

SCOMM

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Alaska State Legislature

JOINT GAS PIPELINE COMMITTEE
1024 West 6th Ave.
Anchorage, Alaska 99501

(907) 279-1243

October 21, 1980

Dear Member of the Natural Gas Industry:

Attached are two requests for proposals: one for a study of the potential uses, in Alaska, of the state's royalty share of Prudhoe Bay natural gas, the other for a combined study of instate uses and the instate extraction and transportation of Prudhoe Bay gas liquids. The additional request for proposals for a combined liquids line/instate use study is being made for three reasons:

1. Several individuals have suggested that the issues to be analyzed in the two studies should be discussed together.
2. A combined study effort would avoid needless duplication, resulting in lower costs.
3. Those making the final decisions on the studies should have the greatest possible range of options from which to choose.

Study proposals for both separate liquids line and instate use studies, and for a combined effort, will be considered.

We would appreciate hearing from any firms that intend to submit a combined study proposal by the earliest possible date, by November 12, 1980 at the latest. The deadline for the actual submittal of the proposals is November 21, 1980.

Please contact me at the above address if I can be of assistance in any way.

Sincerely,

A handwritten signature in cursive script that reads "Mark Wittow".

Mark Wittow
Study Manager
Joint Gas Pipeline Committee

Senator Mike Colletta, Co-Chairman
Representative Terry Gardiner,
Speaker of the House

23 Capital Budget Proposed Project

Form 26 MUST BE COMPLETED AND ATTACHED WITH EACH PROPOSED PROJECT REQUEST

Feasibility Study of Alaskan Communities' TITLE Utilization of NW Pipeline Natural Gas				OPERATING BUDGET BRD Energy & Power Development																																											
PRIORITY GF 80-2	STARTING DATE 8-79	COMPLETION DATE 1-80	TOTAL PROJECT COST \$ 100.0																																												
LOCATION		AREA Communities along NW gas SERVED pipeline route	ELECTION DISTRICT 19,20,21																																												
SOURCE OF COST ESTIMATE DEPD			DATE OF ESTIMATE 10-78																																												
DESCRIPTION Conduct a detailed analysis of costs, major issues and constraints associated with tapping the Alaska portion of the natural gas pipeline for local community uses such as space heating and electrical power generation.																																															
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AGENCY _____

PROGRAM Energy Planning & Assistance

PROJECT & PRIORITY NO GF 80-2

26 Capital Budget Project Justification

OBJECTIVE:

To conduct a feasibility study for natural gas service to communities along the Alaska natural gas line.

Justify the project using the four headings below in the order they appear. Expand upon each section as required. Repeat heading when commencing response. Submit justification for each project listed in first column of Form 27. Attach feasibility studies, reports, or other documentation available. Use Form 23 as continuation sheet.

DOCUMENTATION OF NEED (Cite quantitative and measurable need.)

III. DOCUMENTATION OF ESTIMATED CAPITAL COST (Discuss degree of reliability.)

I. ANALYSIS OF IMPACT ON OPERATION: EXPENSE (estimate and justify.)

IV. IDENTIFICATION OF ALTERNATIVES CONSIDERED (State why rejected.)

I. JUSTIFICATION OF NEED

The cost and availability of energy remains one of the primary concerns of residents in rural Alaska. It often seems incongruous to Alaskan residents that the nation's storehouse of energy also faces some of the most severe energy problems.

Alaska will soon be exporting vast quantities of gas to the lower 48 through Canada. In many communities near or adjacent to the pipeline there is a very strong interest in using a very small amount of the gas for local use, particularly for electrical production and space heating. Only a cursory look at this potential has been made to date, however. A full understanding of these opportunities and their costs must be obtained in time to meet Northwest Gas Pipeline Company's advance design and engineer schedule in order that the gas taps can be incorporated in the final pipeline design. The Pipeline Coordinator's Office has indicated completion of the study by January 1980 will allow adequate time to meet the gasline timetables. In order to make the analysis more meaningful, some cost sharing from the local communities will also be requested.

PROJECT PURPOSE

(check all that apply)

- Improvement of Services ☐
- Accommodation of Increased Demand ☐
- New Program or Service ☐
- Accommodation ☐
- Project Mandated by Law or Regulation (cite) ☐
- Other Feasibility Study ☒

PROJECT BENEFITS

(check any that apply)

- Prevent loss of life or property ☐
- Reduction of accidents or illness ☐
- Protect investment in existing facilities ☐
- Improve production possibilities of Alaskan industries and/or earning capacity of citizens ☐
- Create potential for time or cost savings ☐
- Protect natural environment ☐
- Establish recreation potential ☐
- Other ☐

AGENCY Energy & Power Development

PROGRAM _____

PRIORITY NO. _____

Project Title: _____

Page 1 of 3

26

CAPITAL BUDGET
PROJECT JUSTIFICATION

The issued to be addressed include:

1. Facilities considerations and costs.

- a. Tap and valve only cost now and cost later
 - 1. Does tap impair integrity of gas line? How much?
 - 2. Are by-passes (potential tap points) normally provided around line safety valves? Compressor Stations?
 - 3. If so, how much latitude is permitted in their placement?
- b. Degree of simplicity allowable or desired and costs of City Gate Stations. (CGS)
 - 1. Required heaters and costs.
 - 2. Required meters and regulators and costs.
- c. Costs to construct a gas distribution system.
- d. Costs to construct a C.G.S. for a single purpose facility such as an electric utility or petrochemical plant.
- e. Operation and maintenance cost of each above.

2. Product considerations and costs.

- a. Costs or cost trends of North Slope gas.
- b. costs or cost trends of other fuels.
- c. Determine commercial life of North Slope gas field and gasline.
- d. Considerations and costs of operating Alaskan portion of line at reduced volume and pressure.

3. Computations.

- a. Determine volume required to justify cost of C.G.S.
- b. Population required to justify Distribution System.
- c. Communities or locations that might now or in the future justify C.G.S. or a tap.

4. Examine Financing options and possible repayment schemes.

5. Miscellaneous Environmental Impact Statements, permits, fees and land rights involved.

II. ANALYSIS IMPACT ON OPERATIONAL EXPENSE

Not applicable.

III. DOCUMENTATION OF ESTIMATED CAPITOL COSTS

Work will be contracted on a competitive basis from proposals received from individuals and organizations in response to detailed Request for Proposals issued by the Division. Other cooperating agencies will be the Divisions of Economic Enterprise, the Pipeline Coordinators Office and the Alaska Royalty Oil and Gas Development Board.

Total estimated cost is \$100,000.

IV. IDENTIFICATION OF ALTERNATIVES CONSIDERED

The uncertainty associated with attempting to pool potential funding sources eliminated this approach as a viable option to funding. Even in this case, local community contributions will be of a token nature in order to tie them actively to the effort. At this time Federal monies are not available.

AGENCY Energy & Power Development BRU

COMPONENT _____

DATE
REVISED _____



ENGINEERING INC.

DAMMAM
HOUSTON
LONDON
MELBOURNE
SINGAPORE

10 November 1980

Mr. Mark Wittow, Study Manager
Joint Gas Pipeline Committee
1024 West Sixth
Anchorage, Alaska 99501

Re: Instate Gas Use/Liquids Line Study
PLT's previous proposal dated
30 October 1980 "Gas Liquids Line
Study"

Dear Mr. Wittow:

In response to your request for proposals to combine the Liquids Line and Instate Gas Use Studies, PLT Engineering is pleased to submit the following to be considered in conjunction with our previous proposal:

1. We feel that the two studies may be readily combined and you are correct in assuming that this would reduce your cost.
2. Response to the specific items of the RFP section VIII are:
 - Item A: We propose to employ the same methodology as described in our previous proposal regarding the Gas Liquids Line Study.
 - Item B: The Principals in our firm remain the same.
 - Item C: The Work Performed Summary remains the same.
 - Item D: Your Timeframes are acceptable to PLT.
 - Item E: Manhour and expenses cost shall not exceed \$150,000.00.
 - Item F: The General Information previously submitted remains the same.
 - Item G: The Conflict of Interest Statement previously submitted, stands.
 - Item H: We will, of course, cooperate and take reasonable coordination actions with other studies. Additional cost or delays that may arise, due to this requirement, will result in increased overall study cost.



a concern for energy

Page Two
10 November 1980

We appreciate this opportunity to propose our service, and again look forward to working with you.

