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Senator Ruder

INTERIM REPORT

AND

TESTIMONY SUBMITTED TO JOINT GAS PIPELINE COMMITTEE

PUBLIC HEARINGS

FEBRUARY 17 - 20, 1976

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INTERIM REPORT
OF THE
JOINT GAS PIPELINE IMPACT COMMITTEE

This Committee, through public hearings and staff investigation, has become convinced that immediate action by the State of Alaska is essential if the citizens of this State are to receive maximum benefit from the State's natural gas resource.

The Committee will issue a full and complete report on its findings and recommendations at a later date, but is impelled to submit this interim report to the Legislature and the people of the State of Alaska because of the urgency of the present situation.

The Committee finds and concludes the following:

1. A federal decision authorizing the transportation of North Slope natural gas across Canada would be inimical to the interests of the State of Alaska. The State's resource would be drained, its people denied access to a premium fuel and raw material, its work force deprived of employment opportunities, and productive economic growth would be thwarted.
2. A federal decision authorizing the transportation of North Slope natural gas across the State of Alaska to an open port will serve the best interests of the State.
3. The level of benefits, and burdens reasonably to be expected by the State as a consequence of any decision on a North Slope gas transportation system are of such magnitude that the routing decision must be regarded as critical to the future of the State. Action to secure a Trans-Alaska routing must be pursued as expeditiously as possible; no reasonable step should be left untaken.
4. The position of the state as owner of a one-eighth royalty in natural

gas and natural gas liquids produced from State-owned lands on the North Slope creates an immediate opportunity for effective State action which can assist in securing a Trans-Alaska transportation system.

5. Affirmative, agressive action by the Governor, the Commissioner of Natural Resources, the State Royalty Board, and the Legislature with respect to the State's royalty gas is imperative.
6. Effective use of the State's royalty gas, to serve the best interests of the State, requires:
   a. The State must elect to take its royalty share of natural gas and natural gas liquids in kind.
   b. The State must commit a portion of its royalty gas to purchasers who will assist in securing approval of a Trans-Alaska transportation system, and who will thereafter utilize such a Trans-Alaska system.
7. Present levels of natural gas demand in Alaska permit a commitment of a portion of the State's royalty gas to purchasers outside the State; while every effort must be made to retain a substantial part of Alaska's gas for present and future in-state needs, it is in the overall best interests of the State to offer for sale outside the State, a substantial portion of the State's royalty gas to purchasers who can, and will, assist in securing authorization of a Trans-Alaska transportation system.
8. Those persons and firms interested in the construction and operation of a Trans-Alaska transportation system can materially alleviate State unemployment problems, and the State should, in striking a bargain for the commitment of State resources to a Trans-Alaska

system, secure appropriate commitments for the hire and training of Alaska residents in the construction and operation of such a system.

9. Finally, the risk that non-action by the State, or delayed action by the State, will cause the selection of a Trans-Canadian routing, and the risk that the State will lose substantial benefit of its natural gas resource are so great, it is the sense of this Committee that State action must not be delayed.

BY REASON OF THE FOREGOING, IT IS THE RECOMMENDATION OF THIS COMMITTEE THAT:

1. The commissioner of Natural Resources and the State Royalty Board should undertake immediate negotiations with interested out-of-state purchasers to reach definitive sales and/or exchange agreements covering disposition of substantial portions of the State's royalty gas on the best obtainable terms.
2. The Commissioner of Natural Resources and the State Royalty Board should undertake immediate negotiations with natural gas transporters involved in the proposal for a Trans-Alaska system to reach definitive transportation agreements covering the State's royalty gas sold for out-of-state use, and the State's withdrawal of the unsold portion of its royalty gas from the system for in-state use; appropriate commitments should be obtained with respect to hire and training of Alaska residents.
3. The arrangements and agreements so negotiated should be presented to the Legislature for ratification prior to the end of the Second Session of the Ninth Legislature to avoid, if possible, a special session.
4. The Legislature should hold itself ready for immediate consideration

of and prompt action on, the recommendations of the Commissioner and Board.

5. Such arrangements, contracts, and agreements as are negotiated by the Commissioner and Board and approved by the Legislature should be incorporated into the pending applications for a Trans-Alaska transportation system, presented to the Federal Power Commission by the appropriate transporter-applicant, and approval thereof obtained in the pending Federal Power Commission proceedings.

6. The Legislature should adopt SCR 66 and further seek the active cooperation of all owners of North Slope gas in support of the Trans-Alaska pipeline route.

Alaska State Legislature

Senate

JUNEAU, ALASKA

A G E N D A

GAS PIPELINE IMPACT COMMITTEE

PUBLIC HEARINGS

FEBRUARY 17, 18, & 19 - Supreme Courtroom A, 1-5 PM

FEBRUARY 17

1:00 PM NBC Whitepaper "Natural Gas"

1:45 PM Rush Moody Jr.

3:00 PM George Sellides - Uses of Natural Gas in Alaska

3:30 PM Anchorage Natural Gas, Dale Teel

4:00 PM OMAR

4:30 PM BP Alaska, Joe Josephson

FEBRUARY 18

1:00 PM Legislative Committee on Taxation and Revenue

1:30 PM Wentworth Brothers, J.J. Schons

2:30 PM Fairbanks Industrial Corporation,
Associated General Contractors, Conrad Frank

3:00 PM National Electrical Contractors Association, Julius Kornfiend

3:30 PM Federal Labor Council of Fairbanks, Dave Rasley

4:00 PM Anchorage Municipal Light and Power, Tom Stahr

4:30 PM State of Alaska, Patrick Dobey

FEBRUARY 19

1:00 PM State of Alaska, Guy Martin, William Fackler, Easy Gilbreth

2:00 PM El Paso

3:00 PM Tenneco

3:30 PM ARCO

4:00 PM Exxon

4:30 PM Collier Chemical Corporation

NATURAL GAS FACT SHEET

SADELROCHIT RESERVOIR

Estimated reserves= 26 to 32 Trillion Cubic Feet (TCF)
Estimated daily flow from pipeline= 2.5 Billion Cubic Feet* (BCF)
Estimated yearly flow = .9 Trillion Cubic Feet

Alaska's royalty share= 3.25--4 TCF
Daily royalty share = 312 Million Cubic Feet (MMCF)
Yearly royalty share = 114 BCF

*Department of Interior study.
More proven reserves are expected to be proven in the North Slope area.

ALASKAN USE

Almost all the natural gas used in Alaska is in the Cook Inlet area.

Anchorage Natural Gas uses about 30 BCF per year.
That is equal to 12 days production from Prudhoe Bay.
On a cold day in Anchorage, about 120 MMCF is used.
Anchorage Natural Gas has firm commitments for 10--15 years of gas from Cook Inlet.

Phillips Petroleum uses about 61 BCF per year, most of which is liquified and shipped to Japan.

Collier Chemical Corporation uses about 21 BCF per year in their Ammonia/Urea plant. They are now doubling their operation.

One thousand cubic feet of gas (1 MCF) is equal to about 1 Million BTU. North Slope gas is particularly "rich" at about 1.1 MMBTU.

Six MCF of gas is roughly equal to one barrel of oil.

Consumers are willing to pay a premium for gas. It is a clean energy source.
On strictly energy equivalent, $2.00 per MCF gas = $12 barrel oil.
Considering the advantages of using gas, $2.00 gas = $9 barrel oil.

United States gas production has declined from a peak of about 62 BCF per day in 1973 to 55 BCF/day in 1975.

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January 14, 1976

Senator John Rader, Chairman
Joint Gas Pipeline Impact Committee
The Legislature of the State of Alaska
Juneau, Alaska 99801

Dear Senator Rader:

Your Committee has asked me to address certain issues relative to the transportation of Alaska natural gas, assuming for the purpose of my analysis that there will be gas available for sale from the North Slope. 1/

I propose to set forth in this letter the conclusions that I have reached as a result of my research and my knowledge of the Federal Power Commission, together with certain alternatives which the State might wish to consider. To this letter I will append the legal analysis which leads to the conclusions expressed herein.

1/ You are aware of the possibility that natural gas production for sale may have a detrimental effect on the recovery of oil. Studies conducted by the Department of the Interior and by H.K. Van Poolen and Associates raise questions in this regard which are now being examined by the Committee. This issue is, I agree, of critical importance to State consideration of natural gas transportation issues, inasmuch as the State may find it necessary, for reasons of conservation, to limit natural gas production or require reinjection of associated natural gas for maintenance of reservoir pressure. Such conservation actions are, in my opinion, legally permissable if necessary to prevent waste, see pp. 85-94 of attached analysis, but might result in an indefinite postponement of a natural gas transportation system.

From the outset, I need to make clear my recognition, that State policy relative to natural gas will develop, as it should, through processes of government, and that these policy decisions will involve consideration of far more than questions of law and Federal policy. What I offer can be only a part of the whole which the State will consider as the State moves forward to a sound an productive policy of resource management. 2/

As a substantive starting point in my report to you, it is my judgment that the State should, from the standpoint of legal consequences, decide as quickly as possible the ultimate goals of State natural gas policy. If the State has a strong concern for a retention of a portion of Alaska gas for future Alaska needs, affirmative and aggressive State action will be necessary. Non-action by the State with respect to disposition and transportation of North Slope natural gas threatens permanent loss of the gas resources insofar as Alaska consumers are concerned; non-action creates a risk that natural gas produced in Alaska will not be available to fulfill future Alaska residential or industrial needs.

Let us assume that the El Paso, Trans-Alaska transportation route is authorized. Non-action by the State will result, sooner or later, in producer sales of eight-eighths of the natural gas stream in interstate commerce, either to an interstate pipeline, to distributors in the lower 48 states, or to direct users in the lower 48 states; and non-action by the state will result in the construction and operation of an interstate transportation system designed for, and financed on, the expectation of the flow of eight-eighths of the deliverable natural gas from the North Slope. If the State permits, by non-action, these developments, then certain legal consequences may be expected.

2/ I would ask it to be understood that my opinions do not reflect considerations outside my area of knowledge and training; I have no basis, for example, for advice on environmental or economic factors; nor can I gauge the will of the citizens of Alaska concerning economic growth and industrial development; nor can I estimate how strong will be the demand for revenue because of programs which the State may determine are necessary.

The issues which I address are, therefore, approached only from the relatively narrow standpoint of law and Federal regulation. I do not presume to prescribe what is "right" or "good" for the State. These determinations are peculiarly within the province of this Legislature, which will, I am sure, look to a much broader range of considerations, information, and analysis than are within my capabilities.

1. If producers market Alaska natural gas in interstate commerce, paying the State a one-eighth royalty in cash, the Federal Power Commission can assert jurisdiction over eight-eighths of Alaska production, and thereby attempt to prevent any later efforts by the producers, or by the State, to withdraw the State's one-eighth royalty share for an in-kind taking by the State for use in the State. (pp. 64-73) 3

2. In the event of such a sale by producers to an interstate pipeline, and in the event of FPC denial of a request to withdraw State royalty gas, the only means for securing gas service in Alaska would be through a future demand by Alaska municipalities or distributors for service by the pipeline; such a request may be treated by the FPC, and lower 48 pipeline or distributor customers, as a request for new service which cannot lawfully be authorized. If the pipeline, at the time of the demand, is unable to render adequate service to its non-Alaska customers, or if grant of the Alaska demand would require to enlargement of pipeline transportation facilities, the Commission may be required, by law, to refuse demands for Alaska service -- even for residential and public service needs.

3. If Alaska can successfully claim -- contrary to the hypothesis in Paragraph 2 -- status as an existing customer, pipeline natural gas supplies would be shared by Alaska and non-Alaska customers on the basis of FPC curtailment priorities and allocation orders.

4. In the event of direct sale by producers to end users in the lower 48 states, or sale to distribution companies in the lower 48 states, there is no clear legal mechanism available to the State of Alaska to secure any portion of the natural gas produced in Alaska for future Alaska needs as they may develop.

Non-action by the State, in my judgment, creates serious risk that Alaska natural gas will not be available for future Alaska needs, even if the El Paso transportation proposal prevails. It is not just the

3/ Page references here and later in this letter are to the attached legal analysis.

potential industrial gas demand (which may or may not be a matter of State concern, dependent on the will of the citizenry with respect to industrial development) that is at risk. The needs of Fairbanks, and other communities, for residential service and service to schools, hospitals, and the like is also threatened.

The risk can be lessened by appropriate State action, as hereinafter discussed, if a trans-Alaska routing is authorized. If a trans-Canada routing is selected, whereby North Slope natural gas leaves Alaska north of the Arctic Circle, the State has no means of protecting its future gas needs. The routing question is, therefore, critical to the State -- at least in the context of future availability of Alaska gas for future Alaska needs. 4/

I am of the firm opinion that neither of the present proposals for transportation of North Slope natural gas offers a substantial guarantee that Alaska natural gas needs will be met. If either the El Paso or the Arctic Gas proposal is approved as presently submitted, the State could well find itself unable to draw upon its own gas resources to meet the future needs of the State.

The problems here are inherent in the nature of the applications and the Natural Gas Act: if the Arctic gas proposal prevails, there is no physical means to move gas from North Slope areas to the State's population centers; the Arctic gas routing will simply preclude gas movement within the State since the gas will leave the State north of the Arctic Circle. If, on the other hand, the El Paso proposal prevails on the basis of present filings with the FPC, the full natural gas stream will begin movement in interstate commerce, and even though it may be physically possible to withdraw gas where and when needed in Alaska, it may be legally impermissible to do so.

4/ Whatever the transportation route, natural gas production and transportation may reasonably be expected to contribute significant revenues and economic activity to the State. Accordingly, even if the transportation system which is Federally authorized does not lend itself to serving state natural gas needs, benefits to the State still might result from natural gas production, and transportation. A decision in this regard involves a balancing of economic, environmental, and political considerations which are beyond the scope of the requested analysis, and outside the scope of my knowledge and experience.

The State's present danger stems from the fact that certificates may issue, and interstate service may commence, without formal recognition of the State's needs. Interstate service unconditioned to Alaska's rights, creates grave problems concerning later attempts by the State to withdraw gas from the system -- problems which arise under Granite City Steel Co., v. FPC, 320 F2d 711 (C. A. D. C.. 1963) which suggests that gas customers in Alaska may not be added as pipeline customers if the pipeline is, at the time service to new customers is sought, then unable to meet the needs of existing customers; under Sec. 7(b) of the Natural Gas Act as interpreted by the Commission, which suggests that a partial diversion of the interstate natural gas stream will not be permitted without prior Commission authorization; and under Louisiana Public Service Commission v. FPC, 359 F2 524 (C. A. 5, 1966) cert. den'd. 385 U.S. 833, which holds that commingling of non-jurisdictional natural gas with jurisdictional natural gas results in a single gas stream which is wholly jurisdictional.

It does not follow, however, that Alaska is powerless to influence the movement of North Slope gas in a manner more nearly suited to the State's future gas needs than the proposals now pending. To the contrary, I believe there are reasonable courses of action which the State can pursue.

The State may exercise the option set forth in its oil and gas leases to take royalty gas in kind, and market this production separately from working interest gas; the State need not seek FPC authorization for royalty sales, and should limit the term thereof to the extent possible.

I believe that it would be most unwise, under present circumstances, to permit the producing companies which hold leases on State lands to market the State's royalty share of gas production. If marketing occurs, with the gas moving in interstate commerce, the problems summarized above -- and particularly the Sec. 7(b) abandonment problem -- stand as very real threats to later withdrawal of State royalty gas from the marketing arrangements made by the producers. Most simply put, if 8/8ths of the gas stream is committed to interstate commerce by delivery under an unconditional producer certificate of public convenience and necessity, withdrawal of the royalty 1/8th at a later date may require

FPC approval -- which may, or may not, be forthcoming. This is the lesson of FPC Docket N. C171-879, Superior Oil Company, Letter Order issued June 13, 1975. (pp 64-73).

This particular problem can be mitigated if the State exercises its option, prior to the delivery of any gas, to take its royalty share in kind, with appropriate notice to producer, purchaser, and FPC that the producer is without authority to market the State's natural gas.

The State should, therefore, negotiate for separate sale of its royalty gas on the best terms available, giving due consideration to a relatively short-term sale. The State should take the position that it is not subject to the Natural Gas Act, nor to the jurisdiction of the FPC, and that the State is therefore free to make sales for resale in interstate commerce (or in any other market), without certificate authority, and without restriction as to rates or terms of service. This position, though clouded by the Court decision in FPC v. Corp. Comm. of Oklahoma, 362 F. Supp. 522 (W.D. Okla., 1973) aff'd 415 U.S. 961 (1974) is, I believe, legally sound and legally sustainable.

State marketing of its royalty gas is not a complete answer to the basic problem. That gas must be transported, and the only available means of transport will be through the facilities of an interstate pipeline. The FPC can, therefore, exercise indirect control of royalty gas through its certification powers under Section 7 of the Natural Gas Act, even to the extent of denying the right of transportation if it is opposed to the end-use to which the gas will be put, or the price paid for the gas. See FPC v. Transcontinental Gas Pipeline Corp., 365 U.S. 1 (1961), and pp.3-9 of the attached analysis. Thus, it will still be necessary for the State to involve itself in transportation negotiations and see that FPC approval of transportation arrangements is obtained, even if the State markets its own gas by sale at the wellhead or sale downstream. The protection which the State must have is advance FPC approval of State withdrawal of its gas from interstate commerce, but this approval should be sought and obtained by the transporter in connection with its certificate applications and related tarriff findings.

In suggesting these actions, I hold to the view that the State's power to call upon the gas resource when needed in the future can, in reasonable probability, be exercised if the State's rights and obligations are fully spelled out, fully presented to the FPC, and accepted by the FPC as an integral part of the transportation system which is certified by the FPC.

While all problems relating to future in-State use of State-owned gas may not be wholly solved by advance agreement, and advance FPC clearance, of specific production, transportation, and sales arrangements, it is my judgment that the problems are reduced to the levels of acceptable risk-taking if the FPC, prior to construction and operation of a transportation system, expressly conditions all necessary certificates of public convenience and necessity and pipeline tarrifs to permit and approve such arrangements as are negotiated by the State with respect to its royalty gas.

The State may consider the enactment of legislation to hold State owned resources within the State unless such are surplus to the needs of the state.

Discussed in some detail in the appended legal analysis is a recent Texas statute which is designed to secure for the benefit of the State the resources which are publicly owned. The statute is prospective in operation, and simply requires that all State-issued oil and gas leases shall contain appropriate provisions to prohibit sale of natural gas produced from State-owned lands outside the State unless it is found that such gas is surplus to the needs of the State. (pp. 79-85).

While the State clearly may not "embargo" natural gas through exericse of its regulatory powers, (pp. 43-45 it may be argued that the State's powers incident to ownership of public lands are different from, and greater than, mere regulatory powers. Cannot the State decide to withhold its lands from development? if so, (and about this I can see little argument), does not this right include the lesser right to permit development only upon terms acceptable to the State as a property owner? (pp. 15-17).

I do not offer an unqualified opinion that such legislation would withstand court challenge; I acknowledge that a challenge would probably be forthcoming, and that the legislation might fall as an undue burden on interstate commerce. Nonetheless, there is some chance of upholding protective legislation, and enactment could serve as a clear Legislative expression of Alaska's determination to retain a fair share of Alaska's resources. (pp. 79-85).

The State may consider various means of encouraging conversion of natural gas to methanol, or encouraging extraction of all natural gas liquids, prior to movement of natural gas in interstate commerce.

If North Slope gas is converted to methanol before becoming committed to interstate commerce, the conversion facilities, the methanol itself, and the transportation of methanol would not be subject to FPC control. Since the natural gas would be produced and "consumed" (i.e., converted to something other than natural gas) within the State, the natural gas would never become subject to FPC jurisdiction.

Similarly, if ethane, propane, butane, and other liquids are removed from the natural gas stream prior to transportation or sale in interstate commerce, the extraction facilities, the liquids themselves, and the transportation of the liquids should not be subject to FPC control.

It is beyond the scope of my knowledge to explore the economic feasibility of these alternatives; nor can I judge whether the oil pipeline now under construction can, from an engineering standpoint, serve as a conduit for methanol or other liquids. I believe, however, that the State should be aware that a natural gas stream has enormous potential value other than its obvious value as a heat source. It would be imprudent not to explore all potential uses of the gas stream; particularly where conversion within the State, or liquids extraction within the State, diminishes the range of FPC controls, and where, as here, the use of liquids for generation of heat represents a waste of valuable raw material.

Encouragement of conversion or extraction may be given through legitimate State tax incentives or through dedication, on favorable terms, of State-owned gas to a conversion or extraction project. The most effective means of encouragement should be determined at the time full exploration is made of economic and engineering feasibility.

Legislative action may be considered with respect to extraction operations, but probably may not be considered with respect to a conversion project. The latter situation would almost surely require an impermissable degree of interference with interstate commerce, since any statute directing the flow of natural gas to a con-

version plant would, in actual operation, preclude movement of gas in interstate commerce. Such a restriction would not, in my judgment, withstand Court challenge.

Legislative direction that liquids extraction occur prior to movement of the residue gas in interstate commerce may, on the other hand, be a valid exercise of State regulatory powers to prevent waste. This issue is discussed in some detail in the attached legal analysis (94-100), and I conclude that mandatory extraction, if based on appropriate finding that extraction is necessary to prevent waste of a natural resource, and if properly applied to preclude the possibility of an unconstitutional confiscation, has a reasonable basis and can, therefore, be defended.

In addition to the foregoing alternatives relating to possible State action to retain a portion of the State's gas resources for State use, other, and different, alternatives exist.

What Actions Can the State Pursue to Achieve Benefit from the State's Gas Resources?

Until this point, we have focused on natural gas transportation issues; I suggest that there are other matters which deserve consideration as the State of Alaska moves toward resolution of its basic energy policies. These other matters are not strictly within the request made of me for legal analysis, and indeed some require far more exhaustive consideration before a firm recommendation can be made; I touch upon each briefly because they are germane to the general issues under discussion, and because some, or all, may emerge as part of an overall State strategy of resource management.

1. State leasing policies should be re-examined.

   (a) The State is presently leasing on the basis of a one-eighth royalty. Other producing states, notably Texas and Louisiana, now demand, and receive, a one-fifth or one sixth royalty. Alaska should re-asses its bargaining position, its revenue needs, and whether the greater degree of control which in-kind royalty permits, justify leasing on terms other than those presently employed.

   (b) Consideration whould be given to the possibility that the leasing of State lands, or the withholding of state lands from leasing, is a valid instrument of State policy which can be used to assist in holding State resources for State needs; for example, can

leasing schedules be tied to changes in intrastate supply and demand? Can development be held until the State needs the resource? Here again revenue considerations and State desires regarding the optimum level of drilling and production activity must be weighed, but I suggest that one of Alaska's greatest strengths lies in its ownership of oil and gas bearing lands; thought should be given to the best use of that strength.

2. State taxing policies should be re-examined.

(a) The State presently provides for a production tax on natural gas of 4% of the gross value at the well; other producing states impose a much higher tax--for example, Texas exacts a severance tax of 7-1/2% of the market value of the gas when produced, and Louisiana imposes a basic severance tax of 7 cents/Mcf on natural gas. In considering whether revision of Alaska production taxes is appropriate, thought should be given to the Louisiana form: Louisiana's revenue levels are not controlled by the FPC, while Texas' are, at least to the extent that Texas gas is sold interstate. A further defect in the Texas structure lies in its requirement, in the final analysis, that Texas consumers bear a higher tax than out-of-state users; since the State tax is tied to value, intrastate sales at higher rates than interstate sales produce a higher tax bill for the intrastate producer than for the interstate producer.

(b) Alaska can consider the enactment of a franchise tax on interstate pipelines. Colonial Pipeline Company v. Traigle, 421 U.S. 100, decided April 28, 1975, upheld a Louisiana statute that imposed a franchise tax on a pipeline coany that was admittedly engaged exclusively in interstate commerce.

In 1969, a Louisiana Court held that the commerce clause of the Federal Constitution was violated by a state tax "payable for the

privelege of carrying on or doing business... in this state." The Louisiana legislature then amended the offending provision by providing that the tax was levied upon "(t)he qualification to carry on or do business in this state in a corporate form". The Supreme Court of Louisiana upheld the tax as constitutional levy for priveleges enjoyed by corporations in the state carrying on business, interstate or local, in the corporate form. 289 So. 2d 93 (1974). The U.S. Supreme Court affirmed. The Court cited Memphis Natural Gas Company v. Stone, 335 U.S. 80 (1948), a case that sustained a similar franchise tax imposed by Mississippi on a foreign pipeline corporation exclusively engaged in interstate business. The Court quoted Justice Reed's opinion in the 1948 case: "This is a tax on activities for which the state, not the United States, gives protection and the state is entitled to compensation when its tax cannot be said to be an unreasonable burden or a toll on the inter-state business". The "activities for which the state gives protection" included "protection of... maintaining, keeping in repair, and otherwise manning the facilities of the system," the Court said.

Conclusion

As must be evident, it is my view that from the standpoint of legal consequence, the State should pursue an affirmative, aggressive course of enlightened self-interest if the present and future natural gas needs of the State are to be met. The State must decide what it wants, and then set out to achieve its goals.

My judgment is that the State may reasonably expect success in its negotiations. Consider the pressure points available to the State as bargaining levers:

1. Equity favors the State; it seeks nothing more than a share of the resources which it owns. Further, the State of Alaska alone bears a substantial environmental cost as North Slope resources are developed and transported; since this burden exists, an offsetting benefit should be made available to the people of Alaska.

2. The State has as-yet unused regulatory powers which can materially affect the flow of oil and gas.

3. The State has as-yet unused powers of ownership which can materially affect the flow of oil and gas.

4. The State has as-yet unused powers of taxation which can affect the price of oil and gas.

5. The State probably can retain some control of its royalty gas if the State takes effective action; by non-action the State stands to lose control of its royalty gas. The State's position on its royalty gas is of critical significance because it is doubtful that any North Slope transportation system can go forward without committment of royalty gas to the system, either as part of system supply or as the subject of a continuing transportation agreement. The transportation system needs the royalty gas volumes to support claims of economic viability.

These factors lead me to believe that the State can bargain effectively.

I believe negotiations with both transportation groups are in order. The Arctic Gas proposal has encountered significant opposition, and the FPC staff has only recently concluded that the Arctic Gas group should consider an alternative routing to bring its line down the Alyeska corridor to Fairbanks, and then southeastward. This routing offers an opportunity for physical movement of North Slope gas to, or near, population centers through an Arctic Gas line, a possibility which did not exist so long as Arctic Gas proposed to move eastward out of the State while still within the Arctic Circle.

El Paso should obviously also be approached in definitive negotiations. It has historically supported the principal that a portion of the Alaska gas should be made available for Alaska usage and the El Paso proposal can serve State needs with fewer major revisions than Arctic Gas.

It is, therefore, appropriate for the State to open negotiations with both transportation proponents. It is time to ask, and obtain, positive answers to one basic question: How can Alaska retain the benefit of its natural gas resource under your proposal?

What must be made clear is that the Alaska Legislature and the State Administration, have affirmative duties to ensure, to the fullest possible extent, that the needs of Alaska are served. Others may, and should, consider private interests. But it must be unmistakeably clear that Alaska will judge its present and future position on leasing, regulation, taxation, and royalty gas disposition with due regard to Alaska's present and future needs.

It seems to me that if Alaska can derive no benefit from natural gas produced within its borders in the sense of sharing in the use of the resource, then clearly Alaska can protect its citizen's rights only by looking to natural gas as a source of revenue. Every legitimate means of using gas to raise revenue should be explored. If, on the other hand, Alaska is permitted to share in the benefit of a secure and reliable source of natural gas for use as a non-polluting heat source and as a raw material feedstock, then Alaska need place less emphasis on direct revenue and more emphasis on cooperative development.

If men of good will make an intelligent effort at accommodation and understanding, there is no reason why the mutual problems of producer, transporter, and consumer cannot be solved in a manner which balances fairly their respective interests, and which also serves the interests of national and state government as well.

Respectfully submitted,

Rush Moody, Jr.

RM/ap

CITY OF VALDEZ

P. O. BOX 606
PHONE: (907) 835-4313

February 10, 1976

ZIP CODE: 99686

Senator John Rader, Chairman
Gas Pipeline Impact Committee
Pouch V
Juneau, Alaska 99801

Subject: Gas Pipeline Impact Committee Meeting, February 17,18, 19, 1976

Dear Senator Rader:

This is in reply to your letter of February 2, 1976 regarding possible consumption of natural gas in the city of Valdez.

If natural gas becomes available to the city of Valdez, a whole new era would be opened up. The natural gas would be utilized to heat homes, businesses, schools and hospitals, power electrical generation turbines, and for processing raw materials, minerals and other as yet unknown industries. The use of natural gas would replace the use of heating fuel for heating purposes, thus allowing the heating fuel to be utilized in other more economical ways.

While I have no idea as to the quantity of natural gas which would be consumed by a city of 10,000 to 15,000 people, I am certain it is considerable.

With the El Paso natural gas pipeline passing through the city of Valdez, it would be very inexpensive to construct a short service line into the city proper. The savings to the consumer would be fantastic just in transportation costs alone.

As soon as we become aware that the El Paso gas pipeline is to be built, the city administration of Valdez will immediately undertake the necessary steps to assure an adequate distribution system for the city.

