scomm

#44:35

Susitna Power Studies

415·956·7070 5/30/80 1pm

Craig Kirkwood - WWClyde

prime responsibility to Acres

so must be careful

Background - contacted Dick Firth, Anchorage office

A) quick proposal put together, given to Acres

B) After Acres rec'd contract, began to work on WWC contract - Acres wanted very narrow (OGP-5 model) work for computer model - cost #s, load demand curves, env. impact support work.

C) caused concern - wanted ~~inadequate~~ overextensive detail, given info, too narrow a view - focused on cost estimates of generation

Ignored risks of supply expansion alternatives

Impacts - social, economic

D) Still no agreement on scope of work - starting work on supply

1) alternatives - no agreement yet
2) supply - ISER review
3) " - derive load duration curves
4) look at env. impacts of project alternatives (1.05) by Dick Firth

agree w/ Tussing criticism, but

Acres expect to get least-cost alternative from OGP model, + env.-social impact analysis

Tussing - concentrated on marketing

socio-economic impact questions are also significant

or electrical engineer, concerned about having large part of supply in one facility

What's wrong w/ Acres - need integrated look - instead have ISER piece - but ISER forecasts are significantly lower - needs to see how their assumptions fit in w/ rest of planning alternatives.

$ or scope of work.

Since there are no immediate problems, take time to do a decent study job.

Quiet – Issue report - for additional $ – WWC came forward w/ all new proposal. Some Area members were supportive – but APA got different proposal – no real organizational change, despite radical change proposed by WWC –

need realistic evaluation of risks

need " at decision-making

never a decision yes or no - just a question of what $ pursue aggressively

IEC's forecast – risks different, if high or low

pros – risks of exceeds vs. inadequate capacity

need realistic assessment

don't want to blackened by Susitna study –

may back out of the rest of the work.

Hugh + Brian -

1) ISER will formulate range of demand scenarios, with policy guidelines spelled out for legislature - about 7-10 scenarios. Will select 3 for APA/Acres to use for running load curves, selection of alternatives

2) Peter Sandor, Acres demand economist, said that estimating power demand for a place like Alaska is not much better than educated guesswork. He said building a multi-billion dollar, capital intensive project like Susitna should be a matter decided politically, since it has to be made on policy, not technical, grounds.

3) C. Debelius wanted to know if ISER felt that their work would stand up to criticism; both high + low

4) Perry Sioshansi (WWC) ~~stated~~ that he was unsatisfied with the quality of work + effort considering the size of the project However, he said that he didn't see what more could be done. He was disturbed by how much lower the new ISER pop. estimates are compared to previous work.

5) The only new, good information will come from the census in 1981 - can be used to check our final ISER report.

6) Space heating will be important for electric demand - electric heat expected to increase

7) ~~publi~~ ISER could use a couple weeks of slave labor from someone

8) we need to focus a public debate

9) report progress - ISER, Erickson, Tuck Fed, AkPIRG, Fuger, Sebert

10) future - gov oversight

critique of Acres Alternatives comparison

(10) Geo! - Church connection

Scott

Purposely optimistic - not based on projection
high range estimate
wanted high bias on demand estimates

Demand assumptions workshop - 14
- BR
- RiMinn
- Mack
- Ed Phillips
- Berben Withers
- David Keane
- Bob Richards
- Cole Darrell (Dlader)
- Clyde Topping BLM
- Tom Singer

ask
J. Rhode
Singer

6.7405

Sing th Keane

Housing work - additional work would not be cost effective

- Ed Phillips for geo flooring

2256
Ed Park / royalty accountant

Susitna

checks!

seismic

→ Siltation

streamflows

2/19

Susitna -

1) What makes us uncomfortable?

seismic — cost of power - const. overruns -
fisheries — market demand,
transmission / backup power — utility rates

have good report done on all uncertainties

2) $ to Gov's office
w/ conditions —
☆ projections for various sizes
minimum & maximum
cost, cost of power, excess capacity of each

3) TVA or revenue bonds -

project should pay for itself -

When will utilities commit?

Hudson
Wentworth

gasahol

raw gas → Italy or Belgium
use gas or coal
low efficiency
methane, CO_2 + coal = 75%
instead of 50% efficiency
fuel grade methanol
coal in agitator tankers - slurry to fuel

ethane not oil or gas
for purposes of
regulation
methanol
Alberta Chemical

Can you bill consumers during const.?
— delays, arrears
no equity ownership

cost if
System not built

ISER

expected draft March 1 -

instead will have draft of final report

---

would run moderate case - business as usual

Econ projections, household model, regional allocation → Mike Scott

new innovation

Energy Price suggested

(housing supply)

given pop., how many households

end use models

(heat use)

comm/industrial

Don Baxter - Project Engineer
Gloria (auditor) — Oversight

USGS - hydrology - stream flow measurements
snow survey - soil conservation service
Acres engineers analyze
Eric oversees hydrology

independent Boards
seismic geotechnical (engineering)
biological subcommittee

Procedures manuals being developed for data collection.

Million dollars for review of cost estimates, seismic

Bd will be selected by Acres / APA

Corps plan vs. Alternatives
↳ review by Acres of Corps cost estimate

11/80 report out - decision in Jan. - Feb. 81

Public Comments - will be assigned for immediate answer by Acres

spend Bob Mohr Small Hydro rep

GE Voice actuated computer system

Chugach auditor - feeds information to computerized network

immediate answer

a large # of electric utilities are using this to answer

load management - homes - don't have discipline here utilities

Water heater, dishwasher + dryer - not on at same time

doesn't have cost

not peak management

peak rate - anathema - PUC ordered

load duration curves - 52% in typical system

w/out tremendous social change

want to high use customers - what social changes would accept?

Wash - after 8 pm

water heater only on part time etc.

alternative - pay 3 times as much - would do

Chugach - "would be "criminal" to force small utilities to carry out any load management techniques

Audits - "Followups, most have done nothing

Will only hit major things

City - wanted to get in and out of audit.

about $25/audit - cost to Chugach, no charge

→ Fed $ already available to municipalities

Can't affect demand curves

Adam - if they want to do something
use gas & oil intake for heating
gas - cheapest form
Susitna - 4 or 5 times

Chugach has gas in its possession

→ subsidized fuel rate in utility operations
wholesale level
$4/barrel heating fuel - in Bush
no equity
Could use N Slope royalty gas by exchange
or gas line to Anchorage
connecting large use area w/ large source
Pac NG - buy gas from N Slope producers
- big in influence
5 party agreement

---

expected subsidy proposal to cut down cost of energy
— B. Schoultz proposed plan to C Quinlan

channels of new capacity to low gas to AGASS.

Bradley / HEA

Susitna - will cause firing of whole Chugach labor force
will be largest project for smallest market price

APA - can't talk about costs to utilities when dam goes on line.
Burden & Law - Susitna price costs 87 mil

Susitna

exemption possible

Chugach investment in Susitna - would have to be 3 billion.

Power Adm. - would market power (dump)+ secondary power - cheaper than existing power -
would be placing more efficient, less costly units at idle capacity.

No facts behind

Chugach has all-power requirement for HEA

Bradley - further down list

★ — hydrology #s for market -
→ Retherford #s have always been 100% hydro
Cooper - 50 mills - Peter
get 27 mills

Should it / would do more on hydrology?
Certainly that water will be there?
costs ÷ kWs less there

Mark Fryer

12/28 inter - 50%
geo - 60%
w. heat - 30%
solid waste - 30%
wind - 75%
wood - 25% - draft
small hydro - 20%
solar - 20%

complete draft due by 7/20

1/11 - Seifert - 30% solar done

interim report / tentative conclusions

(1) serious env. questions -
small hydro, wood
wind - limited
policy, economic regulation

(2) economic incentives needed
(3) more CC programs
rural Alaska
(4) Thorough inventories needed
(5) small, efficient, woodburning power generators / Eric Myers
(6) highly efficient, maintainable small hydro

~~[illegible]~~

Cons. Comm

Gould 1.25.80

N. Ca. firm - "Biomass" small gasifier for demonstration
Yuba City 200 - 250 KW (Hodgson, AVEC)
$150,000 in FCC (Summa, Scarlett) feasibility study due next month
if acceptable, will demonstrate in Yuba, test in Anchorage,
move to Nulato (wood, peat, possibly coal)
must reduce moisture content to 30%
First US prototype - needs better fuel handling system
- needs better scrubber

How does this relate the CEQ's money for coal gasification
looking for DOE $ to work on the project

EDI tidal power project in SE - current motion machine
Angoon - latest riptide
gasification unit perfection
→ fluidized bed technology - working in lower 48 - bench size
but needs good quality control
MHD

Fb space heat
now - oil
1985 - gas
1995 - elec. heat
} When should people switch? Economics of various types of space heat?

Interties) - Lee Wareham - Susitna NSW - ① Want interconnect
② Fish hatchery on the Upper Susitna

→ Surficial geology / duplication of effort / but training

(faults & lineaments question (Susitna fault)
but - are they active - Corps took superficial map
minerals mapping isn't redundant
have David Stone work with Gould on the project

AKPIRG should work with Acres

Susitna -

(1) detailed work on cost overruns

↓

(2) paper analyzing how costs should be studied

discounting, etc.

marginal costs

1·20·80

Anti - Susitna Arguments / from Lovins

(A) We need to spend $ on:

(1) liquid fuel for transport, etc. (34%)

(2) heat (58%)

more than electricity (8%)

power stations are too expensive, and produce energy of a much higher quality that what we need.

