COMMITTEE REPORT

SENATE

FURTHER:

2/15/83

Date: 2/15/83

Mr. President:

The Committee on FINANCE has had HB 166

Making special and supplemental appropriations for oil and gas matters; eff. date

under consideration and (a majority of the committee) (the committee) reports it back with the following recommendations:

[ ] do pass [ ] do not pass

[X] do pass with attached amendments(s)

[ ] replace with CS for ______ [ ] same title [ ] new title

and recommends ______

[ ] AND attaches a "Letter of Intent" [ ] New Fiscal Note

[ ] reports it back without recommendation

[ ] referred to the ______ Committee

MEMBERS SIGNING DO PASS:

[signatures]

MEMBERS HAVING OTHER RECOMMENDATIONS:

[signature]

CHAIRMAN

HB 166 am

2/25/83

$36,105,371.70	Sec. 1
3,985,000.00	Sec. 2
1,440,200.00	Sec. 3
240,000.00	Sec. 4
100,000.00	Sec. 5
$41,870,571.70	

SENATE AMENDMENT

BY Finance Committee

To: _____ SENATE BILL No. _____

To: _____ HOUSE BILL No. 166

PAGE: 1 LINE:

Line 10 - Delete "$38,000,000" and insert "$36,105,371.70"

Line 22 - Delete Sec. 4 and add the following sections:

Sec. 4. The sum of $240,000 is appropriated from the general fund to the University of Alaska-Fairbanks for experimental miscible displacement studies for Prudhoe Bay crude.

Sec. 5. The sum of $100,000 is appropriated from the general fund to the Department of Community and Regional Affairs for a FNSB small diameter pipeline study.

Sec. 6. The unexpended and unobligated portions of the appropriations made in Sections 4 and 5 of this Act lapse into the general fund June 30, 1984.

Sec. 7. This Act takes effect immediately in accordance with AS 01.10.070(c).

Note

Change funding information to reflect new total of $41,870,571.70

Introduced: 2/4/83
Referred: Finance

Funding Information ~~$43,425,200~~ 41,870,571.70
General Fund ~~$43,425,200~~ 41,870,571.70
Other Funds -0-
~~$43,425,200~~ 41,870,571.70

BY THE RULES COMMITTEE BY REQUEST OF THE GOVERNOR

IN THE HOUSE

HOUSE BILL NO. 166

IN THE LEGISLATURE OF THE STATE OF ALASKA

THIRTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making special and supplemental appropriations for oil and gas matters; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. The sum of $~~38,000,000~~ 36,105,371.70 is appropriated from the general fund to the Department of Natural Resources to pay the settlement amount arrived at between the Department of Law and the Union Oil Company of California and Marathon Oil Company in the discovery royalty dispute.

* Sec. 2. The sum of $3,985,000 is appropriated from the general fund to the Department of Law to fund proceedings before the Federal Energy Regulatory Commission establishing tariffs on transporting oil through the Trans-Alaska Pipeline System for FY 83 and succeeding fiscal years.

* Sec. 3. The sum of $1,440,200 is appropriated from the general fund to the Department of Law to fund legal proceedings concerning North Slope oil pricing, including litigation against the Alaska Oil Company and State v. Amerada Hess for FY 83 and succeeding fiscal years.

~~* Sec. 4. This Act takes effect immediately in accordance with AS 01.10.070(c).~~

Inserts
Secs. 4 thru 7

2/24/83

PROPOSED AMENDMENTS TO HOUSE BILL 166:

Sec. 4. THE SUM OF $240,000 IS APPROPRIATED FROM THE GENERAL FUND TO THE UNIVERSITY OF ALASKA-FAIRBANKS FOR EXPERIMENTAL MISCIBLE DISPLACEMENT STUDIES FOR PRUDHOE BAY CRUDE.

Sec. 5. THE SUM OF $100,000 IS APPROPRIATED FROM THE GENERAL FUND TO THE DEPARTMENT OF COMMUNITY AND REGIONAL AFFAIRS FOR A FNSB SMALL DIAMETER PIPELINE STUDY.

Sec. 6. THE SUM OF $75,000 IS APPROPRIATED FROM THE GENERAL FUND TO THE OFFICE OF THE GOVERNOR FOR OPERATIONAL AND RELATED OIL AND GAS TRANSPORTING CAPABILITY EXPENSES OF THE ALASKA RAILROAD TRANSFER ADVISORY COMMISSION.

The unexpended and unobligated portions of the appropriations made in Sections 4, 5, and 6 of this Act lapse into the general fund June 30, 1984.

University of Alaska
PETROLEUM ENGINEERING DEPARTMENT
ROOM 17, DUCKERING BUILDING
FAIRBANKS, ALASKA 99701

PETROLEUM ENGINEERING *(907) 474-7734*

RESEARCH PROPOSAL

EXPERIMENTAL MISCIBLE DISPLACEMENT STUDIES FOR PRUDHOE BAY CRUDE

January 1983

EXECUTIVE SUMMARY

The Department of Petroleum Engineering at the University of Alaska, Fairbanks, is proposing an experimental study for hydrocarbon miscible displacement of Prudhoe Bay crude.

Hydrocarbon miscible displacement is a proven, effective, enhanced oil recovery process. Reinjected natural gas alone does not form a miscible phase with most crudes at reservoir conditions and hence it overrides the oil. This is currently the case at Prudhoe Bay. The addition of sufficient quantities of intermediate hydrocarbons (C_2-C_6) to natural gas can form a miscible phase with oil. The most efficient composition for this displacing agent is a strong function of the type of crude oil and the reservoir conditions. Hence, site specific studies are essential.

The proposed program would consist of the following tasks:

1. The investigation of existing processes for the conversion of methane to C_2-C_6, with emphasis on the probable range of composition from such processes, and the development of laboratory equipment to provide these mixtures for use in Tasks 2 and 3.
2. The development of the PVT relationships of light hydrocarbon/CO_2/crude oil mixtures. This task will be accomplished using an existing PVT laboratory at UAF.
3. Experimental core flooding to assess the effectiveness of flooding with a variety of displacing mixtures.

This project will provide data necessary for the assessment of a hydrocarbon miscible displacement process at Prudhoe Bay. If such a project is indicated, it would serve the dual purpose of increasing the ultimate recovery as well as providing a productive use for some of the excess natural gas currently produced.

Our intent is to investigate only the technical dimensions of the subject. The economic and/or political ramifications will not be addressed.

BUDGET

The budget consists primarily of two items (both of them single appropriations).

a) Equipment ($ 93,000)

(i) 2 core holders	$12,000
(ii) Temperature chambers.....	6,000
(iii)Positive Displacement pump.....	30,000
(iv) Instrumentation (transducers, computer, data gathering)	25,000
(v) Analytical Equipment	15,000
(vi) Miscellaneous (piping ,fittings etc.)	5,000
Total equipment	$93,000

b) Salaries ($ 125,317)

This item includes 8 man-months for the faculty involved and 3 graduate students that will serve as research assistants.

Total Salaries	$125,000
c) Services/Supplies/Travel	$22,000
Grand Total	$240,000

BACKGROUND

The term "miscible flood" implies the use of a displacing agent which does not form a separate phase upon contact with the reservoir oil. The agent is totally miscible in the oil phase. No sharp interface exists between the oil and the displacing fluid. Thus trapping of the oil due to capillary effects as occurs with gas "flooding" or water flooding is minimized. A brief background on the topic of hydrocarbon miscible flooding is presented below.

Phase Behavior

In a miscible flood, the goal is to maintain a single miscible phase at the displacement front. An understanding of phase behavior of the oil-flooding agent system is essential to the analysis of the front. Let us offer a brief review of phase behavior. Figure 1 contains two vapor pressure curves. Observe the propane curve first. To the right of the curve we have a single gas phase; to the left we have a single liquid phase; and along the vapor pressure line, liquid and gas coexist (two phases). Notice that the line terminates at about 620 psi and 205^{o}F. This is the critical point for propane.

Let us look at a two component system. Now the methane curve comes into the picture. The dotted line represents the "critical locus". The two-phase region is now an envelop. As we move up, increasing the pressure, the properties of the liquid and gas gradually change. The liquid becomes more compressible and the gas becomes more dense. At the critical locus, they become identical. Above that, the concept of gas and liquid do not exist. This is a single-phase region. Necessarily, operation in this pressure range results in a single (miscible) phase. For example, the methane-propane system at 150^{o}F and above 1100 psi will always be a single phase.

