

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILES 8672

1014 SCOMM 28: JOINT GAS PIPELINE COMMITTEE. 1981-82 1014

STATE OF ALASKA THE LEGISLATURE

LEGISLATIVE AFFAIRS AGENCY

POUCH Y - STATE CAPITOL
JUNEAU, ALASKA 99811
907-465-3600

CONTRACT BETWEEN

STATE OF ALASKA
ALASKA STATE LEGISLATURE
Pouch Y
Juneau, Alaska 99811

AND

INSTITUTE OF SOCIAL
AND ECONOMIC RESEARCH
UNIVERSITY OF ALASKA
Anchorage, Alaska

The parties to this agreement are the Alaska State Legislature, on behalf of the Alaska State Legislature's Joint Gas Pipeline Committee, hereinafter referred to as the "Agency", and the INSTITUTE OF SOCIAL AND ECONOMIC RESEARCH, hereinafter referred to as the "Contractor".

THE PURPOSE OF THIS AGREEMENT is to provide specialized professional economic and governmental consulting services in the area of natural gas policy, petroleum refining and petrochemicals manufacturing in Alaska to the Alaska State Legislature.

IT IS THEREFORE MUTUALLY AGREED THAT:

CLAUSE I - STATEMENT OF WORK

(A) The Contractor shall provide to the Joint Gas Pipeline Committee the series of written reports described in Clause II of this agreement. One hundred copies of the final reports shall be delivered to the Project Director for distribution to members of the Legislature, the Legislative Library and others. In addition, a copy shall be delivered separately to each of the Co-Chairmen of the Committee.

(B) All reports, correspondence, graphs and other documents prepared under this contract are the property of the Alaska State Legislature, and it shall have the full right to use these documents for its purposes, or otherwise, when and where the Alaska State Legislature may designate without any claim on the part of the Contractor for additional compensation.

(C) The work shall be done in accordance with generally recognized standards of professional consulting services. In the event that any work does not meet these standards, the Agency may serve written notice and satisfactory correction shall be made within ten (10) days. Failure to complete work on time shall result in liquidated damages of Two Hundred Dollars (\$200) per day, except for delays approved in advance by the Project Director. Liquidated damages shall not exceed the total payments allowed under the Contract and may be deducted from payments that are owing.

(D) The Agency may terminate this Contract upon written notice of the necessity for doing so and payment shall be made for any satisfactory work. Any dispute concerning a question of fact that relates to the Contractor's performance, if not disposed of by agreement between the parties, shall be decided by the Co-Chairmen of the Committee. This decision, unless appealed to a court of competent jurisdiction within ninety (90) days of the completion of the Contract or the termination of the Contractor, shall be final and conclusive.

CLAUSE II - WRITTEN REPORTS

(A) The first general report shall be a primer on fuels refining. The report will provide analytical descriptions of technology, feedstocks and sources, markets, industrial organization and structure, and financing and regulation, with special attention to issues related to costs and benefits of proposed investments in Alaska. The report is to be written in lay language, as a background for policy deliberations by state officials, legislators and other citizens. The reports, together with the report described in (B) of this Clause, will be similar in scope and style to the 1978 ISER report, "Introduction to the Gas Industry, with Special Reference to the Proposed Alaska Highway Gas Pipeline." The Contractor shall deliver to the Project Director a draft of the report by January 15, 1981. The Contractor shall deliver the final fuels refining report by January 31, 1981.

(B) The second general report shall be a primer on hydrocarbon processing and petrochemicals manufacture. The report will provide analytical descriptions of technology, feedstock and sources, markets, industrial organization and structure, financing and regulation, with special attention to issues related to costs and benefits of proposed investments in Alaska. The report is to be written in lay language, as a background for policy deliveries by state officials, legislators and other citizens. The report, together with the report described in (A) of this Clause, will be similar in scope and style to the 1978 ISER report, "Introduction to the Gas Industry, with Special Reference to the Proposed Alaska Highway Gas Pipeline." The contractor shall deliver to the Project Director a draft of the report by February 15, 1981. The final petrochemicals manufacture report shall be delivered by February 28, 1981.

(C) The Contractor shall also prepare three topical reports on policy issues of immediate Alaska concern. These three reports are intended to be issues or discussion papers, ranging from fifteen to thirty pages in length.

(i) The first topical report will examine possible methods of governmental assistance to proposed development in Alaska based on the use of Prudhoe Bay natural gas and natural gas liquids. The report will examine the policy and broad economic implications of the following types of governmental assistance: the state giving priority for instate processing for royalty hydrocarbon disposal; the State giving priority for instate marketing for royalty hydrocarbon disposal; tax exemption options; state loan guarantees; tax-exempt financing; construction and operation of infrastructure facilities; provision of state or local services, e.g. provision or authorization of promotional rates for utility services; state purchase guarantees for a portion of plant output; and other means of state assistance. The draft of the first topical report will be delivered by March 15, 1981. The final version of the first topical report will be delivered by March 31, 1981.

(ii) The second topical report will be an examination of the interrelationship of the proposed gas-based petrochemical project(s) and the Alaska Natural Gas Pipeline Project, with special attention to any unreasonable burden or jeopardy the pipeline project might encounter through development of the petrochemical projects, and means by which any burden or jeopardy might be alleviated. The draft of the second topical report shall be delivered by April 15, 1981, with the final report delivered by April 30, 1981.

(iii) The Contractor shall also provide a third topical report at the request of the Project Director on behalf of the Joint Gas Pipeline Committee. It will be completed within two months of its being requested.

(D) The Contractor will keep the Project Director informed as to the progress of the work performed under this agreement and shall provide progress reports as specified by him.

CLAUSE III - PROJECT DIRECTOR

The Project Director shall be Duncan Read, Director, House Research Agency, or his designee, acting on behalf of the Joint Gas Pipeline Committee.

CLAUSE IV - PERIOD AND DATES OF PERFORMANCE

The work under this Contract shall commence August 15, 1980, and expire on June 30, 1981. Performance may be extended for additional periods by mutual written agreement of the parties.

CLAUSE V - COMPENSATION AND METHOD OF PAYMENT

(A) Total payments for the work described in Clauses I and II shall not exceed \$50,000 (Fifty Thousand Dollars, inclusive of all expenses).

(B) Payment for the work referenced in Clause II(A), the first general primer on refining, shall be due and payable to the Contractor on delivery of the report in the amount of \$16,525 (Sixteen Thousand, Five Hundred and Twenty-five Dollars). In the event that the report is delivered late, the penalty charge described in Clause I(C) shall apply.

(C) Payment for the work referenced in Clause II(B), the second general primer on petrochemicals manufacture, shall be due and payable to the Contractor on delivery of the report in the amount of \$16,525 (Sixteen Thousand, Five Hundred and Twenty-five Dollars). In the event that the report is delivered late, the penalty charge described in Clause I(C) shall apply.

(D) Payment for the work referenced in Clause II(C), the three topical reports, shall be due and payable to the Contractor on delivery of each of the reports in the amount of \$5,650 (Five Thousand, Six Hundred and Fifty Dollars) for each report delivered. In the event that any report is delivered late, the penalty charge described in Clause I(C) shall apply.

CLAUSE VI - RECORDS, DOCUMENTS AND AUDIT

The Contractor shall maintain accurate records, as may be required by the Agency. The records are subject to inspection by the Agency at all reasonable times.

CLAUSE VII - CONFLICT OF INTEREST

(A) The Contractor affirms that it does not represent, own any beneficial interest in, or have any professional business relationship with:

Northern Natural Gas Company
Northwest Energy Corporation
Panhandle Eastern Pipe Line Company
Pacific Gas and Electric Company
Pacific Interstate Transmission Company
United Gas Pipeline Company
The Standard Oil Company (Ohio)

British Petroleum

Exxon Corporation

Atlantic Richfield Company

or any firm or organization holding an interest in natural gas reserves in the Prudhoe Bay Field.

(B) The Contractor shall immediately notify the Project Director in writing of any events that would require an amendment of this affirmation or tend to create a conflict of interest.

CLAUSE VIII - LOBBYING DISCLAIMER

The Agency and the Contractor agree that the only services to be provided under this contract are the provision of information, analysis, and advice to the Legislature; the Contractor, nor any subcontractors, is not authorized or permitted under this Contract to represent the Legislature, its members, committees or staff agencies before Congress or any other legislative, administrative, or judicial institution.

CLAUSE IX - ALL WRITINGS CONTAINED HEREIN

This agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this agreement shall be deemed to exist or to bind either of the parties of this agreement.

IN WITNESS WHEREOF, the parties have executed this agreement on the dates indicated below.

CONTRACTOR

LEGISLATIVE AFFAIRS AGENCY

Lee Gorsuch 9/30/80
INSTITUTE OF SOCIAL Date
AND ECONOMIC RESEARCH
Lee Gorsuch, Director
IRS I.D. # _____

M. R. CHARNEY Date
EXECUTIVE DIRECTOR

Accepted:

Approved as to form:

DUNCAN READ, DIRECTOR Date
HOUSE RESEARCH AGENCY

BILLY G. BERRIER Date
AGENCY LEGAL COUNSEL

Mike Colletta 30 Sept 80
Senator Mike Colletta Date
Co-Chairman Joint Gas
Pipeline Committee

Howard Cutler 9/30/80
HOWARD CUTLER Date
CHANCELLOR, UAF

Bill Miles 10/2/80
Representative Bill Miles Date
Co-Chairman Joint Gas
Pipeline Committee



ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

Pouch Y, State Capitol
Juneau, Alaska 99811
(907) 465-3991

June 30, 1981

MEMORANDUM

TO: File (at request of Susan Brody)
FROM: Mark Wittow, AA
Joint Gas Pipeline Committee

I have talked with Lee Gorsuch of ISER several times throughout the past three months concerning ~~this~~ contract. We agreed that it would be wise for ISER to conduct oral briefings in late summer or early fall on the substance of their primer and topical reports. We also agreed that the review draft of the primer would receive scrutiny and comment and that a final report would be turned in by August 30, at the latest.

We also agreed that a third topical report on worker health and safety issues should be completed by mid-summer. No firm dates were established.

A draft of the topical report submitted under clause II(c)ii was submitted in early June and was returned with comments and suggested revisions.

The topical report required under Clause II(c)i of the contract has been replaced by Chapter 8 of the primer, which discusses in detail the same issues. This section of the primer is above and beyond what is required for either the primer or topical report.

All of the above discussions took place before June 10, 1981.



Alaska State Legislature

Jt. Gas Pipeline Committee
1024 West Sixth Ave.
Anchorage, Alaska 99501
907-279-1243

December 12, 1980

Peter Lewis
Lazard Freres & Co.
One Rockefeller Plaza
New York, NY 10020

Dear Mr. Lewis:

Clause I of your contract with the committee states that you are to provide the committee with quarterly reports on the progress of financing arrangements for the gas pipeline. You submitted your first quarterly report to the committee in September 1980, in written form. The second and third reports are to be submitted by January 21, 1981 and April 15, 1981, respectively. Since the legislature will be in session at that time, those reports may be delivered as oral presentations to interested legislators and the project director at a date within a few weeks of the dates stipulated in the contract.

Because of the sensitive nature of the financial discussions between the advisors to the Prudhoe Bay producers and Northwest Energy Co., we understand that you may be unable to publicly provide frank reports of the financial discussions. Please take whatever precautions are necessary to ensure your long-term effectiveness as the state's advisor.

Sincerely,

A handwritten signature in cursive script, reading "Mark Wittow".

Mark Wittow
Study Manager

cc: Senator Mike Colletta
Representative Terry Gardiner
Duncan Read, House Research Agency
Robert LeResche, Commissioner of Natural Resources

CONTRACT BETWEEN
STATE OF ALASKA
LEGISLATIVE AFFAIRS AGENCY

and

BIRCH, HORTON, BITTNER & MONROE
1127 West Seventh Avenue
Anchorage, Alaska 99501

IT IS MUTUALLY AGREED THAT THE CONTRACT BETWEEN THE ABOVE
PARTIES DATED October 1, 1979, IS HEREBY AMENDED AS FOLLOWS:

CLAUSE III Paragraphs (A)⁽¹⁾ & (A)⁽²⁾ Page 1 is amended to read:

CLAUSE III - COMPENSATION AND METHOD OF PAYMENT

(A) (1) Total payment for the work referenced in
Clause I shall not exceed \$25,000, inclusive
of all expenses, which, for the work under
Clause I, shall be the sole responsibility
of the Contractor.

(A) (2) Payment for the work referenced in
Clause I and described in the Contract
shall be due and payable to the Contractor
in accordance with the following schedule:

22 monthly payments of \$2500.00 each,
the first payment due and payable on
September 30, 1979 and successive
payments due on the last day of the
succeeding months thereafter.

IN WITNESS WHEREOF, the parties have executed this amendment
to this agreement on dates indicated below.