(B) Conservation + alt. energy investment, usually take less than a year to implement, less than ~~ten~~ to repay. Power stations take 10 yrs to build, more than 30 years to repay.

2/3 of typical rate hikes go to pay for new construction

Susitna - 4 billion ÷ app. 100,000 rate payers

4,000,000,000 40,000 per ~~person~~ household over 50 years

~~4000~~ $800 per year for Susitna!!

does this include interest costs?

(but fuel generation of elec. power would be more expensive)

We need a good economist to work over #s for Susitna vs. gas vs alt. energy vs. conservation

- part of the post-April work

with some recognition of Lovins-type considerations

→ marginal costing

Power North as rev. border-
when?

Please tell Arlon that I see
real problems with the subsidies presently
built into the Power Proj Revolving Loan
Fund because the cost of money to the
borrower is completely free with all the
attendant distortions. But politically
popular. Also problem of planning + incentives

2
25-1196
Sun Plain

Power Load Forecast

+ exclusion of early costs

no discounting

Table 22

APA summary of Battelle report

"OMB would just laugh at this"

Battelle's present value analysis inconsistent

Send Energy Policy ISER proposals, Corp. 76 + usage for demand ~~analysis~~

Where is the cost of the intertie?

APAdm. - Power Market Analysis 3-79

Const. Costs ~~by~~ increased by 87%

We need someone to look at these figures

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

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

MEMORANDUM

May 26, 1980

TO: Representative Hugh Malone
Representative Brian Rogers

FROM: Susan Brody (SEB) and Jack Fargnoli (JF)

RE: Fiscal Note--Legislative Oversight of Susitna Hydroelectric Project Feasibility Study (Acres American, Inc.)
(Research Request No. 144)

The cost of providing legislative oversight of tasks 1 and 11 of the Susitna Hydroelectric Project feasibility study has been estimated at $135,000, and is depicted on two copies of a fiscal note, attached. This estimate represents the cost of monitoring portions of the Acres American, Inc. study through May of 1981, including the power studies (Task 1), and the study's initial financing feasibility phase (Task 11).

The assumptions upon which the estimated cost is based are as follows:

- Oversight monitoring will be coordinated by the House Research Agency (no additional funding required), including ongoing monitoring of the contractual activities described below.

- A single contractor or several contractors, as necessary, will be engaged by the House Research Agency to assess the progress of the feasibility study at identified benchmark stages (coinciding with completion of specified subtasks). Contractor reports to the Agency, and through it to the Legislature, will assess progress to date, identify any potential problem areas, and discuss the implications of the subtask findings for ensuing stages of the feasibility study.

- Contractor costs will be approximately $500 per day, based on current billing rates estimated at $50-$75 per hour.

Based on these assumptions, and the time period for the study, oversight of the subtasks has been costed out as follows:

Subtask	Activity Involved	Estimated Time (@ $500 per day)
1.01	ISER Power Demand Report	30 days (full-time equiv.)
1.02	Peak Load Forecasting	20
1.03	Power Alternatives	40
1.04	Viable Expansion Sequences	20
1.05	Expansion Sequence Impact Assessment	20
1.06	Power Alternatives Study Report	10
	Subtotal:	140 days ($70,000)
11.03	Alternative Power Sources/ Risk Analysis	40
11.04	Base Plan/Initial Risk Analysis	40
11.07	Tax Exempt Bond Issuance	30[a]
11.08	Parties in Interest	20
11.10	Liason/Bond Underwriters	-0-[b]
	Subtotal:	130 days ($65,000)
	TOTAL:	270 days ($135,000)

[a] Estimate is high due to possible need for specialized bond counsel, at higher hourly/daily rate.

[b] As this subtask is a continuous study activity and results in no monitorable product, costs for its oversight have been subsumed under Subtask II.07.

If we may be of further assistance, or if you would like any additional explanation of these estimates, please don't hesitate to contact us.

SB:JF/dp

FY81 Capital Budget

OFFICE OF THE GOVERNOR

Railbelt Power Market and Supply Study $1,604,200

It is the intent of the Legislature that the appropriation to the Office of the Governor is for a railbelt power market and supply study which will serve as the principal study on power demand and alternative supplies in making the decision whether to construct the Susitna hydro-electric project. (Accordingly, the Legislature intends to reduce the total appropriations to the Alaska Power Authority for Susitna feasibility studies by the amount of $1,604,200, and intends that power market and alternative supply studies be deleted from the Acres contract for Susitna feasibility studies.)

NO NEED (*) motion + ~~amendment~~ to reduce APA FY 81 capital app. ~~for~~ Susitna ~~feasibility~~ studies by a like amount.

Suggested language to mine evaluation of alternatives.

H Malone

ALASKA POWER AUTHORITY

333 WEST 4th AVENUE - SUITE 31 - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-2715

May 29, 1980

Honorable Hugh Malone
Alaska House of Representatives
Pouch V
Juneau, Alaska 99811

Dear Representative Malone:

Thank you for your letter of May 26, 1980 in which you requested my clarification of the legislative and Power Authority understanding of the intent of Section 44.56.187 Subsection 2(1).

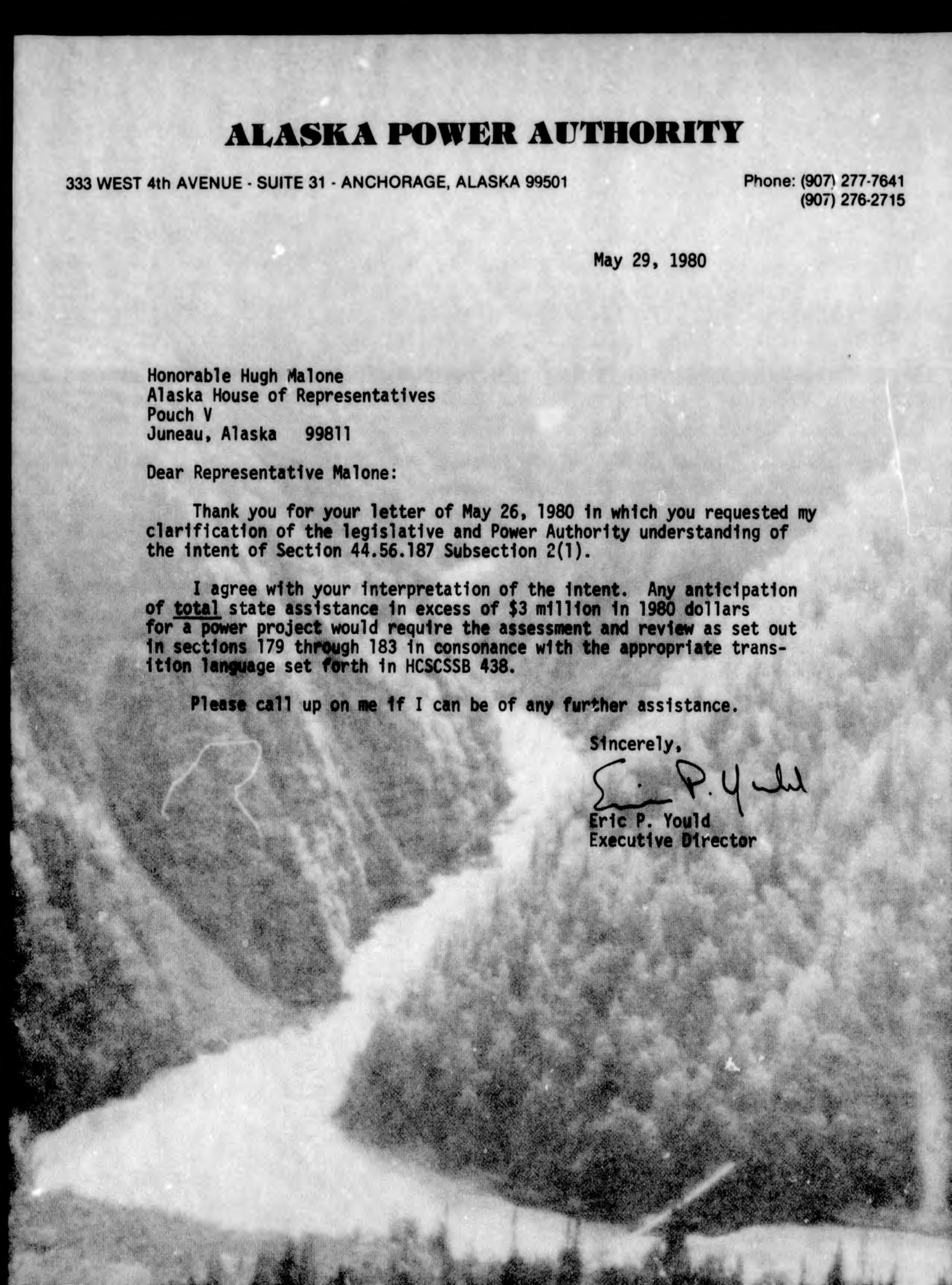
I agree with your interpretation of the intent. Any anticipation of total state assistance in excess of $3 million in 1980 dollars for a power project would require the assessment and review as set out in sections 179 through 183 in consonance with the appropriate transition language set forth in HCSCSSB 438.

Please call up on me if I can be of any further assistance.

Sincerely,

Eric P. Yould

Eric P. Yould
Executive Director



May 28, 1980

We thought you might find this article on electrical load forecasting useful as background material on the projected energy needs of the Alaska railbelt. The University of Alaska's Institute of Social and Economic Research and Acres American recommended this piece in response to requests for information on how forecasts are made.

Nancy Blunck
The Alaska Power Authority
276-0001

Note: A glossary of terms will be available at the workshop.