The availability of natural gas to the citizens of this state is a vital necessity if the state is ever to become other than a consuming state. A low cost energy source is necessary if Alaska is ever going to be able to compete with other states in the production of consumer goods.

I urge you to exert every effort to assure that state royalty gas be retained for use within the state of Alaska.

Very truly yours,

Herbert W. Lehfeldt
City Manager

HWL:ss

GOLDEN VALLEY ELECTRIC ASSOCIATION INC. Box 1249, Fairbanks, Alaska 99707, Phone 907-452-115

February 13, 1976

Senator John Rader, Chairman
Joint Gas Pipeline Impact Committee
Alaska State Legislature
Juneau, AK 99801

Dear Senator Rader

I recently read the Moody report and wholeheartedly concur with its recommendations.

There is a substantial potential market for natural gas available in Interior Alaska. GVEA will have 140,000 KW of base load type gas turbine capacity in operation by November 1977. These units, at nominal base load capacity would require approximately 25,000 cu. ft/day. Eight other reserve peaking units could be adapted to burn gas quite easily and would be if the economic anlaysis proved favorable. Our system plans to add an additional 100,000 KW of generation by 1980-81; therefore, by 1981 GVEA alone would be capable of using in the neighborhood of 50,000 cu. ft/day of natural gas. Other area steam/electric plants in combination would require about 30,000 cu. ft/day.

Further, I feel certain that Alyeska would consider burning natural gas at their pump stations 5 through 12 now scheduled to burn #2 distillate. These stations in combination phase 3 operation would use approximately 70,000 cu. ft/day.

Arrangements might be made to have them back off and go on liquid fuel as other industrial gas requirements and needs within the State developed.

It appears that this is one way that the State might initially utilize this valuable resource and more important, better guarantee its continued availability within the State of Alaska.

Best wishes.

Very truly yours

R. L. Hufman
General Manager

RLH:dee

ALASKA PIPELINE COMPANY
P. O. BOX 6288
ANCHORAGE, ALASKA 99502
3000 SPENARD ROAD
PHONE (907) 277-6651

February 16, 1976

Senator John Rader, Chairman
Joint Gas Pipeline Impact Committee
The Legislature of the State of Alaska
Juneau, AK 99801

Dear Senator Rader:

At your invitation we have rescheduled our travel in order to be present at this hearing, together with our consultant, Mr. Charles E. Smith. Charlie was the Alaska manager for Union Oil Company of California from 1959 to 1962, and later was their vice president for natural gas and gas liquids. He is now president of Transworld Gas Systems Inc., of Whittier, California. He has broad and thorough knowledge of the natural gas industry and its problems and prospects, and has assisted in preparing our position today.

We believe that it is essential and even imperative that the State should resolve not to let the Prudhoe Bay royalty gas become committed to or sold in interstate commerce and thus become subject to federal jurisdiction. Our review of the "Legal Analyses of Issues Relating to Natural Gas Transmission" as submitted by Rush Moody, Jr., strengthens this belief.

Based on our present sales and historical growth rate, we may have less than 10 years' supply remaining in our present contract for gas from the Kenai Gas Field. We are doing whatever we can to supplement these supplies: from Cook Inlet Royalty Gas; by negotiations for additional gas from existing uncommitted reserves in the Cook Inlet area; and by our own exploration program in the Susitna Valley. However, there is competition for all such gas reserves, from Japan and

west coast cities, and it is apparent to us that existing Cook Inlet area gas sources will not be sufficient to supply all the existing demand for this gas. In fact, we can show that there is a projected deficit of about four (4) trillion cubic feet to the year 2000. This conclusion can be seen from the report (SRI Project ECC-4304) which Stanford Research Institute prepared in December 1975 for Pacific Alaska LNG Company. This deficit is approximately the same as the quantity of proven Prudhoe Bay royalty gas. In order to adequately protect the consumer, we do not believe it would be prudent for us, nor would it be in the public interest for the State, to rely on any but proven reserves as the future supply for use within Alaska. We do believe the State should view the Prudhoe Bay royalty as the best proven gas reserve for Alaskan use in future years, regardless of which route is selected for delivering this gas to market.

If the El Paso project is finally approved, which we favor, the alternatives open to the State are more straightforward. State gas can be removed from the pipeline prior to delivery to the LNG plant, and a pipeline connection can be made to the existing gas distribution system in Anchorage. In addition new distribution systems could be installed in any city within economic range of the line. Gas which is surplus to the needs of these distribution systems can be stored in underground reservoirs for future deliveries and peaking service, or converted to methanol fuel for distribution throughout Alaska, particularly as an alternative

ALASKA PIPELINE COMPANY

ANCHORAGE, ALASKA

fuel for power generation. In our opinion such a plan would exempt the gas from the jurisdiction of the Federal Power Commission.

In the event the Canadian routing were to be chosen for Prudhoe Bay gas, there are several possible alternatives to be considered for the treatment and transportation of the royalty gas:

(1) A small gas line might be laid to bring the gas to the vicinity of Fairbanks. After satisfying Fairbanks' needs, the remaining gas could be converted to methanol fuel or LNG for further delivery by appropriate means. Methanol fuel has equal or superior qualities as a fuel, and is also in demand as a petrochemical feedstock. Methanol fuel can be utilized as a liquid fuel replacing oil, with minimal equipment change out, but with combustion characteristics equivalent to natural gas. It would be an ideal peaking fuel for the gas turbines which supply power in Anchorage and Fairbanks. Thus even if the 7/8 of Prudhoe Bay gas is taken through Canada, the royalty could be used as fuel by many Alaskan communities and any excess could be sold in the world market. Methanol fuel could be transported by rail to Seward or Whittier for further delivery throughout Alaska. LNG might be exchanged with Pacific Alaska LNG Company for natural gas reserves in place in the Cook Inlet area.

(2) The Prudhoe Bay royalty gas could be converted to LNG or methanol fuel at wellhead and delivered by Boeing 747 cargo aircraft. Transworld Gas Systems has made studies in cooperation with Boeing which indicate that air movement of LNG is technically feasible for transportation from remote areas. Such a method adapts itself to small deliveries of gas into areas not yet being served. Further, LNG would be valuable as peaking fuel in the Anchorage area and it could provide base load fuel after the Cook Inlet reserves are depleted or otherwise committed.

ALASKA PIPELINE COMPANY
ANCHORAGE, ALASKA

The cost of detailed evaluation and engineering of these alternatives cannot be justified unless or until it is known that the Canadian route will be chosen, and in such event there should be adequate time for the State to provide for handling of royalty gas by the time actual gas deliveries begin. However, as a precautionary measure we believe the State should retain the option to keep the royalty gas in place whether prior to completing its delivery facilities or during any "downtime" of these facilities after deliveries have started.

Regardless of the gas line routing decision, Prudhoe Bay royalty gas is a vital resource for Alaska, and control of its use should be reserved to the State rather than federal authorities. We do not believe that the State should allow even temporary deliveries into interstate commerce because of the danger in relying on existing regulatory and judicial precedents. Only by retaining the gas in place or by taking it as it is produced can the State maximize its opportunity to retain control We urge the legislature to act now, before any commitment can be made or even presumed by federal authorities or by the applicant companies.

If adequate gas supplies should become available in the Cook Inlet area in the future and the Prudhoe Bay royalty thus becomes surplus, the State could at such time release it into interstate commerce.

ALASKA PIPELINE COMPANY

ANCHORAGE, ALASKA

The foregoing is the only direct testimony we have at present. We would request that response to any questions be extended to include our consultant, Mr. Charles Smith of Transworld Gas Systems and Mr. Harold Schmidt, who is our senior vice president, and Mr. Bill Hickman, who is our management analyst.

Very truly yours,

Dale Teel
President

DT:jdh

ALASKA PIPELINE COMPANY

P. O. BOX 6288
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3000 SPENARD ROAD
PHONE (907) 277-5551

February 9, 1976

Senator John Rader, Chairman
Joint Gas Pipeline Impact Committee
The Legislature of the State of Alaska
Juneau, Alaska 99801

Dear John:

In 1975 our sales were about 30 billion cubic feet (BCF), to military and civilian power plants and to all other uses, residential and commercial. At the end of 1975 we had 450 BCF remaining under contract. Recovery of waste heat and other reductions of demand for gas by the power plants can be projected, and we are not obligated to the military after 1980. However, it may be prudent for us to anticipate that our annual sales will increase by 1 BCF or more each year for the foreseeable future. Thus we should be working to obtain additional reserves at every opportunity.

We have not been negotiating for Prudhoe Bay royalty gas thus far, because royalty gas is now available in the Cook Inlet area and because there may be about as much other uncommitted gas in the Cook Inlet area as there is of royalty gas at Prudhoe Bay. The distance (investment) and the daily volume required for using Prudhoe Bay royalty gas have made it comparatively impractical for us to consider thus far.

We have begun exploring for gas in the Susitna Valley in the hope that reserves for our requirements could be found and thereby avoid the full impact of competition by Los Angeles, Portland, or Tokyo for gas from the Cook Inlet area. However, we need gas (not just "hope") and if Prudhoe Bay royalty gas will be available within 5 to 10 years, we believe we should begin considering it as an alternative or supplementary supply. As I read the material you sent me, it seems to be essential that the Prudhoe Bay royalty gas should not be commingled with producer gas regardless of the route selected, in order for the State to retain control of its gas. This would mean that a separate pipeline would have to be built for this royalty gas.

If the State were willing to do the financing of such a pipeline, and compressors as necessary, it may be possible for us to arrange to take part or all of the Prudhoe Bay royalty gas. I believe that a 20 inch (?)

ALASKA PIPELINE COMPANY

ANCHORAGE, ALASKA

pipeline, refrigerated to avoid permafrost problems, could be built along the oil pipeline right of way to the Fairbanks area and then along the new highway to the Anchorage area. It could serve the requirements of Chugach when their "Beluga" supply becomes inadequate, as well as our requirements particularly for the municipal and military power plants. It might also serve some of the requirements of present or future petrochemical industries. I am not sure what daily rate of royalty gas is being considered, but I assume it to be of the order of 100 to 200 million cubic feet per day, which compares to our present peak capacity of 160 million and our present average daily sales of about 75 million.

The seasonal aspect of our demand for gas may be the primary problem with our taking Prudhoe Bay royalty gas, but it may be possible to solve that problem by off-season industrial applications or other means. At any rate, we believe there may be sufficient prospect for Alaskan use of this gas that it should be fully explored.

We are not prepared to testify on February 17-20, and will be out of the state on those days. However, we believe our position should be considered as your committee studies this subject.

Very truly yours,

Dale Teel
President

DT:dh

BCP Billions of Cubic Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
Cumulative Requirements Less Deliverability
Requirements Determining Jan 1 of Each Year
(Existing Service Area Only)
(Existing Service Area Only)
Jan 1 of each year
Jan 1 1971
1970 1 2 3 4 5 6 7 8 9 1980 1 2 3 4 5 6 7 8 9 2000

USE OF NATURAL GAS IN ALASKA

BY

GEORGE C. SILIDES, P. E.

TO THE

SPECIAL LEGISLATIVE COMITTEE ON

GAS PIPELINE IMPACT

FEBRUARY 17, 1976

INTRODUCTION

For the record, my name is George Silides. I am a Registered Professional Engineer in private practice, a former State Senator, and a member of the Eighth Legislature's Interim Natural Gas Pipeline Committee

Thank you Senator Rader, and members of the Ninth Legislature's Special Committee on Gas Pipeline Impact, for your invitation to appear before you and express my thoughts on the complex issues confronting you.

The Committee of which I was a member made three recommendations to the Legislature.

1. That a Special Legislative Committee be established in order to continue studying the alternative proposals of gas pipeline construction and routings, and to keep abreast of the actions of the Federal Power Commission and the Congress.

2. Obtain legal expertise in the area of Federal Power Commission regulation in order to protect Alaska's interests.

The creation of this Committee before which I appear today, and the retention of Mr. Rush Moody, formerly with the F.P.C., bears witness that the first two recommendations were accepted.

3. The third recommendation was that the State take such action as appears necessary so as to make it's position crystal clear. I am proceeding under the assumption that this Committee intends to move in that direction. To this date no clearly stated intent as to the use of our royalty gas or oil has been announced, nor has the Commissioner of Natural Resources invited specific, bona-fide, binding proposals from interested persons for the purchase and use of our royalty gas or oil. There is a partial legislative remedy for this as I shall suggest later.

Senator Rader, who chairs this Committee, invited me to speak on the uses of Natural Gas. Most of my comments will deal, primarily, with this aspect, but I would be remiss in not exploring with you some of the other considerations that relate and govern our ability to secure the use of the gas.

Many of my comments appear similar to those of Mr. Rush Moody. I make no opologies for this since I, and others, have been making these comments to the Legislature since 1972. It is encouraging to be joined in them by someone of Mr. Moody's reputation, experience, and a Washington, D.C. address, who gives us a much clearer insight than before as to what we might expect from the Federal Power Commission.

AMOUNT OF GAS

Prudhoe Bay reportedly contains 26 trillion cubic feet of recoverable cap and solution gas. Each barrel of oil produced will bring up about 750 cubic feet of solution gas. Therefore, 9.6 billion barrels of oil production may be expected to result in the con current production of 7.2 trillion cubic feet of solution gas. In terms of daily production 1.2 million barrels of oil results in 900 million cubic feet of solution gas and 2.0 million barrels per day results in 1.5 billion cubic feet of solution gas daily. This, I stress, is exclusive of any allowable cap gas production.

At 12 1/2% royalty interest, Alaska's share of solution gas amounts to approximately 185 million cubic feet of solution gas daily. When cap gas recoveryis allowed for full pipeline throughput, Alaska's royalty share will rise to about 310 million cubic feet daily under the El Paso proposal, and 435 million cubic feet daily under the Arctic Gas scheme. The question immediately arises as to whether or not a pipeline through Canada is detrimental to Alaska's internal economies by depleting our royalty share at a rate faster than we can consume or convert to the myriad of products capable of being produced from Natural Gas. Add to this the certainty that the price of Natural Gas at the market place will continue to rise in relation to the cost of production; should cause us to consider net income just as important as production of the oil reservoir in determining the allowable rate of production.

ALLOWABLE RATE OF PRODUCTION

This is not to suggest that we should curtail solution and cap gas production below that which is necessary to comply with sound reservoir engineering. Nor do I subscribe to the simplistic, out-of-context, interpretation from a recent report to support the theory that we would lose 4 1/2 per cent of recoverable oil reserves unless all gas production was witheld to the year 2000 or so. Mr. O. K. Gilbraith and Mr. Pat Dobey of the Division of Oil and Gas are the ones to question on that account.

I am assuming that for about the first two years of oil production we will allow removal of about one half the solution gas and none of cap gas until the true nature of the reservoir and its flow pressures can be accurately determined by the State's Engineers. I mention these figures as significant because in point blank questioning, officials of El Paso claimed that they would be willing to proceed with construction even at this early-on reduced flow, while the larger diameter-different system of the Canadian line apparently cannot afford such curtailment. In other words, we tend to further lose control unless an Alaska route is used.

USES OF NATURAL GAS

We come now to the various uses of Natural Gas. Let me say at the outset that the least efficient use one can make of gas is to burn it simply for heat or to generate power. Product manufacture is much more beneficial. Through such latter use we not only provide high quality employment but we actually preserve the resource by conversion to a usable product.

It is at this point that I feel compelled to digress into discussion of another route which my associates and I consider of greater benefit to Alaska for reasons that will become apparent.

Thus far you have had two proposals - one through Canada and one through Alaska to Gravina Point. That latter route touches only one urban area - Fairbanks.

Let me also suggest an alternative route to Cook Inlet - specifically the Beluga area. By so doing, the following benefits accrue:

1. The resource is made accessable to the majority of the people of the State, not just 15%.

2. One of the telling criticisms levelled against the El Paso scheme by Arctic Gas is the almost 8% of the gas to be consumed in the liquification process. At Beluga, coal can be used to power the liquification pumps, thus conserving a valuable resource and materially

assisting the creation of a coal mining industry.

3. Methanol manufacture from our royalty gas can be used for the export of coal in slurry form, capable of being transported by tankers. Heretofore, water was used to transport crushed coal in pipelines. Upon arrival at the boiler, about 90-95% of the water content had to be removed. Using a methanol carrier, the slurry can be fired directly into the using boilers.

This, of course, is burning up the resource, not the most efficient use. But, at least, it has assisted in the formation of jobs and taxable income.

Methanol is a liquid chemical commodity of many uses. One important use is the manufacture of formaldehyde, from which are made synthetic adhesives for use in plywood, particle boards and in compressed wood - a superior substitute for scarce hardwoods. It also leads into a long chain of melamine plastics whcih can easily be manufactured in Alaska for export.

Other salient characteristics of products capable of large scale manufacture of products in Alaska are:

Amonia, urea and nitrates, needed in increasing quantities to sustain the world food supply. Alaska should become a major exporter of fertilizer. These products can be traded for imports which we need.

Nor should the agrarian potential of Alaska be ignored. Cattle ranchers on Kodiak Island and Aleutian Islands have been inhibited by the high cost of feed. The Tanana Valley is producing grain at more than twice the national average per acre. The key to successful cattle and swine raising in Alaska is abundant, cheap fertilizer. Gas is the raw material.

A particularly pure iron can be smelted continuously in the electric furnace, using gas or synthesis gas in place of coke. The tetaniferous iron ores of Klukwan and Snettisham can be smelted by this process in a clean manner.

Going quickly through a partial list of possible uses in Alaska for very large amounts of gas we find the following:

Synthesis Gas
Amonia
Urea
Nitric Acid
Methanol
Formaldehyde
Lime
Pelletized Ore and Iron
Cement
Acetylene
Vinyl Chloride and Polyvinyl Chloride
Nitrates
Fertilizers
Plastics
Adhesives
Residue Board and Compressed Wood
Polypropylene, Polyethylene
Styrofoam
LNG

Also of importance is the availability of bottled gas to the smaller towns and villages which now suffer both high prices and fuel shortage problems. Obviously, these smaller communities cannot afford piped distribution systems.

We can see then, that gas derivitives such as ethane and propane can provide a substantial,, clean petrochemical industry in Alaska. Non-availability of feedstocks rather than cost retards petrochemical capacity. Investment is moving toward the oil and gas producing areas where feedstock availability can be assured. Examples are the Province of Alberta and British Columbia. Last year a 1.5 billion dollar ethane plant was announced in B.C.

CONTINGENCY PLAN

The question arises: "Can we have these things in the face of adverse ruling by the F.P.C., either in routing through Canada or attempted interference in our internal affairs." The answer is, "Yes, if we have a contingency plan."

First: Take the gas in hand. Make no committment of sale to either pipeline, but retain control from the well head to the market place. Declare this intent by final passage of SB 174 on oil and gas. That Bill was introduced by the Senate Resources Committee at my request in 1974. It passed the Senate 18-2 and now resides in the House Resources Committee. If the Administration cannot make up its mind on this matter the Legislature can do it for them.

Do not, as has been suggested, amend the provisions of the statute giving legislative overview of the decision of the Oil and Gas Advisory Board. This Bill was co-sponsored in 1974 by Senator Silides, Senator Butrovich, Senator Poland and Senator Croft. It has proven the corner-stone of public scrutiny by the Legislature.

Second: In either routing, and especially if the line goes through Canada, negotiate a trade for our share of the Methane in exchange for Gas Liquids. This trade should be on a BTU equivalent.

Methane constitutes about 68 1/2 per cent of the gas produced at Prudhoe. The availability of Methane within the State is not as important as the availability of gas liquids, relatively speaking. It is the Methane that the mid-West cities are seeking to introduce into their distributor systems. Alaskan cities, with the exception of Anchorage and Fairbanks, do not warrant such distributor systems.

Ethane, Propane and Butane are more important to the State.

A. Bottled gas for rural use is needed to enhance the quality of life throughout the State.

B. The gas liquids are the main feedstocks for petrochemicals.

C. The gas liquids appear not to be subject to F.P.C. regulations.

D. The volume of gas liquids thus obtained could make a small diameter, high pressure pipeline possible from Prudhoe Bay to Tidewater. It most certainly bears study by the Committee.

CONCLUSION

I could continue this complex discussion at even greater length, but I may have already exceeded my brief. My main purpose was first to indicate the value of the resource, and secondly, to suggest that avenues other than the very obvious remain open, and that they should be explored with a firm, positive action.



The ORGANIZATION for the MANAGEMENT of ALASKA'S RESOURCES, INC.

TESTIMONY PRESENTED BEFORE THE GAS LINE IMPACT COMMITTEE

FEBRUARY 17, 1976, JUNEAU, ALASKA

MY NAME IS BOB HARTIG, I SERVE AS ONE OF THE 49 FOUNDERS AND A MEMBER OF THE EXECUTIVE COMMITTEE FOR THE OMAR GROUP. WHILE OUR ORGANIZATION SEEKS TO PROMOTE THE WISE MANAGEMENT OF ALL ALASKA'S RESOURCES, FOR THE PAST 10 MONTHS, OMAR HAS BEEN DIRECTING ALL ITS EFFORTS TO ONE PROJECT--THE CONSTRUCTION OF A TRANS-ALASKAN, ALL AMERICAN NATURAL GAS PIPELINE RATHER THAN THE PROPOSED TRANS-CANADIAN LINE.

OMAR WELCOMES THE OPPORTUNITY TO SPEAK TO YOU AGAIN TODAY, AND COMMENDS YOU FOR YOUR CONTINUING INTEREST. WE ALSO WISH TO COMMEND THE COMMITTEE'S ACTION IN COMMISSIONING RUSH MOODY, JR. TO RESEARCH AND REPORT ON SOME OF THE MATTERS CONCERNING THE STATE'S RIGHT AND ABILITY TO CONTROL ITS NATURAL RESOURCES.

I DO NOT WISH TO RESPOND TO THE TECHNICAL QUESTIONS WHICH WERE POSED BY THIS COMMITTEE IN ITS CALL OF THIS HEARING BECAUSE OMAR IS NOT AN ENGINEERING FIRM. INSTEAD, WE ARE A GROUP OF CONCERNED CITIZENS AND, IT IS IN THE AREA OF PUBLIC POLICY THAT WE FUNCTION.

MOST IMPORTANT OF THE THREE POINTS WE WISH TO MAKE TODAY IS THAT WE ARE DETERMINED TO SEE THE GAS LINE BUILT THROUGH ALASKA. OUR REASONS ARE BOTH ECONOMIC AND ENVIRONMENTAL. IT MAKES SENSE TO USE THE CONTINUED DEVELOPMENT OF ALASKA'S RESOURCES TO KEEP UNEMPLOYMENT RELATIVELY LOW. IT MAKES SENSE TO KEEP OUR RELATIVELY PROSPEROUS ECONOMY AT THE CURRENT LEVEL. IT MAKES SENSE TO USE THE EXISTING ROADS, CONSTRUCTION CAMPS, LANDING STRIPS AND COMMUNICATIONS

FACILITIES AS MUCH AS POSSIBLE FOR A GAS LINE ONCE THE ALYESKA LINE CONSTRUCTION IS COMPLETED IN ORDER TO REDUCE ENVIRONMENTAL DAMAGE AND REDUCE LOADING COSTS.

IN ADDITION TO BEING VITALLY AFFECTED BY THE COSTS OF THE TRANSPORTATION SYSTEM FOR THE NATURAL GAS, ALASKANS ALSO DESERVE THE OPPORTUNITY TO USE THE ROYALTY SHARE OF THE GAS - 12½% - TO MAXIMIZE ECONOMIC BENEFITS TO THE ENTIRE STATE.

THEREFORE WE RECOMMEND THAT THE MEMBERS OF THIS COMMITTEE CONSIDER TAKING THE FOLLOWING ACTIONS:

1. REQUEST THAT THE ADMINISTRATION NOTIFY ALL HOLDERS OF THE PRUDHOE BAY OIL AND GAS LEASES THAT THE STATE ELECTS TO TAKE ITS ROYALTY GAS IN KIND.

2. TO INSURE CONSTRUCTION OF THE TRANS-ALASKA PIPELINE, CONSIDERATION SHOULD BE GIVEN TO THE PRESENT SALE OF THE ROYALTY GAS TO THE FIRM WHICH WILL BUILD SUCH A LINE. SUCH A COMMITMENT OF ROYALTY GAS TO A TRANS-ALASKA PIPELINE WILL SUBSTANTIALLY HELP BRING THAT LINE INTO BEING.

3. WHILE IT IS RECOGNIZED THAT MOST GAS SALES CONTRACTS ARE NORMALLY LONG TERM CONTRACTS, AN EFFORT SHOULD BE MADE TO OBTAIN A RELATIVELY SHORT TERM SALE. PROVISIONS SHOULD ALSO BE MADE IN THE ROYALTY GAS SALES CONTRACT TO WITHDRAW CERTAIN PERCENTAGES OF THE GAS THROUGHPUT TO PROVIDE FOR NEEDS OF COMMUNITIES ALONG THE PIPELINE ROUTE, INCLUDING THE FAIRBANKS AREA. WHILE THESE EXACT NEEDS MAY NOT BE DETERMINABLE, IT IS SUBMITTED THAT PROVISIONS WHICH WOULD PERMIT INCREASING PERCENTAGE WITHDRAWALS OVER THE PERIOD OF THE SALES CONTRACT WOULD MEET THE INCREASED DOMESTIC AND INDUSTRIAL DEVELOPMENT NEEDS AS THEY BECOME IDENTIFIABLE.

THE RECOMMENDATION TO SELL THE STATE'S ROYALTY GAS IS BASED ON THE RECOGNITION OF THE FOLLOWING:

1. ALASKA HAS NO IDENTIFIABLE USE FOR THE GAS.

2. AMOUNTS OF FLOW ARE STILL UNDECIDED WITH INITIAL FLOWS BEING DETERMINED BY THE ALASKA OIL AND GAS CONSERVATION COMMITTEE ON PROJECTIONS. THESE FLOWS WILL LATER BE ADJUSTED BASED ON EXPERIENCE OF PRODUCTION.

3. ONLY AFTER THE PRODUCTION SCHEDULE IS ESTABLISHED CAN A FIRM DETERMINATION BE MADE OF HOW TO BEST MEET THE NEEDS OF OUR COMMUNITIES, AND POSSIBLE PETROCHEMICAL DEVELOPMENT.

4. PETROCHEMICAL DEVELOPMENT NORMALLY REQUIRES LEAD TIMES OF BETWEEN 5 AND 10 YEARS.

5. FUTURE DISCOVERIES WILL BE AVAILABLE TO MEET FUTURE NEEDS.

WE FEEL THIS PROGRAM RECOGNIZES THE NECESSITY OF HAVING THE STATE'S ROYALTY GAS AVAILABLE FOR USE WITHIN THE STATE AND THE IMPORTANCE OF UTILIZING THE AVAILABILITY OF THE STATE'S ROYALTY GAS AS A WEAPON IN GETTING THE PIPELINE BUILT THROUGH ALASKA.

AS TO THE SPECIFIC QUESTIONS POSED BY YOUR COMMITTEE IN YOUR LETTER OF JANUARY 30, 1976:

(1) (a) WE ARE IN AGREEMENT WITH MR. MOODY'S LEGAL ANALYSIS. PRELIMINARY RESEARCH CONDUCTED BY OMAR PERSONNEL TOGETHER WITH INFORMATION GAINED IN MEETINGS WITH OUR CONGRESSIONAL STAFFS AND PERSONNEL WHO POSSESS AN EXPERTISE IN FPC MATTERS, HAS ALREADY CONVINCED US OF THE NEED TO ESTABLISH A NATURAL GAS POLICY FOR THE STATE AND THE IMPORTANCE OF AND THE ACCURACY CONTAINED IN MR. MOODY'S LEGAL ANALYSIS.

(b) MOST OF MY STATEMENT HAS BEEN DIRECTED TO ANSWERING THIS. HOWEVER, WE WOULD URGE THAT STATE LEGISLATION ALTER TAXATION AND LEASING STATUTES TO PROVIDE INCENTIVES TO THOSE PRODUCERS WHO UTILIZE THESE RESOURCES

WITHIN THE STATE.

(2) RESERVOIR RECOVERY IS BEYOND OUR PROVINCE. HOWEVER WE WOULD EMPHASIZE THE QUALIFICATIONS PLACED ON THE STUDY BY THE CONTRACTOR AND THE STATE. THAT IS, THAT "RESERVOIR PERFORMANCE PREDICTIONS ON A FIELD WITHOUT PRODUCTION HISTORY ARE APPROXIMATE AT BEST". AND IN ADDITION, WE WISH TO CALL ATTENTION TO THE FACT THAT ARCTIC GAS HAD RECOVERY PROJECTIONS SIMILAR TO THE STATE, YET ACCORDING TO A NEWS REPORT FROM THE OTTAWA JOURNAL, THE CONSORTIUM STILL INTENDS TO BUILD A PIPELINE SYSTEM LARGER THAN NEEDED, IN EXPECTATION OF TRANSPORTING FUTURE GAS FINDS THROUGH THAT SAME LINE. THIS MEANS THE INITIAL TRANSPORTATION COST WOULD BE HIGHER THAN NECESSARY, AND THE RESULTANT RETURN TO THE STATE OF ALASKA LOWER THAN IT SHOULD BE.

