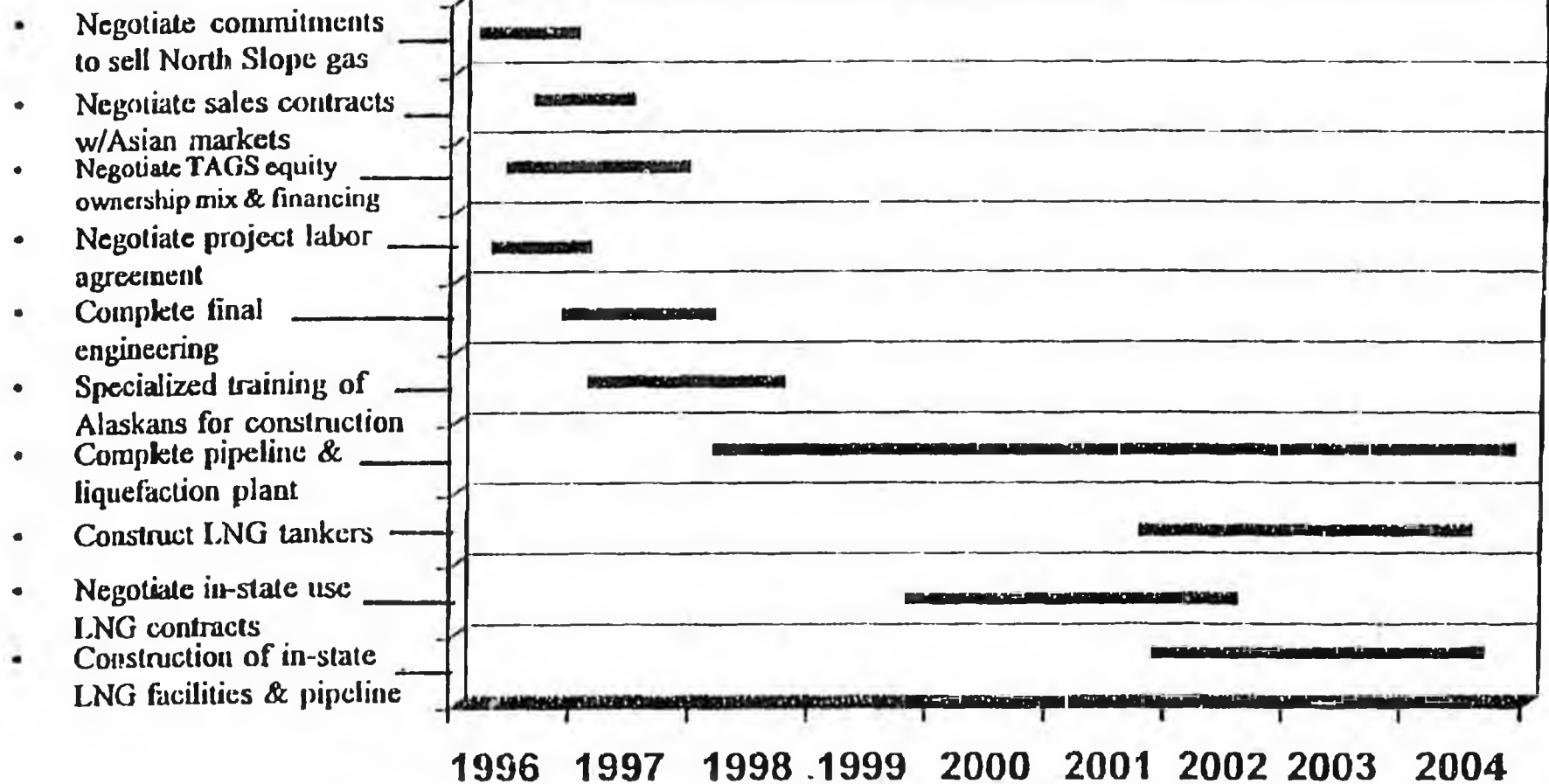


ALASKA LEGISLATURE COMMITTEE FILES 1997-1998 0072

9690 SENATE RESOURCES

TAGS Best Case Development Scenario



BEST CASE DEVELOPMENT SCENARIO
TRANS-ALASKA GAS SYSTEM
PREPARED BY YUKON PACIFIC CORPORATION

The construction and operation of the Trans-Alaska Gas System and sales of Alaska's North Slope natural gas are critical to Alaska's future. State revenues, local government revenues, private sector jobs, contracts for Alaskan businesses, and use of the gas for residential and commercial purposes along the pipeline corridor all hinge upon conclusion of a unified proposal to present to the Asian markets.

Representatives of these Asian markets have recently substantiated that a market now exists for Alaskan gas and that if we do not move quickly to meet this market demand, they will have to make commitments to other competing projects.

The Alaska Legislature recently unanimously passed a resolution in support of the project which established an interim Legislative working group to "track progress and assist the transportation permit holder, the working interest owners of the Prudhoe Bay and Point Thompson units, and the administration in developing a unified proposal for presentation to the Asian market."

This resolution was supported by the Alaska Municipal League, the Alaska AFL-CIO, the Alaska Environmental Lobby, the Fairbanks North Star Borough, the Alaska Trucker's Association, the Fairbanks North Star Borough, the City and Borough of Juneau, the Bristol Bay Borough, the Southwest Marine Pilots and others throughout Alaska.

Korea and Taiwan have already signed letters of intent to purchase Alaskan gas and President Clinton also promoted Alaska North Slope gas sales in Japan on his recent mission to Asia.

Many of the components of this project are already in place. What is the best case development scenario for the earliest completion of this project?

PERMITTING:

Environmental permits are a major uncertainty in any large scale development project. Fortunately, in this instance, Yukon Pacific has already obtained all the permits and an export license within the existing pipeline corridor. This process took 10 years to accomplish. Any alternative to this route would have to start from scratch to seek permits which would delay beginning of this project for at least 5 years. The participation of Yukon Pacific Corporation is critical to any near term Alaska LNG project.

NEGOTIATION OF COMMITMENTS TO SELL GAS:

This is the most pressing component of the project at this time. Until the working interest owners on the North Slope actually agree to put Alaskan gas on the market this project cannot move forward. There are several options to conclude these agreements. First, the major oil companies could agree to let Yukon Pacific market the gas and agree to a sales price and production schedule.

As an alternative they could join as ownership partners with Yukon Pacific to jointly present this project to the Asian markets. Yukon Pacific has offered up to 75% ownership of TAGS to the oil companies or other investors.

If due to reinjection requirements, or the Issues Resolution Agreement, the oil companies cannot market their gas before 2005, Point Thomson could lead the production required for this project to begin, and the oil companies could agree to bring Prudhoe Bay production on line after 2005.

NEGOTIATE SALES CONTRACT WITH ASIAN MARKETS:

Korea and Taiwan have already signed letters of intent with Yukon Pacific to buy Alaskan gas. Representatives of Japan National Oil Corporation who recently visited Juneau indicated their interest in Alaskan gas and encouraged Alaskans to present a unified proposal to them for their consideration. President Clinton also promoted sales of Alaskan gas on his recent mission to Asia. Long term contracts (20 to 30 years) need to be negotiated to facilitate financing of the project.

NEGOTIATE TAGS OWNERSHIP AND FINANCING:

This component would involve establishing an ownership and management structure for the project. This will be partially determined by the investors of the project. Total costs and returns from the project need to be presented to potential financiers including Yukon Pacific, the oil companies, banks, and end users of the gas. Although it is not required to secure adequate project financing, the State of Alaska may want to consider investing in the project if it can be shown that the State can achieve a higher rate of return than its existing investments.

NEGOTIATE PROJECT LABOR AGREEMENT:

Yukon Pacific has stated its willingness to negotiate a project labor agreement for the project to ensure availability of qualified workers and to ensure maximum Alaskan hire. A no strike clause will be an essential part of this agreement.

COMPLETE FINAL ENGINEERING:

Preliminary engineering has been completed but final engineering and construction blueprints need to be completed. During this phase all opportunities for shared facilities

with existing pipeline operations need to be considered in an effort to lower costs of the project.

CONSTRUCT PIPELINE AND LIQUEFACTION PLANT:

Estimated construction schedule is five years from start to completion. This phase will overlap to some degree with the 2-3 years required for final engineering and design discussed above. The pipeline will be buried except for occasional stream crossings.

CONSTRUCT LNG TANKERS:

Construction of the initial vessels required is estimated to take 2 years. New tankers will be phased in as production ramp up occurs.

NEGOTIATE IN STATE USE OF NATURAL GAS:

This would include local distribution companies and potential industrial users including petrochemical production, etc.

CONSTRUCTION OF IN STATE NATURAL GAS FACILITIES AND PIPELINES:

This construction would be timed to coordinate with completion of the main gas line.

Grass Roots LNG Projects Cost Comparison

Project	Production (MMTPA [*])	Estimated Cost \$ Billions	Cost in \$ Billions per MMTPA	Capital ^{**} per MMBTU
Alaska TAGS	15	13.6	0.91	0.70
TAGS at higher cost	15	15.0	1.00	0.70
Qatargas	6	6.0	1.00	0.70
Natuna Island	15	21.3	1.42	1.00
Sakhalin	6	7.9	1.32	1.00

* million metric tons per annum

** does not reflect capitalized interest, cost of gas, time value of money or operating expenses

TAGS Competition is Other Undeveloped Gas Fields in:

	<u>Start-up Date</u>	<u>Annual Volume</u>
▲ Qatar (Qatargas & Rasgas) - Mobil	2005	6-10 MMTA
▲ Indonesia (Natuna Island) - Exxon	2004	15 MMTA
▲ Sakhalin (Russia) - Exxon x2, Marathon/Shell	2004	11 MMTA
▲ Yemen - Exxon	??	??
▲ Papua New Guinea - BP	??	??
▲ Oman - Shell	2005	6 MMTA
▲ Australia - Shell, BP	2003	16 MMTA

Each host country (together with the private gas producers shown above) is actively promoting its project as the next post-2000 LNG supplier to Asia.

TRANS ALASKA GAS SYSTEM ENVIRONMENTAL REVIEW COMMITTEE

750 W. Second Ave., Suite 104
Anchorage, AK 99501-2167
(907) 279-8247 Fax 274-4145

February 3, 1997

The Honorable Rick Halford, Chair
Senate Resources Committee
State Capitol
Juneau, AK 99801-1182

Dear Mr. Chairman and Members of the Resource Committee:

The Trans Alaska Gas System Environmental Review Committee would like to thank you for holding a hearing on HCR 1, relating to the sale of North Slope natural gas.

The Environmental Review Committee consists of individuals representing environmental organizations up and down the pipeline corridor. For the past 9 years, the TAGS Environmental Review Committee has been working with Yukon Pacific to identify and reduce impacts associated with their North Slope gas export project. Yukon Pacific has shown a commendable willingness to address our concerns. Furthermore, Yukon Pacific has indicated that they can build their project within existing state and federal regulations. Yukon Pacific has even committed to meeting the no-net-loss provisions of federal wetlands regulations. Only time will tell whether they will honor these commitments, but for the present we are satisfied with their words and deeds.

For these and other reasons, we urge this legislature to send a strong message to the North Slope leaseholders that there will be no further talk about duplicating permits. It is a little disingenuous for the leaseholders to rail about government duplication and then suggest that they should be able to redo eight years' of permitting. Those of you who want to see a project probably realize that even with Yukon Pacific's permit and marketing acumen, Alaska risks missing out on the 2005 market window. This talk is no more than a delaying tactic and indicates just how much the leaseholders still need to learn about the LNG business.

Yukon Pacific has testified that despite having obtained all the major project-wide permits, it still needs to obtain another 850 permits before it can proceed. For this reason, we urge the legislature to continue to fund the natural resource agencies at least at current levels. Further reductions virtually guarantee that the state will not have on staff sufficient expertise to adequately review these 850 permit applications and ensure that a gas export project is built the way it can and should be. The

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natural resource agencies we are referring to include the departments of Natural Resources, Environmental Conservation, Fish & Game, and Law.

Furthermore, the legislature must ensure the continued independence of the Alaska Oil & Gas Conservation Commission. The AOGCC's hearings on the Prudhoe Bay Unit over the past two years are largely responsible for the little movement the North Slope leaseholders have exhibited in gas sales. If the Department of Law had had the budget to provide the AOGCC with legal representation perhaps this resolution would be moot.

We urge the legislature not to roll back regulations and pressure the natural resource agencies not to enforce various the regulations that we do have. In the past, this has been exceedingly counter-productive and wasteful. One need look no further than the Exxon Valdez oil spill to see why. In the 1980s, Alaska's politicians and regulators refused to confront the catastrophe in the making in Prince William Sound. By not asking for improvements in vessel tracking and escort systems, the legislators and regulators thought they were doing their friends in the oil industry a favor. But rather than save a few million dollars per year, this favor ended up damaging the environment from Cordova to Katmai, destroying several vital fisheries, and costing one company at least \$7 billion.

But wait, it gets worse. As a result of the spill and the penalties, this company seems unwilling to invest another discretionary cent in the state of Alaska, and that company just happens to own more gas on the North Slope than all the other companies combined. In the mistaken belief that they help industry by giving industry whatever it wants, some politicians and regulators created a situation that may ultimately result in Alaska missing out on its best shot to market several hundred billion dollars of North Slope natural gas. And of course, if there is no gas for Tokyo, there won't be any gas for Fairbanks, for Anchorage, or for Tok.

A similar attitude has resulted in the closure of both of Southeast Alaska's pulp mills. By not requiring the mill operators to comply with existing air and water quality regulations, the mills postponed making the associated incremental pollution abatement investments. When it finally came time to comply, management declined on the grounds of expense and closed up shop. In other words, they took the money and ran.

In addition to still having an inadequate tanker escort situation in Prince William Sound, Alaska currently faces a similar situation on the oil pipeline. In the past five years, three

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separate studies by institutions as reputable as the Government Accounting Office (GAO) have documented massive safety problems on the oil pipeline. Alyeska has at times said as much. One report concluded that the pipeline was an accident that had found a place to happen. Despite all this, the state has refused to even acknowledge the problems. Ask yourself what would happen to the prospects of building a natural gas pipeline across Alaska if Alyeska has a catastrophic failure tomorrow? If you think the answer is, "No problem!" think again.

To put it simply, the properties of LNG are poorly understood. In fact, a year ago, Arco's Kevin Meyer compared its explosive hazards to that of atomic bombs. And Arco wants to co-site the LNG facility at the Alyeska pipeline terminal? Ask yourself what kind of media campaign people intent on killing a gas export project could build around those kinds of statements. According to the Anchorage Daily News, Alyeska wants to get an oar in the water so it can build and operate a gas export facility. We don't know about you but talk of commingling the oil terminal and the LNG liquefaction facilities make us extremely nervous.

The North Slope lease holders talk about fiscal certainty is beyond belief. These are the same companies that are going all out to develop competing projects in Indonesia, Sakhalin, in Yemen? Give us a break. The lease holders talk about how many times Alaska has changed its tax policies to their disadvantage. Give us a break. Only a few times have any legislature changed a tax policy without the leaseholders' blessings. And even then, these leaseholders have made scads of money from Alaska's oil.

For example, a recent master thesis from the University of Wisconsin concluded that the per barrel profit provision from the pipeline tariff leads to overcharges of \$4.9 billion during the life of the pipeline. Furthermore, over-deductions for Dismantlement, Removal, and Restoration (DR&R) give carriers \$9-\$13 billion too much. Finally, debt-trending overcharges amount to some \$6 billion. That is a total of \$20 billion in overcharges right there. And that is in addition to all the profits they've made on the North Slope and all the profits they've made shipping the oil out of Alaska and refining and distributing it Outside. And these are our partners?

The producers talk about the need for a constitutional amendment to guarantee fiscal certainty. Fiscal certainty is a non-issue. If the Japanese are willing to do business in Qatar and Abu Dhabi and what is left of Russia, we seriously doubt that they are worried about fiscal certainty in Alaska. But they probably are wondering when the leaseholders are going to get around to offering gas for sale.

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Whenever they talk about fiscal certainty, the leaseholders talk about regulatory certainty. Regulatory certainty is a non-issue. Yukon Pacific, the promoter of the only North Slope gas export project that we know of, has already indicated that they can build this project within the existing regulatory framework.

Recently, both the Anchorage Daily News and Fairbanks News Miner have editorialized that the state should be very careful about fiscal concessions for a gas export project, that there will be a host of impacts from a gas construction project, and that the people of Alaska should receive something in return. The Environmental Review Committee couldn't agree more. There is couple of hundred billion dollars of gas on the North Slope. Yukon Pacific says that an export project is economic and competitive at 14 million tons per year (mmtpa) without fiscal concessions. Yukon Pacific has testified repeatedly that expansion beyond 14 million tons will be make this project very lucrative for investors.

One has to wonder why the Administration continues to arbitrarily provide consultants with assumptions that put Alaska gas sales at a distinct disadvantage to Alaska's competition in Sakhalin and Natuna. These maneuvers aid and abet foot-dragging. They position the lease holders for another unwarranted raid on Alaska's natural resource wealth. The leaseholders seem not to understand that the Japanese negotiate on the basis of cost. If the state lowers the cost, it just means that the state will get that much less for its gas.

When it comes to North Slope gas sales or any other disposal of public resources, it seems incumbent upon both the state and the legislature to live up to its fiduciary responsibilities. The legislature and Administration should support the efforts of those companies that are willing to operate within existing frameworks rather than those companies who so often admit that they can make money on a given project but refuse to undertake it absent additional fiscal incentives and concessions.

Finally, the Environmental Review Committee urges the legislature to focus on North Slope gas exports. When you consider the long-term impact on the state treasury and Alaska's economy, all the legislation introduced in the past five years doesn't amount to a hill of beans compared to the importance of North Slope gas exports.

In summary then, the Environmental Review Committee urges the Senate Resources Committee and the Twentieth Legislature to:

- terminate talk of duplicating permits,
- fund and support the missions of the state's natural

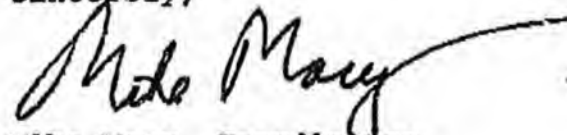
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- resource agencies.
- Support the enforcement of Alaska's environmental regulations.
- Use your influence to force Alyeska to correct the hundreds of problems still threatening the safety of the oil pipeline and its workers.
- Demand improvements to the escort tug system in Prince William Sound now.
- Tell the leaseholders that fiscal and regulatory certainty are non-issues.
- Be very careful about entertaining any discussions about fiscal concessions.