Very truly yours,

G. W. Stevens
Manager, Proposals

GWS/klg



Alaska State Legislature

Gas Pipeline Committee
1024 W. 6th Avenue
Anchorage, Alaska 99501
(907) 279-1243

September 30, 1980

Dear Member of the natural gas or pipeline industry:

Attached is a request for proposals to study the design and costs of the extraction and transportation of Prudhoe Bay gas liquids to an instate petrochemical facility. The study is sponsored by the Gas Pipeline Committee of the Alaska State Legislature. Its results will be used by state policy-makers, and the cost estimates will be used to aid private industry in making investment decisions.

We would appreciate your consideration of the research project, and look forward to the receipt of your proposal. Please contact me at the above address, if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Mark Wittow".

Mark Wittow
Study Manager

Senator Mike Colletta
Representative Bill Miles
Co-Chairmen

September 30, 1980

REQUEST FOR PROPOSALS - ALASKA STATE LEGISLATURE
GAS LIQUIDS LINE STUDY

This is a request for proposals of study of the engineering, design, construction and operation, and respective cost estimates, for a natural gas liquids (NGL) pipeline (and related extraction facilities) for transportation of Prudhoe Bay liquids to an instate petrochemical facility. The construction and operation cost estimates are to be used to establish realistic cost-of-service or tariff figures which shippers, producers, gas transmission firms, and others can use to make an investment decision.

I. BACKGROUND

Gas production from Alaska's Prudhoe Bay will commence within the next decade, probably by 1986 or 1987. Approximately two billion cubic feet per day of sales gas will be produced for the 20 to 25 year life of the field. The volume of ngl's, including ethane, will be approximately 150,000+ b/d. The State and private industry have demonstrated a longterm interest in examining opportunities for future gas-based petrochemical manufacturing in Alaska. The State recently entered into a Memorandum of Understanding and Intent with a petrochemical consortium headed by Dow Chemical U.S.A. and Shell Chemical Company. The Dow-Shell Group has agreed to undertake an indepth feasibility study of an instate petrochemical industry.

The study to be conducted through this Request for Proposals focuses, however, on one segment of the proposed instate industry, the transportation of the gas liquids to the facility site.

LIQUIDS LINE STUDY - 2

II. STUDY SPONSOR

The research will be conducted in consultation with the Joint Gas Pipeline Committee of the Alaska State Legislature. Mark Wittow will be the day-to-day study manager for the committee.

III. STUDY SCOPE

The goal of the study is to establish reasonable cost estimates for construction and operation of a gas liquids pipeline to transport Prudhoe Bay liquids to an instate petrochemical facility site. In addition, the study should identify costs of liquids extraction at Prudhoe Bay or other extraction points on the Alaska Natural Gas pipeline. The study should indicate realistic cost-of-service or tariff figures for the various transportation scenarios.

A. assumptions

The study should be based on the assumption that construction of the petrochemical system will be completed no earlier than 1986. The life of the liquids line should be calculated at 20 to 25 years, concurrent with the life of the Prudhoe Bay field. Phased-in construction of one to three world-scale (1 billion pounds/year) ethylene plants built to come on line four years apart should be assumed. The study should be based on the ultimate maximum economic utilization of recoverable ethane for ethylene production. Cost estimates should be in nominal dollars. For the purposes of this study, natural gas liquids is defined so

as to include ethane. To the extent technically feasible, it should be assumed that the liquids line will follow the routing of the Trans-Alaska Pipeline System.

B. cases/scenarios

The following cases should be examined:

1. Modified conditioning plant at Prudhoe Bay, additional low temperature refrigeration added to current Parsons design for the conditioning plant, with no liquid fractionation. A separate NGL line would be constructed from Prudhoe Bay to a tidewater location, with ethane then delivered to ethylene plant(s). The tidewater locations include the following: Kenai, North Cook Inlet, Point Gravina, and Valdez. The cost estimate should include the costs of liquids extraction equipment designed to take out 30,000 b/d of ethane at Prudhoe Bay for each ethylene plant, with either one, two or three ethylene plants ultimately being phased into production.
2. Modified conditioning plant at Prudhoe Bay, with additional low temperature refrigeration added to current Parsons design for conditioning plant and no liquid fractionation. A separate NGL line from Prudhoe Bay to Fairbanks, with ethylene complex at Fairbanks, and the rest of the liquids delivered in another liquids line to tidewater for export. Tidewater sites are the same as in Case No. 1 above.

LIQUIDS LINE STUDY - 4

3. Conditioning plant at Prudhoe Bay remains the same as designed by Parsons, with approximately two billion cubic feet per day of conditioned gas delivered to the Alaska Natural Gas Pipeline. At Fairbanks, the ethane and propane-plus are extracted and placed in a liquids pipeline and transported to a tidewater petrochemical facility site. The tidewater sites are the same as in Case No. 1 above.

C. cost considerations

The Contractor will want to examine the following possible construction and operating cost consideration:

1. Cost of delivery of construction materials, including size and weight limitations of transportation by Alaska Railroad for equipment shipments to Fairbanks and elsewhere, and barge transportation constraints.
2. Labor costs.
3. Construction cost adjustment factors for different locations in Alaska (Prudhoe, Fairbanks/the Interior, and tidewater sites) as compared to a U.S. Gulf Coast facility.
4. Adverse effect, if any, of major construction demands of the Alaska Natural Gas Pipeline system and related facilities which could require most readily available resources and thus impact construction costs for other facilities during the same time period.
5. Costs of special environmental requirements, if any, for potential routing and siting.
6. Penalties for reduction of BTU's in the Alaska Natural Pipeline stream (NGL shrinkage charges).
7. Wholesale values, state severance taxes and Alaska Natural Gas Pipeline BTU/mile tariff for those liquids recovered at Fairbanks.

LIQUIDS LINE STUDY - 5

8. Conditioning plant tariff.
9. Extraction plant cost, probably allocated to the recovered NGL on a liquid volume basis.

The study results should indicate the varying costs associated with only one ethylene plant in operation, with two ethylene plants in operation, and with three ethylene plants in operation. If the phased-in construction would appear to indicate a phased-in cost-of-service or tariff rather than a steady tariff over the life of the liquids line, that too should be clearly indicated.

D. additional work

In a separate section, the Contractor shall also examine the construction and operation costs of an all-methanol line from (a) Prudhoe Bay to Fairbanks and (b) Prudhoe Bay to tidewater.

IV. OTHER RESEARCH WORK

The Contractor will be furnished with other applicable research work done to date. Prior work has delineated the rate of gas production at Prudhoe Bay, and the various possible compositions and volumes of the gas stream. Other work has delineated probable pipeline sizes.

V. OTHER CONTRACT PROVISIONS

- (A) At least two on-site consultations will be required. The first will take place at the study's outset for research design, and the second before the submission of the final report for a review of the draft report. Each consultation

LIQUIDS LINE STUDY - 6

may require two days. Contract proposals should also discuss the ability of the contractor to provide continuing technical advice and assistance to the State after completion of the final report.

- (B) The study will become the property of the State of Alaska.
- (C) The study must be written in language and style readily understood by persons who are not economists or gas transmission experts.
- (D) Ten copies of a final report and one original that can be readily duplicated must be submitted. Ten copies of the draft report must also be submitted.

VI STUDY TIMEFRAME

Proposals must be received no later than October 31, 1980. A bid will be awarded no later than November 14, 1980. Preferably by December 1, 1980 a research work program will be finalized, and by February 20, 1980 the draft report will be submitted for review. An on-site consultation with the study manager would occur the ensuing week, and a final report prepared and submitted no later than March 20, 1980. The deadlines cited above may be treated as approximate ones.

VII COSTS

A maximum of \$200,000 has been allocated for this study. Bids exceeding this amount will not be considered on the same basis as bids within the cost limit.

VIII CONTENTS OF PROPOSALS

For full consideration, the proposal should contain the following:

- A. a general description of proposed methodology
- B. vitae of principals who would be assigned to the project,
with proposed allocations of responsibility and time
- C. summary of comparable work performed by the firm with references
and samples, if available for public release
- D. timeframes as closely corresponding with those cited above
as can be feasibly met by the firm
- E. a cost quotation
- F. general informational material on the firm
- G. A description of contacts with the following companies
that may pose a conflict of interest:

- Northwest Energy Co.
- American Natural Resources Co.
- Northern Natural Gas Co.
- Panhandle Eastern Pipe Line Co.
- United Gas Pipeline Co.
- Pacific Lighting Corp.
- Pacific Gas & Electric Co.
- Columbia Gas System
- Texas Eastern Corp.
- Texas Gas Transmission Corp.
- TransCanada Pipelines Ltd.
- Foothills Pipe Lines, Ltd.
- Alberta Gas Trunk Line Co. Ltd.
- West Transmission Co. Ltd.
- Atlantic Richfield Corp.
- Sohio Corp.
- Exxon Corp.
- Mobil Corp.
- Chevron Corp.
- Phillips Corp.
- Dow Chemical Co.
- Shell Oil Corp.

