's development is how it spends those billions, Judge Litt said. Those policies will determine the ultimate socio-economic effect of the project.

There was consensus by the Commission staff, the most populous consuming states which took an active interest, and an array of pipelines and distributors serving huge sections of the country that Arctic Gas' proposal would serve their best interests. However, El Paso's proposal is viable and, if Arctic Gas is unable to accept a certificate, El Paso's proposal, with modifications, would also meet the public convenience and necessity, Judge Litt said. The chief problem with the El Paso project is its lack of flexibility and credibility as presented, he continued. It would need at least 9 cryogenic ships, rather than 8, to provide reliable transportation; five rather than four liquefied natural gas storage tanks, and seven, not six, liquefaction trains at Gravina Point in Alaska. While El Paso proposed locating its California terminal at Point Conception, Judge Litt said all the evidence points to Oxnard as the preferred location.

El Paso, primarily through its lawyers, "has made a silk purse out of a sow's ear," Judge Litt said. It has done
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little intermediate design work and its design, while impressive on paper, has no particular backup by core samples or even general site-specific work anywhere along its actual route.

As to Alcan, Judge Litt said the record does not support even the possibility that a certificate could be granted it. Its design is clearly neither efficient nor economic since the pipeline is undersized. Its 3-year phased-in construction schedule is not credible, he said, and judging from the FPC staff's evaluation, the proposed summer construction cannot be accomplished without unacceptable environmental impact, primarily degradation of ice-rich permafrost.

All the major participants in this mammoth undertaking, "in the vernacular, 'have their hand out,'" Judge Litt said. They all want top dollar, creating serious questions of marketability and in turn, financeability. Alaska may again seek to increase its severance tax on hydrocarbons from 4 to 10 percent; the pipelines want consumer guarantees to repay their equity investment but still seek a rate of return of from 15 to 17 percent; the producers' failure to sign sales contracts indicates where their concern lies.

Only a limitation on the field price of the gas to reflect its intrinsic market value and a reduction on investment returns to reflect limitations on risk can bring these projects "in from the cold," Judge Litt concluded. A field price of \$1.00 per thousand cubic feet is about the upper limit, he said: a field price established by contract or otherwise at a level much higher will sink the project, because the delivered cost of the gas would be so high the high-priority consumers which constitute the market would turn to other energy supplies.

The financial plan prepared by Arctic Gas does not outstrip the capacity of any of these markets and is generally feasible, Judge Litt found. He concluded, however, that the magnitude of the capital investment is such that the gas transmission company sponsors cannot provide the institutional lenders with the security necessary to warrant financing. There must be reliance upon both the consumer and the taxpayer to guarantee that the project will be

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completed and that debt service will be secure during any sustained outages.

Legislation to perfect tracking of rates to the consumer level and to approve U.S. Treasury participation is necessary if the project is to be built, Judge Litt concluded. He made the following recommendations: consumer participation in guarantees on capital costs, but only for the debt service; the equity holder should accept the usual risk of equity investment; and the federal government should entertain an insurance or completion guarantee arrangement to facilitate raising project debt capital at a more reasonable cost.

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SUMMARY OF INITIAL DECISION IN EL PASO ALASKA PROCEEDING
RECOMMENDING SELECTION OF ARCTIC GAS PROJECT

The following is a summary of the initial decision issued on 2/1/77 by Administrative Law Judge Nahum Litt in the El Paso Alaska proceeding (CP75-96 et al.) involving competing projects sponsored by the Arctic Gas consortium, El Paso Alaska and Alcan Pipeline-Northwest Pipeline to transport gas from the Prudhoe Bay Field of Alaska to markets in the Lower 48 States.

Judge Litt concluded that the Arctic Gas project is superior in nearly every significant aspect to the El Paso Alaska proposal and should be certificated, including its Western Leg. However, El Paso Alaska also has a "viable plan" which technically can be built in an environmentally sound manner and could be certificated if not for the "clearly superior" Arctic Gas application. Thus, if Arctic Gas is unable to accept a certificate, El Paso's proposal -- subject to certain modifications -- can be found to meet the present and future public convenience and necessity.

On the other hand, Judge Litt declared, the record does not support even the "possibility" of a grant of authority to Alcan. In no event, he said, could the Alcan project be approved with the inclusion of Westcoast Transmission, one of the two Canadian company participants, because of the arbitrary assignment of volumes for transportation through the Westcoast system and higher costs of transportation which would result for U.S. consumers. Specifically, he said, it would appear that the 30%-70% split of volumes in Canada (for transportation to the Canadian-Lower 48 border by Westcoast and Alberta Gas Trunk Line, respectively) was adopted, in the first instance, to secure Westcoast's participation in the Alcan project by assuring that the Westcoast line below Fort Nelson, British Columbia "would be allocated a sufficient volume of gas to fill existing excess capacity, thereby warranting construction of additional loop facilities which would inure to the ultimate benefit of Canadian customers." Moreover, the pro forma tariffs of the two Canadian companies disclose an "overt Canadian bias" and contain cost allocation provisions which are "totally unacceptable" to U.S. consumers. Although allocation procedures supported by Alberta Gas Trunk Line are now alleged to be inoperative, the result is to prevent any meaningful costing of facilities.

Further, Judge Litt asserted, two critical elements of Alcan's proposal -- construction in a three-year period (with completion in 1981) and financing in a separate time frame from the Maple Leaf project (sponsored by the same Canadian companies which are participants in Alcan) -- are totally unsupported. Completion of the Alcan project in three years by 1981 simply "cannot occur," and the financing arrangements proposed for Alcan and Maple Leaf require "intricate timing" which lacks any evidentiary support. Accordingly, "as presently proposed, even with Alcan's willingness to build anything anyone wants (as long as it does not oust Westcoast and AGTL from their Maple Leaf project), there is not enough left of its original proposal to serve as a basis for granting its application."

Overview of Projects

The Arctic Gas project includes a number of interrelated applications involving construction of some 4,512 miles of pipeline from the North Slope of Alaska through Canada to markets on the West Coast and in midwestern and eastern states. Specifically, Alaskan Arctic Gas Pipeline would construct a 195-mile, 48-inch line from the Prudhoe Bay to the Alaska-Canada border. From that point, Canadian Arctic Gas Pipeline would construct over 2,300 miles of mostly 48-inch line across the Mackenzie Delta and then south to Caroline Junction, Alberta where the line would divide -- with a Western Leg extending south to Kingsgate on the British Columbia-Idaho border and the Eastern Leg extending south to Monchy, Saskatchewan. From Kingsgate, Pacific Gas Transmission proposes to loop its existing line to deliver gas to markets in Pacific Northwest states and in Northern and Southern California. From Monchy, Northern Border Pipeline (a partnership of six U.S. pipelines) would build a 1,138-mile, 24-inch line to Dwight, Illinois (near Chicago). Deliveries of Alaskan gas to the Lower 48 States are projected at 2.25 Bcf/d by the fifth year of operations, with approximately 30% to be received by PGT for West Coast markets and the remaining 70% by Northern Border for midwestern and eastern markets.

El Paso Alaska proposes to transport gas from Prudhoe Bay via a new 809-mile pipeline (largely paralleling the Alyeska oil pipeline route) to Gravina Point on the southern coast of Alaska where the gas would be liquefied and shipped by tanker to terminal, storage and regasification facilities proposed by Western LNG Terminal Co. at Point Conception, California (approximately 120 miles north of Los Angeles). From Point Conception, Western LNG proposes to construct new pipelines to connect with existing transmission facilities of Pacific Gas & Electric Co. and Southern California Gas Co. Delivery of Prudhoe Bay gas to other markets in the Lower 48 States would be accomplished through a combination of displacement, reversal of flow in existing lines of California utilities and in certain existing lines of El Paso Natural Gas Co. and Transwestern Pipeline Co. (between the California-Arizona border and the Permian Basin), construction of new lines by El Paso Natural from the Permian Basin to the Anadarko Basin or the Texas Gulf Coast area (or both) to interconnect with other interstate pipeline companies in those areas, and use of projected idle capacity in those pipelines to effect delivery of gas to markets in midwestern, southeastern and eastern states.

Alternative showings of El Paso Alaska contemplated deliveries of 2.4 Bcf/d or 3.2 Bcf/d from the Prudhoe Bay Field.

Finally, the Alcan Pipeline project -- sponsored by Northwest Pipeline Co. and two Canadian companies -- involves the construction of a 730-mile, 42-inch pipeline from Prudhoe Bay to Delta Junction (south of Fairbanks) along the Alyeska oil pipeline route and then extending to the Alaska-Yukon border along the Alcan Highway and an abandoned oil pipeline route. The pipeline would be designed to carry 2.4 Bcf/d of Alaskan gas. At the Alaska-Yukon border, the gas would be delivered to Foothills Pipe Line (or an affiliate) which would construct a new 42-inch line continuing along the Alcan Highway to Fort Nelson, British Columbia where approximately 30% of the gas would be delivered to Westcoast Transmission Co. Ltd. for ultimate transportation through expanded facilities to the Lower 48 border at Sumas, Washington. The remaining 70% would be transported from Fort Nelson to Zama Lake, Alberta (a distance of 144 miles) by a new pipeline -- to be owned in British Columbia by Westcoast and in Alberta by Alberta Gas Trunk Line (AGTL) -- for delivery into existing facilities of AGTL and further transportation to Empress, Alberta and possibly also to Kingsgate, British Columbia. From Empress, gas destined for midwestern or eastern markets in the Lower 48 would be delivered to the Northern Border system at Monchy, Saskatchewan. Gas delivered to Sumas, and possibly to Kingsgate, would be

transported to western markets through existing or expanded pipeline facilities of Northwest and Pacific Gas Transmission.

Initial Decision

The summary below is organized under the following headings (conforming for the most part to those in the initial decision): Lack of Producer Sales Contracts, Jurisdictional Questions and Proposed Legislation, "Western Leg" Issue, Gas Supply, Construction and Geotechnical Problems, Operational Factors, Environmental Considerations, Socio-Economic Factors, Marketability of North Slope Gas, Economics, Net National Economic Benefits, Financing and Tariffs and Canadian Issues.

Lack of Producer Sales Contracts

At the outset of his initial decision, Judge Litt stressed the significant problems caused throughout the hearing by the failure of those owning the Prudhoe Bay reserves -- principally, the State of Alaska, Atlantic Richfield Co., Exxon Corp. and Sohio Petroleum Co. -- to enter into gas sales contracts. This refusal, he said, has prevented the expeditious and orderly examination of pipeline sizing, financing, marketability, and a host of related matters, including disputes as to which companies ultimately would buy the gas. While the State of Alaska announced sales of its royalty gas to El Paso, Southern Natural and Tenneco on the last day of the hearing (11/12/76), even these contracts for royalty gas are not effective until ratification by the state legislature, which is not in session.

All efforts to induce producers to enter into sales contracts, Judge Litt continued, were "singularly unsuccessful." As recently as 9/30/76, while indicating an intent to act reasonably and professing a concern for the national interest, the producers refused to state categorically that they would enter into contracts to sell gas upon certification of a prime pipeline route. "Their position is that they are in business to sell hydrocarbons and the only question is timing. . . . The only conclusion possible from their actions is that the national interest to ARCO, Exxon, Sohio, etc. lies somewhere below their own economic interest, or at least, the national interest of the U.S. appears . . . negotiable in their bid to obtain certain concessions from the Commission or the Congress in return for their cooperation in bringing this gas to market." In short, "the producers, like G. B. Shaw's dinnertime companion, have a price at which they would sell their 'service,' and all of their protestations to the contrary cannot hide that they are mainly dickering over price."

Similarly, the State of Alaska has pursued a course designed to maximize economic benefits flowing to Alaska from its hydrocarbon resources. "This laudable goal for Alaskans, unfortunately, is not always consistent with the general public interest of all the people of the United States."

The Law Judge also noted the absence of an approved production agreement for oil or gas from the Prudhoe Bay Field. While a draft agreement became available in August 1976, it will be several more months until state approval will be given.

Because of the lack of gas sales contracts and the lack of an approved field production agreement, Judge Litt stated, the record has been closed without a gas deliverability schedule, without knowing the purchasers of the gas, without knowing more than the alleged general cost of field gathering and gas conditioning facilities or who would bear such cost, and without specific estimates of reserves on the Lisburne and Kaparuk formations which are part of the Prudhoe Bay Field. In the usual case, these deficiencies would require that the proceeding be held in abeyance pending their resolution. Here, however, "an overwhelming consensus on the part of the

Commission, the Congress and the Executive Branch has been to go forward anyway and to pick a pipeline. It is not the best way to make rational decisions."

Given the above considerations, the Law Judge added, "it is amazing in fact that this proceeding progressed so far so fast. The applications were filed prematurely from any rational regulatory point of view, and the Commission's determination to try the cases without an essential ingredient represents a regulatory boldness normally not seen."

Jurisdictional Questions and Proposed Legislation

Judge Litt dismissed the State of Alaska's claim that the FPC lacks jurisdiction over its interstate sales. This claim, he said, rests solely on the contention that a State is not a "person" within the meaning of Section 2 of the Act. No such gap exists in the law, the Law Judge replied, and one should not be created. Otherwise, producing and energy-rich states of the nation, by virtue of their royalty interest in production from state lands and their "increasing propensity to reserve the right to take that interest in-kind," will expand such gap to permit larger and larger volumes to escape regulatory control. Also, Judge Litt noted, Alaska's essential premise is undercut by the Supreme Court's holding in FPC v. Corporation Commission of Oklahoma that a state agency is a "person" within the meaning of Section 2 of the Natural Gas Act for purposes of jurisdiction by U.S. District Courts to enjoin actions violative of the Act.

The FPC Judge also referred to problems created by the State of Alaska's gas sales contracts with El Paso, Southern Natural and Tenneco reserving the right to reduce daily deliveries by up to 25% at any time during the first five years, 50% during the next five years, 75% during the third five-year period, and 100% after 15 years, for in-state use. While there is little doubt that the Commission would refuse to certificate long-term sales under such terms, the Law Judge stated, Section 13(b) of the 1976 Alaska Natural Gas Transportation Act unfortunately permits Alaska to withdraw its royalty gas from the interstate market in the manner contemplated by its contracts. Such withdrawal could result in the future idling of downstream facilities and produce adverse cost impacts. Additionally, "the mere prospect of withdrawal imperils the financeability of an Alaskan gas project."

Accordingly, Judge Litt urged the Commission, in its report to the President, to recommend deletion of Section 13(b) of the Alaska Natural Gas Transportation Act of 1976, as well as deletion of Section 13(a) which bars the Commission from denying access to the Alaskan gas transportation system to shippers not participating in equity financing. Absent deletion of these two provisions, "direct and total U.S. Government guarantees would appear to be the only feasible method of financing."

Another serious regulatory gap, Judge Litt continued, is the absence of direct plenary jurisdiction by any government agency over the operations and charges of the El Paso tanker fleet. Therefore, if the El Paso project were to be approved, this gap should be closed, either indirectly through certificate conditions or directly through suitable federal legislation. Any certificate conditions should require, at a minimum, that El Paso Alaska bind the shipping companies to all contract pricing provisions and to continued dedication of the ships over the project life; seek prior Commission authorization for any subsequent amendments materially affecting the terms of the approved contracts; cause all books and records of the shipping companies to be made available for Commission audit; and seek prior Commission approval for any effort to divest effective corporate control (if any) over the shipping companies. Since such conditions would be likely to be tested in the courts, "the Commission may wish to recommend appropriate federal legislation to confer jurisdiction in order to avoid uncertainty."

Finally, the Law Judge said, federal legislation is required to enable full and timely recovery from ultimate consumers of all appropriate costs in connection with an Alaskan transportation project. While the Commission should not have the power to suspend flow through of costs, it should have the right to review all such costs at all times, with retention of the power to order refunds where appropriate. Similarly, the Treasury Department should be granted appropriate statutory authority to accomplish whatever federal participation in the Alaskan gas project financing is ultimately determined to be required in the public interest.

"Western Leg" Issue

Judge Litt rejected Staff's recommendation for elimination of the "Western Leg" portion of the Arctic Gas project, currently designed to deliver initial volumes of 659,000 Mcf/d or roughly 30% of the total initial Alaskan gas flow of 2.25 Bcf/d, and for delivery of these volumes instead to the West Coast through combined use of Pacific Gas Transmission facilities and Northern Border facilities. Specifically, Staff proposed two alternatives: (1) use of an expected 601,000 Mcf/d of idle capacity expected on the PGT system by 1981 following expiration of gas export licenses, with the balance of 36,000 Mcf/d to be delivered by displacement through the proposed Northern Border system; and (2) use of 204,000 Mcf/d of idle capacity on PGT's system if curtailments of Canadian export gas are less than predicted, with displacement of 433,000 Mcf/d via Northern Border.

Arctic Gas conceded the technical feasibility of the Staff's displacement proposal, the Law Judge noted, and also admitted that elimination of the Western Leg facilities would result in a net reduction in project capital costs of \$512 million and a reduction in average annual project transportation cost of service of roughly \$50 million. Staff viewed the estimated \$50 million savings in annual cost of service as a minimum.

Staff's proposal, Judge Litt stated, is keyed to very substantial and permanent reductions in Canadian deliveries to PGT, commencing either prior to or contemporaneously with the expiration of applicable export licenses. However, he declared, absent such developments, long-term displacement of full Western entitlements over a fully loaded 42-inch Eastern Leg (Northern Border) would not result in a true saving to the nation's consumers. This is because the \$50 million "saving" cited by Staff would be achieved at the expense of additional fuel requirements amounting to some 70 billion Btu/d, thus resulting in significantly lower volumes of natural gas available to the nation's markets. On this basis, considering Staff's estimated one-time energy requirement of 48 trillion Btu to construct the Western Leg, a net energy loss would be experienced in less than two years. And, over the 20-year life of the project, the cost of replacing the net energy loss would more than wipe out the suggested \$50 million annual saving in transportation costs, since the replacement energy in California markets would mainly take the form of high-cost electricity.

Further, Judge Litt continued, even if true overall savings were to result from the displacement proposal, there does not appear to be any satisfactory way for apportioning such savings among the specific eastern and western markets to be served. Among other things, the problem is complicated by the necessity either to maximize the capacity of Northern Border's presently proposed 42-inch diameter pipeline or to build a larger diameter Northern Border pipeline. Any such plan would entail substantial capital costs, and the Western Leg purchasers would have to pay for the expansion. However, assuming growth in PGT's excess capacity as predicted by Staff, Northern Border capacity installed now to permit displacement could quickly become excess to Northern Border's needs. On the other hand, absolving Western Leg customers of these costs would result in higher costs to Eastern Leg customers. In short, "there is no

way on this record to compare the cost of cheap and easy expansibility to Eastern Leg customers if the Western Leg is built, as against the delays and unknown costs in unknown future years if it is found necessary to fully load Northern Border's 42-inch line now and deny cheap expansibility in the future."

Additionally, the Law Judge observed, Staff's projection of a substantial long-term reduction in Canadian deliveries was based on an NEB report issued in April 1975 which did not consider the impact of new frontier gas supplies in assessing Canada's supply and demand position in future years. However, a subsequent report issued by Canada's Minister of Energy, Mines and Resources in early 1976 suggested that, with the advent of gas supplies from frontier areas after 1982 (assuming an energy price structure adjusted to current levels of international oil prices), Canadian gas supply would substantially exceed demand -- including export demand -- for a number of years. Accordingly, although circumstances may change and the Canadian Government may reappraise its energy goals, "the present outlook for Canadian gas exports at current levels after 1982 appears optimistic."