Thank you, Mr. Chairman and members of the Senate Resource Committee, for your attention. In regards to HCR 1, a resolution relating to North Slope gas sales, the Committee agrees that North Slope gas sales is one of, if not the, biggest issues confronting the legislature and the people of Alaska. And we urge you to pay it the attention it warrants.

Sincerely,



Mike Macy, Coordinator

Version: January 22, 1997

**MEMORANDUM OF UNDERSTANDING RELATING TO THE
PROPOSED ALASKA NORTH SLOPE GAS PROJECT
AMONG THE STATE OF ALASKA, ARCO ALASKA, INC.,
BP EXPLORATION (ALASKA) INC., AND EXXON COMPANY, U.S.A.**

- I. INTRODUCTION**
- II. PROJECTED COSTS AND COST REDUCTIONS**
- III. MARKET TERMS, CONDITIONS AND OPPORTUNITIES**
- IV. THE STATE FINANCIAL MODEL**
- V. STATE FISCAL MODIFICATIONS**
- VI. STATE FISCAL STABILITY AND CERTAINTY**
- VII. RELATIONSHIP WITH THE ALASKA LEGISLATURE**
- VIII. HIRING ALASKANS**
- IX. ENVIRONMENTAL INTEGRITY, HEALTH, SAFETY AND NATURAL GAS
AVAILABILITY FOR ALASKAN COMMUNITIES**
- X. THE POTENTIAL EFFECT OF PERMITTING REQUIREMENTS AND DELAYS**
- XI. FEDERAL ACTIONS THAT MIGHT ASSIST THE PROJECT**
- XII. YUKON PACIFIC CORPORATION**
- XIII. MAJOR GAS SALE INCENTIVE STUDY**
- XIV. LIMITATIONS**

**MEMORANDUM OF UNDERSTANDING RELATING TO THE
PROPOSED ALASKA NORTH SLOPE GAS PROJECT
AMONG THE STATE OF ALASKA, ARCO ALASKA, INC.,
BP EXPLORATION (ALASKA) INC., AND EXXON COMPANY, U.S.A.**

This is a Memorandum of Understanding (Memorandum) among the State of Alaska, acting through the executive branch of state government (State), and the three largest working interest owners in the Prudhoe Bay Unit, ARCO Alaska, Inc., BP Exploration (Alaska) Inc., and Exxon Company, U.S.A. (Producers), who are some of the potential sponsors of a North Slope gas project. (Together the State and the Producers are referred to as the Parties.)

I. INTRODUCTION

The Parties wish to pursue establishing a viable project to produce gas from the Alaska North Slope and to transport that gas to markets in the Far East ("Alaska North Slope Gas Project" or "the Project") and thereby realize value for the Parties' respective interests in that gas. The Parties intend to take a series of actions, both separately and together, to pursue the Alaska North Slope Gas Project.

In addition to potential public and private revenue, the construction and operation of the Alaska North Slope Gas Project offers the possibility of a significant number of jobs for Alaskans and natural gas for Alaskan communities.

The three Producers are pursuing their private economic interests with respect to this Project. The State is charged with pursuing and protecting the public interest and promoting the public benefits pertinent to this Project. The Parties will explore the steps they can take individually and together to harmonize the Producers' private interests and the State's public interest relating to the Project.

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The Parties recognize that the State and the Producers have a contractual relationship through the lease of State lands. The Producers have the right to continue to hold their leases so long as they operate those leases prudently and produce oil and gas from them with reasonable diligence. The State believes the Producers are currently complying with these obligations.

The Parties agree that the following constitute the latest assumptions pertinent to the Project:

1. The most recent capital cost projection (excluding interest during construction) is about \$15 billion in 1995 dollars;
2. The prevailing nominal market price for liquefied natural gas (LNG) delivered to Far East markets in 1995 dollars is about \$3.50 per million BTUs; and
3. The LNG product volume tentatively planned for the Project (about 14 million metric tons of LNG per year) is as follows: 2-3 million metric tons of LNG during the first year of operation, increasing by 2-3 million metric tons per year until the full volume is reached in the sixth year of operation, continuing at that volume for the life of the project.

The Parties believe the Project's chance of success will be enhanced if:

1. The Project can be constructed for substantially less than the projections specified above;
2. The LNG from the Project can be marketed for prices substantially above the price prevailing during 1995;
3. The full volume of LNG available from the Project can be placed in the market more rapidly than in the schedule set forth above.
4. The Project is subject to an appropriate fiscal and regulatory environment that is stable and certain over a long period.

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The State's current fiscal system applicable to a project of this type includes a royalty interest, production tax, property tax, conservation and surcharge tax, and corporate income tax (Project State Fiscal System).

The Parties will examine whether modifications to the Project State Fiscal System might significantly improve the economic feasibility and competitiveness of the Project. The Producers represent that such modifications may be necessary to make the Project either economically feasible or competitive in the market or both. If any of these propositions is true, then modifications to the Project State Fiscal System might be necessary for the State to receive value for its interest in the North Slope gas resource.

Any changes to the Project State Fiscal System must be consistent with the public interest and the legislature's duty to provide for the use, development, and conservation of all natural resources belonging to the State for the maximum benefit of its people.

The State has retained a consultant, Pedro Van Meurs and Associates, to evaluate the Project State Fiscal System and, if appropriate, to make recommendations for possible changes in that system to enhance the possibility that the Project will be built.

The major purposes of this Memorandum are to assist (1) in evaluating the need for and, if needed, the timing of modifications to the Project State Fiscal System; (2) if appropriate, in developing proposals for modifications to the Project State Fiscal System; (3) if appropriate, in compiling the information base required for the responsible deliberation and debate that such proposed changes would occasion; (4) in setting the framework for future discussions and joint work to enhance the possibility that the Project will be built; and (5) in pursuing the best interests of the State.

The major issues that may affect the Project's viability are its economic feasibility and its ability to compete with other proposed LNG projects, other non-LNG energy projects that might serve Far East markets, and other investment opportunities available to potential Project sponsors. The contributing factors include:

1. The projected costs of the Project and means for reducing those costs;
2. The market terms, conditions and opportunities available for the Project;
3. The federal, state, and local tax and state royalty obligations of the Producers and of potential Project sponsors;
4. The stability and certainty of the Project State Fiscal System;
5. The public costs and benefits of the Project; and
6. The legal requirements applicable to the Project, including federal, state, and local regulations, permits, and licenses.

II. PROJECTED COSTS AND COST REDUCTIONS

The Parties recognize that the current cost estimate of about \$15 billion in 1995 dollars (excluding interest during construction) is subject to a great deal of uncertainty and that the actual cost of constructing the Project might be considerably lower or higher than this estimate.

The Parties recognize that determining a reliable cost estimate will be a critical step in developing the Project. A reliable cost estimate will be essential to conclude successfully the sales contracts necessary to support the Project and attract capital investment to the Project.

The Parties recognize that the potential Project sponsors would have to spend a large sum of money to develop a reliable cost estimate and that this money would not be recouped if the

Project is not constructed. The Producers will continue their work to reduce the uncertainty in their estimates and find cost savings for the Project.

III. MARKET TERMS, CONDITIONS AND OPPORTUNITIES

The Parties recognize that a viable Project offers many potential benefits to buyers and governments in the Far East. These benefits may include the opportunity to:

1. Further diversify the buyers' supply portfolios with an LNG source that has stable political institutions and geopolitical characteristics different from the majority of their current sources;
2. Reduce balance of payment surpluses with the United States and gain consequent political benefits; and
3. Invest in and provide some of the important components of the Project.

The Parties recognize there are other potential projects competing for a place in the Far East markets and the possibility of successfully completing this Project will be increased by advancing it as far as possible in the eyes of potential LNG purchasers toward the front of the queue of potential projects. The Parties believe that reducing costs and increasing fiscal and regulatory certainty may assist in advancing this Project's place in the queue of potential projects. The Parties further recognize that forecasts of demand for natural gas and LNG in Far East markets generally show annual increases for the next twenty years. Based on these forecasts, the Parties agree that opportunities for placing LNG in Far East markets are expected to continue to grow in the twenty-first century. The Parties recognize that ultimately the market will dictate the need for and timing of the Project.

The Parties further recognize that if this project could be developed and marketed with larger product volumes, its economic feasibility would be greatly enhanced. Conversely, if this Project could be developed cost effectively with smaller product volumes its marketability, and hence its economic feasibility, would be greatly enhanced.

The Producers will make regular contact with potential LNG buyers and pertinent government officials in the Far East to apprise them of the progress of the Project. The Producers will continue to promote interest in the success of the Project.

IV. THE STATE FINANCIAL MODEL

The State has developed a financial model to use for public discussion of the Project's economic feasibility. The model is available for public inspection and is subject to modification as appropriate. The model permits the Parties and the public to analyze the effect changes in the following factors have on the economic feasibility of the Project:

1. State and Federal fiscal terms;
2. Debt-equity ratios;
3. Return on debt;
4. Return on equity;
5. Required project rates of return;
6. Capital and operating costs;
7. Time to place the full LNG volumes in Far Eastern markets;
8. Full LNG Project volume;
9. LNG market prices; and
10. Reduced oil recovery as a result of a gas sale.

V. STATE FISCAL MODIFICATIONS

The Parties recognize that changes in the Project State Fiscal System may be necessary or advisable for two reasons. First, such changes may be required to make the Project economically feasible and hence able to attract the necessary capital investments. Second, such changes may be necessary for the Project to successfully compete for a place in the market against other proposed LNG projects or other potential energy sources for the pertinent Far East markets.

The Parties will examine whether changes in the Project State Fiscal System will significantly improve the economic feasibility of the Project or significantly improve the competitiveness of the Project in its ability to secure a place in the Far East markets. The Parties recognize that an evaluation of the Project State Fiscal System in relation to the Project will be facilitated by a frank and open exchange of information.

The Parties recognize that the appropriateness of proposed changes to the Project State Fiscal System must be evaluated by examining whether the changes would be socially responsible, given the strain on public services the Project would create, by considering the non-renewable nature of the resources the Project would exploit and by considering the benefits the State and its citizens would receive from the Project. The Parties recognize that any changes to the Project State Fiscal System must maximize the expected benefit of Alaska North Slope gas resources for the people of Alaska.

Where the Parties conclude that a change in the Project Fiscal System would (1) significantly improve the viability or competitiveness of the Project; (2) be socially responsible; (3) maximize the expected benefit of Alaska's North Slope gas resources for its people; and (4) enhance the Project sponsors' shareholder value, the Parties agree to work together in an effort to develop appropriate proposed legislation and to take other actions needed to effect such change. If appropriate, the State will assess the Project's socioeconomic effects on the people of the State.

Finally, the Parties agree that, where possible, modifications to the Project State Fiscal System should be able to respond to variations in the Project's profitability -- where, for example, lower energy prices (or higher costs) produce lower profits or higher energy prices (or lower costs) produce higher profits -- and to adjust the State's share in the economic benefits of the Project accordingly, while Project sponsors retain upside profit potential commensurate with the risks they are undertaking.

Possible changes to the Project State Fiscal System the Parties might consider include:

1. Tax and royalty offsets for early expenditures prior to Project commitment;
2. Accelerated capital depreciation;
3. Investment credits;
4. Deferrals of or reductions in royalties and certain taxes;
5. Recognition of losses in wellhead revenue for royalty payments by either an offset or carry forward of those losses;
6. Profit based taxes and royalties; and
7. Coordination of tax and royalty provisions with the Project tariff arrangements

If the Parties agree it is necessary or appropriate, the State will work with local governments

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regarding how modifications to property taxes may enhance the Project's chance of success.

VI. STATE FISCAL STABILITY AND CERTAINTY

The Parties recognize that due to the anticipated length of time between many of the Project's enormous capital expenditures and the receipt of significant Project revenues, and the Project's need for a reliable revenue stream over a long period, it is likely that potential sponsors will require assurance that the Project State Fiscal System will not change adversely over a significant part of the life of the Project. The Parties also recognize that the Constitution of the State of Alaska imposes some limits on the ability of the State to commit itself irrevocably to certain levels and kinds of taxation. The Parties agree to search for suitable measures within the pertinent Constitutional framework to achieve the fiscal stability and certainty the Project requires.

The Parties also recognize that they can increase the fiscal stability and certainty surrounding the Project by, among other things, agreeing to dispute settlement procedures and clear definitions of tax and royalty obligations, common carrier requirements, tariff methodology, and other regulatory obligations before the Project commences.

VII. RELATIONSHIP WITH THE ALASKA LEGISLATURE

Since the Alaska Legislature must determine whether to modify the Project State Fiscal System, the Parties will keep appropriate members of the Alaska Legislature informed of their respective efforts on the Project. Further, the Parties will develop and provide information to assist in the public discussion and debate occasioned by any proposed modifications to the Project State Fiscal System.

By HJR 54, the Alaska Legislature established an interim working group. This group is scheduled

CORRECTION

THE FOLLOWING DOCUMENT(S)
HAVE BEEN REFILMED TO
ASSURE LEGIBILITY OR PAGINATION



Rev. 6/98

Central Microfilm Services
Department of Education
State of Alaska

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By HJR 54, the Alaska Legislature established an interim working group. This group is scheduled

to report to the House and Senate Resources Committees by February 1, 1997 on the status of efforts to advance exports of Alaska North Slope gas to Far East markets. The group also is to report on any proposed legislative actions appropriate to those efforts. The executive branch and the Producers will work individually and together to ensure that the Alaska Legislature's interim working group created by HJR 54 is kept apprised of the efforts of the Parties, has the information it requires to do its work, and is supported in its efforts in any other appropriate manner.

VIII. HIRING ALASKANS

The Parties recognize that an important potential benefit of the Project is the employment of Alaska residents and Alaska businesses in the construction and operation of the Project. The Parties recognize that Alaskans expect a strong "Alaska-hire" effort for the Project. The Parties are determined to find suitable measures to successfully ensure that a maximum number of Alaska residents and Alaska-based businesses are hired to construct and operate the Project while recognizing that, in order to assist in achieving a commercially viable Project, there will be a need for competitively priced goods and services. The Parties agree that clearly defining who qualifies as an Alaska resident or Alaska business will help this effort.

IX. ENVIRONMENTAL INTEGRITY, HEALTH, SAFETY AND NATURAL GAS AVAILABILITY FOR ALASKAN COMMUNITIES

In addition to public revenue and employment within the State, other important public interests that would be affected by the Project must be considered. They include:

1. Protection of the environment;
2. Protection of the health and safety of workers and the public; and
3. Providing natural gas to Alaskan communities.

The Parties agree to search for suitable measures to ensure that, if the Project is constructed:

1. Its construction and operation will properly protect Alaska's environment;
2. It will be constructed and operated in a manner that properly protects the health and safety of workers and the public; and
3. Where economically, technically, and legally feasible, it will be configured and operated so that natural gas can be marketed to Alaskan communities.

X. THE POTENTIAL EFFECT OF PERMITTING REQUIREMENTS AND DELAYS

The Parties recognize that permitting requirements and delays may affect the viability of the Project. The Parties intend to search for suitable and mutually agreeable measures to aid Project viability while still protecting essential regulatory goals such as environmental quality and the health and safety of all Alaskans.

XI. FEDERAL ACTIONS THAT MIGHT ASSIST THE PROJECT

The Parties recognize that there may be some steps the Federal government could take to improve the economic feasibility and competitiveness of the Project. These steps include, for example, potential changes to federal laws and regulations relating to taxes and permitting requirements. The Parties intend to evaluate these potential changes, including federal fiscal modifications such as:

1. Investment and other tax credits;
2. Accelerated depreciation;
3. Sharing of tax revenues with the State of Alaska; and
4. Authorizing tax free bonds for the Project.

Based on these evaluations, the Parties may encourage federal policy makers and agencies to pursue selected federal changes.

XII. YUKON PACIFIC CORPORATION

Yukon Pacific Corporation (YPC) is a business unit of CSX Corporation and managing general partner for Yukon Pacific Company, L.P. Since 1983 YPC has been engaged in the preliminary design and permitting of facilities very similar to the facilities needed for the Project that is the object of this Memorandum. In carrying out this work, YPC has contacted pertinent government officials and policy makers in this country and potential LNG buyers and pertinent government officials in Asia. The Project may or may not fit closely with the rights-of-way, permits, approvals, and licenses that have been obtained by YPC for its proposed facilities. Nevertheless, the Producers, at an appropriate time, will evaluate YPC's existing work to determine whether there are acceptable, cost-effective means to use the work to add value to the Project; and where there are acceptable, cost-effective means to use the work, the Producers will endeavor to do so. Further, the Parties recognize that success in developing and marketing Alaska North Slope natural gas requires that interested parties emphasize the merits and benefits of any project proposed to achieve that objective.

XIII. MAJOR GAS SALE INCENTIVE STUDY

The State has prepared an analysis of the relative incentives for each of the major Prudhoe Bay producers to engage in a Major Gas Sale (MGS). Each Producer has had an opportunity to review this analysis to ensure that it accurately reflects the impacts of the Prudhoe Bay Unit Operating Agreement and related amendments pertaining to an MGS. The State has concluded that the Producers among themselves have similar incentives for an MGS, and the Producers agree with this conclusion.

XIV. LIMITATIONS

The Parties intend to work together to accomplish the steps outlined in this Memorandum of Understanding. However, this document does not commit any Party to invest or participate in the Project, or create any legally enforceable rights or obligations. The Parties recognize that a future change in circumstances may alter any Party's current intentions or willingness to participate as contemplated by this Memorandum of Understanding.

draft

**MEMORANDUM OF UNDERSTANDING RELATING TO A
PROPOSED ALASKA NORTH SLOPE GAS PROJECT
BETWEEN THE STATE OF ALASKA AND
YUKON PACIFIC CORPORATION**

- I. INTRODUCTION
- II. PROJECTED COSTS AND COST REDUCTIONS
- III. MARKET TERMS, CONDITIONS AND OPPORTUNITIES
- IV. THE CS FIRST BOSTON REPORT AND THE STATE FINANCIAL MODEL
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- X. THE POTENTIAL EFFECT OF PERMITTING REQUIREMENTS AND DELAYS
- XI. FEDERAL ACTIONS THAT MIGHT ASSIST THE PROJECT
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MEMORANDUM OF UNDERSTANDING RELATING TO A
PROPOSED ALASKA NORTH SLOPE GAS PROJECT
BETWEEN THE STATE OF ALASKA AND
YUKON PACIFIC CORPORATION

This is a Memorandum of Understanding (Memorandum) between the State of Alaska, acting through the executive branch of state government (State), and Yukon Pacific Corporation (YPC), a business unit of CSX Corporation and managing general partner of Yukon Pacific Company, L.P. (Together the State and YPC are referred to as the Parties.)