BIRCH, HORTON, BITTNER & MONROE

LEGISLATIVE AFFAIRS AGENCY

Ronald G. Birch
Ronald G. Birch
Date 5/27/80

M. W. Charney
M. W. Charney
Executive Director
Date 5/27/80

Approved:

Approved as to form:

Bill Miles
Representative Bill Miles
Project Director
Date 6/6/80

Billy G. Berrier
Billy G. Berrier
Agency Legal Counsel
Date

Mike Colletta
Senator Mike Colletta
Project Director
Date 28 Aug 80

**PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT**

1602

CONTRACT BETWEEN

STATE OF ALASKA - LEGISLATIVE AFFAIRS AGENCY
Pouch Y - State Capitol
Juneau, Alaska 99811

AND

LARRY ORSINI ASSOCIATES
P.O. Box 869
528 5th Avenue - Suites 216-218
Fairbanks, Alaska 99707

The parties to this agreement are the LEGISLATIVE AFFAIRS AGENCY, hereinafter referred to as the "AGENCY," and LARRY ORSINI ASSOCIATES, hereinafter referred to as the "CONSULTANT."

THE PURPOSE OF THIS AGREEMENT is to provide the Agency an economic and engineering feasibility study of using Alaska's North Slope natural gas; to implement the legislative direction and intent expressed in Chapter 80 SLA '79. Specific emphasis will be placed on developing potentials for maximizing job opportunities for Alaskans.

IT IS THEREFORE MUTUALLY AGREED THAT:

CLAUSE I - STATEMENT OF WORK

(A) The Consultant shall determine and present a written report on the economic and engineering feasibility of utilizing North Slope natural gas for in-state power generation. The report shall contain a statement of the determination reached and shall include a statement of the alternatives and factors considered in arriving at the determination. Further, the Consultant will identify and be prepared to present documentation and testimony to the legislature and/or appropriate regulatory agencies as to matters covered in the report. The Consultant agrees to be available for the presentation of documentation and testimony under this clause and section for a number of days, not to exceed twenty (20), during a two (2) year period beginning on the date this contract is executed.

(B) The Consultant shall determine and present a written report on the economic and engineering feasibility of utilizing North Slope natural gas for in-state residential and commercial use. The report shall contain a statement of the determination reached and shall include a statement of the alternatives and factors considered in arriving at the determination. Further, the Consultant will identify and be prepared to present documentation and testimony to the legislature and/or appropriate regulatory agencies as to matters covered in the report. The Consultant agrees to be available for the presentation of documentation and

testimony under this clause and section for a number of days, not to exceed twenty (20), during a two (2) year period beginning on the date this contract is executed.

CLAUSE II - PERIOD AND DATES OF PERFORMANCE

The work under this contract shall be performed between June 30, 1980 and September 28, 1980 unless extended by mutual agreement of the parties.

CLAUSE III - PROJECT DIRECTOR

The project director shall be Senator George Hohman.

CLAUSE IV - COMPENSATION AND METHOD OF PAYMENT

(A) Total payment under this contract shall not exceed \$150,000.00 (One hundred and fifty thousand dollars.)

(B) \$30,000.00 (Thirty thousand dollars) shall be due to the Contractor on the date this contract is executed.

(C) \$60,000.00 (Sixty thousand dollars) shall be due to the Contractor on the date the project director accepts the Contractor's report required under section (A), CLAUSE I-STATEMENT OF WORK.

(D) \$60,000.00 (Sixty thousand dollars) shall be due to the Contractor on the date the project director accepts the Contractor's report required under section (B), CLAUSE I-STATEMENT OF WORK.

CLAUSE V - TERMINATION

This contract may be terminated by either party upon express written notice.

CLAUSE VI - OFFICE SPACE, EQUIPMENT, CLERICAL SUPPORT

Office space, equipment and clerical support of the Consultant that will be necessary to carry out the completion of this contract shall be supplied by the Consultant at no cost to the Agency.

CLAUSE VII - RECORDS, DOCUMENTS, AUDIT

The Consultant shall maintain accurate records, including detailed time records, as may be required by the project director. The records are subject to inspection by the Agency or the project director at all reasonable times. All documents, reports and writings generated as a consequence of the work done under this contract shall become the property of the State of Alaska and, on completion of the work or at the termination of this contract, shall be delivered to the project director.

CLAUSE VIII - RIGHTS

The Consultant shall keep the project director informed as to the progress of the work performed under this agreement and shall provide progress reports as specified by the project director.

CLAUSE IX - ALL WRITINGS CONTAINED HEREIN

This agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this agreement shall be deemed to exist or to bind either of the parties of this agreement.

IN WITNESS WHEREOF, the parties have executed this agreement on the dates indicated.

CONSULTANT

LEGISLATIVE AFFAIRS AGENCY

LARRY ORSINI June 26, 1980 for Dick Berg 6/30/80
Date Date

ACCEPTED

George H. Hohman June 26, 1980 B. Charney 6/30/80
GEORGE H. HOHMAN Date BILLY G. BERRIER Date
Project Director Legal Affairs Agency

OPINION AND RECOMMENDATION

Regarding the State of Alaska
requisitioning further study
of the utilization of North
Slope natural gas for electric
generation, residential and
commercial use in Alaska

Submitted to:

LARRY ORSINI ASSOCIATES
Fairbanks, Alaska

By:

D. J. MOORE
Anchorage, Alaska

September 8, 1980

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Supplement A - Reference Materials (under separate cover)

SUMMARY

and

OPINION

Before a meaningful study can be conducted, as set out in Section I - Statement of Work to be Performed, Items (a) and (b), several crucial items must first be determined:

(1) At what point does the State of Alaska obtain title to its royalty share of North Slope natural gas, either in kind or dollar value.

(2) What specifically is the chemical composition of Alaska's royalty share of North Slope natural gas. Each component of this gas and its thermal value to the whole should be identified with the total thermal value of each unit of natural gas.

(3) What is the price of the gas, and at what point.

(4) What right does, or could the State of Alaska have to natural gas or components of separator gas, conditioned gas or pipeline gas belonging to shippers or producers of such gas downstream of the separator, conditioning plant, or in the Northwest Pipeline.

The problems associated with utilizing Alaska's North Slope royalty natural gas to the highest and best advantage are complex, with decisions to be made from legal, political, engineering and economic viewpoints.

One approach to Alaska's decision-making problem is to study the Province of Alberta's progress in the industry. Alberta

encountered very similar conditions and, with trial and error, together with economic and engineering procedures, has to date resolved the highest and best use of their natural gas to the satisfaction of all concerned.

Both Dow Chemical Canada and Dome Petroleum, Ltd. have world-scale operations in Alberta relating to pipeline gas and its components, with the Alberta Energy Corporation owning 33 1/3 percent of the ethane pipeline system. Alberta Energy Corporation is 50 percent owned by the Province of Alberta.

A physical survey of Alberta's integrated natural gas and oil industry by the State of Alaska Legislative Affairs representative would be extremely helpful in formulating a plan for Alaska, or for Alaska to obtain useful information as to a comparison relating to resultant studies by the Dow-Shell group, pertaining to their recently signed Memorandum of Understanding and Intent with the State of Alaska, over the signature of the Commissioner of Natural Resources.

Further, should the economics of Northwest Pipeline and the Dow-Shell study and related projects prove that, to economically market Alaska natural gas or components therefrom, the wellhead price may have no value or even be a minus amount, then the State of Alaska at least has the following options:

- (1) A rigid oil and gas conservation policy, requiring the producer to maintain a natural gas formation pressure maintenance program to return the gas to the formation, thus stimulating oil production, and in turn, the State's royalty.

(2) Obtaining a similar right to gas users in Canada (TIAS 9030) by way of an order so stating, from the Federal Energy Regulatory Commission. Swapping on a zero-BTU balance basis, methane for ethane, in amounts enabling the State of Alaska to supply gas processors in world-scale quantities at a reduced rate, or even zero cost, in which case, the State should then enjoy an equity position in consideration.

In any case, the State of Alaska should pursue the acquisition of the right, from the Federal Energy Regulatory Commission, equal to the right of Canadian users (TIAS 9030), to extract gas from Northwest Pipeline and swap on a zero-BTU basis. The aforementioned right would probably assist the Dow-Shell economics relating to their current study, in bargaining with the producers for residual amounts of ethane, propane, or butane, to satisfy necessary feedstocks for world-scale petrochemical operations.

We strongly recommend that the Legislative Affairs Department send a qualified and responsible delegation to Alberta for the purpose indicated above.

We will, as an ancillary addendum to our task, make the necessary arrangements and conduct a tour of Alberta's integrated natural gas industry, together with scheduling meetings with pertinent legal, political, engineering and business people.

SCOPE OF WORK

(a) The Consultant shall determine and present a written report on the economic and engineering feasibility of utilizing North Slope natural gas for in-state power generation.

(b) The Consultant shall determine and present a written report on the economic and engineering feasibility of utilizing North Slope natural gas for in-state residential and commercial use.

(c) Work to be performed in Section I, clauses (a) and (b) will be limited to the review of pertinent material received by the Department of Natural Resources, State of Alaska, Oil and Gas Division, as of this date, together with the Consultant's opinion regarding said material as justification for the State of Alaska to requisition formal studies as set out in clauses (a) and (b), Section I of this document.

DISCUSSION PARTICIPANTS

Mr. Robert Huffman,
President
Golden Valley Electric

Fairbanks, Alaska

Dr. C. E. Bhelke
State of Alaska
Pipeline Coordinator

Fairbanks, Alaska

Mr. William Richards,
President
Dome Petroleum, Ltd.

Calgary, Alberta.

Mr. Jack Bockman,
Area Manager
Northwest Pipeline Corporation

Fairbanks, Alaska

Mr. W. A. McBean,
President
W. A. McBean and Partners, Ltd.

Calgary, Alberta.

Mr. Dale Rusnell
Chief of Power Development
State of Alaska, Dept. of Commerce
and Economic Development

Anchorage, Alaska

MEETING SUMMARIES

August 4, 1980

A meeting was held at 2:00 p.m. this date in the office of Mr. Robert Huffman, President of Golden Valley Electric. Present were Mr. Huffman, representing Golden Valley Electric, and Mr. D. J. Moore, representing Larry Orsini Associates. Purpose of the meeting was to discuss the feasibility of generation of electricity by utilizing North Slope gas as the energy source.

Mr. Huffman advised that while there may be many plus factors by the utilization of natural gas, the key to this scenario is missing, which is, the cost of the natural gas.

Mr. Huffman also stated that coal was costing approximately \$1.06 per million BTU's, with fuel oil \$3.40 per million BTU's. He indicated that with each 10 percent drop in the fuel cost, this would be reflected in a 3 percent - 5 percent drop in the electric rate.

The Federal Fuel Utilization Act 1977 indicates that except in special cases and existing electric generating plants, natural gas shall not be used as an energy source. Alaska is exempt from this ruling until 1990.

Golden Valley Electric will not compile economic feasibility studies with natural gas as an energy source until they can determine the cost of the gas at their plant gate.

August 5, 1980

A meeting was held at 2:00 p.m. in the office of the State of Alaska Pipeline Coordinator, Fairbanks, Alaska. Present were

Dr. C. E. Behlke, State Pipeline Coordinator, and Mr. D. J. Moore, representing Larry Orsini Associates of Fairbanks.

Purpose of the meeting was to discuss the utilization of North Slope natural gas for residential and commercial use.

Dr. Behlke advised that final design meetings regarding the gas conditioning plant and Northwest Pipeline were to be held in Fluor's Irvine, California offices, starting August 12.

He also advised that provision for the following pipeline taps would be made at the aforementioned meetings:

- one at Fairbanks
- one at Delta
- one at Agricultural area, Delta
- one at Dot Lake
- one at Tok
- one at Northway

He also advised that the chemical analysis of the pipeline gas, at current evaluation, would be as follows:

- 1 percent - carbon dioxide
- 91 percent - methane
- 4.4 percent - ethane
- 1.7 percent - propane
- .5 percent - butane
- 1.2 percent - iso-butane
- .2 percent - pentane and plus

The gas is expected to have a thermal value of 1100 BTU's per cubic foot.

Dr. Behlke also advises that the current line operating criteria is 2 billion cubic feet per day at 1260 pounds per square inch

minus ten degrees Fahrenheit.

No wellhead price has yet been established for the gas.

August 6, 1980

A meeting was held in the office of Northwest Pipeline at 9:00 a.m. Present were Mr. Jack Bockman, representing Northwest Pipeline, and Mr. D. J. Moore, representing Larry Orsini Associates.

Purpose of the meeting was to discuss provisions being adopted by Northwest Pipeline to enable North Slope gas to be utilized within the State of Alaska.

Mr. Bockman advised that pipeline taps would be provided for six communities, but that the cost of installation of the taps was not yet included in the capital cost of the pipeline.