(3) REGARDING PROSPECTIVE PURCHASERS FOR THE ROYALTY GAS, AND USES WITHIN THE STATE, WE FEEL CONFIDENT THAT ONCE A GIVEN QUANTITY OF GAS AND DATE OF AVAILABILITY IS DETERMINED, THERE WILL BE NO LACK OF PURCHASERS FOR PETROCHEMICAL USE. BUT ALL OF THAT IS MOOT IF WE DO NOT DEAL WITH THE GAS AS A WEAPON IN GETTING THE GAS LINE BUILT THROUGH OUR STATE.

IN SUMMARY:

(1) ONLY WITH A TRANS-ALASKAN NATURAL GAS PIPELINE WILL THE STATE BE ASSURED OF THE OPPORTUNITY TO RETAIN ITS ROYALTY SHARE FOR FUTURE DOMESTIC AND INDUSTRIAL USES.

(2) IN ORDER TO ENSURE THE APPROVAL AND CONSTRUCTION OF A TRANS-ALASKAN PIPELINE THE DISPOSITION OF THE STATE'S ROYALTY GAS SHOULD BE USED AS A WEAPON. IN THAT REGARD, AND, RECOGNIZING THAT THERE IS PROBABLY NOT A PRESENT IDENTIFIABLE NEED FOR THE GAS, THE STATE SHOULD : (1) NOTIFY ITS OIL AND GAS LESSEES OF ITS PRESENT ELECTION TO TAKE ITS ROYALTY SHARE IN

KIND (2) ARRANGE FOR SHORT TERM SALES OF THE ROYALTY GAS IF POSSIBLE OR IN THE ALTERNATIVE, LONG TERM SALES WITH PROVISIONS TO ACQUIRE INCREASE PERCENTAGES ON A FIXED SCHEDULE.

IN ADDITION:

(3) THE LEGISLATURE SHOULD CONSIDER LEGISLATION WHICH WOULD ALTER FUTURE LEASES FOR OIL AND GAS TO PROVIDE INCENTIVES FOR UTILIZING THESE RESOURCES WITHIN THE STATE.

BP Alaska Inc. 100 Pine Street, San Francisco, California 94111. Telephone (415) 445-9400

February 17, 1976

Senator John Rader
Chairman, Joint Gas Pipeline Impact
Committee
The Legislature Of The State Of Alaska
Juneau, Alaska 99801

Dear Senator Rader:

We appreciate having an opportunity to submit our comments on your letter of January 30, 1976, soliciting testimony on the Rush Moody Report, the State's Reservoir Analysis and Royalty Gas Options. We will also respond herein to your letter of January 15, 1976, asking five questions regarding the recently published Department of Natural Resources Study on Sadlerochit Reservoir Conservation.

At the outset, there are a few things that should be said about the position of BP Alaska in these matters. By means of its 1969 agreement with Standard Oil Company (Sohio) BP Alaska conveyed its working interests in the oil and gas leases in the Prudhoe Bay area to Sohio reserving to BP Alaska a seventy-five percent net profits royalty interest from production from the Prudhoe Bay properties attributable to production in excess of a certain level. The effect of this agreement is to make Sohio the working interest owner of all the gas under the Sohio/BP leases in Prudhoe Bay. The same agreement made BP Alaska the operator of the Sohio interests in Prudhoe Bay.

The BP Alaska net profits royalty interest does not come into play until production of oil reaches levels in excess of approximately 1,200,000 barrels per day. It will be recalled that this is the level of production which the Trans Alaska Oil Pipeline will be capable of handling under current authorization.

Since the BP Alaska net profits royalty interest in gas is triggered by certain criteria of sustained oil production of specified volume and at specified times, it will be seen that the BP gas interest is of small magnitude in comparison with the interests of the principal gas working owners in the Prudhoe Bay Field which are ARCO, EXXON and SOHIO.

BP Alaska has entered into an agreement with Northern Natural Gas Company giving that company the option to purchase the as yet undefined volumes of gas that may be attributed to BP Alaska through BP Alaska's net profits interest agreement up to a maximum volume of three trillion cubic feet. It should be noted that the Northern Natural Gas agreement covers not only gas from Prudhoe Bay but also any other gas which is attributable to BP Alaska and which may be produced from other North Slope oil and gas leases owned by Sohio and BP.

BP has further agreed with Columbia Gas Transmission Corporation to make available to that company any BP gas which is not required to satisfy its undertaking with Northern Natural Gas.

BP Alaska has not entered into any agreements which concern the basis or method of transport of the gas which the above two companies have the option to purchase or in respect to any other gas that may be available to our company on the North Slope. BP Alaska has no intention of participating in the construction of a gas line nor of assisting in the financing of such a venture. BP Alaska is not aligned with the proponents of either of the two principal schemes for transportation of Prudhoe Bay gas. Our role is simply that of a producer of gas.

The Moody opinion represents a very substantial exercise in legal scholarship involving a number of complex legal issues. As the author concedes, it also raises issues which involve rather longer term implications than the immediate question of the State's disposition of royalty gas and the alignment of the gas pipeline.

We can not responsibly endorse or reject an effort of this magnitude without comparable research and analysis. We understand the State's concern with its ability to control the disposition of its royalty gas in the light of Federal law and regulation. We believe the Moody Report is correct in its conclusion that the State should decide as quickly as possible the ultimate goals of the State's natural gas policy. If the State determines that it is in its best interest to attempt toretain a portion of Alaska's gas for future Alaskan needs, we agree with Mr. Moody's recommendation that positive action must be taken before the gas has been committed to interstate commerce. Such participation could include, as Mr. Moody suggests, active involvement by the State in transportation negotiations with the Federal Power Commission.

With respect to the possible changes in the State's leasing and taxing policies, discussed by Mr. Moody, the discussion centered as much on questions of policy as on legal issues. In view of the complexity of the policy and legal issues which might be presented by novel taxation proposals and suggested changes in the State's leasing laws and regulations, we propose to defer comment until the committees of the legislature meet to consider specific proposals incorporating such changes.

We now turn to your letter of January 15, 1976, which poses questions arising out of the State's recent study on the Sadlerochit Reservoir. For ease of reference we set out below the questions and our answers.

1. What effect does the recent study, "Prediction of Reservoir Fluid Recovery Sadlerochit Formation Prudhoe Bay Field", have on marketing plans for Prudhoe Bay gas?

   The State study evaluated several possible reservoir management schemes and indicated the relative effect of each hypothetical case. The results are not inconsistent with our anticipation that a practical reservoir management scheme can be implemented that will allow gas offtake from the field at rates of the order of 2 bscf/d sales.

2. How does this study differ from industry and federal studies?

   Published studies have predicted various production characteristics, consistent with the available detail and reliability of the data applied. It is to be expected that slightly differing results will be found in these circumstances, but generally the same relative effects of reservoir management schemes are to be found.

3. How accurate can a model be without production history?

   Model studies incorporate many uncertainties with or without any production history. They are certainly more reliable when production history is available for calibrating the various input parameters. They can be considered to be reliable as to general performance and are specifically valuable in assessing relative effects due to varying reservoir production schemes. Good reservoir management planning recognizes and allows for these uncertainties.

4. Will some production history be necessary before an accurate model is established that will prove feasibility of a gas pipeline for marketing of Sadlerochit gas?

   We believe it is possible to plan now for a reasonable level of gas offtake from the field, recognizing that the actual circumstance that results during production may need some modification to the reservoir management, particularly with regard to pressure maintenance, to continue to effectively produce the field.

5. How critical are the results of this study in obtaining FPC certification and financing for the gas pipeline project?

5. The above remarks indicate that we believe it is feasible, under a satisfactory reservoir management scheme, to plan for sustained gas sales. As a potential producer, it is not our principal expertise to comment on the gas marketing or financing questions. These could be more authoritatively answered by the gas pipeline/ marketing companies.

In conclusion, we do not believe that the recently published State of Alaska Department of Natural Resources Study nor the lack of production history should adversely affect the F.P.C. decision on the certification of a pipeline.

BP Alaska did not participate in the F.P.C. proceedings and has not been asked to respond to the interrogatories set out in the F.P.C. letter dated December 12, 1975. We have, however, testified at the hearings of your committee held on December 10, 1975, in Anchorage and at that time responded to some of the same questions included in the F.P.C. interrogatories.

It may be useful for you to be aware of answers we shall be providing to questions posed by the Senate Interior and Insular Affairs Committee and the Senate Commerce Committee under cover of a letter dated January 27, 1976, from Senators Warren G. Magnuson and Henry M. Jackson. A copy of the above letter and the referenced questions are enclosed for your convenient reference together with a draft of BP Alaska's response to those questions. The BP response is in the form of an internal memorandum dated February 12, 1976, to J. Gore of BP Alaska's Washington, D.C. office from D. B. Walker who is Vice President, Production Planning for BP Alaska.

If the Committee should desire further information on these or other matters during our new deliberations we will make every effort to respond.

Sincerely,

K. R. Keep

K. R. Keep
Vice President and General Manager

Enclosure

United States Senate

WASHINGTON, D.C. 20510

January 27, 1976

Mr. John Gore
Manager, Government Affairs
B. P. North America, Inc.
1730 M Street, N.W.
Washington, D.C. 20036

Dear Mr. Gore:

The Senate Interior and Insular Affairs Committee and the Senate Commerce Committee are examining the extent of Arctic natural gas reserves and alternative transportation systems for delivery of this gas to markets in the lower 48 states. The Committees are also examining the institutional, resource and other factors which may constrain or significantly influence the cost of this natural gas and the timing and mode of its delivery into the existing distribution system.

To facilitate our respective Committees' consideration of this matter and to develop the factual background relevant to major policy decisions respecting the development of Alaskan natural gas, our Committees request that you respond to the issues raised in the attached questionnaire by Parts I.A.; I.B.(1), (2), (3) and (6); II.A.(3), (a) and (b); and II.B. (2), (a), (b), (c) and (d). We would appreciate delivery of five copies of your response to these questions to the Interior and Commerce Committees no later than February 11, 1976.

For further information, please contact Henry Lippek at 224-9351 or Thomas Platt at 224-0611.

Sincerely yours,

Warren G. Magnuson

WARREN G. MAGNUSON, Chairman
Committee on Commerce

Henry M. Jackson

HENRY M. JACKSON, Chairman
Committee on Interior and
Insular Affairs

94th Congress
2d Session } COMMITTEE PRINT

ISSUES CONCERNING THE TRANSPORTATION OF ALASKAN NATURAL GAS

QUESTIONNAIRE

PREPARED FOR THE

COMMITTEES ON INTERIOR AND INSULAR AFFAIRS

AND

COMMERCE

UNITED STATES SENATE



JANUARY 1976

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MEMORANDUM OF THE CHAIRMEN

In February 1976, the Senate Committee on Interior and Insular Affairs and the Senate Committee on Commerce will conduct joint oversight hearings on Arctic natural gas reserves and alternative transportation systems for delivery of this gas to markets in the lower 48 states. The Committees will examine the institutional, resource and other factors which may constrain or significantly influence the cost, timing and mode of delivery of this natural gas into existing distribution systems.

To facilitate our respective Committee's consideration of this matter and to develop a factual background on the major policy decisions respecting Alaska gas, interested persons are invited to respond to all or any of the attached questions by February 11, 1976.

Materials submitted will be included in the hearing record on this matter.

HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs.
WARREN G. MAGNUSON,
Chairman, Committee on Commerce.

I. ASSESSMENT OF NATURAL GAS SUPPLIES

A. Natural Gas Supplies

(1) What are the current estimates of proven reserves in:
(a) the Sadlerochit formation of the Prudhoe Bay field,
(b) other formations in the Prudhoe Bay field,
(c) reserves elsewhere in Arctic or Interior Alaska, or on the Arctic OCS, and
(d) the Mackenzie Delta and adjacent Canadian onshore and offshore areas.

(2) What additional reserves can reasonably be expected to be discovered and produced from each of these areas by 1985?

(3) What is the range of uncertainty and/or dispute in each of the estimates in questions 1 and 2 above:
(a) resulting from geological or engineering uncertainty,
(b) depending on leasing or resource development policies, or
(c) resulting from uncertainty about other factors (economic incentives, industry response, logistical problems, etc.)?

(4) What are the potential natural gas resources in each of the areas identified in question (1) and the likelihood of their producibility in volumes which could influence the viability or relative merits of alternative systems for delivery of Prudhoe Bay natural gas?

(5) Consider specifically what leasing or development policy regarding the Alaska outer continental shelf, Naval Petroleum Reserve No. 4, the Arctic Wildlife Range, state lands and lands controlled by Alaska Native corporations might be necessary to make viable various alternative transportation systems? Consider also the possibility of major discoveries in Lower Cook Inlet, the Gulf of Alaska, or other areas of Alaska, and their implications for the viability or merits of alternative transport systems?

B. Deliverability and Cost

(1) What levels of natural gas production could each of the areas considered in subpart A above reasonably be expected to support in each year 1980 through 1985, if transportation were available, given due allowance for the time necessary for field development?

estimates? Consider particularly the relationship between crude oil recovery and natural gas production from the Prudhoe Bay field.

(3) The Van Poollen study for the State of Alaska implies that the potential tradeoff between gas and oil production from the Sadlerochit formation will not be known until

(a) tests have been made of the ability to inject water into the reservoir and a source of water has been assured, and

(b) the operation of the aquifier underlying the reservoir has been observed during oil production.

Is this inference correct? If not, can the optimum rate of gas production presently be calculated? If so, what is it? If the inference is correct, when are the earliest and latest dates that enough information might be available to make a prudent decision on the rate of gas production and the system to transport such natural gas

(4) (a) What is the statutory mandate and policy of the oil and gas conservation authority in Alaska with respect to optimizing the joint production of oil and gas?

(b) To what extent is there a requirement or authority for the agency or the State to consider economic or development factors (as opposed to physical conservation alone) in regulating field production levels?

(5) (a) Could the rates of production at Prudhoe Bay now contemplated by the applicants in Docket CP–75–96 before the Federal Power Commission be appreciably reduced by actions of the State of Alaska?

(b) When will the Alaskan conservation agency decide on the allowable rate of natural gas and oil production?

(c) Can its initial decision be later modified?

(d) Is there a conflict between the FPC's certificating authority and the State's conservation authority? If so, which authority would prevail?

(6) What is the anticipated cost (not necessarily equal to price) of Prudhoe Bay natural gas at the wellhead? Please supply the assumptions and detailed back-up for such estimates. Specifically:

(a) Are these calculations incremental costs, assuming that all joint costs of lease acquisition and field development are borne by oil production, or do they assume an allocation of such joint costs to gas production; and

(b) Does the cost estimate include the value of oil production forgone, if any?

A. Anticipated Shortages

In the absence of the Alaskan gas, what are the anticipated natural gas shortages in the lower 48 states by region in the 1980–85 period?

(1) Which pipelines are expected to be in deepest curtailment of priority users in that period? What is the range of uncertainty associated with these estimates?

(2) What is the anticipated intrastate demand for natural gas in Alaska during the 1980–85 period?

(a) How much of the Prudhoe Bay gas is planned to be consumed in Alaska?

(b) To what extent do these projections of Alaskan consumption assume natural gas use for boiler fuel and other uses for which oil or coal could be substituted?

(c) How much do these estimates vary with different assumptions concerning natural gas and oil prices?

(3) Which pipelines or distributors have options to purchase Alaskan natural gas at this time?

(a) Would the same piplines and distributors obtain Alaskan natural gas regardless of whether the Arctic Gas or the El Paso project are approved?

(b) What are the terms and conditions of these options to purchase?

(c) If Prudhoe Bay gas were to be sold to the pipeline systems in greatest need on the basis of the best current projections pursuant to the FPC's current curtailment policy, which pipelines would receive the gas and what quantity would be sold to each?

(d) On what terms would non-transportation system owners have access to the Alaskan gas transportation system?

(4) The State of Alaska has not yet committed its royalty share of the Prudhoe Bay gas to sale or options. Will the State's decision regarding disposition of its royalty gas (a), between interstate and intrastate purchasers, or (b) among interstate purchasers, significantly influence the viability or the FPC's evaluation of alternative transportation systems?

B. Price

(1) Is the demand for Alaskan natural gas sensitive to natural gas prices and to the price of alternative fuels in the lower 48 states?

(2) When do the producers and purchasers intend to enter into firm long-term contracts for the sale of the Prudhoe Bay natural gas?

(a) What is the reason for the delay to date?

(b) What price will the producers receive in the absence of FPC price controls?

(c) What will be the duration of the sales price?

(d) What are the other likely major terms of such contracts?

(3) For the two transportation systems proposed by the applicants and the modifications recommended by the FPC environmental staff, what are the anticipated:

(a) capital costs (in 1975 dollars);

(b) the initial total transportation tariff per Mcf delivered to points on the West Coast, in the Midwest and in the East; and

(c) the total transportation tariff per Mcf delivered to such destinations 13 years after initial delivery?

(4) Are current estimates realistic in light of the large cost overruns that recently have characterized major construction projects like the TransAlaksa oil pipeline, the Washington Metro or nuclear generating plants? To what extent do the current cost estimates take into account the likelihood of materials shortages, failure to perform by certain contractors, defects or late delivery of equipment, labor disputes, unusually severe weather, regulatory delays, etc.? If the experience of the Alaskan oil pipeline and all these factors are taken into consideration, what is the magnitude of total system costs (in both current dollars and 1975 constant dollars) that conceivably could be expected?

(5) To what extent does transportation at each system's design capacity depend upon additional discoveries of new reserves? What is the range of anticipated total capital and operating costs per Mcf at various levels of throughput?

6. (a) What is the size of the market for Alaskan gas in the lower 48 states if its average lower 48 city gate price (in constant 1975 dollars) is $2.00 per Mcf? $2.50 per Mcf? $3.00 per Mcf? $4.00 per Mcf? $5.00 per Mcf? What is the assumed oil price in these estimates?

(b) At each average price what portion of the total gas over the course of a year would be consumed by priority users, (residential and commercial) and at what price; and what portion would have to be sold for boiler fuel or as interruptible supply, and at what price?

(7) What would be the impact on demand for Alaskan gas if its price at the city gate were substantially higher than the equivalent average price of oil? At what price per Mcf would pipelines no longer be willing to purchase Alaskan gas? What is the probability and under what circumstances, taking into account production costs, all tariffs

and taxes, that the price of Alaskan gas would exceed the amount purchasers are willing to pay for an equivalent volume of base load supply?

Please provide the estimates requested in questions (6) and (7) on the alternative assumptions that Alaska natural gas is required to be priced (1) incrementally or (2) on a "rolled in" basis.

C. Cost of Delay

(1) What revisions must be made in project costs for each year of delay (up to five years) in the commencement of construction?

(2) What is the best estimate of the total cost to consumers for each year of delay beyond 1980 in terms of the price of alternative fuels or impact on the economy of a gas shortage?

III. STATUS OF REGULATORY APPROVALS

A. Agencies Involved

List all of the Federal and state agencies which must issue permits or approvals as a prerequisite to the construction or operation of an Alaskan gas transmission system.

(1) State the estimated timetable for the applicants to obtain such approvals in the absence of expediting legislation.

(2) Is it possible or reasonable for the FPC to grant a certificate for any gas transportation system before the deliverability issues identified in subpart I, B are resolved?

(3) State any approvals required after the FPC issues a certificate of public convenience and necessity. Can the necessity of any such approvals delay or even prohibit construction of the system?

(4) Identify the possibilities for slippage and delay in the timetable for the FPC and other agency approvals?

B. Federal-State Relations

(1) Are Federal and state approval processes coordinated?

(2) Is there a potential for conflict between state land-use, coastal zone management, construction, conservation, safety and other regulatory or taxation activities and Federal requirements and permits?

(3) What is the mechanism, or what mechanism should be established, for encouraging early state input and resolving differences between Federal and state policies?

C. Judicial Review

(1) Which Federal or state agency decisions regarding the transportation of Alaskan gas are the likely subjects of judicial review? What is a reasonable estimate of the time required to complete such judicial review of agency decisions? Could construction commence while such judicial review was underway?

(2) In the absence of any legislation, what is the expected date on which construction could commence? Be completed?

D. Alternatives

Please provide estimates of the costs, environmental impacts, construction lead times and other relevant facts concerning:

(1) An alternative pipeline route from the North Slope to Fairbanks and then paralleling the Alcan Highway;

(2) Conversion of natural gas to methanol and shipment by the trans-Alaska oil pipeline or tanker or submarine; and

(3) Other possible alternatives.

E. Safety

What are the design and operation techniques to assure safe and continuous operation of Alaskan natural gas transportation systems?

1. What is the relationship between the Federal Power Commission and the Department of Transportation with respect to safety standards during gas pipeline construction and operation?

2. What are the probable and worst case estimates of injury and damage of natural gas pipeline accidents?

3. Which State and/or Federal agencies have jurisdiction over LNG terminal siting with respect to safety, distance from population centers, and ship traffic control?

4. What plans or procedures have the responsible agencies or the applicant devised to prevent or deal with LNG tanker collisions or other LNG handling accidents? What is the best available technology to minimize the risk of an LNG accident and to deal with serious LNG accidents?

5. What are the probable and worst case estimates of injury and damage that could result from an LNG tanker or terminal accident? What are the owners' liabilities for such an accident? Are existing liability laws adequate to provide compensation for all damages resulting from a probable and worst case accident?

F. Canadian Procedure

(1) What is the status of Canadian proceedings regarding the Arctic Gas and Maple Leaf projects? What is the anticipated schedule for final approvals by the National Energy Board and the Cabinet? What approvals are required by Provincial Governments? Are there other opportunities for delay of a Canadian decision, such as settlement of Canadian native claims? What is the best estimate of when the Canadian Government will reveal whether a trans-Canada route to transport Alaskan gas is acceptable to Canada?

(2) To what extent does the Canadian decision in fact await or depend upon a decision by the United States?

(3) What diplomatic channels or other mechanisms are available to assure coordination of the U.S. and Canadian approval processes? How would differences be resolved if incompatible trans-Canada routes are approved in the U.S. and Canada?

G. Treaty Status

(1) What is the anticipated initialling date for the U.S.-Canadian pipeline treaty?

(2) What are the terms of the draft treaty?

(3) Would the treaty limit or restrain the taxation or regulatory authority of state or Provincial governments?

(4) What other issues remain to be resolved in a specific protocol dealing with an Alaska-Canada transmission system?

IV. FINANCING

A. Private Capability

(1) Do private capital markets have the capability to provide the necessary funds for the construction of an Alaskan gas transportation system? Can the equity capital for this project be attracted solely on the basis of regulated revenues from natural gas consumers? What is the anticipated interest rate at which needed long-term debt capital can be raised?

(2) Assume the project encountered substantial cost overruns. Could it still be financed privately? What are the outer limits of the amount of capital that could be privately raised?

B. Subsidies

(1) To what extent are either of the applicants intending to seek Federal subsidies, loan guarantees or other forms of financial assistance to offset costs or provide cost overrun protection?

(2) Can either project be constructed and operated without any such Federal assistance?

(3) If Federal assistance to protect against cost overruns is required, what incentives can be incorporated to give the successful applicant incentives to minimize costs?

(4) If a project requiring LNG transportation is certified:
(a) How many vessels would be needed?
(b) Where would such vessels be constructed?
(c) What is the amount of subsidies or loan guarantees likely to be requested?

C. Tariffs

(1) Is it anticipated that Alaskan gas will be sold pursuant to an all-events full cost of service tariff whereby rates are automatically adjusted to reflect any costs incurred and are paid by purchasers whether natural gas is delivered or not?

(2) What is the anticipated risk that gas deliveries will be interrupted over the life of a project?

(3) Is the private financing of the Alaskan gas transportation system contingent upon state and Federal approval of such an all-events tariff?

(4) Are there precedents for an all-events tariff in other situations?

(5) What is the likelihood that state public utility commissions would approve natural gas purchases conditioned upon such tariffs?

(6) Can purchasers obtain insurance from private markets to insulate them against financial difficulties if gas deliveries are interrupted?

(7) If the risk of interruption is significant, would it be prudent to limit the percentage of Alaskan gas entering any pipeline or distribution company?

V. LEGISLATION

(1) What legislation, if any, is required to facilitate the construction of an Alaskan natural gas transportation system?

(2) What subjects should such legislation address? Consider and comment on such matters as:
(a) an expedited schedule for FPC action;
(b) a narrowing of judicial review in time and scope;
(c) establishment of a Congressional review process;
(d) congressional selection of one or more routes by directing all involved federal agencies to expeditiously grant all required permits and licenses;
(e) establishment of wellhead price ceilings and tariffs for Alaskan gas;
(f) establishment of a consolidated administrative process for the siting of LNG facilities;
(g) basis for and extent of an LNG vessel owner's liability for damages in the event of accident;
(h) provision for financial assistance to assure project construction;
(i) providing for allocation of Alaskan gas to pipeline systems in greatest need;
(j) resolution of environmental issues associated with the transportation of Alaskan gas; and
(k) other matters.

○

February 12, 1976

TO: J. Gore - Washington, D.C.

FROM: D. B. Walker - San Francisco, CA

Response to questions regarding "Issues Concerning the Transportation of Natural Gas":

I.A.1. (a) The current estimate of proven reserves of gas in the Prudhoe Bay pool, consisting of the closely related Sadlerochit, Sag River and Shublik Formation, is 24 trillion cubic feet.

(b) No other hydrocarbon-bearing formations in the Prudhoe Bay field are, at this time, considered to contain proven reserves of gas.

(c) & (d) BP Alaska does not have sufficient data to establish whether proven reserves of gas exist elsewhere in Arctic or interior Alaska or on the Arctic OCS or in the Mackenzie Delta and adjacent Canadian onshore and offshore areas.

I.A.2. BP Alaska does not have sufficient data available to make any reasonable predicition of the volume of additional gas reserves that may be discovered and produced from these areas by 1985.

I.A.3. (a) Geological and engineering data would suggest that the uncertainty in the reserves estimate given in I.A.1. (a), above, is approximately ±15%.

(b) & (c) As we are unable to make any reasonable prediction of the volume of gas reserves in areas other than in the proven acreage of Prudhoe Bay, the estimates are not sensitive to factors listed in this question. There can be no doubt that leasing and other policies that give real incentives for active exploration and development work will increase the prospects of additional gas reserves being discovered and proven.

I.A.4. We have made no estimate of the potential gas reserves of the areas listed that could be considered to be reliable,

nor have we evaluated the effect these might have on transportation systems for Prudhoe Bay gas.

I.A.5. BP Alaska is not directly involved in any gas pipeline ventures and therefore is not best qualified to respond to this question. Any leasing and development policies that give incentives for active exploration and production should lead to a situation where more data will exist to evaluate the possible alternative transporation systems.

I.B.1. When a gas pipeline is constructed and available to transport gas from the Prudhoe Bay field, sometime after the commencement of oil production, the field should be able to produce sales volumes of about 2 to 2.5 billion cubic feet of gas per day. These rates should be sustained by the operation of the field under an overall reservoir management scheme with pressure maintenance by water injection being applied and continued as necessary.

I.B.2. Until further information is available from both reservoir data and production history, there will remain some uncertainty as to the reservoir management necessary to sustain the offtake rates quoted. However, BP Alaska considers that offtakes within the range given can be sustained with appropriate development drilling and facilities installation, and with pressure maintenance as necessary so that there will be no significant loss of ultimate oil recovery.

I.B.3. BP Alaska has not yet received the full Van Poollen report and therefore is unable to comment on the implications in that study. Experience from production history and tests will enable the operators in the field to more precisely design a management scheme that will enable the field to be efficiently produced to sustain the planned offtake rates. We do not consider that any trade off between gas and oil production is implied by recognizing that this additional data will enable the operators to refine or revise their development plans.

I.B.6. It is not currently possible to estimate reliably what the ultimate cost of the facilities to be installed for gas production will be, nor, without any experience, what the exact operating costs might be until gas production commences. Both the unique nature of the location and the current trend

of escalating costs make any reliable estimations difficult. Further such direct costs should not be viewed in isolation from the overall costs of exploration for the discovery of this gas and the taxes that will be applied.

II.A.3. BP Alaska has entered into an agreement with Northern Natural Gas Company, which gives them the option to purchase the as yet undefined volumes of gas that may be attributed to BP Alaska through the BP Alaska/Sohio net profits interest agreements, up to a maximum volume of 3 trillion cubic feet. BP Alaska has not entered into any agreement which concerns the basis or method of transport of the gas which Northern Natural has the option to purchase, or any other gas that may be available to our company on the North Slope.

BP Alaska also has made similar commitment to Columbia Gas Transmission Corporation with respect to any Prudhoe Bay gas not required to satisfy its undertaking with Northern Natural Gas.

II.B.2. (a) As indicated previously, BP Alaska has granted to Northern Natural Gas an option to purchase up to 3 trillion cubic feet of gas attributed to its net profits interest in Prudhoe Bay leases, held by Sohio, and some of BP Alaska's other leases on Alaska's North Slope. The amount of Prudhoe Bay gas owned by BP Alaska is related by contract to the time and volume of sustained oil production from Prudhoe Bay, and also is related to the level of oil produced at specific times. The total amount of Prudhoe production also is dependent upon unitization and production methods, all of which makes it impracticable, if not impossible, for Northern to exercise its option until the Prudhoe field goes on production.