I. INTRODUCTION

The Parties wish to pursue establishing a viable project to produce gas from the Alaska North Slope and to transport that gas to markets in the Far East ("Alaska North Slope Gas Project" or "the Project"). The Parties intend to take a series of actions, both separately and together, to pursue an Alaska North Slope Gas Project.

In addition to potential public and private revenue, the construction and operation of the Alaska North Slope Gas Project offers the possibility of a significant number of jobs for Alaskans and natural gas for Alaskan communities.

The State recognizes that since 1983 YPC has been engaged in preliminary design, permitting and marketing for a specific North Slope Gas Project, the Trans-Alaska Gas System (TAGS). YPC recognizes that the State, at this time, does not support a specific North Slope Gas Project, but instead must seek to realize value from the natural gas that has been discovered on the Alaska North Slope. The Parties will endeavor to find acceptable, cost-effective means by which the TAGS proposal can be coordinated with other potential Projects.

The State recognizes that YPC, with some conditions, has secured or completed the following in its efforts to promote TAGS:

1. Presidential approval of gas exports as required under the Alaska Natural Gas Transportation Act;
2. A Project-wide Environmental Impact Statement;
3. A right-of-way grant for Ahtna lands;
4. A right-of-way grant for federal lands;
5. A right-of-way grant for State lands;
6. Department of Energy authorization for North Slope gas exports;
7. An Environmental Impact Statement for the Anderson Bay LNG facilities and marine terminal site;
8. Federal Energy Regulatory Commission approval of Anderson Bay as an export site (YPC believes this is an exclusive license);
9. Contacts with customers, trading companies and market country governments;
10. Memoranda of Intent with Korea Gas Corporation and Chinese Petroleum Corporation for purchase volumes of LNG from a North Slope Gas Project;
11. A financial feasibility and financing plan with CS First Boston dated June 24, 1996; and
12. The creation and funding of an environmental oversight group called the TAGS Environmental Review Committee.

YPC is pursuing its private economic interests with respect to TAGS. The State is charged with pursuing and protecting the public interest and promoting the public benefits pertinent to a North Slope Gas Project. The Parties will explore the steps they can take individually and together to harmonize YPC's private interests in TAGS and the State's public interest in a North Slope Gas Project.

The Parties recognize that the State and the North Slope producers (Producers) have a contractual relationship through the lease of State lands. The Producers have the right to continue to hold their leases so long as they operate those leases prudently and produce oil and gas from them with reasonable diligence. The State believes the Producers are currently complying with these obligations.

The State believes that the following constitute the latest assumptions pertinent to the Project:

1. The most recent capital cost projection (excluding interest on construction) is about \$15 billion in 1995 dollars;
2. The prevailing nominal market price for liquefied natural gas (LNG) delivered to Far East markets in 1995 dollars is about \$3.50 per million BTUs; and
3. The LNG product volume tentatively planned for the Project (about 14 million metric tons of LNG per year) is as follows: 2-3 million metric tons of LNG during the first year of operation, increasing by 2-3 million metric tons per year until the full volume is reached in the sixth year of operation, continuing at that volume for the life of the project.

YPC believes that the Project's economics should be assessed using different assumptions. Nevertheless, the Parties agree that the Project's chance of success will be enhanced if:

1. The Project can be constructed for less than the projections specified above.
2. The LNG from the Project can be marketed for prices above the price prevailing during 1995.
3. The full volume of LNG available from the Project can be placed in the market more rapidly than in the schedule set forth above.
4. The Project is subject to an appropriate fiscal and regulatory environment that is stable and certain over a long period.

The State's current fiscal system applicable to a project of this type includes a royalty interest, production tax, property tax, conservation and surcharge tax, and corporate income tax (Project State Fiscal System). Although YPC does not own North Slope gas, it may be an owner of the transportation (including ships) and liquefaction facilities needed for a North Slope Gas Project. As an owner of such facilities, YPC would contribute to the state treasury through the property tax and the corporate income tax. The portion of the Project State Fiscal System that relates to the transportation and liquefaction facilities, the so-called "downstream," is referred to as the Downstream Project State Fiscal System.

The Parties will examine whether modifications to the Downstream Project State Fiscal System might significantly improve the economic feasibility and competitiveness of the Project. The Producers have represented that such modifications may be necessary to make the Project either economically feasible or competitive in the market or both. If any of these propositions is true, then modifications to the Downstream Project State Fiscal System might be necessary for the State to receive value for its interest in the North Slope gas resource.

Any changes to the Downstream Project State Fiscal System must be consistent with the public interest and the legislature's duty to provide for the use, development, and conservation of all natural resources belonging to the State for the maximum benefit of its people.

The State has retained a consultant, Pedro Van Meurs and Associates, to evaluate the Project State Fiscal System and, if appropriate, to make recommendations for possible changes in that system to enhance the possibility that the Project will be built.

The major purposes of this Memorandum are to assist (1) in pursuing the means for coordinating the TAGS proposal with other potential Projects; (2) if appropriate, in developing proposals for

modifications to the Downstream Project State Fiscal System; (3) if appropriate, in compiling the information base required for the responsible deliberation and debate that such proposed changes would occasion; (4) in setting the framework for future discussions and joint work to enhance the possibility that a Project will be built; and (5) in pursuing the best interests of the State.

The major issues that may affect the Project's viability are its economic feasibility and its ability to compete with other proposed LNG projects, other non-LNG energy projects that might serve Far East markets, and other investment opportunities available to potential Project sponsors. The contributing factors include:

1. The projected costs of the Project and means for reducing those costs;
2. The market terms, conditions and opportunities available for the Project;
3. The federal, state, and local tax and state royalty obligations of the potential Project sponsors;
4. The stability and certainty of the Project State Fiscal System;
5. The public costs and benefits of the Project; and
6. The legal requirements applicable to the Project, including federal, state, and local regulations, permits, and licenses.

II. PROJECTED COSTS AND COST REDUCTIONS

The Parties recognize that the State's current cost estimate of about \$15 billion in 1995 dollars (excluding interest during construction) is subject to a great deal of uncertainty and that the actual cost of constructing the Project might be considerably lower or higher than this estimate.

The Parties recognize that determining a reliable cost estimate will be a critical step in developing the Project. A reliable cost estimate will be essential to conclude successfully the sales contracts necessary to support the Project and attract capital investment to the Project.

The Parties recognize that the potential Project sponsors would have to spend a large sum of money to develop a reliable cost estimate and that this money would not be recouped if the Project is not constructed. YPC will continue its work to reduce the uncertainty in its estimates and find cost savings for the Project.

III. MARKET TERMS, CONDITIONS AND OPPORTUNITIES

The Parties recognize that a viable Project offers many potential benefits to buyers and governments in the Far East. These benefits may include the opportunity to:

1. Further diversify the buyers' supply portfolios with an LNG source that has stable political institutions and geopolitical characteristics different from the majority of their current sources;
2. Reduce balance of payment surpluses with the United States and gain consequent political benefits; and
3. Invest in and provide some of the important components of the Project.

The Parties recognize there are other potential projects competing for a place in the Far East markets and the possibility of successfully completing this Project will be increased by advancing it as far as possible in the eyes of potential LNG purchasers toward the front of the queue of potential projects. The Parties believe that reducing costs and increasing fiscal and regulatory certainty may assist in advancing this Project's place in the queue of potential projects. The Parties further recognize that forecasts of demand for natural gas and LNG in Far East

markets generally show annual increases for the next twenty years. Based on these forecasts, the Parties agree that opportunities for placing LNG in Far East markets may continue to grow in the twenty-first century. The Parties recognize that ultimately the market will dictate the need for and timing of the Project.

The Parties further recognize that if this project could be developed and marketed with larger product volumes, its economic feasibility would be greatly enhanced. Conversely, if this Project could be developed cost effectively with smaller product volumes its marketability, and hence its economic feasibility, would be greatly enhanced.

YPC will continue to make regular contact with potential LNG buyers and pertinent government officials in the Far East to apprise them of the progress of the Project. YPC will continue to promote interest in the success of the Project.

IV. THE CS FIRST BOSTON REPORT AND THE STATE FINANCIAL MODEL

YPC has commissioned a report by CS First Boston addressing the Project's financial feasibility. The Parties recognize that the CS First Boston report purposely did not reflect or incorporate all elements of the current Project State Fiscal System. The CS First Boston report concludes that:

- a. Under current Project cost estimates and current capital market conditions, the Project will require an LNG price that escalates 3% annually, from an assumed 1996 price of \$3.57 per MMBtu, through the year 2035;
- b. The size and complexity of the Project will require multiple participants, and the participation of at least one major international oil company as a Project sponsor and potential operator; and
- c. The participation of the Prudhoe Bay oil companies would seem to be most sensible in terms of economic and timing efficiencies.

The State has developed a financial model to use for public discussion of the Project's economic feasibility. The model is available for public inspection and is subject to modification as appropriate. The model permits the Parties and the public to analyze the effect changes in the following factors have on the economic feasibility of the Project:

1. State and federal fiscal terms;
2. Debt-equity ratios;
3. Return on debt;
4. Return on equity;
5. Required project rates of return;
6. Capital and operating costs;
7. Time to place the full LNG volumes in Far Eastern markets;
8. Full LNG Project volume;
9. LNG market prices; and
10. Probable reduced oil recovery as a result of a gas sale.

V. STATE FISCAL MODIFICATIONS

The Parties recognize that changes in the Downstream Project State Fiscal System may be necessary or advisable for two reasons: First, such changes may be required to make the Project economically feasible and hence able to attract the necessary capital investments. Second, such changes may be necessary for the Project to successfully compete for a place in the market against other proposed LNG projects or other potential energy sources for the pertinent Far East markets.

The Parties will examine whether changes in the Downstream Project State Fiscal System will significantly improve the economic feasibility of the Project or significantly improve the

competitiveness of the Project in its ability to secure a place in the Far East markets. The Parties recognize that an evaluation of the Downstream Project State Fiscal System in relation to the Project will be facilitated by a frank and open exchange of information.

The Parties recognize that the appropriateness of proposed changes to the Downstream Project State Fiscal System must be evaluated by examining whether the changes would be socially responsible, given the strain on public services the Project would create, by considering the non-renewable nature of the resources the Project would exploit and by considering the benefits the State and its citizens would receive from the Project. The Parties recognize that any changes to the Downstream Project State Fiscal System must maximize the expected benefit of Alaska North Slope gas resources for the people of Alaska. Where the Parties conclude that a change in the Downstream Project State Fiscal System would (1) significantly improve the viability or competitiveness of the Project; (2) be socially responsible; and (3) maximize the expected benefit of Alaska's North Slope gas resources for its people, the Parties agree to work together in an effort to develop appropriate proposed legislation and to take other actions needed to effect such change. If appropriate, the State will assess the Project's socioeconomic effects on the people of the State.

Finally, the Parties agree that, where possible, modifications to the Downstream Project State Fiscal System should be able to respond to variations in the Project's profitability -- where, for example, lower energy prices (or higher costs) produce lower profits or higher energy prices (or lower costs) produce higher profits -- and to adjust the State's share in the economic benefits of the Project accordingly, while Project sponsors retain upside profit potential commensurate with the risks they are undertaking.

Possible changes to the Downstream Project State Fiscal System the Parties might consider include:

1. Tax offsets for early expenditures prior to Project commitment;
2. Accelerated capital depreciation;
3. Investment credits;
4. Deferrals of or reductions in certain taxes;
5. Profit based taxes; and
7. Coordination of tax provisions with the Project tariff arrangements.

If the Parties agree it is necessary or appropriate, the State will work with local governments regarding how modifications to property taxes may enhance the Project's chance of success.

VI. STATE FISCAL STABILITY AND CERTAINTY

The Parties recognize that due to the anticipated length of time between many of the Project's enormous capital expenditures and the receipt of significant Project revenues, and the Project's need for a reliable revenue stream over a long period, it is likely that potential sponsors will require assurance that the Project State Fiscal System will not change adversely over a significant part of the life of the Project. The Parties also recognize that the Constitution of the State of Alaska imposes some limits on the ability of the State to commit itself irrevocably to certain levels and kinds of taxation. The Parties agree to search for suitable measures within the pertinent Constitutional framework to achieve the fiscal stability and certainty the Project requires.

The Parties also recognize that they can increase the fiscal stability and certainty surrounding the Project by, among other things, agreeing to dispute settlement procedures and clear definitions of tax obligations, common carrier requirements, tariff methodology, and other regulatory obligations before the Project commences.

VII. RELATIONSHIP WITH THE ALASKA LEGISLATURE

Since the Alaska Legislature must determine whether to modify the Project State Fiscal System, the Parties will keep appropriate members of the Alaska Legislature informed of their respective efforts on the Project. Further, the Parties will develop and provide information to assist in the public discussion and debate occasioned by any proposed modifications to the Project State Fiscal System.

By HJR 54, the Alaska Legislature established an interim working group. This group is scheduled to report to the House and Senate Resources Committees by February 1, 1997 on the status of efforts to advance exports of Alaska North Slope gas to Far East markets. The group also is to report on any proposed legislative actions appropriate to those efforts. The executive branch and YPC will work individually and together to ensure that the Alaska Legislature's interim working group created by HJR 54 is kept apprised of the efforts of the Parties, has the information it requires to do its work, and is supported in its efforts in any other appropriate manner.

VIII. HIRING ALASKANS

The Parties recognize that an important potential benefit of the Project is the employment of Alaska residents and Alaska businesses in the construction and operation of the Project. The Parties recognize that Alaskans expect a strong "Alaska-hire" effort for the Project. The Parties are determined to find suitable measures to successfully ensure that a maximum number of Alaska residents and Alaska-based businesses are hired to construct and operate the Project, while recognizing that, in order to assist in achieving a commercially viable Project, there will be a need for competitively priced goods and services. The Parties agree that clearly defining who qualifies as an Alaska resident or Alaska business will help this effort.

**IX. ENVIRONMENTAL INTEGRITY, HEALTH, SAFETY
AND NATURAL GAS AVAILABILITY FOR ALASKAN COMMUNITIES**

In addition to public revenue and employment within the State, other important public interests that would be affected by the Project must be considered. They include:

1. Protection of the environment;
2. Protection of the health and safety of workers and the public; and
3. Providing natural gas to Alaskan communities.

The Parties agree to search for suitable measures to ensure that, if the Project is constructed:

1. Its construction and operation will properly protect Alaska's environment;
2. It will be constructed and operated in a manner that properly protects the health and safety of workers and the public; and
3. Where economically and technically feasible, it will be configured and operated so that natural gas can be marketed to Alaskan communities.

**X. THE POTENTIAL EFFECT OF PERMITTING
REQUIREMENTS AND DELAYS**

The Parties recognize that permitting requirements and delays may affect the viability of the Project. The Parties intend to search for suitable and mutually agreeable measures to aid Project viability while still protecting essential regulatory goals such as environmental quality and the health and safety of all Alaskans.

XI. FEDERAL ACTIONS THAT MIGHT ASSIST THE PROJECT

The Parties recognize that there may be some steps the Federal government could take to improve the economic feasibility and competitiveness of the Project. These steps include, for example, potential changes to federal laws and regulations relating to taxes and permitting requirements. The Parties intend to evaluate these potential changes, including federal fiscal modifications such as:

1. Investment and other tax credits;
2. Accelerated depreciation;
3. Sharing of tax revenues with the State of Alaska; and
4. Authorizing tax free bonds for the Project.

Based on these evaluations, the Parties may encourage federal policy makers and agencies to pursue selected federal changes.

XII. THE NORTH SLOPE PRODUCERS

YPC recognizes that the State is working with the Producers to enhance the possibility that a North Slope Gas Project will be completed. These Producers jointly own ninety-five percent of the working interest in the natural gas in the main Prudhoe Bay Unit reservoir.

YPC recognizes that the State intends to pursue efforts to harmonize the Producers private interests and the State's public interests in a Project. The Parties recognize that success in developing and marketing Alaska North Slope natural gas requires that interested parties emphasize the merits and benefits of any project proposed to achieve that objective.

XIII. MAJOR GAS SALE INCENTIVE STUDY

The State has prepared an analysis of the relative incentives for each of the major Prudhoe Bay producers to engage in a Major Gas Sale (MGS). YPC has had an opportunity to review this analysis to ensure that it accurately reflects the agreements in the Prudhoe Bay Unit Operating Agreement and related amendments pertaining to an MGS. The State has concluded that the Producers among themselves have similar incentives for an MGS, and YPC does not materially dispute the State's conclusions.

XIV. LIMITATIONS

The Parties intend to work together to accomplish the steps outlined in this Memorandum of Understanding. However, this document does not commit any Party to invest or participate in the Project, or create any legally enforceable rights or obligations. The Parties recognize that a future change in circumstances may alter any Party's current intentions or willingness to participate as contemplated by this Memorandum of Understanding.

*Department of Revenue
Summary of Outstanding Area of Disagreement
on Proposed Memorandum of Understanding
(As of February 11, 1997)*

What is the disagreement all about?

How far should the State go in trying to guarantee fiscal certainty? Exxon would like the State to commit in the Memorandum of Understanding that any fiscal certainty deal we make will do all of the following:

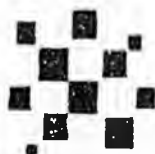
- Freeze the rates for severance taxes and royalties for the oil produced from Prudhoe Bay
- Freeze the property tax rates relating to the facilities now operating to produce oil
- Freeze the corporate income tax rates relating to the existing operations at Prudhoe Bay
- Modify and then freeze the rates for the severance taxes and royalties applicable to the gas that will be produced and marketed as a result of the gas project
- Modify and then freeze the property taxes that would apply to the new facilities that would be constructed for the gas project

The State, ARCO and BP believe the parties should not try to pursue certainty beyond the last two items. They believe that any "certainty" should be confined to the taxes and royalties on the gas and the property taxes on the new facilities to produce and market the gas.

Exxon says it will not sign a Memorandum of Understanding that doesn't at least keep the issue of taxes on oil and oil facilities open for discussion. The State, ARCO and BP are willing to accept a Memorandum of Understanding that keeps the discussions open.

The State, ARCO, BP and Exxon have each offered different proposals expressing this concept. Exxon has rejected the State's and ARCO's proposals. Exxon is still thinking about BP's proposal. The State requested that ARCO, BP and Exxon negotiate among themselves to reach agreement before coming to the State with a new proposal. The State is now waiting for the Producers to do so. It is our understanding that ARCO and BP are waiting to hear Exxon's latest position to the compromise language they have offered.