Thus, Judge Litt concluded, since Staff's displacement alternative is predicated on an "unduly pessimistic view" respecting Canadian curtailments and defended on the basis of transportation cost savings which may be "largely illusory," it cannot be considered a preferable alternative.

Moreover, he added, the specific design recommended by Staff would produce a system operating at or near full capacity from the outset, leaving no room for cheap expansion to take advantage of future Alaskan supply. By contrast, the Eastern and Western delivery legs now proposed by Arctic Gas, although substantially reduced and modified from the designs originally proposed in order to improve the economy and efficiency of gas delivery, are capable of transporting Alaskan volumes above 2.25 Bcf/d solely by increasing compression, thereby affording a reasonable measure of cheap expansibility customarily considered desirable in attaching new transmission facilities to new, promising supply areas.

Judge Litt also reviewed El Paso Alaska's basic scheme for delivering Alaskan gas throughout the Lower 48 States by a combination of direct transportation and displacement using existing pipeline systems. He concluded that the overall proposal is "clearly feasible."

Gas Supply

Judge Litt noted agreement by all parties that in-place gas reserves in the Prudhoe Oil Pool on the North Slope exceed 35 Tcf, but disagreement regarding (1) gas deliverability from the Prudhoe Bay Pool (because of the effect of the rate of gas production on ultimate oil recovery); and (2) the extent and location of undiscovered recoverable reserves in other areas of North Alaska.

With respect to gas deliverability from the Prudhoe Bay Pool, the Law Judge called attention to a study commissioned by the State of Alaska indicating that highest oil recoveries were obtained under conditions of water injection and no gas sales, but that these higher ranges of oil recovery could also be approached with gas sales of 2.0 Bcf/d and water injection, as well as with gas sales above 2.0 Bcf/d assuming further water injection. He also noted a statement by the principal producers that gas deliveries of at least 2 Bcf/d will commence once the necessary pipeline and gas conditioning facilities are in place, and that initial gas deliveries of up to 2.5 Bcf/d may be possible without affecting ultimate oil recovery. Thus, he concluded, while there is still some uncertainty concerning the amount of gas that can and will be sold without adversely affecting oil recovery, "the vast weight of the evidence is that between 2.0 Bcf/d - 2.5 Bcf/d of gas will be available initially from the Prudhoe Bay Field." Moreover, he observed, if estimated additional volumes of 11.7 Tcf in the Sadlerochit, Lisburne and Kuparuk formations by 1985 are included, "it is obvious that the 2.0 Bcf/d - 2.5 Bcf/d estimate is indeed conservative."

In regard to other North Slope reserves, Judge Litt said several specific regions could logistically support additional deliveries into the systems of one or more of the three pipeline applicants. While potential reserve estimates vary considerably, nevertheless, "Arctic Gas, because of its larger potential capacity and cheaper expansibility, would be best able to transport additional volumes from any North Slope source."

Turning to the Mackenzie Delta area, Judge Litt found a "reasonable likelihood" of deliveries not less than 1 Bcf/d in the first year of operations and 1.5 Bcf/d in the fifth year. (Arctic Gas, by contrast, assumed initial deliverability of 1.25 Bcf/d in the first year, rising to 2.25 Bcf/d by the fifth year.)

In arriving at this determination, the FPC Judge first looked to total salable gas reserves of 6.21 Tcf from eight Mackenzie Delta fields established by DeGolyer & MacNaughton as of 7/31/75 -- including 3.83 Tcf of proved reserves, 1.02 Tcf of probable reserves and 1.36 Tcf of possible reserves. If the probable reserves are discounted by 30% and the possible reserves by 70%, the Law Judge stated, the DeGolyer & MacNaughton total is reduced to about 5 Tcf which, assuming a rate-of-take of 1:7300, would support an initial gas deliverability of about 0.7 Bcf/d. However, he continued, "it would be totally short-sighted and unrealistic, in view of the potential of the area and the long lead times involved in this project, to rest the case, as only El Paso urges, on the proposition that no additional reserves from new fields or areas can be relied upon to be forthcoming by the time operations commence, say 1982, or within a reasonable time thereafter. The record simply will not permit the conclusion that exploratory drilling activity in the Mackenzie Delta area is either on the verge of coming to a grinding halt or, if continued, will be totally fruitless."

Further, Judge Litt noted, although the Commission in the past has generally not looked beyond the level of proved reserves in making findings as to gas supply in certificate cases, there is "no inflexible policy" which requires disregard of facts favoring consideration of gas supplies not yet proven. More specifically, in this

case, there is no challenge on the record to the assessment that the Mackenzie Delta, onshore and offshore, "constitutes a major gas-bearing province with very substantial potential reserves in the early stages of exploration." Even when estimates of potential undiscovered gas reserves (ranging from 39 Tcf to 250 Tcf) are discounted severely, "the inescapable conclusion remains that a large resource base exists and that substantial additional gas reserves can be discovered over the next several years." Moreover, although the rate of discovery of such reserves is uncertain, it hardly seems likely that the Canadian Government — should it approve the construction of a gas transportation system into the Mackenzie Delta on the basis of pending applications -- "will fail to provide and maintain the regulatory climate conducive to optimum exploitation of that system." The Law Judge added in this regard that recent natural gas price increases in Canada have resulted in a significant increase in exploratory activity in the traditional western producing provinces. "While a similar impact has not yet been perceived in the Mackenzie Delta area, the allocation of financial resources first to the traditional areas with marketing facilities in place is merely good business practice, especially in light of the long lead times involved in any Mackenzie Delta project."

Assuming discovery of proved reserves at an average annual rate of only 0.6 Tcf over the seven-year period 1975-1982 (or roughly two-thirds of the annual discovery rate from 1971 to the mid-1975 date of the DeGolyer & MacNaughton estimate), the Law Judge said the proved reserve total would amount to approximately 8 Tcf in 1982, or sufficient to support a deliverability of about 1 Bcf/d on the basis of a 1:7300 rate-of-take. Moreover, continuation of this "conservative" findings rate during the following five years would result in discoveries of about 11 Tcf and support deliverability of about 1.5 Bcf/d by 1987, the fifth operational year.

Construction and Geotechnical Problems

Judge Litt assessed the technical feasibility of the Arctic Gas and El Paso Alaska projects in detail, concluding that the pipelines proposed by each could be built in the manner and time frame contemplated. In regard to El Paso Alaska, however, he determined that one additional liquefaction train at the Gravina Point LNG plant and one additional LNG tanker would be required in order to assure reliability of its 2.4 Bcf/d case. Finally, the Law Judge held that Alcan had failed to support its engineering or geotechnical designs, nor its plan for construction in three years.

Arctic Gas, the Law Judge noted, contemplates a construction schedule of six years from the time of initial governmental authorization to the commencement of gas flow. The Alaskan and Canadian portions of this construction would be carried out by nine "spreads," with the North Slope portion of the pipeline to be constructed entirely in the final winter by six "spreads" working simultaneously (three in Alaska and three in Canada), each with a seasonal goal of 65 miles of pipeline. This schedule for Arctic construction was challenged by an El Paso-sponsored study which contended that Arctic Gas had overestimated the number of available working days and underestimated productivity rates, thus making completion within the projected time frame unlikely. The FPC Judge accepted Arctic Gas' estimate of a mid-October "opening date" for snow road construction (a critical timing element in its overall construction schedule) and its estimate of access to the tundra for a period of 145-175 days in the final winter. He also considered it likely that each of the Arctic spreads would attain its assigned productivity rate (0.71 miles per working day). "The ability of a spread to achieve its productivity rate depends upon Arctic Gas' ability to move supplies and equipment to the construction sites and the ability of the construction spreads to expeditiously dig and fill the pipeline ditch, lay and weld the pipe, and move the overall operation from one point to the next along the route. The record contains substantial evidence to show that Arctic Gas will be able to carry out each of these phases in timely fashion and so complete its project on schedule."

Risk analyses indicating a high probability of noncompletion of the Arctic Gas project according to schedule, the FPC Judge added, rested on assumptions which were largely disproven on the record. Also, these analyses failed to take account of Arctic Gas rebuttal evidence, introduced in October 1976, which revised its construction costs upward by \$210 million for facilities and activities to enable it to meet construction deadlines in Alaska and Canada. In addition, Arctic Gas indicated willingness to commit another \$119 million on two additional construction spreads in the third year, if necessary, in order to stay on schedule.

Judge Litt particularly discussed Arctic Gas' plans for construction using snow roads and snow pads in sensitive permafrost areas. This reliance on snow roads was attacked by competing applicants, the State of Alaska and Conservation Interveners on several grounds, including optimistic opening dates for snow road construction, snow fence use, snowfall patterns, snow manufacturing, water availability and surface degradation caused by vegetative mat compaction. In general, these parties argued that, given the history of past "snow road" failures on the North Slope and the huge scale of Arctic Gas project, Arctic Gas had neither proved it can efficiently and safely construct snow roads, nor that these roads will be effective in use. The Law Judge dismissed these argument as unconvincing. "Not only has Arctic Gas committed itself to considerable testing and planning of its proposal, but it has done so by actually building a test road and testing that road under wintertime conditions similar to those it expects to experience in permafrost areas." In short, the "vast weight of evidence demonstrates that Arctic Gas' snow road plan "is both feasible and effective and can be accomplished with a minimum of environmental harm."

The Law Judge additionally endorsed Canadian Arctic's so-called "Cross-Delta" amendment proposed in February 1976, i.e., construction across the Mackenzie Delta instead of its originally proposed route skirting the western edge of the Mackenzie Delta. A major problem respecting the Cross-Delta route, Judge Litt stated, is inaccessibility of the pipeline for repairs during certain periods of the year in the event of an outage. He concluded, however, that the risk of outage is remote. Moreover, twin pipelines are planned for 36.5 miles of the route to reduce problems of inaccessibility. Further, he noted, the Cross-Delta route is 138 miles shorter and \$190 million less costly than the original prime route, and is also considered preferable from certain environmental standpoints.

Turning to the technical feasibility of the El Paso Alaska proposal, Judge Litt declared that special design precautions employed by El Paso for pipeline crossings of active faults are appropriate and should prevent substantial damage and service interruption from a design seismic event (an earthquake registering 8.5 on the Richter scale with ground movement up to 20 or 30 feet horizontally and 5 feet vertically); that El Paso has scheduled a full year for additional seismic analysis which can likely be performed and incorporated in the final pipeline design in that time -- "at a cost"; that design of the Gravina Point LNG facilities for an 8.5 magnitude earthquake -- equivalent to the magnitude of the 1964 Alaska earthquake (the most severe earthquake reading ever recorded) -- and 0.6g ground acceleration is adequate, although El Paso must consider additional seismic factors and undertake further analysis before arriving at a final design; and that El Paso's marine terminal design appears adequate to withstand seismic sea waves (tsunamis) generated by earthquakes.

The Law Judge recommended against El Paso Alaska's so-called "realignment" case -- reflecting realignment of its proposed trans-Alaska pipeline route (basically parallel to the Alyeska pipeline and haul road and within 3,000 feet of these facilities for 85% of the 766-mile distance) in response to suggestion by the State of Alaska urging greater use of the existing Alyeska haul road and facilities. The realignment was not supported by El Paso Alaska (which, however, attested to its feasibility assuming proper precautions) and was opposed by Staff and others because

of the chance of rupture of the Alyeska line due to blasting, collisions of heavy equipment and other construction activities, and because of an estimated \$200 million of additional costs which would be required for thicker walled pipeline and more gravel. Judge Litt held that, although geotechnical redesign could most probably eliminate thermal interference between the heated Alyeska oil line and the chilled El Paso gas pipeline, "a combination of the additional costs of realignment and the serious threat of damage to the Alyeska line" dictates consideration of only El Paso's base case alignment.

In regard to the sites of proposed LNG facilities, FPC Judge Litt recommended that if the El Paso Alaska project is certificated, the liquefaction plant in Alaska should be located at Gravina Point in Prince William Sound as filed -- rather than at Cape Starichkof in the Cook Inlet as suggested by Staff -- but that the LNG receiving terminal and regasification plant in California should be shifted from Point Conception to Oxnard. Staff, he said, failed to provide essential technical evidence to support the Cape Starichkof alternative, which accordingly must be denied. On the other hand, El Paso's selection of Gravina Point as its preferred site for an Alaska LNG plant resulted from a comprehensive site selection study.

As to the proposed LNG facilities in California, the Law Judge concluded that both the Point Conception and Oxnard sites were technically acceptable and feasible, but that the Oxnard site (an industrialized port area with low population and risk levels) was preferable from the standpoint of a lesser amount of pipeline construction (and consequently less capital investment) required to move North Slope gas to the California-Arizona border, greater consistency with present and future land uses, certain environmental considerations, and lesser possibility of seismic occurrences. Accordingly, if the El Paso project is certificated, the Law Judge recommended that authorization to Western LNG Terminal be conditioned upon amendment of its application so as to construct an LNG regasification plant capable of handling 2.4 Bcf/d of North Slope gas at Oxnard.

Finally, with respect to El Paso's cryogenic tanker fleet, Judge Litt determined that one additional LNG vessel -- i.e., a total of nine rather than eight ships as proposed -- would be required to transport 2.4 Bcf/d to California even without a change in terminal location. El Paso, he noted, projected an 11.5-day actual round trip for each tanker, including 10.72 days for the round trip and 0.8 days (19.2 hours) for contingencies. This projection, the Judge asserted, is based on "best-case" assumptions and fails to take account of possible additional delays due to restrictions on nighttime operations at either Gravina Point or Oxnard, reductions in service speed because of bad weather or Coast Guard navigational safeguards in Prince William Sound, and additional port closures because of weather. Also, a shift of the California terminal from Point Conception to Oxnard (70 nautical miles south of Point Conception) would add 140 miles to each round trip. Based on analysis of these factors, he concluded that an additional ship was required to assure reliability.

Similarly, the Law Judge concluded that the proposed six-train design at the Gravina Point liquefaction plant -- assuming El Paso Alaska's 2.4 Bcf/d case -- does not contain sufficient flexibility to assure the necessary reliability of service. He therefore recommended the addition of a seventh liquefaction train.

In regard to the Alcan project, the Law Judge said the lack of necessary preliminary studies in support of geotechnical and seismic design precludes a finding either as to technical feasibility or the reasonableness of Alcan's cost estimates. Also, there is serious question concerning Alcan's three-year construction schedule and proposed summertime construction in permafrost areas. Staff's geotechnic evaluation of Alcan indicates that "summer construction in Alaska cannot be accomplished

without unacceptable environmental impact." Additionally, Alcan's proposed alignment, which would literally be "cheek-to-cheek" with Alyeska for hundreds of miles, raises critical questions regarding potential construction damage to Alyeska.

At the same time, Judge Litt added, Alcan is composed of experienced and knowledgeable companies, at least two of which have extensive experience in building pipelines in both difficult terrain and extreme climates. "The result is that while it has not proved its design or costs, Arctic Gas and El Paso have proven Alcan's general design feasibility and placed outside limits on Alcan's expected costs. At one point or another, a portion of both Arctic Gas and El Paso would go through similar terrain or would be built under similar conditions. . . . In other words, while Alcan did not adduce the evidence to make its case, its piggybacking on those that did gives at least an approximation of what it might cost for comparison purposes."

Operational Factors

Comparing the three projects in terms of fuel usage, heating potential or Btu content, and cheap expansibility, Judge Litt concluded that (1) Arctic Gas, because of its large-diameter, high-compression pipeline, will require less fuel than El Paso or Alcan to transport the same system inlet volume; (2) both Arctic Gas and El Paso, because of the ability of higher-pressure lines to carry a higher proportion of heavier hydrocarbons contained in the wet gas stream, can transport a richer gas stream (i.e., gas with a higher Btu content per cubic foot) than Alcan; and (3) Arctic Gas could expand to carry up to 3.5 Bcf/d of Alaskan gas (assuming maximum volumes of 1 Bcf/d from the Mackenzie Delta) at comparatively low incremental capital cost, thereby providing earlier and cheaper expansibility than El Paso, to expand deliveries beyond 2.4 Bcf/d, which would be required to invest in additional compressors, LNG trains and ships at relatively higher cost. Alcan's claim of cheap expansibility, the Law Judge added, is "nothing but a claim."

With respect to fuel usage, the Law Judge noted estimated fuel requirements of 6.87% for the Arctic Gas project and 13.13% for El Paso Alaska, both assuming a 2.25 Bcf/d case for comparative purposes. The El Paso Alaska estimate, he said, includes fuel usage of 3.17% for transportation-displacement in the Lower 48 States. This fuel usage was estimated by Arctic Gas and is disputed by El Paso. While the record does not permit a determination of the exact fuel requirements for El Paso's proposed Lower 48 transportation-displacement scheme, the Law Judge noted, nevertheless, assuming such usage at only 2% on a 2.25 Bcf/d basis, El Paso's total fuel usage would still be 11.96% compared to 6.87% for Arctic Gas. "This represents a substantial annual saving, exceeding residential consumption in each of a large number of states."

Environmental Considerations

Some 50 pages of Judge Litt's initial decision were devoted to a discussion of environmental objections raised by El Paso, Alcan, the State of Alaska and the Conservation Interveners to routing of the Arctic Gas Project across the Arctic National Wildlife Range. This crossing, it was argued, would destroy "unique" wildlife, wilderness and recreational values of the Wildlife Range and would only lead to a further intrusion of this area in the future.

Judge Litt declared that the Arctic National Wildlife Range must be protected to the extent consistent with its purpose and that any construction through this area should be subject to stringent conditions designed to minimize both short-term and long-term impact. He concluded, however, that pipeline construction by Arctic Gas in the manner proposed -- and subject to appropriate mitigative conditions -- is compatible with the purposes of the reservation as a wildlife range with wilderness values.

Among other things, Judge Litt noted, attitudes toward the Arctic National Wildlife Range depend on subjective evaluations of the terms "unique" and "wilderness." A principal element of "uniqueness" advanced by those opposing a pipeline across the Range, he continued, is one of aesthetics, i.e., the visual aspect from the shoreline to the mountains 20-30 miles distant and the visual unspoiled nature of the Range. However, the FPC Judge observed, a buried pipeline will not interfere with the vista from the coast to the mountains, and it is unlikely that three proposed compressor stations, if built, would bring about any significant visual impairment. Furthermore, he added, smack in the middle of the coastal section of the Wildlife Range is an active Dew Line site (at Barter Island), an airfield, the Village of Kaktovik, and the remains of a long-abandoned Dew Line station at Demarcation Bay. Thus, "the wilderness aspect of the Wildlife Range is maintained by defining Barter Island and Kaktovik out. Similarly dismissed are Demarcation Bay with its beached wrecked ship, temporary native hunting and fishing villages and the Dew Line sites. Arctic Gas cites Lewis Carroll's Humpty Dumpty who said 'When I use the word, it means just what I choose it to mean -- neither more nor less.' Humpty Dumpty would be right at home in a number of briefs filed in this case."

Additionally, Judge Litt stressed that the Arctic National Wildlife Range is not legally a "wilderness" area under the Wilderness Act (which precludes any construction), but rather was created by a Public Land Order in 1960 which expressly provided for issuance of permits under the Mineral Leasing Act -- "a totally useless verbiage if a pipeline right-of-way is excluded." What those opposing Arctic Gas seek, the Law Judge said, is a "bootstrapping from the protection of wildlife in a range to the status of wilderness as if Congress had acted and put the range within the National Wilderness Preservation System." While Congress can effect this change, "the Commission cannot do so as a matter of law."