The whole idea of miscible flooding is: get the fluids into this single-phase region and keep them there. For instance, if we inject propane into a 150^{o}F reservoir and follow it with methane at 1100 psi, the displacement

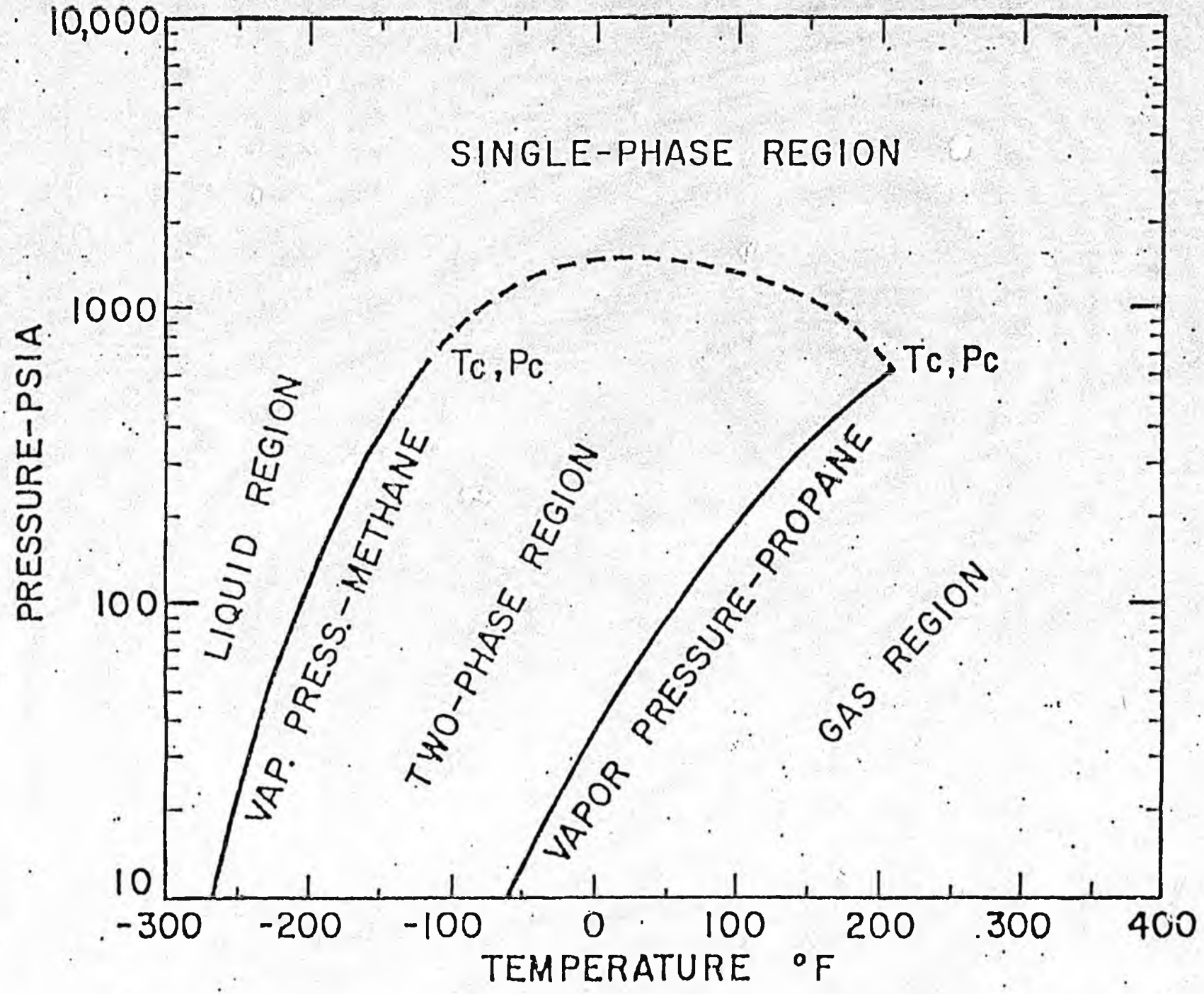


Figure 1. Phase Envelop of a Methane-Propane Binary Mixture

will be totally miscible. However, if the propane becomes contaminated with oil, the critical locus line will be higher. It may be necessary to go to 1500 or 2000 psi, depending on the amount of mixing. Figure 2 taken from the NGPSA Data Book shows critical loci for various hydrocarbon mixtures. From this figure, a good approximation can be made of the pressures needed for miscibility of various injected fluids.

By simple observation, the miscibility pressure of methane and crude oil (let's use n-decane for approximation) is over 8000 psi, while for ethane, the miscibility pressure is less than 1500. For propane the pressure may be less than 1000 psi. Hence, the selection of an appropriate hydrocarbon miscible agent is a function of the reservoir pressure and temperature and the composition of the oil.

Types of Floods - Ternary Diagrams

There are two basic types of miscible floods: (1) vaporizing gas drive, and (2) condensing gas drive. These processes can be visualized using ternary diagrams.

A ternary diagram for reservoir fluids is not thermodynamically rigorous, yet it is useful to represent what is going on in a reservoir. Figure 3 represents such a ternary diagram. The reservoir fluids are split up so the component methane is plotted vertically with 0% methane along the bottom line and 100% methane at the top. The intermediates (ethane through hexanes) are plotted as a pseudo-component: 0% at the left and 100% at the lower right corner. Finally, the heavy liquid components are also treated as a single pseudo-component. They occupy the other peak. Any point in the diagram defines a composition. For example, B has a composition: 15% methane, 55% intermediates (C_2-C_6) and 30% heavy ends (C_7+).

These diagrams have the property that the composition of any mixtures of two fluids will lie along a straight line drawn between the composition of the two fluids. For instance, if a fluid of composition B is mixed with a fluid of composition A, the resulting mixture will have a composition