New Factors in Utility Load Forecasting

By ROBERT W. SHAW, JR.

Load forecasting is the cornerstone of all utility planning. To provide useful input to facility and financial planning, utility load forecasters must be able to project electric energy sales and peak loads fifteen or twenty years into the future. Yet load forecasting has become an increasingly difficult challenge as social, economic, demographic, and political forces converge to form an ever-changing pattern of complexity. The relatively primitive trend line forecasting methods of past decades — which were adequate in their time — are today being replaced with more sophisticated approaches needed to cope with the "new factors" which the forecaster must address.

Two general load forecasting approaches are currently in widespread use in the utility industry: (1) econometric models, and (2) end-use (or engineering) models. Econometric models rely on historical data and statistical techniques to forecast future use of electric energy — in the aggregate for a service area or by customer class — as a function of the price of electricity, the price of alternate energy sources, population, personal income, and other economic-demographic variables. These models are based on the assumption that customer response to changes in these variables will be the same in the future as it was in the past. They cannot deal explicitly with factors such as technological change or regulatory initiatives other than those affecting prices.

The author suggests that the deficiencies in two existing general approaches to utility load forecasting — econometric models and end-use engineering models — may be corrected through a combination of the best features of both. The utility load forecaster would, as one result, be given greater flexibility in assessing the many factors with which he is confronted. This article identifies many of those factors — which constitute a changing forecast environment — and provides a schematic description of the kind of econometric end-use forecasing approach proposed by the author.

End-use models build a forecast on detailed information regarding the way electric energy is used in each consuming sector of the utility's service area. Although these models frequently suffer from a severe lack of data, they do provide a way to deal with the multitude of factors which can cause end-use patterns to change. These models have a serious drawback, however, in that they usually do not explicitly consider the effect of price on the consumption of electricity. This is not an essential flaw in the model structure, but merely an indication that forecasters have not yet pushed the modeling art far enough.

Robert W. Shaw, Jr., is a vice president of Booz, Allen & Hamilton Inc., where he manages the firm's technical and planning practice for electric utilities. He has directed projects on load forecasting, corporate planning, and technology assessment. Dr. Shaw received his PhD degree in applied physics from Stanford University, a Master's degree in electrical engineering, and a Bachelor's degree in engineering physics from Cornell University. He is serving as executive director of the Electric Power Research Institute's utility modeling forum.

Econometric End-use Forecasting Models

To correct the deficiencies in both general approaches and give the utility forecaster greater flexibility in addressing the new factors he must consider, a forecasting approach which combines the most important features of both econometric and end-use models has been suggested. The basic elements of the method are shown in Figure 1 (this page). In simplified terms, the forecast of electric energy consumed during a particular year is the product of the number of utility customers (disaggregated into categories such as residential, commercial, industrial, etc.), the number of electricity-consuming devices that each customer has connected to the grid, and the amount of electricity consumed by each device during the year. Econometric relations are developed to describe the projected change in these three basic components as a function of price and other economic and demographic variables. This type of "econometric end-use models" has recently been used by several utilities to improve their forecasting capability.

The econometric end-use model is simple to describe in concept but much more difficult to execute in practice, because it requires an extensive data base defining the structure of end-use patterns in detail. Very few utilities have such a data base at their disposal. The first and most challenging task in the forecasting effort is to assemble and refine the necessary data over a period of years.

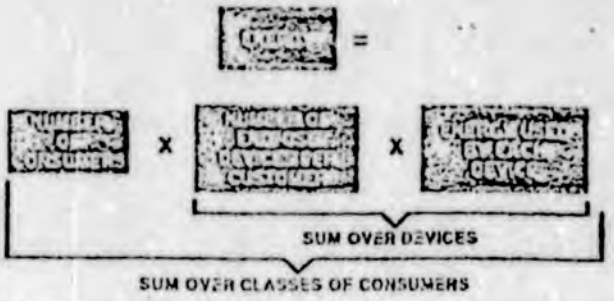
Once the end-use data have been assembled, price and income effects are built into the model — as indicated schematically in Figure 2 (page 21). The econometric methods used in the analysis are essentially identical to those used in market-penetration models. The models describe how the number of different devices used by customers in each sector depends on: price of electricity, prices of alternative fuels that could operate comparable devices, marketplace price of the devices, income (personal or corporate), and characteristics of the sector; i.e., for the residential sector, number of persons per household.

The final step is to develop models such as those illustrated in Figure 3 (page 22) which link the amount of energy consumed by typical devices with:

- The price of the electricity used to run them
- The income of the user
- The efficiency of the device
- The characteristics of present or planned load management programs
- Other socioeconomic and technical variables.

This schematic and highly simplified description of the econometric end-use forecasting approach masks the complexity of the models involved and gives little indication of the extraordinary level of effort required to assemble the necessary data base. To overcome these problems in the early stages of forecast development, the level of disaggregation used in the models can be tailored to fit the data base available. In later years, as the data base expands, the level of disaggregation can be increased.

FIGURE 1
AN ECONOMETRIC END-USE MODEL COMBINES THE BEST FEATURES OF BOTH



The Changing Forecast Environment

The econometric end-use approach to utility load forecasting has the capability to deal with the changing social and economic environment which influences load growth. The "new factors" which characterize this uncertain environment were of little importance in the past, but they must now be taken into account if forecasts of electric energy consumption and peak demand are to be useful in utility decision making. These new factors fall into three generic groups: policy-regulatory factors, technical factors, and economic-demographic factors.

Policy-regulatory factors include fuel price and use controls, efficiency standards, mandatory conservation regulations, load management programs, incentives to adoption of alternative technologies, and changes in rate structure. Changes in policies and regulations can occur at almost any time, taking the forecaster by surprise, and sometimes causing an immediate impact on load growth.

Technical factors, on the other hand, are easier to deal with because changes in technology typically do not penetrate the market very rapidly. Technical factors important to load forecasting include: new end-use devices, improved efficiency of traditional devices, dispersed energy supply technologies (such as solar heating or cogeneration), and new systems for load control and management.

Sometimes these first two categories overlap. For instance, technical advances in solar heating may occur over time, but the use of solar heating may be accelerated by economic incentive mechanisms and government-supported research and development. A similar relationship exists with technical achievements in appliance efficiency, and government-imposed efficiency standards.

Economic-demographic factors also are important to accurate load forecasting. Like technical and policy developments, regional economic and demographic characteristics are changing more rapidly than they did in the past. These factors can best be addressed by constructing a regional economic-demographic model of

utility's service territory, accounting for population ifts, employment, personal and corporate income, etc. uch models are difficult to create and specify, but they ave been built and they work reasonably well.

New Factors Affecting Residential Load Growth

For the remainder of this discussion, we shall assume at a state of the art regional model exists and produces ceptable forecasts of population, employment, and so in the utility's service area. Our major concern will to examine specific new factors in the areas of policy gulation a echnology as they impact the res- ential, comm ial, and industrial components of a ility's load and energy sales.

There are many new factors which could affect sidential load growth over the rest of this century, cluding improvements in the efficiency of buildings d appliances, greater use of solar heating systems, ad management programs, and new energy- nsuming devices.

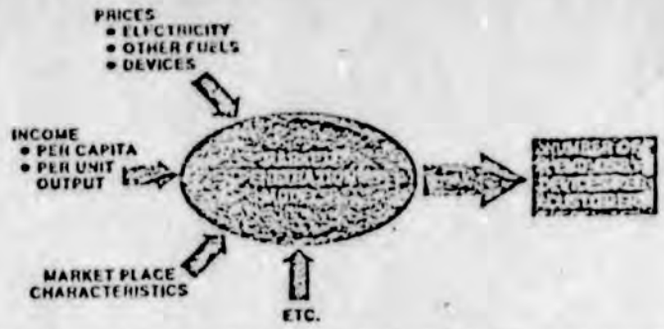
Building Shell Efficiency Improvements. The recently gislated National Energy Act (NEA) requires utilities help home owners install improved attic and wall sulation, caulking, weather stripping, etc., to decrease at loss from their homes. Technically it is feasible to ake the typical residential building far more efficient an it currently is — reductions in energy use by factors two or three are possible. The economics of various ls of improvements are the subject of much debate. e result depend strongly on regional differences and assumptions regarding fuel price increases. It is nerally accepted that a modest investment in ceiling sulation, for example, can lead to a significant energy vings (up to 25 per cent of the heating load) and pay f in a year or two.

These NEA provisions could lead to a substantial ar-term reduction in utilities' electric heating loads — ough perhaps less than has been suggested because ctric homes are typically quite efficient already. To count for this effect in its forecast, the utility would ve to monitor the number of retrofit installations in its rvice area, conduct measurements to determine the erage reduction in energy use per building, and oject the eventual saturation level of retrofit instal- tions. It also would be desirable to obtain data on the ergy efficiency of new homes in the service area.

Appliance Efficiency. Appliances are a major component residential electric load. The NEA mandates nprovements in the efficiency of major appliances, but e standards will not become effective for several years o account for these future appliance efficiency nprovements, the utility forecaster must differentiate tween old and new appli nces after the early 1980's, d develop new data on electric consumption levels for new appliances which enter the market.

Although the use of more efficient appliances will tend decrease energy consumption, net energy use will crease if people continue to buy more and more ectricity-consuming devices. The introduction of entirely new devices — such as electric vehicles — could also result in sharp growth of electric energy sales. The consequences of an increasingly electrified economy must be accounted for in the load forecast, as new electricity-consuming devices enter the marketplace over the next few decades.