LIQUID LINES STUDY - 8

IX. EVALUATION

The proposals will be judged on the basis of the quality of the proposed methodology, the experience and involvement of the principal investigators, cost and timeframe.

If you have any questions, please contact Mark Wittow, Study Manager, Joint Gas Pipeline Committee, 1024 West Sixth, Anchorage, Alaska 99501, phone (907) 279-1243. Proposals should be submitted to Mr. Wittow at this address.

We appreciate your consideration of the research project, and look forward to receipt of your proposal.



5151 Fairbanks Street
Anchorage, Alaska 99503
907-276-2010
TELEX 090-26-374
VE-CON-AHG

November 21, 1980

Alaska State Legislature
Joint Gas Pipeline Committee
1024 West Sixth Avenue
Anchorage, Alaska 99501

Attention: Mark Wittow - Study Manager
Joint Gas Pipeline Committee

Subject: GAS LIQUIDS LINE STUDY

Dear Sir:

We appreciate your inclusion of VECO Engineers and Architects in the request for proposals for the Gas Liquids Line Study and have given this reasearch project considerable thought. However, conditions at this time dictate that we must decline your invitation. We are, however, in joint venture with the Pace Company submitting under separate cover a proposal on the Instate Gas Use Study.

We thank you again for including our company in both of these proposal requests, and we would appreciate our inclusion in any future solicitations for studies of this type.

Sincerely,

E. Tim Hampton
Engineering/
Project Engineering Manager

ETH:lh

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

*May -
see me 1st
B*

PURVIN & GERTZ, INC.
CONSULTING ENGINEERS
2600 ONE MAIN PLACE
DALLAS, TEXAS 75250

OTTO K. WETZEL, JR.
PRINCIPAL

March 27, 1980

TELEPHONE 214/742-7201
TELEX 73-2321
CABLE PURGER

Representative Bill Miles
House of Representatives
Capitol Building, Room 120
Pouch V
Juneau, Alaska 99811

Dear Bill:

I appreciated your taking the time to see me on my recent visit to Juneau. We are enthused about the possibilities for recovery of the natural gas liquids and hopefully a petrochemical project in Alaska. However, time is short and things will come together in quite a hurry. If we can ever be of any assistance in this matter, we would be happy to work with you.

As I told you, I had already met with Chuck Webber, Terry Miller and Mike Colletta. Subsequently, I met with Bob LeResche, Tom Williams and, of course, Bob Maynard. Unfortunately I failed to make an appointment with Terry Gardiner, for which I am sorry.

I have given Terry and Bob LeResche a resume of some of the things we have been involved with and am enclosing a copy for your review. I am always a little hesitant to put these things down on paper, but the fact remains that we have been involved with a number of similar projects over the years. If we can be assistance to the State, we would be happy to do so.

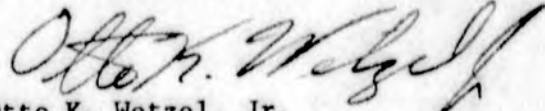
Needless to say, working for the State would preclude us from being involved on behalf of any company. As I told you, we have already turned down several opportunities because we felt that the State's needs were greater, and that nothing would be done unless the State put together the proper basis.

I should also mention that we have worked for the Federal Energy Regulatory Commission (FERC) on both the "Western Leg" and the "Northern Border" pipelines. We have just been informed that we are to undertake a similar review of the costs of the Alaskan portion, including the conditioning plant. While we may not see any conflict, that is something you and FERC would have to resolve.

If we can ever be of any assistance, please feel free to give us a call.

Yours very truly,

PURVIN & GERTZ, INC.


Otto K. Wetzel, Jr.

OKW:mec

Enclosure

DALLAS

HOUSTON

WASHINGTON, D. C.

LONDON

TOKYO

The Company

Purvin & Gertz, Inc. is an independent consulting firm specializing in the application of engineering principles and commercial experience to the solution of problems in the energy and chemical industries. We have purposely concentrated on developing an understanding of the interrelationships between the technical and economic aspects of these industries. In all of our assignments we use a business-oriented approach that is designed to provide our clients with the information necessary for decision-making.

Our professional staff is comprised principally of chemical engineers with extensive industrial experience. Several of our consultants have specialized knowledge in market research, financial analysis and political science, all of which are important in today's complex industrial atmosphere. Consultants are selectively assigned to each project to provide the client with those individuals who have the most appropriate experience. During the course of a project our consultants work closely with the client to insure that the ultimate objectives are attained.

Our firm has been in operation for over 25 years and is wholly-owned by member consultants. We are not connected with any engineering-construction company, equipment manufacturer or process licensor and can, therefore, provide unbiased advice and analysis with only the best interest of our client in mind. We have been retained by private companies in all phases of the energy and chemical industries, by financial institutions and government organizations in all parts of the world. During the past ten years we have developed a worldwide network of branch offices to better serve our U.S. and foreign clients in their international activities.

Purvin & Gertz, Inc.

DALLAS

2600 ONE MAIN PLACE
DALLAS, TEXAS 75250
Phone: 214 742-7201
Telex: 73-2321

HOUSTON

PENNZOIL PLACE
SUITE 1140, SOUTH TOWER
HOUSTON, TEXAS 77002
Phone: 713 236-0318
Telex: 76-2801

WASHINGTON

1000 CONNECTICUT AVENUE, N.W.
SUITE 406
WASHINGTON, D.C. 20036
Phone: 202 833-3580

LONDON

128 MOUNT STREET
LONDON W1Y 5HA, ENGLAND
Phone: 01-493-6484
Telex: 851-263-702

TOKYO

600 KATO BUILDING
2-19-2, AKASAKA, MINATO-KU
TOKYO, JAPAN
Phone: 585-6707
Telex: 781-26765

Affiliate

CALGARY

HYCARB ENGINEERING LTD.
640-7TH AVENUE, S.W.
CALGARY, ALBERTA T2P 0Y5
CANADA
Phone: 403 266-7086
Telex: 038-25717

PURVIN & GERTZ, INC.

CONSULTANTS

SPECIALIZING IN:

**POLICY PLANNING &
PROJECT MANAGEMENT**

**ECONOMIC EVALUATIONS
PHYSICAL ASSET VALUATIONS
& FEASIBILITY STUDIES**

MARKET SURVEYS & FORECASTS

FOR:

PETROLEUM REFINING

NATURAL GAS PROCESSING

COAL PROCESSING

SYNTHETIC GAS MANUFACTURE

PETROCHEMICALS

**PIPELINES & OTHER
TRANSPORTATION**

INDEPENDENT CONSULTING SERVICES TO THE ENERGY & CHEMICAL INDUSTRIES

Policy Planning and Project Management

The primary role of Purvin & Gertz, Inc. is to advise on the conceptual and developmental aspects of projects in the energy and chemical industries. We are most often involved in the formative stages where we assist in turning a concept into a practical and realizable goal. We also serve as project managers on behalf of our clients in coordinating and managing the activities of other groups that may be involved in a project.

Our continuing involvement in numerous projects keeps us abreast of problems and solutions under various economic and political conditions. Because of these activities we can provide our clients with ideas concerning new business opportunities, feedstock sources and potential joint-venture partners. When a decision is made to proceed with a project we can assist in the preparation of bid specifications, selection

of a contractor, negotiation of contracts and planning of a product marketing program. With the increasing involvement of government agencies in industry, we are called upon to provide expert testimony for the various hearings necessary for project approval.

Economic Evaluations and Feasibility Studies

We estimate future profitability of business ventures involving process industry operations and related activities for our client's guidance in making business decisions concerning investment opportunities. Our economic projections and feasibility studies are relied upon extensively by numerous financial institutions.

We provide independent economic analysis for the financing of new facilities, expansions and modifications, and mergers or acquisitions. In addition, our valuations are used to compare competitive processes, to prepare business interruption insurance claims and to support other legal claims. Physical asset appraisals are made to determine replacement or depreciated value of existing facilities for insurance or tax purposes.

Project economics are evaluated taking into account current and expected future technological, economic and political factors. Full consideration is given to the competitive risks associated with each specific project. We are familiar with the sources

of venture capital as well as required cash flows or rates-of-return necessary to confirm project viability.

We also undertake technical reviews of new processes and, in some instances, certify plant performance on behalf of lenders and investors.

Market Surveys and Forecasts

Purvin & Gertz forecasts markets for energy products and chemicals to assist our clients in intermediate and long-range planning.

These involve—

- Supply/demand balances
- market surveys
- long-range forecasts
- market penetration evaluations

We maintain extensive statistical and technical files on energy sources, chemicals, fertilizers and related subjects. Through continuous contacts in these industries, we stay abreast of developments and trends which may affect product markets.