He further advised that the cost of the pipeline had not yet been determined, nor had transportation charges been established.

August 22, 1980

A meeting was held in the office of W. A. McBean and Partners, engineers and designers of oil, gas and petrochemical facilities, on August 22, 1980. Present were W. A. McBean, representing his company, and Mr. D. J. Moore, representing Larry Orsini Associates.

Purpose of the meeting was to recap evaluations of the reference material

Conclusions promulgated by Mr. McBean and Mr. Moore were as follows:

(1) What right does the State of Alaska have to gas other than its 12½ percent royalty gas.

(2) At what point does the State of Alaska obtain title to its 12½ percent royalty gas.

(3) What components are included in a unit of the State of Alaska's royalty gas and the component's relation by volume to the whole unit.

(4) What is the price of the gas.

(5) What is the disposition of C-5 components and heavier, and how does the State of Alaska enjoy a highest and best use of these.

August 24, 1980

A meeting was held August 24th in the office of William Richards, President of Dome Petroleum, Ltd., Calgary. Present were Mr. Richards, representing Dome, and Mr. D. J. Moore, representing Orsini Associates.

Purpose of the meeting was to discuss the potential that Dome could see with regard to petro- and agri- chemical development from the State of Alaska.

Mr. Richards indicated that the interest that Dome would have was subject to the following:

(1) Price of the natural gas and components thereof.

(2) Availability of sufficient ethane to satisfy an olefin complex.

September 8, 1980

A meeting was held in the office of Mr. Dale Rusnell, Chief of

Power Development for the Department of Commerce and Economic Affairs, State of Alaska. Present were Messrs. Rusnell and Eblom representing the State of Alaska, and D. J. Moore, representing Larry Orsini Associates.

The purpose of this meeting was to discuss Section (a) of the Scope of Work (Page 4). Mr. Rusnell was concerned regarding two items:

- (1) The number and location of proposed pipeline taps that would enable North Slope gas to be utilized for the generation of electricity; and

- (2) The cost of the gas at the pipeline tap.

It was the opinion of Mr. Rusnell that Fairbanks was probably the only community that could be feasibly serviced by electricity derived from North Slope gas energy. However, this conclusion was merely hypothetical and dependent upon the cost of the gas at the pipeline tap. Conclusions reached from our discussions indicated that until the above indicated price was determined, that no meaningful approach to the generation of power by North Slope gas could be arrived at.

TASK I-A

Reference Material

TASK I-A Reference Material

1. Federal Energy Regulatory Commission Northwest Pipeline Pressure and Systems Design - Inquiry Paper, By John Adger, September, 1978.
2. S. 2470, Powerplant Fuels Conservation Act of 1980.
3. Introduction to Electric Power Supply Planning, by Arlon R. Tussing and Associates, May 9, 1980.
4. Northwest Alaska Pipeline filing with Federal Energy Regulatory Commission - Pipeline Taps. July 1, 1980.

TASK I-A

Summaries of the meetings, as set out on Pages with Mr. Huffman, President of Golden Valley Electric, and Mr. Rusnell of the State of Alaska Department of Commerce and Economics, and a perusal of the reference material (page clearly indicate that an economic and engineering feasibility study of this task would be meaningless, and until a price for gas at the piepline gate can be established, the economics of such a proposal are impossible to determine.

Notwithstanding the foregoing, Congress has virtually eliminated natural gas as an energy source for the generation of power, by S. 2470.

The State of Alaska enjoys exemption from this law for established generating plants until December 31, 1990.

Congress has also made funds available (H.R. 6930) not to exceed 10 billion dollars, for the Fiscal Year ending September 30, 1982, to be used as grants for conversion of gas-fired power plants to coal energy and related expenditures.

The possibility of utilizing North Slope natural gas as an energy source in power plants is remote. Coal is simply the most economical at present, and North Slope natural gas is a unique composition, components of which can readily be converted to substances in market demand having an add-on value greatly exceeding their value as a power generating energy source.

However, the following tables are of interest:

(1) Summary of power load growth along the proposed Northwest Pipeline route to Big Delta, being approximately 90 percent of the projected energy requirements (El Paso); and

(2) Existing utility plant indicating generating capacity in the Tanana Valley.

Tok, Dot Lake and Northway have relatively small diesel energized plants.

Table 20

**Summary of Load Growth Projections for Civilian and Military
Requirements Along Proposed Pipeline Route, 1980, 1990
By 1974 Alaska Power Survey**

	Generation 1972		Projected Requirements			
	Peak Demand 1000 KW	Annual Generation Million KWH	1980 Peak Demand 1000 KW	1980 Annual Generation Million KWH	1990 Peak Demand 1000 KW	1990 Annual Generation Million KWH
<u>Civilian</u>						
<u>ation and Utility Abbreviations</u>						
Fairbanks Area ^{1/}						
City of Fairbanks (FMUS)	21.0	90.0	51.8	221.0	161.1	687.3
Tanana Valley (GVEA)	45.9	211.0	131.0	610.0	379.0	1,790.0
Glennallen (CVEA) ^{1/}	1.2	5.4	3.2	14.0	5.2	22.8
Valdez (CVEA) ^{1/}	1.5	6.4	4.2	18.3	6.9	30.0
Cordova (CU) ^{2/}	1.3	5.8	2.3	10.1	4.6	20.2
<u>Military</u>						
<u>Location^{3/}</u>						
Fort Wainwright	15.0	50.1	15.8	52.8	17.4	58.1
Eielson Air Force Base	11.5	58.5	NE ^{4/}	65.0	NE ^{4/}	75.6
Fort Greely	3.5	14.3	4.1	16.6	4.9	19.9

Source: 1974 Alaska Power Survey, "Economic Analysis and Load Projections," pp. 63.- 77.

1/ Utility estimates from REA power requirements studies, and consultant's studies, generally through 1982, and extended to 1990 by APA at same growth rate.

2/ APA estimate based on 1972 generation and various growth assumptions.

3/ Data compiled by Headquarters, Alaskan Command, for 1974 Alaska Power Survey.

4/ Not estimable.

D. J. Miller

Table 21

Estimates of Annual Electric Utility Load Growth Projections
Prepared by the 1974 Alaska Power Survey

Estimate:	<u>Assumed Annual Growth Rate</u>		
	<u>1972-1980</u>	<u>1980-1990</u>	<u>1990-2000</u>
Higher Range	14.8%	9%	8%
Likely Mid-Range	12.3%	7%	6%
Lower Range	9.8%	6%	4%

EXISTING UTILITY PLANT AND ORGANIZATION: FAIRBANKS — TAHANA VALLEY

UTILITY	SERVICE AREA	CUSTOMERS	TYPE OF UTILITY	PRESENT AND PLANNED GENERATING EQUIPMENT	PEAK LOAD	DEMAND FORECAST
TAHANA VALLEY ELECTRIC ASSOCIATION (GVEA)	Fairbanks North Star Borough, in- cluding part of Fairbanks city; North Pole, Ester, Delta Junction, Healy, Clear, Anderson, Cantwell, Rex, McKinley Park, Ft. Wainwright, Eilson AFB. Will extend to Summit	15,000 retail	REA coop	Coal-fired steam turbine (Healy) 25 MW; Six oil- fired gas turbines 179 MW; 10 diesel 22 MW --- Total 226 MW Interconnections: FMUS, Fort Wainwright, Eilson AFB, U. of A.	850 KWH/mo/ customer (1979)	1983: 900 KWH/mo/ customer 1988: 100 kwh/mo/ customer
FAIRBANKS MUNICIPAL UTILITY SYSTEM (FMUS)	Fairbanks city limits	5,615 retail (1979)	Municipal utility owned by city of Fairbanks	Four steam turbines 8 MW Two oil-fired gas tur- bines 32 MW; three diesel 8 MW --- Total 68 MW Interties: GVEA, U of A	28.7 MW (1979)	n.a.

TASK I-B

Reference Material

TASK I-B Reference Material

1. Statement of Position Regarding Selection of Pipe, for the Whitehorse, Yukon to Caroline, Alberta Segment of the Foothills Pipeline System
2. Natural Gas Pipeline, Treaty between Canada and U. S. (TIAS 9030) (extraction)
3. Northern Pipeline Act, April 12, 1978, passed by the Canadian Government.
4. Alaska Natural Gas Transportation Act of 1976, U. S. Public Law 94-586
5. Alaska Statute 44.55.100, Alaska Gas Pipeline Financing Authority
6. Alcan Project - Cost Estimates, prepared by Exxon Company
7. Preliminary Proposal for Assuring the Future Availability of Natural Gas for Use in the State of Alaska, August 11, 1980, prepared by Alaska Gas and Service Company.
8. Alaskan Arctic Resources Project, prepared by Alaskan Arctic Resources Group, June, 1980.
9. Basic Considerations for Manufacture of Petrochemicals in Alaska, El Paso.
10. State of Alaska, Utilization of Royalty Gas, prepared by Bonner & Moore Associates, January 23, 1978, for the Department of Revenue.
11. Sales Gas Conditioning Facilities, Prudhoe Bay, Alaska, September 1978 Study Report, prepared by Ralph M. Parsons Group.
12. Memorandum of Understanding and Intent, signed by Dow-Shell and the State of Alaska.

TASK I-B

At the meeting with Mr. Huffman, Dr. Behlke, Mr. Bockman, Mr. Richards and Mr. McBean (Pages 6-10), together with a perusal of the reference material (Page 14), the following must be accomplished before meaningful economics or feasibility can be determined:

- (1) Determination of North Slope natural gas price and/or its individual components.
- (2) Point or points of delivery of North Slope natural gas for this purpose.
- (3) Chemical content of the gas to be delivered.

The following references indicate potential in-state residential and commercial utilization of North Slope natural gas:

- (1) North Slope gas reserves.
- (2) Alaska Highway Pipeline Project map.
- (3) Expected gas composition at liquefaction plant.
- (4) Schematic flow diagram.
- (5) AARD exhibits and scenario.
- (6) Alaska Gas and Service Co. estimated 1980 natural gas demand for Fairbanks.

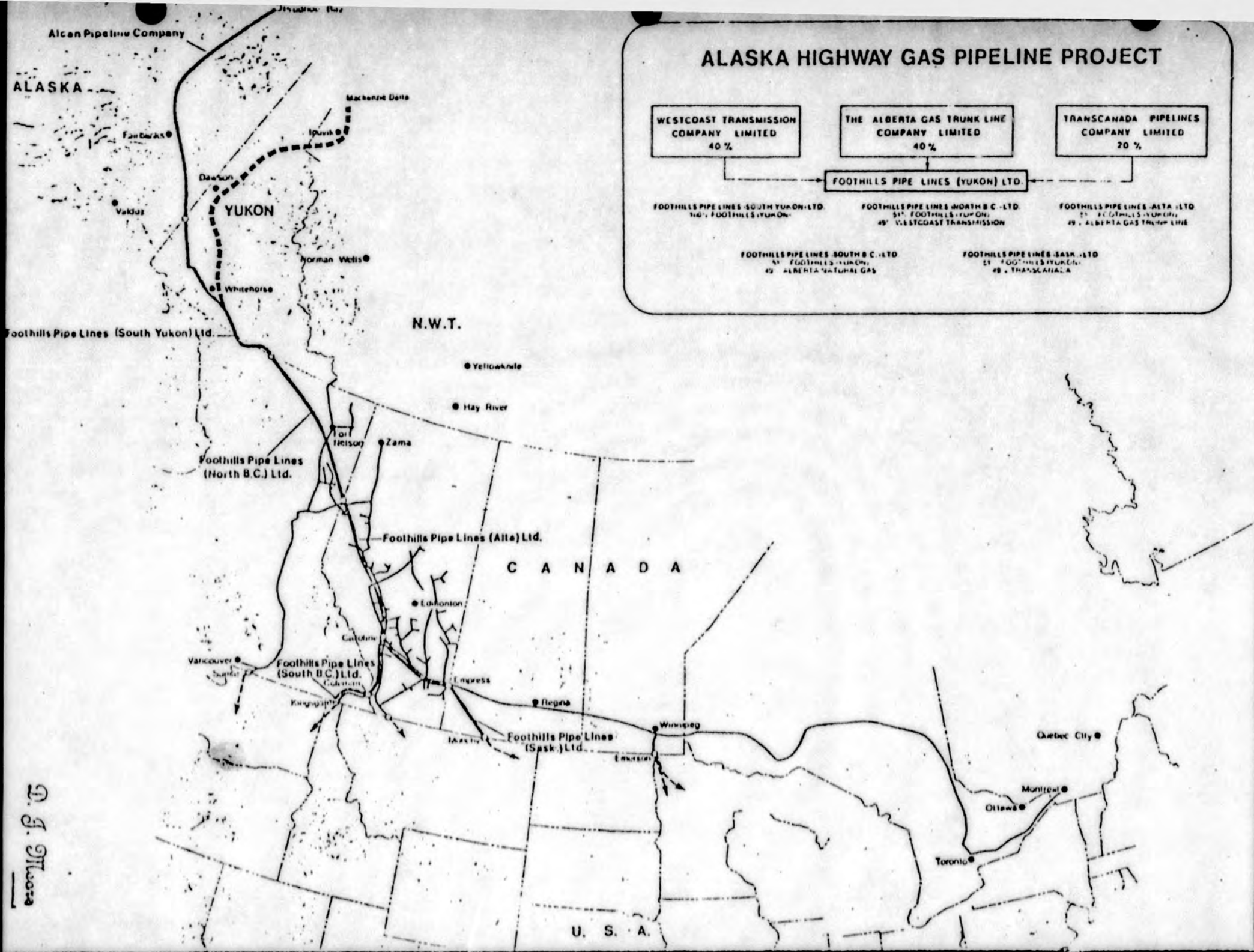
The communities of Delta, Agricultural Project at Delta, Tok, Dot Lake and Northway, are presently being considered for a pipeline tap facility and will be serviced with natural gas provided results of economic and engineering studies permit.