FIGURE 8
MARKET MODELS CAN BE USED TO PROJECT HOW MANY END-USE DEVICES THERE WILL BE



Solar Heating Systems. Another factor of concern to utility forecasters is the market penetration of solar heating systems. Although solar heating currently is not economical in most parts of the country, it is possible that the NEA's solar incentives coupled with rising fuel prices could cause significant market penetration of solar heating systems within the next decade. In many cases the backup for solar heating systems will be electric. As a result, it is conceivable that increased use of solar systems could reduce electric energy consumption on an annual basis, but exacerbate the peak-load problems.

To account for increased use of solar heating systems, the forecaster must use market models to predict how rapidly solar technology will penetrate the service area, as a function of various price and policy factors. Measurements must be made to determine the annual electric energy consumption — and the impact at peak — of solar systems with electric backup. A similar approach can be used to account for the possible introduction of passive solar designs in new homes.

Load Management. While increased use of solar heating systems may be detrimental to utilities' load factors, improved load management programs will likely offset these effects and benefit the entire utility industry. A variety of schemes has been recommended to help flatten the load duration curve, ranging from ripple controls on water heaters to time-of-day rates. Many of these schemes are being tested now, and there is already evidence that poorly designed load management programs can have adverse effects on load shape. For example, time-of-day rates can lead to a new and even higher pe in the hour after the peak rate ends, if there is no "shoulder" rate.

Dealing with load management options in the forecast is extremely difficult, because little data are available to help predict how customers will respond to load management efforts. It is important, therefore, for utilities to gather and disseminate data from the

experiments which are now being conducted. These data will help predict the average usage rate per controlled appliances; the impact of storage, feedback meters, etc., on usage levels; and response of customers to various rate structures.

In principle, the econometric end-use forecasting model has the flexibility to deal with both rate changes and engineering-oriented load management options. The problem is lack of data; but this problem should be resolved as the results of ongoing experiments are disseminated, and new experiments are initiated. The importance of load management cannot be overstated. Improved load management means more efficient use of the industry's capital stock — its generating plants and transmission lines — and that is good business.

New Factors Affecting Commercial Load Growth

The nonmanufacturing or commercial sector often represents the fastest-growing component of load in a utility's service area. Yet it is the most difficult component to deal with in forecasting, because it includes a broad spectrum of customers — ranging from restaurants, to shopping centers, to high-rise office buildings — using energy in a variety of ways.

The new factors which could have a major impact on commercial sector load growth include building efficiency standards, dispersed energy sources, and improved equipment efficiency.

Building Efficiency. Among the conservation-related provisions of the National Energy Act are standards to improve the energy efficiency of commercial buildings. These standards, which are not expected to be in place until the mid-1980's, will not have an immediate effect because the building stock turns over slowly. In the long run, however, the impact of these standards on load growth may be substantial, reducing the energy consumption of new office buildings by a factor of two or more. Even now, many states are in the process of adopting the voluntary ASHRAE 90-75 standard, and advanced building-design concepts are being developed with the aim of attaining even greater reductions in the energy consumption of new buildings.

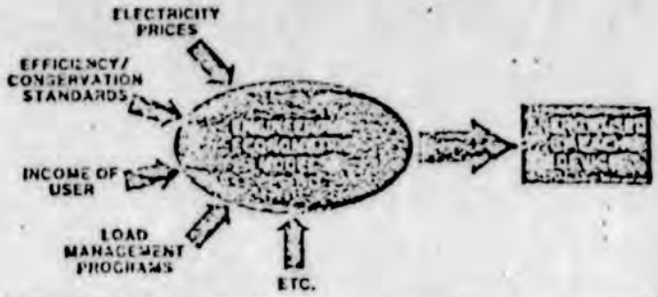
Dispersed Energy Sources. Not only are commercial buildings the prime targets of new energy-efficiency standards, they are also attractive candidates for pioneering the use of dispersed energy sources, including solar heating and cooling, total energy systems, and fuel cells. These innovations may penetrate the market rapidly, particularly if the commercial sector becomes subject to interruptible service as part of state or federal load management policies. There are two crucial issues which the forecaster must address in dealing with these new sources:

- The penetration rate of each type of device on a standard industrial code specific basis.
- The impact of each device on the utility's load, particularly at the peak.

To account for the possible introduction of dispersed

Figure 3

ENGINEERING/ECONOMETRIC MODELS CAN BE DEVELOPED TO PROJECT CHANGES IN CONSUMPTION OF VARIOUS DEVICES



energy sources, the utility load forecaster must construct market models to estimate penetration rates, based on historical experience with similar new technologies (such as central air conditioning). Load profiles for the new devices will have to be established through field measurements of early users.

Equipment Efficiency. A third factor important in forecasting commercial sector load is the improved efficiency of lighting, office machines, compressors, pumps, commercial ranges and ovens, and other equipment. The approach used in dealing with these efficiency improvements is similar to forecasting the impact of appliance efficiency improvements in the residential sector, but is complicated by the heterogeneity of commercial sector users.

The commercial sector will also be influenced — perhaps more strongly than the residential sector — by changes in the way electricity is priced, and by the prices of competing energy sources. Econometric models which incorporate price explicitly into the penetration and consumption models — for both current and future end uses — are of particular importance in the commercial sector. The same point holds true for the industrial sector.

New Factors Affecting Industrial Load Growth

Projecting load growth in the industrial sector is complicated by three factors. When a new industrial facility locates in the service territory, or leaves it, the load can change by a large increment at one time. Also of importance is the fact that industrial energy use is strongly dependent on the health of the national economy — it was the industrial load that dropped most sharply in the recession that followed the 1973 oil embargo. A third factor is that fuel shifting and process changes, initiated for economic or regulatory reasons, can create large new loads in a short time period.

In order to understand better their industrial load, most utilities are moving toward highly disaggregated industry (or plant) specific forecasting techniques. These techniques address end uses at the process level, and account for industrial output in the service territory as a function of national as well as regional economic

indicators. Once these models are in place, it is a relatively straightforward task to deal with new factors such as energy conservation standards, process efficiency improvements, regulations constraining the use of oil and gas, and alternative energy sources.

Energy Conservation Standards. Although the federal government has promulgated a set of energy-efficiency targets for the ten most energy-intensive industries, compliance is still voluntary, and may remain so. Industry's primary concern is not the cost of energy, but the certainty of supply — the efficiency of end use is of secondary importance. Thus in order to pursue conservation targets, industries may switch to electricity-based processes, shifting the burden of inefficient fossil fuel conversion to the utility.

Process Efficiency. Improvements in process efficiency, although part of the overall conservation effort, warrant special attention because they are the focus for substantial research and development effort on the part of both industry and the federal government. Dealing with process efficiency improvements is not much different, in principle, than examining the efficiency of specific appliances in the residential sector. Because there is so much room for process efficiency improvements in most industries, it behooves the utility forecaster to disaggregate his models to the point where these improvements can be captured when there is evidence that they are occurring.

Coal Conversion. A highly disaggregate model is also desirable in order to capture the influences of new NEA-mandated regulations providing for industrial use of coal instead of oil or gas. In many cases, industrial users may choose to convert to electric energy rather than cope with the problems inherent with coal use, including environmental effects and supply uncertainties. As with process efficiency improvements, a highly disaggregated end-use model is essential if these effects are to be addressed correctly in the forecast.

Alternative Sources. The NEA also provides incentives for industrial use of cogeneration, as well as for the use of solar energy, geothermal resources, and other advanced technologies. Increased use of such technologies could reduce electric energy sales to the industrial sector significantly. Again, detailed end-use models — reflecting specifically the potential for use of alternative sources in industrial process applications —will be necessary to account for switchovers in the load forecast.

Limitations of Models

This discussion has stressed the use of analytical models to address the new factors affecting electric load growth. It is important, however, to remember that models are only a tool. They are intrinsically:

- Nothing more than a systematic way to structure the available data and information about a situation. They can in no way transcend the data used to create them, although they may occasionally help the forecaster to discover relationships which were not intuitively evident.
- Limited by the "boundaries of the modeler's understanding"* of what is happening in the world around him. If he does not know, for example, how customers will respond to changes in regulation or technology based on past experience, then models cannot help the forecaster out of the bind imposed by his ignorance.

The art and science of load forecasting will have taken a major step forward when it progresses to the point where accounting — in an explicit way — for the types of factors discussed here is truly feasible. But the challenge of trying to foresee what new factors —beyond those we already envision — will emerge in the years ahead is even more forbidding. Unfortunately, anticipating basic changes in the course of society is something that no utility forecaster will ever be able to do. The tool of sensitivity analysis, which can help him address the "what-if" questions, is perhaps the most effective way of assessing the potential impacts of events such as new regulations or potential technological breakthroughs on load growth.

Dealing with the new factors affecting load growth requires a commitment on the part of utility managers to the development of analytical tools and the data necessary to understand what is going on in the service territory, and to specify the forecasting models. It is legitimate to ask if the investment in data and models is worth the return. There is no simple answer to this question. The returns from improved forecasting come both in reduced levels of uncertainty and in a better understanding of the potential impacts which various futures could have on the utility. Only senior management can decide when an incremental improvement in its perspective on the future is outweighed by the marginal cost of achieving it.

*"Electric Load Forecasting: Probing the Issues with Models," EMF Report 3, Vol. 1, Energy Modeling Forum, Stanford University, Stanford, California, April, 1979, p. 7. EMF is sponsored by the Electric Power Research Institute.