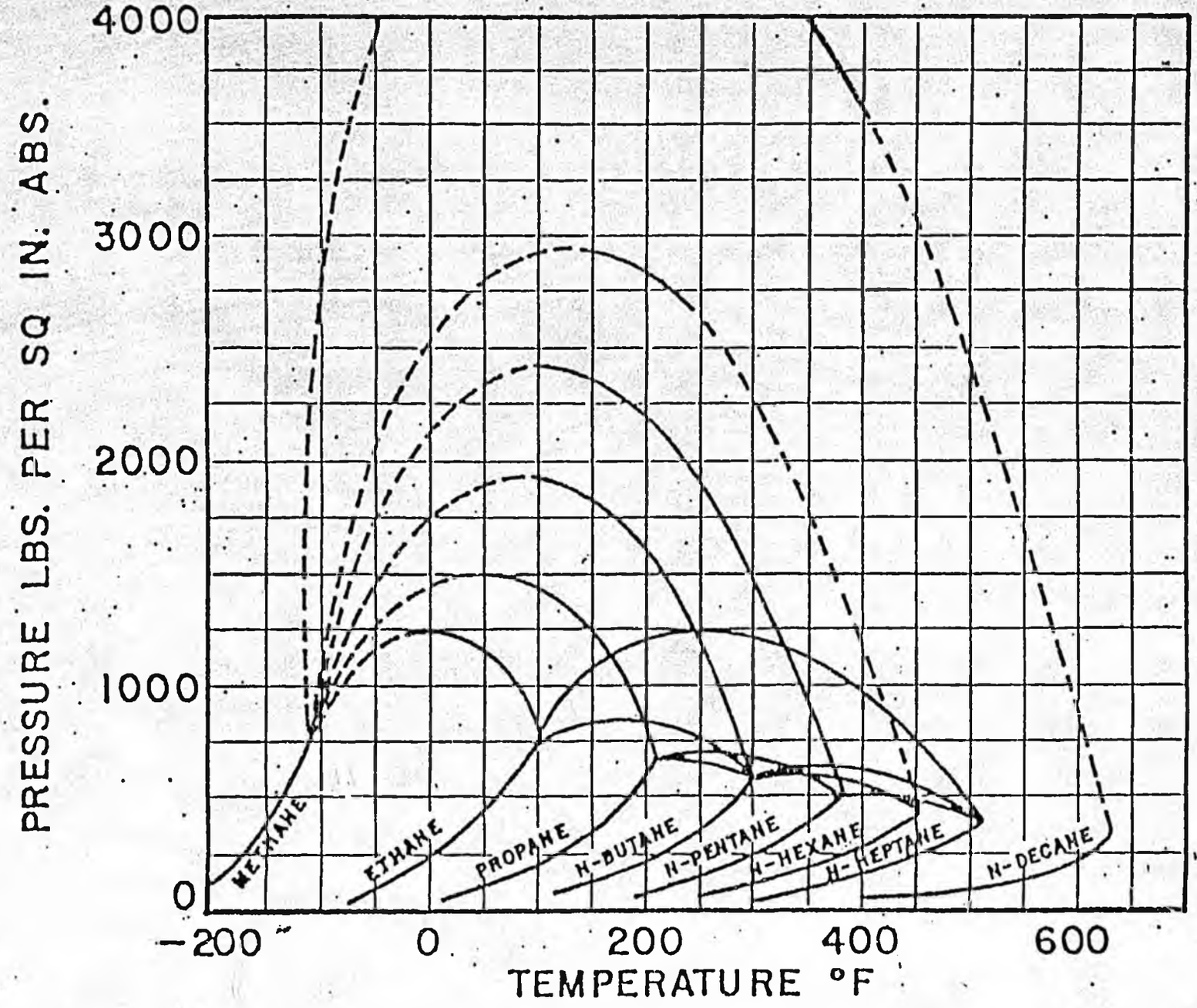


Figure 2. Critical loci of hydrocarbon compounds (from N.G.P.S.A. Data Book)

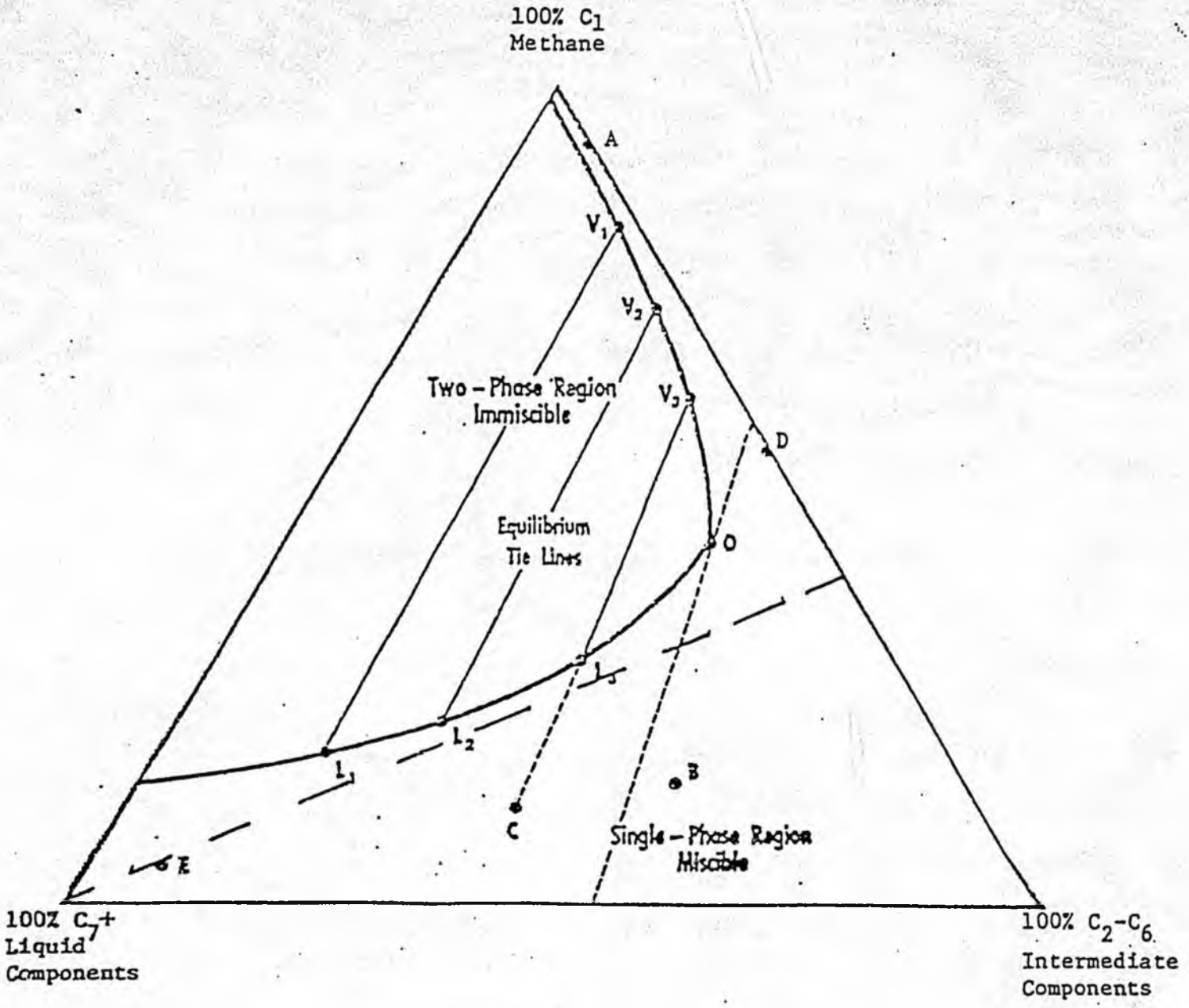


Figure 3. Phase Relations for Vaporizing Gas Drive and Condensing Gas Drive.

somewhere along the straight line between them, depending on how much A and B are present. (The inverse lever rule applies in determining the exact location.)

Observe the two-phase region included in the diagram. Any composition within this region will split into two phases; liquid and gas. The compositions of these phases is given by the "tie lines" drawn connecting the liquid compositions L_1, L_2, L_3 and the gas compositions V_1, V_2, and V_3. The goal of miscible flooding to to avoid this region. With the diagram and the conclusions outlined above, a short treatment of the different miscible displacement methods is in order.

Vaporizing Gas Drive

In this method a lean gas (such as A) is injected into a high pressure oil reservoir (such as B). When the gas first contacts the reservoir fluid, it is not miscible in all proportions, since the straight line between the two passes through the two-phase region.

When the gas reaches equilibrium with oil, its composition changes and is given by the equilibrium tie lines. It may, for example, have a composition V_2. Now, if this "enriched" gas at V_2 again contacts oil B, the mixture composition again lies along a line between V_2 and B.

A new equilibrium is attained and the gas becomes further enriched to say, V_3. As this process continues, the leading edge of the gas enriches to composition "O". From there on the displacement is miscible. This process is called "Vaporizing Gas Drive", because the intermediate compounds in the oil have been vaporized into the gas until it is rich enough in C_2-C_6 components to be in the single-phase region. It is also called "High Pressure Gas Drive" since, ordinarily, this process will not work at pressures below 4000 psi. As the pressure declines and production of light ends continues, B moves further to the left. Hence, the connecting line between a lean reinjected gas and B always passes through the two-phase region. Gas, then, overrides since a miscible, one-phase flow is not attainable. This is what happens at Prudhoe today.

Condensing Gas Drive

Suppose a gas of composition D is injected (Figure 3). This is a rich gas containing about 45% intermediates. If this gas contacts oil C, the oil will become enriched until it reaches composition "O". From then on, the displacement is miscible. Some of the intermediates condense from the gas to liquid.

However, a rich gas D is automatically miscible with oil B since the line connecting the two is outside the two-phase envelop.

Rich gas is expensive. In practical operations, after a sufficient size slug is injected, it is chased by a dry gas such as A. There is no problem with miscibility between rich gas D and lean gas A.

The concept is to inject an appropriate composition slug to form a miscible front with oil. Then a lean gas slug can follow to displace the rich gas slug. At Prudhoe, a partial conversion of the methane into intermediate components will result in a miscible hydrocarbon displacing slug. This method may not only alleviate the present gas cycling problem, but could provide an effective enhanced oil recovery process. The problem becomes the determination of an appropriate composition of the injected fluid.