The Law Judge conceded the argument that construction of a gas pipeline may bring further development within the Wildlife Range, but said this in no way lessens the need for a decision on whether to permit hydrocarbon exploration or to grant such permits as may be in the public interest. In this connection, Judge Litt observed that, considering the present natural gas shortage, exploitation of hydrocarbon reserves is clearly in the public interest, and ultimate incursion into the Wildlife Range for this purpose must be considered a "virtual certainty" unless expressly prohibited by Congress. Therefore, to the extent that such exploitation is likely to occur, "it makes less significant the fact that Arctic Gas is the first major construction project on the eastern reaches of the North Slope since the construction of the Dew Line stations."

Turning to specific impacts of construction across the Arctic National Wildlife Range, the Law Judge found no significant evidence of any serious disturbance to caribou, short-term or long-term, along the Arctic Gas route. Furthermore, he emphasized, the major factor affecting caribou viability in Alaska is not the construction, operation and maintenance of pipelines but rather the state game laws. "Man has been systematically destroying these animals for overhunting, whether by subsistence hunting or sport, to the point where the herds may not be able to maintain population levels necessary for survival. The Forty-Mile Alaska herd, for example, has been reduced in a short period of time from literally hundreds of thousands of animals to a size where it may be exterminated if hunting pressure is not removed. The same could happen to the Porcupine herd, if the same hunting laws are enforced. Therefore, for state and federal officials to sanctimoniously enter into discourses as to whether a pregnant caribou will or will not cross a one- or two-foot high berm, while still permitting almost indiscriminate shooting of these animals by any Alaskan along the migratory route (or any rich hunter wanting a 'double shovel' set of antlers) is illogical."

Further, he concluded, the evidence indicates that the Arctic Gas construction schedule will have negligible impact on polar bears, that sufficient water is available on the North Slope which may be withdrawn for snow road construction without causing significant environmental harm to fish spawning and overwintering areas, that certain fish populations inadvertently damaged by water withdrawal during construction could probably be restocked, and that bird populations on the North Slope will not suffer any serious or long-term effects assuming implementation of satisfactory mitigative measures.

In contrast to the Arctic Gas project which is supported by exhaustive research studies and evidence relating to specific environmental impacts, the FPC Judge said the environmental information pertaining to the El Paso Alaska and Alcan proposals is mostly general in nature and not site-specific. Nevertheless, he noted, a basic environmental advantage stressed by both El Paso and Alcan is the common utility corridor concept (since both proposals would essentially parallel the Alyeska line and, in the case of Alcan, various other pipelines as well as the Alcan Highway). The argument in favor of construction in a common corridor, the Law Judge continued, is that impact will be merely incremental to that already imposed by previous development. However, he declared, this argument appears to rely on a priori expectation rather than actual field research. "El Paso and Alcan have the burden of proving that their respective projects are environmentally acceptable by site-specific evidence, not merely by the fact that they are in a 'corridor.' Each has partially failed to meet this burden, much less show superiority over Arctic Gas."

The Law Judge also discussed potential environmental impacts of pipeline construction by El Paso through the Chugach Forest and its proposed installation of a "once-through sea water cooling system" at the Gravina Point LNG plant. Routing of the pipeline through the Chugach Forest, he concluded, would have significant long-term effects but within acceptable limits if the public interest otherwise requires certification of the El Paso Alaska project. He recommended, however, that El Paso's LNG plant design must include air cooling towers as an alternative, absent a clear showing that its once-through seawater cooling design will not in fact adversely affect the marine biota in Prince William Sound.

In regard to Alcan, the Law Judge said its only advantage on the basis of the record is that it crosses neither the Wildlife Range nor the Chugach Forest. However, he observed, the Alcan project is promoted in part by the same companies which are sponsoring the all-Canadian Maple Leaf project to attach gas in the Mackenzie Delta. Therefore, the Alcan proposal would involve building two pipelines to market the same U.S. and Canadian gas which Arctic Gas proposes to do in one pipeline. "The combined adverse impact of Alcan's facilities far outweighs any environmental savings to the U.S. from building these separate facilities." Moreover, Judge Litt added, the same consideration pertains to the El Paso Alaska project. "The overall environmental advantages to the U.S. and Canada in building a single line far exceed an LNG-ship-LNG project at the end of an 800-mile pipeline and an additional 1,000 miles of pipeline for Maple Leaf."

Judge Litt recommended deferral of determination of specific environmental conditions until the second phase of this proceeding when they can be directed to the specific project certificated by the Commission.

Socio-Economic Factors

Judge Litt asserted that the State of Alaska will reap enormous socio-economic benefits from gas pipeline construction, regardless of which project is certificated. The most substantial economic benefit to Alaska, he stated, will come from hydrocarbon severance taxes and royalty payments -- estimated at \$135.5 million annually assuming a Prudhoe Bay production of 2.25 Bcf/d and a wellhead price of \$1.00/Mcf. This amount will be approximately the same for all projects.

Other socio-economic impacts -- on population, employment, gross state product, personal income, and government revenues and expenditures -- are more difficult to quantify and remain uncertain, the Law Judge continued. For example, while El Paso Alaska and Alcan will create more construction employment in Alaska than Arctic Gas, the number of direct jobs created is not substantial, long-term employment opportunities are few, and a greater population increase will create greater employment disturbances and other immigration problems. Also, Judge Litt observed, there are many uncertainties connected with intrastate use of royalty gas to promote industrial development in Alaska. While the State supports El Paso Alaska as the project best able to encourage industrial development, the present economic realities are not favorable for such development. Moreover, there is a serious question whether the State's anticipated use of gas in Alaska would be compatible with the Federal Government's natural gas end-use policy.

While the views of the State of Alaska -- which supports the El Paso Alaska project on the grounds of greatest net benefits to the State -- are entitled to substantial weight, the FPC Judge concluded, the Natural Gas Act does not permit certification of projects which will benefit one area of the country to the detriment of another. In this case, the great bulk (or all) of the Prudhoe Bay gas will be marketed in the Lower 48 States. While Congress has power to direct that certain actions be taken solely to benefit the economic condition of a particular state or region at the expense of others, no intention was expressed that the FPC create such preferences in performing its duties under the Natural Gas Act. Nor does anything in the Alaska Natural Gas Transportation Act of 1976 require a change in that policy. Thus, "if there exists an alternative system which better meets the overall public interest, it would be contrary to the Commission's accepted regulatory role under the Natural Gas Act to select a particular transportation system at the behest of the State of Alaska in order to accord substantial economic benefits to the State."

Marketability of North Slope Gas

Judge Litt reviewed an Arctic Gas-sponsored study which estimated incremental and rolled-in costs of North Slope gas delivered to eight metropolitan areas in the Lower 48 States (representing the anticipated major markets to be served by the Arctic Gas Group), assuming alternative wellhead prices of 55¢/MMBtu and \$1/MMBtu for Alaskan gas (and for new gas supplies developed in the Lower 48). These costs were then compared with competitive energy prices at the citygate of distillate fuel oil, residual fuel oil and electricity. On a rolled-in basis, the estimated cost of Alaskan gas was substantially lower than the price of fuel oil and electricity for all metropolitan areas except in California where parity with fuel oil was shown. On an incremental basis, the price of Alaskan gas was estimated to be lower than fuel oil and electricity except in New York City where gas prices would be equivalent to distillate fuel oil and higher than residual fuel oil. According to the study, however, this price differential in New York would be more than offset by nonprice premiums in excess of 50¢.

The FPC Judge concluded that the above study confirms the marketability of Alaskan gas, on either a rolled-in or incremental basis, "given the assumptions made by its sponsor." 1/

Economics

The Law Judge compared overall unit costs estimated for each project on the basis of 7/1/75 cost levels (with no adjustments for inflation). For this purpose, he looked primarily to costs submitted by each applicant and made certain adjustments (or accepted certain adjustments proposed by others) to achieve greater comparability or to reflect certain modifications or conclusions discussed elsewhere in his decision. The comparison related to proposals to transport initial volumes in the order of 2.0-2.5 Bcf/d from Alaska. The Alcan project was included in the comparison even though, in Judge Litt's view, it cannot be constructed in the time frame proposed (three years) and is incapable of proper cost analysis.

The comparison showed an average cost of \$1.60/MMBtu in the fifth year for Arctic Gas, a five-year average cost of \$2.15/MMBtu for El Paso Alaska, and a five-year average cost of \$1.91/MMBtu for Alcan. Arctic Gas is "clearly superior" under this comparison, Judge Litt asserted. 2/

In arriving at the above figures, the Law Judge adjusted Arctic Gas' estimated fifth year cost of \$1.39 for a system transporting 2.25 Bcf/d of Prudhoe Bay gas and 2.25 Bcf/d of Mackenzie Delta gas to reflect the lower volumes expected to be available from the Mackenzie Delta (in the range of 1.0 to 1.5 Bcf/d). The effect of lower volumes of Canadian gas, he noted, is to raise the transportation cost for U.S. gas. Specifically, the cost of service for U.S. deliveries via Arctic Gas was estimated to rise from \$1.39 to \$1.54 assuming transportation of 1.5 Bcf/d of Canadian gas and to \$1.66 assuming transportation of only 1.0 Bcf/d. The midpoint of the two was adopted for comparative purposes. The Law Judge declined to accept El Paso Alaska's proposed adjustments to Arctic Gas' estimates to include construction costs over an additional winter because of various factors alleged to render completion by the scheduled date improbable. Judge Litt noted that Arctic Gas, toward the close of hearings, increased its estimated construction costs in the North Slope region by \$330 million -- including \$120 million for two more spreads in the final construction winter and \$210 million for contingencies -- so as to provide additional resources for completion of construction on schedule.

El Paso Alaska's average cost of \$1.88 over the first five years was adjusted by Judge Litt to include an additional financing charge (0.16¢) to achieve financing comparability with Arctic Gas, as well as the estimated incremental cost (0.11¢) of a seventh liquefaction train and ninth LNG tanker determined by the Judge to be necessary to assure reliability of El Paso's 2.4 Bcf/d project.

1/ In another section of his initial decision (relating to financing and tariffs), however, Judge Litt said there were serious questions regarding marketability, primarily because all the prospective beneficiaries are looking for the "top dollar." He also suggested that a \$1/MMBtu field price in Alaska might be the maximum if marketability is to be achieved.

2/ In another section of his initial decision, Judge Litt assumed a 20% cost overrun on all of the projects for illustrative purposes. If a 20% cost overrun has a 20% effect on unit costs, he said, the average unit costs for the three projects would become \$1.92 (Arctic Gas), \$2.58 (El Paso Alaska) and \$2.29 (Alcan). "Even at this transmission cost and assuming a rational field price, Arctic Gas is clearly marketable on both an incremental and rolled-in basis. El Paso is marginally so."

With respect to Alcan, the Law Judge adopted a five-year average calculated by Arctic Gas based on certain adjustments to Alcan's estimates. Among other things, the Arctic Gas calculation reflected a deferral (or phasing) of a portion of costs in the first two years of operations to later years, consistent with the approach followed by both Arctic Gas and El Paso Alaska.

The Law Judge made clear that the above comparison was confined to average nationwide costs over a limited period. "Specific costs, including distribution costs, cannot be made on a nationwide basis at this time from this record." Moreover, he declared, the record does not enable estimates of project costs over a 20-year period, either on a nationwide basis or for different regions of the country, as required by the Alaska Natural Gas Transportation Act of 1976. Additionally, the FPC Judge noted, there are presently no tools available to the Commission for performing meaningful and expeditious analyses of the effect of any variations in the applicants' construction or financing assumptions. ^{1/}

Net National Economic Benefits

The Law Judge reviewed net national economic benefit (NNEB) studies submitted by the Department of Interior, Staff, Arctic Gas and El Paso Alaska. As tools for predicting behavior into the future, he said, NNEB studies are still in an embryonic stage of development. Moreover, "to argue that the costs and benefits of these projects standing alone can have a measurable (positive or negative) long-term impact on an economy whose annual GNP measures in the trillions, borders on the fanciful. Comparisons of the small difference in impact of the \$2 to \$3 billion in any year are totally impossible, given existing tools."

All of the NNEB studies, the Law Judge continued, indicate that each of the three projects here involved will provide a net national economic benefit to the United States. Thus, the only remaining task is to determine, if possible, a relative ranking of the three from an NNEB standpoint. Judge Litt concluded that the Department of Interior model could be used for this limited purpose so long as reliable input data are used. "Precise dollar determinations are not necessary if it can be reliably deduced that one margin favors one applicant over the others." At the same time, the Law Judge added, the Department of Interior model is not necessarily the one best-suited to the task at hand, and it incorporates several variables which are beyond the

^{1/} The Law Judge noted that efforts toward the end of the hearings to collect computer software developed by the applicants, for use by the Commission in analyzing the various programs, were only partially successful, not necessarily because of any unwillingness on the part of the applicants to supply material, but because of the limited time available to the Presiding Judge to fully comprehend the logic of all the existing programs as well as to develop additional software to replace the numerous hand calculations performed by each applicant. However, he declared, this computer technology would be of great benefit for the Commission. Accordingly, the FPC Judge directed the parties to supply detailed technical aspects of their computer technology to the Commission, including (1) explanations and workpapers of all manual calculations and all computer software; (2) engineering studies and computer programs used to develop all facility designs and construction estimates; (3) all computer data files used to develop the testimony in this record, and any additional files that may be requested for further analysis by the Commission; and (4) all automated or manual calculations utilized to develop allocated delivered costs to Lower 48 markets, along with current design specifications and contractual arrangements with regard to delivery volumes at specified delivery points.

control of science or diplomacy. Hence, caution should be used in drawing any conclusions from the results derived through application of such model. 1/

On the basis of the evidence, the FPC Judge found that the Arctic Gas project, with a Western Leg, stands to generate a greater net national economic benefit for the United States than either the El Paso or Alcan projects. However, he stated, this finding rests on certain assumptions which, although justified, cannot be considered as "inviolable." Therefore, no more than a "modicum" of weight should be attached to findings based upon the NNEB studies. Judge Litt further made clear that any rearrangement of the three projects on the NNEB ladder would in no way affect his ultimate decision.

Financing and Tariffs

Judge Litt declared that the magnitude of capital investment required for any of the projects here involved is such that the gas transmission company sponsors cannot provide institutional lenders with the degree of security necessary to warrant financing the project. Accordingly, absent credit-worthy private parties, the projects are arguably not financeable without reliance upon either consumers or taxpayers to guarantee project completion and protection of debt service during prolonged service interruptions or premature abandonment. Thus, a significant issue is whether a shifting of traditional risks taken by sellers and transporters to the consumer or taxpayer is in the public interest.

The all-events cost of service tariff proposed by the applicants as well as various tariff modifications proposed by pipeline shippers, the Law Judge noted, are all premised on direct flow through of transportation charges to distributors and then consumers. The sponsoring parties, except El Paso, also suggested the need for federal financial guarantees of some sort. 2/ Staff, New York and California, on the other hand, opposed a shifting of project risks to consumers, while the Treasury Department opposed any steps to involve taxpayers as a guarantor of the project and instead urges that consumers bear at least a portion of financial risks.

1/ The Department of Interior model developed net national economic benefits for hypothetical projects similar to those proposed by Arctic Gas and El Paso Alaska, and for a Fairbanks-Alcan alternative close to the route subsequently proposed by Alcan-Northwest. The study determined an NNEB of \$8.7 billion for the hypothetical project similar to Arctic Gas, compared with \$7.8 billion for the El Paso alternative. The advantage in favor of the Arctic Gas hypothetical was attributed to relatively lower fuel usage, a lower U.S. share of the cost of the transportation system, and a lower cost of facilities required to carry out a displacement plan. (See REPORT NOS. 1031, pp11-18; 1077, App. ppl-10.)

2/ Judge Litt dismissed El Paso's view that an Alaskan gas transportation system can be financed without federal guarantees provided that (1) the Commission authorizes an all-events cost of service transportation tariff and preoperational surcharge provisions in shippers' tariffs, and amends tariffs of FPC-regulated pipeline purchasers to require that all costs be shifted by state-regulated distributors directly to ultimate consumers, and (2) pipeline purchasers accept the legal theory that future Commissions cannot substantially modify the consumer guarantees under the all-events cost of service tariffs, and that state utility commissions will be unable to prevent timely flowthrough of costs to consumers. While this theory has "substantial merit," the Law Judge said, it can be given "no practical credence" because of its unacceptability to prospective pipeline purchasers.

The FPC Judge concluded that the final financing arrangement should involve assumption of risks by both consumers and taxpayers, and that the Commission and the Treasury Department should cooperate in working out such an arrangement to permit proper financing at reasonable rates. Based on the premise that there is a need for Alaskan gas and that any unusually high price demands for either unattractively located gas supply or relatively low-risk money are not met, the Law Judge declared that "shifting a portion of risk for securing this gas supply to the consumer is in the public interest." However, if the risk is shifted, "Treasury should be prepared either to sell noncompletion or sustained outage insurance or enter into some other type of arrangement to remove the remote risk" of noncompletion or sustained outage. "Coming behind a consumer guarantee of debt service and the sponsors' risk of equity capital, this limited contribution would substantially reduce the costs of debt capital and might help attract equity."

More specifically, with respect to the shifting or sharing of risks, Judge Litt found as follows: (1) consumers -- as one of the principal beneficiaries of attaching North Slope gas supplies -- should participate in guaranteeing project risks, but only to the extent of debt service; (2) equity holders should accept the usual risk of equity investment, with no guarantee of return of or return on equity investment in the event of prolonged outage; (3) the Federal Government should enter into an insurance or completion guarantee arrangement to facilitate raising project debt capital at a more reasonable cost, thereby reducing the cost of gas to consumers; and (4) legislation to perfect tracking of debt service costs to the consumer level and to approve Treasury participation is necessary.

Judge Litt emphasized that two other creditworthy parties -- namely, the Prudhoe Bay producers and the State of Alaska, both direct financial beneficiaries of Alaskan gas sales -- have declined to offer any financial assistance, either through debt or equity participation, or any form of cost overrun guarantees. Rather, the producers have raised constitutional objections to any arrangements linking sales or sale prices to financing participation, indicated a reluctance to expand energy-oriented activities while faced with divestiture proposals, and cited the desirability of investing discretionary capital in nonregulated business ventures. Moreover, the Law Judge noted, "several of the producers also pleaded poverty, since other investments, including nonenergy-oriented ones like Mobil's recent purchase of Marcor or Arco's purchase of Anaconda Co., have reduced both their available cash and their ability to undertake the level of guarantees which would assure lenders repayment of debt and equity."

The FPC Judge continued as follows:

"Realistically, in the time frame necessary to expeditiously finance these projects, the Commission is incapable of more than strongly suggesting to the producers that their financial assistance to these projects is both fair and proper and in their best interests. However, if the President and Congress deem it appropriate that the producers, as chief beneficiaries of the sale of Alaskan hydrocarbons, should participate in financing construction of a transportation system to market their product -- a position pressed obliquely by the Department of Treasury representatives on the record and on brief -- legislative methods may be pursued, as Treasury hinted, to secure such participation. If that should occur, many of the problems . . . will become less significant."

As for the State of Alaska, Judge Litt said there is no evidence that other states have participated in financing this type of gas pipeline project. However, in

view of Alaska's avowed intentions to invest its revenues and the high rate of return suggested here for both equity and debt, "the State may see this as a better investment than it can receive elsewhere." Moreover, if the tariffs require the ultimate consumers to shoulder full debt service responsibility and the bonds achieve debt ratings satisfactory to the New York State Insurance Commission, "they would probably also satisfy the State of Alaska's investment trust fiduciary. Nevertheless, such investments are voluntary, and the State of Alaska has not volunteered."