On occasion we undertake multi-client studies concerning future market developments for specific energy or chemical products or total energy surveys for specified geographical areas. Our detailed knowledge of markets is also an important ingredient in our feasibility and policy planning work.

PROJECT MANAGEMENT EXPERIENCE - NATURAL GAS PROJECTS

1953-1957

Purvin & Gertz acted as engineering consultants and project managers in the development of the Goliad Corporation owned by the H. W. Bass interests. This involved the development of five gas processing plants - four in Texas, one in Louisiana. At that time, these were among the largest gas processing facilities in the world. The work involved negotiating processing contracts with numerous major oil companies, sales contracts with gas pipelines, construction contracts and product sales contracts. These were among the first "straddle plants" built. The Goliad Corporation was subsequently sold to Mobil Oil Corporation.

1956-58

Purvin & Gertz acted as project manager on developing the Pembina Gas Conservation project in Alberta. The Pembina field was one of the largest fields (in surface area) then discovered. Due to the relatively low gas/oil ratio and low oil 'allowable' per well, ordinary gathering and processing facilities were uneconomic. We devised an "area processing" concept, together with a novel financing and processing scheme which enabled the economic conservation of the gas. The "Pembina formula" developed a reasonable sharing of the risk among producers and processors. I served as project manager, residing in Canada for over a year during this period. This plant is still operating and was sold in 1977 to Dome/Amoco for more than its original cost.

1959-1960

Purvin & Gertz did the initial study which led to the decision of TransCanada to have its gas processed before it left Alberta. This was the original "Empress Straddle Plant". As a result of this work, Purvin & Gertz negotiated the initial contract with Pacific Petroleum (Phillips) and oversaw the project on TransCanada's behalf until their staff was assembled. I made the original study and acted as project manager.

1960-1961

Purvin & Gertz was called in to do the final feasibility study when Northern Natural Gas Company was deciding whether to build the Bushton Straddle Plant in Kansas. Based on this study, Purvin & Gertz acted as project supervisor in the negotiation of the various contracts and appearances before the Federal Power Commission (now the Department of Energy) and for the sale of the products. It continued to function in this role until Northern built up its staff, and this included the selection of process, contractors, etc.

1960-1963

In conjunction with the Bushton plant, Northern contemplated the installation of a helium extraction plant in accordance with the U.S. government's helium conservation program. Here again, we negotiated the first helium extraction contract with the Helium Activity Division of The Bureau of Mines, and helped select the process and contractor for this installation. We served as advisers to Northern Natural in their recruitment of personnel for this project.

1968-1969

Purvin & Gertz perceived the need for an all-new ethane, propane, butanes and gasoline raw mix pipeline from West Texas/New Mexico to Houston. This concept was taken to Santa Fe Railroad which stood to lose rail transportation business to existing or expanded pipelines serving this market. In conjunction with Santa Fe Railroad, Purvin & Gertz developed this concept, including the negotiation of the throughput contracts with shippers, process selection for an extraction plant that provided some throughput, and in the selection of the pipeline contractor. I acted as project manager until permanent management could be obtained by Santa Fe Railroad. The Chaparral pipeline, as it is called, is a 600-mile gathering and trunkline system from Hobbs, New Mexico, to Mont Belvieu near Houston. The 12" main trunkline has a capacity of over 100,000 barrels per day and consideration is being given to enlarging it.

1965-1968

After the discovery of gas in the Cooper Basin area of South Australia, Purvin & Gertz did the initial market survey. On behalf of the producers, I acted as project supervisor during the development phase of that project, including negotiating, on behalf of the producers the gas sales contract. This also included the selection of the carbon dioxide removal process and assisting in selection of the contractor for both the pipeline and the processing plant. This 500-mile pipeline now serves the capital city of Adelaide in South Australia and the fields have subsequently been connected to Sydney, New South Wales. Purvin & Gertz and its Canadian affiliate, Hycarb Engineering Ltd., continue to act as advisers to the producers. I am currently involved in decisions regarding the recovery and marketing of the natural gas liquids.

1974

After oil was discovered in the North Sea, Purvin & Gertz conceived a need for a gas gathering system to gather associated gas, recover natural gas liquids and transmit through undersea pipeline to the United Kingdom. A consortium of P & O Steam Navigation Company, Cambridge Petroleum Royalty, Gulf Interstate Engineering, and an affiliated company of Purvin & Gertz undertook development of this project. This included negotiation of gas

transportation contracts, financing, and development and construction costs, etc. The project was terminated when the British Gas Corporation, the gas monopoly in Great Britain, determined that any such system should be undertaken by the state as opposed to private enterprise.

Otto K. Wetzel, Jr.
Purvin & Gertz, Inc.
March 1980 *OKW*

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



INSTITUTE OF GAS TECHNOLOGY • 3424 SOUTH STATE STREET • IIT CENTER • CHICAGO, ILLINOIS 60616

GENERAL PHONE 312/567-3650
TELEX 25-6189
DIRECT DIAL 312/567- 3862

November 17, 1980

Alaska State Legislature
Joint Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Alaska 99501

RE: RFP INSTATE (ALASKA) GAS USE/
LIQUIDS LINE COMBINED STUDY

Gentlemen:

This is to advise that IGT will not submit a proposal in response to the subject RFP. Thank you for forwarding the RFP to us.

Please retain IGT on your mailing list for solicitations for energy R&D and related services.

Very truly yours,

William A. Siljander
Proposal Preparation

WAS/lr

GEORGE C. SILIDES

REGISTERED CIVIL ENGINEER

BOX 746

FAIRBANKS, ALASKA

(907) 456-1110

HAROLD H. GALLIETT, JR.

REGISTERED CIVIL ENGINEER

746 "F" STREET

ANCHORAGE, ALASKA

(907) 272-9212

A JOINT VENTURE

Representative Hugh Malone
Attn: Mr. Mark Wittow
Special Committee on Oil & Gas
Pouch V, State Capitol
Juneau, Alaska 99811

March 9, 1981

Dear Mark,

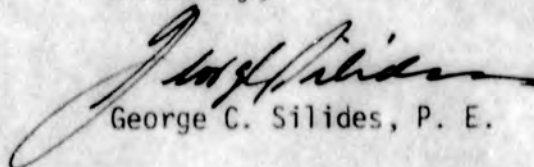
Thank you for your time and information regarding the several items of mutual interest during my recent visit to Juneau.

Following my meeting with you I met with several legislators, including Representative Gardiner, relative to instate use of natural gas. Representative Gardiner and I also briefly discussed the oil & gas taxing structure.

The tax structure and the probable need for a comparative analysis was also discussed at greater length with Joe Donahue, at Revenue, as suggested by your forwarding to him of our letters. He is discussing the matter further with Commissioner Williams and Attorney General Condon, in the light of the income tax case now venued in Washington, D. C. D. C.

I appreciate receiving copies of the report on Prebuilding The Pipeline and the general information on crude oil profitability. Any additional information and updates you have or may receive would also be very welcome, including word of your discussions with individual Committee members regarding the instate gas use study.

Sincerely,



George C. Silides, P. E.

H. ZINDER & ASSOCIATES CONSULTANTS

DIVISION OF ZINDER COMPANIES, INC.

1828 L STREET N.W. WASHINGTON D.C. 20036 · (202) 862-3400

November 21, 1980

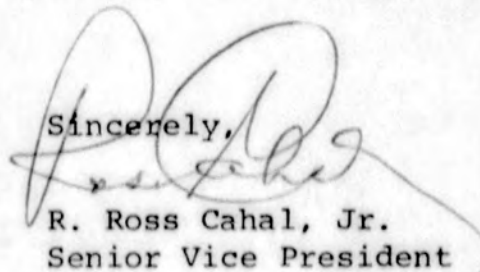
Mr. Mark Wittow
Study Manager
Joint Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow:

I apologize, for after indicating that we would be submitting a proposal for the combined Instate Gas Use/Liquids Line Study, we failed to develop an adequate proposal.

I hope that we might be considered in some of your future programs. We thank you for extending this opportunity to us.

Sincerely,



R. Ross Cahal, Jr.
Senior Vice President

RRC:et

MAIN

CHAS. T. MAIN, INC.