Appendix A - Continued
Table 1 - COOK INLET NATURAL GAS RESERVE

Estimates from the American Gas Association "Reserves of Crude Oil, Natural Gas Liquids and Natural Gas in the United States and Canada as of December 31, 1977," Volume 32, June 1978.

<u>Field</u>	<u>Ultimate Recovery</u> (Trillions of Cubic Feet- 14.73 psia at 60° F)	<u>Comments</u>
Total Alaska	33.241,606	Non-Associated and Associated-Dissolved
Prudhoe Bay	-26.000,000	(These fields are not in the Cook Inlet region.)
Kavik	- .300,000	
S. Barrow	- .025,000	
Gubik	- .004,000	
E. Umiat	- .008,000	
Subtotal	-26.337,000	
Cook Inlet	6.904	(Total Alaska minus non- Cook Inlet fields.)

Note: The engineers who compiled the above report did not include any estimate of natural gas in the following fields in Cook Inlet: Birch Hill, Falls Creek, North Fork and West Foreland. For reserve estimates made by other engineers in these fields, see Table 2.



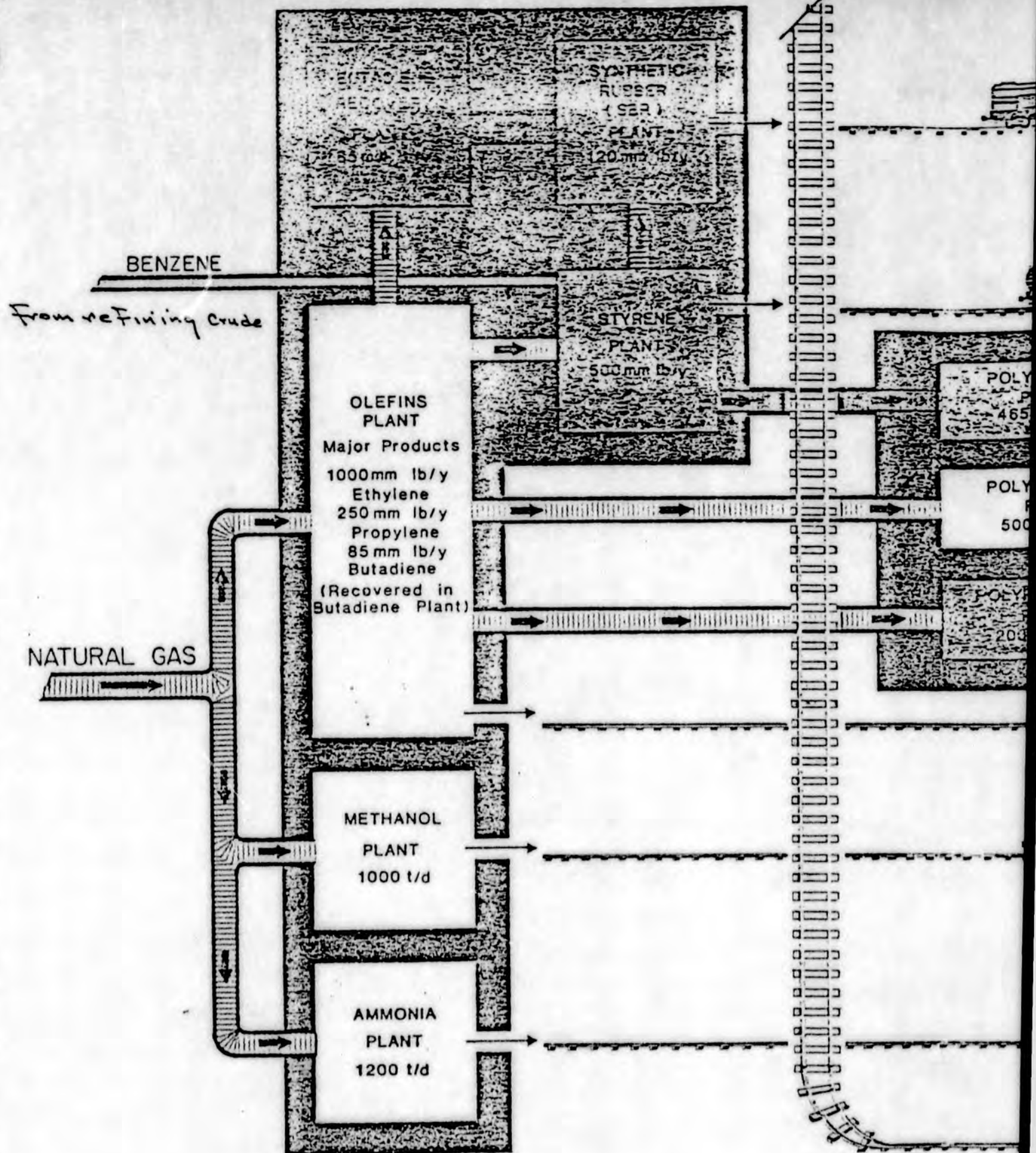
Expected Gas Composition
at Liquefaction Plant Inlet

<u>Component</u>	<u>Volume %</u>
CO ₂	1.02
N ₂	.75
CH ₄	85.91
C ₂ H ₆	7.77
C ₃ H ₈	3.93
I-C ₄ H ₁₀	.26
N-C ₄ H ₁₀	.30
C ₅ Plus	.06

Recoverable Liquids Per Billion SCF/Day
Leaving 1022.4 BTU/SCF Gas

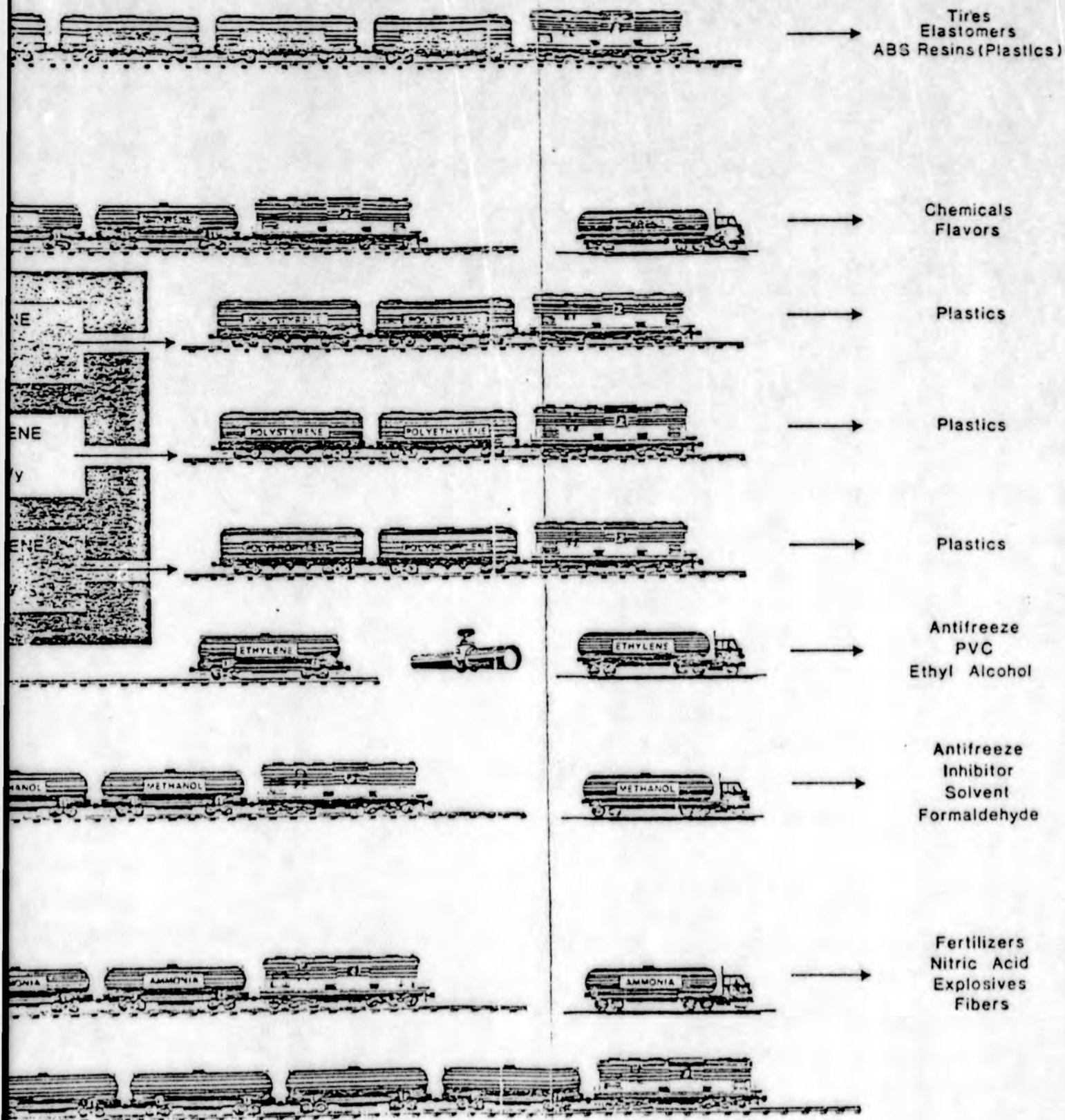
<u>Component</u>	<u>Barrels Per Day</u>
Ethane	39,467
Propane	25,689
Butane	4,267
Gasoline	533
Remaining Gas	.882 Billion SCF/Day