WORK PLAN

Task 1

The conversion of methane to heavier hydrocarbons could be accomplished through several processes. It is not our intention to research these processes per se. Rather, we are interested in the range of hydrocarbon mixtures which might result from these processes. In the initial stage of our research, we would perform a thorough literature review and initiate direct contact with researchers currently working on this type of process at industrial and academic research laboratories.

The PVT and core flooding studies in Tasks 2 and 3 will require the use of significant quantities of mixtures of hydrocarbons. Rather than buying premixed gas at considerable expense and with a loss of flexibility due to the delays, it is more appropriate that we develop the necessary equipment to prepare our own mixtures. This will require the construction of a manifolding system and installation of a gas chromatograph for analytical verification of the mixture compositions. This task must precede Tasks 2 and 3.

Task 2

This portion of the research project will use the existing PVT cell to gather the data necessary to construct a ternary diagram of methane, C_2-C_6 and Prudhoe Bay crude oil. Miscibility calculations for various compositions of "rich" gas will be done using the results of Task 1 and the PVT work outlined here.

Since CO_2 is present in large quantities, it will be grouped with the intermediates. A "pure CO_2", natural gas and crude oil ternary diagram will also be constructed since CO_2 miscible could also be contemplated at Prudhoe.

Task 3

This task will comprise the major thrust of the project.

After a hydrocarbon mixture has been determined that is miscible with the Prudhoe Bay crude oil, flow experiments will be designed to determine the amount of rich gas needed to achieve miscibility in the porous medium and to reduce the crude oil saturation to a low residual value. The effects of chasing a rich gas slug with light gas will also be investigated.

A core holder will be custom constructed for placement in a controlled temperature air bath. Suitable diameters and lengths for the experimental cores will be determined from a dimensional analysis study to assess laboratory dimensions which would realistically simulate field operations. High permeability berea sandstone cores will be used in order to acquire reproducible results.

The equipment will incorporate a high accuracy positive displacement pump (such as a Ruska pump), pressure transducers, flowmeters, a computerized real time data gathering system, pressure control devices and analytical equipment for analysis of the produced fluids from the displacement experiments.

The results of this project will be presented in quarterly progress reports crowned by a final report at the conclusion of the project.

RESEARCH PERSONNEL

The Co-Principal Investigators and the Participating Engineers constitute a formidable team for the project. All are members of the faculty of the Petroleum Engineering Department at the University of Alaska, Fairbanks.

The program, although only two years old, is expected to have 200 students during the 1982-83 academic year. B.S. and M.S. degrees are offered. Over 100 students from 17 U.S. universities have currently applied for admission to the M.S. program. No shortage of highly qualified research assistants is envisioned.

Prof. M.J. Economides is a specialist in reservoir engineering. He has taught courses (among others) in modern fluid injection and enhanced oil recovery. Professors Ehlig-Economides and Ostermann are presently the Principals in a large grant from the Alaska Council of Science and Technology titled "Enhanced Oil Recovery in Alaska". Professor Al-Khafaji has eight years of experience in PVT studies and core analysis. As a Ph.D. student at Stanford he was instrumental in the development of steam foam displacement processes at the Stanford University Petroleum Research Institute.

RESUME

Michael J. Economides

Professional Interests:

Education
Oil and Gas Reservoir Engineering
Geothermal Energy
Process Design of Petrochemical Operations
Engineering Economics
Dissertation Subject: Well Testing

Personal:

Birth: September 6, 1949, Greece (Naturalized U.S. citizen)

Office Phone: (907) 474-7734
Address: 3074 Riverview Drive, Fairbanks, AK 99701

Education:

B.S. 1974 Chemical Engineering
University of Kansas

M.S. 1976 Chemical Engineering
University of Kansas

Ph.D. 1981 Petroleum Engineering
University of California, Berkeley
Stanford University

Honors and Awards:

Fulbright Scholar
Tau Beta Pi
Earl C. Anthony Scholar (U.C. Berkeley)
Sigma Xi (National Honor Research Society; Elected to full membership)

Other Interests:

Journalism (Regular Columnist for the Stanford Daily; Wrote for San Francisco Chronicle and the Houston Post)

Professional Experience:

Assistant Professor of Petroleum Engineering (University of Alaska - June 1980 to present)

Designed with Assistant Professor Christine Ehlig-Economides, the curriculum for the B.S. and M.S. programs in petroleum engineering at the University of Alaska, Fairbanks. Created several new courses. Designed laboratories and laboratory courses. Presented a proposal for the establishment of a Masters in Petroleum Engineering at the University of Alaska, Anchorage. Wrote the proposal

for the creation of the Alaska Petroleum Research Institute. Serves on the Fairbanks Assembly. Elected to the Budget Committee of the University. Research Supervisor for at least four graduate students at a time. Principal Investigator of the following projects:

Name of Project	Funding Agency	Amount
Preliminary Design & Feasibility Study for a Calcium-Magnesium Acetate Unit	Department of Transportation & Public Facilities	$56,000.00
Unalaska Geothermal Drilling	Alaska Power Authority	$53,465.00
Resource Assessment of Geothermal Sites	Division of Geological & Geophysical Surveys	$35,783.00
Pilgrim Geothermal Drilling Project	Division of Geological & Geophysical Surveys	$29,840.00
ANS Review/Futures Conference; Prudhoe Bay Conservation Practices Study	Division of Energy & Power Development	$12,000.00
A Process Design, Bench Scale Pilot Plant & Wide Field Applications of Calcium Acetate	Department of Transportation & Public Facilities	$67,941.00

Geothermal Consultant for Unalaska Island (Alaska Power Authority - underway)

Management Consultant for a $5 million project for deep geothermal drilling on Unalaska Island of the Aleutian Chain. Responsibility for the preparation of the R.F.P., selection of private contractors and monitoring of the technical dimension of the contract. The project involved the geological and geophysical assessment, drilling and well completion, well testing, reservoir engineering and economic evaluation.

Drilling and Reservoir Engineer for Pilgrim Hot Springs (Division of Energy and Power Development - underway)

Wrote the drilling specification and monitored the project for a $700,000 geothermal drilling program at Pilgrim Hot Springs near Nome, Alaska. Conducted a thorough well testing and reservoir engineering study.

Geothermal Engineer for Selected Sites in Alaska (Division of Geological and Geophysical Surveys - underway)

Conducted a thorough engineering resource assessment of several sites in the State. These included Sitka, Tennakee Hot Springs, Copper Valley, Akutan and Cold Bay. Evaluation of these resources included an economic comparison with other available modes of energy.

Researcher (Stanford University 1978-1980)

Did extensive work in reservoir engineering, well testing, field applications of petroleu, natural gas and geothermal reservoirs. Participated as principal

engineer on the DOE/ENEL (Italy) binational agreement on technology transfer in reservoir engineering. Acquired expertise in geothermal energy. Developed new welltesting techniques.

Reservoir Engineer (Shell Oil Company - Summer 1979)

In charge of reservoir engineering of Shell's Geysers leases. Did work on steam injection for recovery of low gravity, high viscosity crude. Designed and analyzed two dozen welltests including drawdown, buildup and interference.

Research Associate (University of California, Berkeley - 1976-1978)

In the Department of Chemical Engineering, did work on polymeric alloys. Extensive fundamental and experimental work. Designed experiments for the Unit Operations Laboratory in Chemical Engineering.

Chemical Engineer (Black and Veatch Consulting Engineers - Summer 1976)

Worked on process design for water treatment systems of coal and petroleum power plants.

Research Assistant (University of Kansas - 1975-1976)

Designed and constructed experiments on vapor-liquid equilibrium, distillation, liquid-liquid extraction and heat transfer. Published papers resulted in hundreds of reprint requests.

Process Engineer (Celanese Chemical Company - 1974-1975)

Did process design engineering covering the entire front of organic chemistry. Was technical support to 1,000,000 pounds per day acetic acid production unit. Designed over ten fractionating towers and over twenty heat exchangers. Did the complete design for a licensed plant on the separation of organic acids from water ($15.6 MM - 1974). Performed extensive economic evaluation.

Had experience with other petrochemicals including low alcohols, esters, ethers and ketones. Exposure to corrosion problems.