HCRI



Anchorage Economic Development Corporation
The Center of Opportunity

Date: January 28, 1997

To: Representative Ramona Barnes

Subject: Support for CS-1:
A Resolution Concerning a New Alaska Natural Gas Pipeline

The Anchorage Economic Development Corporation (AEDC) supports House Concurrent Resolution No.1 relating to a new Alaska liquefied natural gas project (CS-1). The AEDC is a private, non-profit corporation whose mission is to expand and diversify the Anchorage economy, provide a favorable business climate and improve the standard of living for Anchorage residents by creating permanent jobs. Over 160 businesses support the organization.

Alaska operates in a global economy from an economic base currently driven by extraction and export of natural resource commodities. Through the process of developing the oil resources in Prudhoe Bay over the last twenty years, natural gas co-located with oil has been discovered, and reinjected to existing fields. As a competitive market position, Alaska enjoys greater certainty of the availability and size of gas reserves. The competitive nature of the gas business requires a lengthy process of negotiation for contract sales in advance of development. Alaska has a long term presence anticipated in the natural gas market. However, the window of opportunity for entering the market and establishing a solid presence is narrowing as other fields progress toward market.

The proposed Resolution CS-1 addresses the need to begin the process of establishing the commitment of Alaska to enter the gas production arena and capture a share of the market. The AEDC supports this resolution for three reasons:

First, the resolution is a means of **providing a background of policy stability** against which negotiations can proceed in good faith. Removing governmental and regulatory uncertainty contributes significantly to Alaska's advantage in the market.

Second, the AEDC supports the creation of jobs and business opportunities that will follow development of a new gas pipeline. Following initial construction, operation of the gas development facilities will provide jobs directly proportional to the flow of gas to international markets. The AEDC is active in promoting the retention of qualified and skilled businesses and workers in gas exploration, development and production. This is a key, high value component of the economy of our state.

Third, it is important for any development of gas resources to provide for use of natural gas in Alaskan communities along the pipeline route. Alaskan businesses and development needs can be significantly enhanced by the availability of natural gas both as an energy source and as a potential process feedstock.

The State of Alaska's ownership of a portion of the natural gas resource should be brought to bear as leverage to achieve resolution of the prevailing impediments to market entry.

AEDC urges expeditious action to implement the provisions of Resolution CS-1.

Respectfully submitted,



Patricia M. DeMarco, Ph.D.
President





FYL
REP. HODGINS.

HCR 1

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Governor Tony Knowles
State of Alaska
P. O. Box 110001
Juneau, Alaska 99811-0001
Fax (907) 465-3532

27th December, 1996

Dear Governor Knowles,

I would like to express our appreciation for your visit to our offices in London on 16th December, 1996. I believe our discussions were mutually beneficial and extremely valuable. While we discussed many subjects, the purpose of this letter is to confirm with you our views on and plans for Alaska North Slope (ANS) gas commercialisation.

Firstly, we are committed to work with the State and the other major gas producers to progress an economically viable Prudhoe Bay field gas development. We currently believe that a liquefied natural gas (LNG) project with exports to the Far East is the most likely alternative. Richard Campbell will be directly responsible for these efforts which currently involve over 30 BP personnel (about 7 full-time equivalents) as well as additional contract personnel.

As we discussed the scale of investment in a new 800-mile gas pipeline is the critical project disadvantage to be overcome. We enjoy the advantages of very large proven reserves as well as existing infrastructure in the field, along the pipeline route, and at the Valdez marine terminal. The shipping distance from Alaska to the Far East is favourable when compared to the shipping distance from the Middle East. Far East LNG buyers prefer Alaskan gas if priced competitively due to their desire for supply diversification and their view that the US is a reliable and stable supplier. LNG buyers also place importance on the technical and financial strength of BP, ARCO, and Exxon. Although a major gas sale will reduce oil recoveries and it will be important to understand this, we do not view this to be a significant economic impediment given the likely timescale.

Governor Tony Knowles

27th December, 1995

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BP does not envision a market window opening and then closing, rather a window which remains open for projects which can compete for the next increment of demand. An Alaskan project must be competitive with numerous other potential LNG suppliers. We currently believe that demand for first deliveries of ANS gas is unlikely much before 2010.

Japan could be the anchor purchaser due to its large market size and proximity. While demand growth has been faster in Korea and Taiwan during recent years, potential deregulation of the monopoly buyers, Korea Gas Corporation and China Petroleum Corporation (Taiwan), creates uncertainty. Other potential LNG markets such as China, India, Thailand, etc. are more uncertain and less attractive to ANS Gas due to shipping distances. The challenge ANS Gas faces in the market place is the additional very large quantities in a timely fashion. This will take major commitments from a broad, need to place, set of buyers. With several local representative offices in Asia and the Far East, BP is in the market on a regular basis as we currently sell LNG from projects in Australia and Abu Dhabi. We intend to continue our regular contacts with the market by updating prospective LNG buyers on ANS Gas progress and plans as well as learn from the buyers what technical and commercial factors would make ANS Gas most attractive.

We also need to make advances in three important additional areas: costs, project structure, and fiscal terms. Costs (especially in the pipeline) are a prime focus. This work is being accomplished jointly with ARCO and Exxon in a number of teams charged with defining the project technically (including environmental, safety, and integrity aspects), identifying additional cost reductions, and reducing cost uncertainty.

Project structure work encompasses an understanding of the legal and regulatory aspects of the pipeline, commercial options for shipping, and the State's ability to invest in the project. We are also identifying other potential investors such as LNG buyers, pipeline and shipping suppliers, trading houses, permit holders, and pipeline companies who can add value and increase the project's chance of success.

We are very pleased by the State's efforts seriously to discuss appropriate State fiscal terms for this project. The State's own modelling efforts as well as findings by the State's consultant Pedro Van Meurs confirm that even with no State take, project economics under current assumptions are not acceptable for the risks involved. We plan to continue these discussions and consider the fiscal system that could help this project. We also intend to work with the State and discuss how Federal fiscal and regulatory changes may assist the project.

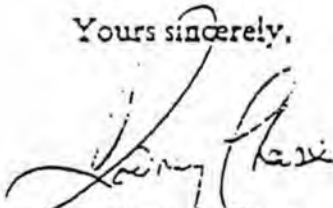
Governor Tony Knowles
27th December, 1996
Page 3 of 3

We need to focus on making advances in each of these areas over the next year or so. As we discussed with you, we would be concerned if a fast track of legislative progress on the fiscal terms were to create a political pressure for a level of commitment which may not be justified by overall project progress. This may suggest avoiding fiscal terms legislation during 1997.

Bearing in mind the concerns expressed above and the work each of us has already agreed to undertake, it may be better to proceed without the formality on an MOU for the present.

I look forward to future discussions with you on this important topic. Please do not hesitate to call me or Richard Campbell at any point.

Yours sincerely,



Rodney F. Chase

cc: Richard Campbell
David Woodward
Jim Palmer
Mark Bendersky
Commissioner Wilson Condon-DoR

TRANS ALASKA GAS SYSTEM ENVIRONMENTAL REVIEW COMMITTEE

750 W. Second Ave., Suite 104
Anchorage, AK 99501-2167
(907) 279-8247 Fax 274-4145

February 3, 1997

The Honorable Rick Halford, Chair
Senate Resources Committee
State Capitol
Juneau, AK 99801-1182

Dear Mr. Chairman and Members of the Resource Committee:

The Trans Alaska Gas System Environmental Review Committee would like to thank you for holding a hearing on HCR 1, relating to the sale of North Slope natural gas.

The Environmental Review Committee consists of individuals representing environmental organizations up and down the pipeline corridor. For the past 9 years, the TAGS Environmental Review Committee has been working with Yukon Pacific to identify and reduce impacts associated with their North Slope gas export project. Yukon Pacific has shown a commendable willingness to address our concerns. Furthermore, Yukon Pacific has indicated that they can build their project within existing state and federal regulations. Yukon Pacific has even committed to meeting the no-net-loss provisions of federal wetlands regulations. Only time will tell whether they will honor these commitments, but for the present we are satisfied with their words and deeds.

For these and other reasons, we urge this legislature to send a strong message to the North Slope leaseholders that there will be no further talk about duplicating permits. It is a little disingenuous for the leaseholders to rail about government duplication and then suggest that they should be able to redo eight years' of permitting. Those of you who want to see a project probably realize that even with Yukon Pacific's permit and marketing acumen, Alaska risks missing out on the 2005 market window. This talk is no more than a delaying tactic and indicates just how much the leaseholders still need to learn about the LNG business.

Yukon Pacific has testified that despite having obtained all the major project-wide permits, it still needs to obtain another 850 permits before it can proceed. For this reason, we urge the legislature to continue to fund the natural resource agencies at least at current levels. Further reductions virtually guarantee that the state will not have on staff sufficient expertise to adequately review these 850 permit applications and ensure that a gas export project is built the way it can and should be. The

HCR 1 - February 3, 1997
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separate studies by institutions as reputable as the Government Accounting Office (GAO) have documented massive safety problems on the oil pipeline. Alyeska has at times said as much. One report concluded that the pipeline was an accident that had found a place to happen. Despite all this, the state has refused to even acknowledge the problems. Ask yourself what would happen to the prospects of building a natural gas pipeline across Alaska if Alyeska has a catastrophic failure tomorrow? If you think the answer is, "No problem!" think again.

To put it simply, the properties of LNG are poorly understood. In fact, a year ago, Arco's Kevin Meyer compared its explosive hazards to that of atomic bombs. And Arco wants to co-site the LNG facility at the Alyeska pipeline terminal? Ask yourself what kind of media campaign people intent on killing a gas export project could build around those kinds of statements. According to the Anchorage Daily News, Alyeska wants to get an oar in the water so it can build and operate a gas export facility. We don't know about you but talk of commingling the oil terminal and the LNG liquefaction facilities make us extremely nervous.

The North Slope lease holders talk about fiscal certainty is beyond belief. These are the same companies that are going all out to develop competing projects in Indonesia, Sakhalin, in Yemen? Give us a break. The lease holders talk about how many times Alaska has changed its tax policies to their disadvantage. Give us a break. Only a few times have any legislature changed a tax policy without the leaseholders' blessings. And even then, these leaseholders have made scads of money from Alaska's oil.

For example, a recent master thesis from the University of Wisconsin concluded that the per barrel profit provision from the pipeline tariff leads to overcharges of \$4.9 billion during the life of the pipeline. Furthermore, over-deductions for Dismantlement, Removal, and Restoration (DR&R) give carriers \$9-\$13 billion too much. Finally, debt-trending overcharges amount to some \$6 billion. That is a total of \$20 billion in overcharges right there. And that is in addition to all the profits they've made on the North Slope and all the profits they've made shipping the oil out of Alaska and refining and distributing it Outside. And these are our partners?

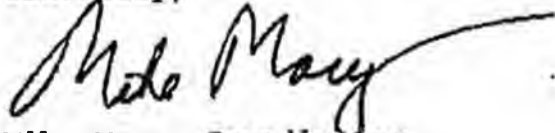
The producers talk about the need for a constitutional amendment to guarantee fiscal certainty. Fiscal certainty is a non-issue. If the Japanese are willing to do business in Qatar and Abu Dhabi and what is left of Russia, we seriously doubt that they are worried about fiscal certainty in Alaska. But they probably are wondering when the leaseholders are going to get around to offering gas for sale.

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- resource agencies.
- Support the enforcement of Alaska's environmental regulations.
- Use your influence to force Alyeska to correct the hundreds of problems still threatening the safety of the oil pipeline and its workers.
- Demand improvements to the escort tug system in Prince William Sound now.
- Tell the leaseholders that fiscal and regulatory certainty are non-issues.
- Be very careful about entertaining any discussions about fiscal concessions.

Thank you, Mr. Chairman and members of the Senate Resource Committee, for your attention. In regards to HCR 1, a resolution relating to North Slope gas sales, the Committee agrees that North Slope gas sales is one of, if not the, biggest issues confronting the legislature and the people of Alaska. And we urge you to pay it the attention it warrants.

Sincerely,

A handwritten signature in cursive script that reads "Mike Macy". The signature is written in dark ink and is positioned above the typed name.

Mike Macy, Coordinator

THE FOLLOWING DOCUMENT HAS NOT
BEEN FILMED BUT IS AVAILABLE IN THE
ORIGINAL FILE.

Yukon Pacific Corporation is a business unit of CSX Corporation, an international transportation services company based in Richmond, Virginia. CSX includes one of the largest U.S. freight railroad systems (CSX Transportation Inc.), the largest U.S.-flag ocean-container shipping company (Sea-Land Service Inc.), and a variety of companies offering intermodal, barging and logistics management services. CSX employs 50,000 people worldwide.

ALASKA'S NORTH SLOPE NATURAL GAS AND TAGS:

A major new supply source of clean Pacific Rim energy

Asia's Pacific Rim countries are experiencing dramatic industrial development as well as growing public demand for a healthier environment. Liquefied natural gas (LNG), imported by ocean tanker, is playing an increasingly important role as the one fuel which can satisfy both of these vital objectives. Completion of the Trans-Alaska Gas System (TAGS) will offer several unique benefits as a long-term and dependable supplier of this clean-burning energy resource.

DIVERSIFICATION OF SUPPLY

By committing to buy Alaska's huge reserves of North Slope natural gas, Asian market countries will significantly diversify their source of this important fuel and help guarantee energy security far into the future.

RESOURCE RELIABILITY

Because of its large production volumes, the TAGS project offers Asian nations assured energy reliability. At design capacity, TAGS will produce and deliver 14 million metric tons of LNG per year. Proven North Slope natural gas reserves are sufficient to supply TAGS for nearly 50 years - with the potential for more than twice that much still to be discovered nearby.

The North Slope's Prudhoe Bay field is currently producing 7.5 billion cubic feet (bcf) of natural gas per day in conjunction with oil recovery. When completed TAGS will utilize about 2 bcf per day. After separation from the crude oil, nearly all of the gas is now reinjected back into the reservoir utilizing an extensive network of dedicated gas-handling facilities.

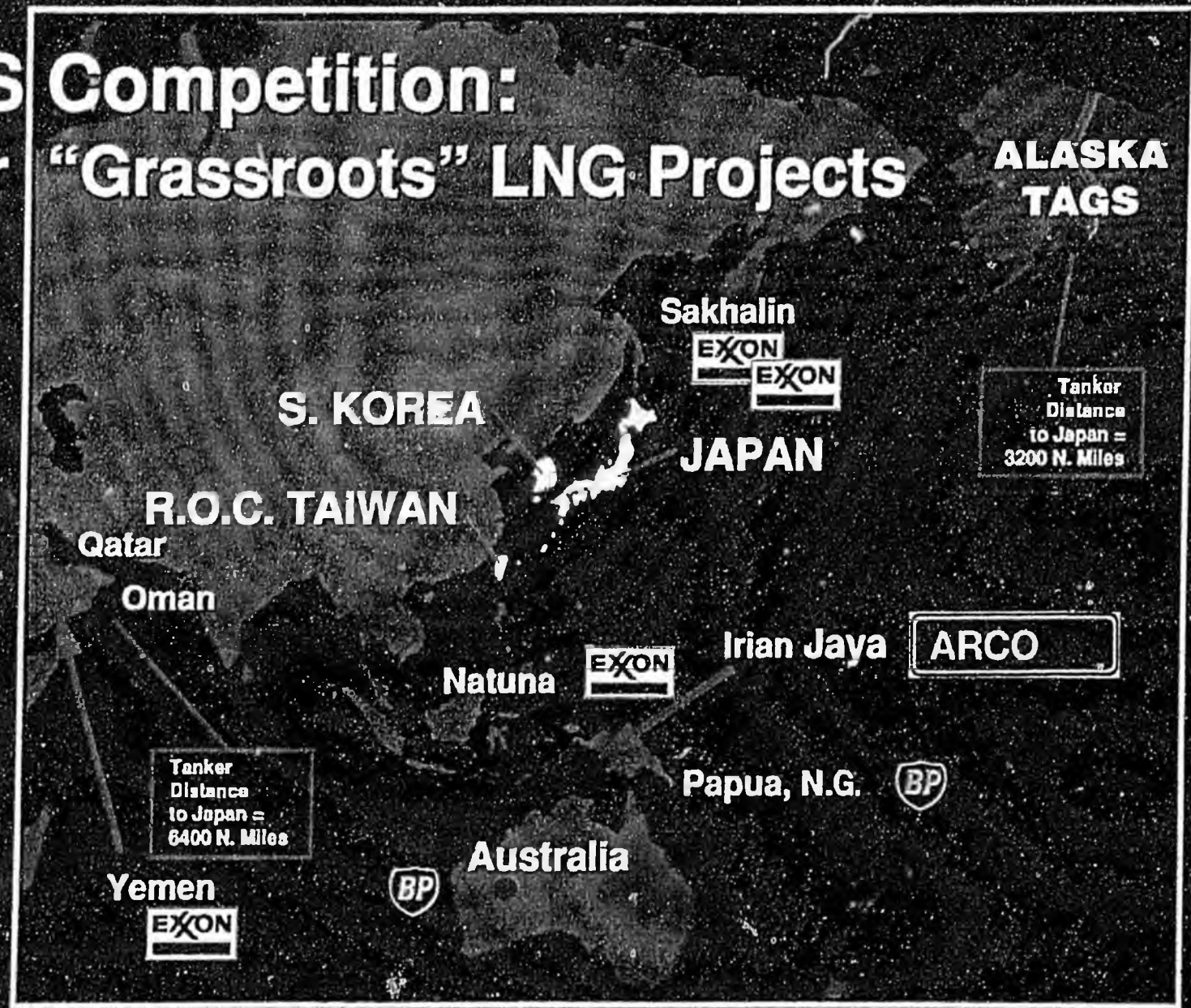
The TAGS project will be a direct beneficiary of this unique, fully-developed field infrastructure.

CONTINUITY OF SUPPLY

As a supplier country, the United States offers a predictable, stable, political and economic climate. Alaska is also an experienced supplier of LNG to Asia: Since 1969, LNG has been successfully, safely transported from Cook Inlet near Anchorage to buyers in Japan.

TAGS Competition: Other "Grassroots" LNG Projects

**ALASKA
TAGS**



Sakhalin



S. KOREA

JAPAN

Tanker
Distance
to Japan =
3200 N. Miles

R.O.C. TAIWAN

Qatar

Oman

Irian Jaya



Natuna



Tanker
Distance
to Japan =
6400 N. Miles

Papua, N.G.