PRUDENTIAL CENTER BOSTON, MASSACHUSETTS 02199 • TELEPHONE 617-262-3200

November 5, 1980

SUBJECT: Requests for Proposals
Instate Gas Use Study and Gas Liquids
Line Study

Mr. Mark Wittow
Study Manager
Joint Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Alaska 99501

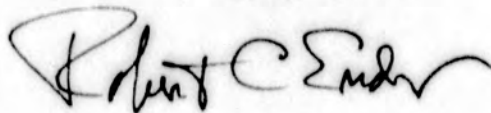
Dear Mr. Wittow:

Chas. T. Main, Inc. thanks you for the opportunity to review the above referenced requests and wishes to inform you that, after careful consideration, MAIN will not prepare proposals.

Please continue to send similar requests for our services and appropriate response.

Sincerely yours,

CHAS. T. MAIN, INC.



Robert C. Ender

RCE/PTK/lb
cc: G. S. Bingham
(Portland)

**WILLIAMS
BROTHERS
ENGINEERING
COMPANY**

A Resource Sciences Company

RESOURCE SCIENCES CENTER | 6600 S. YALE AVE | TULSA, OKLAHOMA 74177
PHONE (918) 496-5020 | TELEX 49-7493 WBEC-TUL

November 3, 1980

Joint Gas Pipeline Committee
Alaska State Legislature
1024 West Sixth
Anchorage, Alaska 99501

Attention: Mr. Mark Wittow

Re: Instate Gas Use Study

Dear Mr. Wittow:

This letter is to confirm our telephone conversation of Friday, October 31, 1980, wherein you were informed of Williams Brothers Engineering Company's intention to submit a further proposal for the Instate Gas Use Study. Williams Brothers is interested in doing both the Instate Gas Use Study and the Liquids Line Study, a proposal for which was submitted October 31.

Williams Brothers sees little reduction in cost by combining the two studies, however, it may be useful from an administrative point of view to have both supervised by the same study manager.

Williams Brothers endeavors to be completely responsive to the requirements of its clients. To that end, if you see any deficiency in the proposals submitted, or if you would like further information, please do not hesitate to call us.

Very truly yours,

WILLIAMS BROTHERS ENGINEERING COMPANY



J. S. Barton
Project Manager

JSB:scm/4530

H. ZINDER & ASSOCIATES CONSULTANTS

DIVISION OF ZINDER COMPANIES, INC.

1828 L STREET N.W. WASHINGTON D.C. 20036 • (202) 862-3400

November 3, 1980

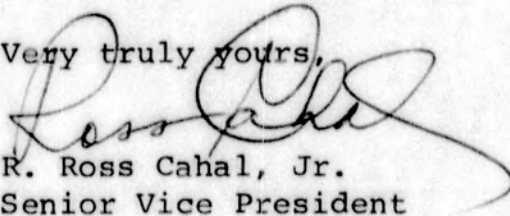
Mr. Mark Wittow
Study Manager
Joint Gas Pipeline Committee
1024 West 6th Ave.
Anchorage, Alaska 99501

Dear Mr. Wittow:

Following up our telephone conversation of October 31, we are intending to submit a proposal for the combined Instate Gas Use/Liquids Line Study which you invited in your letter of October 21, 1980.

We appreciate having the opportunity to submit the proposal.

Very truly yours,



R. Ross Cahal, Jr.
Senior Vice President

RRC:et

October 3, 1980

Mr. Mark Wittow
Alaska State Legislature
Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Alaska 99501

Dear Mark:

I have received the Gas Pipeline Committee's September 30 request for proposal on a study of the design and costs of extraction and transportation of Prudhoe Bay gas liquids. Our firm is considering submitting a proposal jointly with an Alaska engineering firm and others, but I would like your advice with respect to the possibility of a conflict of interest or apparent conflict.

We are consultants to Doyon, Ltd. regarding potential investments in energy-related projects. As you know, Doyon is a member of the Dow-Shell consortium, with a particular interest in the Northern leg (Prudhoe Bay to Fairbanks) of the gas liquids line, and our work for Doyon is likely to include advice on this project, including judgments regarding its economic and financial feasibility.

Our agreement to provide consulting services to Doyon expressly subordinates any work for the corporation to other professional relationships, including work for the State, and declares explicitly that we do not intend to become advocates for or take any interest in Doyon's ventures, nor will we undertake any other work that can reasonably be construed to jeopardize our objectivity.

Nevertheless, there may at some point be an appearance of conflict, and I would be interested in your judgment as to whether this situation necessarily precludes our participation in the study proposed by the Gas Pipeline Committee.

Sincerely,



Arlon R. Tussing



Battelle

Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington U.S.A. 99352
Telephone (509) 376-4742
Telex 15-2874

October 6, 1980

Mr. Mark Wittow
Alaska State Legislature
Gas Pipeline Committee
1024 W. 6th Ave.
Anchorage, AK 99501

Dear Mr. Wittow:

Request for Proposals - Gas Liquids Line Study

We very much appreciate your providing a copy of the subject request for proposals. After careful review, we concluded that there are several other firms with more directly related experience that could be brought to the project. Therefore we will not be proposing.

You may know however that Battelle has just been retained by the Office of the Governor to conduct the Railbelt Electric Power Alternatives Study. Since there may be interaction between the gas liquids study and our project, I hope to be in contact with you in the future.

Sincerely,

W.H. Swift, Manager
Alaska Projects
Energy Systems Department

Bechtel Incorporated

Engineers - Constructors

Del Monte Tower
5575 Del Monte Drive
Houston, Texas 77056
Telephone: (713) 877-3000



Mail Address: P.O. Box 2166, Houston, TX 77001

October 15, 1980

Mr. Mark Wittow
Alaska State Legislature
Gas Pipeline Committee
1024 W. 6th Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow:

We have received your study proposal inquiry dated September 30, 1980 addressed to members of the natural gas and pipeline industry. Bechtel is pleased to have been invited to submit a proposal to study the design and costs of the extraction and transportation of Prudhoe Bay gas liquids to an instate petrochemical facility.

After reviewing the proposal request, we must respectfully decline to submit a proposal due to our involvement and present contacts with our clients who are involved in the development of the North Slope of Alaska.

We again wish to thank you for considering Bechtel.

Yours very truly,

F.D. Valentino
Vice President
Manager of Business Development
Pipeline and Production Facilities Division

FDV:jp



Bonner & Moore Management Science

2727 Allen Parkway • Houston, Texas 77019
(713) 522-6800 • TWX: 9108812542

October 27, 1980

Mr. Mark Wittow
Study Manager
Joint Gas Pipelines Committee
Alaskan State legislature
1024 W. 6th Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow:

This is to inform you that after a careful review of the two RFP's recently sent to us, one concerning a liquid pipeline and separation facility and the other an instate gas use study, we must decline to bid on either.

The liquid line and separation facilities engineering design study is beyond our normal consulting capabilities. In the case of the instate use of royalty gas, we must decline because of limited manpower resources of the type necessary for that activity.

We wish to remain on the potential bidder's list for any future request for proposals which may be developed by your agency.

Sincerely,

Franklin P. Frederick
Franklin P. Frederick
Vice President
Energy Economics

FPF:dj
cc: Monte Smith
Joe Moore

16 October 1980

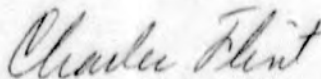
Mr. Mark Wittow, Study Manager
Alaska State Legislature
Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow:

We acknowledge your request for proposals to study the design and costs of the extraction and transportation of Prudhoe Bay gas liquids to an instate petrochemical facility. We have thoroughly evaluated the scope of the work that will be required to carry out your study and have determined that our workload during the period of performance of your study is such that we would not be able to give it the proper attention. For this reason we regret that we must decline the opportunity to present a proposal.

We are extremely interested in projects in Alaska and have a number of consulting engineers who are registered engineers in the State of Alaska. We appreciate your consideration in the future for projects that may develop at a later date.

Yours very truly,



Charles J. Flint
Senior Vice President

CJF:br

October 28, 1980



CHEM SYSTEMS INC.

1750 Montgomery St., San Francisco, CA 94111

Telephone (415) 397-6366 TWX 910 372 7380

Mr. Mark Wittow
Study Manager
Alaska State Legislature
Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Ak 99501

Dear Mr. Wittow:

It was a pleasure to speak with you on Friday concerning the current and future activities of the Gas Pipeline Committee. Thank you again for adding Chem Systems to the distribution list for RFP's relating to the work of the Committee.

Enclosed is a brochure describing the activities of Chem Systems. I am looking forward to meeting you during my next trip to Anchorage and please let me know when you will be in San Francisco. In the meantime, if I can be of any assistance, please do not hesitate to contact me.

Very truly yours,

Glenn W. Mortimer
Manager, Western Operations

GWM/mr
Enclosures

TRANSMITTAL SHEET

DAMES & MOORE

CONSULTANTS IN THE ENVIRONMENTAL AND APPLIED EARTH SCIENCES

800 CORDOVA • SUITE 101 • ANCHORAGE, ALASKA 99501 • (907) 279-0673

To: Alaska State Legislature
Gas Pipeline Commission
1024 W. 6th Avenue
Anchorage, AK 99501

Date October 30, 1980

Your Order No.