The FPC Judge also raised questions concerning the marketability of Alaskan gas from the standpoint of financing. Unlike most past pipeline certificate cases where large residential, commercial and industrial markets could be assumed, he explained, "here we have a constantly shrinking industrial load which will have cost consequences because lower-priority supply shortages will cause a significant shift in load factor consideration. The higher priority market remaining could well prove sensitive to price, and the unspoken message from the financial community is that the time has come to assess the risk of nonsaleability. It is now apparent that the financial community has raised a warning flag; to ignore this sub silentio questioning would be foolhardy."

One of the prime reasons for the high projected prices of delivered Alaskan gas, Judge Litt continued, is the makeup of the project.

"Rather than the usual business compromises arranged both to make a marketable product and to split the benefits among those who will gain the financial advantages from a successful venture, all of the prospective beneficiaries are looking for the top dollar. The producers and State of Alaska want a high wellhead gas price even though (1) their overall profit from their North Slope investment is already assured by the sale of the Prudhoe Bay oil under FEA regulations, (2) the product is at the end of an expensive transportation system, and (3) the market is no longer assured. Governor Jay S. Hammond of Alaska, for example, sought and will probably seek again Alaskan legislative approval to raise the severance tax on hydrocarbons from 4% to 10%. Access without equity contribution, withdrawal, underlifting and a host of other proposals put Alaska in the forefront of seeking special treatment at the consumer's expense. . . . [T]he pipeline shippers want consumer guarantees to repay their equity investment but still seek 15% to 17% after tax returns in what could be a low-risk situation. The financial community in general also wants a high rate of return regardless of how the risk might be reduced by consumer or taxpayer guarantees. In the common vernacular, 'everyone has his hand out.' It is in large measure the combination of these elements which creates the serious questions of marketability and, in turn, financeability. Only a limitation on the field price of gas to reflect its value and a reduction on investment returns to reflect limitations on risk can bring these projects 'in from the cold.'"

In short, the Law Judge said, the marketability of Alaskan gas is questionable, with no final determination possible until gas sales contracts are signed. Thus, the matter must be considered again as part of the overall presentation of producer sales contracts and financing at the next phase of these proceedings. Nevertheless, he added, the energy involved here is needed and should be secured. For this reason, project financing will require either consumer or government backstopping, or both, to guarantee project completion.

Further, Judge Litt declared, a crucial element of marketability is the field price of Prudhoe Bay gas, as yet unknown. Such price, he noted, will include not only the purchase of gas but also the cost of gas gathering and conditioning facilities which, on the basis of some untested producer calculations, may total about one-half of the unit cost of transportation system. Hence, the unit cost will be high. At the same time, the FPC Judge observed, the Prudhoe Bay Field is more remote from market than any other domestic supply previously attached, the cost of transporting this gas to market far exceeds that of the most expensive gas transmission line previously built, and gas will be produced as an adjunct to the production of oil. Therefore, the unit value of gas in the field "cannot be favorably compared with production from fields in West Virginia, Michigan or California, located close to market where existing facilities can be used for transportation -- or, for that matter, from fields in the Lower 48 States generally."

These considerations, Judge Litt declared, strongly suggest that a field price for Prudhoe Bay gas should be determined by backing off transportation costs from alternative energy prices in the market. A field price established at a level higher than such value "will sink this project." If the delivered cost of Prudhoe Bay gas "is such that the high-priority consumers which constitute the market are prompted to turn to other energy supplies, the project is uneconomic." Further, the Law Judge stated, "no one should be misled into the belief that this Commission must fix, on an allocated cost-plus basis, a field price for Alaskan gas in excess of its intrinsic market value."

In the above connection, the FPC Judge called attention to Arctic Gas' estimate of \$2.41/MMBtu (including a \$1/MMBtu field price) as the average citygate cost of Alaskan gas delivered to various Lower 48 markets (in 1975 dollars), as compared with costs of \$2.61 for distillate fuel oil, \$2.59 for residual fuel oil and \$6.89 for electricity. Assuming continuation of these price relationships between competing energy supplies in the future, a premium value of \$0.65/MMBtu for natural gas, and an actual transportation cost of \$2.00/MMBtu in 1975 dollars, "Alaskan gas with a field price of \$1.00/MMBtu would prove to be marketable on an incremental basis." But, the Law Judge declared, a price of \$1.00/MMBtu at the inlet of the transmission system (i.e., after gathering and conditioning) "is, in all likelihood, close to the maximum that this gas could command in the field and still be marketable under present market conditions. . . . However, depending upon the ultimate costs of the gathering system and conditioning plant, as well as the allocation of those costs between pipeline gas and the large volume of removable liquids, there would nevertheless appear to be a substantial return to the producers from a total field price at or below \$1.00/MMBtu."

Turning to rate of return, the Law Judge said neither the cost of debt capital nor a definite rate of return on equity can be fixed at this juncture. Therefore, determination of a specific rate of return must await the next phase of this proceeding. Nevertheless, Judge Litt observed, the range of equity returns (15% to 17%) sought by the applicants here -- on investments which, under proposed tariff mechanisms, would be virtually insulated from risk through the ability to write off charges in the event of project abandonment or prolonged outages -- is roughly two to three percentage points higher than the highest rate of return previously approved by the Commission for pipeline companies. Specifically, the highest rates of return on common equity allowed by the Commission in recent years for interstate gas pipelines are 13.5% and 13.75%. While these pipelines were not faced with the risks inherent in constructing and operating an Alaskan gas transportation system, "neither did they have the degree of insulation from risk sought by equity investors in the Alaskan project."

Nevertheless, Judge Litt added, in view of the finding that neither return of nor return on equity should be allowed in the event of project noncompletion or sustained or permanent outage, some increment above the previous high pipeline rates of return may be warranted. He suggested 14% to 15% as an "upper limit" -- or, alternatively, 12% to 13% if a partial return of equity were to be allowed in the event of noncompletion or premature abandonment.

Still another issue bearing on financing, the Law Judge said, concerns incremental versus rolled-in pricing. He concluded that, "when, as here, the new gas supply will simply replenish the diminishing existing supply in high-priority markets, incremental pricing to the burner tip would merely introduce unnecessary and avoidable administrative problems which this Commission should not encourage." Deferral of this issue to a subsequent phase of this case -- as urged by Staff, Judge Litt added, would only "further imperil, if not frustrate, the timely financeability of an Alaskan gas transportation system."

The Law Judge also reviewed the feasibility of the different financing plans proposed by the three applicants. (A detailed analysis of these plans was included in a 22-page appendix to the initial decision.) Based on this review, he concluded that financing of the El Paso project appears to be the most feasible, even though certain provisions must be altered. The Arctic Gas project can also be financed, but capital cost premiums and financial restrictions, inherent in its binational makeup, produce less flexibility and higher capital costs. However, there is serious doubt regarding the feasibility of financing Alcan because of the possibility of simultaneous financing of the Maple Leaf project. On the other hand, if Maple Leaf is not in the picture, "there appears to be adequate market capacity in the U.S. and Canada for Alcan to obtain financing."

Next, Judge Litt discussed various proposals designed to permit pre-operations charges to consumers, generally equivalent to prepayment of return on equity, in order to generate cash flow for regulated shippers prior to commencement of deliveries. A number of tariff provisions advanced toward this end, the Law Judge noted, are essentially variations on the basic concept of including construction work in progress (CWIP) in rate base during construction (as opposed to capitalizing AFUDC during construction and putting it in the rate base once operations have begun). The FPC Judge supported the need for consumer prepayment of carrying costs to assist the financing of equity investment. Each pipeline shipper, he noted, must raise its share of an enormous amount of equity capital on the basis of its own credit standing. However, just as the financial wherewithal of these shippers to guarantee project debt is nonexistent, "it also appears that they do not have the ability to raise equity funds absent the generation of cash flow during the construction stage."

None of the reasons advanced by the Commission in Order No. 555 (issued 11/8/76) for excluding interstate gas pipelines from the limited scope of its new policy to allow inclusion of CWIP in the rate base, the FPC Judge noted, is applicable to the Alaskan gas transportation proposals. Moreover, the problem of "intergenerational transfer," which apparently caused the Commission to limit Order No. 555 to certain types of electric utility construction (pollution control facilities and conversions of generating plants to alternate fuels), "is small in the instant case because Alaskan gas should flow within four years of the first surcharge payments." Also, a properly designed pre-operations consumer surcharge is not inequitable to present ratepayers since "benefits flowing from a surcharge for equity returns inure not only to future ratepayers but also to present ratepayers, the most obvious benefit being assurance of continued gas supplies." Another benefit, Judge Litt added, is a lower rate of return on project equity which should flow from the reduction in burdens on the utilities' overall capital structures.

The Law Judge made no attempt to choose a method from among the several proposed to establish a pre-operations surcharge. However, the so-called Method 4 sponsored by Arctic Gas "may well constitute the basic guide for crafting an appropriate provision." ^{1/}

Finally, in regard to specific tariff provisions, Judge Litt (1) recommended a 90% level of performance as the cutoff below which penalties (in the form of a pro rata reduction of return on equity) would apply if a transporter were unable to accept deliveries (the applicants all proposed an 80% cutoff, while Staff urged 100% performance); (2) endorsed El Paso Alaska's suggestion that carrying costs on construction expenditures, after passing Commission audit, should be permitted to be flowed through immediately by pipeline shippers to consumers; (3) recommended that project cost of service tariffs be conditioned to prevent the commencement of billing until such time as contract service can be rendered (the tariffs of companies involved in the Arctic Gas and Alcan groups provided for commencement of billing by each company as soon as facilities are in place, regardless of whether service is actually rendered); (4) found no reason to reject the monthly billing procedure proposed by Arctic Gas and Northern Border on the basis of estimated costs over a six-month period, with adjustments in subsequent billing periods to reflect any deviations from actual costs (this method was opposed by Staff which advocated monthly billing on the basis of actual costs); and (5) supported Staff's proposal for a fixed interim rate, rather than the cost "phasing" procedure recommended by Arctic Gas.

Canadian Issues

The Law Judge said the principal dispute regarding Canadian matters at this time relates to political issues -- including how Canada will act and when it will act.

As to timing, the FPC Judge noted that a decision by the NEB is anticipated in the spring or early summer of 1977 and that a report by Mr. Justice Berger on native claims in the Yukon and Northwest Territories (including the Mackenzie Valley) is expected in the early spring of 1977. As to the latter, Judge Litt considered unlikely that native claims will significantly modify the Canadian Government's energy decision.

El Paso contends, Judge Litt continued, that Canada will act in the "best interests" of Canadians, which are not necessarily the "best interests" of the U.S. ^{2/} Moreover, despite the hydrocarbon transit treaty negotiated by the U.S. and Canada,

^{1/} Method 4 would permit each sponsoring pipeline subject to FPC jurisdiction to annually charge its customers a percentage of its accumulated equity investment in the project companies (Alaskan Arctic, Canadian Arctic and Northern Border), the charge generating enough cash flow to cover the carrying costs of each sponsor's equity investment. A figure of 15% is suggested. The charge would commence upon the first equity investment, would be collected throughout the construction period, and would continue to be collected for up to the first 10 years of project operations, although the equity investment to which this percentage is applied would be reduced by at least 10% for each of these first 10 years of operations. The sponsors could accelerate this 10% reduction of equity investment so as to stop customer charges before the end of 10 operating years. Once the project commenced operations, the sponsoring pipelines (shippers) would start refunding to their customers the full amount of the Method 4 charges collected with compound interest (at the Commission-prescribed rate). The refund period would be set by the Commission, though 20 years is recommended.

^{2/} This treaty was signed by the Canadian Ambassador to the United States and the Assistant Secretary of State on 1/28/77. The treaty is still subject to ratification by both countries.

El Paso suggests that the Canadian Government could remain within the law but still take actions unreasonable from a U.S. point of view in allocating costs of future capacity, granting applications for line expansion, taxes, and other areas within the ambit of Canadian policy.

"The El Paso Canadian Reply Brief is as well crafted a chamber of horrors as this writer has ever seen and would do justice to the standards set by the Marquis de Sade if he had been interested in economics and politics. But that is also its undoing, for the questions so piously raised for the most part are no more than unrealistic speculations which, if valid, might be as applicable to El Paso's Alaskan and Algerian endeavors as to the Arctic Gas and Alcan proposals here to cross Canada. If El Paso can argue to the American consumer that the gas supply from Algeria will remain constant for the next 20 years or that tax treatment by Alaska will remain constant for a similar period, reliance factors which impact most heavily on El Paso, it cannot at the same time expect its arguments against the reliability of Canada to be given much weight."

Judge Litt acknowledged that there was little justification, from the U.S. consumer standpoint, for actions of the British Columbia Government in requiring the entire burden of curtailments by Westcoast Transmission in the past few years (due to production failures) to be imposed entirely on U.S. customers and none on Canadian customers. On the other hand, he saw nothing untoward in Canadian Government actions raising the export price of gas -- most recently to \$1.94 as of 1/1/77 -- in order to achieve a pricing scheme consistent with the commodity value of gas in relation to other fuels.

Also, the Law Judge noted, charges regarding Canadian unreliability ignore "historical facts," namely, a constancy in relationships extending back almost 200 years. If the future Canadian Government were predisposed to act unreasonably, "such imprudence could be countered with equally unsavory activities on the part of the U.S." Still another factor, Judge Litt added, is that, whatever the Canadian Government's decision regarding the continuation or expansion of gas exports to the U.S. in the future, the attachment of Canadian frontier gas reserves can only help U.S. prospects.

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currently shut down because of curtailments in Columbia's service area manufacture materials necessary for the production of defense-related goods, and that the requirement to restore Columbia's severely depleted reserves will result in continued industrial load curtailments through the summer storage season. Therefore, FEA urged the requested waiver in order that the nation "may fully meet its defense requirements." Similarly, Secretary Blumenthal added, the Department of Defense advised of the adverse effects of the current shortage of LNG and the potential resultant shortages of petroleum fuels for production facilities engaged in the manufacture of items for DOD and at defense installations.

Finally, Secretary Blumenthal noted that, according to the Department of Commerce, no LNG carrier built in a U.S. shipyard is available to transport this LNG from Alaska to Massachusetts and that the severity of the natural gas shortage which threatens to shut down all types of facilities, including military facilities, justifies a limited non-precedent setting waiver of the Jones Act.

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According to the Wall Street Journal dated 2/4/77, Secretary Blumenthal has granted another waiver of the Jones Act to permit Tropigas International Corp. to ship liquefied propane gas from Houston, Texas to Chesapeake, Virginia on a Panamanian ship. The waiver expires 4/30/77 and will permit five trips, each carrying 34,700 barrels of LPG.

FPC Judge Litt Recommends Certification of Arctic Gas Project to Transport North Slope Gas to Lower 48 States; FPC Suspends El Paso Alaska Proceeding

On 2/1/77 Administrative Law Judge Nahum Litt issued an initial decision in the El Paso Alaska proceeding (CP75-96 et al.) recommending selection of the Arctic Gas Project over competing proposals of El Paso Alaska and Alcan Pipeline-Northwest Pipeline to transport gas from the Prudhoe Bay Field of Alaska to markets in the Lower 48 States.

Judge Litt concluded that the Arctic Gas project is superior in nearly every significant aspect to the El Paso Alaska proposal and should be certificated, including its Western Leg. However, El Paso Alaska also has a "viable plan" which technically can be built in an environmentally sound manner and could be certificated if not for the "clearly superior" Arctic Gas application. Thus, if Arctic Gas is unable to accept a certificate, El Paso's proposal -- subject to certain modifications -- can be found to meet the present and future public convenience and necessity.

On the other hand, Judge Litt declared, the record does not support even the "possibility" of a grant of authority to Alcan. In no event, he said, could the Alcan project be approved with the inclusion of Westcoast Transmission, one of the Canadian company participants, because of the arbitrary assignment of volumes for transportation through the Westcoast system and higher costs of transportation which would result for U.S. consumers. Specifically, he said, it would appear that the 30%-70% split of volumes in Canada (for transportation to the Canadian-Lower 48 border by Westcoast and Alberta Gas Trunk Line, respectively) was adopted, in the first instance, to secure Westcoast's participation in the Alcan project by assuring that the Westcoast line below Fort Nelson, British Columbia "would be allocated a sufficient volume of gas to fill existing excess capacity, thereby warranting construction of additional loop facilities which would inure to the ultimate benefit of Canadian customers." Moreover, the pro forma tariffs of the two Canadian companies disclose an "overt Canadian bias" and contain cost allocation provisions which are "totally unacceptable" to U.S. consumers. Although

allocation procedures supported by Alberta Gas Trunk Line are now alleged to be inoperative, the result is to prevent any meaningful costing of facilities.

Further, Judge Litt asserted, two critical elements of Alcan's proposal -- construction in a three-year period (with completion in 1981) and financing in a separate time frame from the Maple Leaf project (sponsored by the same Canadian companies which are participants in Alcan) -- are totally unsupported. Completion of the Alcan project by 1981 simply "cannot occur," and the financing arrangements proposed for Alcan and Maple Leaf require "intricate timing" which lacks any evidentiary support. Accordingly, "as presently proposed, even with Alcan's willingness to build anything anyone wants (as long as it does not oust Westcoast and AGTL from their Maple Leaf project), there is not enough left of its original proposal to serve as a basis for granting its application."

The FPC Judge was highly critical of the Prudhoe Bay producers -- both for their refusal thus far to enter into gas sales contracts, and for their refusal to offer any assistance to financing of an Alaskan gas transportation project. ✓

The absence of producer contracts was identified by Judge Litt as a major impediment to this proceeding. All efforts to induce producers to enter into sales contracts were "singularly unsuccessful." Rather, the producers appear to consider the national interest as "negotiable" in their attempt to obtain concessions from the Commission or the Congress in return for cooperation in marketing the Prudhoe Bay gas. Nor, the FPC Judge noted, does there exist an approved field production agreement. As a result, the record has been closed without a gas deliverability schedule, without knowing the purchasers of the gas, without knowing more than the alleged general cost of field gathering and gas conditioning facilities or who would bear such cost, and without specific estimates of reserves on the Lisburne and Kaparuk formations which are part of the Prudhoe Bay Field. In the usual case, these deficiencies would require that the proceeding be held in abeyance pending their resolution. Here, however, "an overwhelming consensus on the part of the Commission, the Congress and the Executive Branch has been to go forward anyway and to pick a pipeline. It is not the best way to make rational decisions."

In regard to financing, Judge Litt noted various objections raised by the producers to financial participation -- including the desirability of investing capital in nonregulated business ventures and "poverty" as a result of such investments. Realistically, he continued, the Commission can do more than strongly suggest that financial assistance by the producers is both fair and in their best interests. "However, if the President and Congress deem it appropriate that the producers, as chief beneficiaries of the sale of Alaskan hydrocarbons, should participate in financing construction of a transportation system to market their product -- a position pressed obliquely by the Department of Treasury representatives on the record and on brief -- legislative methods may be pursued, as Treasury hinted, to secure such participation."

Since the gas transmission company sponsors of the various projects are not sufficiently creditworthy in the aggregate to provide institutional lenders with the degree of security necessary to warrant financing and since other obvious creditworthy parties (producers and the State of Alaska) have shown no interest in participation, Judge Litt said a critical question is the degree to which financial risks should be shifted to consumers and/or taxpayers, if at all. The FPC Judge concluded that the final financing arrangement should involve assumption of risks by both consumers and taxpayers, and that the Commission and the Treasury Department should cooperate in working out such an arrangement to permit proper financing at reasonable rates. Specifically, he declared, (1) consumers -- as one

of the principal beneficiaries of attaching North Slope gas supplies -- should participate in guaranteeing project risks, but only to the extent of debt service; (2) equity holders should accept the usual risk of equity investment, with no guarantee of return of or return on equity investment in the event of prolonged outage; (3) the Federal Government should entertain an insurance or completion guarantee arrangement to facilitate raising project debt capital at a more reasonable cost, thereby reducing the cost of gas to consumers; and (4) legislation to perfect tracking of debt service costs to the consumer level and to approve Treasury participation is necessary.