Teaching Experience:

Assistant Instructor:	University of Kansas 1975-1976 Unit Operations Laboratory
Instructor:	University of California, Berkeley 1976-1977 Full responsibility for a Senior Design Course. Unit Operations in Chemical Engineering
Assistant Professor:	University of Alaska 1980-present Petroleum Engineering

Courses Taught:
- PETE 103 - Introduction to the Energy Industries
- PETE 411 - Natural Gas Engineering
- PETE 693 - Waterflooding
- PETE 612 - Advanced Well Test Analysis
- PETE 211 - Drilling Laboratory
- PETE 476 - Reservoir Engineering

Consulting (Active):

Reservoir Engineering:	Shell Oil Company 1979 -
Reservoir Engineering:	Hughes Aircraft Company 1979 - Reservoir engineering backup to the design of computer aided sensing and control devices
Well Testing:	Ente Nazionale per l' Energia Eletrica ENEL (It.) 1978 -

PUBLICATIONS

1. Economides, M.J., and Maloney, J.O.: "Two Experiments for Estimating Free Convection and Radiation Heat Transfer Coefficients," Chemical Engineering Education (Summer 1978), 122-126.

2. Economides, M.J., and Maloney, J.O.: "An Integrated Sequence of Experiments in Distillation," AICHE Symposium Series, No. 183, vol. 75, 60-70.

3. Economides, M.J. et al.: "A Parallelepiped Model to Analyze the Pressure Behavior of Geothermal Steam Wells Penetrating Vertical Fractures" Paper SPE 8231, presented at the 54th Annual Fall Meeting, SPE of AIME, Las Vegas, Nevada, Sept. 23-26, 1979.

4. Economides, M.J. et al." "Influence Functions and their Application to Geothermal Steam Wells," Geothermal Resource Council Transactions, Vol 3, 177-180, (1979).

5. Economides, M.J., Miller, F.G., and Ramey, H.J., Jr.: "The Effect of Noncondensable gases on the Flow Performance of Geothermal Steam Wells," Proceedings New Zealand Geothermal Workshop, Part 2, 249-254, (1979).

6. Economides, M.J., and Fehlberg, E.L.: "Two Short-Time Buildup Test Analyses for Shell's Geysers Well D-6 A Year Apart," Proceedings Fifth Workshop Geothermal Reservoir Engineering, 91-98, (1979).

7. Economides, M.J.: "Shut-In and Flowing Bottom Hole Pressure Calculation for Geothermal Steam Wells," Proceedings Fifth Workshop Geothermal Reservoir Engineering, 139-152, (1979).

8. Economides, M.J., et al.: "Pressure Buildup Analysis of Geothermal Steam Wells Using a Parallelepiped Model," Journal of Petroleum Technology, Vol. 34, no. 4, 925-929, (April, 1982).

9. Ehlig-Economides, C., Economides, M.J. and Miller, F.G.: "Interference Between Wells in a Fractured Formation," Geothermal Resources Council Transactions, Vol. 4, 321-324 (1980).

10. Economides, M.J., Ogbe, D., Miller, F.G. and Ramey, H.J., Jr.: "Geothermal Steam Well Testing: State of the Art," Journal of Petroleum Technology, Vol. 34, no. 5, 976-988, (May, 1982).

11. Economides, M.J., Ehlig-Economides, Christine and Wescott, Eugene: "Geothermal Reservoir Engineering in Alaska," Proceedings Sixth Workshop Geothermal Reservoir Engineering, 43-47, (1980).

12. Ehlig-Economides, C. and Economides, M.J.: "Pressure and Temperature Dependent Properties of the Rock-Fluid Systems in Petroleum and Geothermal Formations," Paper SPE 9919, presented at the 51st Annual California Regional Meeting, SPE of AIME, Bakersfield, California, March 25-27, 1981.

13. Economides, M.J., Reeder, J.W. and Markle, D.: "Unalaska Geothermal Development," Proceedings Third Annual New Zealand Geothermal Workshop, 7-12, (November, 1981).

14. Economides, M.J., Ostermann, R.D., and Miller, F.G.: "Implications of Adsorption and Formation Fluid Composition on Geothermal Reservoir Evaluation," Geothermal Energy, The British Hydrodynamics Research Association, 149-162, U.K., 1982.

15. Ehlig-Economides, C.A. and Economides, M.J.: "Analysis of a Geothermal Well Test in a Predominantly Linear Flow System," Geothermal Energy, The British Hydrodynamics Research Association, 281-292, U.K., 1982.

16. Chaney, G. and Economides, M.J.: "The Effects of a Prolonged Flow Interruption on the Rheological Properties of Prudhoe Bay Oil in the Transalaska Pipeline," to be published in the October, 1982 issue of the Journal of Petroleum Technology.

Developed computer simulation for patten steam flood for a Shell-owned heavy oil lease in California.

Research Assistant - Water Resources Section (Kansas Geological Survey 1974-1976

Developed computer simulations for groundwater reservoir modeling. Developed mathematical solutions for the convection - diffusion equation in two dimensions.

Current Research Activities:

Principal Investigator for grant from the Alaska Council on Science and Technology entitled, "Enhanced Oil Recovery: Part 1 - Physical and Thermodynamic Properties of Alaskan Crude Oils".

Participating Engineer for grant from the Division of Energy and Power Development, Department of Commerce, State of Alaska, entitled, "Pilgrim Hot Springs Geothermal Drilling Project".

Authored proposal for study of the In Situ Formation and Equilibrium Phase Behavior of Natural Gas Hydrates in a Porous Rock.

Participant in ongoing projects dealing with well test analysis, geothermal reservoir engineering, and reservoir simulation.

Publications:

1. Ehlig, C., "Comparison of Numerical Methods for Solution of the Convection-Diffusion Equation in One and Two Dimensions", M.S. Thesis, University of Kansas, 1976.

2. Ehlig, C., "Comparison of Numerical Methods for Solution of the Diffusion-Convection Equation in One and Two Dimensions", Finite Elements in Water Resources, W.G. Gray, G.F. Pinder, and C.A. Brebbia, editors, Pentech Press, London, p. 1.91-1.102, 1976.

3. Ehlig, C. and Halepaska, J.C., "A Numerical Study of Confined-Unconfined Aquifers Inlcuding Effects of Delayed Yield and Leakage" Water Resources Research, Vol. 12, p. 1175-1183, Dec. 1976.

4. Danesh, A., Ehlig-Economides, C. and Ramey, H.J., "The Effect of Temperature Level on Absolute Permeability of Unconsolidated Silica and Stainless Steel", Geothermal Resources Council Transactions, Vol 2, p. 137-139, 1978.

5. Ehlig-Economides, C.: "Well Test Analysis for Wells Produced at a Constant Pressure", Ph.D. Dissertation, Stanford University, 1979.

6. Ehlig-Economides, C., Economides, M.J., and Miller, F.G.: "Interference Between Wells in a Fractured Formation", Geothermal Resources Council Transactions, Vol. 4, 321-324, 1980.

R E S U M E

Christine A. Ehlig-Economides

Professional Interests:

Oil and Gas Reservoir Engineering
Geothermal Reservoir Engineering
Dissertation Subject: Well Test Analysis

Personal:

Birth: June 8, 1949
Office Phone: (907) 474-7734
Address: 3074 Riverview Drive
Fairbanks, Alaska 99701

Education:

B.A.	1971	Math-Science, cum laude Rice University
M.A.T.	1974	Mathematics Education University of Kansas
M.S.	1976	Chemical Engineering University of Kansas
Ph.D.	1979	Petroleum Engineering Stanford University

Honors and Awards:

cum laude graduate (Rice University)
Phi Kappa Phi (University of Kansas)
Standard Oil of California Fellowship (Stanford University)
Sigma Xi (National Honor Research Society; elected to full membership)
Teaching Award (University of Alaska; School of Mineral Industry)
SPE Distinguished Achievement Award, 1982

Professional Societies:

Associate member of Society of Petroleum Engineers of AIME
SPE Technical Editor, 1982-83

Community Activities:

Member University Women's Association
Soloist for University Community Chorus
League of Women Voters

Professional Experience:

Head, Petroleum Engineering Department, July, 1981 to present

Assistant Professor of Petroleum Engineering (University of Alaska, July 1980 - July 1981)

Designed curricula for the Bachelor of Science and Master of Science degrees in Petroleum Engineering at the University of Alaska, Fairbanks. Developed several new lecture and laboratory courses. Acquired laboratory facilities for instruction and research and secured funding for furnishing the laboratories. Wrote proposals for research funding and served as Principle Investigator or Participating Engineer on several of the funded projects. Wrote a proposal for establishment of an Alaska Petroleum Research Institute still awaiting possible funding through the state legislature. Supervised the budget planning process for the Department of Petroleum Engineering. Taught undergraduate courses in oil well design and production, underground fluid properties, reservoir engineering, formation evaluation, and reservoir simulation; and was co-instructor in a graduate course in waterflooding. Published and presented several professional papers and a magazine article. Served on several school-wide and university-wide committees. Gave lectures, workshops, and interviews for the university community, for the local newspaper and local radio and television stations.