Telecommunications Policy Conference: Call for Papers

The eighth annual Telecommunications Policy Research Conference (scheduled for spring, 1980) will provide a forum for analysis and discussion of important telecommunications policy issues. Participants will include researchers and policymakers from academia, government, and industry. Those engaged in research which has implications for telecommunications policy are invited to submit abstracts (500 words or less) by December 1, 1979. Authors of papers selected for presentation at the conference will be reimbursed for travel and conference living expenses if no alternative source of funding is available. Please send abstracts to: TPRC Organizing Committee, c/o Robert Dansby, American Telephone and Telegraph Company, 195 Broadway, Room 1942B, New York, N. Y. 10007.

People have asked for the chance to talk directly with those doing the energy projections and the work on the power alternatives. That's why this workshop was set up. Come for part or all of the sessions. We will try to keep the language simple and easy to understand.

Active participation is encouraged by the public on Day 1. Day 2 includes observation only, with ACTION forms available to express your views.

For further information contact: Public Participation Program
Alaska Power Authority 276-0001

May 28, 1980

ALASKA POWER AUTHORITY

WORKSHOP #1 ON SUSITNA STUDIES

DAY ONE, WEDNESDAY JUNE 11 Place: ACC Lucy Cuddy Center

Morning: 9:00 - Noon.

Presentation of final report on future energy demands. (Review assumptions, methodology, results.) — Scott Goldsmith, Institute of Social and Economic Research

Open discussion. — Alaska Power Authority

Afternoon: 1:00 - 4:30.

Presentation on conservation:

-How ISER handled conservation in the energy demand. — ISER

-Where do we go from here? — Acres

Presentation on load forecasting and management. (Review of assumptions and methodology.) — Woodward Clyde

Open discussion. — Alaska Power Authority

Evening: 7:00 - 9:30.

Presentations on power alternatives study: — Acres

1. Changes made in power alternatives study as a result of public input.
2. Evaluation process and criteria for screening.
3. Formation of decentralized expansion sequence.
4. Status report on selected alternatives: wind, geothermal, small hydro.

Open discussion. — Alaska Power Authority

DAY TWO, THURSDAY JUNE 12 Place: Alaska Power Authority Conference Room, Post Office Mall, Anchorage

9:00 a.m. - 4:30 p.m.

Coordination meeting with Acres and state and federal agencies.

Discussion and coordination of Federal Energy Regulatory Commission (FERC) licensing process.

ALASKA POWER AUTHORITY

333 WEST 4th AVENUE - SUITE 31 - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-2715

April 25, 1980

The Honorable Hugh Malone
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Representative Malone:

The Power Authority's Susitna Hydroelectric Project Plan of Study (POS), prepared by Acres American Incorporated, has now had the benefit of substantial review. Comments have been received during a series of four public meetings held throughout the Railbelt during the week of April 14, 1980; they have been received from Arlon R. Tussing & Associates in the form of a draft report for House Power Alternatives Committee; and others have been received directly from agencies and individuals who have studied the POS.

The Tussing Report, along with many of the other comments, address the selection of the preferred power generation alternatives in the face of uncertainty and risk. The original plan of study acknowledged this high level of uncertainty and the resultant difficulties in recommending a single plan. At the same time, the POS was also sensitive to the somewhat conflicting goal of economizing on study cost. The weighing of these and other factors resulted in an approach whereby all alternatives would be studied for one year after which a single plan would be recommended for additional study. This plan, if it included the Susitna Project, would then be the subject of intensified detailed feasibility investigations. At the completion of the feasibility studies, the earlier decision would be reassessed in light of the more detailed information gathered during the second year. If the earlier decision was confirmed, then the Federal Energy Regulatory Commission license application would be prepared and submitted.

A more cautious and more costly approach has been suggested by Mr. Tussing. He suggests detailed assessments of several of the more promising alternatives before the recommended plan is selected. Thus, detailed marketing, financing, cost, scheduling and risk assessments would be conducted on a number of alternatives rather than on the one alternative plan that emerged from the first year alternatives study.

A plan of study revision in keeping with Tussing's suggestions has been prepared by Acres American at the request of the Power Authority. The Go/No Go decision points in the POS relate to continuation of study efforts and not construction of any project. The revised plan now has two such decision points relating specifically to [illegible] of alternatives, one in early 1981 much as originally proposed and a second in the spring of 1982. The first decision was and still is intended to provide [illegible] continuation [illegible]

of Susitna Project studies are, or are not, likely to be worthwhile. In addition, it would now serve to identify several promising power generation plans. The second decision would provide the more detailed comparison of the several more promising alternative plans such that a decision could be made on whether to proceed with licensing the project. In the event that a decision in favor of Susitna licensing was forthcoming, the revised approach would not impact license application submittal timing. In fact, it would likely strengthen the defensibility of the license application and thereby possibly accelerate eventual licensing. The additional cost associated with this revised approach is $1,365,000. A summary of changes to the POS reflecting the revised approach is attached.

While the Tussing Report contains a number of valuable suggestions, there are also a number of inaccuracies that should be noted. First of all, there is an apparent misconception about the purpose of the first decision. It is not to decide "whether or not the state should develop the hydropower potential of the Susitna River" (Tussing, page 12). Instead, it is to decide whether or not the feasibility studies of the project should be continued. Thus, the statement that "the decision regarding Susitna's viability will not be based on either its economic or financial feasibility" (Tussing, page 12) is grossly in error.

With regard to load forecasting, Tussing claims that the POS ignores load management techniques (page 17). In fact, the POS specifically calls for the consideration of such techniques in Subtask 1.03.

Despite such inaccuracies, the suggestions provided by Mr. Tussing and others to more completely and systematically deal with uncertainty and risk in choosing among different power generation strategies is worthy of your consideration for additional funding.

Sincerely,

Eric P. Yould

Eric P. Yould
Executive Director

Attachment:
as noted

ATTACHMENT 1

SUMMARY OF CHANGES RECOMMENDED TO INCREASE LEVEL OF EFFORT FOR ALTERNATIVE POWER STUDIES ($ x 1000)

Subtask	Original POS Value	Changes Associated With Recommendation Number(4) 1	2	3	4	5	6	8	Other Recommended Changes	New Value	Remarks
ISER Work	$ 60(1)							+100		$160	Provides funds for major updates, especially after census data is in
1.01 - Review ISER	35.2							+ 50		85.2	Permits continuing interaction with ISER work, including the formulation of a place for improving the data base for future energy and load forecasting
1.02 - Forecasting Peak Load Demand	47.7	+100								147.7	Provides separate peak load and load duration for each load management strategy at each demand level
1.03 - Identify Alternatives	96.3	+100									Provides detailed analysis of load management strategy and considers interrelationship with conservation strategy. Develops energy conservation in more detail as an alternative.
				+100						296.3	Provides for refined site-specific data to assess energy resource availability, technical and commercial use availability, expected fuel dependency, preliminary safety, health and environmental concerns, costs per unit of electricity supplied, schedules and input to risk analyses.
1.04 - OGP Analyses and Expansion Sequence	30.0						+ 70			100.0	Significant increases due to: (1) More alternatives to be evaluated in-depth and screened through OGP Program (2) Decentralized scenario added (3) Imposition of three load management strategies on each demand level (4) Reiterate when necessary using additional OGP analyses and Delphi method when appropriate.
05 - Impact Assessments	138.0								+150.0	288.0	Balances more detail on study of other factors (cost, risk, site specificity, finance, etc.) Has to be expanded to additional scenarios (Decentralized scenario, three load management strategies).

NOTE:

Tussing's Recommendation #7 is incorporated as an integral part of the Revised Study Approach.

ATTACHMENT 1 (Cont'd)

SUMMARY OF CHANGES RECOMMENDED TO INCREASE LEVEL OF EFFORT FOR ALTERNATIVE POWER STUDIES ($ x 1000)

Subtask	Original POS Value	Changes Associated With Recommendation Number(4) 1	2	3	4	5	6	8	Other Recommended Changes	New Value	Remarks
1.06 - Report	12		+ 25				+ 50			87.0	$50k for interim report and updates. $25k to account for reporting on broader scope, more alternatives, etc.
6.01 - 6.08 (Susitna alts)	354.6		+200							554.6	Develop more details on cost and schedule for all Susitna alternatives (not just "selected" scheme)
11.01, .02 - Project Overview and Internal Reports	$ 191.1(2)							+ 50(3)		$241.1	Although Task 11 is still under discussion with APA, changes noted here are based on effect of Tussing recs on plan as currently in POS
11.03 - Alternative Risk Analysis	17.5			+ 50 (3)						67.5	Major increase in number of expansion sequences to be considered requires corresponding increase in risk analysis
11.04 - Susitna Risk Analysis	24.5		+ 50 (3)							74.5	Risk analysis would now be done on all Susitna alternatives (not just one)
11.12 - Preliminary Marketing and Financial Studies	(New)				+ 75					75	Marketing and Financing studies were to be made only for Susitna and only if selected. More detail is now sought earlier per Mr. Tussing's comment
1.07 - Power Study Panel	(New)					+ 75				75	Adds subjective probability factors permitting increase in information available at review points. Adds objectivity factor to eliminate potential bias
*(0) TALS	1006.9	200	275	150	75	75	120	200	150	2251.9	

*(0) Does not include $120,000 for changes to the Public Participation Program needed to accommodate the revised approach.

(1) The ISER work is funded in part by APA ($30) and in part by the Legislature ($30)

(2) Although this is the POS value for subtasks 11.01 and 11.02, the work involved is only partially in support of power studies.

(3) These values may not require full additional funding by the Legislature if pending proposed Task 11 changes are accepted by APA.

(4) Numbers above each column are keyed to numbered recommendations on pp 22-23 of the Tussing report.