Other findings by Judge Litt included the following, among others: (1) a \$1.00 per MMBtu field price for North Slope gas (including costs of gathering and conditioning) is close to the maximum level at which the supply could remain marketable under present conditions; (2) an equity rate of return in the range of 14% to 15% represents an "upper limit"; (3) the North Slope gas should be priced on a rolled-in basis in view of the fact that it "will simply replenish a diminishing existing supply in high priority markets"; and (4) in the event the El Paso Alaska project is ultimately selected, the proposed LNG terminal facility in California should be moved from Point Conception to Oxnard.

A more detailed summary of Judge Litt's initial decision appears in an Appendix to this REPORT.

* * * * *

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Order No. 558-B implemented the FPC's intent, previously announced in Order No. 558 (issued 12/14/76), to suspend the El Paso Alaska proceeding upon issuance of Judge Litt's initial decision (which was directed by 2/1/77).

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Another provision of the Act directed the FPC to "suspend" all proceedings relating to the transportation of Alaskan gas pending on the date of enactment "as soon as the Commission determines to be practicable after such date," to review all applications to transport Alaskan gas pending on the enactment date, and to discuss in its report to the President some 13 specified factors with respect to each transportation system considered. Such report shall recommend either a particular transportation system or no decision at this time. Any recommendation for an all-land pipeline transportation system, or a transportation system involving water transportation, must "include provision for new facilities to the extent necessary to assure direct pipeline delivery of Alaskan natural gas contemporaneously to points both east and west of the Rocky Mountains in the lower continental United States."

In addition, for purposes of reaching a recommendation, the Act authorizes the FPC to provide, by rule, for the "presentation of data, views, and arguments" pursuant to such procedures as the Commission determines to be appropriate, with such rule to apply "notwithstanding any provision of law that would otherwise have applied to the presentation of data, views, and arguments." (See REPORT NO. 1076, pp9-11.)

*File
Oil-Gas*

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currently shut down because of curtailments in Columbia's service area manufacture materials necessary for the production of defense-related goods, and that the requirement to restore Columbia's severely depleted reserves will result in continued industrial load curtailments through the summer storage season. Therefore, FEA urged the requested waiver in order that the nation "may fully meet its defense requirements." Similarly, Secretary Blumenthal added, the Department of Defense advised of the adverse effects of the current shortage of LNG and the potential resultant shortages of petroleum fuels for production facilities engaged in the manufacture of items for DOD and at defense installations.

Finally, Secretary Blumenthal noted that, according to the Department of Commerce, no LNG carrier built in a U.S. shipyard is available to transport this LNG from Alaska to Massachusetts and that the severity of the natural gas shortage which threatens to shut down all types of facilities, including military facilities, justifies a limited non-precedent setting waiver of the Jones Act.

* * * * *

According to the Wall Street Journal dated 2/4/77, Secretary Blumenthal has granted another waiver of the Jones Act to permit Tropigas International Corp. to ship liquefied propane gas from Houston, Texas to Chesapeake, Virginia on a Panamanian ship. The waiver expires 4/30/77 and will permit five trips, each carrying 34,700 barrels of LPG.

FPC Judge Litt Recommends Certification of Arctic Gas Project to Transport North Slope Gas to Lower 48 States; FPC Suspends El Paso Alaska Proceeding

On 2/1/77 Administrative Law Judge Nahum Litt issued an initial decision in the El Paso Alaska proceeding (CP75-96 et al.) recommending selection of the Arctic Gas Project over competing proposals of El Paso Alaska and Alcan Pipeline-Northwest Pipeline to transport gas from the Prudhoe Bay Field of Alaska to markets in the Lower 48 States.

Judge Litt concluded that the Arctic Gas project is superior in nearly every significant aspect to the El Paso Alaska proposal and should be certificated, including its Western Leg. However, El Paso Alaska also has a "viable plan" which technically can be built in an environmentally sound manner and could be certificated if not for the "clearly superior" Arctic Gas application. Thus, if Arctic Gas is unable to accept a certificate, El Paso's proposal -- subject to certain modifications -- can be found to meet the present and future public convenience and necessity.

On the other hand, Judge Litt declared, the record does not support even the "possibility" of a grant of authority to Alcan. In no event, he said, could the Alcan project be approved with the inclusion of Westcoast Transmission, one of the Canadian company participants, because of the arbitrary assignment of volumes for transportation through the Westcoast system and higher costs of transportation which would result for U.S. consumers. Specifically, he said, it would appear that the 30%-70% split of volumes in Canada (for transportation to the Canadian-Lower 48 border by Westcoast and Alberta Gas Trunk Line, respectively) was adopted, in the first instance, to secure Westcoast's participation in the Alcan project by assuring that the Westcoast line below Fort Nelson, British Columbia "would be allocated a sufficient volume of gas to fill existing excess capacity, thereby warranting construction of additional loop facilities which would inure to the ultimate benefit of Canadian customers." Moreover, the pro forma tariffs of the two Canadian companies disclose an "overt Canadian bias" and contain cost allocation provisions which are "totally unacceptable" to U.S. consumers. Although

allocation procedures supported by Alberta Gas Trunk Line are now alleged to be inoperative, the result is to prevent any meaningful costing of facilities.

Further, Judge Litt asserted, two critical elements of Alcan's proposal -- construction in a three-year period (with completion in 1981) and financing in a separate time frame from the Maple Leaf project (sponsored by the same Canadian companies which are participants in Alcan) -- are totally unsupported. Completion of the Alcan project by 1981 simply "cannot occur," and the financing arrangements proposed for Alcan and Maple Leaf require "intricate timing" which lacks any evidentiary support. Accordingly, "as presently proposed, even with Alcan's willingness to build anything anyone wants (as long as it does not oust Westcoast and AGTL from their Maple Leaf project), there is not enough left of its original proposal to serve as a basis for granting its application."

The FPC Judge was highly critical of the Prudhoe Bay producers -- both for their refusal thus far to enter into gas sales contracts, and for their refusal to offer any assistance to financing of an Alaskan gas transportation project.

The absence of producer contracts was identified by Judge Litt as a major impediment to this proceeding. All efforts to induce producers to enter into sales contracts were "singularly unsuccessful." Rather, the producers appear to consider the national interest as "negotiable" in their attempt to obtain concessions from the Commission or the Congress in return for cooperation in marketing the Prudhoe Bay gas. Nor, the FPC Judge noted, does there exist an approved field production agreement. As a result, the record has been closed without a gas deliverability schedule, without knowing the purchasers of the gas, without knowing more than the alleged general cost of field gathering and gas conditioning facilities or who would bear such cost, and without specific estimates of reserves on the Lisburne and Kaparuk formations which are part of the Prudhoe Bay Field. In the usual case, these deficiencies would require that the proceeding be held in abeyance pending their resolution. Here, however, "an overwhelming consensus on the part of the Commission, the Congress and the Executive Branch has been to go forward anyway and to pick a pipeline. It is not the best way to make rational decisions."

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In addition, Order No. 558-B ruled on certain requests for clarification of Order No. 558-A (issued 12/16/76) which provided for the appointment of a delegate (or delegates) to request data, views and arguments from other federal agencies and from persons or groups in the private sector (excluding the applicants in the El Paso Alaska proceeding) in order to enable the Commission to analyze in its report to the President on 5/1/77 certain factors specified in the Alaska Gas Transportation Act for discussion but not covered by the record in the El Paso Alaska proceeding. 1/ Such factors include, for example, annual volumes of Alaskan gas expected to be available to each region of the U.S. over the next 20 years, together with transportation costs and delivered prices. (See REPORT NO. 1083, pp23-24.)

In regard to the procedures established in Order No. 558-A, Arctic Gas asked that (1) the delegate be permitted to request information from applicant parties, if such requests are to be made of any nonfederal person or group; (2) all requests for information and assistance by the delegate, and all responses thereto, be made public; and (3) any person be allowed to respond to such requests.

The Commission replied that it will only consider information requested by it or a delegate, and will not consider unsolicited communications. Since the applicants in the El Paso Alaska case have had more than adequate opportunity to advance their positions regarding the competing projects and to submit "data, views and arguments" in support of their positions, "the quality of information available to the Commission would not be enhanced through mere repetition of that discourse." Therefore, "the Commission or delegates should not communicate in relation to substantive matters with the applicants or affiliates thereof or parties, counsel, or witnesses (including Commission Staff witnesses) that have advocated on the record the approval or rejection of any of the competing projects."

An exception to this ruling, the FPC noted, is any necessary communication regarding the computer programs or models of the applicants which Judge Litt seeks to obtain for the Commission's use. Any such communication, however, should be limited to information required to enable comprehension of the program or models and should not extend to the merits of any proposal.

The Commission further stated that there was no need to place all communications in the public files. However, prior to submission of the FPC's recommendation to the President, a summary of extra-record data which has been obtained and may be relied upon by the Commission will be noticed, and interested parties will be given an opportunity to comment. Finally, all records and documents compiled during this phase of the proceeding will be available for appropriate Congressional or Executive review after submission of the Commission's recommendation. These procedures, the Commission concluded, will insure "impartiality in the process," give parties adequate opportunity to rebut factual matters, and enable the Commission to discharge its duties under the Alaska Natural Gas Transportation Act of 1976.

1/ Jerome Hass and Richard Smith were subsequently designated as delegates for this purpose. (See REPORT NO. 1084, pp7-8.)

SUMMARY OF INITIAL DECISION IN EL PASO ALASKA PROCEEDING
RECOMMENDING SELECTION OF ARCTIC GAS PROJECT

The following is a summary of the initial decision issued on 2/1/77 by Administrative Law Judge Nahum Litt in the El Paso Alaska proceeding (CP75-96 et al.) involving competing projects sponsored by the Arctic Gas consortium, El Paso Alaska and Alcan Pipeline-Northwest Pipeline to transport gas from the Prudhoe Bay Field of Alaska to markets in the Lower 48 States.

Judge Litt concluded that the Arctic Gas project is superior in nearly every significant aspect to the El Paso Alaska proposal and should be certificated, including its Western Leg. However, El Paso Alaska also has a "viable plan" which technically can be built in an environmentally sound manner and could be certificated if not for the "clearly superior" Arctic Gas application. Thus, if Arctic Gas is unable to accept a certificate, El Paso's proposal -- subject to certain modifications -- can be found to meet the present and future public convenience and necessity.

On the other hand, Judge Litt declared, the record does not support even the "possibility" of a grant of authority to Alcan. In no event, he said, could the Alcan project be approved with the inclusion of Westcoast Transmission, one of the two Canadian company participants, because of the arbitrary assignment of volumes for transportation through the Westcoast system and higher costs of transportation which would result for U.S. consumers. Specifically, he said, it would appear that the 30%-70% split of volumes in Canada (for transportation to the Canadian-Lower 48 border by Westcoast and Alberta Gas Trunk Line, respectively) was adopted, in the first instance, to secure Westcoast's participation in the Alcan project by assuring that the Westcoast line below Fort Nelson, British Columbia "would be allocated a sufficient volume of gas to fill existing excess capacity, thereby warranting construction of additional loop facilities which would inure to the ultimate benefit of Canadian customers." Moreover, the pro forma tariffs of the two Canadian companies disclose an "overt Canadian bias" and contain cost allocation provisions which are "totally unacceptable" to U.S. consumers. Although allocation procedures supported by Alberta Gas Trunk Line are now alleged to be inoperative, the result is to prevent any meaningful costing of facilities.

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Overview of Projects

The Arctic Gas project includes a number of interrelated applications involving construction of some 4,512 miles of pipeline from the North Slope of Alaska through Canada to markets on the West Coast and in midwestern and eastern states. Specifically, Alaskan Arctic Gas Pipeline would construct a 195-mile, 48-inch line from the Prudhoe Bay to the Alaska-Canada border. From that point, Canadian Arctic Gas Pipeline would construct over 2,300 miles of mostly 48-inch line across the Mackenzie Delta and then south to Caroline Junction, Alberta where the line would divide -- with a Western Leg extending south to Kingsgate on the British Columbia-Idaho border and the Eastern Leg extending south to Monchy, Saskatchewan. From Kingsgate, Pacific Gas Transmission proposes to loop its existing line to deliver gas to markets in Pacific Northwest states and in Northern and Southern California. From Monchy, Northern Border Pipeline (a partnership of six U.S. pipelines) would build a 1,138-mile, 24-inch line to Dwight, Illinois (near Chicago). Deliveries of Alaskan gas to the Lower 48 States are projected at 2.25 Bcf/d by the fifth year of operations, with approximately 30% to be received by PGT for West Coast markets and the remaining 70% by Northern Border for midwestern and eastern markets.

El Paso Alaska proposes to transport gas from Prudhoe Bay via a new 809-mile pipeline (largely paralleling the Alyeska oil pipeline route) to Gravina Point on the southern coast of Alaska where the gas would be liquefied and shipped by tanker to terminal, storage and regasification facilities proposed by Western LNG Terminal Co. at Point Conception, California (approximately 120 miles north of Los Angeles). From Point Conception, Western LNG proposes to construct new pipelines to connect with existing transmission facilities of Pacific Gas & Electric Co. and Southern California Gas Co. Delivery of Prudhoe Bay gas to other markets in the Lower 48 States would be accomplished through a combination of displacement, reversal of flow in existing lines of California utilities and in certain existing lines of El Paso Natural Gas Co. and Transwestern Pipeline Co. (between the California-Arizona border and the Permian Basin), construction of new lines by El Paso Natural from the Permian Basin to the Anadarko Basin or the Texas Gulf Coast area (or both) to interconnect with other interstate pipeline companies in those areas, and use of projected idle capacity in those pipelines to effect delivery of gas to markets in midwestern, southeastern and eastern states.

Alternative showings of El Paso Alaska contemplated deliveries of 2.4 Bcf/d or 3.2 Bcf/d from the Prudhoe Bay Field.

Finally, the Alcan Pipeline project -- sponsored by Northwest Pipeline Co. and two Canadian companies -- involves the construction of a 730-mile, 42-inch pipeline from Prudhoe Bay to Delta Junction (south of Fairbanks) along the Alyeska oil pipeline route and then extending to the Alaska-Yukon border along the Alcan Highway and an abandoned oil pipeline route. The pipeline would be designed to carry 2.4 Bcf/d of Alaskan gas. At the Alaska-Yukon border, the gas would be delivered to Foothills Pipe Line (or an affiliate) which would construct a new 42-inch line continuing along the Alcan Highway to Fort Nelson, British Columbia where approximately 30% of the gas would be delivered to Westcoast Transmission Co. Ltd. for ultimate transportation through expanded facilities to the Lower 48 border at Sumas, Washington. The remaining 70% would be transported from Fort Nelson to Zama Lake, Alberta (a distance of 144 miles) by a new pipeline -- to be owned in British Columbia by Westcoast and in Alberta by Alberta Gas Trunk Line (AGTL) -- for delivery into existing facilities of AGTL and further transportation to Empress, Alberta and possibly also to Kingsgate, British Columbia. From Empress, gas destined for midwestern or eastern markets in the Lower 48 would be delivered to the Northern Border system at Monchy, Saskatchewan. Gas delivered to Sumas, and possibly to Kingsgate, would be

transported to western markets through existing or expanded pipeline facilities of Northwest and Pacific Gas Transmission.

Initial Decision

The summary below is organized under the following headings (conforming for the most part to those in the initial decision): Lack of Producer Sales Contracts, Jurisdictional Questions and Proposed Legislation, "Western Leg" Issue, Gas Supply, Construction and Geotechnical Problems, Operational Factors, Environmental Considerations, Socio-Economic Factors, Marketability of North Slope Gas, Economics, Net National Economic Benefits, Financing and Tariffs and Canadian Issues.

Lack of Producer Sales Contracts

At the outset of his initial decision, Judge Litt stressed the significant problems caused throughout the hearing by the failure of those owning the Prudhoe Bay reserves -- principally, the State of Alaska, Atlantic Richfield Co., Exxon Corp. and Sohio Petroleum Co. -- to enter into gas sales contracts. This refusal, he said, has prevented the expeditious and orderly examination of pipeline sizing, financing, marketability, and a host of related matters, including disputes as to which companies ultimately would buy the gas. While the State of Alaska announced sales of its royalty gas to El Paso, Southern Natural and Tenneco on the last day of the hearing (11/12/76), even these contracts for royalty gas are not effective until ratification by the state legislature, which is not in session.

All efforts to induce producers to enter into sales contracts, Judge Litt continued, were "singularly unsuccessful." As recently as 9/30/76, while indicating an intent to act reasonably and professing a concern for the national interest, the producers refused to state categorically that they would enter into contracts to sell gas upon certification of a prime pipeline route. "Their position is that they are in business to sell hydrocarbons and the only question is timing. . . . The only conclusion possible from their actions is that the national interest to ARCO, Exxon, Sohio, etc. lies somewhere below their own economic interest, or at least, the national interest of the U.S. appears . . . negotiable in their bid to obtain certain concessions from the Commission or the Congress in return for their cooperation in bringing this gas to market." In short, "the producers, like G. B. Shaw's dinnertime companion, have a price at which they would sell their 'service,' and all of their protestations to the contrary cannot hide that they are mainly dickering over price."

Similarly, the State of Alaska has pursued a course designed to maximize economic benefits flowing to Alaska from its hydrocarbon resources. "This laudable goal for Alaskans, unfortunately, is not always consistent with the general public interest of all the people of the United States."

The Law Judge also noted the absence of an approved production agreement for oil or gas from the Prudhoe Bay Field. While a draft agreement became available in August 1976, it will be several more months until state approval will be given.

Because of the lack of gas sales contracts and the lack of an approved field production agreement, Judge Litt stated, the record has been closed without a gas deliverability schedule, without knowing the purchasers of the gas, without knowing more than the alleged general cost of field gathering and gas conditioning facilities or who would bear such cost, and without specific estimates of reserves on the Lisburne and Kaparuk formations which are part of the Prudhoe Bay Field. In the usual case, these deficiencies would require that the proceeding be held in abeyance pending their resolution. Here, however, "an overwhelming consensus on the part of the

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Commission, the Congress and the Executive Branch has been to go forward anyway and to pick a pipeline. It is not the best way to make rational decisions."

Given the above considerations, the Law Judge added, "it is amazing in fact that this proceeding progressed so far so fast. The applications were filed prematurely from any rational regulatory point of view, and the Commission's determination to try the cases without an essential ingredient represents a regulatory boldness normally not seen."

Jurisdictional Questions and Proposed Legislation

Judge Litt dismissed the State of Alaska's claim that the FPC lacks jurisdiction over its interstate sales. This claim, he said, rests solely on the contention that a State is not a "person" within the meaning of Section 2 of the Act. No such gap exists in the law, the Law Judge replied, and one should not be created. Otherwise, producing and energy-rich states of the nation, by virtue of their royalty interest in production from state lands and their "increasing propensity to reserve the right to take that interest in-kind," will expand such gap to permit larger and larger volumes to escape regulatory control. Also, Judge Litt noted, Alaska's essential premise is undercut by the Supreme Court's holding in FPC v. Corporation Commission of Oklahoma that a state agency is a "person" within the meaning of Section 2 of the Natural Gas Act for purposes of jurisdiction by U.S. District Courts to enjoin actions violative of the Act.