Acting Assistant Professor Petroleum Engineering (Stanford University, 1979-1980)

Taught the undergraduate laboratory courses in Fluid Properties and Core Analysis and team taught with Professor H.J. Ramey, Jr., a graduate level course in Advanced Natural Gas Engineering. In the Spring of 1980 taught a graduate course on Reservoir Engineering in Anchorage, Alaska.

Program Manager (Stanford Geothermal Program 1978-1980)

Managed a $400,000 per year DOE contract on geothermal energy. Work done included bench scale experiments as well as field applications. Organized for two years the Annual Stanford Workshop on Geothermal Reservoir Engineering. The workshop is considered the premier conference on the subject. There were over one hundred participants from two dozen countries.

Research Assistant (Petroleum Engineering Department, Stanford University, 1976-1978)

Conducted and supervised research on temperature effects on absolute and relative permeability including oil-water and water-steam systems.

Developed a new and comprehensive well testing procedure for wells flowing at constant pressure. The work was acclaimed widely by members of the profession.

Engineer (Shell Development Company, Summers of 1977, 1979 and 1981)

Performed experimental determination of 3-phase relative permeability for oil-water-steam systems.

Worked on the properties of steam foam as a displacing medium in Enhanced

7. Economides, M.J., Ehlig-Economides, Christine and Wescott, Eugene; "Geothermal Reservoir Engineering in Alaska", Proceeding Sixth Workshop Geothermal Reservoir Engineering, 43-47, 1980.

8. Ehlig-Economides, C.A., and Ramey, H.J., Jr.: "Transient Rate Decline Analysis for Wells produced at Constant Pressure", Society of Petroleum Engineering Journal, February 1981.

9. Ehlig-Economides, C.A., and Ramey, J.H., Jr.: "Pressure Buildup for Wells Produced at a Constant Pressure", Society of Petroleum Engieering Journal, February 1981.

10. Ehlig-Economides, C.A., and Economides, M.J.: "Pressure and Temperature Dependent Properties of the Rock-Fluid Systems in Petroleum and Geothermal Formations", Paper SPE 9919, to be presented at the 51st Annual California Regional Meeting, SPE of AIME, Bakersfield, California, March 25-27, 1981.

11. Ehlig-Economides, C.A., and Combellick, P.: "Natural Gas Hydrates - A Frozen Treasure", The Northern Engineer, V. 13 No. 1, Spring, 1981.

12. Ehlig-Economides, C., and Economides, M.J.: "Analysis of a Geothermal Well Test in a Predominantly Linear Flow System", Proceedings from the International Conference on Geothermal Energy in Florence, Italy, May 11-14, 1982.

R E S U M E

Russell D. Ostermann

Professional Interests:

Synthetic Fuel Technology
Thermochemical Liquefaction of Biomass
Biochemical Engineering
Oil and Gas Reservoir Engineering

Personal:

Birth: March 24, 1952, Wichita, Kansas
Office Phone: (907)474-7734
Address: 718 A Chandalar - University of Alaska
Fairbanks, Alaska 99701

Education:

B.S. 1974 Chemical Engineering, summa cum laude
University of Kansas

Ph.D. 1980 Chemical Engineering
University of Kansas

Honors and Awards:

summa cum laude graduate (University of Kansas)
Awarded graduate exchange fellowship to attend the Swiss Federal Institute of Technology (ETHA) in Zurich
Northern Natural Gas Company Energy Research Fellowship (Kansas)

Society Memberships:

Phi Kappa Phi
Tau Beta Pi
Sigma Tau
American Institute of Chemical Engineers

Professional Experience:

Assistant Professor of Petroleum Engineering (University of Alaska, August 1981 - present)

Taught courses in advanced thermodynamics and an introductory course to the field of petroleum engineering. Designed the petroleum fluids laboratory course.

Assistant Professor of Chemical Engineering (Texas A&M University, February 1979 - August 1981)

Taught courses in material and energy balances, fluid mechanics, and

kinetics. Supervised one graduate student on a funded research program in the kinetics of the thermochemical liquefaction of cellulose. Wrote a proposal (accepted) to the Center for Mineral and Energy Resources at Texas A&M University to fund basic research on the kinetics of the thermochemical liquefaction of cellulose. ($28,000 for two years). Worked with an interdisciplinary team on the preparation of a proposal to study the production of ethanol from grains and cellulose for ultimate use as gasohol. (Funded with over $1,000,000 for a multiyear study). Departmental duties: graduate student recruitment, in charge of review and preparation for professional licensing, freshman advisor.

Consulting Activities: Was on retainer as chief engineering consultant for a local firm engaged in the manufacture of alcohol plants. Co-founded General Technologies Incorporated, a Texas Corporation engaged in the design and manufacture of equipment for the production and use of alternative forms of energy. Currently on board of directors and vice-president of engineering.

Assistant Adjunct Instructor (University of Kansas, August 1977 - December 1977)

Taught basic course in Material and Energy Balances.

Research Assistant (Chemical Engineering Department, University of Kansas, 1975 - 1979)

Conducted research or the kinetics of the thermochemical conversion of cellulose to oil in aqueous alkaline solution. Developed and subsequently published new data on the kinetics of this reaction.

Planning Engineer (Northern Natural Gas Company, Omaha, Nebraska, June 1975 - August 1975)

Worked directly with corporate management as a consultant on coal conversion technology. Prepared a detailed comparison of the then available technology and presented same to management.

Technical Service Engineer (E.I. DuPont - Sabine River Works, Orange, Texas, June 1974 - September 1975)

Process engineer responsible for technical support of an HCN production facility. Helped to develop a closed-loop, computer-controlled process optimization system. Worked on the process design of a sister plant to be built in France, making heavy use of an in-house computer aided process design package.

Research Assistant (National Science Foundation, University of Kansas, Summer 1972)

Performed basic research on polymer entrapment in tertiary oil recovery processes utilizing polymer flooding.

Cement Analysis: Observation of cement setting properties using high pressure-high temperature cement consistometer. Also, measuring cement strength properties using high pressure-high temperature curing chamber. Compressive and tensile strengths of the cured cement were tested.

Mud Analysis: Study of the rheological properties of various muds.

6/71-2/73 Head of Pet. Eng. Dept., Pet. Res. Inst., Iraq, involved in the following: establishing new PVT, core analysis, and mud test laboratories; also carried out the PVT, core, and mud analysis for numerous samples for the INOC, and studied the effect of salt in the setting properties of the Iraqi oil well cement.

6/70-6/71 Technical Training, Pet. Res. Inst.(IFP), France , technical training in core analysis, PVT, and well logging.

1/68-6/70 Research Assistant, Pet. Res. Inst., Iraq, "Development of Iraqi Oil Well Cement" according to the API Specifications could be used up to 14,000 feet .

11/66-6/67 Hydraulic Engineer, Geotechnical Co., Iraq, installing hydraulic pumps in water wells and maintenance.

7/63-8/63 Summer Training, Basrah Pet. Co., Iraq, reservoir engineering laboratory training, production installations and oil transportation.

HONORS AND AWARDS:

1. 6/69 An Honor Appreciation Prize from the President of the Republic of Iraq for the completion of the Iraqi Oil Well Cement Project.

2. 9/70 The Award of the Iraqi Foundation of Scientific Research.

3. 3/72 An Honor Prize for the Contribution in the First Congress of the Iraqi Foundation of Scientific Research.

MEMBERSHIPS: SPE.

LANGUAGES: Arabic, English, and French.

PERSONAL INFORMATION:

Date of Birth: July 1, 1943. Place of Birth: Kufa, Iraq. Nationality: Iraqi. Marital Status: Married. Number of Children: Five.