(b), (c) & (d) Northern's option provides for good faith negotiations of the price and other terms at the time gas is available for purchase.

BP Alaska also has made similar commitment to Columbia Gas Transmission Corporation with respect to any Prudhoe Bay gas not required to satisfy its undertaking with Northern Natural Gas.

PRUDHOE BAY FIELD

SADLEROCHIT SAND RESERVOIR OIL DATA ---JOHN HUBER

ANALYSIS OF STOCK TANK OIL SAMPLES

H_2 S-% wt.	NIL
SULPHUR % WT	0.95
POUR POINT	27.5°F.
KINEMATIC VISCOSITY (CENTISTOKES)	
50°F.	53
70°F.	26
100°F.	12.6
GRAVITY API	27.9
VANADIUM ppm	13.5
NICKEL ppm	7
WAX % WT	6.3
MELT PT WAX°F	135
% DISTILLED 150°C.	9.5
" 200°C.	17.5
" 300°C.	38.0

SEPARATOR GAS DATA

	PRESSURE (psia)	TEMP.	GOR.	GAS SP. GR.	S.T.O. GRAVITY
1st	615	130	620	0.785	
2nd	100	120	130	0.950	
3rd	15	115	37.7	1.33	0.8864
			787.7		(28.13°API)

SEPARATOR GAS MOL %

	1st	2nd	3rd
CO_2	15.27	18.75	12.91
N_2	0.75	0.23	0.03
C_1	73.94	55.66	24.03
C_2 - C_9	10.04	25.36	63.03

NOTE HIGH CO_2 CONTENT

RESERVOIR TEMPERATURE - 200°F.

REPORT ON METHANOL/METHYL FUEL

Prepared for: Senator John Huber

By: Franklin D. Fleeks

Introduction

Along with the discovery of the Prudhoe Bay oil field came the discovery of a vast pool of gas located at the same field. In order to exploit and remove this resource various schemes have been brought forth. The focus has been on removal by a gas pipeline. The Legislature formed the Joint Gas Pipeline Impact Committee to make a thorough study to help formulate and implement necessary policy decisions.

While gathering its data, questions have arisen dealing with (1) competing gas line proposals, (2) how to handle the state's royalty gas, and (3) problems with federal regulatory agencies. In a thought-provoking report, the consultant to the Committee -- Rush Moody, Jr., succinctly outlined the federal problem. If natural gas is sold in interstate commerce, regulation will be done by the Federal Power Commission. Whether or not the state's royalty gas is initially taken "in kind" it is more than probable that when a later request is made, the state could not withdraw its royalty share without FPC approval.[1]

Considering the current regulated price of gas and the degree of possible federal interference with Alaska's policy regarding its natural gas resource, several alternatives have been looked at. Senator Huber, a member of the Joint Committee, has pursued an alternative based on conversion of the gas to methanol/methyl fuel.

We use methanol here for convenience. The proper term should be methyl fuel, a liquid consisting principally of methanol, produced catalytically from synthesis gas, a mixture of hydrogen and carbon monoxide.

What is Methanol/Methyl Fuel and Its Uses

Methanol/Methyl Fuel or methyl alcohol, CH_3OH, is a colorless, neutral liquid at ambient temperature with a mild odor.[2] In its earliest form, it was called "wood alcohol." It is a clean burning stable fuel which can be converted from natural gas and coal. It can be shipped in conventional tankers and stored in conventional tanks.

The versatility of methanol is clearly shown in the use that can be made of it. Some of its more important uses currently and in the future are:

(1) Directly as a liquid boiler fuel;

(2) Turbine fuel;

(3) In automotive fleets;

(4) Petrochemical feedstock;

(5) Development of Alaskan coal resources.[3,4]

Chemical Feedstock

As Exhibit 1 shows, methanol/methyl fuel can be converted into a number of chemicals having commercial value. The methanol/methyl fuel produced from Alaskan gas and coal resources can create an array of downstream petrochemical industries. With the decrease of hydrocarbon feedstocks based on natural gas in the lower 48 there is a market for methanol/methyl fuel produced from Alaskan coal and gas.

Gasoline Additives

Methanol/methyl fuel can be used as a gasoline additive or as a substitute for gasoline.

As an additive, methanol/methyl fuel will decrease current gasoline consumption on a barrel for barrel basis. According to available information, there is no fall off in fuel efficiency up to approximately ten percent blend levels.[5] Methanol/methyl fuel, however, has about half the heating value per gallon when compared to gasoline. Comparison of some of the properties of methanol/methy fuel and gasoline are shown in Exhibit 2.[6] A bill, introduced in the California Legislature in 1975, would require the addition of methanol to gasoline sold in the state.

Methanol/methyl fuel can effectively reduce the level of pollutants caused by automotive emissions.[7] From a study carried out by the Lawrence Livermore Laboratory in 1974 the following is given:

> ". . . The health effects on man as a consequence of emissions from methanol as compared to gasoline fired automobiles can be summarized as follows: (1) reduction in adverse health effects of photchemical smog as a consequence of reduced photoactivity, (2) elimination of the possibility of lead toxicity to children and other sensitive individuals, because no lead is needed to boost the octane number (3) aromatic emissions from automobiles will be drastically reduced, reducing the carcinogens released to the atmosphere, and (4) reduce exposure to sulfuric acid mist. . ." 8

One of the crucial elements in the gas pipeline/methanol energy debate is what is the net effective energy. If methanol is added in at ten percent blend it will increase the efficiency of energy used in the automobile.

> -". . . (The) maximum BTU's available from the estimated Prudhoe Bay maximum gas production-is 2.36 trillion BTU/degrees. That same gas, transformed into methanol at the wellhead would yield at least 514,000 bbl of methanol. Transported to the lower 48 states at no BTU shrinkage . . . it would displace 514,000 bbl of gasoline in a ten percent blend. Gasoline has a BTU content of 514 million BTU per bbl so the net gain in effective energy in the transportation part of the lower 48 market would be 2.7 trillion BTU/day. This is more than the natural gas delivered BTU's of heating value. . . ." 9

Industrial or Electrical Utility Fuel

The use of methanol/methyl fuel as a liquid boiler and liquid turbine fuel is currently feasible. Tests have been carried out by the electrical utility industry which show that turbines perform more " efficiently on methanol/methyl fuel. Although twice as many gallons of methanol/methyl fuel must be burned to provide the same number of BTU's as oil, turbines burning methanol/methyl fuel generate up to six percent more power per million BTU's.[10]

Transportation of Methanol/Methyl Fuel

The transmission of methanol/methyl fuel to a shipping point for transport to potential markets can be done in a variety of ways. After conversion at Prudhoe Bay, it can be shipped on a batch basis through the Alyeska pipeline, a common carrier.[11] The enabling legislation for the Alyeska Pipeline project (PL 93-153) allows for transportation of synthetic or gaseous fuels through the Alyeska Pipeline.[12] Also a pipeline could be built entirely for methanol/methyl fuel and other synthetic or gaseous fuels.

Once the methanol/methyl fuel reaches tidewater it can be shipped in conventional tankers. Unlike liquified natrual gas (LNG) methanol/methyl

fuel does not need special tanker ships to carry it or special storage facilities. Present proposals call for the transportation of natural gas by pipeline to Gravina Point where it will be liquified for shipment via tankers (to be built) to it[13] emand markets. Use of conventional tankers in transporting methanol/methyl fuel can cut into the lead time needed to get the product from the gas field to market.

Methanol/Methyl Fuel Concept Effect on Alaska

One immediate effect would be to remove the gas from FPC jurisdiction. In Mr. Moody's letter of January 14, 1976, he concluded:

> ". . . if North Slope gas is converted to methanol before becoming committed to interstate commerce, the conversion facilities, the methanol itself, and the transportation of methanol would not be subject to FPC control. Since the natural gas would be produced and "consumed" (i.e., converted to something other than natural gas) within the state, the natural gas would never become subject to FPC jurisdiction. . ." 14

For Alaska, one of the most promising concepts that methanol/methyl fuel opens up is the possibility of using the state's coal resources. By taking the state's royalty gas in kind and transporting the gas to the vicinity of the major Alaskan coal fields, especially those near tidewater, a new industry can be developed.

The coal and gas mixture increases the conversion to methanol/methyl fuel by approximately ten percent. The building of the methanol/methyl fuel plants will provide an infrastructure that will be in place once the natural gas resource is depleted. That infrastructure will be available to further develop the state's coal resources. The building

of the methanol/methyl fuel plants will provide needed energy for the state, increase employment, and provide the industrial infrastructure needed to develop one of the state's most abundant resources, coal.

Conclusion

From review of the literature and studies, most of the data presented is in a prospective form. Even though prospective, the production of methanol/methyl fuel using Alaskan gas is feasible and should be pursued as a viable alternative. The methanol/methyl fuel concept will negate federal regulation, provide a substitute to help alleviate the nation's energy problems and protect the environment by reducing pollutants. The market for industrial chemical uses is not yet defined. However, the net quantities of methanol/methyl fuel produced from Alaskan natural gas can be absorbed by the electrical utility and automotive markets. Continued study should be made of the methanol/methyl fuel concepts.

FOOTNOTES

1. Rush Moody, Jr., Legal Analysis of Issues Relating to Natural Gas T Transportation, 64 (1976).

2. Lecture, Methanol -- Feedstock for the Chemical Industry and Fuel of the Future, Tiemann and Raghuraman, Selas of American, April, 1973.

3. Alaskan Methanol Concept -- A Pre-Feasibility Study, Institute for Energy Analysis, Oak Ridge Associated Universities, IEA Research Memorandum, 75-5, Nov., 1975.

4. The Clean Synthetic Fuel That's Already Here, E. Faltermeyer, Fortune Magazine, Sept., 1975, 147.

5. Alaskan Methanol Concept, supra.

6. Methanol -- The "New Fuel" from Coal, Mills and Harney, Chemtech, January, 1974, 26.

7. Arctic Energy A New Perpesctive, Westinghouse Oceanic Division, January, 1976, 42.

8. Paper, Environmental Aspects of Methanol as Vehicular Fuel: Health and Environmental Effects, Beverly J. Berger, Lawrence Livermore Laboratory, Sept., 1974, 4-5.

9. Arctic Energy, A New Perspective, supra, 50.

10. Faltermeyer, supra, 150.

11. Alaska Methanol Concept, supra, 66.

12. Arctic Energy, A New Perspective, supra, 10.

13. Trans-Alaska Gas Pipeline Project, State of Alaska, Department of Labor, December, 1975, 2.

14. Moody, Jr., Cover letter, supra, 8.

EXHIBIT 1

73

Figure 1

METHANOL

- **Formaldehyde**
  - **Trimethylolpropane**
    - Alkyd Resins
    - Polyurethanes
  - **Pentacrythritol**
    - Plasticizers
    - Alkyd Resins
    - Pentaerythritol-tetranitrate
      - Explosives
  - **Urea-formaldehyde Resins**
    - Malamine-formaldehyde Resins
    - Phenol-formaldehyde Resins
    - Acetal Resins
    - Cresol Resins
    - Crecylic Acid Resins
    - Resoremol Resins
    - Urea Formaldehyde Fertilisers
    - Paraformaldehyde & Trioxane
    - Disinfectant & Preservative
    - Dyes, Rubber chemicals & pharmaceuticals
    - Explosive
    - Phenol Resin Curing
    - Hexamethylene tetramine
    - Ethylene Glycol
      - Antifreeze
      - Cellophane
      - Explosives
      - Polyethylene-Terephthalate
      - Alkyd Resins
- **Methyl Bromide**
  - Grain Fumigant
- **Methyl-Chloride**
  - Tetramethyllead
  - Methylene Chloride
- Antifreeze
- Aircraft fuel
- Inhibitor
- Solvent
- Methylacrylate
- Methyl Parathion
- Dimethyl Sulfide
- Formic Acid
- **Methylamines**
  - **Mono-Methylamines**
    - Herbicides
    - Insecticides
  - **Di-Methylamines**
    - Rubber Accelarators
    - Dimethyl-Formamide
      - Textile Chemical
  - **Tri-Methylamines**
    - Chlorine products
      - Vitamin
- **Dimethyl Terephthalate**
  - Polyethylene Teraphthalate
    - Fibers
    - Films

SELAS OF AMERICA (NEDERLAND) N.V.

EXHIBIT 2

COMPARISON OF METHANOL AND GASOLINE

	Methanol	Gasoline
Formula	CH_3OH	$C_4H_{10}C_{12}H_{26}$
Boiling point, F	148	100-400
Freezing point, F	-144	-100
Latent heat of vaporization at bp BTU/lb	502	116
Liquid density 16/gal.	6.6	6.2
Heat of combustion (liquid-fuel-liquid H_2O) BTU/lb.	9,776	20,260
BTU/gal.	64,500	124,800

Source: Mills and Harney, Methanol -- The "New" Fuel" from Coal; Chemtech, January 1974, 27.

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February 13, 1976

Senator John Huber
Chairman,
Special Committee on Taxation and Revenue
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear John:

Thank you for sending me a copy of the Rush Moody report on "Legal Analysis of Issues Relating to Natural Gas Transportation." I did indeed find it quite interesting and informative. While I am not competent to comment on the legal issues analyzed, I am happy to respond to your request for comments or recommendations on the report, as it may touch on economic questions. This letter represents my initial reaction to some of these matters:

1. As I understand the Moody report, a key legal conclusion is that the State should take royalty gas in kind rather than in value; otherwise, it may lose control in the future of this royalty gas because it will come under FPC regulation, and thus it would be possible that none of Alaska's natural gas would be available for consumption within the State.

2. From an economic point of view, I think the State would also be wise to take royalty gas (and maybe royalty oil also) in kind, so as not to lose the future option on having the royalty gas. This is particularly true because the real value of the royalty gas to the State may be much higher than its market value, for the following reasons.

3. First, at present the price of FPC regulated natural gas moving in interstate commerce is about one-fourth its real market value, as measured by prices on intra-state sales (50¢ versus $2.00 per MCF). While natural gas prices may be deregulated in a few years, there is no present certainty on this.

4. More important, in the long run I think it is generally agreed that the use of natural gas for its heat content as a fuel is a waste of a valuable resource, since its greatest value would be as a petrochemical feedstock. This suggests among other

things that over the long run natural gas prices will rise as it increasingly is reserved for its more valuable use.

5. But, because of the high profit rates the oil companies use in their DCF calculations (as discussed at length in my report), their decisions will tend to be made on short run profit considerations, which may not be best for the State. By way of hypothetical illustration, I constructed a case to show where it might be better for the State to have the gas stay in the ground until it became more valuable, while for the companies it would be more profitable to produce quickly. The hypothetical assumptions were that natural gas would sell at $2 per MCF in the 1980s, $6 per MCF in the 1990s, and $18 per MCF thereafter. Assuming a time value of money, or discount rate, for the companies of 20% per year and for the State of 10% per year, it turns out that if a gas field has a 20 year life, the companies would be best off producing all the gas in the 1981-2000 period, while the State would be better off with the gas produced in the 1991-2010 period. (See attached table.)

6. The problem of the State having a lower discount factor, and hence a longer time horizon, than the companies is of course a general one which may lead to conflicts of interest in many oil and gas areas. Thus, for example, it may be better for the State if all oil and gas were produced at a slower rate than the companies would like, and it is possible that this could be handled under conservation regulations. Specifically, however, with regard to its royalty gas, if the State decides it would be better off with gas production at a slower rate than the companies want, perhaps a way could be worked out to require the companies to leave the royalty gas in the ground until the State requests it, either for its own use or for resale. Alternatively, the State could perhaps exchange the royalty gas with companies for "future gas" to be delivered by them when desired by the State.

7. Another factor favoring taking of royalty gas in kind is that market prices of gas may not reflect the full economic cost to the State of not having the gas. In the short run, a lack of gas could mean costly shutdowns of industry and great consumer inconvenience. In the long run, the absence of an assured supply of gas might hinder the whole economic development of the State. Thus, the question of royalty gas cannot be divorced from questions of planning long-run economic development. But, at least keeping the option to take gas in kind does not foreclose future industrial development opportunities.

8. Also, I think taking royalty gas in kind would have the advantage that it will help the State learn more about the oil and gas business, from practical experience. With oil companies fully integrated from the raw material through petrochemicals, and with the allocation of costs between oil and gas production,

and between raw material production and other functions, often being arbitrary, it is important for the State to have a good grasp of the practical economics of the gas business as well as the oil business. This is vital for the State even if it is to simply maximize its benefits as a tax collector.

9. Finally, I certainly agree with the Moody Report's general recommendations that State leasing policies and taxation on natural gas should be reconsidered. In my opinion both of these questions call for detailed study of possible alternatives. Here I would only observe that tax rates in Texas and Louisiana, where the oil companies have widespread political support from small producers, would not normally be an adequate yardstick as to what rates of taxation could be imposed.

I hope these general comments will be of use to you. My thanks also for your kind words about my report.

Yours sincerely,

Michael Tanzer

Dr. Michael Tanzer,
President

ALASKAN NATURAL GAS PRODUCTION: HYPOTHETICAL EXAMPLE ILLUSTRATING POSSIBLE CONFLICT OF INTEREST BETWEEN THE STATE AND THE COMPANIES OVER TIMING OF PRODUCTION

Assumptions:

(1) Prices of natural gas ($ per MCF): 1981-90, $2; 1991-2000, $6; 2001-2020, $18.

(2) Ignore in all cases investment and operating costs (Alternative interpretation: Prices are net of costs).

(3) Potential production = 1 MCF per year for 20 years.

(4) Discount factors for computing present value in 1980 of future income from gas: companies, 20% per year; State, 10% per year.

TOTAL VALUE OF INCOME FROM 20 YEARS OF GAS PRODUCTION ($):

	1981-2000	1991-2010	2001-2020
A. Gross Value (undiscounted)			
(a) First 10 years	20	60	180
(b) Next 10 years	60	180	180
(c) Total 20 years	80	240	360
B. 1980 Present Value, Discounted at 20% per year (company rate)			
(a) First 10 years	8.39	4.06	1.96
(b) Next 10 years	4.06	1.96	.32
(c) Total 20 years	12.45**	6.02	2.28
C. 1980 Present Value, Discounted at 10% per year (State rate)			
(a) First 10 years	12.29	14.22	16.43
(b) Next 10 years	14.22	16.43	6.32
(c) Total 20 years	27.51	30.65**	22.75

** = Most profitable production period

METHYL-FUEL

Wentworth Brothers, Inc.

Cincinnati, Ohio

At the onset, I would like to very briefly outline the METHYL-FUEL concept.

At the present time, the total installed world's methanol production (chemical grade) is about 25,000 short tons, (a short ton contains about 7.2 API barrels, or just over 300 gallons). This capacity consists of about 5,000 tons in Japan with the balance about equally split between the U.S. and the balance of the world.

In the U.S., our personnel have designed about 30-35% of the installed capacity, including the current worlds largest chemical grade plant (2,500 TPD) down in Beaumont, Texas.

In part stemming from the later plant, and recognizing the large volumes of associated gas being flared in remote locations, the METHYL-FUEL concept was brought forth as a means to bring this energy to market in a stable liquid form. Events in 1973, the Middle East war, temporarily brought a halt to this endeavor in many parts of the world.

This then prompted a renewed look at producing METHYL-FUEL from our nations coal reserves.

When considering coal as feedstock, one is forced to consider the environmental unacceptable coals, the low quality coals or the marginal coals in remote locations. Good, high quality coal should be used as is.

A brief while back, it was brought to our attention that significant quantities of coal existed in Alaska. Very preliminary studies indicated that these coals can be quite economically converted to METHYL-FUEL and transported as a liquid to distant markets. Through this work, the melding of possibilities came forth wherein the production of METHYL-FUEL from the State's coal and/or from the State's coal and gas, appears to offer a very attractive situation. Examples:

1. The synthesis gas from coal for METHYL-FUEL production is deficient in hydrogen. Synthesis gas from natural gas is deficient in carbon. This brings forth the prospect of a optomized combination coal and gas fed plant with thus a considerable increase in conversion efficiency.

2. Many of the Alaskan coals appear to be the type that would lend themselves to simple coal beneficiation. This brought forth the concept wherein, for example, two tons of coal would be mined, one ton would be upgraded to a dehydrated, low sulfur, high BTU coal, the other ton (or the reject from the beneficiation) would serve as METHYL-FUEL feedstock. The METHYL-FUEL would then be utilized as the slurrying media for the beneficiated coal. This not only results in further increases in conversion efficiency, but permits very economical transport of the beneficiated coal and a most appropriate use of gas and coal in the State.

3. It is understood that the gas with Alaskan crude contains a rather large amount of carbon dioxide (CO_2). For METHYL-FUEL production, this presence of CO_2 is a benefit in that it does not have to be removed to permit METHYL-FUEL production, but rather augments it and becomes of the product -- METHYL-FUEL.

4. It is understood that the Alaskan associated gas contains a fair amount of LPG (Propane and Butane) and natural gas liquids (iso pentane and heavier). Our firm has a proprietary process wherein the butane and heavier liquids can be handled very economically with METHYL-FUEL with no loss in conversion efficiency for these stocks. This concept can thus result in the elimination of the waste in at least one, perhaps two, or even three of the other energy systems that will result. The capital and operating cost

savings that are possible here can be quite outstanding. Also, it is this point that makes comparison of METHYL-FUEL handling with other gas handling alternatives about like comparing "apples with oranges" -- with the apples in this case being much more valuable than the oranges because of the inherent case in handling METHYL-FUEL.

5. Last, but not least, is the further processing on the Alaskan scene of the byproducts from a METHYL-FUEL complex with the value added benefits to Alaska. The ones that immediately suggest themselves are ammonia, urea, the ammonium nitrates and the many -- many drivatives possible from the chemical grade alcohols. In summary, it is believed that METHYL-FUEL should be given serious consideration in Alaska. The benefits resulting are many, and far reaching; i.e.:

A.) METHYL-FUEL from coal will in effect revive an old industry and initiate a new vibrant Alaskan industry.

B.) METHYL-FUEL from coal and gas will start and establish an infrastructure which, when the gas reserves are depleted the quantities of coal remaining will permit an on-going clean energy supply situation into the next century.

C.) The existance of a METHYL-FUEL facility will permit consideration of a vast downstream petro-chemical complex for products which in their own right may not otherwise be economically viable.

LNG, METHANOL, FISCHER-TROPSCH SYNTHESIS: METHODS OF UTILIZING REMOTE NATURAL GAS

SRI has recently completed a $300,000 technoeconomic study on this subject. This in-depth study is sponsored by 40 companies from 16 countries.

At the present time, trillions of cubic feet of natural gas are being burned uselessly in flares in remote oil fields in the Middle East, Africa, South America, Indonesia, and elsewhere. Remote natural gas fields have not been developed because of lack of markets.

The economical utilization of remote gas would be attractive to both the exporting and importing countries. Schemes previously considered uneconomical for transporting and utilizing this gas are now being seriously proposed. The two most commonly suggested means of utilizing remote natural gas are liquefaction of the gas to LNG or conversion to methanol and transportation of the liquid product to the market. Several LNG projects are in operation or planned for utilizing natural gas from Algeria, Libya, Brunei, Indonesia, Nigeria, and Alaska. Proposed fuel methanol-from-gas projects have been announced for Middle East gas.

Less attention, however, has been given to other methods of utilizing remote gas. These methods include:

- Fischer-Tropsch liquid fuels
- Long distance natural gas pipelines
- Petrochemical manufacture.

This study includes technical and economic evaluations of all of these options for various distances between producing and consuming regions.

The cost of this study is US$8,000.

STANFORD RESEARCH INSTITUTE
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November 6, 1975

Senator John Huber
Pouch V
Juneau, Alaska 99811

Dear Senator Huber:

As I promised at our meeting here last month, I am sending you the Table of Contents of our recently issued report, "LNG, Methanol, Fischer-Tropsch Synthesis: Methods of Utilizing Remote Natural Gas."

If you have any questions, please contact me.

Sincerely,

Jim Moll

A. James Moll, Director
Energy Technology Department

AJM/jlb

Enclosure

cc: Anchorage, Alaska

John Thrasher

October 1975

LNG, METHANOL, FISCHER-TROPSCH SYNTHESIS: Methods of Utilizing Remote Natural Gas

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CLIENT PRIVATE

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Dutch State Mines
Earl & Wright
El Paso Natural Gas Co.
ELF-ERAP
Empresa Nacional del Gas S.A.
Getty Oil Co.
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Air Products and Chemicals, Inc.
J. C. Carter Co.
Chemico Process Plants Co.
Chicago Bridge and Iron Co.
Davy Powergas, Inc.
El Paso LNG Co.
El Paso Natural Gas Co.
FMC Corp.
General Electric Co.
Girdler Chemical, Inc.
Imperial Chemical Industries, Ltd.
Ingersoll-Rand Co.
Katalco Co.
The M. W. Kellogg Co.
Linde AG
Mitsui Shipbuilding and Engineering Co., Ltd.
Pacific Gas and Electric Co.
Pacific Lighting Co.
Phillips Petroleum Co.
J. F. Pritchard and Co.
Selas Corporation of America
Shell Oil Co.
The South African Coal, Oil and Gas Corporation (SASOL)
Sumitomo Metal Industries, Ltd.
Union Carbide Corp.
Vulcan-Cincinnati, Inc.