Figure 5



TYPICAL U
PETRO

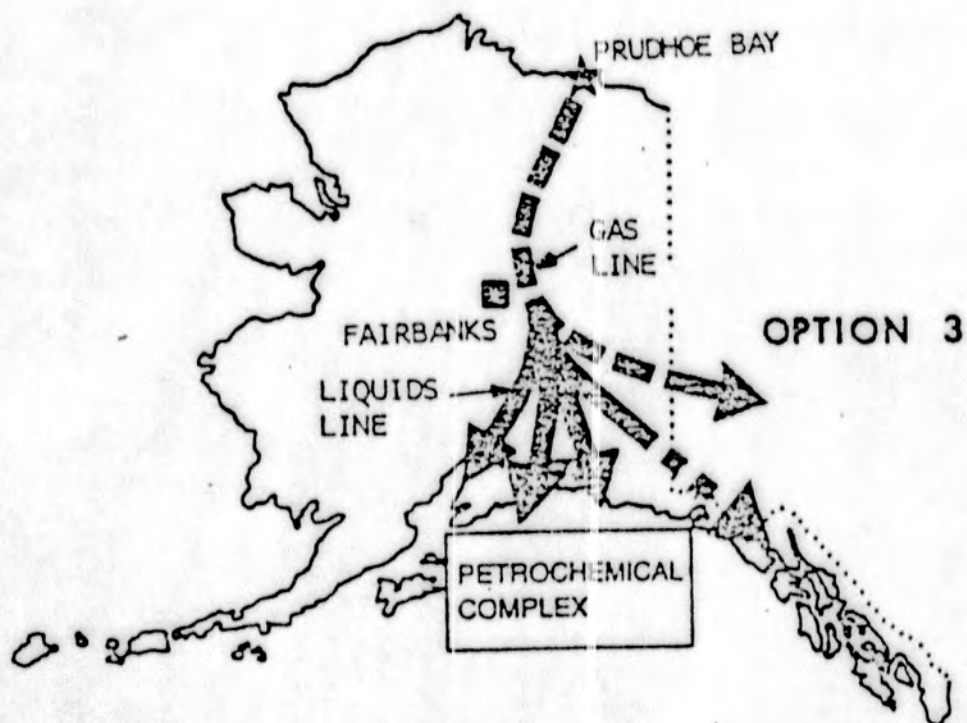
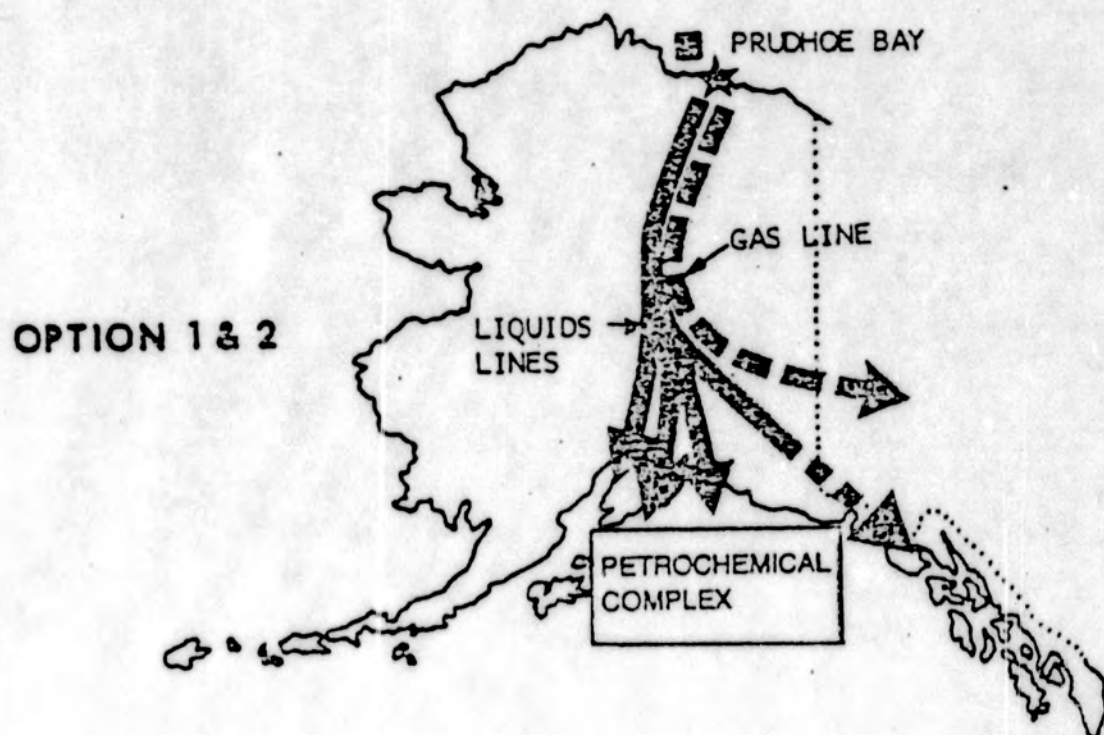
**END
PRODUCTS**



UNITED STATES GULF COAST
CHEMICAL COMPLEX

D. J. Moore
FIGURE 1

ALASKAN ARCTIC RESOURCES PROJECT



D. J. Moore

★ CONDITIONING PLANT

■ EXTRACTION PLANT

ALASKAN ARCTIC RESOURCES PROJECT

INITIAL PROJECT OPTIONS

OPTION 1

Pre-Natural Gas Pipeline

- CO₂ Extraction Plant — Prudhoe Bay
- Gas Liquid Extraction Plant — Prudhoe Bay
- Gas Liquids Pipeline — Prudhoe Bay to Tidewater
- Fractionation, Storage and Marine Loading Facilities at Tidewater
- Petrochemical Complex at Tidewater

OPTION 2

In Conjunction with Gas Pipeline

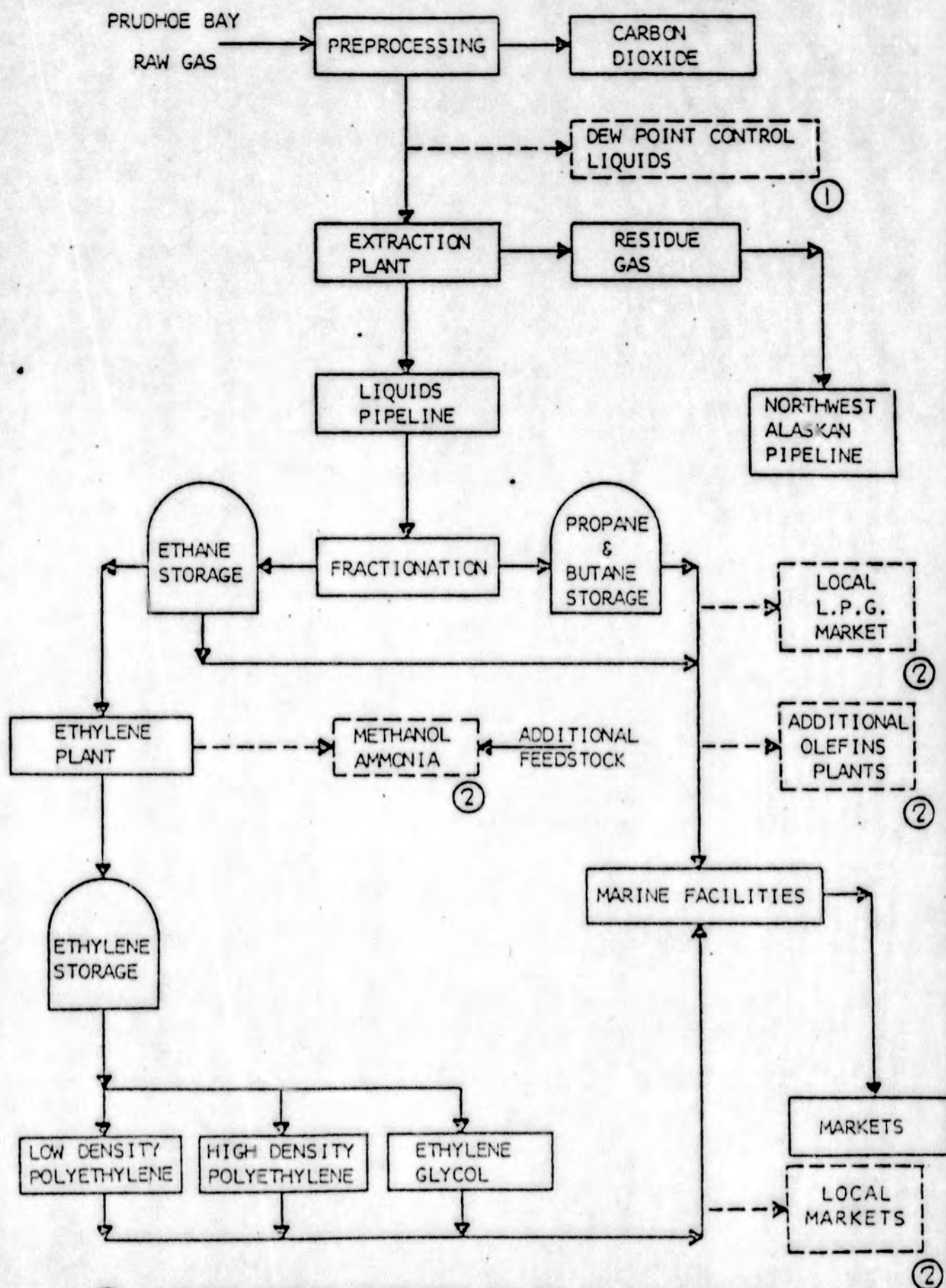
- CO₂ Extraction Plant — Prudhoe Bay
- Ethane Plus Extraction Plant — Prudhoe Bay
- Gas Liquid Pipeline — Prudhoe Bay to Tidewater
- Fractionation, Storage and Marine Loading Facilities at Tidewater
- Petrochemical Complex at Tidewater

OPTION 3

In Conjunction with Gas Pipeline

- CO₂ Extraction Plant — Prudhoe Bay
- Dew Point Control Plant — Prudhoe Bay
- Straddle Plant — Fairbanks
- Gas Liquids Pipeline to Tidewater
- Petrochemical Complex at Tidewater

ALASKAN ARCTIC RESOURCES PROJECT



① LIQUIDS REMOVED AT PRUDHOE BAY FOR DEW POINT CONTROL IF EXTRACTION PLANT IS AT FAIRBANKS

1. (a) What products and by-products, and in what volumes, would your proposed project produce?

The initial facilities would consist of a world scale size ethylene unit, the output of which would be processed into such readily marketable products as high density polyethylene, low density polyethylene and ethylene glycol in compatible world-scale sized derivative plants. The second, third and subsequent ethylene production facilities could include further processing into such products as polyvinyl chloride (PVC), styrene, polypropylene, and other high demand petrochemicals as the markets dictate.

Hydrogen rich off-gas from the ethylene unit plus any locally available natural gas could be converted to ammonia and methanol for sale in the Pacific Rim market.

The initial plant size would be as follows:

<u>Product</u>	<u>Plant Capacity</u>
Ethylene	1,200 million pounds per year
Low density polyethylene	500 million pounds per year
High density polyethylene	300 million pounds per year
Ethylene glycol	400 million pounds per year

Consideration will be given to the manufacture of linear low density polyethylene if the demand for this product expands rapidly.

1. (b) What products would be available for in-state use and consumption?

Polymers and ethylene glycol could be used locally. Availability of these products in Alaska will stimulate development of local industry requiring these products. Certain participants in the Group have substantial experience in converting these intermediate petrochemicals into higher value products, and would assist local businesses in developing appropriate facilities, or pursue such further processing independently.

Gas liquids will also be available for such in-state uses as LPG markets, possible use of the liquids to develop residential and industrial gas distribution systems prior to natural gas availability, and butanes and natural gasoline for refinery consumption. Gas liquids in excess of in-state demand would be exported from Alaska.

3. What feedstocks would be needed, and in what volume?

Pending the final conclusions reached, it is estimated the initial ethylene cracking facility and derivative plants will require the following feedstocks:

<u>Plant</u>	<u>Feedstock</u>	<u>Volume</u>
Ethylene	Ethane	35,000 barrels per day
Low Density Polyethylene	Ethylene	515 million pounds per year
High Density Polyethylene	Ethylene	315 million pounds per year
Ethylene Glycol	Ethylene	370 million pounds per year

Available information would suggest the following volumes of natural gas liquids in barrels per day will be available from each project option:

	<u>Option 1</u>	<u>Option 2</u>	<u>Option 3</u>
	<u>Pre Natural Gas Pipeline</u>	<u>Post Natural Gas Pipeline</u>	<u>Maximum Liquids</u>
			<u>Minimum Liquids</u>
Ethane	54,100	101,000	82,000
Propane	30,500	57,000	41,000
Butane	18,800	35,000	17,000
Gasoline	<u>16,600</u>	<u>31,000</u>	<u>4,000</u>
Total Production	120,000	224,000	144,000

It is anticipated that the maximum amount of liquids available at Prudhoe Bay will be required to support the high costs of facilities to extract, transport, and store these natural gas liquids in each case.

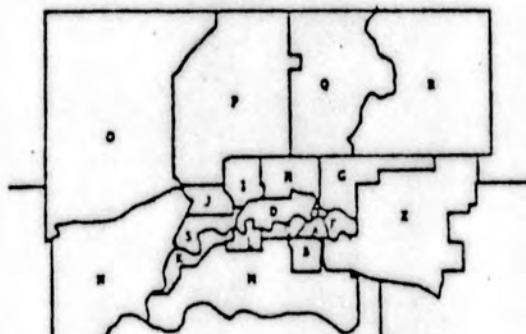
	(1) TOTAL POTENTIAL CUSTOMERS	(2) EXPECTED CUSTOMERS	(3) ANNUAL PER CUSTOMER (MCF)	(4) EXPECTED AVERAGE CONSUMPTION (MCF/YEAR) (MCF/DAY)	(5) PEAK CONSUMPTION (MCF/DAY)
RESIDENTIAL	5,880	5,000	300	1,500,000	4,110
COMMERCIAL	880	750	2,000	1,500,000	4,110
SUBTOTAL	6,760	5,750	N/A	3,000,000	8,220
ELECTRIC GENERATION	3	3	N/A	2,786,000	7,500
TOTAL	N/A	N/A	N/A	5,736,000	15,720
					21,372
					13,500
					34,872

Notes:

- (1) Total Potential Customers. Estimated customer base for the areas of Fairbanks which could initially be served. Specifically, these are 13 planning areas (A through L and S) as defined by the Planning Department of the Fairbanks North Star Borough, as indicated below.