Our Job No. Prosp. File Santa Fe/State of AK

Attention: Mark Wittow

Subject: Proposal

We are sending you via hand delivery (Stewart Parker) the following proposal entitled:

Natural Gas Liquids Study, October, 1980

~~This is~~
These are for your consideration.

No. of copies submitted: 5

Copies to:

DAMES & MOORE

By James E. Hemming

DM International

Engineers and Constructors

October 16, 1980

ALASKA STATE LEGISLATURE
Gas Pipeline Committee
1024 W. 6th Avenue
Anchorage, Alaska 99501

Attention: Mr. Mark Wittow
Study Manager

Gentlemen:

In preparing for a response to your invitation to bidders concerning the extraction and transportation of Prudhoe Bay gas liquids, I have had conversations with Mr. Arlon Tussing. I expect Mr. Tussing to join in our proposal effort, however, he has informed me of yet another study being considered by the Gas Pipeline Committee.

It is my understanding that your committee will soon issue an RFP for a study of in-state uses of Prudhoe Bay natural gas and gas liquids.

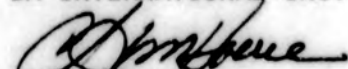
After due consideration, we firmly believe that this issue cannot reasonably be separated from the design of the Sales Gas Conditioning Facility and the consideration of an NGL pipeline.

DM International teamed with the Institute of Social and Economic Research at the University of Alaska and/or Arlon R. Tussing and Associates, Inc. and possibly Pipeline Technologists Inc. would like an opportunity to bid or to propose a single study incorporating both the Sales Gas Conditioning Facility/NGL Pipeline and the study for in-state uses. This request, however, does create a problem of timing as the in-state use study RFP has not yet been issued.

I would appreciate your consideration of this suggestion and your advice as to how this might best be handled.

Sincerely,

DM INTERNATIONAL INC.



C. J. von Hoene
Sales Manager



ENGINEERING-SCIENCE

930 SOUTH 336 STREET, SUITE B • FEDERAL WAY, WASHINGTON 98003

206/682-5060 SEATTLE
206/952-6722 TACOMA

October 14, 1980

Mr. Mark Wittow, Study Manager
Gas Pipeline Committee
1024 W. 6th Avenue
Anchorage, Alaska 99501

Reference: Gas Liquids Line Study

Dear Mr. Wittow:

We appreciated receipt of your request for proposals for this project. At the present time, we are committed to other projects and are, therefore, unable to respond to your request. We would appreciate receiving notification of other future projects.

Thank you for your consideration.

Very truly yours,

DONALD L. HANSEN
Manager, Seattle Area Office

DLH:jk



mapco
INC.

W. H. THOMPSON, JR.
PRESIDENT
CHIEF EXECUTIVE OFFICER

October 20, 1980

Mr. Mark Wittow
Study Manager
Alaska State Legislature
Gas Pipeline Committee
1024 West Sixth Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow,

Thank you for your request of September 30 for a proposal to submit a study on various phases of a natural gas liquids pipeline to handle Prudhoe Bay gas liquids.

We are very interested in this project as some of our major activities are transportation, storage and processing of such liquids. We regret that we cannot make a proposal at this time due to a very large expansion program of our own pipeline system which is now in progress.

Again, thank you for considering us and possibly we can participate in some way in the future.

Sincerely,

W. H. Thompson, Jr.

WHTjr/DAR/bev.

Procon Incorporated

A Subsidiary of Procon International Inc.
30 UOP Plaza—Algonquin & Mt. Prospect Roads
Des Plaines, Illinois 60016
Telephone 312-391-3700 • Telex 25-3280

October 22, 1980

Alaska State Legislature
Gas Pipeline Committee
1024 W. 6th Avenue
Anchorage, Alaska 99501

Attention: Mr. Mark Wittow
Study Manager

Subject: Prudhoe Bay Gas Liquids Study

Gentlemen:

Procon appreciates the opportunity to submit a proposal for the subject study. However, after an indepth review of the study requirements as they relate to the NGL transportation aspects of the project, we have reached the conclusion that we must decline to submit a proposal at this time. We trust that this decision will not inconvenience your committee.

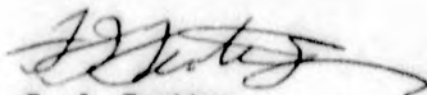
Procon is extremely interested in the extraction and storage aspects of this study and if that portion was separated from NGL transportation we would be in a position to submit a proposal addressing those aspects. Enclosed for your review is our brochure outlining our gas processing experience and capabilities.

Procon is pleased that you have afforded us the opportunity to make a proposal on this project and trust that we will continue to be considered for future projects that you may have.

Thank you again for your interest in Procon for this project. We look forward to working for the State of Alaska in the future.

Very truly yours,

PROCON INCORPORATED



F. J. Trotter
Vice President, Director of
Business Development

FJT/mls

Pullman Kellogg

Division of Pullman Incorporated

Three Greenway Plaza East
Houston, Texas 77046
Telex 762556
Cable Monologg Houston

October 20, 1980

Rolf C. Nedelmann
Commercial Vice President

(713) 960-2286

Mr. Mark Wittow,
Study Manager
Joint Gas Pipeline Committee
1024 W. 6th Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow,

We are most appreciative of your letter dated September 30, 1980 with which you enclosed the Request For Proposals - Alaska State Legislature, Gas Liquids Line Study.

We have reviewed this inquiry in depth and feel that we are not in the position to respond. Whereas Kellogg would have the capability to conduct the study effort with regard to the process plant itself, we are not a pipeline contractor and would, therefore, have to subcontract the pipeline portion of the study. In addition, we are currently performing work and are maintaining sales contact with several of the firms you list in Part VIII-G of your inquiry document.

We sincerely appreciate your consideration of Pullman Kellogg in connection with your needs for this study and hope that our decision to decline will not stand in the way of your contacting us again when you believe that we may assist you with your future needs.

Yours sincerely,



RCN:dg

Attachment

STONE & WEBSTER ENGINEERING CORPORATION

STONE & WEBSTER ENGINEERING CORPORATION - NEW YORK

ONE PENN PLAZA
250 WEST 34TH STREET
NEW YORK, NEW YORK 10001



BOSTON
NEW YORK
CHERRY HILL, N.J.
DENVER
CHICAGO
HOUSTON
PORTLAND, OREGON
SAN DIEGO
WASHINGTON, D.C.

TELEPHONE: 212-760-2000
W.U. TELEX: 12-8291
CABLE ADDRESS: STOWEBENG - NEW YORK

October 27, 1980

Mr. Mark Wittow
Alaska State Legislature
Gas Pipeline Committee
1024 West Sixth Avenue
Anchorage, Alaska 99501

Reference: September 30, 1980 request for proposals to study the design and costs of the extraction and transportation of Prudhoe Bay gas liquids to an instate petrochemical facility.

Dear Mr. Wittow:

Stone & Webster Engineering Corporation may be the most experienced and best qualified firm in the world to provide the Alaska State Legislature with a study of the design and costs for the extraction of Prudhoe Bay gas liquids, but we can not respond to your specific request because we are not pipeline people.

Our firm pioneered and patented the best of available technologies for the extraction of such liquids and their conversion to products of economic importance such as ethylene and related petrochemicals. For example, we have provided the process technology, engineering, procurement, construction and successful start-up of more than 50% of such facilities throughout the world.

Stone & Webster Corporation has excellent credentials for providing technologies which could maximize your return on investment. Moreover our capabilities are available to any company whom you would select to operate facilities in the best interests of the State of Alaska.

We would like to mention also that we are now completing the process design of the only facilities for Methanol production on the East Coast. Our company, and the technology to which we have license, were selected after careful study of all available technologies.

Should you have related or additional requirements, please keep our qualifications in mind and know that we would be very interested in hearing from you.

Very truly yours,

John S. DeMurley
Sales Representative

JSD/sdg



2515 A STREET
ANCHORAGE, AK. 99503
PH. 907-278-4245

October 3, 1980

Mr. Mark Wittow
Study Manager
Gas Pipeline Committee
1024 West 6th Avenue
Anchorage, Alaska 99501

Dear Mr. Wittow:

We appreciate your consideration of our firm in possibly submitting a proposal to study the design and costs regarding extraction and transportation of Prudhoe Bay gas liquids here within the State. However, upon review of the scope of work, it appears as though this type of study would be outside the range of expertise which we possess. Consequently, we will not be submitting a proposal on this project.