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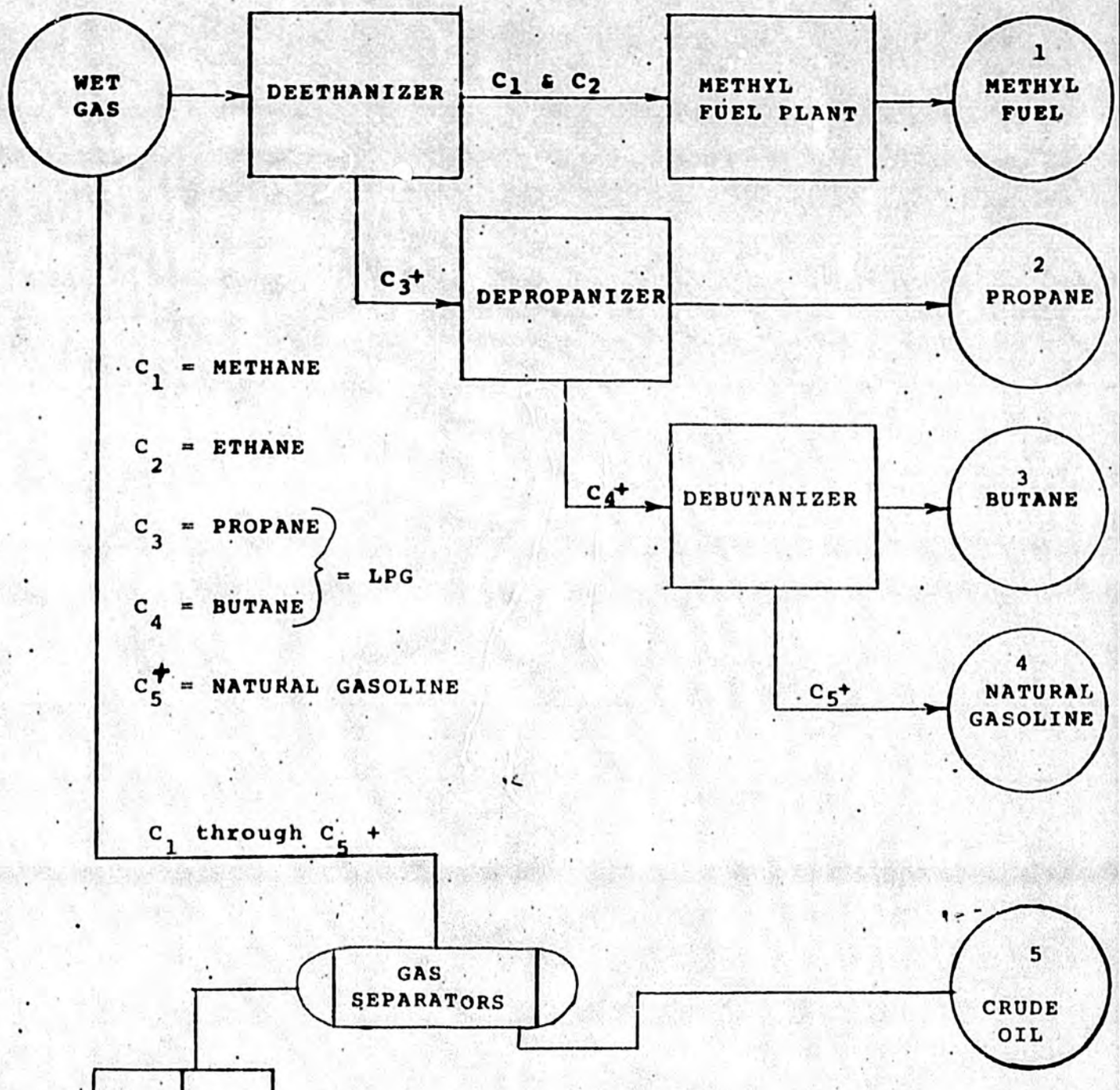
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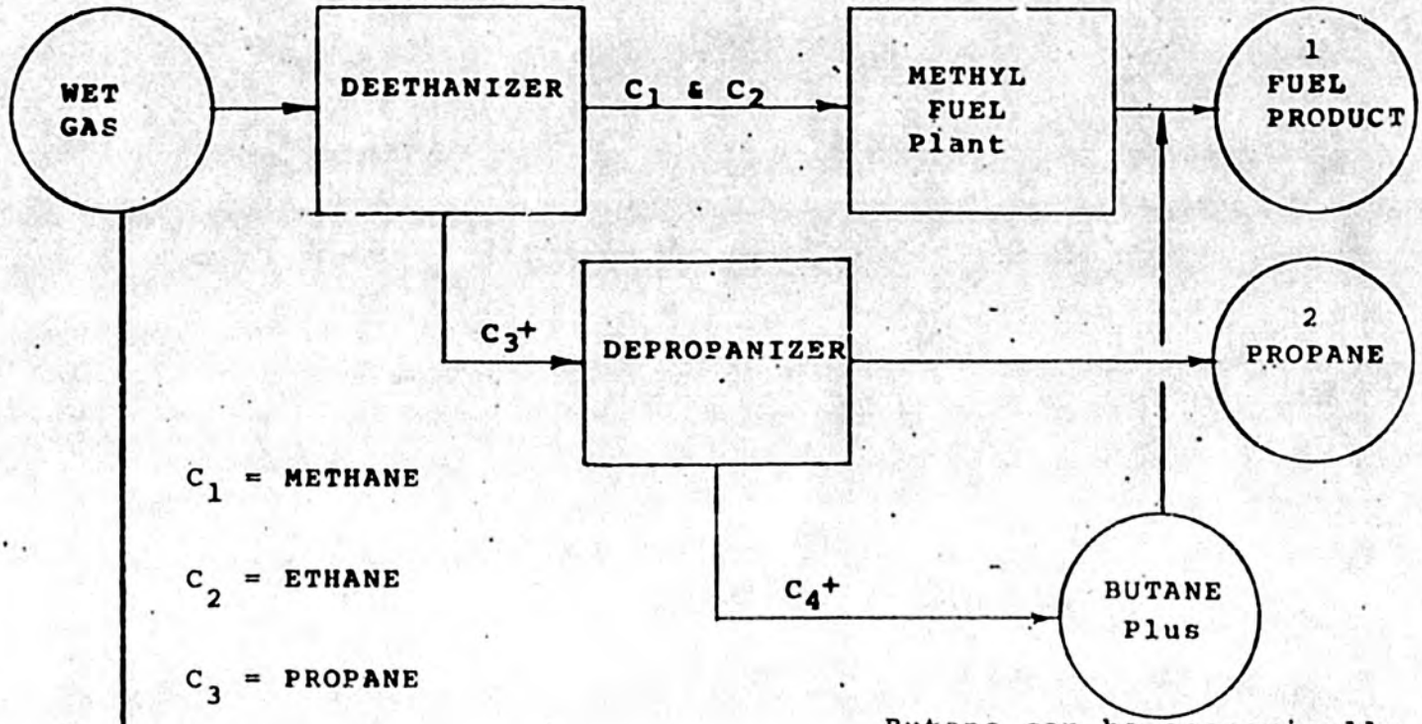
SYSTEMS



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BLOCK FLOW DIAGRAM
GAS HANDLING
CONVENTIONAL CASE

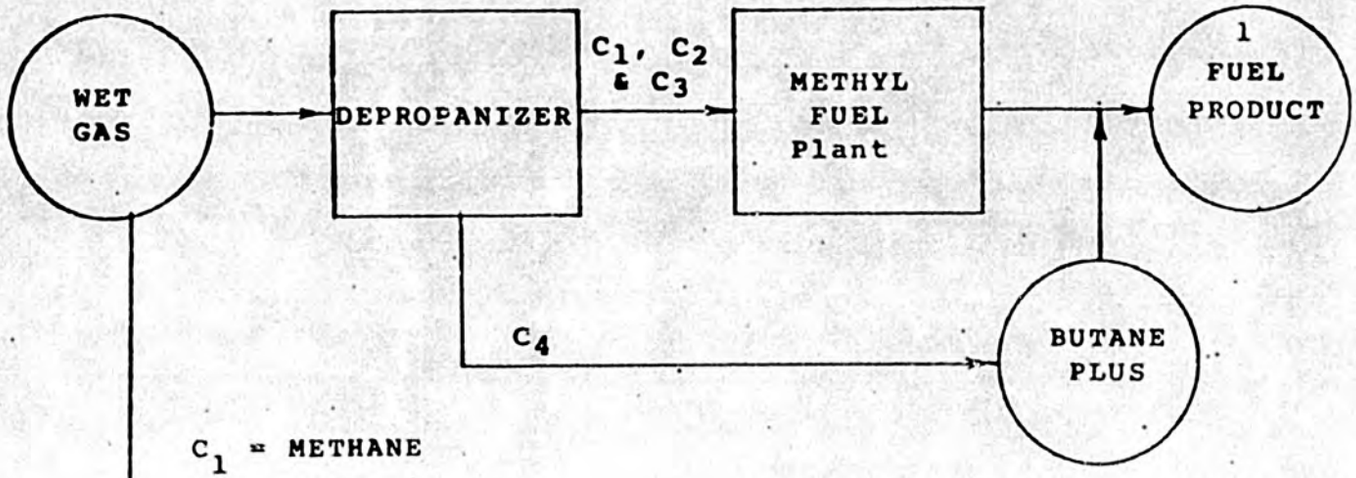
DRAWN BY. MRD	DATE 9/24/75	JOB NO. P-203	DWG. NO. A-P203-1-108



WENTWORTH BROTHERS, INCORPORATED

BLOCK FLOW DIAGRAM
GAS HANDLING
ALTERNATIVE I

DRAWN BY MRD	DATE 9/24/75	JOB NO. P203	DWG. NO. A-P203-1-109



C_1 = METHANE

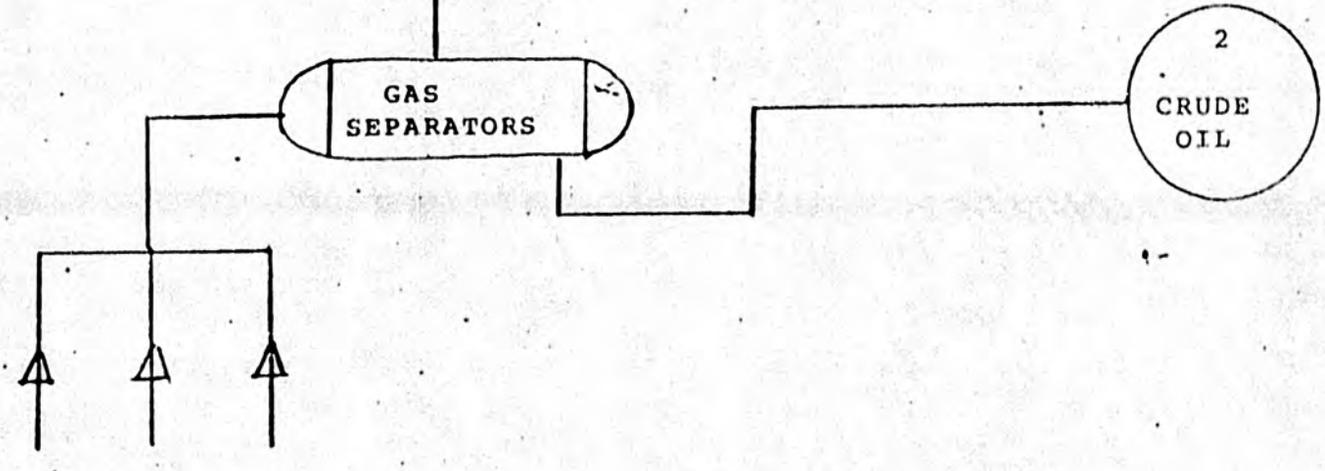
C_2 = ETHANE

C_3 = PROPANE

C_4 = BUTANE

C_5 = NATURAL GASOLINE

Butane can be economically recovered at the receiving port



WENTWORTH BROTHERS, INCORPORATED

BLOCK FLOW DIAGRAM
GAS HANDLING
ALTERNATIVE II

DRAWN BY MRD	DATE 9/24/75	JOB NO. P203	DWG. NO. A-P203-1-110

DR. WILLIAM R. WOOD
EXECUTIVE VICE PRESIDENT

FAIRBANKS INDUSTRIAL DEVELOPMENT CORPORATION
Phone 907 452-5400 or 452-5752 619 Eleventh Avenue Fairbanks, Alaska 99701

February 5, 1976

Senator John Rader, Chairman
Joint Gas Pipeline Impact Committee
Alaska State Legislature
Juneau, Alaska, 99801

Dear Senator Rader:

The undersigned, representing a number of leading labor, business, professional, and industrial groups and more than seven thousand jobs for as many thousands of workers and their families in the Fairbanks area, have studied with deep interest the "Moody Report" submitted to your committee on 14 January 1976.

We heartily commend your foresight in authorizing a study of such fundamental significance for all Alaskans. Your selection of Mr. Rush Moody, a former member of the Federal Power Commission, to conduct the analysis of Alaska's natural gas issues was most wise and fortunate.

Mr. Moody's informative, forthright, yet restrained and objective report to you and your committee clearly reflects the deep-seated concerns of the Alaska tax-paying residents whom we represent. With all of the complexities involved, including the authority of the FPC to fix the well-head price of gas, conceivably Alaska could derive little or no benefit from its great store of natural gas, a rare and precious commodity in the world today. Specifically, we endorse the following basic ooncepts presented in the Moody Report:

1. "The State should pursue an affirmative, aggressive course of enlightened self-interest" to meet its present and future natural gas needs.

2. The State should "place less emphasis upon direct revenue and more emphasis upon cooperative development" with the private interests involved in exploration, extraction, transportation, processing in Alaska, and marketing to insure that Alaska "share in the benefit of a secure and reliable source of natural gas for use as a non-polluting heat source and as a raw material feedstock." In particular, it is essential that the State establish forthwith a stable business climate conducive to such cooperation with potential purchasers or processors of Alaska royalty gas.

3. The State should adopt a basic energy policy that will encourage and stabilize interest in the wisest possible use of its natural gas resources, emphasizing processing within the State to provide the benefits of meaningful and productive employment opportunities for Alaskans on a long-term basis. Such basic policy is required for orderly and economical development of both present and potential commercial oil and gas fields of Alaska.

4. The State should consider in depth the advantages to be gained by the enactment of legislation to hold State owned resources within the State unless ... surplus to the needs of the State" and thus encourage the making in Alaska of more of our own consumer products through the good use of our own human and other natural resources.

5. Since "a natural gas stream has enormous potential value", the State should promptly and aggressively explore all potential uses ... " where conversion within the State, or liquids extraction within the State" strengthens the State's control of its own resource and ... diminishes the range of FPC controls." Especially the State might well consider how best to arrange for the conversion of natural gas to methanol and ways of removing butane, propane, and other LPG's "from the natural stream prior to transportation or sale in interstate commerce."

We pledge our full support of prompt and responsible legislative action as suggested in the conclusion stated in the Moody Report that will effectively secure for Alaskans the

opportunity to make the best use of the State's natural gas resource. It strikes us as an urgent necessity that strong action on these vital issues be taken now without further delay. Clearly, at this point the regulation and taxation are less significant than stimulation and encouragement to make wise use of our resources.

Sincerely yours,

Dave Rasley, Secretary-Treasurer
Central Labor Council

Wally Baer, General Manager
Chamber of Commerce

James Kelly, Manager, Fairbanks Chapter
Associated General Contractors

John C. Morris, M.D., Fairbanks
Chairman, OMAR

J.A. Kornfeind, Manager, Alaska Chapter
National Electrical Contractors Assn.

Al Seeliger, Secretary-Treasurer
Fairbanks Industrial Development
Corporation

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cc: Members, Committee
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Senator T. Stevens
Senator M. Gravel
Congressman D. Young
Governor J.S. Hammond
Commissioner L. Motley
Commissioner G. Martin

OUTLINE OF TESTIMONY TO THE GAS PIPELINE IMPACT COMMITTEE

I am Thomas R. Stahr, Manager of the Municipal Light and Power Department (ML&P) of the Municipality of Anchorage. I am testifying on behalf of the Municipality of Anchorage.

Municipal Light & Power consumed 6.3 Billion cubic feet (BCF) of natural gas for electric power generation in 1975. Our projections indicate 14.6 BCF of gas will be required by 1985. The projected figure is based on the use of waste heat recovery and other conservation measures. Significant improvements in efficiency cannot be anticipated beyond then so the annual increase in usage will be somewhere between 6 and 12%, 8-9% appearing as most likely unless major hydro power projects are built. In the latter case, natural gas consumption for power generation will likely decrease somewhat.

Alaska Gas and Service Company states their total sales are approximately 30 BCFfor all purposes and anticipate a one BCF increase annually. It is our (ML&P) opinion they have slightly under-estimated the increase in electric power generation but the difference is not critical.

The Stanford Research Institute in their report titled "Natural Gas Demand and Supply to the Year 2000 in the Cook Inlet Basin of South-Central Alaska" projects a household-commercial usage of 55 BCF by the year 2000 and requirements for electric power generation as high as 150 BCF per year. Based on the previously cited study and general considerations it appears that the local needs of the area plus the proposed exports cannot be supported over the next 25 years by the now known reserves in the Cook Inlet area. While it is likely that additional local sources will be found, there is no certainty to this. Even if Hydroelectric power becomes available we certainly do not have a secure energy future unless additional reserves are secured. I believe the needs of Alaska should be served before our energy resources are irretrievably committed to others.

Commissioner Guy R. Martin
Chairman, Alaska Royalty Oil and Gas
Development Advisory Board
Department of Natural Resources
Juneau, Alaska

I have been authorized by the El Paso Company to make a formal proposal to purchase the State of Alaska's royalty gas which is excess to the State's needs in Alaska. The following is a draft Memorandum of Agreement which sets forth El Paso's proposal:

(Quote)
WHEREAS, THE EL PASO COMPANY (El Paso), either singly or in conjunction with others is willing to construct and operate facilities to transport natural gas in a large diameter pipeline from the North Slope of Alaska across Alaska to a point on the south central coast, providing outlets for markets enroute, and thence by LNG tankers to markets in the lower forty-eight states ("The Alaska Project");

WHEREAS, the implementation of the plan contemplated by the Alaska Project is in the maximum interest of Alaska and the nation in coping with the critical energy shortage; and

WHEREAS, the State of Alaska ("the State") is entitled to take in kind its royalty share of natural gas produced on state-owned lands within Alaska ("Royalty Gas");

NOW THEREFORE, to the end that the Alaska Project may be realized and the State's objectives achieved, the parties hereto agree as follows:

1. El Paso agrees that the Alaska Project will be constructed and operated in a manner suitable to the handling of the State's Royalty Gas to achieve its objectives herein set forth;

2. The State, having indicated a desire to make its Royalty Gas available for use within the state, will authorize such gas to be delivered to the Alaska Project for transportation to such points along the route of the pipeline as it shall designate;

3. Those quantities of the State's gas determined by it to be surplus to its economic and sociological needs ("Surplus Gas") shall be sold to and purchased by El Paso at the terminus of the pipeline;

4. The charge for the transportation of the State's Royalty Gas shall be that fixed by the appropriate regulatory agency;

5. El Paso shall pay the State for the Surplus Gas at a rate equal to the highest price paid by any responsible purchaser from time-to-time for gas of which the State's Royalty Gas is a portion;

6. If from time-to-time the State shall have available to it additional quantities of Royalty Gas, El Paso agrees to transport and/or purchase such additional quantities of gas on the same terms and conditions set forth herein;

7. The term applicable to the purchase of the Surplus Gas shall be for a period of such years and for such amounts as shall be determined by the State to be surplus to its needs. The State agrees to quantify these amounts and to enter into a further definitive agreement to implement the Alaska Project within one month after signature of this agreement;

8. The State may withdraw any portion of its Surplus Gas from sale to El Paso whenever additional gas is made available to El Paso by others in a volume equal to that withdrawn by the State;

9. At the end of the term of the agreement which will be entered into pursuant to paragraph 7 herein, the State shall have the option to sell and El Paso agrees to purchase the volumes of such gas then determined by the

State to be surplus to its economic and sociological needs for an additional term of similar duration and upon the same terms herein set forth;

10. The undertakings of both the State and El Paso are subject to the receipt of all requisite government approvals, provided, however, that either party shall have the right to cancel this agreement upon thirty (30) days written notice to the other party if El Paso's application to construct and operate the Alaska Project is denied by the Federal Power Commission, or if the certificate which may be issued contains conditions which are unacceptable to El Paso, or to the State, or conditions which render El Paso unable to perform its contract with the State; and

11. At the appropriate time, the State and El Paso will execute a definitive agreement which shall incorporate the general principles covered by this Memorandum of Agreement and which shall include other terms and conditions as may be required and agreed upon.

DATED this _____ day of _____, 1975.

THE STATE OF ALASKA

By:_____

EL PASO COMPANY

By:_____

(End Quote)

Prompt execution of such an agreement will achieve the following:

A. Express to the Federal Power Commission the State's position on ownership of its royalty gas while being transported within Alaska.

B. Preserve the State's freedom to determine the best uses of its royalty gas within the State, while insuring a ready market for the surplus royalty gas.

C. Insure that the State receives the best price for its surplus royalty gas.

D. Demonstrate by affirmative action the State's support for the Trans-Alaska Gas Pipeline, thereby strengthening the position of El Paso in the current hearings before the Federal Power Commission.

If the Board wishes to revise the agreement, discuss its provisions with El Paso representatives, or requires additional data from El Paso, we are prepared to respond promptly.

Thank you for your consideration of our proposal.

JOHN C. BENNETT

VICE PRESIDENT

EL PASO ALASKA COMPANY

El Paso COMPANY

2727 ALLEN PARKWAY
P.O. BOX 2185
HOUSTON, TEXAS 77001

PHONE 713 524-3911

HOWARD BOYD CHAIRMAN OF THE BOARD

February 11, 1976

Senators Henry M. Jackson
and Warren G. Magnuson
United States Senate
Washington, D. C. 20510

Dear Messrs. Chairmen:

Thank you for the opportunity to contribute to the updating of your respective committees on the vital question of how and when Prudhoe Bay natural gas will reach the consumers of the United States. Enclosed are responses to the questions recently published by your committees. I hope you and your colleagues will find our contribution useful.

Having worked intimately with LNG projects for some thirteen years and having devoted five years of thought and effort to the Alaskan proposal, I hope you will find some general observations concerning El Paso's Trans-Alaska Project worthy of consideration.

There are many questions of fact which cannot be answered with absolute accuracy until a project of this unique magnitude has been undertaken. Costs of materials, wage rates, inflation rates, future taxation policies, reservoir deliverability--none of these facts can be finally determined five to six years before the project will come on-stream. Great effort has been expended to quantify such factors, but they will remain open to argument until actual implementation of the project refines the data once and for all. It is imperative that we focus on those major elements of decision-making which, unlike the details of execution, are now well known and which facilitate a response to the central question: How can Prudhoe Bay natural gas be delivered to American consumers?

There are basically four issues: timing, economics, environmental impact, and security.

First, there is timing. Any delay in bringing the gas to market will increase hardship throughout the country, escalate costs, and erode consumers' confidence in their governmental and industrial institutions. The trans-Alaska project will be completed sooner than the trans-Canadian project (Arctic Gas) for several major reasons:

-- The availability of Alyeska's haul road, work pads, camps, and equipment.

-- Only American approvals are required to launch the El Paso project.

-- Litigation protesting the trans-Canadian project's crossing of the Arctic National Wildlife Range could delay construction for years.

-- Alaskan native claims are settled; agreement even to negotiate Canadian native claims is still in the future.

-- The critical cooperation of the State of Alaska is assured in expediting our project's execution.

-- The cooperation of American Labor is assured (44 national and international unions support our project).

-- The Department of Interior's "Report to the Congress" estimates that the risk of delay in completion of El Paso's project is half that of the trans-Canadian project.

The second issue is economics. The trans-Alaska project will benefit the United States as follows:

-- It will provide 9.3 billion dollars more in taxes to U. S. governmental entities than will be paid by the trans-Canadian project.

-- Were the trans-Canadian project approved, the American consumer would pay (at present tax rates) more than 7 billion dollars in Canadian taxes, versus zero for the trans-Alaska project.

-- It will provide more American jobs than will the trans-Canadian project--by a margin of 345,000 man-years.

-- El Paso has committed to procure all possible goods and services within the American economy, in contrast to billions of dollars to be spent by the trans-Canadian project in Japan, Canada, and Europe.

-- Interstate pipeline systems have not been able to add new supplies of gas sufficient to offset the decline in existing sources. The trans-Alaska project will utilize the idle capacity in these existing systems--presently being paid for by the American consumer--in bringing Alaskan gas to markets served by these systems.

-- If the Arctic Gas project is viewed under realistic assumptions, neither project would enjoy a significant advantage in the cost of transportation. If credit be given to the trans-Alaska project for the huge amount of additional U. S. taxes paid by it, the advantage is tilted in its favor. Construction changes and delays experienced in building across thousands of miles of unpenetrated hostile terrain selected by Arctic Gas could result in a dramatic advantage in favor of the trans-Alaskan route.

-- All of the U. S. consumers' payments for El Paso's transportation of gas will remain in the U. S. economy; under the trans-Canadian project, more than half of such payments would flow into the Canadian economy (for twenty-five years).

-- By redesigning certain of the liquefaction facilities, the "shrinkage" (consumption of natural gas) of the trans-Alaska project is substantially the same as the trans-Canadian project. However, in the trans-Alaska project, that portion of the "shrinkage" attributable to the transformation of gas into a mass of "super cold" will be available for future use in the making of industrial gases and in food processing, as now employed in connection with LNG projects in France and Japan, and for other uses.

-- All aspects of the trans-Alaska project over its entire life will be subject exclusively to the national interest of the United States as expressed from time to time by the U. S. Congress and implemented by the Federal Power Commission.

Third, the widespread support of El Paso's project among environmental groups (both American and Canadian) stems from persuasive facts:

-- While El Paso's pipeline will follow the routing of Alyeska's oil pipeline (in the most exhaustively studied corridor in the world), the trans-Canadian project would lay 5500 miles of pipe, much of it in new corridors in Canada and the United States.

-- The trans-Canadian project would require more than five times as many minor waterway crossings, and six times as many major waterway crossings as will El Paso.

-- Concerning LNG technology, the U. S. Coast Guard has reported that LNG shipment is among the safest seagoing operations being carried on today. LNG has been shipped for more than twelve years--covering more than 1400 deliveries--without a cargo release.

There is also the question of security--not in the sense of a threat of war, but peacetime requirements for pipeline security and the need for future expansion as other supplies of gas and oil in Alaska (e.g., NPR-4 and the Beaufort Sea) are produced:

-- The Department of Defense has concluded that the "Alaska-LNG route permits full U. S. physical control and does not require reliance on a foreign government for defense in war and security in peace."

-- Were the trans-Canadian project approved, future expansion of pipeline capacity in order to market additional increments of Alaskan gas would be subject to Canadian regulatory approval, Canadian corporate control, and Canadian political factors.

-- Failure to obtain timely expansion of a trans-Canadian line could adversely affect production of new Alaskan oil discoveries, with which additional natural gas may be associated, including the oil produced in the Naval Petroleum Reserve contiguous to the Prudhoe Bay field.

-- The recently initialled ad referendum agreement with Canada provides no answer to American concerns regarding the foregoing. In addition, it does not provide guarantees against increased provincial ad valorem taxes, etc. As to this latter aspect, the State Department is on record that "the impact of State and Provincial taxes on an Arctic pipeline and other issues relating to a specific pipeline can most effectively be addressed in the context of a protocol negotiated after the approval of the treaty." (Emphasis added.)

I might add that support in Canada for the Foothills and Polar Gas all-Canadian projects to market Canada's arctic reserves raises serious doubts as to whether the Arctic Gas project will gain Canadian approval. Neither Congress nor the Federal Power Commission can assure that the numerous Canadian approvals will be forthcoming within the critical time frame facing this country, if at all. For example, the ruling National Liberal Party adopted a resolution at its November, 1975 convention giving first priority to northern Canadian pipeline schemes that are all Canadian in ownership and which are designed to serve the Canadian public first.

Again, my thanks for this opportunity to contribute to the record of your deliberations. El Paso is at your service should you feel that we can be of help in your consideration of this vital issue of delivering Prudhoe Bay natural gas to the American people as quickly, economically, and securely as possible with an absolute minimum of adverse environmental effects.

Very truly yours,

Howard Boyd

Enclosures

TESTIMONY OF HOWARD A. SLACK, VICE PRESIDENT
ATLANTIC RICHFIELD COMPANY
BEFORE THE GAS PIPELINE IMPACT COMMITTEE
JUNEAU, ALASKA
FEBRUARY 19, 1976

Mr. Chairman, my name is Howard A. Slack. I am a Vice President of Atlantic Richfield Company and Manager of our North American Producing Division's Alaska Region. I am responsible for Atlantic Richfield's exploration and production activities in the State of Alaska and the adjacent offshore areas.

Atlantic Richfield Company welcomes the opportunity to assist the Committee in its deliberations today. I will address the three topics set forth in your letter of January 30, 1976 - namely, the Rush Moody Report, the State's Reservoir Analysis, and Royalty Gas Options - and I will endeavor to be responsive to the several specific questions raised in your letter.

THE RUSH MOODY REPORT

Mr. Moody's "Legal analysis of issues relating to natural gas transportation" has been studied by Atlantic Richfield's counsel. We do not disagree in any material respect with the principals of

law discussed by Mr. Moody. We do, however, note that Mr. Moody's suggestions concerning State taxation options in his letter to Senator Rader must be read in light of his legal conclusions that taxing schemes that burden interstate commerce or conflict with federal interests are suspect. It should also be noted, that Mr. Moody's legal memorandum and cover letter of January 14, 1976, appear to suggest that the State could, among other things, employ its "as yet unused powers of taxation", including new or increased taxes on producers such as Atlantic Richfield, as a counter to "bargain effectively" with Federal agencies regarding route selection and reservations of gas for State usage. To the extent that Mr. Moody's comments might be construed to advocate such a course of action, we would have contrary views.

As a first step toward a decision concerning natural gas sales, the State should decide whether or not it plans to exercise its option as set forth in its oil and gas leases to take royalty gas in kind and market this production separately from working interest gas. We believe that a prompt decision to permit royalty gas in excess of the State's needs to flow to markets in the South 48 States is essential to both maximize state gas royalty revenues and help insure the viability and early construction of a gas transportation system from the North Slope area. However, to insure that provision will be made for the State's gas needs, we endorse Mr. Moody's view that "the State's power to call upon the gas resource

when needed in the future can, in reasonable probability, be exercised if the State's rights and obligations are fully spelled out, fully presented to the Federal Power Commission (FPC) and accepted by the FPC as an integral part of the transportation system which is certified by the FPC". Once basic agreement has been reached between the State and the FPC, the prospective purchasers of royalty gas can be designated by the State and contracts negotiated which will permit reasonable reservations of gas to meet future Alaskan needs. Atlantic Richfield supports, and believes that Mr. Moody's legal analysis supports, a State policy which would favor:

(1) early construction of a gas transmission system from the North Slope of Alaska to the South 48 States,

(2) the marketing of State royalty gas in the South 48 States coupled with a reasonable reservation of royalty gas volumes to meet future Alaskan needs, and

(3) the adoption of taxation and regulatory policies which would be reasonably calculated to foster such a gas transmission system. To further insure the economic viability of a North Slope gas transmission system, Atlantic Richfield also urges the State to adopt a policy which will include cooperation with Federal regulatory agencies and the oil and gas producing industry to bring about prompt exploration and development of undiscovered Alaskan gas reserves.

In our view, both the national interest and the best interests of the State of Alaska require the earliest possible certification and construction of a viable gas transmission system to permit early gas sales. Design and optimization of such a gas transmission system is dependent upon the proved and potential volume of gas reserves which are estimated to be available for delivery. The State's royalty gas share, even if subject to future Alaskan needs, is a significant factor in determining both economic feasibility and line design. We, therefore, urge an early clarification of the State's intention and a prompt and cooperative resolution of its posture with the FPC. Massive investments will be required to facilitate early gas sales, and we urge the State to adopt and maintain fiscal policies which will facilitate such investments and not handicap an industry already burdened with enormous exploration and development costs.

Atlantic Richfield Company has responded to the Federal Power Commission's interrogatories in connection with the pending FPC proceeding pertaining to transportation of Alaskan natural gas. A copy of the Company's submittal to the FPC is attached to the written copy of my testimony as you have requested.

With regard to the Committee's inquiry pertaining to Atlantic Richfield's commitments for the sale of gas, the company, in accordance with Federal Power Commission Order No. 499, entered into advance payment agreements with Panhandle Eastern Pipeline Company and Texas

Eastern Transmission Corporation committing to each of them a call on 20% of Atlantic Richfield's share of the Prudhoe Bay field gas production. A funding agreement was signed with Pacific Lighting Gas Development Company (PLGD), granting the California company a call on the remaining 60% of Atlantic Richfield's Prudhoe Bay gas. On December 31, 1975, the FPC retroactively terminated the advance payments program for Alaska and the California PUC then scheduled hearings to reconsider its prior approval of the Atlantic Richfield - PLGD funding agreement. As a result of these actions the PLGD funding agreement has been terminated and the advance payment agreements with Panhandle Eastern Pipeline Company and Texas Eastern Transmission Corporation will be terminated if the decision of the FPC becomes final.