Australia



Yemen



HJR

12

SENATE COMMITTEE REPORT

DATE: 2/10/97

FURTHER:

DATE TURNED IN TO OFFICE: 2/20/97

Resources Committee considered HOUSE JOINT RESOLUTION NO. 12 am

Urging the Secretary of the Interior to conduct competitive oil and gas lease sales within the National Petroleum Reserve in Alaska.

and recommends:

- be replaced with S CS FOR HJR 12 am (RES)
- adopt previous _____ CS _____ (_____)
- attached amendment(s)
- adopt Letter of Intent by _____ Committee
- further referral to the _____ Committee

- Senate Bill:**
- same title
 - new title
- House Bill:**
- same title
 - technical change
 - new: SCR# _____

SIGNING DO PASS	DP	OTHER RECOMMENDATIONS	NR	DNP	AM
<i>[Signature]</i>	✓				
<i>[Signature]</i>	✓				
<i>[Signature]</i>	✓				
<i>[Signature]</i>	✓				
<i>[Signature]</i>	✓				
CHAIR: <i>[Signature]</i>	✓	CHAIR:			

NEW FISCAL NOTE(S):

Department	Date	Zero	Fiscal

PREVIOUS FISCAL NOTE(S):*

Department	Date	Zero	Fiscal
LAA	1/17	X	

APPROPRIATION -- no fiscal note

*include fiscal notes accompanying Governor's bill

Alaska State Legislature

Representative Joe Green

Sponsor Statement

HJR 12

Supporting oil & gas lease sales in the National Petroleum Reserve Alaska

HJR 12 is a statement by the 20th Alaska Legislature urging the Secretary of the U.S. Department of the Interior to re-institute an oil and gas leasing program in the National Petroleum Reserve Alaska (NPRA).

Leasing in the NPRA is in the state's best interest for three reasons: 1) The economic activity associated with oil and gas leasing, exploration, and production benefits Alaskans; 2) oil produced in the NPRA would be transported through the Trans-Alaska Pipeline, helping to keep the pipeline open, and potentially enhancing the commercial viability of existing and future oil development projects on the North Slope; 3) the State of Alaska will receive 50% of the revenues from oil and gas production in the NPRA.

There were four oil and gas lease sales in the NPRA during the early 1980's. In January 1982 Sale # 821 offered 59 tracts. 52 bids were submitted on 29 tracts for a total of \$86,575,537. In May of 1982 Sale # 822 offered 212 tracts. 14 bids were submitted on 12 tracts for a total of \$11,747,131. In July of 1983 Sale # 831 offered 84 tracts. 23 bids were submitted on 18 tracts for a total of \$20,309,208. In July of 1984 Sale # 841 offered 64 tracts but no bids were submitted. Sale # 841 scheduled for August 1985 was canceled due to lack of interest.

With advances in technology new interpretations are being developed from the data collected during the past several decades by both the private sector and the federal government. These new evaluations are generating renewed interest, and oil companies with considerable experience in Alaska have indicated that they would like to utilize new interpretations of it to resume exploration.

I believe the federal government should resume lease sales and allow - no, encourage - the industry to explore for oil and gas in the NPRA. I also believe it is important that the Alaska Legislature send a unified message to the Department of the Interior that we support a lease sale being scheduled. I would appreciate your support of this measure.

TO: Senator Halford
FROM: Brett Huber
DATE: 19 February 1997
SUBJECT: Resource Committee Action on HJR 12
=====

Amendment #1 was offered by Senator Lincoln:

Insert on Page 2, Line 30

Whereas exploration and development will be conducted in a manner consistent with the state's ongoing commitment to protecting the environment and utilizing its work force to the maximum extent possible: and

Amendment #1 was adopted without objection

No further amendments were offered, and the SCS for HJR12am(RES) was passed out of committee with accompanying zero fiscal note.

FISCAL NOTE

STATE OF ALASKA
1997 LEGISLATIVE SESSION

NO. _____
BILL VERSION: HJR 12
PUBLISH DATE: _____

Revision Date: _____
Title: Urging the Secretary of the Interior to
conduct competitive oil and gas lease sales....
Sponsor: Representative Green
Requestor: Representative Green

Department Affected: Legislative Affairs Agency
BRU: All
Component: All

COMPONENT SERIAL NO:

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
PERSONAL SERVICES	0	0	0	0	0	0
TRAVEL	0	0	0	0	0	0
CONTRACTUAL	0	0	0	0	0	0
SUPPLIES	0	0	0	0	0	0
EQUIPMENT	0	0	0	0	0	0
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE FUND SOURCE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS						
OTHER FUND SOURCE						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

Estimate of current year impact: _____

ANALYSIS: (Attach a separate page if necessary)

Zero fiscal impact.

Prepared By: Karla Schofield, Deputy Director *Karla Schofield* Phone: 465-3852
Division: Administrative Services Date: 1/17/97
Approved By: Pamela A. Varni, Executive Director *Pamela A. Varni*
Agency: Legislative Affairs Agency Date: 1/17/97

Distribution (by preparer): Leg. Finance, Legislative Sponsor, Requestor, OMB, Gov. , & Impacted Agency(ies).

ARCO Alaska, Inc.
Post Office Box 100360
Anchorage, Alaska 99510-0360
Telephone 907 276 1215



January 23, 1997

Representative Joe Green
Alaska State Legislature
House of Representatives
State Capital
Juneau, AK 99801-1182

Re: House Joint Resolution No. 12

Dear Representative Green:

We at ARCO Alaska support resumption of leasing in the Natural Petroleum Reserve Alaska.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dave A. Sutter". The signature is fluid and extends to the right with a long, sweeping tail.

Dave A. Sutter
Land Manager
Exploration & Land

E-2 Sunday, January 19, 1997

Anchorage Daily News

NPR-A

Oil reserve merits another look

Alaskans are notorious for never being able to agree on anything, but there's at least one place in the state where oil rigs can go to work without stirring up controversy: The National Petroleum Reserve — Alaska.

Though prior drilling never found more than piddling amounts of oil in this part of the North Slope, that was back in the Stone Age of drilling technology. Now that Arco Alaska Inc. has found oil just across from the reserve's eastern boundary, it would be foolish not to take another look at what may be there. Arco's discovery may extend into the reserve, in which case the American public should be sure to get its fair share of the action.

This is one of those happy cases where government can open a hot oil prospect without invading hallowed environmental ground. Bill Clinton and Interior Secretary Bruce Babbitt are as green as they come, but they had no trouble agreeing to take a fresh look at the possibility of leasing the reserve's most promising areas.

That's not to say that it will be open season for oil anywhere. The reserve itself is huge, roughly the size of Indiana. There will be some environmentally sensitive areas that will be best left undisturbed by oil activity. Fortunately, the areas of greatest concern seem to be well away from the hot spot near Arco's discovery. The study process announced by Secretary Babbitt should identify potential conflicts, but at first glance, no serious problems lie ahead.

Seeing this new opportunity unfold under Democrats Knowles and Clinton seems to have stirred Republican U.S. Sen. Frank Murkowski into a fit of one-upmanship. He immediately went on record with a complaint that the whole reserve should be opened to leasing.

The senator's idea is politically unwise and economically dubious. It would stir up more environmental opposition, as groups geared up to protect sensitive areas elsewhere in the reserve. And the feds would drive down the value of the public's resources by flooding the market with leases before we know whether there really are commercial oil deposits inside the reserve.

For now, the feds should concentrate on getting the uncontroversial eastern portion of the reserve on the market as quickly as possible. Once that work is done, they can take more time to plan a responsible balance between exploration and protection for the rest of the reserve.

THE ALASKA JOURNAL OF COMMERCE

FOCUS

Alpine discovery brings renewed interest in reserve

By Tim Bradner
Alaska Journal of Commerce

ARCO Alaska Inc.'s Alpine oil discovery on the Colville River Delta west of Prudhoe Bay has brought renewed interest in the National Petroleum Reserve — Alaska, the huge 23.4 million acre federal land reserve on the western Arctic Slope that covers an area the size of Indiana.

Gov. Tony Knowles and the Alaska congressional delegation are pushing Interior Secretary Bruce Babbitt to reopen the area to private oil and gas leasing, but Babbitt has made no commitments.

The Arctic Slope Regional Corp. also has been working to get additional mineral rights in NPR-A through exchanges of other ASRC-owned lands with the government.

The Barrow-based Native regional corporation already owns some mineral rights within the reserve, underneath surface lands selected by the village of Nuiqsut. But an expansion of ASRC holdings would likely speed exploration.

The reserve has seen three rounds of oil and gas exploration, two by the federal government itself and a third by private industry.



SOURCE: The Arctic Coastal Zone Management Newsletter

AJOC/NOLAN

Oil and gas was found, but not in amounts that would justify development in the remote area. For many years, the industry considered NPR-A to be too remote, with little potential.

Alpine has changed that perception, for at least the northeastern part of the reserve near the Colville River.

"The good news is that NPR-A is back on peoples' radar screen because of the Alpine discovery," said Mike Richter, ARCO's exploration vice president.

A lot of the NPR-A acreage considered marginal in the earlier rounds of exploration may now be worth a second look because of advances in technology and the industry's new, lower-cost methods of exploring and developing North Slope oil, Richter said.

The Colville Delta, where ARCO discovered oil at Alpine and Texaco made a nearby, earlier discovery that was uneconomic, is at the eastern border of NPR-A. ARCO's Richter declined to comment, but most geologists feel

it's likely that oil-bearing geologic strata extends to the west into NPR-A.

The construction of a pipeline into the region from the east also will make it possible to develop small oil and gas discoveries in nearby NPR-A lands that were considered previously uneconomic.

The oil potential of the reserve long has been known, and it was actually this that first

Continued on Page 11

National Petroleum Reserve may now be worth new

Continued from Page 9

attracted private industry to the North Slope, although the first commercial discoveries were made to the east near Prudhoe Bay.

Inupiat Eskimo people of the North Slope were the first to tap the oil potential of what is now the National Petroleum Reserve — Alaska.

There are oil seeps throughout the region, and Native hunters would cut oil-saturated tundra into blocks for home heating and cooking, using the pitch-laden bricks in much the same way that urban homeowners use artificial particle logs.

Local tradition has it that Charles Brower, a well-known early resident of Barrow, was the first person to lead U.S. government geologists to oil seeps in the early part of the century.

In the following years, federal geologists made surveys of river drainages in

what is now NPR-A. In 1923, President Warren Harding signed legislation creating Naval Petroleum Reserve No. 4, covering 23.4 million acres, as a source of oil for the U.S. Navy.

World War II stimulated more interest in the region, and from 1943 to 1953 the Navy sponsored an exploration program that was to result in two small oil and two small gas discoveries, none of them commercial in the modern sense.

The U.S. Geological Survey handled geological and geophysical aspects of the program, contracting with United Geophysical Co. for seismic services.

Over nine years, 37 exploratory wells and 45 core holes were drilled in NPR-4, with an aggregate footage of 175,000 feet. About \$45 million was spent on the program before it was halted by the Eisenhower administration.

One oil discovery was at Umiat, on the Colville River in the southeastern part of NPR-A, where a shallow deposit with about 300

million barrels of reserves was discovered. The find was noncommercial due to its remoteness, but the oil was of sufficient high quality that it could be run without refining through diesel engines at the site.

An airfield was built at Umiat and it became a logistics support base for exploration in that part of the reserve. Umiat still is used today as a base for geological and scientific research.

A significant gas field also was discovered near Barrow, in the northern part of the reserve. The Walakpa Gas Field was developed to

serve government installations in Barrow and later the local Inupiat community of Barrow.

Because reserves in the Walakpa field were limited, the North Slope Borough, the regional municipal government, later invested in further exploration and was successful in finding additional reserves.

Nothing much happened in NPR-4

for the next 20 years, but in 1975, following the discovery of the large Prudhoe Bay field east of NPR-4, the OPEC oil embargo, the first "oil crisis" and the runup in oil prices, the federal government decided to take another look at the area.

Under the Naval Oil Reserve Production Act of 1976, the area was transferred from the Navy to the Department of the Interior and given a new name, the National Petroleum Reserve — Alaska.

Local communities in the region, particularly the North Slope Borough and the City of Barrow, were to play a major part in passage of this legislation. The city needed land for expansion, but was blocked by restrictions on access to lands managed by the Navy.

Under the Department of the Interior, more conventional federal land regulations were applied to NPR-A, and Barrow was allowed access to adjacent land for new subdivisions.

The responsibility for exploring and develop-

ing NPR-A was given to the U.S. Geological Survey, which contracted for drilling and exploration services with Husky Oil, a Canadian firm.

Under the USGS, Husky drilled 28 exploration wells and gathered 14,770 miles of seismic data before the program of government-sponsored exploration was halted by the Reagan administration in 1981.

NPR-A exploration continued under President Reagan, but it was led by private industry in a more conventional fashion. Reagan's Secretary of the Interior James Watt held four lease sales between 1982 and 1985.

Industry interest in the area was lukewarm. At the time, the companies were more focused on offshore prospects in the Beaufort Sea. Two sales were held in 1982, netting the government \$66.8 million in

Commerce • January 6, 1997 • 11

oil exploration

high bids.

In the third sale, in July 1983, bids were made on only 18 of 84 tracts offered, with \$16.7 million in high bids collected by the government. A fifth sale, planned for 1985,

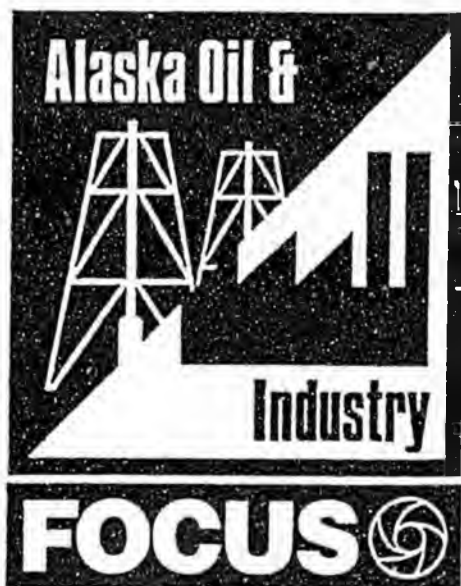
was canceled due to lack of industry interest.

Of all the companies working on the North Slope, ARCO has had the most sustained in-

terest in the area. ARCO was the big player in the 1983 sale, paying out \$9.4 million in high bids including a \$2.9 million bid for a tract south of Barrow.

ARCO also drilled the only exploration well drilled by private industry on NPR-A under the Reagan-era leasing program. ARCO's Brontosaurus No. 1 well south of Barrow encountered oil shows in the Sadlerochit formation, but was not economic.

Of all the companies working on the North Slope, ARCO has had the most sustained interest in





Jody Kennedy

Alaska Environmental Lobby, Inc.

P.O. Box 22151 Juneau, Alaska 99802

Phone: 907-463-3366

Fax: 907-463-3312

HJR 12

"A Resolution, Urging the Secretary of the Interior to conduct competitive oil and gas lease sales within the National Petroleum Reserve in Alaska."

We oppose House Joint Resolution 12 because oil and gas exploration in the NPRA is not essential for national security at this time, and will cause unnecessary harm to an ecologically significant area.

Spanning across more than 23 million acres from the crest of the Brooks Range north to the Beaufort and Chukchi Seas, the NPRA is the largest continuous span of undeveloped public land in the United States. The National Reserve is essential to the survival of the 450, 000 western Arctic caribou herd, (our nation's largest herd) as well as numerous species of waterfowl, possibly, the world's largest congregation of wolverines, and the largest populations of spotted seals and beluga whales (35 hundred mammals) along the Chukchi Sea coast. Also within its borders lies the world's largest breeding grounds for several species of birds and five million waterbirds, including the threatened spectacled eider.

Without a pressing need for oil and gas development, we feel it is in the nation's interest to leave the land preserved. HJR 12 specifically references national security as a reason for drilling while currently, Congressional policy allows for the export of Alaskan oil. Under this act, development today could prove harmful in the event of a future energy crisis. Additionally, since United States' energy needs are not great enough to provoke a national energy policy that stresses energy conservation, it is inappropriate and misguided to consider an oil development project of this scale. This act would be an unnecessary give away of Alaska's federal lands to industry.

In conclusion we suggest using the same technologies making NPRA a valuable prospect to utilize existing state-owned fields. When you consider existing oil prices along with the natural values of the NPRA in its current state, this is clearly not the time to drill for oil and gas in the Preserve.

ALASKA CENTER FOR THE ENVIRONMENT • ALASKA CHAPTER, SIERRA CLUB • ALASKA FRIENDS OF THE EARTH
ANCHORAGE AUDUBON SOCIETY • ARCTIC AUDUBON SOCIETY • CLEAN AIR COALITION • DENALI CITIZENS' COUNCIL
DENALI GROUP, SIERRA CLUB • JUNEAU AUDUBON SOCIETY • JUNEAU GROUP, SIERRA CLUB
KACHEMAK BAY CONSERVATION SOCIETY • KENAI PENINSULA AUDUBON SOCIETY • KNIK CANOERS AND KAYAKERS
KNIK GROUP, SIERRA CLUB • KODIAK AUDUBON SOCIETY • LYNN CANAL CONSERVATION • NORTHERN ALASKA ENVIRONMENTAL CENTER
PRINCE WILLIAM SOUND CONSERVATION ALLIANCE • SITKA CONSERVATION SOCIETY • SOUTHEAST ALASKA CONSERVATION COUNCIL • TONGASS CONSERVATION SOCIETY



What and where is the NPRA—and how was it established?