The FPC Judge also referred to problems created by the State of Alaska's gas sales contracts with El Paso, Southern Natural and Tenneco reserving the right to reduce daily deliveries by up to 25% at any time during the first five years, 50% during the next five years, 75% during the third five-year period, and 100% after 15 years, for in-state use. While there is little doubt that the Commission would refuse to certificate long-term sales under such terms, the Law Judge stated, Section 13(b) of the 1976 Alaska Natural Gas Transportation Act unfortunately permits Alaska to withdraw its royalty gas from the interstate market in the manner contemplated by its contracts. Such withdrawal could result in the future idling of downstream facilities and produce adverse cost impacts. Additionally, "the mere prospect of withdrawal imperils the financeability of an Alaskan gas project."

Accordingly, Judge Litt urged the Commission, in its report to the President, to recommend deletion of Section 13(b) of the Alaska Natural Gas Transportation Act of 1976, as well as deletion of Section 13(a) which bars the Commission from denying access to the Alaskan gas transportation system to shippers not participating in equity financing. Absent deletion of these two provisions, "direct and total U.S. Government guarantees would appear to be the only feasible method of financing."

Another serious regulatory gap, Judge Litt continued, is the absence of direct plenary jurisdiction by any government agency over the operations and charges of the El Paso tanker fleet. Therefore, if the El Paso project were to be approved, this gap should be closed, either indirectly through certificate conditions or directly through suitable federal legislation. Any certificate conditions should require, at a minimum, that El Paso Alaska bind the shipping companies to all contract pricing provisions and to continued dedication of the ships over the project life; seek prior Commission authorization for any subsequent amendments materially affecting the terms of the approved contracts; cause all books and records of the shipping companies to be made available for Commission audit; and seek prior Commission approval for any effort to divest effective corporate control (if any) over the shipping companies. Since such conditions would be likely to be tested in the courts, "the Commission may wish to recommend appropriate federal legislation to confer jurisdiction in order to avoid uncertainty."

Finally, the Law Judge said, federal legislation is required to enable full and timely recovery from ultimate consumers of all appropriate costs in connection with an Alaskan transportation project. While the Commission should not have the power to suspend flow through of costs, it should have the right to review all such costs at all times, with retention of the power to order refunds where appropriate. Similarly, the Treasury Department should be granted appropriate statutory authority to accomplish whatever federal participation in the Alaskan gas project financing is ultimately determined to be required in the public interest.

"Western Leg" Issue

Judge Litt rejected Staff's recommendation for elimination of the "Western Leg" portion of the Arctic Gas project, currently designed to deliver initial volumes of 659,000 Mcf/d or roughly 30% of the total initial Alaskan gas flow of 2.25 Bcf/d, and for delivery of these volumes instead to the West Coast through combined use of Pacific Gas Transmission facilities and Northern Border facilities. Specifically, Staff proposed two alternatives: (1) use of an expected 601,000 Mcf/d of idle capacity expected on the PGT system by 1981 following expiration of gas export licenses, with the balance of 36,000 Mcf/d to be delivered by displacement through the proposed Northern Border system; and (2) use of 204,000 Mcf/d of idle capacity on PGT's system if curtailments of Canadian export gas are less than predicted, with displacement of 433,000 Mcf/d via Northern Border.

Arctic Gas conceded the technical feasibility of the Staff's displacement proposal, the Law Judge noted, and also admitted that elimination of the Western Leg facilities would result in a net reduction in project capital costs of \$512 million and a reduction in average annual project transportation cost of service of roughly \$50 million. Staff viewed the estimated \$50 million savings in annual cost of service as a minimum.

Staff's proposal, Judge Litt stated, is keyed to very substantial and permanent reductions in Canadian deliveries to PGT, commencing either prior to or contemporaneously with the expiration of applicable export licenses. However, he declared, absent such developments, long-term displacement of full Western entitlements over a fully loaded 42-inch Eastern Leg (Northern Border) would not result in a true saving to the nation's consumers. This is because the \$50 million "saving" cited by Staff would be achieved at the expense of additional fuel requirements amounting to some 70 billion Btu/d, thus resulting in significantly lower volumes of natural gas available to the nation's markets. On this basis, considering Staff's estimated one-time energy requirement of 48 trillion Btu to construct the Western Leg, a net energy loss would be experienced in less than two years. And, over the 20-year life of the project, the cost of replacing the net energy loss would more than wipe out the suggested \$50 million annual saving in transportation costs, since the replacement energy in California markets would mainly take the form of high-cost electricity.

Further, Judge Litt continued, even if true overall savings were to result from the displacement proposal, there does not appear to be any satisfactory way for apportioning such savings among the specific eastern and western markets to be served. Among other things, the problem is complicated by the necessity either to maximize the capacity of Northern Border's presently proposed 42-inch diameter pipeline or to build a larger diameter Northern Border pipeline. Any such plan would entail substantial capital costs, and the Western Leg purchasers would have to pay for the expansion. However, assuming growth in PGT's excess capacity as predicted by Staff, Northern Border capacity installed now to permit displacement could quickly become excess to Northern Border's needs. On the other hand, absolving Western Leg customers of these costs would result in higher costs to Eastern Leg customers. In short, "there is no

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way on this record to compare the cost of cheap and easy expansibility to Eastern Leg customers if the Western Leg is built, as against the delays and unknown costs in unknown future years if it is found necessary to fully load Northern Border's 42-inch line now and deny cheap expansibility in the future."

Additionally, the Law Judge observed, Staff's projection of a substantial long-term reduction in Canadian deliveries was based on an NEB report issued in April 1975 which did not consider the impact of new frontier gas supplies in assessing Canada's supply and demand position in future years. However, a subsequent report issued by Canada's Minister of Energy, Mines and Resources in early 1976 suggested that, with the advent of gas supplies from frontier areas after 1982 (assuming an energy price structure adjusted to current levels of international oil prices), Canadian gas supply would substantially exceed demand -- including export demand -- for a number of years. Accordingly, although circumstances may change and the Canadian Government may reappraise its energy goals, "the present outlook for Canadian gas exports at current levels after 1982 appears optimistic."

Thus, Judge Litt concluded, since Staff's displacement alternative is predicated on an "unduly pessimistic view" respecting Canadian curtailments and defended on the basis of transportation cost savings which may be "largely illusory," it cannot be considered a preferable alternative.

Moreover, he added, the specific design recommended by Staff would produce a system operating at or near full capacity from the outset, leaving no room for cheap expansion to take advantage of future Alaskan supply. By contrast, the Eastern and Western delivery legs now proposed by Arctic Gas, although substantially reduced and modified from the designs originally proposed in order to improve the economy and efficiency of gas delivery, are capable of transporting Alaskan volumes above 2.25 Bcf/d solely by increasing compression, thereby affording a reasonable measure of cheap expansibility customarily considered desirable in attaching new transmission facilities to new, promising supply areas.

Judge Litt also reviewed El Paso Alaska's basic scheme for delivering Alaskan gas throughout the Lower 48 States by a combination of direct transportation and displacement using existing pipeline systems. He concluded that the overall proposal is "clearly feasible."

Gas Supply

Judge Litt noted agreement by all parties that in-place gas reserves in the Prudhoe Oil Pool on the North Slope exceed 35 Tcf, but disagreement regarding (1) gas deliverability from the Prudhoe Bay Pool (because of the effect of the rate of gas production on ultimate oil recovery); and (2) the extent and location of undiscovered recoverable reserves in other areas of North Alaska.

With respect to gas deliverability from the Prudhoe Bay Pool, the Law Judge called attention to a study commissioned by the State of Alaska indicating that highest oil recoveries were obtained under conditions of water injection and no gas sales, but that these higher ranges of oil recovery could also be approached with gas sales of 2.0 Bcf/d and water injection, as well as with gas sales above 2.0 Bcf/d assuming further water injection. He also noted a statement by the principal producers that gas deliveries of at least 2 Bcf/d will commence once the necessary pipeline and gas conditioning facilities are in place, and that initial gas deliveries of up to 2.5 Bcf/d may be possible without affecting ultimate oil recovery. Thus, he concluded, while there is still some uncertainty concerning the amount of gas that can and will be sold without adversely affecting oil recovery, "the vast weight of the evidence is that between 2.0 Bcf/d - 2.5 Bcf/d of gas will be available initially from the Prudhoe Bay Field." Moreover, he observed, if estimated additional volumes of 11.7 Tcf in the Sadlerochit, Lisburne and Kuparuk formations by 1985 are included, "it is obvious that the 2.0 Bcf/d - 2.5 Bcf/d estimate is indeed conservative."

In regard to other North Slope reserves, Judge Litt said several specific regions could logistically support additional deliveries into the systems of one or more of the three pipeline applicants. While potential reserve estimates vary considerably, nevertheless, "Arctic Gas, because of its larger potential capacity and cheaper expansibility, would be best able to transport additional volumes from any North Slope source."

Turning to the Mackenzie Delta area, Judge Litt found a "reasonable likelihood" of deliveries not less than 1 Bcf/d in the first year of operations and 1.5 Bcf/d in the fifth year. (Arctic Gas, by contrast, assumed initial deliverability of 1.25 Bcf/d in the first year, rising to 2.25 Bcf/d by the fifth year.)

In arriving at this determination, the FPC Judge first looked to total salable gas reserves of 6.21 Tcf from eight Mackenzie Delta fields established by DeGolyer & MacNaughton as of 7/31/75 -- including 3.83 Tcf of proved reserves, 1.02 Tcf of probable reserves and 1.36 Tcf of possible reserves. If the probable reserves are discounted by 30% and the possible reserves by 70%, the Law Judge stated, the DeGolyer & MacNaughton total is reduced to about 5 Tcf which, assuming a rate-of-take of 1:7300, would support an initial gas deliverability of about 0.7 Bcf/d. However, he continued, "it would be totally short-sighted and unrealistic, in view of the potential of the area and the long lead times involved in this project, to rest the case, as only El Paso urges, on the proposition that no additional reserves from new fields or areas can be relied upon to be forthcoming by the time operations commence, say 1982, or within a reasonable time thereafter. The record simply will not permit the conclusion that exploratory drilling activity in the Mackenzie Delta area is either on the verge of coming to a grinding halt or, if continued, will be totally fruitless."

Further, Judge Litt noted, although the Commission in the past has generally not looked beyond the level of proved reserves in making findings as to gas supply in certificate cases, there is "no inflexible policy" which requires disregard of facts favoring consideration of gas supplies not yet proven. More specifically, in this

case, there is no challenge on the record to the assessment that the Mackenzie Delta, onshore and offshore, "constitutes a major gas-bearing province with very substantial potential reserves in the early stages of exploration." Even when estimates of potential undiscovered gas reserves (ranging from 39 Tcf to 250 Tcf) are discounted severely, "the inescapable conclusion remains that a large resource base exists and that substantial additional gas reserves can be discovered over the next several years." Moreover, although the rate of discovery of such reserves is uncertain, it hardly seems likely that the Canadian Government — should it approve the construction of a gas transportation system into the Mackenzie Delta on the basis of pending applications -- "will fail to provide and maintain the regulatory climate conducive to optimum exploitation of that system." The Law Judge added in this regard that recent natural gas price increases in Canada have resulted in a significant increase in exploratory activity in the traditional western producing provinces. "While a similar impact has not yet been perceived in the Mackenzie Delta area, the allocation of financial resources first to the traditional areas with marketing facilities in place is merely good business practice, especially in light of the long lead times involved in any Mackenzie Delta project."

Assuming discovery of proved reserves at an average annual rate of only 0.6 Tcf over the seven-year period 1975-1982 (or roughly two-thirds of the annual discovery rate from 1971 to the mid-1975 date of the DeGolyer & MacNaughton estimate), the Law Judge said the proved reserve total would amount to approximately 8 Tcf in 1982, or sufficient to support a deliverability of about 1 Bcf/d on the basis of a 1:7300 rate-of-take. Moreover, continuation of this "conservative" findings rate during the following five years would result in discoveries of about 11 Tcf and support deliverability of about 1.5 Bcf/d by 1987, the fifth operational year.

Construction and Geotechnical Problems

Judge Litt assessed the technical feasibility of the Arctic Gas and El Paso Alaska projects in detail, concluding that the pipelines proposed by each could be built in the manner and time frame contemplated. In regard to El Paso Alaska, however, he determined that one additional liquefaction train at the Gravina Point LNG plant and one additional LNG tanker would be required in order to assure reliability of its 2.4 Bcf/d case. Finally, the Law Judge held that Alcan had failed to support its engineering or geotechnical designs, nor its plan for construction in three years.

Arctic Gas, the Law Judge noted, contemplates a construction schedule of six years from the time of initial governmental authorization to the commencement of gas flow. The Alaskan and Canadian portions of this construction would be carried out by nine "spreads," with the North Slope portion of the pipeline to be constructed entirely in the final winter by six "spreads" working simultaneously (three in Alaska and three in Canada), each with a seasonal goal of 65 miles of pipeline. This schedule for Arctic Gas was challenged by an El Paso-sponsored study which contended that Arctic Gas had overestimated the number of available working days and underestimated productivity rates, thus making completion within the projected time frame unlikely. The FPC Judge accepted Arctic Gas' estimate of a mid-October "opening date" for snow road construction (a critical timing element in its overall construction schedule) and its estimate of access to the tundra for a period of 145-175 days in the final winter. He also considered it likely that each of the Arctic spreads would attain its assigned productivity rate (0.71 miles per working day). "The ability of a spread to achieve its productivity rate depends upon Arctic Gas' ability to move supplies and equipment to the construction sites and the ability of the construction spreads to expeditiously dig and fill the pipeline ditch, lay and weld the pipe, and move the overall operation from one point to the next along the route. The record contains substantial evidence to show that Arctic Gas will be able to carry out each of these phases in timely fashion and so complete its project on schedule."

Risk analyses indicating a high probability of noncompletion of the Arctic Gas project according to schedule, the FPC Judge added, rested on assumptions which were largely disproven on the record. Also, these analyses failed to take account of Arctic Gas rebuttal evidence, introduced in October 1976, which revised its construction costs upward by \$210 million for facilities and activities to enable it to meet construction deadlines in Alaska and Canada. In addition, Arctic Gas indicated willingness to commit another \$119 million on two additional construction spreads in the third year, if necessary, in order to stay on schedule.

Judge Litt particularly discussed Arctic Gas' plans for construction using snow roads and snow pads in sensitive permafrost areas. This reliance on snow roads was attacked by competing applicants, the State of Alaska and Conservation Interveners on several grounds, including optimistic opening dates for snow road construction, snow fence use, snowfall patterns, snow manufacturing, water availability and surface degradation caused by vegetative mat compaction. In general, these parties argued that, given the history of past "snow road" failures on the North Slope and the huge scale of Arctic Gas project, Arctic Gas had neither proved it can efficiently and safely construct snow roads, nor that these roads will be effective in use. The Law Judge dismissed these argument as unconvincing. "Not only has Arctic Gas committed itself to considerable testing and planning of its proposal, but it has done so by actually building a test road and testing that road under wintertime conditions similar to those it expects to experience in permafrost areas." In short, the "vast weight of evidence demonstrates that Arctic Gas' snow road plan is both feasible and effective and can be accomplished with a minimum of environmental harm." However, confirmation of this "conservative" finding following The Law Judge additionally endorsed Canadian Arctic's so-called "Cross-Delta" amendment proposed in February 1976, i.e., construction across the Mackenzie Delta instead of its originally proposed route skirting the western edge of the Mackenzie Delta. A major problem respecting the Cross-Delta route, Judge Litt stated, is inaccessibility of the pipeline for repairs during certain periods of the year in the event of an outage. He concluded, however, that the risk of outage is remote. Moreover, twin pipelines are planned for 36.5 miles of the route to reduce problems of inaccessibility. Further, he noted, the Cross-Delta route is 138 miles shorter and \$190 million less costly than the original prime route, and is also considered preferable from certain environmental standpoints.

Turning to the technical feasibility of the El Paso Alaska proposal, Judge Litt declared that special design precautions employed by El Paso for pipeline crossings of active faults are appropriate and should prevent substantial damage and service interruption from a design seismic event (an earthquake registering 8.5 on the Richter scale with ground movement up to 20 or 30 feet horizontally and 5 feet vertically); that El Paso has scheduled a full year for additional seismic analysis which can likely be performed and incorporated in the final pipeline design in that time -- "at a cost"; that design of the Gravina Point LNG facilities for an 8.5 magnitude earthquake -- equivalent to the magnitude of the 1964 Alaska earthquake (the most severe earthquake reading ever recorded) -- and 0.6g ground acceleration is adequate, although El Paso must consider additional seismic factors and undertake further analysis before arriving at a final design; and that El Paso's marine terminal design appears adequate to withstand seismic sea waves (tsunamis) generated by earthquakes.

The Law Judge recommended against El Paso Alaska's so-called "realignment" case -- reflecting realignment of its proposed trans-Alaska pipeline route (basically parallel to the Alyeska pipeline and haul road and within 3,000 feet of these facilities for 85% of the 766-mile distance) in response to suggestion by the State of Alaska urging greater use of the existing Alyeska haul road and facilities. The realignment was not supported by El Paso Alaska (which, however, attested to its feasibility assuming proper precautions) and was opposed by Staff and others because

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of the chance of rupture of the Alyeska line due to blasting, collisions of heavy equipment and other construction activities, and because of an estimated \$200 million of additional costs which would be required for thicker walled pipeline and more gravel. Judge Litt held that, although geotechnical redesign could most probably eliminate thermal interference between the heated Alyeska oil line and the chilled El Paso gas pipeline, "a combination of the additional costs of realignment and the serious threat of damage to the Alyeska line" dictates consideration of only El Paso's base case alignment.

In regard to the sites of proposed LNG facilities, FPC Judge Litt recommended that if the El Paso Alaska project is certificated, the liquefaction plant in Alaska should be located at Gravina Point in Prince William Sound as filed -- rather than at Cape Starichkof in the Cook Inlet as suggested by Staff -- but that the LNG receiving terminal and regasification plant in California should be shifted from Point Conception to Oxnard. Staff, he said, failed to provide essential technical evidence to support the Cape Starichkof alternative, which accordingly must be denied. On the other hand, El Paso's selection of Gravina Point as its preferred site for an Alaskan LNG plant resulted from a comprehensive site selection study.

As to the proposed LNG facilities in California, the Law Judge concluded that both the Point Conception and Oxnard sites were technically acceptable and feasible, but that the Oxnard site (an industrialized port area with low population and risk levels) was preferable from the standpoint of a lesser amount of pipeline construction (and consequently less capital investment) required to move North Slope gas to the California-Arizona border, greater consistency with present and future land uses, certain environmental considerations, and lesser possibility of seismic occurrences. Accordingly, if the El Paso project is certificated, the Law Judge recommended that authorization to Western LNG Terminal be conditioned upon amendment of its application so as to construct an LNG regasification plant capable of handling 2.4 Bcf/d of North Slope gas at Oxnard.

Finally, with respect to El Paso's cryogenic tanker fleet, Judge Litt determined that one additional LNG vessel -- i.e., a total of nine rather than eight ships as proposed -- would be required to transport 2.4 Bcf/d to California even without a change in terminal location. El Paso, he noted, projected an 11.5-day actual round trip for each tanker, including 10.72 days for the round trip and 0.8 days (19.2 hours) for contingencies. This projection, the Judge asserted, is based on "best-case" assumptions and fails to take account of possible additional delays due to restrictions on nighttime operations at either Gravina Point or Oxnard, reductions in service speed because of bad weather or Coast Guard navigational safeguards in Prince William Sound, and additional port closures because of weather. Also, a shift of the California terminal from Point Conception to Oxnard (70 nautical miles south of Point Conception) would add 140 miles to each round trip. Based on analysis of these factors, he concluded that an additional ship was required to assure reliability.