While this action on the part of the FPC purports to be in the public interest, in our opinion it is misguided and contra productive where the State of Alaska is concerned in that:

(1) Cancellation of all advance payment agreements will deprive U.S. gas transmission companies and distributors of their former rights to purchase Prudhoe Bay gas and lessen their incentive to invest equity capital in <u>any</u> Alaskan gas transmission facility.

(2) Alaska producers, including the owners of the Prudhoe Bay Field, will be deprived of a source of financing - financing which, in the absence of current Alaskan gas

revenues, is necessary to insure industry capability to find new reserves and develop known reserves at the earliest possible date.

Atlantic Richfield's position as to its gas sale commitments has been clearly set forth in our response to the FPC interrogatories. As we indicated in that response, all of our agreements with prospective purchasers contemplated the ability and willingness of such purchasers to accept deliveries of Prudhoe Bay gas through any gas transmission system which was certificated and constructed. Such an understanding should be an essential ingredient of any other commitment of Prudhoe Bay gas made prior to selection and certification of a gas transmission system. Indeed, both competing route proposals contemplate nationwide delivery capability.

Hence, relative to SCR 66, we can categorically state that our existing commitments to Panhandle Eastern and Texas Eastern are in no way detrimental to the certification of a trans-Alaska natural gas pipeline nor can we conceive of any situation in which we would make a pre-commitment of Prudhoe Bay gas to a market which could not be served by any gas transmission system that might be constructed.

THE STATE'S RESERVOIR ANALYSIS

The Committee has expressed a concern about the effect of the recently published State of Alaska, Department of Natural Resources Study on Sadlerochit Reservoir conservation and specifically whether this study, or the lack of production history, will affect the FPC decision on certification of a gas transmission system. Atlantic Richfield does not believe that the Van Poollen study which was done for the Department of Natural Resources will influence the FPC decision on route selection or certification, nor do we expect it to have any adverse effect upon the financing of the approved gas transmission project. The various points raised in the Van Poollen study had been recognized and incorporated in our studies prior to the time of the Van Poollen report. We have found nothing in the report which will lead us to alter in any way our plans for Prudhoe Bay gas production.

The studies of the Prudhoe Bay Field Sadlerochit Reservoir which have been made by Atlantic Richfield Company and those reported by the state and federal governments differ in a fundamental and important manner. That difference lies in the fact that the various reservoir simulation studies of the Prudhoe Bay Field that have been published were undertaken with different objectives in mind. On the one hand, our studies have as their objective the optimum reservoir management for maximum economic

recovery of oil and gas. On the other hand, we believe the state and federal studies have as their objective the determination of recoveries of either oil or gas for a range of different operating conditions.

The question has been raised concerning the reliability of a model in the absence of production history. It is certainly true that the availability of production history can provide a useful check of a study and a basis for modification. However, Atlantic Richfield has a high degree of confidence in its predictions of Prudhoe Bay reservoir performance. This confidence stems from the fact that in the Prudhoe Bay modeling effort the major elements of the model have been subjected to thorough sensitivity testing. In sensitivity testing the first step is to identify those parameters having the greatest effect on the answer and define those parameters to the fullest extent possible. Our thorough application of this approach and the subsequent follow-up work, both field and laboratory, has given us a high degree of confidence in our current forecast of the Prudhoe Bay Field performance. We are convinced that, although some adjustments may be made to the model as production history is developed, our present studies are adequate to demonstrate that, from a reservoir performance standpoint, early gas sales from the Sadlerochit reservoir would be non-injurious.

As we stated in our response to FPC Question II(5) of the "Interrogatories", Atlantic Richfield believes that the Trans Alaska oil pipeline can be expected to begin operation in Mid-1977 at 600,000 barrels per day, reach a sustained throughput of 1.2 million barrels per day before year's end and have a 1.5 million barrels per day production rate commencing on January 1, 1979. We also believe that at such oil production rates, gas sales of 2.0 to 2.5 billion cubic feet per day would be consistent with good reservoir management.

ROYALTY GAS OPTIONS

We have made no study of the market for State royalty gas inside of Alaska. As to the market for State royalty gas outside of Alaska, in our view the opportunities are virtually unlimited. We are aware that the Department of Natural Resources has solicited offers from potential gas buyers and that many have responded. If the State should decline to separately dispose of its share of the gas, the producers, pursuant to their leases, would be obligated to sell such gas on the same terms that producers' gas would be sold. As noted earlier, prompt State action to resolve the "in kind versus in value" issue and active cooperation with the FPC will expedite early construction of the optimum gas transmission facility.

Thank you again, Mr. Chairman, for affording me the opportunity to testify before your Committee today. Atlantic Richfield's response to your letter of January 15, 1976, is also attached to my statement. If you have any questions concerning my testimony today, I shall be happy to attempt to answer them.

Alaska Region
Post Office Box 360
Anchorage, Alaska 99501
Telephone 907 277 5637

Howard A. Slack
Vice President &
Resident Manager

February 19, 1976

Senator John Rader, Chairman
Gas Pipeline Impact Committee
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Senator Rader:

Thank you for your letter of January 15, 1976, and the opportunity to comment on the recently published study entitled "Prediction of Reservoir Fluid Recovery, Sadlerochit Formation, Prudhoe Bay Field" which was prepared by H. K. Van Poollen and Associates for the State of Alaska. The specific questions set out in your letter and our responses are as follows:

QUESTION NUMBER 1

What effect does the recent study, "Prediction of Reservoir Fluid Recovery, Sadlerochit Formation, Prudhoe Bay Field" have on marketing plans for Prudhoe Bay gas?

ANSWER

We do not expect the referenced study prepared by Van Poollen and Associates to have any effect on our plans for marketing Prudhoe Bay gas. The observations reported in this study were recognized and considered in the studies we have prepared with regard to sale of gas from the Prudhoe Bay Field.

QUESTION NUMBER 2

How does this study differ from industry and federal studies?

ANSWER

The state and federal studies differ from Atlantic Richfield's studies primarily because they were undertaken with different objectives in mind. The stated purpose of the Van Poollen

study prepared for the State of Alaska was to "evaluate the oil recovery potential from the Sadlerochit Reservoir at Prudhoe Bay under a number of different operating conditions." The Aerospace study prepared for the Department of the Interior was designed "to determine estimates for gas reserves and deliverability for a range of reservoir characteristics and operating assumptions." These objectives are much more limited in scope than the objectives of our studies. Over the past five years we have made and are continuing to make reservoir studies oriented toward maximizing economic recovery of both oil and gas reserves. In addition to the broader objectives, our conclusions benefit from the inherent advantages of a more lengthy study time and better analytical resources as well as the fact that we are closer to the source of physical data, and better able to define the key input parameters.

QUESTION NUMBER 3

How accurate can a model be without production history?

ANSWER

In Prudhoe Bay Field, extensive physical data has been gathered on the Sadlerochit Reservoir from well logs, cores, geological studies, laboratory analysis of fluid samples, well tests, etc. These data have been used in preparing mathematical reservoir simulation models. Reservoir performance history associated with field production is very useful in reservoir modeling, but it is not essential. Such data are commonly used to adjust reservoir models so that their calculated performance will match history. As longer periods of performance are compared to the model, confidence in the model's ability to predict future performance is usually increased. However, history matching during the primary stage of production does not necessarily assure a reasonable prediction of secondary recovery performance. Some of the most important parameters in the projection of future performance may not be calibrated during the history match.

Although production history is a valuable source of information for developing reliable reservoir models, sensitivity testing of the model parameters is also important. Without production history, sensitivity testing becomes essential in establishing confidence in the model forecasts. The first step in such testing is to identify those parameters having

the greatest impact on the answer and then concentrate on defining those parameters to the fullest extent possible. We have conducted numerous such sensitivity studies for the Prudhoe Bay Field.

During the past five years, we have made very detailed studies of the Sadlerochit Reservoir for alternative reservoir management programs and we are continuing to make such studies. In view of the extensive physical data available for use in preparing the model and the sensitivity studies that we have made with regard to the key factors influencing reservoir performance, we have a high degree of confidence that the effects of gas production from the Sadlerochit Formation can be predicted with reasonable accuracy.

QUESTION NUMBER 4

Will some production history be necessary before an accurate model is established that will prove feasibility of a gas pipeline for marketing of Sadlerochit gas?

ANSWER

No. As expressed in our answer to question 3, we believe the extensive reservoir data available and the detailed reservoir model studies that have been and are being made based on this data will provide reasonably accurate results that are fully adequate for making decisions with regard to timing and rate of gas sales.

QUESTION NUMBER 5

How critical are the results of this study in obtaining FPC certification and financing for the gas pipeline project?

ANSWER

Conditions leading to the observations made in the Van Poollen study have been recognized and considered by industry in developing plans for marketing of Prudhoe Bay gas. We see no reason for such study to have any impact on the FPC decision on pipeline certification or upon the financing of a gas pipeline project.

I want to thank you for the opportunity to comment on this important study. If you have any additional questions or if we can be of further assistance, please let me know.

Yours very truly,

Howard A. Slack.

Howard A. Slack

HAS/jt

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL POWER COMMISSION

EL PASO ALASKA COMPANY, ET AL.) Docket No. CP75-96, et al.

ATLANTIC RICHFIELD COMPANY RESPONSES TO INTERROGATORIES

I. POLICY

QUESTION 1. Were you ever a member of a group investigating the feasibility of bringing gas from Prudhoe Bay and/or the Mackenzie Delta to the Lower 48 states?

ANSWER 1. Yes.

QUESTION 1. a. If yes, please describe your participation in the group.

ANSWER 1. a. Atlantic Richfield Company has participated in two such feasibility studies. Atlantic Richfield joined with El Paso Natural Gas Company in a study to determine the economic feasibility of bringing gas from Prudhoe Bay to the West Coast of the United States by means of a trans-Alaska gas pipeline, gas liquefaction and regasification facilities and LNG tankers. Atlantic Richfield contributed its expertise and financial support to this study from April 23, 1973 to October 23, 1974.

Atlantic Richfield has participated in a study to determine the economic feasibility of bringing gas from Prudhoe Bay and the Mackenzie Delta by means of a trans-Canadian pipeline to markets in Canada and the Lower 48 states. Atlantic Richfield contributed its expertise and financial support to this study from July 14, 1970 to November 30, 1975.

QUESTION 1. b. Are you still a member of such a group; and if not, please explain the reasons for departing.

ANSWER 1. b. No. Atlantic Richfield withdrew from these groups since we felt that the purpose for which we had joined, i.e., to determine the feasibility of transporting arctic gas to the Lower 48 states, had been accomplished and that our further participation was unnecessary. We continue to cooperate with both groups.

QUESTION 2. Why haven't firm gas purchase contracts been executed for Prudhoe Bay?

ANSWER 2. As a result of the FPC's Order of December 31, 1975, in Docket R-411, et al., and subsequent action by the California PUC in, sua

sponte, reopening of CPUC decision #84729, Atlantic Richfield's funding agreement with Pacific Lighting Development Company (PLGD), which gave PLGD a call on 60% of its Prudhoe Bay gas, has been terminated. Our advance payment agreements with Texas Eastern Transmission Corporation and Panhandle Eastern Pipeline Company covering the remaining 40% of Atlantic Richfield's Prudhoe Bay gas will be terminated should the FPC Order become final. Under present circumstances we have no basis for negotiation of a definitive gas purchase contract. Neither unit agreements nor a plan of development for the field have been formally submitted to or approved by the State of Alaska.

Additionally, in light of certain language appearing in the Commission's Order of December 31, 1975, in Docket No. R-411, et al., we are uncertain as to whether any gas purchase contract would be certificated or if the Commission would require a full-blown allocation case for North Slope gas.

QUESTION 3. Please explain the relationship of a unitization and operation agreement for Prudhoe Bay to the execution of gas purchase contracts.

ANSWER 3. The Prudhoe Bay Field consists of a gas cap and an oil rim. The field has a diversity of ownerships in the tracts with differing interests in the gas cap and oil rim. Efforts are underway to unitize the entire field so that it might be developed and operated in the most efficient manner. The plan of development agreed to by the producers must then be approved by the State of Alaska. Until such time as these events occur, it is not known what precise amount of gas production and oil production will be owned in the unit by each party nor is it known to what extent and at what time the State will permit gas sales.

QUESTION 4. Do you have any present intention to provide equity for either the El Paso Alaska project or the Arctic-Canadian gas project should either of them be issued a certificate?

ANSWER 4. No.

QUESTION 5. If the natural gas pipeline and distribution companies are unable to commit the amount of equity required by lendors as necessary for either the Arctic Gas or the El Paso project, would your company be willing to help provide some of the needed equity?

ANSWER 5. A decision on the question would be dependent upon conditions at the time such a need becomes apparent; however, it seems highly unlikely that our other capital requirements would permit such an investment.

QUESTION 6. Will your company bear the cost of gathering and treatment facilities on the North Slope? If no decision has been made on this, what factors would influence a decision and by when would such a decision have to be made?

ANSWER 6. The cost of gathering and treatment facilities on the North Slope will be borne in accordance with gas purchase contracts yet to be negotiated. Under our remaining advance payment agreements (which will be terminated in the event the Commission's Order issued December 31, 1975, in Docket No. R-411, et al., becomes final), Atlantic Richfield would bear the initial cost of installing the gas gathering system but would have the option to require the gas purchaser to purchase all gas handling facilities. A decision relative to exercising such option would have been made at the proper time in light of circumstances existing at the time. It was contemplated that the gas conditioning

plant (treatment facilities) would be installed and operated by or for the gas purchasers.

QUESTION 7. Can your company categorically guarantee that the purchase price of Prudhoe Bay gas under future gas purchase contracts would be no higher than the commodity price of gas in the market area to be served adjusted for applicable cost to market?

ANSWER 7. No. So long as the price of natural gas sold for resale in interstate commerce is subject to Federal Power Commission regulation, producers will receive no more than the regulated price permitted at the wellhead. In the event of price decontrol, Atlantic Richfield hopes to receive fair market value at the wellhead for its gas. The commodity price (which is subject to many variables) of gas in any particular market area to be served, adjusted for applicable delivery cost to that market, may or may not have relevance in determining the regulated rate or fair market value at the wellhead.

QUESTION 8. Would your company oppose any attempt by a potential gas purchaser to place a minimum daily delivery volume provision in a gas

purchase contract for the Alaskan North Slope?

ANSWER 8. Yes. We cannot guarantee to deliver any specific volume of gas at any period of time. As mentioned in answer I, 3., the unitization agreement and State action will have a bearing on the volume of gas that can be sold by each company at Prudhoe Bay. As in all oil or gas fields, it is impossible to preduct with certainty what volume of gas will be available from day to day.

QUESTION 9. How did you choose or how will you choose a purchaser or purchasers for your Prudhoe Bay gas? Explain the steps that will be taken or have been taken in this matter.

ANSWER 9. In July, 1974, Atlantic Richfield sent letters to 17 prospective gas purchasers, requesting bids for its share of the natural gas in the Prudhoe Bay Field. With the FPC's Order No. 499 advance payment program in mind, Atlantic Richfield stated that it was interested in offers which include interest-free loans repayable over time as gas is delivered.

Eleven of the 17 companies responded by making offers for Atlantic Richfield's Prudhoe Bay gas. Interstate pipeline companies generally offered to make advance payments

pursuant to Order No. 499 in the form of interest-free loans. Pacific Lighting Gas Development Company (PLGD) offered to make an advance payment for Prudhoe Bay gas, but stated that it was not feasible for PLGD to raise the funds needed to make an interest-free loan. Instead, it offered to make payments to Atlantic Richfield to cover the interest expense and other costs associated with Atlantic Richfield's raising the money through the sale of a production payment.

The offers made by Pacific Lighting Gas Development Company (PLGD), Panhandle Eastern Transmission Corporation and Texas Eastern Pipeline Company, most nearly fulfilled Atlantic Richfield's needs and we proceeded to conclude agreements with them. As noted in the answer to question I (2), the PLGD agreement has been terminated and if the FPC's Order in Docket R-411, et al., beccmes final, the remaining advance payment agreements will be terminated. All of these agreements expressly recognize that certification and construction of either of the

proposed Alaskan Gas transmission systems would be satisfactory to both seller and buyer.

In light of the confusion brought about by the Commission's Order in Docket No. R-411, et al., and other uncertainties existing at this time, Atlantic Richfield is in the process of reevaluating all options open to it and has made no decision as to its future action.

II. RESERVES

QUESTION 1. Please describe your exploration and development activities on the North Slope of Alaska through 1975 indicating, among other things, the following:

a. Total amount of acreage held in Prudhoe Bay Field as defined by the Alaska Oil and Gas Conservation Committee;

ANSWER 1. a. Atlantic Richfield Company holds interests in 181,689 gross acres or 94,490 net leasehold acres in the Prudhoe Bay Field as defined by the Alaska Oil and Gas Conservation Committee.

QUESTION 1. b. Number of wells presently drilled in the Prudhoe Bay Field and the success ratio of well completions;

ANSWER 1. b. Fifty-three wells have been drilled on the Atlantic Richfield Company/Exxon Company, U.S.A. acreage in the Prudhoe Bay Oil Pool limits. Six of these wells are not commercial.

QUESTION 1. c. An estimation of the total amount of gas reserves in Prudhoe Bay held by your company and an estimate of its deliverability;

ANSWER 1. c. DeGolyer and MacNaughton, our reserve consultant, has estimated that the proved gas reserves in the Prudhoe Bay Field total 24 Tcf of hydrocarbon gas, with Atlantic Richfield Company's net share calculated to be in excess of 7.08 Tcf. Atlantic Richfield's share of the gas deliverability from Prudhoe Bay Field will depend on the outcome of unitization. Insofar as the total field is concerned, gas production will begin with the start of oil production; but gas sales cannot begin until the gas transportation system is built, gas conditioning facilities constructed and a plan of operation which includes gas

sales is approved by the working interest owners and by the Alaska Oil and Gas Conservation Committee.

QUESTION 1. d. Total amount of acreage held on the North Slope including the offshore area outside of Prudhoe Bay and location of such leases;

ANSWER 1. d. Atlantic Richfield holds interests in 817,734 gross acres or 417,016.41 net leasehold acres on the North Slope of Alaska including the offshore portion and the interest set out in answer II, 1., a., above.

QUESTION 1. e. Number of wells drilled outside of the Prudhoe Bay Field on the North Slope, including offshore areas, their location and an indication whether they were successful; and

ANSWER 1. e. Atlantic Richfield Company has participated in the drilling of 31 wells outside of the Prudhoe Bay Field on the North Slope through 1975. These wells, their location and results are as follows:

ARCO No. 1 Colville, 25-12N-7E, Dry and Abondoned (D and A)

ARCO No. 1 Itkillik, 10-8N-5E, D and A

ARCO No. 2 Kavik, 11-3N-22E, D and A

ARCO No. 3 Kavik, 8-3N-23E, gas

ARCO No. 1 Little Twist, 34-3S-4W, D and A

ARCO No. 1 Nora Federal, 5-2N-14E, D and A

ARCO No. 1 North Franklin Bluffs, 20-8N-14E, D and A

ARCO No. 1 Schrader Unit, 18-3S-5E, D and A

ARCO No. 1 Susie Federal, 22-2N-13E, D and A

ARCO No. 1 Toolik Federal, 4-8N-15E, D and A

ARCO No. 2 Toolik Federal, 5-8N-12E, D and A

ARCO No. 3 Toolik Federal, 4-8N-9E, D and A

ARCO No. 1 Ugnu, 22-12N-9E, oil

ARCO No. 1 West Sak River, 2-11N-10E, oil

ARCO No. 2 West Sak River, 22-11N-10E, oil

ARCO No. 3 West Sak River, 26-11N-9E, oil

ARCO No. 5 West Sak River, 11-10N-10E (confidential)

ARCO No. 6 West Sak River, 29-11N-11E (confidential)

Pan Am Kavik No. 1, 7-3N-23E, gas

BP East Ugnu No. 1, 17-2N-10E, oil

BP East Umiat No. 1, 19-1S-2E, gas

BP Kemik Unit No. 2, 6-1S-21E, D and A

BP Itkillik Unit No. 1, 11-1N-6E, D and A

BP Shale Wall Unit No. 1, 2-5S-5E, D and A

Exxon East Mikkelsen No. 1, 17-9N-21E, D and A

Forest Kemik Unit No. 1, 17-1N-20E, gas

Mobil Beli Unit No. 1, 8-4N-23E, D and A

Mobil Echooka Unit No. 1, 32-1N-16E, D and A

Mobil West Kadleroshilik No. 1, 14-5N-14E, D and A

Texaco East Kuparuk Unit No. 1, 10-2S-8E, D and A

Texaco West Kavik Unit No. 1, 20-5N-20E, D and A

QUESTION 1. f. Total amount of gas reserves estimated to be held on non-Prudhoe Bay field lease and their deliverability.

ANSWER 1. f. DeGolyer and MacNaughton, our reserve consultant, has not assigned any proved reserves on the North Slope outside the Prudhoe Bay Field.

QUESTION (cont'd.) 1. Explain the method and data used in determining any reserve estimates.

ANSWER 1. DeGolyer and MacNaughton has said that "since Prudhoe oil pool is essentially a shut-in field with no reservoir performance data, we have based our reserve estimates on the volumetric method. By volumetric method we mean that we have used individual well data -

logs, cores, fluid samples, and flow tests - to determine the sand thickness in each well and to determine certain average reservoir properties. We then used standard mapping techniques to determine the oil and gas in place throughout the field, including the Atlantic Richfield acreage. Then we have estimated an overall recovery factor based on our experience with other fields of similar reservoir characteristics."

QUESTION 2. Has your company made an independent estimate of the amount of potential reserves on the North Slope of Alaska? If yes, please describe your findings.

ANSWER 2. Yes. Atlantic Richfield has estimated the potential reserves yet to be discovered on the North Slope of Alaska using a method based on recovery factors times the cubic miles of sediment capable of containing hydrocarbons. The area included extends northward from the Brooks Range to the 300 foot water depth at the edge of the Continental platform in the Chukchi and Beaufort Seas. A large part of this area lies under the Polar ice cap. We estimate that recoverable reserves

could range up to 45 billion barrels of oil and 135 Tcf of gas. Estimates of potential reserves derived by this method for untested frontier areas are generally regarded as being optimistic.

QUESTION 3. Based upon your company's drilling experience to date, does it appear that the areal extent of the Prudhoe Bay Field as defined by the Alaska Oil and Gas Conservation Committee is larger than anticipated?

ANSWER 3. No. However, additional wells drilled on either Atlantic Richfield or other companies' acreage may allow the boundary to be moved.

QUESTION 4. Has your company studied the possibility of drilling in the Yukon-Kandik Basin, Middle Tanana Basin and Copper River Basin areas of Alaska? If yes, what do your studies indicate, what has been your past experience in such areas, if any, and what are your company's current and future plans with respect to such areas?

ANSWER 4. Yes, Atlantic Richfield has made evaluations of the Yukon-Kandik, Middle Tanana and Copper River Basins. Atlantic Richfield's experience in these basins has been as follows:

a. Yukon-Kandik Basin

Atlantic Richfield conducted a field program in the basin in 1962. Several areas of interest were found, however, the

structural fabric was complex and was accompanied with a very limited sedimentary section with good reservoir characteristics.

b. Middle Tanana Basin

No meaningful rocks are exposed in the basin for examination. A well drilled in the basin in 1962 revealed a thin, non-marine tertiary cover.

c. Copper River Basin

Atlantic Richfield drilled two of the eight wells in the Copper River Basin. We did not find significant shows of hydrocarbons in these wells, nor adequate amounts of reservoir quality rock. In addition, the presence of perma-frost and surficial volcanic rocks make it difficult to obtain the quality geophysical data necessary for pinpointing new drill site possibilities.

We have no current plans for additional evaluation of these areas.

QUESTION 5. **With respect to oil production from the Prudhoe Bay Field, what are the anticipated deliverability rates for the first 12 years? Will this affect the deliverability of your gas? What effect would a 2.25 Bcf deliverability capacity pipeline have on oil production during this period?**

ANSWER 5. **The production rate for the early years in the Prudhoe Bay oil field will be limited by the completion, expansion and operation of the Trans-Alaska Oil Pipeline. In later years the oil production rate (as well as gas deliverability) will be determined by field performance. It is not possible to predict with certainty either of these events. Thus, the oil production rates which can be forecast today must be viewed only as reasonable estimates.**

The Trans-Alaska Oil Pipeline is expected to begin operation in mid-1977 at 600 thousand barrels per day and reach a sustained throughput of 1.2 million barrels per day before the year's end. As yet, no agreement has been reached on pipeline expansion; however, this expansion could take place by the first of 1979. We have assumed that this expansion will take place as early as possible and have

projected a 1.5 million barrels per day production rate from the Prudhoe Bay Field commencing on January 1, 1979, and continuing until field performance can no longer sustain that rate. The field performance predictions used in this production forecast are based on numerical simulation studies conducted during the past five years. These studies have been conducted for several alternative methods of reservoir management. The studies have also considered the sensitivity to many of the reservoir unknowns. Based on these studies, Atlantic Richfield believes that the following is a reasonable projection for the oil production rate from the Jurassic-Triassic formation and is consistent with 2.0 to 2.5 BCF/D gas sales:

Prudhoe Oil Pool Production[1/] 1977-1988

Year	Rate, MB/D
1977	900[2/]
1978	1,200

(cont'd.)

1/ Production forecast for the Jurassic-Triassic crude oil only, does not include condensate or crude oil from other zones, such as Lisburne or Cretaceous formations.

2/ Average for the last six months of 1977.

(cont'd.)

Year	Rate, MB/D
1979	1,500
1980	1,500
1981	1,500
1982	1,500
1983	1,500
1984	1,500
1985	1,485
1986	1,280
1987	1,020
1988	900

QUESTION 6. Please describe your proposed exploration and development activities for the North Slope, if any, for 1976.

ANSWER 6. A. Exploration

Atlantic Richfield will continue its geological studies on the North Slope during 1976. The Company plans to drill four exploratory wells in search of oil. We have no plans for geophysical work on the North Slope this year.

B. Development

Atlantic Richfield will be drilling development wells with two rigs through-

out 1976. This activity should result in the completion of 20 to 22 wells. In addition, eight to 10 gas injection wells will be drilled and existing wells will be completed and perforated for production.

III. FACILITIES AND COSTS

QUESTION 1. What is the type of gas that will be produced from your Prudhoe Bay leases?

ANSWER 1. Solution gas and gas cap gas will be produced.

QUESTION 2. What type of facilities would be needed to process and/or treat each type of gas?

ANSWER 2. Gas handling and conditioning facilities will be required. The gas handling facilities include the gas compression and treating facilities at the flow stations as well as the gas gathering pipelines, compression facilities, gas injection pipelines and injection wells. The gas conditioning facilities will include equipment to achieve dehydration and removal of excess liquids and carbon dioxide from the gas.

QUESTION 3. Which facilities mentioned in interrogatory 2 will be constructed and operated by the producer and which will be required to be purchased entirely or partly by pipeline purchaser? Who will operate those owned by the pipeline?

ANSWER 3. Our advance payment agreements contemplated that the producer would construct and the gas purchaser would acquire, at Atlantic Richfield's option, those gas handling facilities from the outlet of the oil and gas separators and flash tanks at each flow station or separation center to the gas conditioning plant. No decision was made and no discussions were held as to who would operate these facilities. The gas conditioning plant (at the entrance of the gas pipeline system) would have been constructed and operated at the expense of the gas purchaser or the gas pipeline system.

These agreements have been or will be terminated if the FPC Order becomes final. 3/

QUESTION 4. What is the quality of the gas at the wellhead and what will be the acceptable quality for pipeline delivery?

ANSWER 4. The gas at the wellhead, in addition to containing the basic hydrocarbon constituents, also contains approximately 12% CO_2 and will

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3/ See Answer I, 2.

be saturated with water. Although this gas could be delivered to a pipeline specifically designed to handle this quality of gas, gas purchasers (or transporters) will probably condition the gas to meet such requirements as the gas transportation system may determine.

QUESTION 5. It is noted that certain agreements between various producers on the North Slope and pipeline purchasers reserve the right of the producer to process Prudhoe Bay gas in the Lower 48 states. What type of processing is contemplated by your company, where, when and how much? What type of transportation arrangements would be necessary to implement this provision?

ANSWER 5. At the present time, Atlantic Richfield does not have in mind any specific plans for processing in the Lower 48 states. Any transportation arrangement would have to be made with the gas purchaser and gas transporter and presumably approved by the FPC.

QUESTION 6. What would be the cost of each separate facility mentioned in interrogatory 2 ?

ANSWER 6. The current estimates of costs of the gas handling and conditioning facilities are $1.333 billion and $877 million respectively. It should be noted that it is extremely difficult to estimate these costs at this

time due to the uncertainties of the timing of these facilities and the cost inflation which will occur prior to installation of the facilities.

QUESTION 7. How would you allocate the cost between oil and gas production with the facilities which would be either owned by the pipeline or jointly with your company? Please explain your rationale for such allocation.