ALASKA POWER AUTHORITY

333 WEST 4th AVENUE - SUITE 31 - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-2715

May 2, 1980

Mr. Arlon R. Tussing
Arlon R. Tussing & Associates, Inc.
2720 Rainier Bank Tower
Seattle, Washington 98101

Dear Mr. Tussing:

We have had the opportunity to examine your review draft entitled "Susitna Hydropower: A Review of the Issues" and appreciate the opportunity to offer our comments before your preparation of the final version. In this response we initially summarize the purpose of the Susitna Plan of Study (POS) and discuss its intended philosophy. This is followed by a discussion of some specific issues raised in your Report.

The Susitna Plan of Study is a dynamic document which has been and will continue to be modified and expanded as the concerns and needs of various agencies and the general public become known. There are obviously a number of courses of action which the Power Authority and the utilities might take over the next decade to meet the future electric power needs of the Railbelt Region. As presently conceived, the Susitna POS embodies but one of these courses of action. The scope of work will:

- establish the criteria by which the technical, economic, financial and environmental feasibility of the Susitna Project should be measured;

- assess whether Susitna or some other alternative future Railbelt generation expansion plan satisfies such criteria; and finally,

- if such criteria are satisfied, pursue the FERC licensing of the Project.

In other words, the study will establish whether the Susitna development is appropriate and if so, how best to proceed with that development.

The POS has since its inception undergone a continuing process of evolution in satisfying the overall objectives. At the same time, provision has been made for tapping the input of those concerned through reviews, public meetings and the action list. As a result, the scope and direction of the Susitna study may be changed at any time or the study even terminated, should the evidence indicate that some other course of action should be pursued instead.

Your Report constitutes probably the most detailed assessment yet made of the POS, and is welcomed as a positive contribution to the development of an acceptable course of action. By and large, it is well prepared, thoughtful, and well written, but a significant flaw is its preoccupation with

making explicit judgements about the Project before all the evidence is in. Many of the comments may prove to be valid, but until studied, cannot be verified. More specific comments follow.

1. The Report seems to be based on a misunderstanding of the Go/No Go decision points. In the POS there are essentially three such decision points. During the proposed 30-month study period, each of these decision points relate to "continue-to-study" or "not-continue", rather than "build the project". We wholeheartedly agree with you that a project as large as Susitna requires extensive study and cost expenditures to fully determine whether it is the appropriate course of action. In our judgement and that of Acres, a 30-month period and at least a $30 million expenditure is necessary for a license application decision to be made which adequately considers all issues involved. Nevertheless, it would clearly not be cost effective to defer an obvious No-Go decision until the end of the 30-month period. The Power Authority has not only fiscal responsibility, but also cannot delay its power generation expansion planning activities for that long. The first Go/No Go decision in early 1981 will consequently be made on the basis of an initial comparison of alternatives essentially based on available information and considerable well-informed judgement.

   There is no question that, with the constraints imposed on data collection, load forecasting, alternative energy studies, etc., it will be difficult enough to make the decision whether or not to proceed with the study within one year; it would be entirely impractical and imprudent to make the much more profound decision regarding whether or not to build at that time, unless some overwhelming factor(s) intervene (either for or against).

2. Nowhere does the POS propose that "Woodward-Clyde will derive . . . load duration curves from ISER's projections". The first paragraph of Page 5-11 of the POS states that various recognized methodologies and their applicability will be studied for the problem at hand.

3. Contrary to the assertion that peak load pricing is not mentioned in the POS, Subtask 1.03 has load management activities as an integral part.

4. In response to your concern regarding the lack of some sort of probability assessment for ISER's scenarios, it should be noted that the ISER contract calls for an evaluation of " . . . the probability of each of the projections generated . . .".

5. Your Report presents a useful overview of the planned Susitna hydroelectric project in relation to likely future developments and economic trends in Alaska's Railbelt Region. In this regard, however, the Report seems biased towards a general scenario which sees preferential pricing of natural gas continuing into the next century and a resource-depletion-led slow-down in the mid 1990's. This bias strongly influences the arguments presented in relation to the marketability of Susitna power

and energy. Further, the Report seems to view Susitna hydroelectric development as a single project coming into operation all at once. In fact, the present proposal is for a two stage development phased to meet market area requirements, and we are pursuing studies to assess the possibility of more numerous smaller stages. While there is some support for the cautionary attitude regarding competitiveness of Beluga coal and other alternatives, the situation regarding these must certainly be taken at the time as "not proven". The level of relative competitiveness with Susitna hydroelectric power production will be only partially established one year from now when the decision is taken whether or not to proceed with the study (let alone the project).

The lack of support for Susitna development from the management of Chugach Electric is readily acknowledged, but Chugach can hardly be expected to commit itself to the Project in advance of completed feasibility studies. At the same time, it would be foolish to drop further consideration of Susitna because Chugach has not committed itself; to do so would be to accept a Catch-22 situation. Also overlooked in your assessment of marketability is the opportunity to provide power to industries which now produce their own power. Certain marketing arrangements are conceivable that would induce the purchase of Susitna power to the benefit of all Susitna power customers.

6. The content of Task 11 as proposed in the POS does not appear to be properly understood. You state with emphasis that "Susitna's viability will not be based on either its economic or financial feasibility". This is incorrect. Task 11 requires incisive studies and reports on:

- "Possible Economic Limits to Project"
- "Overrun Possibilities"
- "Security of Project Capital and Structure"
- "Evaluation of Alternative Markets of Susitna Output"
- "Evaluation of Alternative Options for Meeting Railbelt Power Needs"

All of these are to be completed before the third Go/No Go decision point and before a decision is made on submitting the license application.

7. It is fully realized that one of the problems to be faced with a capital intensive development such as a hydropower plant is that the cost of service with the project in the system is likely to exceed the cost of service without the project in the system for the first several years (probably 8-10). Particular attention will be necessary to find ways and means of alleviating the burden on Alaskan consumers in this century of costs of service which will benefit the next generation. This is a very major issue which will require review of a number of options and it should not be readily assumed that past practices will prevail.

In two places in your report, the burden imposed on consumers by the Construction Financing burden (AFUDC) is referred to. It is suggested that the consumers will pay in advance for electricity they may not receive for 10 years or, in your words, "if ever". Capitalization of AFUDC is yet another issue that will be exhaustively studied and treated in the marketing and financing tasks. It is quite improper to assert at this stage that "non-recourse financing would require all-events contracts (compelling consumers to pay for Susitna whether or not they ever got Susitna Power and no matter how much it turned out to cost) prior to construction". The statement is correct if the words in parenthesis are omitted; but the inference with the words left in is, to say the least, provocative and misleading. You may claim that under Alaska PUC rules this has occurred in the past on other arrangements between wholesaler and utility delivering to consumers, but it is a gross assumption that it is necessarily to be the approach for Susitna.

In closing, I want to reiterate my sincere appreciation for your helpful review of our Susitna Plan of Study. While I believe there were a number of inaccuracies or misunderstandings in the review draft, there were also a number of very worthwhile suggestions. A revised plan of study has already been prepared and presented to the Legislature and to the Administration for their consideration. If approved and funded, I think it will be extremely responsive to your recommendations.

Sincerely,

Eric P. Yould

Eric P. Yould
Executive Director

POWERLINE!

I. Mismanagement
II. Health & Safety Effects

United Power Association and Cooperative Power Association have been working on the Coal Creek plant and powerline for many years. Two of the major points raised by citizens protesting the project have been (I) its costly mismanagement and (II) its health and safety effects.

I. Mismanagement

According to Cooperative Power Association's "*Power Cost Study and Financial Forecast, 1979-1991*", CPA members alone will have paid over $1.4 billion just for debt service and interest expenses on this project by 1991. By then, only $43 million will have been paid on the principal. Such costs have already caused bulk electric rates to more than double in the past two years. In 1977 CPA sold bulk power for 14.53 mills per kilowatt/hour, and it is up to 29.38 mills per Kwh for 1979. CPA projects rates will nearly double again by 1981, and by 1990 CPA aims to sell electricity for 80 mills per Kwh.

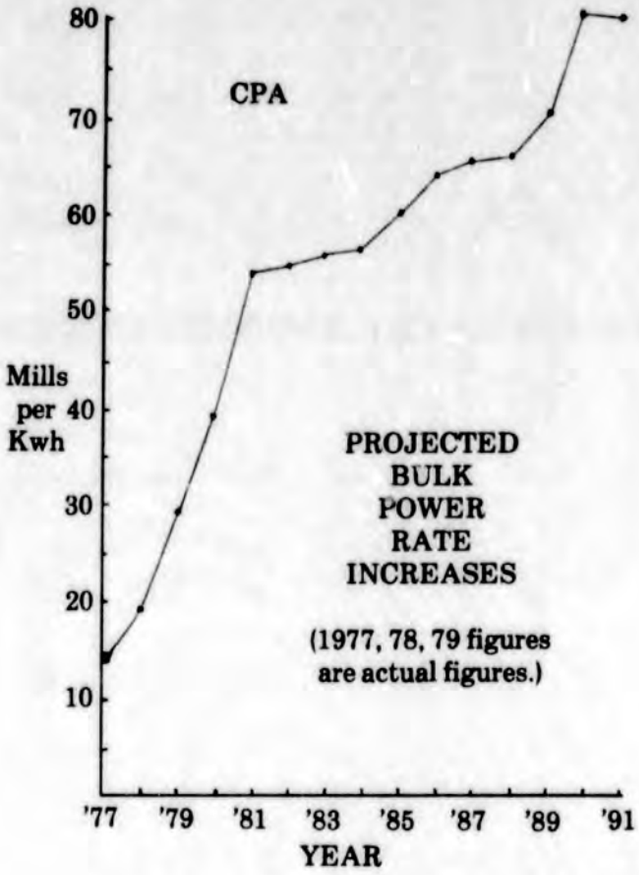
While UPA/CPA have been planning such rate increases for a long time, they have engaged in a massive advertising campaign during the summer of 1979 which claims that powerline protesters are the culprits responsible for rising electric bills. UPA/CPA are using protesters as the scapegoat, but the only conclusion supported by UPA/CPA's own figures is that bad decision-making and gross mismanagement by UPA/CPA are the major reasons for increased costs to consumers.