FROM: USGS PROFESSIONAL
PAPER 1240-C

NPRA established

In 1923, President Warren G. Harding set aside, by Executive Order, a Naval Petroleum Reserve, later designated No. 4, in Arctic Alaska. His Executive Order reads, in part:

"Whereas there are large seepages of petroleum along the Arctic Coast of Alaska and conditions favorable to the occurrence of valuable petroleum fields on the Arctic Coast and,

WHEREAS the present laws designed to promote development seem imperfectly applicable in the region because of its distance, difficulties, and large expense of development and,

WHEREAS the future supply of oil for the Navy is at all times a matter of national concern,

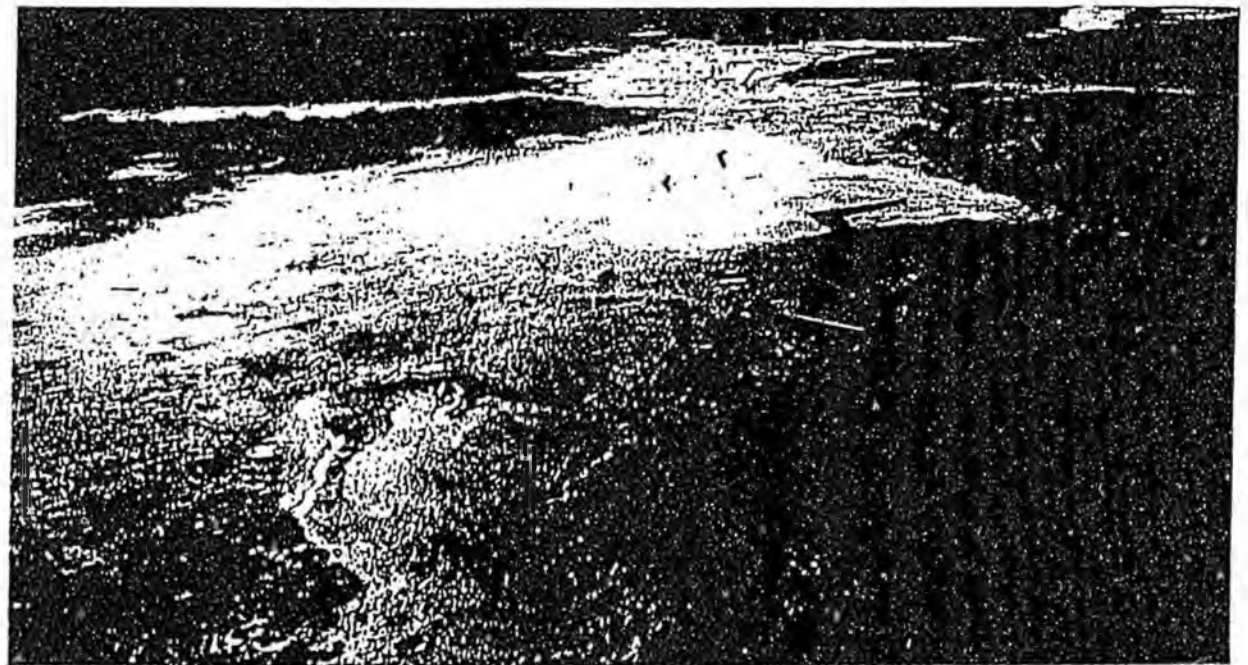
Now, THEREFORE, I, WARREN G. HARDING, President of the United States of America, by virtue of the power in me vested by the laws of the United States, do hereby set apart as a Naval Petroleum Reserve all of the public lands within the following described area not now covered by valid entry, lease or application: * * *

WARREN G. HARDING

The White House,
Feb. 27, 1923.

No. 3797-A.

The first description of oil seepages at Cape Simpson by A. H. Brooks was published in 1909 in USGS Bulletin 379. Eskimos had known of these seepages, as well as of oil shales that burned like wood; they had used both for fuel long before recorded history. Although these leads were in a remote and isolated region of the then Territory of Alaska, oil prospectors were already following up on them. Crude oil had been discovered and produced in the conterminous United States, but experts, including some prominent geologists, were predicting that resources were limited and soon could be in short supply. Oil was rapidly replacing other sources of energy (coal and whale oil), and oil for ships was considered critical to the Nation's welfare and defense. Thus, the establishment of a Naval Petroleum Reserve in Arctic Alaska was fitting.



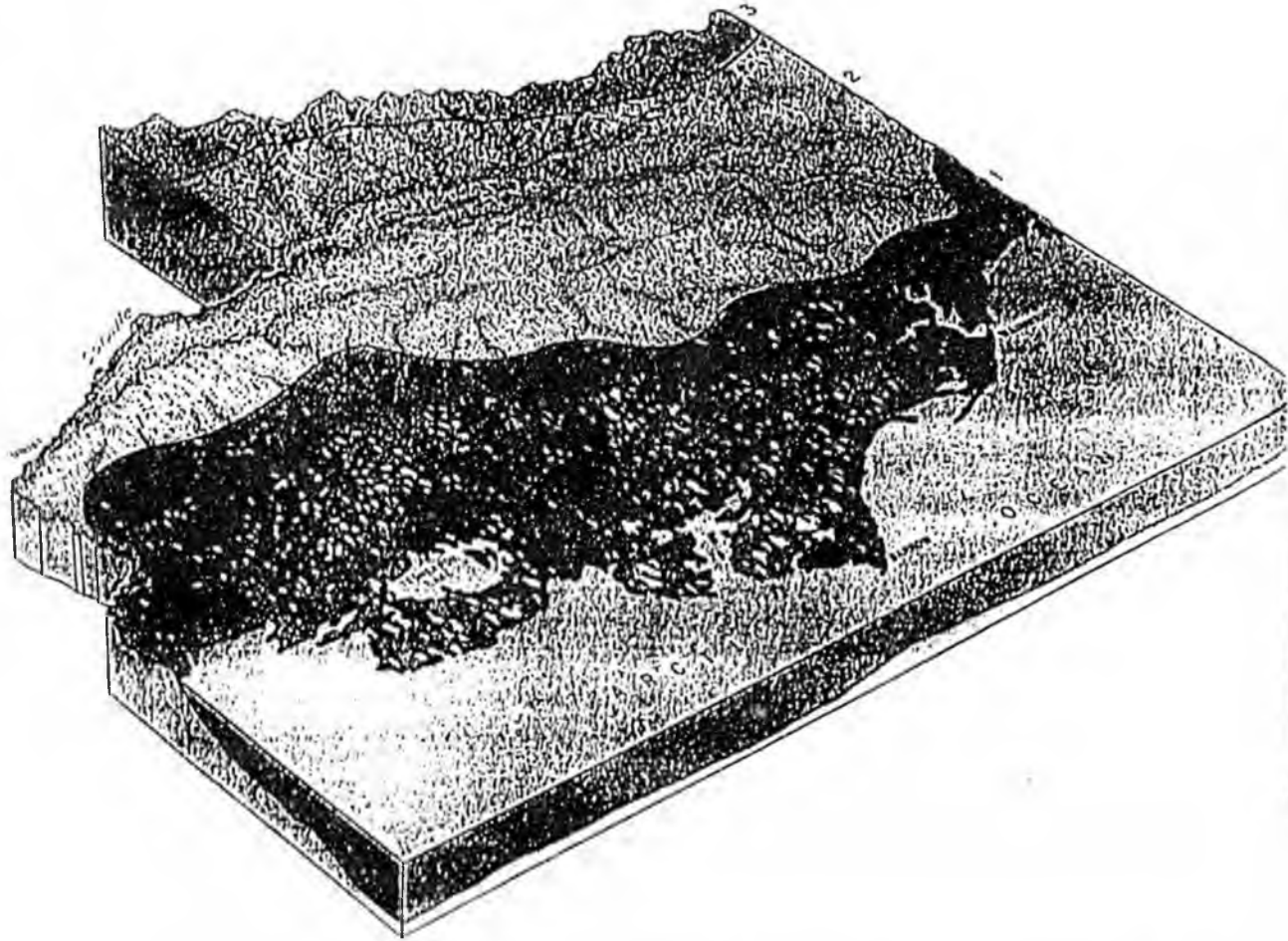
Oil seeps, such as this one near Simpson, provided clear evidence to early explorers that petroleum-rich rocks were present beneath the Arctic tundra. Photograph by George Gryc.

Geographic setting

The entire NPRA is north of the Arctic Circle. It occupies an area about the size of the State of Indiana—some 37,000 square miles. Its north boundary is the Arctic Ocean, and about half of its south boundary follows the watershed divide of the western Brooks Range, thence northward to the Colville River, and along that river to the Arctic coast.

Northern Alaska and the NPRA are divided into three major physiographic provinces: the Arctic Coastal Plain, the foothills, and the east-west-trending Brooks Range that cuts off this Arctic region from the rest of Alaska. The Brooks Range forms a major watershed, the north slope of which drains into the Arctic Ocean—thus the terms "Arctic Slope" and "North Slope" of Alaska. The mountains form an arc, concave northward, of complexly folded and faulted rocks. Peaks range in elevation from 3,000–4,000 feet in the west to more than 9,000 feet in the east. The foothills immediately to the north consist of low synclinal mountains separated by broad anticlinal lowlands that give way to long, continuous, east-west-trending ridges covered by a green tundra mat. These ridges gradually blend into the vast, nearly treeless coastal plain dotted with literally thousands of shallow north-west-oriented lakes.

Typical scenes in the three physiographic provinces of northern Alaska.



From north to south, the NPRA consists of (1) the Arctic Coastal Plain, a broad, flat expanse dotted with lakes; (2) the foothills, an area of rolling hills; and (3) the Brooks Range, a rugged mountain range with elevations as high as 5,020 feet within the NPRA and peaks of 8,000 to 9,000 feet near the United States-Canadian border.

When, by whom, and how was the NPRA explored?

Early exploration

Between 1800 and 1900, several hardy explorers sailed along the Arctic coast and described and named the major geographic features. Much of the sealane traffic, however, was by enterprising traders and whalers. It is interesting to note that the oil business, in one form or another, has had the greatest impact on the North Slope and its inhabitants.

The first big push to the Arctic was in search of whale oil, which, in the years before the Civil War, was the principal fuel for lamps and a common lubricant. The premium grade of fuel came from sperm whales, and the regular grade from bowhead and other species of whales. The rising industrialization of the United States and the heightened emphasis on education (requiring better light for evening study) created a rapid increase in demand. In 1823, sperm oil sold for 45 cents a gallon, but by 1866 the price rose to \$2.55 a gallon—the first “oil shortage.” The relief for this shortage came through the discovery and development of a more abundant and cheaper source of fuel, petroleum. Ironically, the next several waves of exploration and development in Arctic Alaska focused on a search for “rock oil.”

In winter 1885–86, Lt. George M. Stoney participated in expeditions sponsored by the U.S. Naval Institute that explored the Brooks Range from the south. Ens. W. L. Howard of the U.S. Navy crossed the Brooks Range in 1886, and continued overland across the Colville River valley and thence down the Chipp River by skin boat to Point Barrow. He described what were undoubtedly lumps and pebbles of oil shale along the Etivluk River. His report, published in 1900, may have been the first recorded suggestion of the oil potential of northern Alaska. However, this material and seepage tars had been known and used by the Eskimos before recorded history.

Frank C. Schrader, 1910. The first systematic survey of the North Slope was made in 1901 with Schrader as geologist and W. J. Peters, an experienced topographer and explorer, in charge. The geography and geology of an entirely new section of northern Alaska were studied by Peters and Schrader, much of it in the NPRA area.

Geologic and topographic surveys, 1923–26

The first systematic topographic and geologic survey across the Brooks Range and the North Slope was by F. C. Schrader and W. J. Peters of the USGS in 1901; the results were published in 1904 in Professional Paper 20. Schrader described thick marine sequences and noted broad anticlinal structures—both of prime importance in the search for oil. Thus, by 1923, when the lands were set apart, three of the prerequisites for the occurrence of petroleum were already known to be present: source rocks, such as organic marine deposits, including oil shale; potential reservoir rocks, including limestone and sandstone; and favorable structures, such as anticlines. In addition, oil



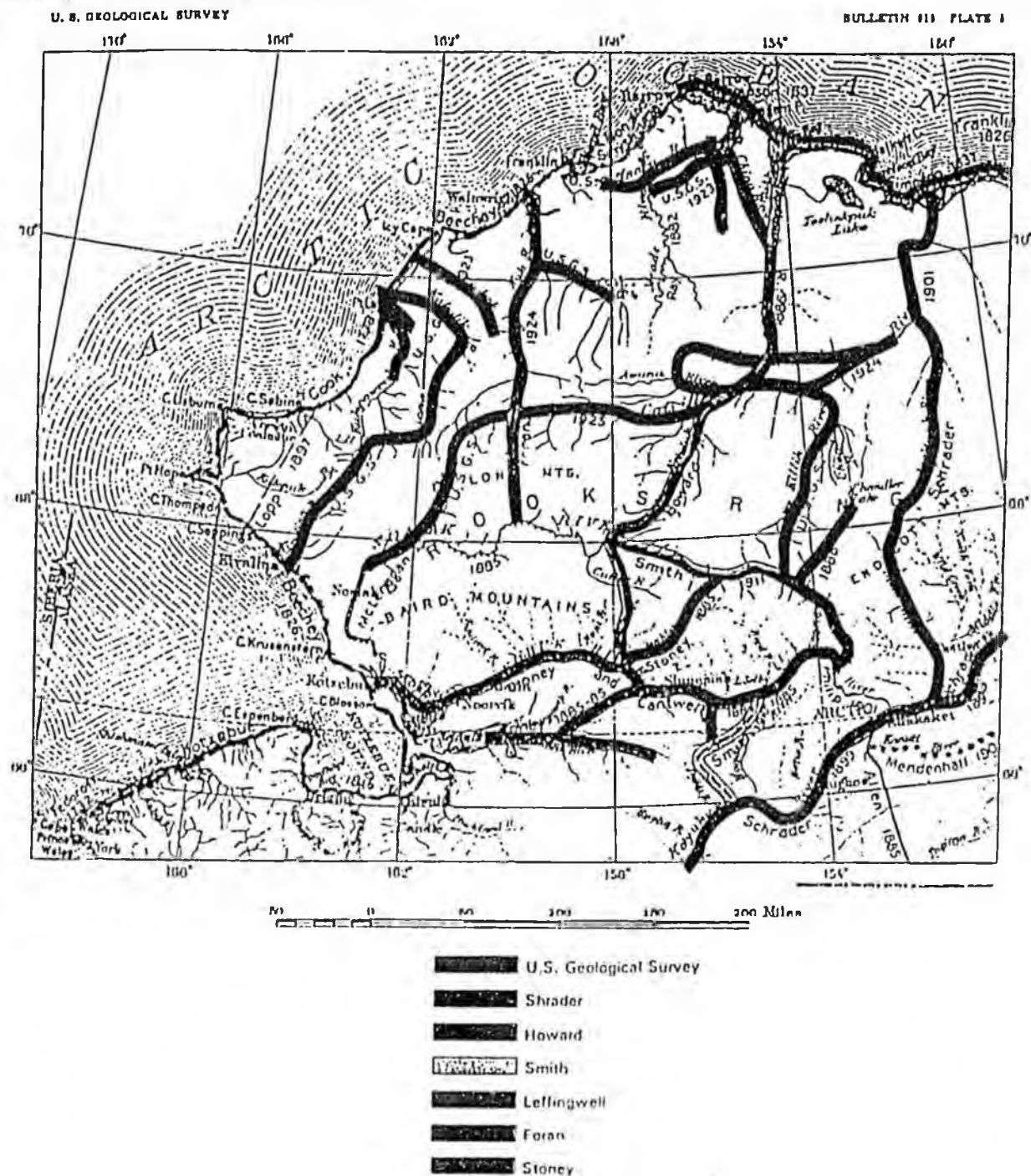
seepages were found along the Arctic coast. The region had already attracted the attention of the new oil industry, and several applications for prospecting permits were filed under the old mining laws on claims near Cape Simpson, Peard Bay, and along the Meade, Kukpowruk, and Kokolik Rivers.

About 150 miles east of NPR-4, E. de K. Leffingwell completed his classic work in the Canning River region. From 1906 to 1914, Leffingwell mapped the Arctic coast from Barrow to the United States-Canadian border. He named and described the now-famous Sadlerochit Group, which includes the primary oil reservoir of the Prudhoe Bay field. His report, published in 1919 as USGS Professional Paper 109, is now a collector's item. The region mapped by Leffingwell from the Canning River to the border was set aside in 1960 as the Arctic National Wildlife Refuge (ANWR).



Ernest de K. Leffingwell. Between 1906 and 1914 Leffingwell mapped in the Canning River region from Barrow to the United States-Canadian border. His expedition was privately funded, half by his father. Toward the close of his fieldwork, the USGS provided him with office space to write and compile his maps, and eventually published his work in 1919. Photograph by George Gray.

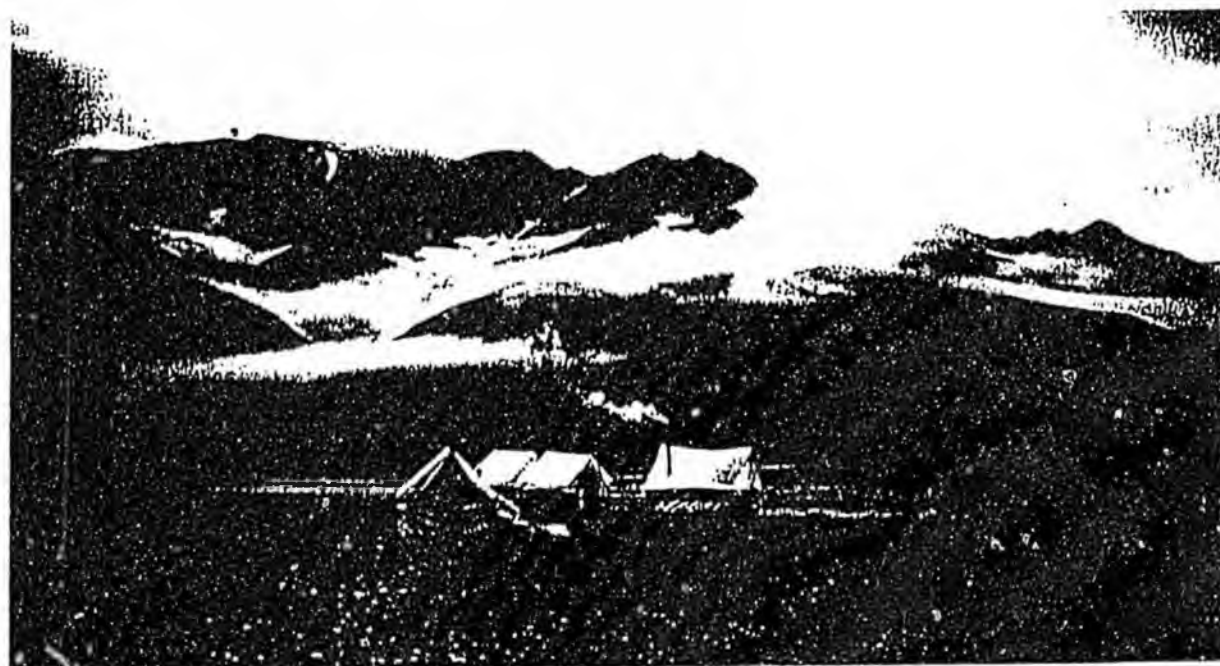
Sketch map showing the progress of mapping, seismic surveying, and drilling from 1944 to 1953 (modified from Reed, 1958).