ANSWER 7. We do not anticipate the joint ownership by a pipeline company and Atlantic Richfield of any facility handling oil and gas production.[4/] If we were to utilize any facilities owned by the pipeline for such purpose, we would expect to negotiate a charge for such use.

QUESTION 8. If the Prudhoe Bay gas is to be processed through facilities owned by the pipeline or jointly by the producer, who will have benefit of the liquid products and how will the operation and maintenance costs be allocated and on what basis?

ANSWER 8. If your word "processed" is intended to mean conditioned or treated, then under the present argreements[5/] on our Prudhoe Bay gas, Atlantic

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4/ See Answer I, 6.

5/ See Answer I, 2.

Richfield would have the option to take in kind any liquid hydrocarbons incidentally recovered therein. Details were never negotiated but, since it was contemplated that the gas would be sold on a BTU basis the purchaser would have been compensated for the heating value of any liquids extracted and redelivered to the producer.

QUESTION 9. Provide the (a) length and size of the gathering facilities for your operation, (b) estimated cost of such line, (c) ownership of such lines, and for those lines to be owned by the pipeline purchaser or jointly with the producer how will costs be allocated for that portion of the facilities attributable to the transportation of gas?

ANSWER 9. (a) Assuming that your question pertains to natural gas gathering facilities, the natural gas gathering facilities consist of lines connecting the six separation centers to a conditioning facility. These lines are expected to be as follows: 30" diameter, 7 miles; 34" diameter, 5-1/2 miles; 38" diameter, 5-3/4 miles; 42" diameter, 5-1/2 miles. These data are for the entire field.

(b) The cost for these lines is currently estimated to be slightly in excess of

$60 million.

(c) See Answer to I, 6.

QUESTION 10. What type of design would be required for the gas gathering system, i.e., buried, above group pipe, chilling facilities, etc.?

ANSWER 10. The gathering system will be installed on supports above ground and insulated.

QUESTION 11. Would your cost estimates vary depending upon whether the Arctic Gas or El Paso project were certificated?

ANSWER 11. No. We assume that the pipeline delivery specifications, both as to gas quality and pressure, would be identical for either project.

QUESTION 12. What percentage of gas available at the wellhead will be lost in treatment and/or processing?

ANSWER 12. We anticipate that approximately 6% of the hydrocarbon gas could be consumed in conditioning the gas to pipeline requirements. This estimate does not include fuel for operation of the Prudhoe Bay Field.

QUESTION 13. What state approvals will have to be obtained in relation to Alaskan North Slope gas production and when will your company make the necessary filings to obtain such approvals?

ANSWER 13. The lease owners of the Prudhoe Bay Field are actively engaged in discussions to

unitize the field. The Prudhoe Bay Field should be unitized prior to commencement of oil production and the agreement must be approved by the Alaska Oil and Gas Conservation Committee. The unitization agreement should contain a plan for the development and operation of the Prudhoe Bay Field, including gas sales timing and volumes, as well as facilities, wells and liquid production rates. The Prudhoe Bay Field owners expect to request approval of these documents during the last half of 1976.

Respectfully submitted,

ATLANTIC RICHFIELD COMPANY

By P.T. Davis ERK

P. T. Davis

AFFIDAVIT

DISTRICT OF COLUMBIA)

EDWARD R. LEAHY, being duly sworn, deposes and says that he is an attorney for Atlantic Richfield Company; that he is authorized to verify and file this document; that he has examined the statements contained in the submittal and that all such statements are true and correct to the best of his knowledge, information and belief.

Edward R. Leahy
EDWARD R. LEAHY

Subscribed and sworn to before me this 13th day of February, 1976.

Sandra M Pagel
NOTARY PUBLIC

(SEAL) My Commission Expires: expired 12, 1977

Testimony of
Exxon Company, U.S.A.
To
Joint Gas Pipeline Impact Committee
Juneau, Alaska
February 20, 1976

Mr. Chairman, Members of the Joint Gas Pipeline Impact Committee, Mr. Moody. My name is W. Ray Booth, Assistant General Manager of the Natural Gas Department of Exxon Company, U.S.A., P. O. Box 2180, Houston, Texas 77001. I am appearing on behalf of Exxon Company, U.S.A. (A division of Exxon Corporation) pursuant to your letter, Mr. Chairman, dated January 30, 1976 addressed to W. Monte Taylor.

You have requested that Exxon testify with respect to a number of matters contained in the January 30 letter. We have filed separately with the Committee a document containing our full answers thereto. My comments will summarize these answers. The principal questions relate to the State's policy with respect to the sale of royalty gas as discussed in the Rush Moody report, routing of a gas pipeline, and the effect of the gas production on reservoir behavior in the Prudhoe Bay field as reflected in the Van Poollen study.

Rush Moody, Jr. Report

Question 1 of your letter requested comments on the report prepared by Rush Moody, Jr. The legal and policy advice in the report is so extensive that it would not be appropriate to agree or comment fully. Our counsel advises

that he would generally agree with Mr. Moody's legal analysis of the effect of the Natural Gas Act on the shipments of the State's royalty gas in interstate commerce, since once it begins its path in interstate commerce, control thereof will be in the hands of the FPC.

Let me state here at the outset that we have always been aware of the right that the State has preserved in its leases to take its royalty gas in kind. We agree that the State must assess its risks in this matter and act in its best interest. Whether the State takes its royalty gas in kind, or whether it permits its gas to be sold under the producer contracts will not unduly affect Exxon's ability to market its gas.

With respect to the question of "banking" which has been raised in these hearings, we are not opposed to exploring with with state the concepts of a banking arrangement. We would observe that lease owners at Prudhoe Bay will be selling gas to different purchasers and that short term balancing provisions are the norm for the situation where multiple sellers and purchasers exist in the same field. If a balancing concept is extended to include banking of gas for the State on some basis other than for temporary operating purposes, additional operating costs and risks to the banking parties must be considered. Further, some delivery problems could be created for the gas purchasers - i.e., the purchasers would have difficulties in determining their respective future allowable gas takes. Since the lease does not provide for banking, we would have to

consider the State's banking its royalty gas in the light of any specific proposal made by the State.

Mr. Moody indicates the commitment of the state's royalty gas to either of the proposed pipeline projects is of critical significance to their economic viability. The state royalty gas will amount to 250-300 MMcf/d under the 2-2.5 Bcf/d gas production plan. We do not feel that this amount of gas removed from viable systems which are designed for a capacity of 2.4 to 4.5 Bcf/d will affect such viability.

Our counsel advises that he is not in agreement with some other portions of Mr. Moody's letter and particularly the portions which speculate as to the power of the State to take certain actions as lessor which would otherwise be beyond its power as a governing body. I am not sure that this necessarily differs with Mr. Moody's opinion, as he stated affirmatively that he does not offer an unqualified opinion that such legislation would withstand court challenge. From Exxon's point of view, the state has leased certain lands for a valuable consideration. There are equities to the lessees that should be considered, and the State should not continue to reduce the value of what it has leased, appropriating those values to itself.

FPC Interrogatories

We have supplied a copy of Exxon Company, U.S.A.'s answers to the FPC interrogatories which were requested and

believe them to be self-explanatory. These answers generally reflect information which has previously been provided to various Alaska State agencies.

Commitments for Sale of Prudhoe Gas

Regarding commitments for the sale of Prudhoe gas, Exxon Corporation, as of February 27, 1976, will have no agreements with any potential purchaser for its share of Prudhoe Bay gas reserves. Prior agreements between Exxon and potential purchasers providing for negotiating rights in exchange for advance payments have been terminated by mutual agreement of the parties due to the action of the Federal Power Commission on December 31, 1975, which eliminated, retroactively, rate base treatment for advances made by these pipelines for Alaskan gas reserves.

Senate Concurrent Resolution 66

With regard to Senate concurrent resolution 66, we can fully understand why many people in Alaska feel it is to the best interest of the State to have a gas pipeline built through Alaska rather than principally through Canada. However, our involvement in the implementation of this resolution gives us some concern. First, Exxon Company, U.S.A. is not engaged in the transportation of natural gas in interstate commerce, nor does it intend to invest in either one of the competing gas pipeline proposals. Exxon Company, U.S.A. intends to sell its gas in the field as a conventional producer

sale. As a seller of gas in the field, Exxon cannot legally commit its purchasers as a condition of sale to transport the gas over a designated route. Our recently terminated agreements with prospective purchasers included a provision recognizing the right of the prospective purchaser to enter into any transportation arrangement suitable to it.

Second, we have in mind the fundamental principal of gas economics that where transportation costs are minimized, the wellhead value is more likely to approach its consumer price. Based on information filed with the FPC the transportation costs of gas from the North Slope to markets in the lower 48 states are less when transported by pipeline through Canada than through Alaska by pipeline and then by tanker as LNG. Such lower transportation costs could benefit the Prudhoe Bay gas owners, including the State of Alaska.

We recognize that there are other counter-balancing factors which the State of Alaska may consider, the primary one being that the trans-Alaska route of the pipeline would make the gas more available to Alaska markets should these markets later develop. On the other hand, if the State would adopt an orderly schedule of oil and gas development and maintain a stable investment climate, gas for later developing markets could be available.

From a practical standpoint, however, it must be recognized that the final decision on the gas pipeline certifica-

tion will be made by the FPC, or perhaps even the U.S. Congress. If available information indicates that the Alaska route is in the national interest, giving full consideration to construction costs and environmental impact, then it may be expected that the Alaska route will be certified. In any event, all of the factors which Alaska deems to be of importance in developing the best route will no doubt be presented so that the proper decision will be made. Therefore, it is not proper for Exxon to make commitments in support of a trans-Alaska natural gas pipeline routing, or for that matter, for any particular routing.

Sadlerochit Reservoir Study

Question 1(a) refers to questions in Senator Rader's letter of January 15, 1976. Exxon's answers to these questions on the Van Poolen study are contained in Exhibit "B" to the written response which has been submitted to you. Please note that our answers are based only on a preliminary review of the report prepared by Van Poollen. We expect that when economics of the total field production are considered the results of the Van Poollen study will be consistent with other studies which indicate that the optimum producing plan for the Prudhoe Bay field will involve gas deliveries of 2 to 2.5 Bcf/d beginning as soon as a gas pipeline is available. Aou are aware that the field working interest owners advised the Division of Oil and Gas that they plan a technical review of the field operating plans in July of this year, at which

time the Van Poollen reservoir study can be discussed in more detail.

Royalty Gas Options

Prospective Purchasers for State Royalty Gas - In Exxon's opinion, the prospective purchasers of the State of Alaska's royalty gas are the same firms which are prospective purchasers of portions of Exxon's share of the gas. Most of the large gas transmission and distribution companies with markets in the lower 48 states have demonstrated substantial interest in purchasing some Prudhoe Bay gas.

Household or Industrial Use Within Alaska - Exxon has no detailed independent study relative to the possibilities of household or industrial use of natural gas within Alaska. We are aware of Mr. Ward's report of the Arctic Gas study of prospective Fairbanks area gas demand, prepared about two years ago. That study concluded that substantial use of natural gas in Fairbanks was unlikely even if gas were available.

Conclusion

In conclusion, I would refer you to the testimony of Judd Miller, Jr. presented to this Committee on December 10, 1975 on behalf of Exxon Company, U.S.A. We reiterate that the State's interest and the interest of the leaseholders are generally the same. An optimum producing plan for the Prudhoe field will provide maximum economic benefits for all con-

cerned. This will include producing the large gas reserves simultaneously with the oil after a minimum delay of only 3-5 years as required for pipeline approval and construction. These conclusions appear to be supported by the Van Poollen study. Not only does a gas pipeline provide an opportunity to produce gas from Prudhoe Bay, it will also provide the opportunity to sell gas from other fields. This will enhance the overall attractiveness of future exploration in Alaska and increase the value of the State's acreage. Finally, I would like to emphasize the importance associated with the support of all concerned parties and the early approval and construction of a gas pipeline from the Arctic Slope.

EXXON COMPANY, U.S.A.
POST OFFICE BOX 2180 · HOUSTON, TEXAS 77001

NATURAL GAS DEPARTMENT

W. RAY BOOTH
ASSISTANT GENERAL MANAGER

February 18, 1976

Joint Gas Pipeline Impact Committee
Alaska State Legislature
425 G Street, Suite 750
Pouch V
Juneau, Alaska 99801

Attention: Senator John H. Rader, Chairman

Gentlemen:

There are enclosed for the Committee's information, the response of Exxon Company, U.S.A. to the questions submitted with your letter of January 30, 1976 to Mr. W. Monte Taylor of this company.

I plan to make a statement on behalf of our company during the hearing on February 19, 1976 in Juneau.

Very truly yours,

W. Ray Booth
Assistant General Manager
Natural Gas Department

WRB/bl
Enclosures

Questions Relating to Topics To Be Discussed At Hearings of The State of Alaska Legislative Gas Pipeline Impact Committee On February 17-18-19, 1976

Q.1. The Committee solicits your review and comments on the report prepared by Rush Moody, Jr.

a) Are you in agreement with Mr. Moody's legal analysis?

A.1.(a) We are in agreement with a part of Mr. Moody's analysis and in disagreement with other parts as we will briefly comment on in answer to question 1.(b).

Q.1. b) How should this analysis effect state policy with regards to royalty gas, taxation, or state leasing powers?

A.1. b) With respect to state royalty gas, our counsel advises that in general he would agree with Mr. Moody's analysis of the effect of the Natural Gas Act on the shipments of the state's royalty gas in interstate commerce and that, therefore, the state should decide what it proposes to do with its royalty gas, since once it begins its path in interstate commerce, control thereof will be in the hands of the FPC.

With respect to state policy concerning taxation, it is understood that this subject will be considered in extensive legislative hearings in connection with particular statutes that have been introduced. Further, concerning state leasing powers, our counsel advises that he cannot agree with Mr. Moody; this subject has been before this legislature on numerous occasions and has been the subject of extensive litigation in this State. Therefore we have no comment upon either of these topics.

Q.1. c) Could you please supply the Committee with the answers to the FPC "Interrogatories"?

A.1. c) The answers to the FPC "Interrogatories" are attached as Exhibit "A" hereto, entitled "Response Of Exxon Corporation To FPC Interrogatories Dated December 12, 1975, El Paso Alaska Company, et al., Docket No. CP75-96, et al."

Q.1. d) If you are or plan to be a gas producer, what commitments have you made for sale of gas? Are you prepared to support the State's efforts relative to SCR 66?

A.1. d) Regarding commitments, Exxon Corporation, as of February 27, 1976, will have no effective agreements with any potential purchaser for its share of Prudhoe Bay gas reserves. Prior agreements between Exxon and potential purchasers providing for negotiating rights in exchange for advance payments have been terminated by mutual agreement of the parties due to the action of the Federal Power Commission on December 31, 1975 which eliminated rate base treatment retroactively for advances made by these pipelines for Alaskan gas reserves.

Regarding SCR 66, Exxon expects to sell its North Slope gas at the well or in the field. This would be in conformity with usual practice in the United States.

Because of legal and regulatory restraints, a seller may not control transportation modes of any commodity, including natural gas, after delivery, or attempt to control transportation methods as a condition of sale. The public interest is best served when buyers and sellers compete unfettered by ancillary restraints as to transportation mode. The buyer must be free to choose the transportation mode for the commodity he has purchased. Neither producing nor gas purchasing companies will select the pipeline route. The Federal Power Commission has been holding extensive hearings on the competitive routes. Exxon believes the transportation mode will be chosen not on the basis of which companies have signed gas purchase contracts, but on the determination of the most practical and efficient mode.

Q.2. Testimony regarding the Sadelrochit Reservoir study recently completed by the Department of Natural Resources:

a) Reference questions in letter of January 15.

A.2. a) Our responses are enclosed as Exhibit "B" hereto, entitled "Response of Exxon Company, U.S.A. to Questions Posed By Senator John H. Rader By Letter Dated January 15, 1976".

Q.2. b) Reference FPC "Interrogatories", Part II.

A.2. b) The answers to FPC "Interrogatories", Part II are included in Exhibit "A".

Q.3. Royalty Gas Options

a) What prospective purchasers exist for state royalty gas, inside or outside of Alaska?

b) What is the possibility of household or industrial use of natural gas within Alaska?

A.3. Roy. ty Gas Options

a) Prospective Purchasers for State Royalty Gas

In Exxon's opinion, the prospective purchasers of the State of Alaska's royalty gas are the same firms which are prospective purchasers of portions of Exxon's share of the gas. Most of the large gas transmission and distribution companies with markets in the lower 48 states have demonstrated substantial interest in purchasing some Prudhoe Bay gas. So far, however, potential purchasers with markets inside Alaska have failed to express interest to Exxon.

b) Household or Industrial Use Within Alaska

Exxon has no independent detailed study relative to the possibilities of household or industrial use of natural gas within Alaska. The most recent study within Exxon's knowledge is an Arctic Gas study of prospective Fairbanks area gas demand, prepared about two years ago. That study concluded that substantial use of natural gas in Fairbanks was unlikely even if gas were available. No doubt, similar studies have been made of the possibilities of increased natural gas utilization in South Alaska.

Possibly useful information regarding the prospects for such gas usage would be found in the responses received to last year's solicitations of interest by the Alaska Royalty Oil and Gas Development Advisory Board.

EXHIBIT "A"

TO

RESPONSE OF EXXON COMPANY, U.S.A.

STATE OF ALASKA

LEGISLATIVE GAS PIPELINE IMPACT COMMITTEE

February 17-18-19, 1976

EXXON COMPANY, U.S.A.
POST OFFICE BOX 2180 · HOUSTON, TEXAS 77001

PAUL W. WRIGHT
COUNSEL

February 13, 1976

OGC
El Paso Alaska Company, et al.
Docket No. CP75-96, et al.

Interrogatories

Mr. Kenneth F. Plumb, Secretary
Federal Power Commission
825 N. Capitol St N.W.
Washington DC 20426

Dear Sir:

By letter dated December 12, 1975, Commission Staff Counsel Allan W. Anderson, Jr. transmitted to Exxon Corporation a series of written interrogatories in connection with the above-referenced proceeding.

Attached hereto for filing are the original and three conformed copies of the "Response of Exxon Corporation To FPC Interrogatories Dated December 12, 1975". Please direct any inquiries with respect to this Response to one of the following:

Martin N. Erck
Paul W. Wright
Larry W. Lindeen
Exxon Corporation
PO Box 2180
Houston TX 77001
AC713 656-4705

Copies of this filing have been served upon all parties to the restricted service list compiled in this proceeding in accordance with Commission regulations. Please acknowledge receipt of this document by placing your file mark on the enclosed extra copy and return same to the undersigned in the enclosed self-addressed envelope.

Very truly yours,

Paul W. Wright

Paul W. Wright

PWW/bl
Attachments

cc: Hon. Nahum Litt
Presiding Adm. Law Judge

Allan W. Anderson, Jr., Esq.
Commission Staff Counsel

RESPONSE OF

EXXON CORPORATION

TO FPC INTERROGATORIES DATED DECEMBER 12, 1975

El Paso Alaska Company, et al.

Docket No. CP75-96, et al.

February 13, 1976

I. POLICY

Q.1. Were you ever a member of a group investigating the feasibility of bringing gas from Prudhoe Bay and/or the Mackenzie Delta to the lower forty-eight states?

A.1. Yes.

Q.1.a. If yes, please describe your participation in the group.

A.1.a. Exxon Company, U.S.A., (a division of Exxon Corporation) was one of the six initial participants in the Northwest Project Study Group. Exxon continued its participation from June, 1970 through the merger with the Gas Arctic Study Group in 1972 and numerous additions to the membership of the Gas Arctic-Northwest Project Study Group (Arctic Gas), while feasibility studies were in progress.

Q.1.b. Are you still a member of such a group; and if not, please explain the reasons for departing.

A.1.b. Exxon Company, U.S.A. withdrew as a participant in Arctic Gas in January, 1975. Our public announcement at that time was as follows:

> "Exxon, USA joined a predecessor study group in 1970 because it was interested in the development of a project that would be capable of moving Prudhoe Bay gas to market. The company believes these initial project development objectives have been accomplished.
>
> "Exxon, USA is not in the interstate gas transmission business. The company has decided to withdraw from the study group now that the Arctic gas pipeline project is nearing an implementation stage."

Q.2. Why haven't firm gas purchase contracts been executed for your Prudhoe Bay gas?

A.2. As explained by Exxon Counsel on the record in this proceeding on several occasions and in the "Response Of Exxon Corporation To Oral Motions To Certify" dated December 15, 1975, definitive gas purchase contracts must await a decision on the competitive aspects of the two transportation proposals before the Commission and the completion (and approval by the State of Alaska) of a unitization agreement and operating plan for the Prudhoe Bay field by the working interest owners of

the field.

Q.3. Please explain the relationship of a unitization and operation agreement for Prudhoe Bay to the execution of gas purchase contracts.

A.3. We anticipate that the Prudhoe Bay field will be unitized prior to initiation of oil production scheduled for mid-1977. The Prudhoe Bay Unitization and Operating Agreements will provide among other things for the allocation of oil and gas production between owners of leases in the field. Upon unitization Exxon will own an agreed upon percentage share of gas produced in the field whether such gas is produced from the gas cap, from the oil zone, from an Exxon interest lease or from a lease in which Exxon has no current interest. Until such agreements have been executed by the working interest owners and the unit plan is approved by the State of Alaska, there exists uncertainty as to both Exxon's share and the total quantity of the gas available for sale. For these reasons, the execution of a gas purchase contract prior to unitization would be premature.

Q.4. Do you have any present intention to provide equity for either the El Paso Alaska project or the Arctic-Canadian gas project should either of them be issued a certificate?

A.4. There is no intention for Exxon Company, U.S.A. (a division of Exxon Corporation) to provide equity for either project. Imperial Oil Ltd. in which Exxon Corporation has approximately a 70% interest, is a member of the Arctic Gas consortium and has made a tentative equity commitment.

Q.5. If the natural gas pipeline and distribution companies are unable to commit the amount of equity required by lenders as necessary for either the Arctic gas or El Paso project, would your company be willing to help provide some of the needed equity?

A.5. Only as noted in response to interrogatory 4.

Q.6. Will your company bear the cost of gathering and treatment facilities on the North Slope? If no decision has been made on this, what factors would influence any decision and by when would such a decision have to be made?

A.6. Exxon plans to sell its gas in the field and thus plans that the purchaser(s) of its gas will own those facilities required for handling, gathering and treating the gas to pipeline quality specifications downstream of field separation facilities. Exxon expects to have the right to use a portion of these facilities subject possibly to Exxon paying a charge for such usage during periods of required gas injection.

Q.7. Can your company categorically guarantee that the purchase price of Prudhoe Bay gas under future gas purchase contracts would be no higher than the commodity price of gas in the market area to be served adjusted for applicable costs to market?

A.7. No.

Q.8. Would your company oppose any attempt by a potential gas purchaser to place a minimum daily delivery volume provision in a gas purchase contract for the Alaskan North Slope?

A.8. Yes, Exxon certainly would oppose any attempt by a potential gas purchaser (or the Commission, for that matter) to impose minimum daily delivery volume provisions. The several valid reasons for this position have been stated in the following documents which are in the public files of the Commission and which are incorporated herein by reference:

1. Application For Rehearing And Motion For Reconsideration, filed by indicated producers, Docket No. RM76-8, dated November 11, 1975.

2. Motion For Oral Argument, Docket No. RM76-8, dated December 19, 1975.

3. Application Of Exxon Corporation For Rehearing, Docket No. CI74-528, dated December 3, 1975.

Q.9. How did you choose or how will you choose a purchaser or purchasers for your Prudhoe Bay gas? Explain the steps that will be taken or have been taken in this matter.

A.9. Exxon independently will choose the party or parties with whom it will negotiate gas sales contract(s) utilizing criteria which are proprietary to it. Exxon's marketing strategy is completely confidential, recognizing however that under present law sales in

interstate commerce for resale must be the subject of Certificates of Public Convenience and Necessity issued by the Commission.

II. RESERVES

Q.1. Please describe your exploration and development activities on the North Slope of Alaska through 1975 indicating among other things the following:

Q.1.a. total amount of acreage held in Prudhoe Bay field as defined by the Alaska Oil and Gas Conservation Committee;

A.1.a. The Prudhoe Bay Oil Pool limits shown on the attached map are taken from the Alaska Division of Oil and Gas Report dated June, 1974 entitled "In Place Volumetric Determination of Reservoir Fluids Sadlerochit Formation Prudhoe Bay Field". Exxon holds leases on 70,756 net acres within these geographic limits. That acreage shown as Exxon-ARCO is owned on a 50-50 basis with the Atlantic Richfield Company.

Q.1.b. number of wells presently drilled in the Prudhoe Bay field and the success ratio of well completions;

A.1.b. A total of 53 wells have been drilled on Exxon interest acreage within the limits of the Prudhoe Bay Oil Pool, of which 47 were successful, five were dry, and one suspended (as defined in the answer to 1.e.).

Q.1.c. an estimation of the total amount of gas reserves in Prudhoe Bay held by your company and an estimate of its deliverability.

A.1.c. Based on current estimates, Exxon's share of proved Prudhoe Oil Pool gas reserves is 8.7 Tscf.

Based on Exxon's operational, economic and reservoir studies, we believe the optimum producing plan will include the production (when sales commence, currently estimated to be 3 to 5 years after the start of oil production) of an amount of gas sufficient to allow the purchaser(s) to deliver 2 to 2.5 Bcf/day of pipeline quality gas to a gas pipeline. Exxon's working interest share of gas deliveries to purchaser(s) is expected to be in the range of 0.7 Bcf/day and 0.95 Bcf/day.

Q.1.d. total amount of acreage held on the North Slope including the offshore area outside of Prudhoe Bay and location of such leases;

A.1.d. Exxon currently holds 167,425 net acres. The location of these leases is shown on the attached map.

Q.1.e. number of wells drilled outside of the Prudhoe Bay field on the North Slope including offshore areas, their location and an indication whether they were successful;

A.1.e. Exxon has participated, on a working interest basis, in eleven wells on the North Slope outside of the Prudhoe Oil Pool Limits. The location of these wells and their status are shown on the attached map. Additional information regarding the status of these wells is included on the attached tabulation. Exxon has participated in three wells classified as suspended. The classification of suspended applies to those wells adjacent to unleased acreage. To maintain the competitive nature of exploration, information on such wells is not released pending the disposition of adjacent acreage.

Q.1.f. total amount of gas reserves estimated to be held on non-Prudhoe Bay field leases and their deliverability.

A.1.f. Of the wells not classified as "suspended", seven were dry holes and one (the Kemik Unit #1) is a marginal gas discovery. This discovery will require further drilling before any determination of either reserves or deliverability is possible.

Q.2. Has your company made an independent estimate of the amount of potential reserves on the North Slope of Alaska? If yes, please describe your findings.

A.2. The USGS estimates* of undiscovered gas resources on the North Slope range from 14 to 49 Tcf, with a statistical mean of 28 Tcf. Exxon feels these estimates establish a good base for further analyses by the FPC. Equally important as the amount of potential reserves are such factors as the timing of discovery and development, the size and location of fields found, plus when and at what rate the gas can be transported to market.

Q.3. Based upon your company's drilling experience to date, does it appear that the areal limit of the Prudhoe Bay field as defined by the Alaska Oil and Gas Conservation Committee is larger than anticipated?

A.3. No.

Q.4. Has your company studied the possibility of drilling

*Geological Survey Circular 725

in the Yukon-Kandix Basin, Middle Tanana Basin and Copper River Basin areas of Alaska? If yes, what do your studies indicate, what has been your past experience in such areas, if any, and what are your company's current and future plans with respect to such areas?

A.4. Exxon has conducted exploration studies in the Yukon-Kandix, Middle Tanana and Copper River basins and at one time did hold several leases or lease applications. Exploration data developed did not provide sufficient encouragement for additional exploratory effort and the leases were cancelled. Exxon has no immediate plans for lease acquisitions or drilling in these three basins.

Q.5. With respect to oil production from the Prudhoe Bay field, (a) what are the anticipated deliverability rates for the first twelve years? (b) will this affect the deliverability of your gas? (c) what effect would a 2.25 billion cubic feet deliverability capacity pipeline have on oil production during this period?

A.5.(a) It is not possible to make precise forecasts of future oil production, especially for such a long period into the future, but the following represents our best current estimate of crude oil production from the Prudhoe Bay field.

The Trans Alaska Pipeline is expected to begin operation in mid-1977 and sustained throughput of 1.2 million barrels of oil per day should be achieved by January 1, 1978. Although decisions on future expansions of the pipeline have not been firmly established at this time, the Prudhoe Bay Field is expected to produce 1.5 million barrels of oil per day by January 1, 1979, and it is anticipated that the pipeline will be expanded accordingly. If an early expansion to 1.5 million barrels per day is accomplished, a rate decline during the latter part of the first twelve years of operation would be expected, unless reserves are substantially in excess of those currently recognized.

A.5.(b) No.

A.5.(c) None, based on current studies.

Q.6. Please describe your proposed exploration and development activities for the North Slope, if any, for 1976.

A.6. Exxon is continuing its geological and geophysical studies for the North Slope and is contemplating seismic programs during the winter and summer of 1976. Exxon does not plan to drill any wells during 1976 on Exxon operated acreage.