However, we would appreciate being kept in mind for possible future projects that may require the expertise of an Alaskan firm in the areas of surveying, civil engineering, structural engineering or architecture. We have enclosed a brief resume which indicates our areas of expertise to allow you to evaluate our qualifications for any future work.

Very truly yours,

Gordon D. Unwin, P.E.

GDU/cld
Enclosure
cc: Senator Mike Colletta
Representative Bill Miles

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SECTION 1

METHODOLOGY

Williams Brothers Engineering Company proposes the study of a gas liquids pipeline and related facilities to transport Prudhoe Bay liquids to an instate petrochemical facility site be conducted with the following elements of work and the organization. This approach was developed to achieve the goal of establishing reasonable cost estimates for construction and operation of these proposed facilities. In this proposal, Williams Brothers has interpreted the scope of work to include verification of basic information and the examination of peripheral requirements to the extent necessary for complete evaluation of the alternatives. On this basis, the final report will provide a realistic cost of service for the various alternatives and, also, produce a firm basis for the development of recommendations and assure the study has included development of all possible viable variations or alternates.

- Refine Schedule and Scope of Work

The initial steps will be to establish the scope of work, schedule and key parameters to insure the work reflects the requirements of the State of Alaska. Coordination between the Study Manager for the State of Alaska and Williams Brothers' study team will be necessary both initially and throughout the study. This coordination will ensure a continuing understanding of the requirements and objectives of the study and the effective use of resources within budget restrictions.

- Collect and Review Basic Information

- a. Obtain data for volumes of gas to be processed, gas analysis and other parameters for both Prudhoe Bay and Fairbanks. This information will include estimated variations over the project's life.



A Resource Sciences Company

- b. Review with North West Alaska their requirements of temperature and pressure at the exchange points in Prudhoe and in the Fairbanks area. Also, review the effect on North West Alaskan operation of the larger volume of high Btu gas moved to Fairbanks and the reduced calorific value of gas in the remainder of North West's pipeline. Determine the cost of transporting gas liquids as a vapor of high calorific content in the natural gas pipeline. Because the cost of transportation is based on heating units transported per mile, definition should be given to the allowance for removal of carbon dioxide which increases the pipeline's capacity.
- c. Review the volume and schedule of materials to be shipped into Alaska by North West Alaska Pipeline during construction. This review will evaluate penalties and bottlenecks to be avoided if construction of the two systems coincide.
- d. Obtain basic data on the proposed gas conditioning plant at the inlet to North West Alaska's pipeline. This data will enable an estimate and economic analysis to be made of combining the plant at Prudhoe with a plant to remove ethane plus liquids.
- e. Review and check the possible plant sites at Prudhoe Bay, the Fairbanks area and the various tidewater locations including collecting information on available services and facilities. This activity will be reviewed with representatives from appropriate state organizations and petrochemical companies.
- f. Review the general features of the pipeline routes to establish sensitive areas which may significantly increase cost or delay construction. For example, if the North West Alaskan Pipeline is laid through Atigun Pass, there will probably be insufficient space for a third pipeline.



A Resource Sciences Company

- g. Determine the owners of gases to be removed from the gas stream and the value, including severance taxes, of these gases both in the gas stream and as separated liquids.
- h. Confirm data for Alaskan shipping including tariffs, size and weight restrictions, and volume capability.
- i. Verify labor rates and construction cost adjustment factors in Alaska.
- j. Determine volumes of other natural gas liquids which may be available in the future on the North Slope. This review will include butanes and propanes currently used as fuel, which potentially could be available by substituting natural gas.

● Preliminary Engineering

Review existing hydraulic calculations, perform further hydraulic analysis and complete preliminary engineering. These efforts will form a basis for selection of the optimum pipeline system to serve the various plants and allow capacity for future transportation as the volume of liquid increases.

Efforts on the processing facilities, as schematically shown on Figure 1-1 (page 1-6), will include:

- a. Finalize preliminary process basis
- b. Prepare computer simulation of each plant
- c. Prepare conceptual designs and preliminary optimization of ethane recovery.
- d. Prepare preliminary cost estimates and economic analysis including the effect of phased in ethylene plant construction and the resulting stepwise ethane demand


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- Schedule

Develop a schedule for construction of the various plants and pipeline sections. This schedule will reflect construction of the Alaskan Natural Gas System to minimize conflict with a liquids pipeline in movement of materials and use of resources. In areas of conflict, the penalties will be assessed in the form of extra costs and delays. The schedule will be extended to include future operation of the plants as the markets develop and product volumes increase.

- Cost Estimates/Economic Analysis

On the basis of the study data, estimate the capital and operating cost of the various plants and pipeline segments. For each alternate, the cost of service per unit of volume delivered will be developed for each year of operation during the life of the project. To illustrate this analysis, an example of a computer printout from Williams Brothers program is shown in Attachment 'A' (pages 1-8 to 1-19) at the back of this section. This analysis will reflect changes in the annual volumes transported and processed. The information will be presented in a format to separate pipeline costs of service from extraction plant cost of service. The three basic cases (shown on Figure 1-1) will be addressed and any beneficial variations will be investigated as required to produce a comprehensive analysis. Steps for analysis of the pipeline facilities are outlined on Figure 1-1 (pages 1-7).

- Presentation of Final Report

Summarize, in a form readily understood by individuals without an economic or engineering background, study methods and basis, the alternates evaluated, the significant results on facilities and the conclusions on the potential development of alternates. This summary will be published in the form of a final study report.



- Continuing Technical Advice and Assistance

Following completion of the study, Williams Brothers will be available as required to provide technical advice and assistance on a continuing basis. Due to the undefined scope of this activity, Williams Brothers excluded this effort from the cost estimate presented in Section 5.

ANNUAL COST OF SERVICE - RETURN ON RATE BASE

22 INCH DIAMETER PIPE
OCTOBER, 1979

Sheet 9 of 12

OPERATING YEAR	15	16	17	18	19
RETURN ON RATE BASE AT 15.000	7975.	6577.	5653.	4572.	2870.
INCOME TAX	0.	0.	0.	0.	0.
DEPRECIATION (STRAIGHT LINE)	9317.	9317.	9317.	11350.	11350.
OPERATING EXPENSE	1340.	1340.	1761.	2085.	2085.
TAXES OTHER THAN INCOME	3179.	379.	3179.	3301.	3301.
AMORTIZATION OF DEBT FINANCE	0.	0.	0.	0.	0.
TOTAL COST OF SERVICE	21811.	20413.	19910.	21309.	19606.
YEAR NET THROUGHPUT (MMCF)	72700.	76200.	80100.	80400.	89200.
COST OF SERVICE CENT/MCF)	30.001	26.789	24.856	25.247	21.980
PROJECT TOTAL EXPENSES	457877.				
PROJECT TOTAL THROUGHPUT	1001900.				
PROJECT COST OF SERVICE	45.701				

PROFORMA INCOME STATEMENT SCHEDULE

22 INCH DIAMETER PIPE
OCTOBER, 1979

Sheet 10 of 12

OPERATING YEAR	1	2	3	4	5	6	7
COMMODITY INPUT (CENTS/MCF)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COMMODITY OUTPUT (CENTS/MCF)	60.000	60.000	60.000	60.000	60.000	60.000	60.000
ANNUAL QUANTITIES (MMCF)	12000.	14100.	29000.	31100.	34100.	35300.	38800.
OPERATING REVENUES AT 43.303	7200.	6460.	17400.	18660.	20460.	21180.	23280.
OPERATING EXPENSE	1102.	1102.	1102.	1102.	1102.	1102.	1102.
TAX DEPRECIATION (1 OVER 20)	1789.	7543.	7543.	7543.	7543.	7543.	7543.
TAXES OTHER THAN INCOME	730.	2930.	2930.	2930.	2930.	2930.	2930.
SUB-TOTAL	3620.	11775.	11575.	11575.	11575.	11575.	11575.
OPERATING INCOME	3580.	-3115.	5825.	7085.	8885.	9605.	1175.
INCOME ADJUSTMENTS							
INTEREST CHARGED TO CONSTR.	0.	0.	0.	0.	0.	0.	0.
AMORTIZATION OF DEBT FIN.	0.	0.	0.	0.	0.	0.	0.
INTEREST EXPENSE	3295.	13224.	13224.	13224.	13224.	13224.	13132.
TAX LOSSES CARRIED FORWARD	0.	0.	0.	0.	0.	0.	0.
TAXABLE INCOME	284.	-16339.	-7399.	-6139.	-4339.	-3619.	-1427.
INCOME TAX RATE (PCT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INCOME TAX	0.	0.	0.	0.	0.	0.	0.
OPERATING INCOME AFTER TAX	3580.	-3115.	5825.	7085.	8885.	9605.	11705.
NET INCOME	284.	-16339.	-7399.	-6139.	-4339.	-3619.	-1427.
BOOK DEPRECIATION (OVER 20)	1789.	7543.	7543.	7543.	7543.	7543.	7543.
CASH FLOW AFTER TAXES	2073.	-8796.	144.	1404.	3204.	3924.	6116.
DEBT PAYMENT	0.	0.	0.	0.	0.	0.	10199.
EQUITY PAYMENT	0.	0.	0.	0.	0.	1025.	1025.
CASH FLOW AFTER PAYMENT	2073.	-8796.	144.	1404.	3204.	2899.	-5108.
PRESENT WORTH (FAC. = .10000)	1885.	-770.	108.	959.	1989.	1636.	-2621.
DIVIDENDS	284.	0.	0.	0.	0.	0.	0.
DIVIDEND TAX AT 0.00 PCT.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS AFTER TAX	284.	0.	0.	0.	0.	0.	0.
RATE BASE	109765.	141374.	133831.	126289.	118746.	111203.	103661.
RETURN ON RATE BASE - PCT	3.26	-2.20	4.35	5.61	7.48	8.64	11.29
RETURN ON EQUITY - PCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PROPOSED INCOME STATEMENT SCHEDULE