POPULATION AND DWELLINGS
BY PLANNING AREA

FAIRBANKS
October, 1978



	ESTIMATED POPULATION	MOBILE HOMES DUPLEXES SINGLE FAMILY	MULTI- FAMILY	TOTAL (INCLUDING HOTELS)
A Central City	3,034	674	583	2,039
B Southside	3,783	803	768	1,946
C Lathrop	2,493	535	500	1,056
D Phillips	413	74	90	164
E Slaterville	801	197	127	324
F Hamilton Island	2,554	710	294	1,004
G Birch Hill	431	159	10	169
H Creumers	3,486	781	651	1,492
I College	1,588	503	84	587
J Campus	691	-	-	-
K Pike	599	206	16	242
L Westgate	1,971	533	279	831
S Geist	2,946	638	546	1,184
TOTAL	24,790	5,813	3,948	11,038

Notes: (contd)

- (2) Expected Customers. 85% of Potential Customers. The rate of conversion to gas will largely depend upon the customer's anticipated cost savings.
- (3) Annual Consumption Per Customer. Based upon monthly calculation of degree and consumption days for each customer category as summarized below:

	<u>Anchorage</u>		<u>Fairbanks</u>	
	<u>Annual Total</u>	<u>Monthly Average</u>	<u>Annual Total</u>	<u>Monthly Average</u>
Degree Days	10,534	878	14,279	1,190
Consumption/Customer (Mcf)				
Residential	229	19	300	24
Small Commerical	837	70	1,312*	109
Large Commercial	6,408	534	7,587*	632

*Average commercial consumption of 2,000 Mcf/Customer in Fairbanks derived by assuming the Anchorage ratio of 11% small and 89% large commercial.

- (4) Expected Average Consumption. (2) x (3)
- (5) Peak Consumption. Based upon analysis of daily consumption patterns adjusted to reflect Fairbanks weather.

TASK I-C

It is our considered opinion, after a perusal of all of the reference material Page 11-15) and consultations with the discussion participants (Page 3), that the State of Alaska should not at this time requisition formal studies as set out in the SCOPE OF WORK, but should instead consider the suggestions as set out in the SUMMARY AND OPINION (Pages 1-3).

To further exemplify the Alaska Arctic Resource proposed project regarding North Slope natural gas (as set out in Task I-B, page 15e, which is similar to the Dow-Shell proposal), a review of the vertical integration of separator gas in Alberta is of interest:

Separator gas is conditioned at many gas field plants in Alberta to meet pipeline specifications. The pipeline gas is then gathered in a vast pipeline network owned and operated by Alberta Gas Trunkline Co. Ltd. (a free enterprise corporation with original stock issues limited to Albertans and bonded debt carried by the Province of Alberta) and conveyed to border processing plants.

In the late 1950's, under Premier Ernest C. Manning's leadership, authority was enacted under the Energy Resources Conservation Board Legislative Act of the Province of Alberta, to strip all hydrocarbons other than methane from export gas thus setting the stage for a profitable series of events for free enterprise.

At present and for some years, the gas leaving Alberta is stripped of ethane (C_2), propane (C_3), butane (C_4) and heavier components by gas processing straddle plants at Empress on the Saskatchewan-Alberta boundary for southeastern export, and at Cochrane for gas leaving in a southwesterly direction. These straddle plants processing the gas are owned by free enterprise participants. Two products lines, one carrying C_2 and the other C_3 , and heavier, then convey these components to centralized plants for further processing and marketing. Alberta Energy Corporation owns 33 1/3 percent of the ethane pipeline system, and in turn is 50 percent Alberta government owned.

Free enterprise (Alberta Gas Trunkline) converts the C_2 to ethylene at Joffre, with the ethylene then being conveyed to a world-scale petrochemical plant at Fort Saskatchewan owned by free enterprise (Dow Canada). Surplus ethane, propane, butane and heavier is in turn batch-shipped by Cochin Pipeline, also owned by free enterprise, to other world-scale petrochemical plants in Eastern Canada and the United States, with a full spectrum of manufacturing products then entering the marketplace.

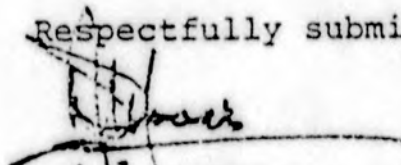
Upon perusal of the Dow-Shell submission by worthy and well-qualified representatives of the State of Alaska, a productive economic and engineering critique, together with recommendations, can then be provided. To accept any study without the foregoing is somewhat related to "having a fox determine the operation and management of a henhouse".

D. J. Moore

We respectfully submit that now is the time to expend every effort to obtain the highest and best use of North Slope natural gas for Alaskans, one of which could be to look over the fence and peruse the neighbor's plus and minus efforts in the self-same game.

Should the State of Alaska determine positively, the right to swap gas on a zero balance BTU basis, which is a right of Canadian users of North Slope gas (TIAS 9030), prior to and in conjunction with completion of the Dow-Shell study, an obvious advantage is to be obtained by providing the feedstock requirements (C_2) supplementary to Alaska's in-kind royalty portion of C_2 , thus satisfying said feedstock requirements of a world-scale olefin plant, by swapping methane (C_1) for ethane (C_2).

Respectfully submitted,



D. J. MOORE

**PLEASE NOTE: THE PRECEDING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT.**

CONTRACT

Between

STATE OF ALASKA, HOUSE RESEARCH AGENCY

and

ZINDER ENERGY PROCESSING

The parties to this agreement are the HOUSE RESEARCH AGENCY on behalf of the Alaska State Legislature's Joint Gas Pipeline Committee, hereinafter referred to as the "Agency", and ZINDER ENERGY PROCESSING, hereinafter referred to as the "Contractor."

The PURPOSE OF THIS AGREEMENT is to provide the Alaska State Legislature with specialized consulting services regarding the economic feasibility of a petrochemicals industry in Alaska.

IT IS THEREFORE MUTUALLY AGREED THAT:

CLAUSE 1.—STATEMENT OF WORK

- (A) The Contractor will prepare an economic evaluation computer model in which combinations of costs and prices can be evaluated to determine thresholds of economic feasibility, projected income statements and real returns on investments over a 20 to 25 year period for a gas liquids based petrochemicals industry in Alaska. This computer model will incorporate feasible ranges of financing, feedstock, transport, construction and operating costs and world market prices. The following factors will be ranged:

feedstocks--available volumes of various composition, prices charged by the State and private producers, and tariffs

construction costs--conditioning plant, extraction (straddle) plant, pipelines, and world-scale petrochemicals plant (with special attention to factors that influence construction costs in Alaska)

investment considerations--charges under various financing schemes, real and inflated discount rates

operating costs--labor, maintenance, and fuel

product prices, marketing and transport costs--for both domestic and Pacific Rim markets.

In ranging factors, assumptions reflecting sensitivity to oil pricing and supply will be provided by the contractor. The Agency will assist in establishing parameters on all ranges, except those pertaining to investment considerations, marketing considerations, and product pricing. The alternative scenarios listed in Appendix A to this contract will be used as the basis for ranging transport and construction costs. Current federal and State taxation will be used for the model.

The economic evaluation computer model will be designed in such a manner as to permit the later incorporation of public financial incentives, subsidies, investments, changes in federal and State taxation, and risk aversion factors.

- (B) The Contractor will develop the computer model in Fortran IV to be run on an IBM System/370 Model 3033. The tape, source code and documented input data coding form will be provided to the Agency by the Contractor following completion of the project.
- (C) The Contractor will prepare a two volume report. The first volume will contain a non-technical narrative explaining the computer model and the results of the computer runs. The report will identify those sets of circumstances which would have to prevail within the ranges of factors, if a petrochemical industry in Alaska is to be economically feasible. The second volume will contain the output from the computer runs.
- (D) The Contractor will attend two on-site consultations with the Agency, for a total of six (6) days. One meeting will occur at the outset of the study to establish the research design. Prior to this meeting, the contractor will submit a memorandum to the Agency which describes the information needed from the study team to range the factors. The second meeting will follow completion of the draft report to interpret data and identify possible policy applications of the study findings.

CLAUSE II.--PERIOD OF PERFORMANCE

- (A) A draft of the report required under Clause 1(C) will be delivered to the Project Director by August 15, 1980. A final report incorporating comments from the Agency, will be delivered to the Project Director by September 5, 1980.
- (B) Unless extended by written agreement, this contract expires on September 30, 1980.

- (C) The contract may be terminated by the Agency on seven (7) days advance written notice to the Contractor. In the event of termination, the Contractor shall receive a lump sum payment determined by multiplying the contract price (\$43,500) times the proportion of the total work completed by the Contractor.

CLAUSE III.--PROJECT DIRECTOR

The Project Director will be Duncan Reed, Director of the House Research Agency.

CLAUSE IV.--PROGRESS REPORTS

The Contractor will keep the Project Director informed as to the progress of the work performed under this agreement and shall provide progress reports as specified by him, including estimates of the proportion of total work completed by the Contractor.

CLAUSE V.--COMPENSATION AND METHOD OF PAYMENT

- (A) Total compensation under this contract, inclusive of expenses, shall not exceed \$43,500, except that this amount shall be reduced by 10% if the work specified in Clause I is not completed by September 5, 1980.
- (B) The Contractor will be compensated at the billing rates specified in Appendix B.
- (C) Billings for all work and requests for reimbursement of expenses shall be submitted monthly to the Project Director and shall specify the number of hours worked by each of the Contractor's principal staff people.

CLAUSE VI.--CHANGES IN CONTRACT SCOPE

If there is any significant change of scope to consider products beyond those based on natural gas liquids, additional compensation may be negotiated between the two parties to this agreement.

CLAUSE VII.--RECORDS, DOCUMENTS, AUDIT

- (A) The Contractor shall maintain accurate records of the time worked and such other records as may be required by the Project Director. The records of time worked are subject to inspection by the Agency or the Project Director at all reasonable times.

- (B) All documents, reports and writings, and computer tapes, generated as a consequence of work done under this contract shall become the property of the State of Alaska, and on completion of the work or at the termination of this contract, such material, or copies thereof, shall be delivered to the Agency. Nothing herein prevents the later use of such material by Contractor.

CLAUSE VIII.--ALL WRITINGS CONTAINED HEREIN

This agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this agreement shall be deemed to exist or to bind either of the parties of this agreement.

IN WITNESS WHEREOF, the parties have executed this agreement on the dates noted.

ZINDER ENERGY PROCESSING

STATE OF ALASKA
HOUSE RESEARCH AGENCY

Philip E. Kean

5/2/80
Date

Duncan L. Read 5/28
DUNCAN L. READ Date

Accepted: JOINT GAS PIPELINE COMMITTEE

Approved as to form.

Bill Miles

BILL MILES, Co-Chairman

Barry J. Brown June 6, 1980

Agency Legal Counsel

Mike Colletta

MIKE COLLETTA, Co-Chairman

APPENDIX A

ALTERNATIVE SCENARIOS

1. Conditioning plant at Prudhoe Bay; separate liquids line from Prudhoe Bay to tidewater at location on the Gulf of Alaska; petrochemicals complex at tidewater.
2. Conditioning plant at Prudhoe Bay; separate liquids line from Prudhoe Bay to Fairbanks; petrochemicals complex at Fairbanks; product transportation from Fairbanks to tidewater by rail or other mode of transportation.
3. Conditioning plant at Prudhoe Bay; all gas in main gasline from Prudhoe Bay to Fairbanks; liquids extraction/straddle plant at Fairbanks; petrochemical complex at Fairbanks; transportation of product from Fairbanks to tidewater.
4. Conditioning plant at Prudhoe Bay; all gas in main gasline from Prudhoe Bay to Fairbanks; liquids extraction/straddle plant at Fairbanks; separate liquids line from Fairbanks to tidewater; petrochemicals complex at tidewater.
5. Minimum conditioning facility at Prudhoe Bay; all gas in main gasline to Fairbanks; conditioning plant at Fairbanks, with liquids extracted for petrochemicals complex at Fairbanks, transportation of product from Fairbanks to tidewater.
6. Minimum conditioning plant at Prudhoe Bay; gas in main gasline to Fairbanks; conditioning and extraction plants at Fairbanks, with separate liquids line from Fairbanks to tidewater and petrochemicals complex at tidewater.

APPENDIX B

BILLING RATES
ZINDER ENERGY PROCESSING

	<u>Per Day</u>
Theodore Davis	\$700
Philip Keown	\$550
Lamente Long	\$550
Betty Cook	\$175

AMENDMENTS TO CONTRACT

Between

STATE OF ALASKA, HOUSE RESEARCH AGENCY

and

ZINDER ENERGY PROCESSING

It is mutually agreed that Clauses I, II, and V of the contract between the above parties, dated June 6, 1980, is hereby amended to read as follows:

CLAUSE I -- STATEMENT OF WORK (A) is amended to read:

(A) A new paragraph is inserted to read:

For each alternative scenario listed in Appendix A, the following three ethylene production cases will be analyzed:

1. One ethylene plant
2. Two ethylene plants
3. Maximum ethane feedstock ethylene production

CLAUSE I -- STATEMENT OF WORK (D) is amended to read:

(D) The Contractor will attend three on-site consultations with the Agency, for a total of nine (9) days. One meeting will occur at the outset of

the study to establish the research design. Prior to this meeting, the Contractor will submit a memorandum to the Agency which describes the information needed from the study team to range the factors. The second meeting will follow completion of the first draft of the report to interpret data and review project methodology. The third meeting will follow completion of the second draft of the report to identify possible policy applications of the study findings and initiate computer training.