Similarly, the Law Judge concluded that the proposed six-train design at the Gravina Point liquefaction plant -- assuming El Paso Alaska's 2.4 Bcf/d case -- does not contain sufficient flexibility to assure the necessary reliability of service. He therefore recommended the addition of a seventh liquefaction train.

In regard to the Alcan project, the Law Judge said the lack of necessary preliminary studies in support of geotechnical and seismic design precludes a finding either as to technical feasibility or the reasonableness of Alcan's cost estimates. Also, there is serious question concerning Alcan's three-year construction schedule and proposed summertime construction in permafrost areas. Staff's geotechnic evaluation of Alcan indicates that "summer construction in Alaska cannot be accomplished

without unacceptable environmental impact." Additionally, Alcan's proposed alignment, which would literally be "cheek-to-cheek" with Alyeska for hundreds of miles, raises critical questions regarding potential construction damage to Alyeska.

At the same time, Judge Litt added, Alcan is composed of experienced and knowledgeable companies, at least two of which have extensive experience in building pipelines in both difficult terrain and extreme climates. "The result is that while it has not proved its design or costs, Arctic Gas and El Paso have proven Alcan's general design feasibility and placed outside limits on Alcan's expected costs. At one point or another, a portion of both Arctic Gas and El Paso would go through similar terrain or would be built under similar conditions. . . . In other words, while Alcan did not adduce the evidence to make its case, its piggybacking on those that did gives at least an approximation of what it might cost for comparison purposes."

Operational Factors

Comparing the three projects in terms of fuel usage, heating potential or Btu content, and cheap expansibility, Judge Litt concluded that (1) Arctic Gas, because of its large-diameter, high-compression pipeline, will require less fuel than El Paso or Alcan to transport the same system inlet volume; (2) both Arctic Gas and El Paso, because of the ability of higher-pressure lines to carry a higher proportion of heavier hydrocarbons contained in the wet gas stream, can transport a richer gas stream (i.e., gas with a higher Btu content per cubic foot) than Alcan; and (3) Arctic Gas could expand to carry up to 3.5 Bcf/d of Alaskan gas (assuming maximum volumes of 1 Bcf/d from the Mackenzie Delta) at comparatively low incremental capital cost, thereby providing earlier and cheaper expansibility than El Paso, to expand deliveries beyond 2.4 Bcf/d, which would be required to invest in additional compressors, LNG trains and ships at relatively higher cost. Alcan's claim of cheap expansibility, the Law Judge added, is "nothing but a claim."

With respect to fuel usage, the Law Judge noted estimated fuel requirements of 6.87% for the Arctic Gas project and 13.13% for El Paso Alaska, both assuming a 2.25 Bcf/d case for comparative purposes. The El Paso Alaska estimate, he said, includes fuel usage of 3.17% for transportation-displacement in the Lower 48 States. This fuel usage was estimated by Arctic Gas and is disputed by El Paso. While the record does not permit a determination of the exact fuel requirements for El Paso's proposed Lower 48 transportation-displacement scheme, the Law Judge noted, nevertheless, assuming such usage at only 2% on a 2.25 Bcf/d basis, El Paso's total fuel usage would still be 11.96% compared to 6.87% for Arctic Gas. "This represents a substantial annual saving, exceeding residential consumption in each of a large number of states."

Environmental Considerations

Some 50 pages of Judge Litt's initial decision were devoted to a discussion of environmental objections raised by El Paso, Alcan, the State of Alaska and the Conservation Interveners to routing of the Arctic Gas Project across the Arctic National Wildlife Range. This crossing, it was argued, would destroy "unique" wildlife, wilderness and recreational values of the Wildlife Range and would only lead to a further intrusion of this area in the future.

Judge Litt declared that the Arctic National Wildlife Range must be protected to the extent consistent with its purpose and that any construction through this area should be subject to stringent conditions designed to minimize both short-term and long-term impact. He concluded, however, that pipeline construction by Arctic Gas in the manner proposed -- and subject to appropriate mitigative conditions -- is compatible with the purposes of the reservation as a wildlife range with wilderness values.

Among other things, Judge Litt noted, attitudes toward the Arctic National Wildlife Range depend on subjective evaluations of the terms "unique" and "wilderness." A principal element of "uniqueness" advanced by those opposing a pipeline across the Range, he continued, is one of aesthetics, i.e., the visual aspect from the shoreline to the mountains 20-30 miles distant and the visual unspoiled nature of the Range. However, the FPC Judge observed, a buried pipeline will not interfere with the vista from the coast to the mountains, and it is unlikely that three proposed compressor stations, if built, would bring about any significant visual impairment. Furthermore, he added, smack in the middle of the coastal section of the Wildlife Range is an active Dew Line site (at Barter Island), an airfield, the Village of Kaktovik, and the remains of a long-abandoned Dew Line station at Demarcation Bay. Thus, "the wilderness aspect of the Wildlife Range is maintained by defining Barter Island and Kaktovik out. Similarly dismissed are Demarcation Bay with its beached wrecked ship, temporary native hunting and fishing villages and the Dew Line sites. Arctic Gas cites Lewis Carroll's Humpty Dumpty who said 'When I use the word, it means just what I choose it to mean -- neither more nor less.' Humpty Dumpty would be right at home in a number of briefs filed in this case."

Additionally, Judge Litt stressed that the Arctic National Wildlife Range is not legally a "wilderness" area under the Wilderness Act (which precludes any construction), but rather was created by a Public Land Order in 1960 which expressly provided for issuance of permits under the Mineral Leasing Act -- "a totally useless verbiage if a pipeline right-of-way is excluded." What those opposing Arctic Gas seek, the Law Judge said, is a "bootstrapping from the protection of wildlife in a range to the status of wilderness as if Congress had acted and put the range within the National Wilderness Preservation System." While Congress can effect this change, "the Commission cannot do so as a matter of law."

The Law Judge conceded the argument that construction of a gas pipeline may bring further development within the Wildlife Range, but said this in no way lessens the need for a decision on whether to permit hydrocarbon exploration or to grant such permits as may be in the public interest. In this connection, Judge Litt observed that, considering the present natural gas shortage, exploitation of hydrocarbon reserves is clearly in the public interest, and ultimate incursion into the Wildlife Range for this purpose must be considered a "virtual certainty" unless expressly prohibited by Congress. Therefore, to the extent that such exploitation is likely to occur, "it makes less significant the fact that Arctic Gas is the first major construction project on the eastern reaches of the North Slope since the construction of the Dew Line stations."

Turning to specific impacts of construction across the Arctic National Wildlife Range, the Law Judge found no significant evidence of any serious disturbance to caribou, short-term or long-term, along the Arctic Gas route. Furthermore, he emphasized, the major factor affecting caribou viability in Alaska is not the construction, operation and maintenance of pipelines but rather the state game laws. "Man has been systematically destroying these animals for overhunting, whether by subsistence hunting or sport, to the point where the herds may not be able to maintain population levels necessary for survival. The Forty-Mile Alaska herd, for example, has been reduced in a short period of time from literally hundreds of thousands of animals to a size where it may be exterminated if hunting pressure is not removed. The same could happen to the Porcupine herd, if the same hunting laws are enforced. Therefore, for state and federal officials to sanctimoniously enter into discourses as to whether a pregnant caribou will or will not cross a one- or two-foot high berm, while still permitting almost indiscriminate shooting of these animals by any Alaskan along the migratory route (or any rich hunter wanting a 'double shovel' set of antlers) is illogical."

Further, he concluded, the evidence indicates that the Arctic Gas construction schedule will have negligible impact on polar bears, that sufficient water is available on the North Slope which may be withdrawn for snow road construction without causing significant environmental harm to fish spawning and overwintering areas, that certain fish populations inadvertently damaged by water withdrawal during construction could probably be restocked, and that bird populations on the North Slope will not suffer any serious or long-term effects assuming implementation of satisfactory mitigative measures.

In contrast to the Arctic Gas project which is supported by exhaustive research studies and evidence relating to specific environmental impacts, the FPC Judge said the environmental information pertaining to the El Paso Alaska and Alcan proposals is mostly general in nature and not site-specific. Nevertheless, he noted, a basic environmental advantage stressed by both El Paso and Alcan is the common utility corridor concept (since both proposals would essentially parallel the Alyeska line and, in the case of Alcan, various other pipelines as well as the Alcan Highway). The argument in favor of construction in a common corridor, the Law Judge continued, is that impact will be merely incremental to that already imposed by previous development. However, he declared, this argument appears to rely on a priori expectation rather than actual field research. "El Paso and Alcan have the burden of proving that their respective projects are environmentally acceptable by site-specific evidence, not merely by the fact that they are in a 'corridor.' Each has partially failed to meet this burden, much less show superiority over Arctic Gas."

The Law Judge also discussed potential environmental impacts of pipeline construction by El Paso through the Chugach Forest and its proposed installation of a "once-through sea water cooling system" at the Gravina Point LNG plant. Routing of the pipeline through the Chugach Forest, he concluded, would have significant long-term effects but within acceptable limits if the public interest otherwise requires certification of the El Paso Alaska project. He recommended, however, that El Paso's LNG plant design must include air cooling towers as an alternative, absent a clear showing that its once-through seawater cooling design will not in fact adversely affect the marine biota in Prince William Sound.

In regard to Alcan, the Law Judge said its only advantage on the basis of the record is that it crosses neither the Wildlife Range nor the Chugach Forest. However, he observed, the Alcan project is promoted in part by the same companies which are sponsoring the all-Canadian Maple Leaf project to attach gas in the Mackenzie Delta. Therefore, the Alcan proposal would involve building two pipelines to market the same U.S. and Canadian gas which Arctic Gas proposes to do in one pipeline. "The combined adverse impact of Alcan's facilities far outweighs any environmental savings to the U.S. from building these separate facilities." Moreover, Judge Litt added, the same consideration pertains to the El Paso Alaska project. "The overall environmental advantages to the U.S. and Canada in building a single line far exceed an LNG-ship-LNG project at the end of an 800-mile pipeline and an additional 1,000 miles of pipeline for Maple Leaf."

Judge Litt recommended deferral of determination of specific environmental conditions until the second phase of this proceeding when they can be directed to the specific project certificated by the Commission.

Socio-Economic Factors

Judge Litt asserted that the State of Alaska will reap enormous socio-economic benefits from gas pipeline construction, regardless of which project is certificated. The most substantial economic benefit to Alaska, he stated, will come from hydrocarbon severance taxes and royalty payments -- estimated at \$135.5 million annually assuming a Prudhoe Bay production of 2.25 Bcf/d and a wellhead price of \$1.00/Mcf. This amount will be approximately the same for all projects.

Other socio-economic impacts -- on population, employment, gross state product, personal income, and government revenues and expenditures -- are more difficult to quantify and remain uncertain, the Law Judge continued. For example, while El Paso Alaska and Alcan will create more construction employment in Alaska than Arctic Gas, the number of direct jobs created is not substantial, long-term employment opportunities are few, and a greater population increase will create greater employment disturbances and other immigration problems. Also, Judge Litt observed, there are many uncertainties connected with intrastate use of royalty gas to promote industrial development in Alaska. While the State supports El Paso Alaska as the project best able to encourage industrial development, the present economic realities are not favorable for such development. Moreover, there is a serious question whether the State's anticipated use of gas in Alaska would be compatible with the Federal Government's natural gas end-use policy.

While the views of the State of Alaska -- which supports the El Paso Alaska project on the grounds of greatest net benefits to the State -- are entitled to substantial weight, the FPC Judge concluded, the Natural Gas Act does not permit certification of projects which will benefit one area of the country to the detriment of another. In this case, the great bulk (or all) of the Prudhoe Bay gas will be marketed in the Lower 48 States. While Congress has power to direct that certain actions be taken solely to benefit the economic condition of a particular state or region at the expense of others, no intention was expressed that the FPC create such preferences in performing its duties under the Natural Gas Act. Nor does anything in the Alaska Natural Gas Transportation Act of 1976 require a change in that policy. Thus, "if there exists an alternative system which better meets the overall public interest, it would be contrary to the Commission's accepted regulatory role under the Natural Gas Act to select a particular transportation system at the behest of the State of Alaska in order to accord substantial economic benefits to the State."

Marketability of North Slope Gas

Judge Litt reviewed an Arctic Gas-sponsored study which estimated incremental and rolled-in costs of North Slope gas delivered to eight metropolitan areas in the Lower 48 States (representing the anticipated major markets to be served by the Arctic Gas Group), assuming alternative wellhead prices of 55¢/MMBtu and \$1/MMBtu for Alaskan gas (and for new gas supplies developed in the Lower 48). These costs were then compared with competitive energy prices at the citygate of distillate fuel oil, residual fuel oil and electricity. On a rolled-in basis, the estimated cost of Alaskan gas was substantially lower than the price of fuel oil and electricity for all metropolitan areas except in California where parity with fuel oil was shown. On an incremental basis, the price of Alaskan gas was estimated to be lower than fuel oil and electricity except in New York City where gas prices would be equivalent to distillate fuel oil and higher than residual fuel oil. According to the study, however, this price differential in New York would be more than offset by nonprice premiums in excess of 50¢.

The FPC Judge concluded that the above study confirms the marketability of Alaskan gas, on either a rolled-in or incremental basis, "given the assumptions made by its sponsor." 1/

Economics

The Law Judge compared overall unit costs estimated for each project on the basis of 7/1/75 cost levels (with no adjustments for inflation). For this purpose, he looked primarily to costs submitted by each applicant and made certain adjustments (or accepted certain adjustments proposed by others) to achieve greater comparability or to reflect certain modifications or conclusions discussed elsewhere in his decision. The comparison related to proposals to transport initial volumes in the order of 2.0-2.5 Bcf/d from Alaska. The Alcan project was included in the comparison even though, in Judge Litt's view, it cannot be constructed in the time frame proposed (three years) and is incapable of proper cost analysis.

The comparison showed an average cost of \$1.60/MMBtu in the fifth year for Arctic Gas, a five-year average cost of \$2.15/MMBtu for El Paso Alaska, and a five-year average cost of \$1.91/MMBtu for Alcan. Arctic Gas is "clearly superior" under this comparison, Judge Litt asserted. 2/

In arriving at the above figures, the Law Judge adjusted Arctic Gas' estimated fifth year cost of \$1.39 for a system transporting 2.25 Bcf/d of Prudhoe Bay gas and 2.25 Bcf/d of Mackenzie Delta gas to reflect the lower volumes expected to be available from the Mackenzie Delta (in the range of 1.0 to 1.5 Bcf/d). The effect of lower volumes of Canadian gas, he noted, is to raise the transportation cost for U.S. gas. Specifically, the cost of service for U.S. deliveries via Arctic Gas was estimated to rise from \$1.39 to \$1.54 assuming transportation of 1.5 Bcf/d of Canadian gas and to \$1.66 assuming transportation of only 1.0 Bcf/d. The midpoint of the two was adopted for comparative purposes. The Law Judge declined to accept El Paso Alaska's proposed adjustments to Arctic Gas' estimates to include construction costs over an additional winter because of various factors alleged to render completion by the scheduled date improbable. Judge Litt noted that Arctic Gas, toward the close of hearings, increased its estimated construction costs in the North Slope region by \$330 million -- including \$120 million for two more spreads in the final construction winter and \$210 million for contingencies -- so as to provide additional resources for completion of construction on schedule.

El Paso Alaska's average cost of \$1.88 over the first five years was adjusted by Judge Litt to include an additional financing charge (0.16¢) to achieve financing comparability with Arctic Gas, as well as the estimated incremental cost (0.11¢) of a seventh liquefaction train and ninth LNG tanker determined by the Judge to be necessary to assure reliability of El Paso's 2.4 Bcf/d project.

1/ In another section of his initial decision (relating to financing and tariffs), however, Judge Litt said there were serious questions regarding marketability, primarily because all the prospective beneficiaries are looking for the "top dollar." He also suggested that a \$1/MMBtu field price in Alaska might be the maximum if marketability is to be achieved.

2/ In another section of his initial decision, Judge Litt assumed a 20% cost overrun on all of the projects for illustrative purposes. If a 20% cost overrun has a 20% effect on unit costs, he said, the average unit costs for the three projects would become \$1.92 (Arctic Gas), \$2.58 (El Paso Alaska) and \$2.29 (Alcan). "Even at this transmission cost and assuming a rational field price, Arctic Gas is clearly marketable on both an incremental and rolled-in basis. El Paso is marginally so."

With respect to Alcan, the Law Judge adopted a five-year average calculated by Arctic Gas based on certain adjustments to Alcan's estimates. Among other things, the Arctic Gas calculation reflected a deferral (or phasing) of a portion of costs in the first two years of operations to later years, consistent with the approach followed by both Arctic Gas and El Paso Alaska.

The Law Judge made clear that the above comparison was confined to average nationwide costs over a limited period. "Specific costs, including distribution costs, cannot be made on a nationwide basis at this time from this record." Moreover, he declared, the record does not enable estimates of project costs over a 20-year period, either on a nationwide basis or for different regions of the country, as required by the Alaska Natural Gas Transportation Act of 1976. Additionally, the FPC Judge noted, there are presently no tools available to the Commission for performing meaningful and expeditious analyses of the effect of any variations in the applicants' construction or financing assumptions. 1/

Net National Economic Benefits

The Law Judge reviewed net national economic benefit (NNEB) studies submitted by the Department of Interior, Staff, Arctic Gas and El Paso Alaska. As tools for predicting behavior into the future, he said, NNEB studies are still in an embryonic stage of development. Moreover, "to argue that the costs and benefits of these projects standing alone can have a measurable (positive or negative) long-term impact on an economy whose annual GNP measures in the trillions, borders on the fanciful. Comparisons of the small difference in impact of the \$2 to \$3 billion in any year, are totally impossible, given existing tools."

All of the NNEB studies, the Law Judge continued, indicate that each of the three projects here involved will provide a net national economic benefit to the United States. Thus, the only remaining task is to determine, if possible, a relative ranking of the three from an NNEB standpoint. Judge Litt concluded that the Department of Interior model could be used for this limited purpose so long as reliable input data are used. "Precise dollar determinations are not necessary if it can be reliably deduced that one margin favors one applicant over the others." At the same time, the Law Judge added, the Department of Interior model is not necessarily the one best-suited to the task at hand, and it incorporates several variables which are beyond the

1/ The Law Judge noted that efforts toward the end of the hearings to collect computer software developed by the applicants, for use by the Commission in analyzing the various programs, were only partially successful, not necessarily because of any unwillingness on the part of the applicants to supply material, but because of the limited time available to the Presiding Judge to fully comprehend the logic of all the existing programs as well as to develop additional software to replace the numerous hand calculations performed by each applicant. However, he declared, this computer technology would be of great benefit for the Commission. Accordingly, the FPC Judge directed the parties to supply detailed technical aspects of their computer technology to the Commission, including (1) explanations and workpapers of all manual calculations and all computer software; (2) engineering studies and computer programs used to develop all facility designs and construction estimates; (3) all computer data files used to develop the testimony in this record, and any additional files that may be requested for further analysis by the Commission; and (4) all automated or manual calculations utilized to develop allocated delivered costs to Lower 48 markets, along with current design specifications and contractual arrangements with regard to delivery volumes at specified delivery points.

control of science or diplomacy. Hence, caution should be used in drawing any conclusions from the results derived through application of such model. 1/

On the basis of the evidence, the FPC Judge found that the Arctic Gas project, with a Western Leg, stands to generate a greater net national economic benefit for the United States than either the El Paso or Alcan projects. However, he stated, this finding rests on certain assumptions which, although justified, cannot be considered as "inviolable." Therefore, no more than a "modicum" of weight should be attached to findings based upon the NNEB studies. Judge Litt further made clear that any rearrangement of the three projects on the NNEB ladder would in no way affect his ultimate decision.