Publications:

"Kinetics of the Thermochemical Conversion of Cellulose to Oil in Aqueous Alkaline Solution", IGT Symposium Proceedings: "Energy from Biomass and Wastes IV". With K.A. Bishop and H.F. Rosson, 1980.

"Batch Kinetic Studies of the Conversion of Cellulose to Oil by Heating to 480-590°F in the Presence of Water, Carbon Monoxide and Sodium Carbonate Catalyst", Ph.D. Dissertation, University of Kansas, 1980.

"Implications of Adsorption and Formation Fluid Composition on Geothermal Reservoir Evaluation", with M. Economides, and F. Miller, International Conference on Geothermal Energy, Florence, Italy, May 11-14, 1982.

ALI AL-KRAFAJI

Home:

111E Escondido Village
Stanford, CA 94305
(415) 858-2795

Office:
Dept. of Pet. Engineering
Stanford University
Stanford, CA 94305
(415) 497-0629

EDUCATION:

1/79-6/82 STANFORD UNIVERSITY. PH.D. in Petroleum Engineering. Foam Project, Thesis Topic: "Temperature Effect on Thermal Degradation, Adsorption, and Phase Partitioning of Surfactants."

2/73-2/75 UNIVERSITY OF CALIFORNIA - BERKELEY. M.S. In Petroleum Eng. Thesis Topic: "The Effect of Temperature on Shear Wave Propagation in Dry and Liquid Saturated Sandstones."

9/60-6/65 BAGHDAD UNIVERSITY. B.Sc. in Petroleum Eng.

EXPERIENCE:

1/79-Current Research Assistant, Pet. Res. Inst., Stanford University: working in foam project. Surfactant will be injected with steam in order to generate foam in the reservoir to enhance oil recovery. The purpose of this project is to find some surfactants having a half-life sufficient for the surfactant slug to travel from the injection well to the producer and also having the ability to generate foam with steam.

Thermal degradation, adsorption of surfactant on to porous rock and phase partitioning into the oil phase were studied at steam injection conditions (i.e. 400°F-205°C and 500 psi-34 bars). Another experimental work was also conducted to study the effect of salt on surfactant using NaCl, $NaHCO_3$, KCl, and $CaCl_2$ at the above-mentioned conditions.

2/75-9/79 Research Assistant, Pet. Res. Inst., Iraq: Head of a research group working on the following topics: PVT analysis, core analysis, tertiary oil recovery techniques, and the manufacturing & improving of Iraqi oil well cement.

PVT Analysis: Flash and differential liberation tests for bottom hole and recombined crude oil samples. Recombined samples were prepared in large volumes from the surface gas and oil obtained from the first stage separator.

Core Analysis: The study of reservoir rock properties such as air permeability and porosity.

Tertiary Oil Recovery Techniques: Theoretical study of water injection, gas ingection (i.e., high pressure gas injection, lean gas injection, CO_2 injection etc.), micellar-polymer flooding, and thermal recovery techniques.

REFERENCES:

1. Dr. W. E. Brigham, Professor
Petroleum Research Institute, Stanford University, Stanford, CA, 94305. Telphone: (415) 497-0611.

2. Dr. S. K. Sanyal, Consulting Professor
Petroleum Engineering Dept., Stanford University, Stanford, CA, 94305. Telphone: (415) 497-0691. or GeothermEx, Tel.(415) 527-9876.

3. Dr. R. N. Horne, Asst. Professor
Petroleum Engineering Dept., Stanford University, Stanford, CA, 94305. Telphone: (415) 497-9595.

PUPLICATIONS:

1. "Steam-Surfactant System at Reservoir Conditions," SPE 10777, 52 Annual CA Regional Meating, San Francisco, CA, March 24-26, 1982.

2. "Long-Term Surfactant Temperature Stability," Annual Heavy Oil/EOR Contractor Reports, 1982.

3. "Improvement of Steam Injection Through the Use of Foaming," Annual Heavy Oil/EOR Contractor Reports, San Francisco, CA, July 28-30, 1981.

4. "Foam as A Mobility Control Agent in Steam Injection Processes-Temperature Stability of Foaming Agent, Application to Improved Steam Injection," SPE 8912-B, 50th Annual CA Regional Meating, Pasadena, CA, April 9-11, 1980.

5. "Screening of Foaming Agents for Use in Steam Injection Processes," Annual Heavy Oil/EOR Contractor Presentations, Presented in San Francisco, CA, July 22-24, 1980.

6. "Study of the Secondary and Tertiary Recovery Techniques," Iraq Pet. Res. Inst., Baghdad, Iraq, 1978.

7. "Manufacturing and Improving of Iraqi Oil Well Cement," Iraq Pet. Res. Inst., Baghdad, Iraq, 1978.

8. "The Effect of Temperature on Shear Wave Propagation in Dry and Liquid Saturated Sandstones," M.S. Thesis, U. OF CA, Berkeley, Feb. 1975.

9. "PVT Manual-Equipment, Procedure and Experimental Examples," Iraq Pet. Res. Inst., Baghdad, Iraq, 1974.

10. "Effect of the Salt on the Setting Time and the Strength of the Iraqi Oil Well Cement," First Congress of the Iraqi Foundation of Scientific Research, Baghdad, Iraq, 1972.

11. "Development of Iraqi Oil Well Cement According to the API Specifications," Iraq Pet. Res. Inst., Baghdad, Iraq, 1969.

Program for Progress

Project: Small Diameter Pipeline - Study

Sponsoring Agency: Fairbanks North Star Borough

Capital Request: $100,000

Estimated Annual M&O Cost: None

Description/Public Benefit:

The objective of this project is to promote economic development while being responsive to public needs within the Borough.

This project would fund a feasibility study of extending a small diameter natural gas pipeline from Pump Station Three to Fairbanks.

The benefits of this project could range from encouraging economic commercial and industrial development to simply cutting the cost of heating the homes of Borough residents. Natural gas is abundant on the North Slope; the possibility of bringing it to the Interior for distribution must be explored. Funding of this request would enable the Borough to determine how, why and to what ultimate benefit a pipeline could be contructed.

Contact Person

Name: Don Moore

Title: Director, Public Facilities & Services, FNSB

Phone: 452-4761

Sen. Bennett
2/24/83

SENATE AMENDMENT

BY Finance Committee

To: _____ SENATE BILL No. _____

To: _____ HOUSE BILL No. 166

PAGE: 1 LINE: 22 & 23

Delete Sec. 4.

Add the following new sections:

Sec. 4. The sum of $240,000 is appropriated from the general fund to the University of Alaska-Fairbanks for experimental miscible displacement studies for Prudhoe Bay crude.

Sec. 5. The sum of $100,000 is appropriated from the general fund to the Department of Community and Regional Affairs for a FNSB small diameter pipeline study.

~~Sec. 6. The sum of $75,000 is appropriated from the general fund to the Office of the Governor for operational and related oil and gas transporting capability expenses of the Alaska Railroad Transfer Advisory Commission.~~

Sec. 7. The unexpended and unobligated portions of the appropriations made in Sections 4, 5, and 6 of this Act lapse into the general fund June 30, 1984.

Sec. 8. This Act takes effect immediately in accordance with AS 01.10.070(c).

Introduced: 1/31/83
Referred: Finance

Funding Information
General Fund $75,000
Other Funds -0-
$75,000

IN THE SENATE — BY KERTTULA BY REQUEST

SENATE BILL NO. 99

IN THE LEGISLATURE OF THE STATE OF ALASKA

THIRTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making a special appropriation to the Office of the Governor for operational expenses of the Alaska Railroad Transfer Advisory Commission; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. The sum of $75,000 is appropriated from the general fund to the Office of the Governor for operational expenses of the Alaska Railroad Transfer Advisory Commission established by sec. 1, ch. 128, SLA 1982.

* Sec. 2. The unexpended and unobligated portion of the appropriation made by this Act lapses into the general fund June 30, 1984.

* Sec. 3. This Act takes effect immediately in accordance with AS 01.-10.070(c).

2/15/83

NOTE

HB 166

SEE RED LOOSELEAF BINDER FOR ADDITIONAL BACKUP MATERIAL.