CLAUSE II -- PERIOD OF PERFORMANCE is amended to read:

- (A) A first draft of the report required under Clause I(C) will be delivered to the Project Director by August 18, 1980. A second draft of the report, incorporating comments from the Agency, will be delivered to the Project Director by September 30, 1980. The second draft will be reviewed by the Agency and representatives of both the executive and legislative branches from October 1 through October 8, 1980. The Contractor will then prepare a final report, incorporating review comments, and deliver an original of the final report to the Project Director by October 24, 1980.
- (B) Unless extended by written agreement, this contract expires on November 30, 1980.

CLAUSE V -- COMPENSATION AND METHOD OF PAYMENT is amended to read:

- (A) Total compensation under this contract, inclusive of expenses, will be a fixed fee of \$61,500. If the work specified in Clause I is not completed according to the schedule in Clause II (A), the Agency may withhold from payment \$500 per day for each day that the work is delayed.
- (C) Billings for all work and requests for reimbursement of expenses shall be submitted to the Project Director as follows:
1. 15 percent of the total contract price on June 30, 1980
 2. 30 percent of the total contract price on July 30, 1980
 3. 20 percent of the total contract price on August 30, 1980, contingent on receipt of the first draft of the report.
 4. 20 percent of the total contract price on September 30, 1980, contingent on receipt of the second draft of the report.

5. The remaining 15 percent of the contract price on October 30, 1980,
contingent on receipt of the final report.

IN WITNESS WHEREOF, the parties have executed this agreement on the dates
noted.

ZINDER ENERGY PROCESSING

STATE OF ALASKA
HOUSE RESEARCH AGENCY

Date

Duncan L. Read 9/17/80
DUNCAN L. READ Date

Accepted: JOINT GAS PIPELINE COMMITTEE

Approved as to form

Bill Miles 9/17/80
BILL MILES, Co-Chairman Date

Agency Legal Counsel Date

Mike Colletta 17 Sept 80
MIKE COLLETTA, Co-Chairman Date

**PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT**

STUDY OF THE IN-STATE USES OF THE STATE OF ALASKA'S ROYALTY
SHARES OF PRUDHOE BAY NATURAL GAS (AND NATURAL GAS LIQUIDS) (added)
PROPOSED CHANGES IN SECOND DRAFT PROPOSAL

Overall scope: Study will consider all hydrocarbons produced as part of the gas stream at Prudhoe Bay ($C_1 - C_6$) to the extent they may be used or processed for final use within the state. It would consider, for example, the possible residential and commercial distribution of natural gas in Fairbanks, the distribution of propane as "bottle gas" for Alaska consumption, the use of natural gas liquids (NGLs) as fuel for electric utility boilers or turbines in Alaska, and the conversion of natural gas (and associated CO_2) to fuel-grade methanol or fertilizers for in-state use. The study would not, however, deal with the conversion of methane to methanol or urea, ethane to ethylene, or butanes to MTBE, for export (even where local use may be an incidental effect), except to the extent that plans for export-oriented processing investments may influence options for in-state use.

Introduction: The introduction would devote some attention specifically to the Dow-Shell agreement with the State and its possible influence on the availability of gas and NGLs for in-state use.

Sequence of tasks: I would divide the subtasks differently --- as follows:

- a. Detailed work plan.
- b. Introductory overview --- a companion-piece in scope and style to the primers on refining and petrochemicals.
- c. Raw materials assessment --- identification and quantification of the proved and probable supplies of natural gas and NGLs; their ownership, contractual, and regulatory status; their cost and opportunity value to those controlling the supplies; and their likely field prices.
- d. Primary processing, conditioning, and transportation assessment --- identification and analysis of the alternative combinations of gas processing and conditioning systems, transportation arrangements, and choice of ANS local fuels, with respect to their effect on the availability and cost of natu-

① Status
② Bonner Moore
③ Shuck of PL

al gas, NGLs, and products (like methanol) for final consumption in various parts of Alaska.

e. Distribution assessment --- description and analysis of potential distribution systems (natural gas, bottle gas, methanol, etc.), with particular attention to the effects of scale and density of consumption; and of the probable cost of distribution.

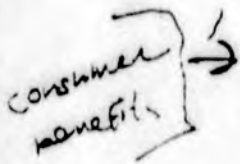
f. Market analysis --- estimation of the volume of potential in-state demand for natural gas, NGLs, and products processed from them, and their market value (as determined by the prices of alternate fuels, or the same fuel from other sources.

g. Economic and financial analysis --- using inputs from tasks c - f, identify plausible opportunities to lower fuel costs or provide other benefits to Alaska consumers (residential, commercial, and industrial) by in-state use of Alaska natural gas, NGLs, and methanol. Perform conventional cash flow and investment analyses to select the most promising systems.

h. Sensitivity and risk analyses --- using decision analysis, Monte Carlo techniques, or other methods of manipulating probabilistic inputs and uncertainty, determine the market and financial risks, and the sensitivity to specified variables, of the viability of the systems chosen in g.

i. Policy options --- identify and analyze state policy issues relevant to the study topic, and the policy implications of the findings of tasks g and h. Compare plausible policy options.

Consumer
benefits



Schedule. The full program, either in the second draft, or as described here, cannot be carried out competently in the time allowed. I propose that task b, the Introductory Overview, be scheduled for completion by mid-Session, but that the full technical analyses be delivered at mid-year (i.e., by June 30).

Subcontracts. I don't know whether NERA is the right subcontractor for the task assigned them. I would prefer to use local talent (e.g., Fred Boness) for regulatory legal analyses, and allow them to consult with specialized out-of-state talent as necessary.

For both the regulatory analysis and the engineering inputs, I suggest that the proposal simply describe the capabilities we are seeking in the subcontractors, and specify that the Contract Officer for the Committee have the right to review and approve subcontractors designated by ISER.

Staff and budget: These considerations are intimately linked to the work program. I have not had time to consider them in detail, but will work up a generalized plan for you to flesh out.

•

MARK

THIS IS AN UNEDITED DRAFT WHICH NEITHER
SCOTT NOR ARON HAVE YET TO REVIEW. IT WILL BE
REVISED AND THE BUDGET LAID OUT BY TOMORROW
AFTERNOON. WE'LL ALSO IDENTIFY THE ENGINEER WE
HOPE TO USE. NORMALLY I WOULDN'T RELEASE A FIRST
DRAFT FOR OUTSIDE REVIEW BUT WILL IN THIS INSTANCE
TO FACILITATE GETTING YOUR COMMENTS BACK.

A STUDY OF THE IN-STATE USES OF THE STATE OF ALASKA'S
ROYALTY SHARES OF PRUDHOE BAY NATURAL GAS

THE DRAFT IS NOT FOR DISTRIBUTION.

(Lee Gorsuch)

INSTITUTE OF SOCIAL AND ECONOMIC RESEARCH
UNIVERSITY OF ALASKA

OCTOBER 1980

Do Not
Distribute

Background and Purpose

Alaska's economy is based largely on the extraction and export of natural resource commodities, the most important of which is petroleum.¹ As in most countries and regions with a similar economic base, many Alaska business and political leaders advocate policies to encourage the local upgrading, refining, or processing of indigenous crude materials prior to their exportation. Additional in-state petroleum processing could take the form of fuels refining, liquefaction of natural gas for export as LNG, or conversion of crude oil refinery products, natural gas, and/or NGLs into primary or secondary petrochemicals.²

During the past two years the issue of in-state processing of Alaska oil and natural gas has captured statewide attention. North Slope crude oil is now flowing through the Trans-Alaska Pipeline at the rate of 1.5 million barrels each day; and except for about 80,000 daily barrels that are refined in Alaska, the oil all leaves the state in crude form. This fact, coupled with the traumatic fall in employment following completion of the oil pipeline, has generated an enthusiasm within business and government for adding "wordscale" refining and petrochemical operations to the Alaska economy.^{3,4} The Alaska Legislature's approval of the Alpetco contract, to refine in Valdez approximately, 100,000 b/d of the state's royalty oil substantiates this desire and intent to add value to the state's extracted resources prior to exporting them.

In addition, planning for the transport of North Slope gas and gas liquids adds an element of urgency to state policymaking: Negotiations among the interested parties, including the State of Alaska, are presently underway with respect to decisions about the Alaska Highway Gas Pipeline design and the transportation tariff. The outcome of those decisions could virtually preclude the upgrading of those resources in Alaska unless a commitment to process some portion in-state is made before pipeline construction plans are finalized.

Several important studies which bear on the state's efforts to secure options to use or process portions of its royalty share in-state include an engineering and design study related ^{participation in the} to the gas pipeline and the gas conditioning plant; an examination of the feasibility of using the state's share of royalty gas/gas liquids to support an Alaska based petrochemical industry; a study to design and estimate the costs (and tariffs) associated with constructing an exclusively gas liquid pipeline; and a research project to develop a microeconomic model of a workscale ^{id} petrochemical facility. In addition to these projects, the state is sponsoring a series of energy-related studies designed specifically to address the questions of how the state can best meet its projected energy requirements given the various alternative sources of energy supplies in Alaska.

All of these efforts bear directly or indirectly on the more narrowly focused policy questions related to the alternative in-state uses of the state's royalty gas, minus the liquids which may have been stripped from the gas stream as a part of the conditioning of gas for transmission. They serve as a policy context as well as a source of pertinent information.

Because one-eighth of oil and gas produced on state land (including the Prudhoe Bay field) is owned by the state as royalty, state government interest in where Alaska hydrocarbons are processed and/or how they are used is inescapable. While it is conceivable that Alaska policy-makers might accept a passive role with respect to what private oil companies choose to do with their working interest in the hydrocarbons, public officials cannot avoid considering in-state use and processing as they decide how to dispose of the state's own royalty share.

Currently, the expressed policy of the Hammond administration (and the apparent policy of the Legislature) is to promote in-state processing of Alaska crude oil, natural gas, and NGLs, but only so far as they do not require direct or indirect state subsidies, or the waiver of environmental standards. Assistance to Alpetco, for example, has been limited to the sale of royalty oil--at full market value--plus technical assistance and a strong symbolic endorsement of the project by state officials.

The proposed study of in-state uses of the state's royalty shares of natural gas from the Prudhoe Bay field will be consistent with this policy framework. However, the study will examine the relative significance of selected policy options as they affect the overall feasibility and benefit-cost assessments of using the state's royalty gas in-state. The state could, for example, entertain several alternative ways of organizing and financing the distribution of gas for in-state uses, with varying effects on both feasibility and benefit-cost assessments.

Scope and Method of Work

To examine whether or not it is feasible for the State of Alaska to use its royalty shares of natural gas for in-state consumption involves a series of sequentially related questions, the answers to which are often interdependent. The characteristics of the natural gas and the terms under which it would be available circumscribe many of the questions concerning the demand for natural gas and its by-products. The demand for various uses, in turn, establishes the parameters for sketching the design, organization, and financing of alternative gas distribution and consumption options. These distribution and consumption options determine the price and value of the in-state use which can be compared to other marketing options and ^{the cost of} other energy sources.

The scope of the proposed project will explicitly examine (a) the potential demand for direct residential and commercial use of natural gas both along the pipeline corridor and within the railbelt region; (b) the potential industrial demand, with particular attention to the energy requirement of the developing agricultural industry and the potential feedstock uses of natural gas by ammonia/urea plants and for the stripping of propane and butane from the gas stream; and (c) other potential market demand within Alaska, with a particular examination of a possible swap of the state's royalty gas with that of the Cook Inlet producers'. Throughout the examination of each of these three

topics attention will be devoted to the statutory and regulatory framework affecting each of these potential uses and to the policy decisions and options available to the State of Alaska. An integral part of the study method will be the sensitivity to the technical, economic, and regulatory uncertainties confronting the potential demand and use of the state's royalty shares of natural gas.

The following series of research tasks set forth the basic approach and methods ISER will employ to accomplish the objectives of the study and to address each of the topics cited above.

Task 1 - Finalize the Study design

ISER will review the proposed study plan with the legal and technical consultants who are representing the State of Alaska in the FERC proceedings concerning the gas pipeline and with its consultants from the National Economic Research Associates. Adjustments will be made in the study, subject to the approval of the project monitor, to ensure that the study design addresses the economic concerns likely to be raised during the proceedings and that the study take full cognizance of the legal and regulatory parameters potentially affecting the use of the state's royalty shares of natural gas in-state.