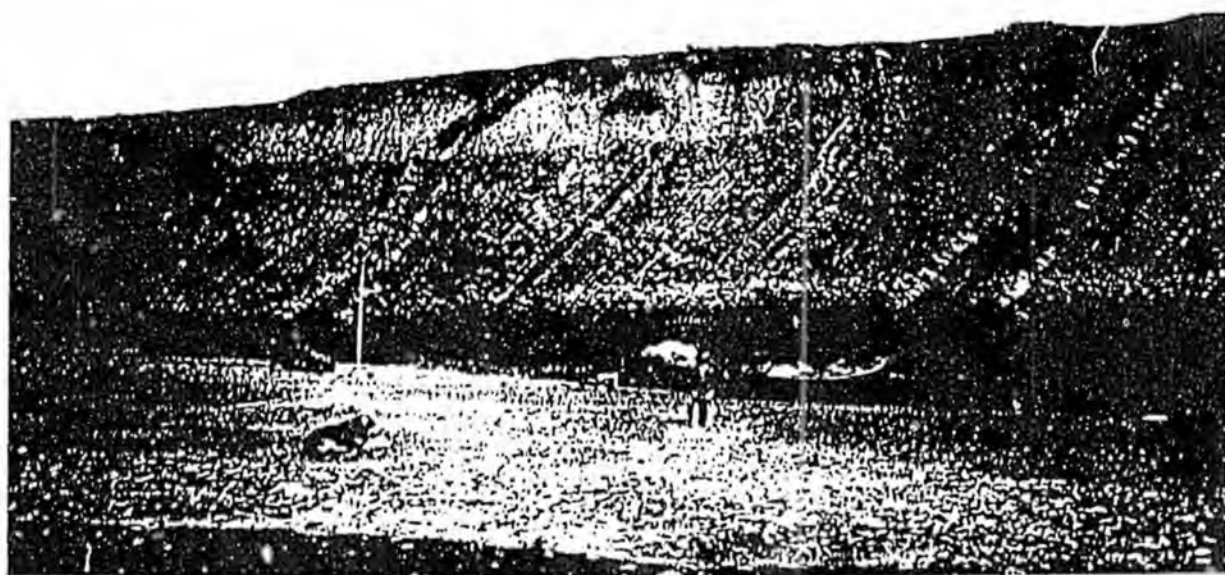
The International Boundary Commission completed locating and marking the border between the United States and Canada in 1912, and additional geologic information was collected along it by USGS geologists attached to the mapping party.

Thus, the geology and geography of the east edge of this potential petroleum province were known and mapped in a general way before the establishment of the Reserve. However, there remained a virtually unknown gap, 130 miles wide, between the Canning and Colville Rivers. That area included the Prudhoe Bay oil and gas fields.

NPR-4 was defined, and its boundaries described, on the basis of explorations carried out before 1923. In delineating the Reserve, account was taken of the observations of oil seepages at Cape Simpson, the early explorations by the U.S. Navy (particularly Howard's traverses in the western area), and the traverse by Schrader and Peters along the Colville River—the east boundary of the Reserve. Although some detailed surveys had been made by Leffingwell and the United States-Canadian-boundary survey teams, their information was not considered to warrant a change in delineation of the boundary. Furthermore, the northwest coast of Arctic Alaska was more accessible by sea than the northeast coast.



USGS surveying camp on the banks of the Canning River where Leffingwell worked. Photograph by George Gray.



Smith and Mertie party resting with dog teams along the Colville River, 1924. The first expedition started from Tanana on February 17, but it was not until April 2 that all supplies, including four specially built canoes, were safe in the first camp on the Arctic drainage, and it was May 30 before the streams were open enough to

In 1923, little was known of the interior of the new Reserve. The U.S. Navy recognized that more geologic and geographic information would be required for proper management, and so the USGS was asked to survey the region. From 1923 through 1926, USGS parties traversed the Reserve along the major rivers and crossed the Brooks Range through Howard Pass and at the head of the Colville River. In 1930, the results of these field studies and surveys by P. S. Smith, J. B. Mertie, Jr., and others were published in USGS Bulletin 815. This classic report includes the first topographic and geologic maps of the Reserve, as well as descriptions of the rock sequences and structures, and an analysis of the mineral potential of the region, including petroleum and coal. Although the authors could not identify the precise age or distribution of the oil shales, they concluded that these rocks were the most likely source of crude oil. They felt that sources in Paleozoic rocks were "extremely problematic" and that, because the Cretaceous rocks were of shallow marine and terrestrial origin, oil deposits derived from them were "likely to be small and of extremely sparse distribution." Smith and Mertie noted the numerous anticlinal structures in the Cretaceous sequences, as well as the faulted and overthrust structures in the Paleozoic rocks of the Brooks Range, and concluded that the regional dip of the older rocks was monoclinial to the north. Thus, pre-Cretaceous rocks at Cape Simpson and along the Arctic coast would be below practical drilling depth. They recommended that the next steps in evaluating the petroleum possibilities should be drilling for stratigraphic and structural information in the vicinity of Cape Simpson, followed by geologic field studies, and then drilling in other areas that these studies might indicate to be favorable.



Philip S. Smith, about 1915. Smith was Chief Alaskan geologist from 1925 until he retired in 1946. At the request of the Department of the Navy, the USGS was included in the first explorations of the newly established NPR-1.



John Braver Mertie, 1915. Mertie began his long geologic career with the USGS in 1908 and finished his last publication, a professional paper, in 1979. Along with Philip S. Smith, Mertie led the expedition into NPR-1.

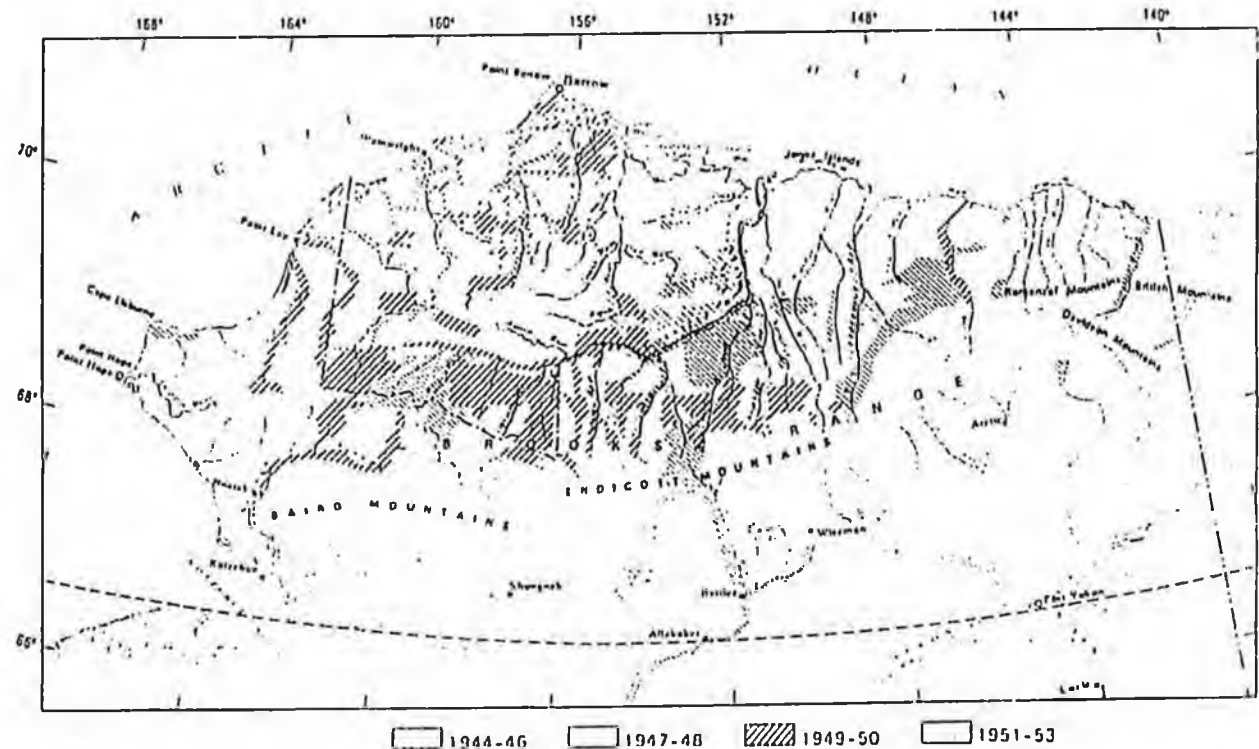
W. T. Foman field party in Svalok, about 1941. From left to right, E. W. Belgard, W. T. Foman, O. J. Wix, and H. C. Hughes. In 1941, W. T. Foman called attention to the petroleum potential of NPR-1 as World War II brought an increasing demand for petroleum. Sparked by his encouragement, the first modern systematic oil exploration program began in NPR-1 (1944 until 1953).



The Pet-4 exploration program, 1943-53

From 1926 to 1943, little interest was shown in the petroleum potential of NPR-4. There was then no shortage of petroleum either for the U.S. Navy or for industry, and the remote and frigid Arctic was not an attractive target for commercial exploration. However, World War II brought a new perspective and an increasing demand for petroleum products to fight a highly mechanized war. In 1943, Lt. W. T. Foran, a former USGS geologist and a Navai Reserve officer, prepared a memorandum to the U.S. Bureau of the Budget, calling attention to the petroleum potential of NPR-4. Consequently, in 1943 the Secretary of the Interior issued Public Land Order 82, which withdrew from further entry all the possible petroleum areas of Alaska, including lands north of the drainage divide of the Brooks Range. Later in 1943, the U.S. Bureau of Mines fielded a party to investigate and sample the known oil seepages and to check on reported seepages elsewhere in northern Alaska, including those on the Colville River at the base of Umiat Mountain. In early spring 1944, Lt. Foran made a quick reconnaissance of the Reserve, including the Umiat anticline, and reported that in his opinion a petroleum potential of major importance existed in NPR-4. On the basis of Foran's enthusiastic report and the perceived need for additional domestic oil supplies, a major exploration program, commonly called Pet-4, was started. This program had a tremendous impact on not only the future of petroleum exploration but also many aspects of life in the North American Arctic.

The Pet-4 program established the feasibility and practicality of carrying out large-scale modern oil-exploration operations in the Arctic, and developed many new techniques for such operations. During the period 1945 through 1952, 45 shallow core tests and 36 test wells were drilled in and adjacent to NPR-4. Public Land Order 82 and the addition of enabling appropriation language permitted exploration in adjacent areas. This drilling resulted in the discovery of oil deposits at



Progress of geologic investigations in northwestern Alaska (modified from Smith and Mearns, 1930).

Umiat, Cape Simpson, and Fish Creek, gas deposits at Umiat, Barrow, and Gubik, and prospective gas deposits at Meade, Square Lake, and Wolf Creek. Operating bases were established (and still exist) at Barrow and Umiat; the gas deposit at Barrow was developed, and gas was produced for use originally by the U.S. Navy base and other Government installations and, in 1964, by the entire Barrow community. The Pet-4 Barrow camp facility evolved into the Naval Arctic Research Laboratory, which was the hub of U.S. Arctic scientific investigations until it was decommissioned in 1981.

The USGS contribution to this program included surface geologic mapping of the Reserve and adjoining areas, study of subsurface samples and

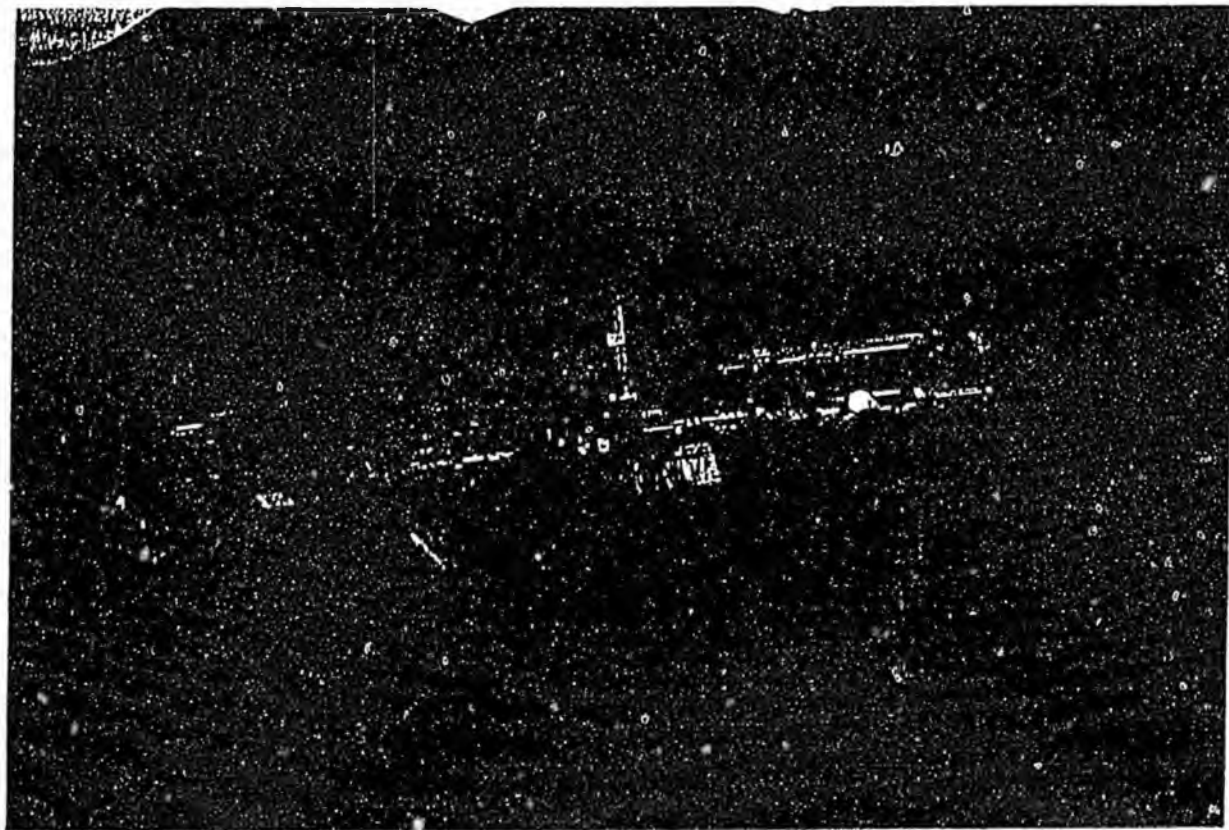
geophysical data, an airborne magnetic survey, interpretation of the geologic framework, assessment of potential resources, and production of the first complete set of planimetric maps of all of northern Alaska.

A series of reports on the Pet-4 program were prepared and published by the USGS as Professional Papers 301 through 305. They include a historical account, description of logistics and operations, well histories and descriptions, a geophysical report, and geologic maps and descriptions of the extensive surface mapping. Thus, a general geologic framework for all of northern Alaska became available for the first time.

Several test wells were drilled on the flank of the Barrow structure, and a new gas field was discovered at Walakpa, 14 miles southwest of Barrow. This deposit may be useful to the Barrow community but probably is of insufficient size to warrant development for export to the "South 48." Farther south on the downslope of the Prudhoe-Barrow trend, test wells were drilled to explore the wedge edge of potential reservoir rocks, and two deep test wells were drilled near the center of the northern Alaska depositional trough. Additional test wells were drilled on anticlinal structures in the foothills, an area that had been drilled extensively in the Pet-4 program, but only for shallow horizons. One test well was drilled in the overthrust belt near the front of the Brooks Range. Nearly all these test wells produced shows of oil or gas, but no commercial deposits were discovered.

The congressional mandate to continue supplying gas to the Barrow community required drilling additional production wells in that area. Six wells were drilled, and four were completed for production.

The third duty of the USGS was to complete cleanup of the debris from earlier work within or adjacent to the Reserve. In addition, all the sites or "areas of operations" of the current program, as defined in a memorandum of understanding (MOU) with the U.S. Bureau of Land Management (BLM), had to be rehabilitated and revegetated. A cleanup program was started by the U.S. Navy in 1971 and was completed by the USGS in 1984. These sites have recently been returned to management by the BLM.



The Lashburne No. 1 test well, located in the southern part of the NPRA, was spudded in June 1979 and completed in June 1980 at a total depth of 17,000 feet.

The 1974–82 exploration of NPR–4/NPRA

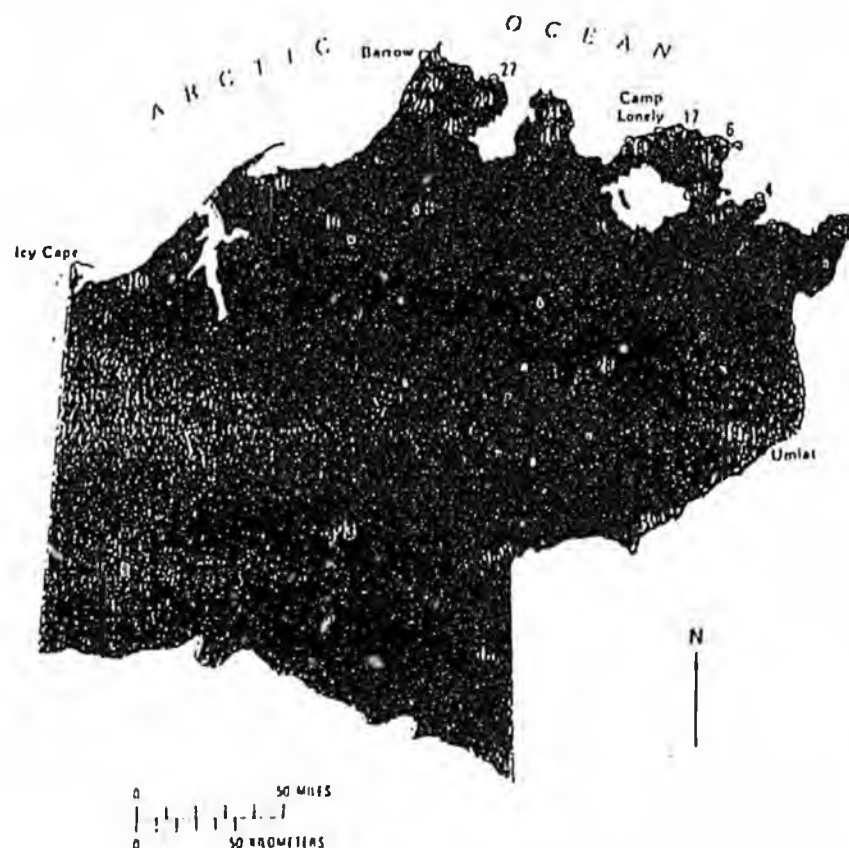
The discovery of oil and gas at Prudhoe Bay in 1968, in combination with the Arab oil embargo of 1974, stimulated the U.S. Navy to propose, and the Congress to approve, the next exploration program in the Reserve. Between 1974 and 1977, the Navy drilled seven test wells in the northeast corner of the Reserve, following the Prudhoe trend and hoping for similar results. The Navy also drilled four wells in the Barrow area and discovered the East Barrow gas field, thus providing an additional supply of gas for local use.