MEMORANDUM State of Alaska

TO: Louisiana Cutler
Professional Assistant
House Finance Committee

DATE: February 8, 1983

FILE NO:

TELEPHONE NO: 465-3600

FROM: NORMAN C. GORSUCH
ATTORNEY GENERAL

By: Robert M. Maynard
Assistant Attorney General

SUBJECT: FY 83 supplemental appropriations for oil and gas matters HB 166

Union Marathon Discovery Royalty - $38,000,000

This amount is to pay a judgment in favor of Union and Marathon oil companies to refund overpayments of royalty for oil produced from Cook Inlet since the mid 1960's. After lengthly litigation and administrative hearings, it was determined that these companies should only have paid a royalty of 5%, rather than the 12.5% that they did pay. The amount due is $36,904,000, with interest of 10.5% per year from the date of judgment (about $10,000 per day). The supplemental request for $38,000,00 will pay the interest that will accrue up to February 17, 1983.

North Slope Pricing Litigation - Alaska Oil Company, State v. Amerada Hess - $1,440,200

The State is in ongoing litigation with Alaska Oil Company to recover up to $62,000,000 for underpayment for deliveries of state royalty oil to that company. The state attempted to shortcut the recovery process by putting Alaska Oil into involuntary bankruptcy, but that attempt has failed. Now the state must take the normal route of getting a judgment in state superior court prior to returning to bankruptcy court to use that court's jurisdiction to trace the money to Alaska Oil's affiliates and parent. In addition, the Alaska Oil case raises many issues similar to those being litigated in the North Slope royalty case, State v. Amerada Hess. That litigation challenges the amounts paid and the methods used by the oil companies in making payment to the state for royalty oil. The amounts at stake in Amerada Hess are worth approximately $200,000,000 for past royalties, and about $50,000,000 per year prospectively. Alaska Oil is presently attempting to intervene in Amerada Hess. Vigorously pursuing these cases at this time is the only practical way to protect the state's interest in the recoverable assets remaining in Alaska Oil and to overcome the Alaska Oil Company's delaying tactics that we have experienced in the past. This supplemental is needed not only to pay past unpaid litigation bills, but also to continue to pursue these matters.

TAPS Tariff Proceedings - $3,985,000

The supplemental request for the TAPS tariff proceedings before the Federal Energy Regulatory Commission represents funding that is necessary to continue this case beyond February of 1983. The funding of this case for FY 83 (SLA 1982, ch. 101, § 42) was intentionally underfunded with the concurrence of the legislature while the 1982 legislature considered a possible settlement of the case. The proposed settlement terms were subsequently rejected by the legislature, and this case has continued uninterrupted. Further complicating the litigation schedule is a recent decision by the FERC commissioners to remand Phase I of the proceedings to an administrative law judge. The state earlier received a favorable ruling on Phase I from the administrative law judge hearing the case. However, this earlier ruling has now been rejected by the FERC. Because Phase I will now be reheard, the department's additional costs in this matter, first projected at $2,982,000 for the balance of FY 83, must be increased to $3,985,000.

The TAPS tariff proceeding is the largest single ratemaking case in the history of the United States. At stake is the potential for up $200,000,000 per year in increased oil revenues over the life of the Prudhoe Bay oil field. Benefits will also accrue to the state when new oil fields in the North Slope and Beaufort Sea areas are brought into production if favorable ratemaking rules are established.

RMM:mr

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

February 4, 1983

The Honorable Joe L. Hayes
Speaker of the House
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Mr. Speaker:

Under the authority of art. III, sec. 18, of the Alaska Constitution, I am transmitting a bill making special and supplemental appropriations for oil and gas matters.

Sincerely,

Bill Sheffield
Governor

Introduced: 2/4/83
Referred: Finance

Funding Information	
General Fund	$43,425,200
Other Funds	-0-
	$43,425,200

IN THE HOUSE

BY THE RULES COMMITTEE BY REQUEST OF THE GOVERNOR

HOUSE BILL NO. 166

IN THE LEGISLATURE OF THE STATE OF ALASKA

THIRTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making special and supplemental appropriations for oil and gas matters; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. The sum of $38,000,000 is appropriated from the general fund to the Department of Natural Resources to pay the settlement amount arrived at between the Department of Law and the Union Oil Company of California and Marathon Oil Company in the discovery royalty dispute.

* Sec. 2. The sum of $3,985,000 is appropriated from the general fund to the Department of Law to fund proceedings before the Federal Energy Regulatory Commission establishing tariffs on transporting oil through the Trans-Alaska Pipeline System for FY 83 and succeeding fiscal years.

* Sec. 3. The sum of $1,440,200 is appropriated from the general fund to the Department of Law to fund legal proceedings concerning North Slope oil pricing, including litigation against the Alaska Oil Company and State v. Amerada Hess for FY 83 and succeeding fiscal years.

* Sec. 4. This Act takes effect immediately in accordance with AS 01.-10.070(c).

University of Alaska
PETROLEUM ENGINEERING DEPARTMENT
ROOM 17, DUCKERING BUILDING
FAIRBANKS, ALASKA 99701

PETROLEUM ENGINEERING

(907) 474-7734

RESEARCH PROPOSAL

EXPERIMENTAL MISCIBLE DISPLACEMENT STUDIES FOR PRUDHOE BAY CRUDE

January 1983

EXECUTIVE SUMMARY

The Department of Petroleum Engineering at the University of Alaska, Fairbanks, is proposing an experimental study for hydrocarbon miscible displacement of Prudhoe Bay crude.

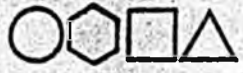
Hydrocarbon miscible displacement is a proven, effective, enhanced oil recovery process. Reinjected natural gas alone does not form a miscible phase with most crudes at reservoir conditions and hence it overrides the oil. This is currently the case at Prudhoe Bay. The addition of sufficient quantities of intermediate hydrocarbons (C_2-C_6) to natural gas can form a miscible phase with oil. The most efficient composition for this displacing agent is a strong function of the type of crude oil and the reservoir conditions. Hence, site specific studies are essential.

The proposed program would consist of the following tasks:

1. The investigation of existing processes for the conversion of methane to C_2-C_6, with emphasis on the probable range of composition from such processes, and the development of laboratory equipment to provide these mixtures for use in Tasks 2 and 3.
2. The development of the PVT relationships of light hydrocarbon/CO_2/crude oil mixtures. This task will be accomplished using an existing PVT laboratory at UAF.
3. Experimental core flooding to assess the effectiveness of flooding with a variety of displacing mixtures.

This project will provide data necessary for the assessment of a hydrocarbon miscible displacement process at Prudhoe Bay. If such a project is indicated, it would serve the dual purpose of increasing the ultimate recovery as well as providing a productive use for some of the excess natural gas currently produced.

Our intent is to investigate only the technical dimensions of the subject. The economic and/or political ramifications will not be addressed.



Program for Progress

Project: Small Diameter Pipeline - Study

Sponsoring Agency: Fairbanks North Star Borough

Capital Request: $100,000

Estimated Annual M&O Cost: None

Description/Public Benefit:

The objective of this project is to promote economic development while being responsive to public needs within the Borough.

This project would fund a feasibility study of extending a small diameter natural gas pipeline from Pump Station Three to Fairbanks.

The benefits of this project could range from encouraging economic commercial and industrial development to simply cutting the cost of heating the homes of Borough residents. Natural gas is abundant on the North Slope; the possibility of bringing it to the Interior for distribution must be explored. Funding of this request would enable the Borough to determine how, why and to what ultimate benefit a pipeline could be contructed.

Contact Person

Name: Don Moore

Title: Director, Public Facilities & Services, FNSB

Phone: 452-4761

Introduced: 1/31/83
Referred: Finance

Funding Information
General Fund $75,000
Other Funds -0-
$75,000

IN THE SENATE BY KERTTULA BY REQUEST

SENATE BILL NO. 99

IN THE LEGISLATURE OF THE STATE OF ALASKA

THIRTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making a special appropriation to the Office of the Governor for operational expenses of the Alaska Railroad Transfer Advisory Commission; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. The sum of $75,000 is appropriated from the general fund to the Office of the Governor for operational expenses of the Alaska Railroad Transfer Advisory Commission established by sec. 1, ch. 128, SLA 1982.

* Sec. 2. The unexpended and unobligated portion of the appropriation made by this Act lapses into the general fund June 30, 1984.

* Sec. 3. This Act takes effect immediately in accordance with AS 01.-10.070(c).