Such a conclusion is documented by the CPA forecast, and by Theodore Barry & Associates, a consultant firm hired by CPA to find out what was wrong with this project. They concluded that CPA had been taken for a sucker by the Coal Company and that a mine-mouth plant should never have been built.

Such a conclusion is also documented by Booz, Allen & Hamilton, the consultant retained by UPA to figure out what to do about "schedule slippage and cost increases." In defining the problem, the consultant reported that material is being lost, work is done in the wrong order, engineering is sloppy, labor is inefficient, and so forth. Like we said, poor management and bad decision-making.

In the fall of 1978, UPA/CPA claimed $140 million in damages due to the protest, a figure used by Governor Quie and other state officials to justify their misguided attempts to stamp out the protest. Of that $140 million, $90 million is 34 years' worth of interest, $685,000 is listed under "security guards," and $200,000 is actually called "vandalism."

All the rest, over $49 million, is listed under such categories as hearings, data gathering, environmental protection costs, costs of re-negotiated contracts for accelerated work schedules, costs of additional material needed to meet required route changes and license requirements, additional supervisory costs, etc. As of the fall of 1979, the powerline protest is responsible for *less than ½ of 1% of the increase* in electric bills.



THE MORE IT COSTS, THE MORE WE USE?

According to CPA, the tremendous rate increases will somehow stimulate ever greater electric consumption. Even though CPA's demand peaked at 474 megawatts for *both* 1977 and 1978 (1976 wasn't far behind), they project a 1979 peak of 535 MW. By 1992 it is all the way up to 1237 MW. That is a projected peaking increase of over 8% per year, compared with an average national peak growth rate of 1-3% for the past several years. Another Minnesota utility, Northern States Power Co., experienced a summer peak electrical load for 1979 that actually *dropped* from the peak level in 1978.

The figures for total energy sales are almost as outlandish, with sales climbing from 2,259,000 Mwh in 1978 to a projected 5,500,000 Mwh in 1991. In a valiant attempt to meet their projections, UPA/CPA are pushing wasteful electric consumption, especially resistance heating.

With both rates and sales projected to increase exponentially, there is a violation of some very basic economic laws. Things are so far out of line that, according to CPA's figures, CPA is paying almost *twice* as much for the electricity they generate themselves as they pay for the electricity they purchase.

If we grant that this powerline will deliver 900 MW and that the investment for the project is $1.2[illegible] billion, there is a cost of $1,348 per kilowatt. The Barry Report states that $450 is average for a fossil fired unit coming on line in 1980. There are 2 MW wind systems in operation at a cost of only $360 per kilowatt, and wind is the most expensive alternative energy. Clearly, renewable sources already have a cost advantage over coal and nuclear facilities.

IF WE CAN AFFORD THIS ELECTRICITY, IT WILL KILL US.

II. Health & Safety Effects

The 800 KV DC powerline that runs through central Minnesota is a deadly means of energy transportation. The health effects of the line are every bit as dangerous as the radiation that leaked out of the Three Mile Island nuclear plant or the emissions of coal plants which form acid rains. The danger of the line comes from shocks, ionized gases formed by corona discharge, and from exposure to the electromagnetic field.

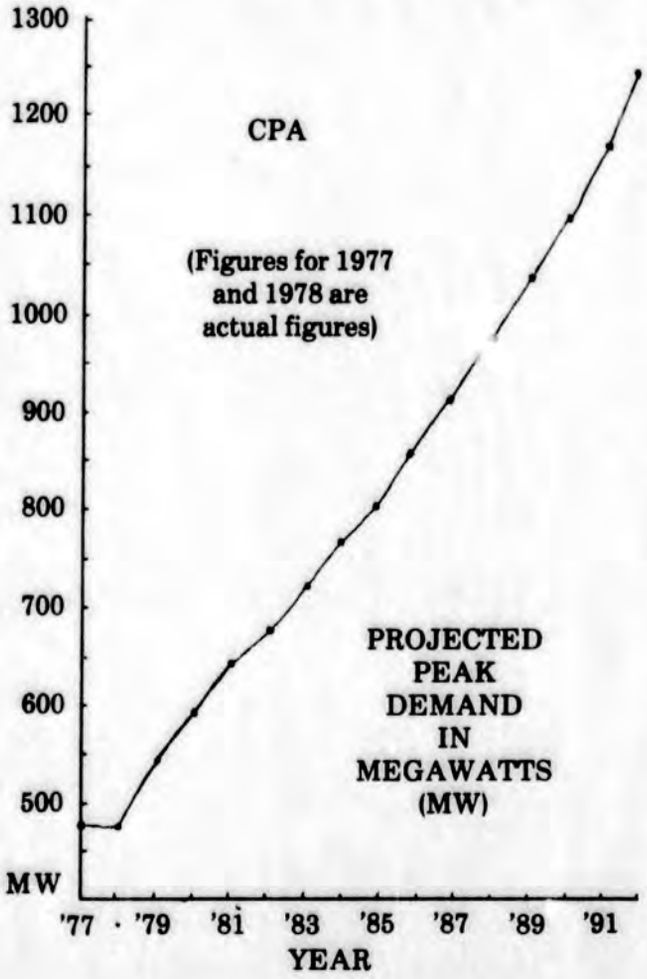
SHOCKS. Available literature indicates that shocks should be no more than "annoying inconveniences," yet there have already been dangerous jolts experienced under the line. While long-term problems created by repeated shocking should not be ignored, it is only a matter of time until a shock is the secondary cause of death or serious injury to someone working with machinery near the line.

AIR IONS. Air ions, or charged particles, are associated primarily with DC lines. The 1977 Minnesota Department of Health report, *Public Health and Safety Effects of High Voltage Overhead Transmission Lines,* views air ions with particular concern, stating, "In fact, it can be reasonably argued that the space-charge field [which forms the ion cloud]—from a public health and safety perspective—is the dominant DC effect.

The immediate effect of over-exposure to negative ions is similar to the effect of too much alcohol. Over-exposure to positive ions brings on headaches and a mental state of irritability and depression. Long-term effects of ion exposure are not well understood. Air ions also reduce the resistance of the atmosphere around the powerline, thus increasing the strength of the electromagnetic field.

CORONA DISCHARGE. The amount of corona discharge, or line loss, depends upon the line voltage and the diameter of the conductor. Any imperfection on the conductor, such as dust, scratches, corrosive pits, or water will cause an extremely high localized discharge. Corona discharge means that some of the electrons escape from the wire into the surrounding air, where they collide with the air molecules.

The split air molecules are chemically activated and can form new molecules, including ozone and nitric oxides. These chemicals are highly toxic to plant, animal and human life, even in very small concentrations. One ozone molecule per 12 million air molecules can be dangerous to humans. Nitric oxides are ten times as toxic as ozone, and may combine with water in the air to cause acid rain to fall along the line route.



Preliminary calculations indicate that for every day the line is fully operational, each mile of line will produce 60 lbs. of ozone and 40 lbs. of nitric oxide! The line is over 425 miles long.

The symptoms of ozone and nitric oxide contamination are similar, and the initial effects include sinus trouble and the misery of an asthma attack. Other effects include chest pains, rapid heart beat, vomiting, coughing up blood, swollen glands, burning eyes, diarrhea, dizziness, and forgetfulness. Long-term effects include lung and heart damage and possible chromosome damage.

Corona discharge information source: Dr. Merle Hirsch, Physics Dept., University of Minnesota, Morris, authority on electrical discharges in the atmosphere.

ELECTROMAGNETIC FIELDS. The most subtle hazard posed by this powerline comes from exposure to electromagnetic fields, EmFs. Indeed, there is consensus throughout the scientific community that much more research needs to be done on the relationships between EmFs and life. Yet there is a substantial body of knowledge on the effects of EmFs. Just as the EmF is our most reliable information carrier (radio, television, etc.), living nature has used EmFs in the process of evolution to obtain information about changes in the environment as well as for the transmission, coding and storage of information within biological beings.

It has been found that in some cases the reactions of living organisms to EmFs occur only at certain "optimum" intensities. In other cases the effects increase when the intensity of the EmF is reduced, and in other cases the reaction to low and high intensities are of opposite nature. Cumulative biological effects produced by repeated exposure to EmFs at intensities well below the effective threshold for a single exposure have been observed. There is a virtually limitless number of variables which influence the effect of exposure on any particular living thing.

The informational aspect of the interaction of EmFs with biological organisms is very important, because these effects to *not* depend upon the *amount of energy* introduced into the system, but on the *amount of information* introduced

into it. This is known as the "trigger phenomenon," because very small amounts of energy can trigger major biological changes. Thus, in a 1977 document prepared for the utility industry and the Federal government by Battelle Pacific Northwest Laboratories entitled *Biological Effects of Static and Low-Frequency Electromagnetic Fields: An Overview of United States Literature,* it is reported that a 10 KV/Meter static electric field (which is exactly the same field permitted by the construction permit at ground level for this DC powerline) increases brain wave activity and decreases posterior-hypothalmic activity in rats. "Hypothalmic" refers to the brain's ability to control bodily functions. In their own ad campaign to convince people of the safety of the powerline, UPA/CPA admit that utility studies have found that EmFs cause delayed reaction times. That is admitting that the central nervous system is affected.