22 INCH DIAMETER PIPE
OCTOBER, 1979

Sheet 11 of 12

OPERATING YEAR	8	9	10	11	12	13	14
COMMODITY INPUT (CENTS/MCF)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COMMODITY OUTPUT (CENTS/MCF)	60.000	60.000	60.000	60.000	60.000	60.000	60.000
ANNUAL QUANTITIES (MMCF)	42600.	49200.	54800.	54800.	66000.	67600.	69900.
OPERATING REVENUES AT 43.3¢/3	25560.	29520.	32880.	32880.	39600.	40560.	41940.
OPERATING EXPENSE	1102.	1102.	1102.	1102.	1102.	1340.	1340.
TAX DEPRECIATION (1 OVER 20)	7543.	7543.	7543.	7543.	7543.	7543.	9317.
TAXES OTHER THAN INCOME	2930.	2930.	2930.	2930.	2930.	2930.	3179.
SUB-TOTAL	11575.	11575.	11575.	11575.	11575.	11813.	1584.
OPERATING INCOME	13985.	17945.	21305.	21305.	28025.	28747.	28104.
INCOME ADJUSTMENTS							
INTEREST CHARGED TO CONSTR.	0.	0.	0.	0.	0.	0.	0.
AMORTIZATION OF DEBT FIN.	0.	0.	0.	0.	0.	0.	0.
INTEREST EXPENSE	12122.	11112.	10101.	9091.	8081.	7071.	7186.
TAX LOSSES CARRIED FORWARD	1863.	6834.	8890.	0.	0.	0.	0.
TAXABLE INCOME	0.	0.	2514.	12214.	19944.	21676.	20918.
INCOME TAX RATE (PCT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INCOME TAX	0.	0.	0.	0.	0.	0.	0.
OPERATING INCOME AFTER TAX	13985.	17945.	21305.	21305.	28025.	28747.	28104.
NET INCOME	1863.	6834.	11204.	12214.	19944.	21676.	20918.
BOOK DEPRECIATION (OVER 20)	7543.	7543.	7543.	7543.	7543.	7543.	9317.
CASH FLOW AFTER TAXES	9406.	14376.	18746.	19756.	27487.	29219.	30234.
DEBT PAYMENT	10199.	10199.	10199.	10199.	10199.	10199.	10199.
EQUITY PAYMENT	1025.	1025.	1025.	1025.	1025.	1025.	3179.
CASH FLOW AFTER PAYMENT	-1818.	3152.	7523.	8533.	16263.	17995.	16926.
PRESENT WORTH (FAC. = .1000n)	-848.	1337.	2900.	2991.	5182.	5213.	447.
DIVIDENDS	0.	332.	7523.	8533.	16263.	17995.	16926.
DIVIDEND TAX AT 0.00 PCT.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS AFTER TAX	0.	3152.	7523.	8533.	16263.	17995.	16926.
RATE BASE	96118.	88575.	81033.	73490.	65947.	64687.	62481.
RETURN ON RATE BASE - PCT	14.55	20.26	26.29	28.99	42.50	44.44	44.98
RETURN ON EQUITY - PCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PROFORMA INCOME STATEMENT SCHEDULE

22 INCH DIAMETER PIPE
OCTOBER, 1979

Sheet 12 of 12

OPERATING YEAR	15	16	17	18	19
COMMODITY INPUT (CENTS/MCF)	0.000	0.000	0.000	0.000	0.000
COMMODITY OUTPUT (CENTS/MCF)	60.000	60.000	60.000	60.000	60.000
ANNUAL QUANTITIES (MMCF)	72700.	76200.	80100.	84400.	89200.
OPERATING REVENUES AT 43.303	43620.	45720.	48060.	50640.	53520.
OPERATING EXPENSE	1340.	1340.	1761.	2085.	2085.
TAX DEPRECIATION (1 OVER 20)	9317.	9317.	9317.	11350.	11350.
TAXES OTHER THAN INCOME	3179.	3179.	3179.	3301.	3301.
SUB-TOTAL	13836.	13836.	14257.	16736.	16736.
OPERATING INCOME	29784.	31884.	33803.	33904.	36784.
INCOME ADJUSTMENTS					
INTEREST CHARGED TO CONSTR.	0.	0.	0.	0.	0.
AMORTIZATION OF DEBT FIN.	0.	0.	0.	0.	0.
INTEREST EXPENSE	5989.	4791.	3593.	2954.	1484.
TAX LOSSES CARRIED FORWARD	0.	0.	0.	0.	0.
TAXABLE INCOME	23795.	27093.	30210.	30950.	35299.
INCOME TAX RATE (PCT)	0.00	0.00	0.00	0.00	0.00
INCOME TAX	0.	0.	0.	0.	0.
OPERATING INCOME AFTER TAX	29784.	31884.	33803.	33904.	36784.
NET INCOME	23795.	27093.	30210.	30950.	35299.
BOOK DEPRECIATION (OVER 20)	9317.	9317.	9317.	11350.	11350.
CASH FLOW AFTER TAXES	33112.	36410.	39527.	42300.	46650.
DEBT PAYMENT	10199.	10499.	10199.	10199.	10199.
EQUITY PAYMENT	3109.	3109.	3109.	6212.	6293.
CASH FLOW AFTER PAYMENT	19804.	23102.	26219.	25889.	30158.
PRESENT WORTH (FAC. = .10000)	4741.	5028.	5187.	4656.	4931.
DIVIDENDS	19804.	23102.	26219.	25889.	30158.
DIVIDEND TAX AT 0.00 PCT.	0.	0.	0.	0.	0.
DIVIDENDS AFTER TAX	19804.	23102.	26219.	25889.	30158.
RATE BASE	53164.	43847.	37686.	30483.	19133.
RETURN ON RATE BASE - PCT	56.02	72.72	89.70	111.22	192.25
RETURN ON EQUITY - PCT	0.00	0.00	0.00	0.00	0.00
PROJECT INCOME TAXES	0.				
PROJECT DIVIDEND TAXES	0.				
PROJECT CASH FLOW AFTER PAY.	189565.				
PROJECT PRESENT WORTH CASH	42461.				
PROJECT PRESENT WORTH INV.	159695.				
COMPUTED PRESENT WORTH FAC.	100986.				
COMPUTED PRESENT WORTH CASH	164153.				
COMPUTED PRESENT WORTH INV.	164153.				

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Alaska State Legislature

House of Representatives

JT. GAS PIPELINE COMMITTEE

Official Business

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Juneau, Alaska 99811
907/465-4844

March 17, 1981

George H. Beck
Williams Brothers Engineering, Co.
Resources Sciences Center
6600 S. Yale Ave.
Tulsa, Oklahoma 74177

Dear Mr. Beck:

This year's legislature has decided not to proceed with the Gas Liquids Line Study which you submitted a proposal for in October 1980. One of the primary reasons for the decision is the fact the Dow-Shell Group's present Petrochemical Feasibility Study effect has incorporated almost all of the concerns of the legislature.

The Co-Chairmen offer their apologies for the delays in reaching a final decision, and thank you for the time and effort devoted to your proposal.

Please contact me if you have further questions.

Sincerely,

A handwritten signature in cursive script that reads "Mark Wittow".

Mark Wittow
Special Assistant

MW/drz

cc: Pete Lehman
Project Director, Dow-Shell Group