Planned development activity jointly with ARCO within the Prudhoe Oil Pool Limits in 1976 is expected to consist of the continued development drilling of approximately 30 wells and the continuation of the installation of field facilities associated with anticipated oil production startup by mid-1977.

III. FACILITIES AND COSTS

Q.1. What is the type of gas that will be produced from your Prudhoe Bay leases?

A.1. The natural gas produced at Prudhoe Bay will be associated with oil production and will consist of a mixture of solution gas evolved from oil and gas from the gas cap.

Q.2. What type of facilities would be needed to process and/or treat each type of gas?

A.2. Processing of Prudhoe Bay gas will not be required, although it may be found to be economic, as discussed in 5. below. Treatment of the gas, however, will be required. Based on current planning, the facilities required to handle the produced gas from the gas-oil separators to the inlet of the gas pipeline are:

(a) Gas Facilities At Gas-Oil Separation Centers

Compression for low pressure gas and conditioning to make the gas suitable for gathering from the gas-oil separation centers to the central location. This conditioning will include cooling and dehydration for hydrocarbon and water dew point control.

(b) Gas Gathering Facilities

Gas gathering lines to gather the gas from the gas-oil separation centers to a central location in the field.

(c) Gas Conditioning Plant Facilities

Gas conditioning to bring the gas to pipeline quality including carbon dioxide removal, hydrocarbon dew point control, dehydration, and compression and cooling to pipeline pressure and temperature.

Q.3. Which facilities mentioned in interrogatory 2 would be constructed and operated by the producer and which will be required to be purchased entirely or partly by a pipeline purchaser? Who will operate those owned by the pipeline?

A.3. See response to question I.6. Exxon intends to act as the purchaser's representative in the construction and operation of those facilities.

Q.4. What is the quality of the gas at the wellhead and what will be the acceptable quality for pipeline delivery?

A.4. The gas will not be available at the wellhead since it will be mixed with oil and condensate. It will be delivered to the purchaser after separation from the oil and condensate. It is anticipated that the separation will be done in three stages which during initial production of the field will be approximately 650 psig and 170° F. for the first stage, 80 psig and 150° F. for the second stage, and a slight positive pressure (approximately 0.5 psig) and 150° F. for the third stage. Based on our current engineering calculations, the estimated composition and quality of the combined gases from all three stages of separation are as follows:

Composition, Mol Percent	
Methane	72.92
Ethane	6.91
Propane	3.72
Iso Butane	0.58
Normal Butane	1.23
Pentanes plus	1.42
Carbon Dioxide	12.71
Nitrogen	0.51
Total	100.00
Heating Value (Gross, Wet, Actual @ 14.73 psia and 60° F.), Btu/cu.ft.	1063
Water Content, Lbs/MMcf	820
H_2S Content, grs./100 cu.ft.	*

*Not precisely known at this time, but is less than 1 grain per 100 cubic feet.

The low pressure portions of the above gas stream will be compressed to about 650 psig and the combined stream, cooled, dehydrated, and reheated before delivery into the field gas gathering system at approximately 620 psig and 100° F. After this treatment, the gas is expected to have the following composition and quality:

Composition, Mol Percent	
Methane	73.34
Ethane	6.91
Propane	3.67
Iso Butane	0.56
Normal Butane	1.18
Pentanes plus	1.08
Carbon Dioxide	12.74
Nitrogen	0.52
Total	100.00

Heating Value (Gross, Wet, Actual @ 14.73 psia and 60° F.), Btu/cu.ft.	1046
Water Content, Lbs/MMcf	1 (approx.)
H_2S Content, grs./100 cu.ft.	*

*Not precisely known at this time, but is less than 1 grain per 100 cubic feet.

It is Exxon's opinion that the Prudhoe Bay gas composition and quality used by Arctic Gas in the design of their pipeline facilities will be suitable for transmission through the pipeline (or any other pipeline operating at the same pressure [1680 psig] and temperature [less than 30° F.] conditions). The composition was furnished to Arctic Gas by the Prudhoe Bay producers and is our best current engineering estimate of the quality of the gas after treatment to make it suitable for pipeline operations, pending detail design of the gas treating facilities. The treated gas composition is recorded on page 12 of Section 8.b.2. of the Arctic Gas filing and is shown below for comparison with the above compositions along with Exxon's estimates of other characteristics which describe the gas "quality":

Composition, Mol Percent	
Methane	85.11
Ethane	7.70
Propane	3.99
Iso Butane	0.50
Normal Butane	0.73
Pentane plus	0.22
Carbon Dioxide	1.00
Nitrogen	0.75
Total	100.00

Heating Value (Gross, Wet, Actual @ 14.73 psia and 60° F.), Btu/cu.ft.	1130
Water Content, Lbs/MMcf	0.2**
H_2S Content, grs./100 cu.ft.	*

*Not precisely known at this time, but is less than 1 grain per 100 cubic feet.

**Tentative, pending results of research work in progress to determine whether a water content this low will actually be required.

Q.5. It is noted that certain agreements between various producers on the North Slope and pipeline purchasers reserve the right of the producer to process Prudhoe Bay gas in the lower forty-eight states. What type of processing is contemplated by your company, where, when and how much? What type of transportation arrangements would be necessary to implement this provision?

A.5. Exxon plans to reserve the right to process its Prudhoe Bay gas. An adequate evaluation of an operation to exercise such a right is not possible at this time, because of many uncertainties, such as the location of the gas transportation facilities. This will probably not be possible prior to the early 1980's, at which time it should be possible to define clearly and negotiate, if appropriate, the type of arrangement which would be mutually satisfactory to the parties involved.

Q.6. What would be the cost of each separate facility mentioned in interrogatory #2?

A.6. Estimated costs of the facilities are as follows:

Facility	Estimated Cost, $MM 7/1/75 Basis	Escalated Basis
Gas Facilities at Gas-Oil Separation Centers	527	634
(including IDC of)	(98)	(118)
Gas Gathering Facilities	57	63
(including IDC of)	(8)	(8)
Gas Conditioning Plant Facilities	1252	1590
(including IDC of)	(286)	(360)
TOTAL	1836	2287
(including IDC of)	(392)	(486)

Q.7. How would you allocate the costs between oil and gas production for the facilities which would be either owned by the pipeline or jointly with your company. Please explain your rationale for such allocation.

A.7. We do not envision that an allocation of costs will be necessary. All the facilities enumerated in III.A.2. and A.6. will be required for the handling, gathering and conditioning of the gas by the purchaser prior to delivery to a gas pipeline.

Q.8. If the Prudhoe Bay gas is to be processed, through facilities owned by the pipeline or jointly by the producer, who will have benefit of the liquid products and how will the operation and maintenance costs be allocated and on what basis?

A.8. The removal of hydrocarbon liquids which will be required at Prudhoe Bay will be a treating, not a processing, operation. Excess liquid hydrocarbons removed in treating will not be sold to the gas purchaser(s). Although firm plans have yet to be made concerning disposition of these liquids, Exxon expects that they will either be used as fuel or transported in the oil pipeline. Exxon expects to bear the costs, if any, to store and transport its

share of these liquids. If processing should be found to be economic, it would be conducted under arrangements yet to be negotiated.

Q.9. Provide the (a) length and size of the gathering facilities for your operations (b) estimated costs of such lines (c) ownership of such lines, and for those lines to be owned by the pipeline purchaser or jointly with the producer how will costs be allocated for that portion of the facilities attributable to the transportation of gas?

A.9. (a) The gas will be gathered from the six gas-oil separation centers to the central gas conditioning plant in the following lines:

Diameter, inches	Length, miles
30	7.0
34	5.6
38	5.7
42	5.4

(b) See cost estimate table in response to III.6.

(c) Exxon's plans are that the portion of these facilities which is necessary for gathering Exxon's gas will be owned by the purchaser(s) of its gas. The matter of allocation is dealt with in the response to III.7.

Q.10. What type of design will be required for the gathering system, i.e. buried, above ground pipe, chilling facilities, etc.?

A.10. The pipelines will be insulated and will be laid above ground on supports.

Q.11. Would your costs estimates vary depending upon whether the Arctic gas or El Paso project was certificated?

A.11. No, assuming pipeline quality and pressure specifications are the same.

Q.12. What percentage of the gas available at the wellhead will be lost in treatment and/or processing?

A.12. Of the gas available for sale at the separator outlets, approximately 12% will be removed as

carbon dioxide and approximately 6% will be consumed as fuel. The gas available for sale at the separator outlets does not include field fuel requirements.

Q.13. What state approvals will have to be obtained in relation to Alaskan North Slope gas production and when will your company make the necessary filings to obtain such approval?

A.13. The Prudhoe Bay Field Working Interest Owners plan to unitize the field prior to initiation of oil production. The Alaska Department of Natural Resources must approve this unitization plan. Associated with this approval will be approval of a unit operating plan including a plan for gas sales.

Negotiations are underway by the Prudhoe Bay Working Interest Owners and the request for State approvals will be made as soon as possible.

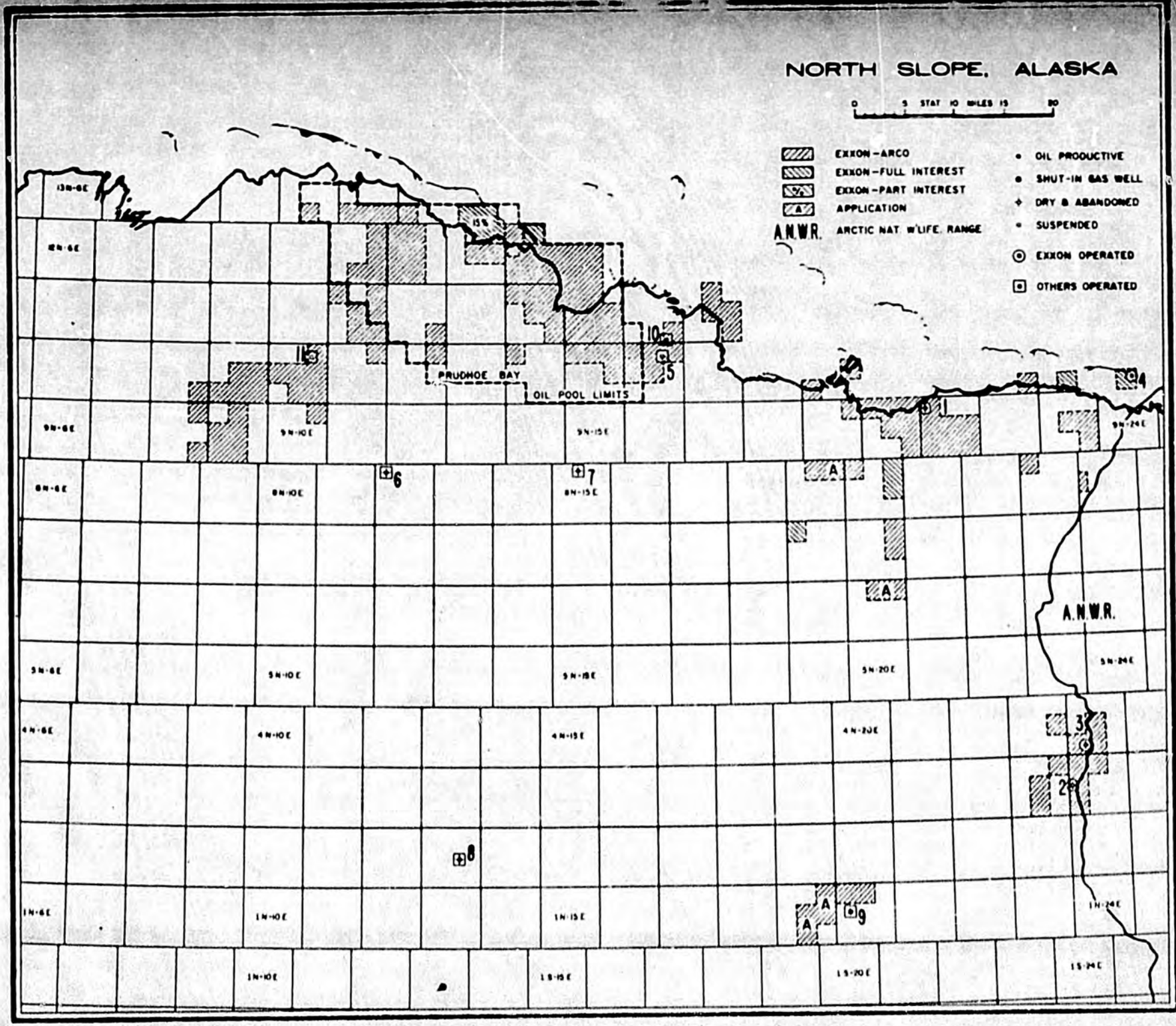
EXXON COMPANY, U.S.A. WORKING INTEREST WELLS DRILLED ON NORTH SLOPE OUTSIDE OF THE PRUDHOE OIL POOL LIMITS

EXXON OPERATED

Map Code	Well Name	Completion Date	Status
1	E. Mikkelsen Bay State #1	6/16/71	D & A
2	Canning River Unit A #1	7/10/74	D & A
3	Canning River Unit B #1	4/22/75	D & A
4	Alaska State A #1	9/21/75	Suspended

OTHER OPERATED

Map Code	Operator	Well Name	Completion Date	Status
5	Atlantic Richfield	Delta State #1	2/27/69	D & A
6	Atlantic Richfield	Toolik Federal #2	9/14/69	D & A
7	Atlantic Richfield	Toolik Federal #1	4/15/69	D & A
8	Atlantic Richfield	Susie Unit #1	1/9/67	D & A
9	Forest	Kemik Unit #1	6/17/72	Shut-in gas well
10	Atlantic Richfield	Delta State #2	5/17/75	Suspended
11	Atlantic Richfield	West Sak River #5	2/27/75	Suspended


NORTH SLOPE, ALASKA
0 5 STAT 10 MILES 15 20
EXXON-ARCO
EXXON-FULL INTEREST
EXXON-PART INTEREST
APPLICATION
A.N.W.R. ARCTIC NAT. W'LIFE. RANGE
OIL PRODUCTIVE
SHUT-IN GAS WELL
DRY & ABANDONED
SUSPENDED
EXXON OPERATED
OTHERS OPERATED
PRUDHOE BAY
OIL POOL LIMITS
A.N.W.R.
13N-6E
12N-6E
9N-6E
9N-10E
9N-15E
9N-20E
8N-6E
8N-10E
8N-15E
5N-6E
5N-10E
5N-15E
5N-20E
5N-24E
4N-6E
4N-10E
4N-15E
4N-20E
1N-6E
1N-10E
1N-15E
1N-24E
1S-10E
1S-15E
1S-20E
1S-24E

VERIFICATION

W. Ray Booth, being duly sworn, deposes and says that he is Assistant General Manager of the Natural Gas Department of Exxon Company, U.S.A. (a division of Exxon Corporation); that he is authorized to verify and file this document, that he has examined the statements contained in the submittal and that all such statements are true and correct to the best of his knowledge, information and belief.

W. Ray Booth

Subscribed and sworn to before me by the said W. Ray Booth, this 13th day of February, 1976.

Kathryn S. Foulks
Notary Public in and for
Harris County, Texas

KATHRYN S. FOULKS
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1977

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon the restricted service list in these proceedings, in accordance with the Commission's Rules of Practice and Procedure.

Dated at Houston, Texas, this 13th day of February, 1976.

Paul W. Wright

Of counsel for
Exxon Corporation

EXHIBIT "B"

TO

RESPONSE OF EXXON COMPANY, U.S.A.

STATE OF ALASKA

LEGISLATIVE GAS PIPELINE IMPACT COMMITTEE

February 17-18-19, 1976

TO QUESTIONS POSED BY
SENATOR JOHN H. RADER
BY LETTER DATED JANUARY 15, 1976

The letter of Senator Rader contained a list of five questions relating to the potential impact of a recent Prudhoe Bay reservoir performance study conducted by H.K. Van Poollen and Associates, under contract to the State of Alaska. Exxon has received only a brief summary report on the Van Poollen Study. It is understood that a more detailed report will be issued within the next few weeks. The summary report does not provide adequate information to allow Exxon to evaluate the technical methods employed in the study; therefore, the enclosed responses to the Senator's questions are based only on the study results as presented in the summary report and the results of studies that Exxon has conducted.

Q.1. **What effect does the recent study, "Predictions of Reservoir Fluid Recovery Sadlerochit Formation Prudhoe Bay Field", have on marketing plans for Prudhoe Bay gas?**

A.1. None. The major Prudhoe Bay leaseholders have indicated that it is desirable to commence gas deliveries at a rate of 2 to 2.5 Bcf/D as soon as a gas pipeline can be approved and constructed (estimated to be 3-5 years after the start of oil production). The results presented in the Van Poollen summary report do not conflict with this basic plan.

The Van Poollen study indicates that a reduction in ultimate oil recovery could occur with increasing gas delivery volumes under certain conditions wherein reservoir management plans were not optimized. However, the Van Poollen results demonstrate that there is potential for minimizing, or eliminating completely, such reductions by modifying the reservoir management plan. For example, by modifying certain operating conditions in a 2 Bcf/D gas delivery case (Case 21), Van Poollen was able to eliminate a potential reduction in oil recovery and, in fact, obtain slightly higher oil recovery with gas delivery than in a similar oil rate no gas delivery case (Case 11).

Q.2. How does this study differ from industry and Federal studies?

A.2. The summary report does not provide adequate technical information to permit a detailed comparison of the Van Poollen study technique with other studies. When the results of the Van Poollen study become available and have been analyzed with appropriate consideration given to cost and other relevant factors, we expect that the conclusions will indicate that the optimum producing plan for the field will involve gas deliveries at a rate of at least 2 Bcf/D beginning as soon as a pipeline is available. This finding would be consistent with our studies, other operators' studies, and the Gruy study for the Department of Interior, all of which have concluded that deliveries of 2 to 2.5 Bcf/D are desirable early in the producing life of the field.

Q.3. How accurate can a model be without production history?

A.3. The accuracy of reservoir simulator model studies depends primarily on the validity of the description of reservoir rock and fluid properties, and, to a lesser degree, on the refinement of the modelling program. Based on Exxon's experience and technical judgment, if reservoir properties are accurately described and a technically sound program is utilized, model predictions can be accurate enough without production history to develop reasonable reservoir management plans.

Prior to fieldwide production, reservoir description is based principally on fluid samples, rock samples, production tests, pressure data, and log analysis from wells which have been drilled in the field. Once production commences, it is possible to add information to the reservoir description. It is often the case that development of new fields proceeds such that the reservoir data obtained prior to production is limited. However, at Prudhoe Bay ample reservoir data has been collected and thoroughly analyzed. Consequently, model studies prior to production at Prudhoe Bay are considered to be more accurate than is typical of other new fields where less data are available.

Q.4. Will some production history be necessary before an accurate model is established that will prove feasibility of a gas pipeline for marketing of Sadlerochit gas?

A.3. No. We believe that model predictions prior to production can be reasonably accurate and demonstrate the feasibility of early gas deliveries in the range of 2.0-2.5 Bcf/D. Exxon model studies have shown that reservoir management plans developed prior to production which include early gas deliveries can be modified, if necessary, during the producing life of the field to adapt to variations in actual reservoir performance that may be encountered.

Q.5. How critical are the results of this study in obtaining FPC certification and financing for the gas pipeline projects?

A.5. It is our opinion that the FPC and potential investors as well as interested regulatory bodies, particularly the Alaska Division of Oil and Gas, will consider the results of several studies before making decisions which would affect the gas pipeline project. Studies of Prudhoe Bay reservoir performance have been conducted by the major leaseholders and we expect that these studies will receive due consideration.

As indicated in our response to question 2, we expect the results of the Van Poollen study will be consistent with other studies, which indicate that the optimum producing plan for Prudhoe Bay will involve gas deliveries of at least 2 Bcf/D beginning as soon as a pipeline is available.

Alaska Conservation Society
Box 80192
Fairbanks, Alaska
February 18, 1976

Honorable Senator Rader
Chairman Royalty Gas Utilization

Senator Rader and members of the Committee;

I am Sharron Lobaugh, representing the Alaska Conservation Society.

The Board of Directors of our organization have informed me that it is their position that a reasonable state allotment of royalty gas should be requested from the FPC which would provide for the highest and best use of this valuable natural resource.

The first consideration, we feel should be given to using the gas by reinjection to produce oil as economically as possible.

Other considerations must be made which are both economic and environmental for the State's portion, but the overriding concern should be that decisions of this kind must be made with a regard for the total growth policy of the state.

Demands of petrochemical industries in the lower'48 are great and these industries produce products of importance to Alaskans. It seems inappropriate economically, politically, and environmentally to force industry to relocate in Alaska. Petrochemical industries already in existence have invested heavily in their facilities, are supporting a number of communities in the U.S., and have addressed themselves to the environmental constraints of those communities.

One important Alaskan use that should be encouraged is the possibility of using natural gas for domestic and commercial purposes in the Fairbanks area. This should be encouraged because it is a cleaner source of energy which will have an effect on the air quality problems of that area. Future use of natural gas for domestic purposes in Alaska where other possible power sources are not available must also be provided for.

Thank you for the opportunity to appear before your committee on this issue.

Sincerely,

Sharron Lobaugh

Mrs. Sharron Lobaugh

February 27, 1976

Senator Chancy Croft
President of the Senate
Alaska State Legislature
State Capitol, Pouch V
Juneau, Alaska 99811

Representative Mike Bradner
Speaker of the House
Alaska State Legislature
State Capitol, Pouch V
Juneau, Alaska 99811

RE: Interim Report of the Joint Gas Pipeline Impact Committee

Dear Mr. President and Mr. Speaker:

Please consider this to be a letter of transmittal of the Interim Report of the Joint Gas Pipeline Impact Committee existing pursuant to H.B. 258 "The Gas Pipeline Impact Committee", Chapter 170 SLA 75. I request that this letter of transmittal, together with the report, be read into the appropriate Journal in each house.

As an aid to the interpretation of the Interim Report, I submit the following as being my understanding of the sense of the Committee:

1. The Committee does not intend to suggest that the Commissioner of Natural Resources or the Royalty Board enter into unreasonable agreements with prospective purchasers. It is the sense of the Committee that Alaska should indicate that it is a "willing seller" of a portion of it's gas and is seeking a "willing buyer" on terms which will reserve as much gas as possible for future use to meet Alaska's internal domestic and other needs. The Committee would expect the executive to negotiate the best possible agreement. Understanding, that when such an agreement is negotiated, it may or may not be acceptable to the Legislature. It may be that the executive will negotiate the best possible agreement, at the same time recommending against its implementation on the basis that too little is received by the State and too much given by the State. We believe that it is imperative, however, in the conduct of the people's business, that such a tentative agreement be made public and its merits debated.

2. We do not wish to tie our negotiator's hands by quantifying the word "substantial" as used in paragraph #7 in the Committee's findings, and paragraph #1 of the Committee's recommendations.

3. The Committee does not suggest an arbitrary time deadline for our executive negotiators. We do point out, however, for the agreement to be finalized, legislative approval is necessary and a special session should be avoided if possible.

4. We do not intend in any manner to preclude negotiations for use of royalty gas within the State of Alaska and the further exploration of petrochemical and domestic uses. The major thrust of the Committee's recommendations is based on the belief that a Trans-Alaska pipeline is essential for future domestic and petrochemical in-state use options of North Slope gas.

5. Pursuant to other action by the Committee, the following have been introduced by the respective Rules Committee by request:

SCR 85/HCR 107	"Relating to the Impact on Alaska of a Trans-Canada Gas Transportation System"
SB 685/HB 848	"An Act Making a Special Appropriation to the Department of Natural Resources for the Purpose of Conducting Negotiations with Prospective Purchasers of North Slope Natural Gas and Providing for an Effective Date"
SB 686/HB 850	"An Act Relating to Waste of Oil and Gas and Providing for an Effective Date"
SB 687/HB 849	"An Act Relating to the Leases of State Land for Oil and Gas into taking of Royalty Gas from them and Providing for an Effective Date"

6. Finally, and most importantly, our recommendations are based on the facts and circumstances as they exist today.

   The situation may change at any time rendering the presently recommended strategy inappropriate. For example, it has been suggested that the Federal Power Commission may conduct allocation proceedings nullifying contractual sales commitments. Gas may be more or less deregulated. The recent request of the President for authority to make the final route decision subsequent to January 1, 1977 may effect the political climate. It may be determined, as has been suggested by some, that neither the Trans-Alaska nor the Trans-Canada line are economically feasible at this time.

The recommendations of the Committee rely strongly on the advice of our consultant, Mr. Rush Moody, recently Vice-Chairman of the Federal Power Commission. The strategy may only be appropriate if the Federal Power Commission closes the certification hearings in May according to it's present schedule and further certifies one route based on the precedents, principles, and considerations customarily employed in past certification proceedings admittedly more limited in scope and of much less national significance.

The opportunity to use royalty gas to accomplish our public purposes as we perceive them may be lost unless we have substantially negotiated possible sale terms and are ready to move if and when the time arrives - which may be very soon.

Respectfully submitted,

Senator John Rader, Chairman
Gas Pipeline Impact Committee

JR/kb

INTERIM REPORT
OF THE
JOINT GAS PIPELINE IMPACT COMMITTEE

This Committee, through public hearings and staff investigation, has become convinced that immediate action by the State of Alaska is essential if the citizens of this State are to receive maximum benefit from the State's natural gas resource.

The Committee will issue a full and complete report on its findings and recommendations at a later date, but is impelled to submit this interim report to the Legislature and the people of the State of Alaska because of the urgency of the present situation.

The Committee finds and concludes the following:

1. A federal decision authorizing the transportation of North Slope natural gas across Canada would be inimical to the interests of the State of Alaska. The State's resource would be drained, its people denied access to a premium fuel and raw material, its work force deprived of employment opportunities, and productive economic growth would be thwarted.
2. A federal decision authorizing the transportation of North Slope natural gas across the State of Alaska to an open port will serve the best interests of the State.
3. The level of benefits, and burdens reasonably to be expected by the State as a consequence of any decision on a North Slope gas transportation system are of such magnitude that the routing decision must be regarded as critical to the future of the State. Action to secure a Trans-Alaska routing must be pursued as expeditiously as possible; no reasonable step should be left untaken.
4. The position of the state as owner of a one-eighth royalty in natural gas and natural gas liquids produced from State-owned lands on the North Slope creates an immediate opportunity for effective State action which can assist in securing a Trans-Alaska transportation system.

5. Affirmative, agressive action by the Governor, the Commissioner of Natural Resources, the State Royalty Board, and the Legislature with respect to the State's royalty gas is imperative.
6. Effective use of the State's royalty gas, to serve the best interests of the State, requires:
   a. The State must elect to take its royalty share of natural gas and natural gas liquids in kind.
   b. The State must commit a portion of its royalty gas to purchasers who will assist in securing approval of a Trans-Alaska transportation system, and who will thereafter utilize such a Trans-Alaska system.
7. Present levels of natural gas demand in Alaska permit a commitment of a portion of the State's royalty gas to purchasers outside the State; while every effort must be made to retain a substantial part of Alaska's gas for present and future in-state needs, it is in the overall best interests of the State to offer for sale outside the State, a substantial portion of the State's royalty gas to purchasers who can, and will, assist in securing authorization of a Trans-Alaska transportation system.
8. Those persons and firms interested in the construction and operation of a Trans-Alaska transportation system can materially alleviate State unemployment problems, and the State should, in striking a bargain for the commitment of State resources to a Trans-Alaska system, secure appropriate commitments for the hire and training of Alaska residents in the construction and operation of such a system.
9. Finally, the risk that non-action by the State, or delayed action by the State, will cause the selection of a Trans-Canadian routing, and the risk that the State will lose substantial benefit of its natural gas resource are so great, it is the sense of this Committee that State action must not be delayed.

BY REASON OF THE FOREGOING, IT IS THE RECOMMENDATION OF THIS COMMITTEE THAT:

1. The commissioner of Natural Resources and the State Royalty Board should undertake immediate negotiations with interested out-of-state purchasers to reach definitive sales and/or exchange agreements covering disposition of substantial portions of the State's royalty gas on the best obtainable terms.
2. The Commissioner of Natural Resources and the State Royalty Board should undertake immediate negotiations with natural gas transporters involved in the proposal for a Trans-Alaska system to reach definitive transportation agreements covering the State's royalty gas sold for out-of-state use, and the State's withdrawal of the unsold portion of its royalty gas from the system for in-state use; appropriate commitments should be obtained with respect to hire and training of Alaska residents.
3. The arrangements and agreements so negotiated should be presented to the Legislature for ratification prior to the end of the Second Session of the Ninth Legislature to avoid, if possible, a special session.
4. The Legislature should hold itself ready for immediate consideration of and prompt action on, the recommendations of the Commissioner and Board.
5. Such arrangements, contracts, and agreements as are negotiated by the Commissioner and Board and approved by the Legislature should be incorporated into the pending applications for a Trans-Alaska transportation system, presented to the Federal Power Commission by the appropriate transporter-applicant, and approval thereof obtained in the pending Federal Power Commission proceedings.
6. The Legislature should adopt SCR 66 and further seek the active cooperation of all owners of North Slope gas in support of the Trans-Alaska pipeline route.

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