Task 2 - Establish Supply Estimates

Estimates of the quantities of natural gas, its condition, and wellhead value all need to be established as a data base of available supplies of natural gas. Similarly the uncertainties regarding the reservoir which affect production estimates needed to be taken into account and the alternative outcomes of pending negotiations over the gas conditioning plant which will affect both the character or composition of the gas properties available for in-state use as well as the wellhead value of the gas also need to be documented.

The various legal and regulatory constraints which potentially affect both the production and value of Prudhoe Bay natural gas will be identified and described. To the extent practicable these constraints will be defined in terms of the range of the impacts possible changes in these constraints may have in the estimates of both the quantities and value of Prudhoe Bay natural gas.

The product resulting from this task will be a working paper setting forth the range of production estimates of natural gas, the alternative set of properties the gas supplies will have once it has entered the gas pipeline, and range of wellhead values of the gas. The paper will highlight the policy decisions affecting these production and value estimates and the actual properties of the gas.

Task 3 - Specify In-state Uses and Project Demand for Such Uses

The actual properties of natural gas at the tap will define whether or not some uses such as selected industrial feedstocks is feasible. However, in general the likely categories of uses include both residential and commercial use for such purposes as space heating, cooking, water heating, transportation, industrial uses either as feedstocks or process heating, and power generation uses associated with public utilities. Once each of these categories have been specified in adequate detail estimates of demand both present and projected through the estimated life of Prudhoe Bay gas production will be generated for the following localities and regions:

Communities along the pipeline corridor, including Bettles, Anah-tuvak Pass, Fairbanks, Big Delta, Delta Junction, Ft. Greely, Dot Lake, Tetlin, Tanacross, Tok, the Delta Barley project area, and Northway.

The railbelt region, including the Greater Anchorage area, Cook Inlet, and the Kenai area.

ISER's energy end-use model will be used to generate demand estimates, augmented by a peak load analysis, for each of the localities and regions. The model is, however, appropriate for forecasting only demand for residential, commercial, and power generation uses.

Separate analyses, appropriate for each of the specific industrial uses will be required and will be performed by Mr. Kent Miller, an experienced industrial analyst.

The product of this work task will be a use and location specific demand forecast appropriate for each scenario.

Task 4 - Contract Technical Supply Scenario and Cost Estimates

For each type of use ISER will subcontract with a consulting engineering to sketch the design and cost of the necessary distribution and/or processing system required to meet the projected demand. Gas taps for community residential and commercial uses will be performed on a prototype basis using community size and distance from the gas pipeline as the variables considered in selecting two or three applications. Separate analyses will be performed for both Fairbanks' and the railbelt regions and for the various industrial uses.

A composite, aggregate analysis will then be performed in an effort to assess the overall configuration of the various uses and to attempt to achieve as much technical integration as is possible. The organization and financing of the various supply alternatives will be a separate but integral task, the outcome of which will yield estimates of the price at which the projected demands can be met by using portions of the state's royalty gas.

Task 5 - Compare Prices of Alternative Energy Sources

Drawing upon numerous existing studies pertaining to alternative energy sources and analyses of existing energy supplies ISER will compile a cost schedule of alternative energy supplies for and within the various energy markets and analyze the cost differences. Assumptions necessary to derive such cost estimates will be specified. The more significant technical, legal, environmental, and economic differences among the energy alternatives will also be discussed. This analysis will for all practical purposes establish an opportunity cost for the in-state use of natural gas.

Task 6 - Conduct a Benefit/Cost Analysis

Building upon the preceding task, ISER will perform a benefit/cost analysis of the in-state use of Prudhoe Bay natural gas. The analysis will include changes in consumer costs, employment levels, and property valuations. Consideration will also be given to changes in equipment, technology, maintenance, reliability of services, and expansion potential. Safety as well as environmental and regulatory concerns will also be addressed. The task will conclude with a synopsis of the major benefits and costs associated with the various in-state uses.

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Task 7 - Summarize Policy Options

A concluding work paper will be prepared summarizing the policy issues and options that underly and directly affect the overall decision of using all or portions of the state's royalty gas for in-state purposes. The paper will address not only this overall issue but also delineate the subsequent choices implicit in the decision the state will confront in implementing its decision, i.e., the organizational, financial, and regulatory issues surrounding the various uses of natural gas.

WORK PLAN AND SCHEDULE

The following chart identifies both the task to be performed, the person principally responsible for performing the task, and projected date of completing the task.

<u>Task</u>	<u>Person Responsible</u>	<u>Completion Date</u>
1.		
2.		
3.		
4.		
5. Alternative Price Study		
6. Benefit/Cost Analysis		
7. Policy Options		

BUDGET

<u>Personnel</u>	<u>No. Days</u>	<u>Daily Rate</u>	<u>Total</u>
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Tussing, Arlon			
Goldsmith, Scott			
Rowe, Phil			
Dignan, Terry			
Siver, Darla			

Fringe

Overhead

Subcontractors

Miller, Kent			
Harrison, Gordon			
National Economic Research Association Engineer			

Travel and Related Expenses

Office and Related

Communications			
Xeroxing			
Computer			
Supplies			
Miscellaneous			

V. QUALIFICATIONS

This section outlines the qualifications to perform the work proposed. The general area of ISER's expertise is provided along with a listing of previous relevant projects and resumes of key individuals to be employed in the effort. Additionally, a description of subcontractors and their qualifications is provided.

Institute of Social and Economic Research

The primary mission of the Institute of Social and Economic Research is to study and provide information on the contemporary issues confronting the state's economy, population, and social and political institutions. It investigates such issues as the economies of natural resource development, principally petroleum and fisheries, and of land-use alternatives, the social and economic impacts of proposed resource developments such as oil or gas pipelines, petrochemical facilities, and hydroelectric projects; the effectiveness of federal and state programs operating in Alaska; the state's transportation and energy requirements; the development of human resources; and the effects of modernization on Alaska Native people and cultures and on the overall quality of life in Alaska.

Established by the Alaska State Legislature in 1961, the Institute of Social and Economic Research (ISER) is administratively a part of the University of Alaska, Fairbanks, but has staff based at three campuses--Fairbanks, Anchorage, and Juneau. Computer terminals at the Fairbanks

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and Anchorage offices link the institute to the university's computer system. The ISER staff is multidisciplinary, comprising economists, sociologists, anthropologists, social workers, political scientists, demographers, planners, educational psychologists, and geographers. In addition to the work of its permanent staff, ISER conducts research in collaboration with other university faculty members, private businesses, and other U.S. universities. It is currently engaged in a continuing research agreement with the Harvard-MIT Joint Center for Urban Affairs.

The following is a partial listing of research ISER and the proposed principal investigators have performed in recent years which is relevant to the proposed study:

1. "Federal Policies Affecting the Wellhead Value of Prudhoe Bay Crude Oil," (for the Alaska Legislative Council's Subcommittee on Oil and Gas Leasing and Taxing Policies, Ninth Alaska State Legislature), March 28, 1977, 120 pp., by Arlon Tussing.
2. "Energy Intensive Industry for Alaska," (for Department of Commerce and Economic Development), 1978, 339 pp., by Oliver S. Goldsmith and Kent Miller.
3. "An Introduction to the Gas Industry, with Special References to the Proposed Alaska Highway Gas Pipeline" and "Marketing and Financing Supplemental Gas, the Outlook for, and Federal Policy Regarding, Synthetic Gas, LNG, and Alaska Natural Gas," (A report to the Alaska Legislature), October 25, 1978, 309 pp., by Arlon R. Tussing and Connie C. Barlow.
4. "Oil and Gas Consumption in Alaska, 1976-2000," (for Alaska Royalty Oil and Gas Development Advisory Board and 1978 Alaska State Legislature), January 1978, 1200 pp., by Oliver S. Goldsmith and Tom Lane. This report is to be updated this year by Dr. Goldsmith under subcontract to the Department of Natural Resources.

5. "The Alaska Highway Gas Pipeline: A Look at the Current Impasse," (for the Legislative Affairs Agency), January 12, 1979, 72 pp., by Arlon R. Tussing and Connie C. Barlow.
6. "Financing the Alaska Highway Gas Pipeline: What is to be Done?" (for the Legislative Affairs Agency), April 1979, 120 pp., by Arlon R. Tussing and Connie C. Barlow.
7. "Petrochemical Development Study," Alaska Division of Policy Development and Planning, by Arlon R. Tussing, 1978.
8. "Royalty Oil and Gas Export Study" February 22, 1978, Alaska Department of Natural Resources. Paper presented to State Royalty Oil and Gas Board, February 22, 1978, by Arlon R. Tussing.
9. Consulting to Alaska Legislature and Joint Alaska-California Interagency Group seeking solution to the West Coast oil surplus. Arlon R. Tussing. 1978-1979.
10. Consulting to State of Alaska (Commissioners of Natural Resources and Revenue) concerning negotiations for Alaska-Japan-Mexico oil swap. Arlon R. Tussing, 1979.
11. "The Alpetco Petrochemical Proposal: An Economic Impact Analysis" (a report to the Alaska State Legislature), April 1978, 174 pp., by Oliver S. Goldsmith and Lee Huskey.
12. Evaluation of and proposed amendments to Alaska preleasing procedures for oil and gas, by Arlon R. Tussing. (Sponsored by one of the oil producers, but intended as assistance to DNR).
13. "Electric Power Requirements for the Railbelt," Alaska Legislature, House of Representatives' Special Committee on Power Alternatives and the Alaska Power Authority. March 1980, ___ pp., by Oliver S. Goldsmith.
14. "The Impact of Fuel Price Increases on Rural Alaska," the Alaska Growth Policy Council, in preparation, by Oliver S. Goldsmith.

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In addition to these past studies, ISER will concurrently to the proposed research, be engaged in two other highly relevant research projects. For the Division of Policy Development and Planning of the Governor's Office, under subcontract to Battelle Memorial Institute Pacific Northwest Laboratories, ISER will be participating in the "Railbelt Electric Power Alternatives Study." The purpose of this study is to evaluate alternative sources of electric power supply and conservation in the railbelt region of Alaska and to prepare a comprehensive energy plan for this region. ISER's responsibility in this important project will be to test the sensitivity of various load forecasts to the various parameters and underlying assumptions of the various energy demand models. In addition, ISER will assist Battelle to improve the energy consumption data required to operate ISER's energy end-use model.

Under contract to the Alaska State Legislature's Joint Gas Pipeline Committee in collaboration with a grant from the Ford Foundation, ISER will be generating a series of reports related to fuels refining and hydrocarbon processing and petrochemicals manufactured in Alaska. Two primers will be developed on these subjects to analytically describe the nature of the associated technology, the feedstocks, markets, industrial organization, and the financing and regulation of these industries. The primers will be written in lay language, highlighting the issues related to the costs and benefits of proposed investments in Alaska and designed to serve as background material for policy deliberations by state officials, legislators, and other citizens.

In addition to the two primers, topical reports will also be prepared which examine (a) the possible methods of governmental assistance to proposed developments in Alaska based on the use of Prudhoe Bay natural gas and natural gas liquids and (b) the inter-relationship of the proposed gas-based petrochemical project(s) and the Alaska Natural Gas Pipeline Project, with particular emphasis on any jeopardy a petrochemical facility might impose on the pipeline (and how it could be alleviated).

A primary advantage in using ISER to perform the proposed work is the cumulative knowledge of the Alaska economy and of energy economics. All of ISER's proposed principal researchers have extensive professional experience in Alaska and maintain an active and on-going involvement in Alaska energy-related and economic development-related issues.

ISER's two principal investigators responsible for designing, directing, and conducting the research are:

Dr. Arlon Tussing, adjunct Professor of Economics and noted authority on petroleum economics.

Dr. Scott Goldsmith, associate Professor of Economics and a specialist in energy economics and fiscal policy.

Resumes for both Dr. Tussing and Dr. Goldsmith are attached as Appendix A.

Assisting ISER will Dr. Gordon Harrison and Mr. Kent Miller.

Dr. Harrison a former ISER faculty member is a consulting socio-economic consultant with a range of consulting experience pertaining to Alaska's oil and gas resources. Mr. Miller has been a frequent ISER subcontractor as an industrial economist. He performed a feasibility study of a natural gas distribution study in Fairbanks for Doyan LTD. and has extensive corporate experience with energy-intensive industries.

To assist in study design and review of findings ISER will subcontract with the National Economic Research Associates, NERA, based in New York. NERA has considerable experience before the Federal Energy Regulatory Commission and will be helpful in guiding the design of the project within the appropriate regulatory framework.

ISER will also subcontract with an independent engineer to assist in the instruction and cost estimation of technical scenarios associated with the design of facilities to transport and process natural gas for in-state uses.

**PLEASE NOTE: THE PRECEDING PAGES WERE TREATED
AS A UNIT IN THE ORIGINAL DOCUMENT.**