Financing and Tariffs

Judge Litt declared that the magnitude of capital investment required for any of the projects here involved is such that the gas transmission company sponsors cannot provide institutional lenders with the degree of security necessary to warrant financing the project. Accordingly, absent credit-worthy private parties, the projects are arguably not financeable without reliance upon either consumers or taxpayers to guarantee project completion and protection of debt service during prolonged service interruptions or premature abandonment. Thus, a significant issue is whether a shifting of traditional risks taken by sellers and transporters to the consumer or taxpayer is in the public interest.

The all-events cost of service tariff proposed by the applicants as well as various tariff modifications proposed by pipeline shippers, the Law Judge noted, are all premised on direct flow through of transportation charges to distributors and then consumers. The sponsoring parties, except El Paso, also suggested the need for federal financial guarantees of some sort. 2/ Staff, New York and California, on the other hand, opposed a shifting of project risks to consumers, while the Treasury Department opposed any steps to involve taxpayers as a guarantor of the project and instead urges that consumers bear at least a portion of financial risks.

1/ The Department of Interior model developed net national economic benefits for hypothetical projects similar to those proposed by Arctic Gas and El Paso Alaska, and for a Fairbanks-Alcan alternative close to the route subsequently proposed by Alcan-Northwest. The study determined an NNEB of \$8.7 billion for the hypothetical project similar to Arctic Gas, compared with \$7.8 billion for the El Paso alternative. The advantage in favor of the Arctic Gas hypothetical was attributed to relatively lower fuel usage, a lower U.S. share of the cost of the transportation system, and a lower cost of facilities required to carry out a displacement plan. (See REPORT NOS. 1031, p11-13; 1077, App. p1-10.)

2/ Judge Litt dismissed El Paso's view that an Alaskan gas transportation system can be financed without federal guarantees provided that (1) the Commission authorizes an all-events cost of service transportation tariff and preoperational surcharge provisions in shippers' tariffs, and amends tariffs of FPC-regulated pipeline purchasers to require that all costs be shifted by state-regulated distributors directly to ultimate consumers, and (2) pipeline purchasers accept the legal theory that future Commissions cannot substantially modify the consumer guarantees under the all-events cost of service tariffs, and that state utility commissions will be unable to prevent timely flowthrough of costs to consumers. While this theory has "substantial merit," the Law Judge said, it can be given "no practical credence" because of its unacceptability to prospective pipeline purchasers.

The FPC Judge concluded that the final financing arrangement should involve assumption of risks by both consumers and taxpayers, and that the Commission and the Treasury Department should cooperate in working out such an arrangement to permit proper financing at reasonable rates. Based on the premise that there is a need for Alaskan gas and that any unusually high price demands for either unattractively located gas supply or relatively low-risk money are not met, the Law Judge declared that "shifting a portion of risk for securing this gas supply to the consumer is in the public interest." However, if the risk is shifted, "Treasury should be prepared either to sell noncompletion or sustained outage insurance or enter into some other type of arrangement to remove the remote risk" of noncompletion or sustained outage. "Coming behind a consumer guarantee of debt service and the sponsors' risk of equity capital, this limited contribution would substantially reduce the costs of debt capital and might help attract equity."

More specifically, with respect to the shifting or sharing of risks, Judge Litt found as follows: (1) consumers -- as one of the principal beneficiaries of attaching North Slope gas supplies -- should participate in guaranteeing project risks, but only to the extent of debt service; (2) equity holders should accept the usual risk of equity investment, with no guarantee of return of or return on equity investment in the event of prolonged outage; (3) the Federal Government should entertain an insurance or completion guarantee arrangement to facilitate raising project debt capital at a more reasonable cost, thereby reducing the cost of gas to consumers; and (4) legislation to perfect tracking of debt service costs to the consumer level and to approve Treasury participation is necessary.

Judge Litt emphasized that two other creditworthy parties -- namely, the Prudhoe Bay producers and the State of Alaska, both direct financial beneficiaries of Alaskan gas sales -- have declined to offer any financial assistance, either through debt or equity participation, or any form of cost overrun guarantees. Rather, the producers have raised constitutional objections to any arrangements linking sales or sale prices to financing participation, indicated a reluctance to expand energy-oriented activities while faced with divestiture proposals, and cited the desirability of investing discretionary capital in nonregulated business ventures. Moreover, the Law Judge noted, "several of the producers also pleaded poverty, since other investments, including nonenergy-oriented ones like Mobil's recent purchase of Marcor or Arco's purchase of Anaconda Co., have reduced both their available cash and their ability to undertake the level of guarantees which would assure lenders repayment of debt and equity."

The FPC Judge continued as follows:

"Realistically, in the time frame necessary to expeditiously finance these projects, the Commission is incapable of more than strongly suggesting to the producers that their financial assistance to these projects is both fair and proper and in their best interests. However, if the President and Congress deem it appropriate that the producers, as chief beneficiaries of the sale of Alaskan hydrocarbons, should participate in financing construction of a transportation system to market their product -- a position pressed obliquely by the Department of Treasury representatives on the record and on brief -- legislative methods may be pursued, as Treasury hinted, to secure such participation. If that should occur, many of the problems . . . will become less significant."

As for the State of Alaska, Judge Litt said there is no evidence that other states have participated in financing this type of gas pipeline project. However, in

view of Alaska's avowed intentions to invest its revenues and the high rate of return suggested here for both equity and debt, "the State may see this as a better investment than it can receive elsewhere." Moreover, if the tariffs require the ultimate consumers to shoulder full debt service responsibility and the bonds achieve debt ratings satisfactory to the New York State Insurance Commission, "they would probably also satisfy the State of Alaska's investment trust fiduciary. Nevertheless, such investments are voluntary, and the State of Alaska has not volunteered."

The FPC Judge also raised questions concerning the marketability of Alaskan gas from the standpoint of financing. Unlike most past pipeline certificate cases where large residential, commercial and industrial markets could be assumed, he explained, "here we have a constantly shrinking industrial load which will have cost consequences because lower-priority supply shortages will cause a significant shift in load factor consideration. The higher priority market remaining could well prove sensitive to price, and the unspoken message from the financial community is that the time has come to assess the risk of nonsaleability. It is now apparent that the financial community has raised a warning flag; to ignore this sub silentio questioning would be foolhardy."

One of the prime reasons for the high projected prices of delivered Alaskan gas, Judge Litt continued, is the makeup of the project.

"Rather than the usual business compromises arranged both to make a marketable product and to split the benefits among those who will gain the financial advantages from a successful venture, all of the prospective beneficiaries are looking for the top dollar. The producers and State of Alaska want a high wellhead gas price even though (1) their overall profit from their North Slope investment is already assured by the sale of the Prudhoe Bay oil under FEA regulations, (2) the product is at the end of an expensive transportation system, and (3) the market is no longer assured. Governor Jay S. Hammond of Alaska, for example, sought and will probably seek again Alaskan legislative approval to raise the severance tax on hydrocarbons from 4% to 10%. Access without equity contribution, withdrawal, underlifting and a host of other proposals put Alaska in the forefront of seeking special treatment at the consumer's expense. . . . [T]he pipeline shippers want consumer guarantees to repay their equity investment but still seek 15% to 17% after tax returns in what could be a low-risk situation. The financial community in general also wants a high rate of return regardless of how the risk might be reduced by consumer or taxpayer guarantees. In the common vernacular, 'everyone has his hand out.' It is in large measure the combination of these elements which creates the serious questions of marketability and, in turn, financeability. Only a limitation on the field price of gas to reflect its value and a reduction on investment returns to reflect limitations on risk can bring these projects 'in from the cold.'"

In short, the Law Judge said, the marketability of Alaskan gas is questionable, with no final determination possible until gas sales contracts are signed. Thus, the matter must be considered again as part of the overall presentation of producer sales contracts and financing at the next phase of these proceedings. Nevertheless, he added, the energy involved here is needed and should be secured. For this reason, project financing will require either consumer or government backstopping, or both, to guarantee project completion.

Further, Judge Litt declared, a crucial element of marketability is the field price of Prudhoe Bay gas, as yet unknown. Such price, he noted, will include not only the purchase of gas but also the cost of gas gathering and conditioning facilities which, on the basis of some untested producer calculations, may total about one-half of the unit cost of transportation system. Hence, the unit cost will be high. At the same time, the FPC Judge observed, the Prudhoe Bay Field is more remote from market than any other domestic supply previously attached, the cost of transporting this gas to market far exceeds that of the most expensive gas transmission line previously built, and gas will be produced as an adjunct to the production of oil. Therefore, the unit value of gas in the field "cannot be favorably compared with production from fields in West Virginia, Michigan or California, located close to market where existing facilities can be used for transportation -- or, for that matter, from fields in the Lower 48 States generally."

These considerations, Judge Litt declared, strongly suggest that a field price for Prudhoe Bay gas should be determined by backing off transportation costs from alternative energy prices in the market. A field price established at a level higher than such value "will sink this project." If the delivered cost of Prudhoe Bay gas "is such that the high-priority consumers which constitute the market are prompted to turn to other energy supplies, the project is uneconomic." Further, the Law Judge stated, "no one should be misled into the belief that this Commission must fix, on an allocated cost-plus basis, a field price for Alaskan gas in excess of its intrinsic market value."

In the above connection, the FPC Judge called attention to Arctic Gas' estimate of \$2.41/MMBtu (including a \$1/MMBtu field price) as the average citygate cost of Alaskan gas delivered to various Lower 48 markets (in 1975 dollars), as compared with costs of \$2.61 for distillate fuel oil, \$2.59 for residual fuel oil and \$6.89 for electricity. Assuming continuation of these price relationships between competing energy supplies in the future, a premium value of \$0.65/MMBtu for natural gas, and an actual transportation cost of \$2.00/MMBtu in 1975 dollars, "Alaskan gas with a field price of \$1.00/MMBtu would prove to be marketable on an incremental basis." But, the Law Judge declared, a price of \$1.00/MMBtu at the inlet of the transmission system (i.e., after gathering and conditioning) "is, in all likelihood, close to the maximum that this gas could command in the field and still be marketable under present market conditions. . . . However, depending upon the ultimate costs of the gathering system and conditioning plant, as well as the allocation of those costs between pipeline gas and the large volume of removable liquids, there would nevertheless appear to be a substantial return to the producers from a total field price at or below \$1.00/MMBtu."

Turning to rate of return, the Law Judge said neither the cost of debt capital nor a definite rate of return on equity can be fixed at this juncture. Therefore, determination of a specific rate of return must await the next phase of this proceeding. Nevertheless, Judge Litt observed, the range of equity returns (15% to 17%) sought by the applicants here -- on investments which, under proposed tariff mechanisms, would be virtually insulated from risk through the ability to write off charges in the event of project abandonment or prolonged outages -- is roughly two to three percentage points higher than the highest rate of return previously approved by the Commission for pipeline companies. Specifically, the highest rates of return on common equity allowed by the Commission in recent years for interstate gas pipelines are 13.5% and 13.75%. While these pipelines were not faced with the risks inherent in constructing and operating an Alaskan gas transportation system, "neither did they have the degree of insulation from risk sought by equity investors in the Alaskan project."

Nevertheless, Judge Litt added, in view of the finding that neither return of nor return on equity should be allowed in the event of project noncompletion or sustained or permanent outage, some increment above the previous high pipeline rates of return may be warranted. He suggested 14% to 15% as an "upper limit" -- or, alternatively, 12% to 13% if a partial return of equity were to be allowed in the event of noncompletion or premature abandonment.

Still another issue bearing on financing, the Law Judge said, concerns incremental versus rolled-in pricing. He concluded that, "when, as here, the new gas supply will simply replenish the diminishing existing supply in high-priority markets, incremental pricing to the burner tip would merely introduce unnecessary and avoidable administrative problems which this Commission should not encourage." Deferral of this issue to a subsequent phase of this case -- as urged by Staff, Judge Litt added, would only "further imperil, if not frustrate, the timely financeability of an Alaskan gas transportation system."

The Law Judge also reviewed the feasibility of the different financing plans proposed by the three applicants. (A detailed analysis of these plans was included in a 22-page appendix to the initial decision.) Based on this review, he concluded that financing of the El Paso project appears to be the most feasible, even though certain provisions must be altered. The Arctic Gas project can also be financed, but capital cost premiums and financial restrictions, inherent in its binational makeup, produce less flexibility and higher capital costs. However, there is serious doubt regarding the feasibility of financing Alcan because of the possibility of simultaneous financing of the Maple Leaf project. On the other hand, if Maple Leaf is not in the picture, "there appears to be adequate market capacity in the U.S. and Canada for Alcan to obtain financing."

Next, Judge Litt discussed various proposals designed to permit pre-operations charges to consumers, generally equivalent to prepayment of return on equity, in order to generate cash flow for regulated shippers prior to commencement of deliveries. A number of tariff provisions advanced toward this end, the Law Judge noted, are essentially variations on the basic concept of including construction work in progress (CWIP) in rate base during construction (as opposed to capitalizing AFUDC during construction and putting it in the rate base once operations have begun). The FPC Judge supported the need for consumer prepayment of carrying costs to assist the financing of equity investment. Each pipeline shipper, he noted, must raise its share of an enormous amount of equity capital on the basis of its own credit standing. However, just as the financial wherewithal of these shippers to guarantee project debt is nonexistent, "it also appears that they do not have the ability to raise equity funds absent the generation of cash flow during the construction stage."

None of the reasons advanced by the Commission in Order No. 555 (issued 11/8/76) for excluding interstate gas pipelines from the limited scope of its new policy to allow inclusion of CWIP in the rate base, the FPC Judge noted, is applicable to the Alaskan gas transportation proposals. Moreover, the problem of "intergenerational transfer," which apparently caused the Commission to limit Order No. 555 to certain types of electric utility construction (pollution control facilities and conversions of generating plants to alternate fuels), "is small in the instant case because Alaskan gas should flow within four years of the first surcharge payments." Also, a properly designed pre-operations consumer surcharge is not inequitable to present ratepayers since "benefits flowing from a surcharge for equity returns inure not only to future ratepayers but also to present ratepayers, the most obvious benefit being assurance of continued gas supplies." Another benefit, Judge Litt added, is a lower rate of return on project equity which should flow from the reduction in burdens on the utilities' overall capital structures.

The Law Judge made no attempt to choose a method from among the several proposed to establish a pre-operations surcharge. However, the so-called Method 4 sponsored by Arctic Gas "may well constitute the basic guide for crafting an appropriate provision." ^{1/}

Finally, in regard to specific tariff provisions, Judge Litt (1) recommended a 90% level of performance as the cutoff below which penalties (in the form of a pro rata reduction of return on equity) would apply if a transporter were unable to accept deliveries (the applicants all proposed an 80% cutoff, while Staff urged 100% performance); (2) endorsed El Paso Alaska's suggestion that carrying costs on construction expenditures, after passing Commission audit, should be permitted to be flowed through immediately by pipeline shippers to consumers; (3) recommended that project cost of service tariffs be conditioned to prevent the commencement of billing until such time as contract service can be rendered (the tariffs of companies involved in the Arctic Gas and Alcan groups provided for commencement of billing by each company as soon as facilities are in place, regardless of whether service is actually rendered); (4) found no reason to reject the monthly billing procedure proposed by Arctic Gas and Northern Border on the basis of estimated costs over a six-month period, with adjustments in subsequent billing periods to reflect any deviations from actual costs (this method was opposed by Staff which advocated monthly billing on the basis of actual costs); and (5) supported Staff's proposal for a fixed interim rate, rather than the cost "phasing" procedure recommended by Arctic Gas.

Canadian Issues

The Law Judge said the principal dispute regarding Canadian matters at this time relates to political issues -- including how Canada will act and when it will act.

As to timing, the FPC Judge noted that a decision by the NEB is anticipated in the spring or early summer of 1977 and that a report by Mr. Justice Berger on native claims in the Yukon and Northwest Territories (including the Mackenzie Valley) is expected in the early spring of 1977. As to the latter, Judge Litt considered it unlikely that native claims will significantly modify the Canadian Government's energy decision.

El Paso contends, Judge Litt continued, that Canada will act in the "best interests" of Canadians, which are not necessarily the "best interests" of the U.S. ^{2/} Moreover, despite the hydrocarbon transit treaty negotiated by the U.S. and Canada,

^{1/} Method 4 would permit each sponsoring pipeline subject to FPC jurisdiction to annually charge its customers a percentage of its accumulated equity investment in the project companies (Alaskan Arctic, Canadian Arctic and Northern Border), the charge generating enough cash flow to cover the carrying costs of each sponsor's equity investment. A figure of 15% is suggested. The charge would commence upon the first equity investment, would be collected throughout the construction period, and would continue to be collected for up to the first 10 years of project operations, although the equity investment to which this percentage is applied would be reduced by at least 10% for each of these first 10 years of operations. The sponsors could accelerate this 10% reduction of equity investment so as to stop customer charges before the end of 10 operating years. Once the project commenced operations, the sponsoring pipelines (shippers) would start refunding to their customers the full amount of the Method 4 charges collected with compound interest (at the Commission-prescribed rate). The refund period would be set by the Commission, though 20 years is recommended.

^{2/} This treaty was signed by the Canadian Ambassador to the United States and the Assistant Secretary of State on 1/28/77. The treaty is still subject to ratification by both countries.

El Paso suggests that the Canadian Government could remain within the law but still take actions unreasonable from a U.S. point of view in allocating costs of future capacity, granting applications for line expansion, taxes, and other areas within the ambit of Canadian policy.

"The El Paso Canadian Reply Brief is as well crafted a chamber of horrors as this writer has ever seen and would do justice to the standards set by the Marquis de Sade if he had been interested in economics and politics. But that is also its undoing, for the questions so piously raised for the most part are no more than unrealistic speculations which, if valid, might be as applicable to El Paso's Alaskan and Algerian endeavors as to the Arctic Gas and Alcan proposals here to cross Canada. If El Paso can argue to the American consumer that the gas supply from Algeria will remain constant for the next 20 years or that tax treatment by Alaska will remain constant for a similar period, reliance factors which impact most heavily on El Paso, it cannot at the same time expect its arguments against the reliability of Canada to be given much weight."

Judge Litt acknowledged that there was little justification, from the U.S. consumer standpoint, for actions of the British Columbia Government in requiring the entire burden of curtailments by Westcoast Transmission in the past few years (due to production failures) to be imposed entirely on U.S. customers and none on Canadian customers. On the other hand, he saw nothing untoward in Canadian Government actions raising the export price of gas -- most recently to \$1.94 as of 1/1/77 -- in order to achieve a pricing scheme consistent with the commodity value of gas in relation to other fuels.

Also, the Law Judge noted, charges regarding Canadian unreliability ignore "historical facts," namely, a constancy in relationships extending back almost 200 years. If the future Canadian Government were predisposed to act unreasonably, "such imprudence could be countered with equally unsavory activities on the part of the U.S." Still another factor, Judge Litt added, is that, whatever the Canadian Government's decision regarding the continuation or expansion of gas exports to the U.S. in the future, the attachment of Canadian frontier gas reserves can only help U.S. prospects.