In 1975, the U.S. Navy signed a 5-year contract with Husky Oil NPR Operations, Inc., to manage and supervise all aspects of the exploration program.

In 1976, the Naval Petroleum Reserves Production Act (Public Law 94–258) authorized further development and actual production for sale of crude oil from NPR Nos. 1, 2, and 3 in California and Wyoming, and redesignated NPR–4 as the NPRA. Thus, the purpose of these Reserves was redirected to augment domestic supplies of crude oil. The act also required studies of other resources and alternative management systems for NPRA. Responsibility for these studies and for continuation of the NPRA exploration program was transferred to the Secretary of the Interior, who, in turn, assigned to the USGS three duties: (1) furthering of the exploration program; (2) continuation of the operation, maintenance, and production of the gas fields at Barrow; and (3) cleanup of debris left from previous activities in and adjacent to the NPRA.

The USGS took over management of the program, including all contracts and facilities, on June 1, 1977. The primary objective of the exploration program was defined as an assessment of the oil and gas potential of the entire Reserve. A secondary objective was the discovery of commercially producible deposits. Thus, all tests were drilled "on structure," to the extent that this could be determined. A total of 28 test wells were drilled in the

period 1974 to 1982, of which 7 were under U.S. Navy management. One, the W. T. Foran test well, and a followup, the J. W. Dalton test well, penetrated a section of favorable rock similar to that at Prudhoe Bay, but only shows (indications) of oil were found. Apparently, oil had accumulated in quantity at these localities but had subsequently migrated elsewhere.

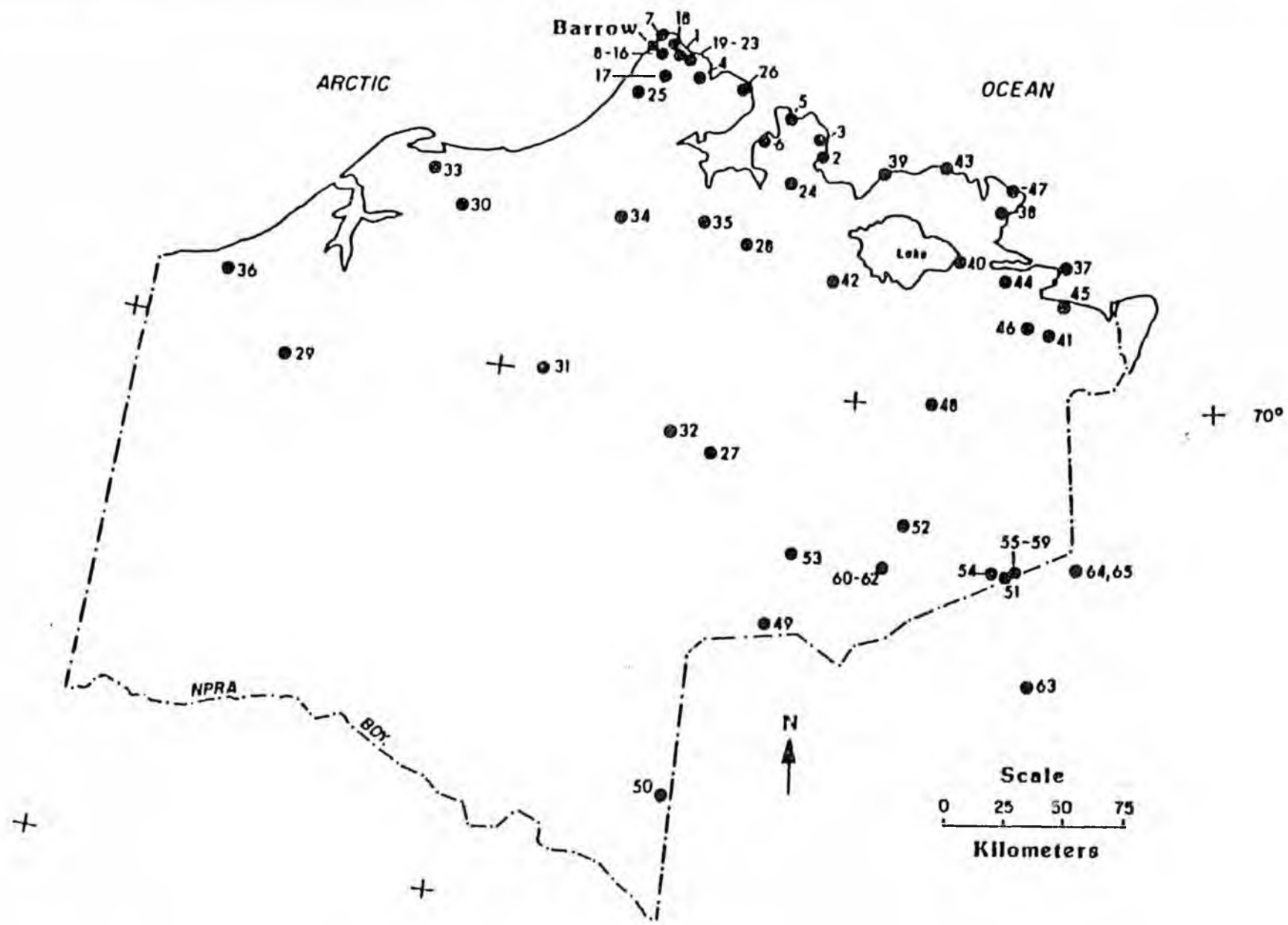


EXPLORATION WELLS 1975-1981

1. Cape Hallett
2. S. Harrison
3. E. Teshepuk
4. Atigaru
5. W. Fish Creek
6. W. T. Foran
7. S. Simpson
8. Drew Point
9. S. Meade
10. Kugrua
11. N. Kulikuk
12. Inigok
13. Tunalik
14. Ibpikuk
15. Peard
16. E. Simpson No. 1
17. J. W. Dalton
18. Lisburne
19. Seabee
20. Walakpa No. 1
21. E. Simpson No. 2
22. W. Dease
23. Awuna
24. Walakpa No. 2
25. N. Inigok
26. Kuyansk
27. Tulageek
28. Koluktak

Exploration wells in the NPRA drilled from 1975 to 1981 (from Mitchell, 1981)

Names and locations of wells drilled
in the NPRA by the federal government.



Well location, number refers to key on preceding page.

LEGEND FOR FIGURE 2

- | | | | |
|-----------------------|-------------------------|--------------------------|-------------------------|
| 1. Avak - 1 | 17. South Barrow - 3 | 33. Peard - 1 | *49. Knifeblade - 1, 2A |
| 2. East Simpson - 1 | 18. South Barrow - 16 | 34. South Meade - 1 | 50. Lisburne - 1 |
| 3. East Simpson - 2 | 19. South Barrow - 12 | 35. Topagoruk - 1 | 51. Seabee - 1 |
| 4. Iko Bay - 1 | 20. South Barrow - 14 | 36. Tunalik - 1 | 52. Square Lake - 1 |
| 5. North Simpson - 1 | 21. South Barrow - 17 | 37. Atigaru Point - 1 | *53. Titaluk - 1 |
| 6. Simpson - 1 | 22. South Barrow - 19 | 38. Cape Halkett - 1 | 54. Umiat - 1 |
| 7. South Barrow - 1 | 23. South Barrow - 20 | 39. Drew Point - 1 | 55. Umiat - 2 |
| 8. South Barrow - 2 | 24. South Simpson - 1 | 40. East Teshekpuk - 1 | 56. Umiat - 3 |
| 9. South Barrow - 4 | 25. Walakpa - 1 | *41. Fish Creek - 1 | 57. Umiat - 4 |
| 10. South Barrow - 6 | 26. West Dease - 1 | 42. Ikpikpuk - 1 | 58. Umiat - 7 |
| 11. South Barrow - 7 | 27. East Oumalik - 1 | 43. J.W. Dalton - 1 | 59. Umiat - 11 |
| 12. South Barrow - 8 | *28. East Topagoruk - 1 | 44. North Kalikpik - 1 | *60. Wolf Creek - 1 |
| 13. South Barrow - 9 | 29. Kaolak - 1 | 45. So. Harrison Bay - 1 | *61. Wolf Creek - 2 |
| 14. South Barrow - 10 | 30. Kugrua - 1 | 46. West Fish Creek - 1 | *62. Wolf Creek - 3 |
| 15. South Barrow - 11 | *31. Meade - 1 | 47. W.T. Foran - 1 | 63. Grandstand - 1 |
| 16. South Barrow - 13 | 32. Oumalik - 1 | 48. Inigok - 1 | 64. Gubik - 1 |
| | | | 65. Gubik - 2 |

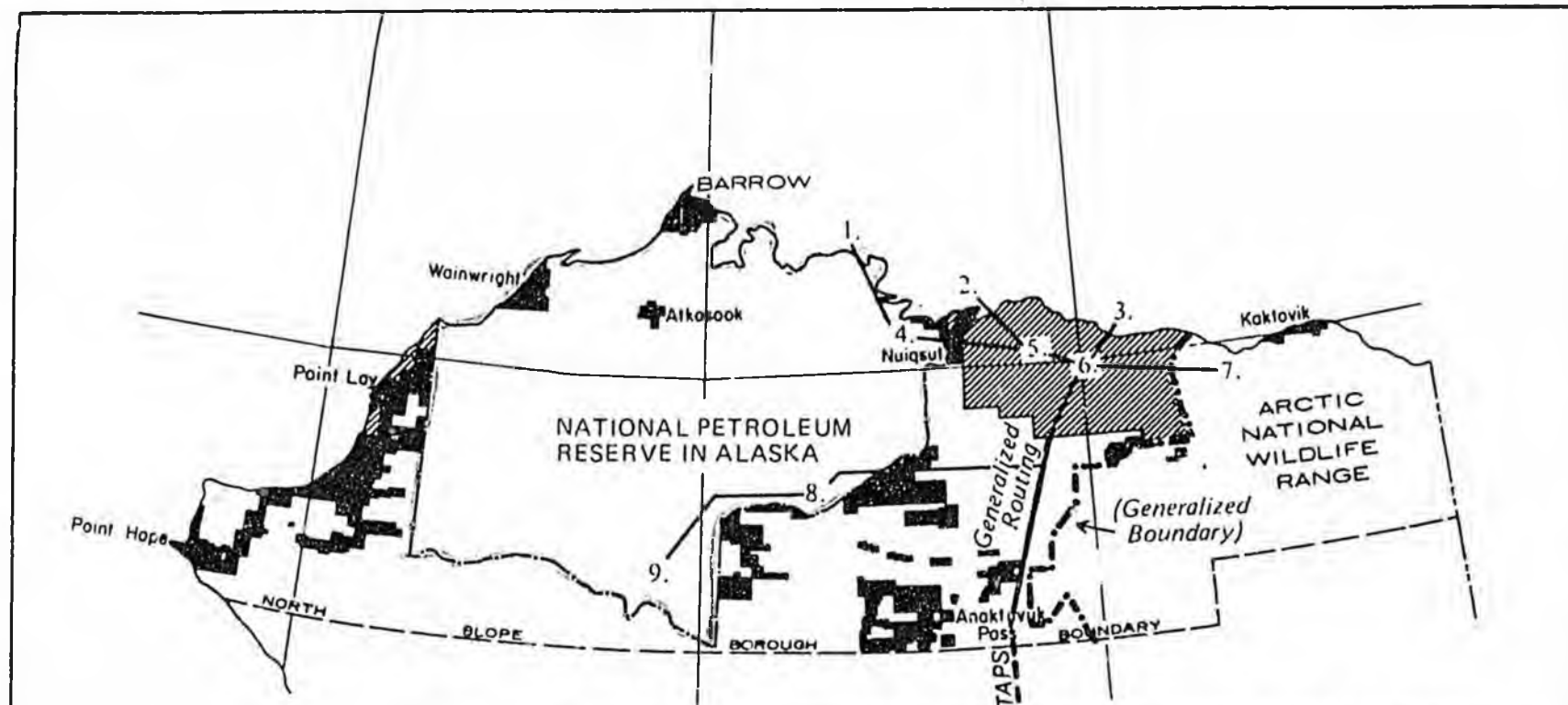
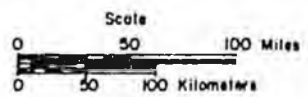


FIGURE 23 A MODEL OF HYPOTHETICAL CONCURRENT NORTH SLOPE DEVELOPMENT

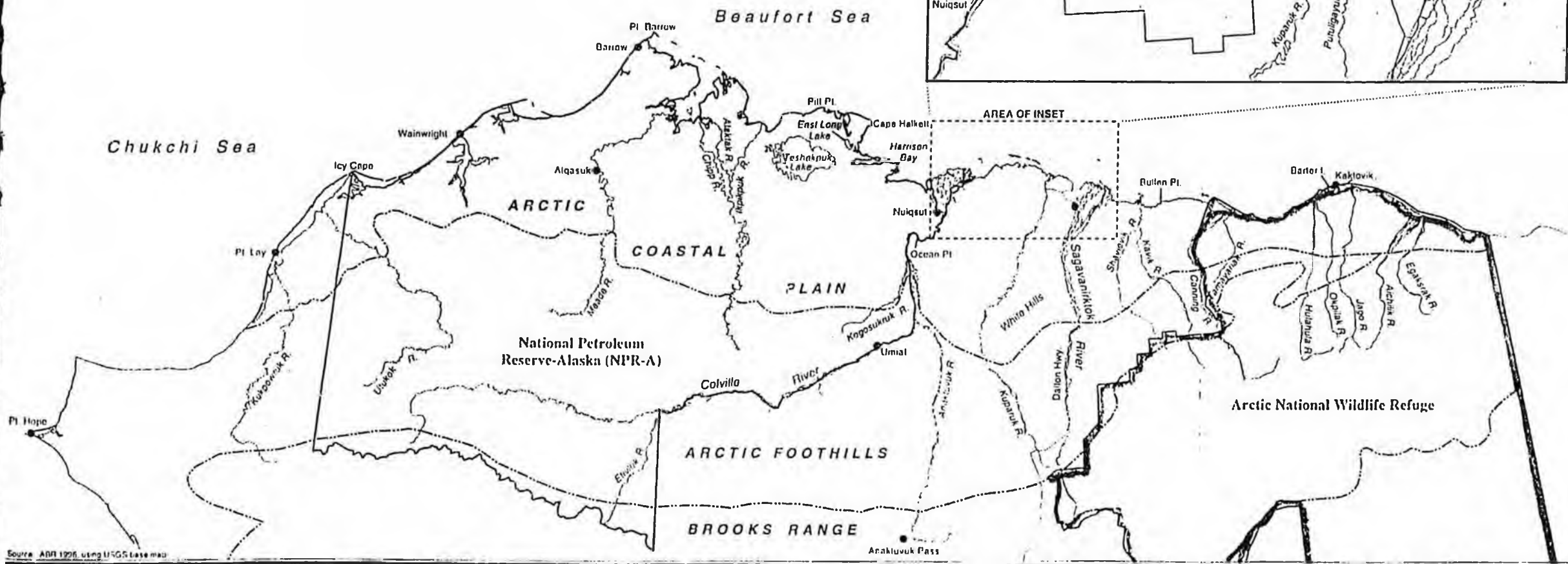
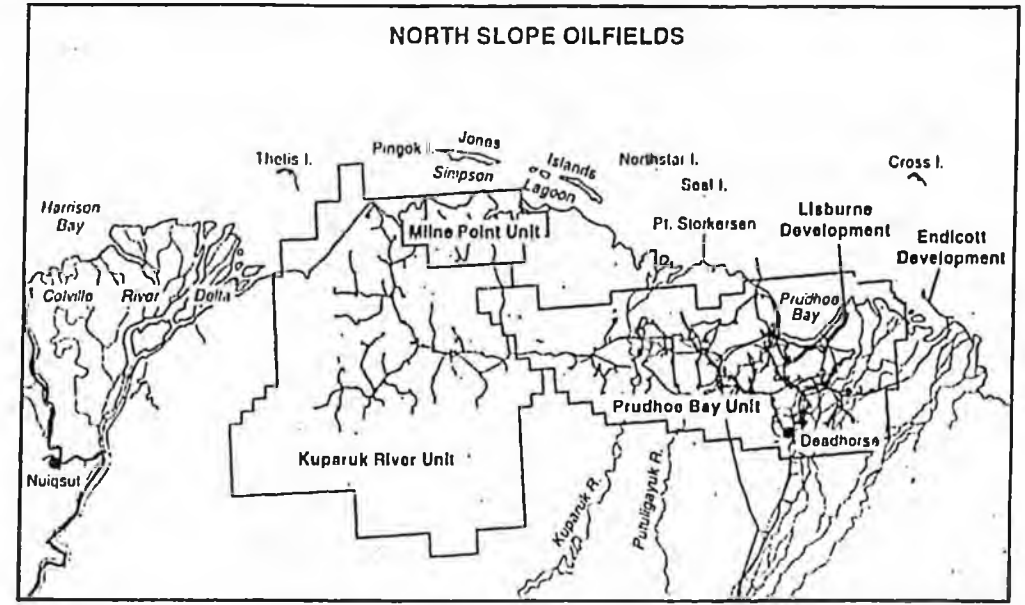


- Federal
- ▨ State
- Private

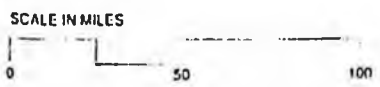
Hypothetical Developments

- | | |
|---------------|-------------------|
| 1. N. Diapir | 6. Prudhoe Bay |
| 2. S. Diapir | 7. Canning River |
| 3. E. Diapir | 8. Kimikpak Ridge |
| 4. Fish Creek | 9. Tukuto Lake |
| 5. Kuparuk | |

Current Land Status on the North Slope (T.A. or Patent)



Source: ARII 1976, using USGS base map
ARII File NSREG.RI.P11



Boundary of physiographic province (Arctic Coastal Plain, Arctic Foothills, Brooks Range)

Figure 2.1.0-1. North Slope Region and Existing Oilfields