Additional biological effects of EmFs which have been noted experimentally include the symptoms of stress, decreased body weight from one generation of rats to the next, chromosomal abnormalities, glaucoma, and changes in blood chemistry: blood protein counts increased and the count of blood antibodies fluctuated, some decreasing and some increasing, depending on the field strength and the specific antibody. Impotence, sterility, and an increase in the incidence of blood cancers have been linked to long-term EmF exposure.

An excellent article covering the general subject of EmF effects on health was published in the Sept. 15, 1979 issue of Saturday Review.

A STRANGE COINCIDENCE

People who live and work along the line route have experienced the following effects from this powerline, with children being the most sensitive:

- Headaches
- Skin rashes
- Nosebleeds
- Fatigue
- Numbness
- Nervousness
- Respiratory problems
- Eye problems
- Tingling sensation all over the body.

UPA/CPA claim that all that may very well be, but it's all psychosomatic. Yet fish have abandoned streams under the powerline, wild life is gone from state-owned land near the line, and farmers under the line are having problems with their livestock which they have never had before.

Livestock under the line is skittish and jumpy, milk production has been reduced because cows have trouble letting down their milk, there has been some increase in livestock abortions and deformities at some farms along the line route, and cows pastured under the line come in for milking and shit all over the barn. Things were not like this before the powerline came, but these developments are also, no doubt, psychosomatic.

THIS POWERLINE MUST COME DOWN

Just as powerline protesters will not be the scapegoat for rising electric rates, neither will the inhabitants along the line route take on the role of guinea pig while the utilities experiment to see just how bad their line really is. This powerline is not safe; it costs too much; and we, the utility customers, simply don't need it. There is plenty of electricity already available to UPA/CPA. This powerline must come down. Please help us.

Powerline protesters mail a bi-weekly newsletter called *Hold That Line.* If you are interested in receiving the newsletter or any additional powerline information, contact: *Hold That Line,* Box 5, Lowry, Minnesota 56349.

UNIVERSITY OF ALASKA
Institute of Social and Economic Research
707 "A" St., Suite 206
Anchorage, Alaska 99501
Phone (907) 278-4621

May 29, 1980

Arlon Tussing
2720 Rainier Bank Tower
Seattle, WA 98101

Dear Arlon,

Thanks for your comments on the executive summary of our report entitled Electric Power Consumption for the Railbelt. Enclosed is a copy of the technical appendixes. I apologize for the fact that the final report is only coming out a piece at a time, but the study ended up being much more of a job than first anticipated. The final report text is now being written. My responses to your comments are as follows:

1. You seem to be correct about the real price of electricity falling in Fairbanks in the 1970s. In nominal terms, however, the price of GVEA electricity increased more rapidly in the 1970s than prices in most other parts of the railbelt. According to the APUC annual reports, the 500 kWh price in 1973 was 5.5¢/kWh; and in 1979, 8.84¢/kWh. The average price increase for Fairbanks is obviously smaller if FMUS is averaged in, since in the same period (again using APUC data), its price increase was ngeligible. I argue that the price increase was concentrated among GVEA consumers and that the important factor is that the price increased rapidly in contrast to previous trends, even though over the period the price increase was less than the CPI. Basically, any change in the rate of change of the price can have an effect on consumption.

2. The large projects referred to and included in the most likely case for the 1980s include:

a) Secondary recovery at Prudhoe Bay
b) OCS activity statewide
c) Pacific Alaska LNG
d) ANGTS
e) Alpetco - fuels refinery only
f) Beluga coal for export after 1985

As in many other places, my language here is imprecise or incomplete. What I should have said was that, for the 1980s, it is possible to identify a number of large-scale projects which may occur. This provides us with

a narrow range of possible outcomes relative to later years (although probably a broader range relative to other states). The resources of state government will also help to "backstop" the economy during this period.

3. We utilized petroleum revenue projections from the Alaska Department of Revenue; and at rates of growth of state spending based on 0, 1, and 1.5 for the elasticity of spending relative to per capita real income, the general and permanent fund balances remain solidly in the black beyond 2000. I am still an advocate of the "fiscal crunch" idea, but I am less certain than previously about when it will come and what the impact on the total economy will be.

The likely economic scenario is actually based upon the assumption of unitary income elasticity of government spending, which is roughly equivalent to state government employment maintaining its present ratio to total employment. In the short run, the growth could be much more rapid; but a significant portion of available revenues may be spent on explicit and disguised income redistribution programs, which dollar-for-dollar have a relatively modest impact on the economy. If this is the case, the elimination of these programs in a "crunch" situation would have a relatively modest negative multiplier effect.

4. This is sloppiness on my part. The most likely case with a price-induced shift toward electricity is a subcase. The same economic assumptions (most likely) apply to the most likely and most likely with a price-induced shift . . . The only difference is in the relative price of electricity which is lower in the subcase. It is not meant to be a likely forecast (a price-induced shift) but rather to provide an example of the effect if there were such a shift.

5. In the appendixes, I do discuss in general the conditions necessary for the price-induced shift case to occur (page F-49 to F-71) and show by implication that they are relatively unlikely. Since it was not part of our study to examine the costs of all alternatives, it would be inappropriate to go beyond the statements which appear there. The appendix discussion does not come through in the summary. The high electricity use case may indeed be an empty box, but it should be analyzed and not dismissed out of hand.

In the course of doing this study, a number of "problem areas" surfaced which require further analysis. You have indicated some. Another is the quantification of the impact of conservation measures on demand. I would hope that future work would concentrate on these areas.

Sincerely,

Oliver Scott Goldsmith
Associate Professor
of Economics

OSG/ds
Enclosure

(1) Select oversight agency in Exec Branch — Preferably within office Gov't

(2) Determination of major points where information in revision of plan of study is critical on P.O.S (INCLUDES SCALED VERSIONS OF Subsistnd, fossil fuel & hydro combinations.) Suggest Tossings recommendations as bottom line.

(3) Require that revisions to P.O.S. for these items be approved by review agency and that they incorporate revisions needed before proceeding with work.

(4) Require that APA include results of these revisions in reports

(5) Require that A.P.A. and AGRES submit ASSUMPTIONS FOR REVIEW BEFORE "INTEGATION" OF DATA

+ Info

(6) Require that "integration" of data includ reins or analyses covering assumptions noted by review agency and that these analyses appear in reports

(7) review by agency of draft reports before completion, not just final rough draft only necessarily TO PROVIDE OPPORTUNITY FOR EDITING

(8) Review agency must have access to expert review. This means $ and contracting authority

(9) To make this work, review agency must have backing of governor. To ensure that, competent responsible management in the effort is required.

UNIVERSITY OF ALASKA
FAIRBANKS, ALASKA 99701

22 May, 1980

Professor O.S. Goldsmith
Institute of Social and Economic Research
University of Alaska
707 A Street
Anchorage, Alaska 99501

Dear Scott:

Nancy Blunck of the Power Authority sent for my comment a copy of the executive summary of your report Electric Power Consumption for the Railbelt. There are a few comments and questions I prefer to address to you first. The full report will probably answer some of my questions, and I would of course appreciate receiving a copy. Nevertheless, here are my comments.

1. At the top of page vi, you state that "price-induced conservation measures" appear "to have been a factor in the reduction of the growth rate of electricity consumption in the Fairbanks area." Curiously, however, the real price of electricity seems to have fallen in Fairbanks during the 1970's. See the enclosed. (I was suprised, too. Is there something wrong with these data?)

2. On page viii, you cite the "high probability of a number of large construction projects" [mostly in the first half of the decade] as the basis for a "narrow range" of economic activity projections. I can't imagine what you are referring to: Alpetco? Probablility less than 25%. ANGTS? Probablility that construction will begin before 1985 about 50%, never 25%. NGL-based worldscale olefins plant? Probability before 1985 less than 10%; ever, less than 50%. NGL pipeline? Probability before 1985 less than 10%; ever, about 25%. Susitna? Probability before 1985 zip; ever, about 50%. Anything using Beluga coal? Probablility before 1985 less than 10%; before 1995 less than 50%.

Professor O.S. Goldsmith
Institute of Social and Economic Research
University of Alaska
22 May, 1980

The foregoing rough probabilities for five projects give a 30 percent probability there will be no project before 1985 ; one or more project: 70%; two or more: 23%; three or four: 3.5%; and four: .125%; and five: no possibility. You may disagree with my intuitive judgments on specific projects, but even with rather different numbers, two generalizations would be in order: (a) The expectation of new-project-driven growth is rather modest, particularly in the first half of the decade, and (b) the range of outcomes is exceptionally wide.

3. At the top of page ix you state that "the likely economic scenario assumes that the problem of a 'fiscal crunch' can be avoided through adequate fiscal planning and controlled growth of government employment." [emphasis in original] Do you really believe that this is the most likely scenario? Experience in Alaska and elsewhere (Indonsesia, Iran, Venezuela, Dubai, Denmark) demands that we assume the opposite. If (as is most likely) you don't believe it, why pretend you do? Why mislead people by calling this the "likely" scenario?

4. I read the sentence at the bottom of page ix over and over, and couldn't make any sense of it. ("The electricity use assumptions apply to all the projections presented, with the exception of the most likely case with a price-induced shift toward electricity for space heating and appliances." [emphasis in original]) Only when I reached page xiii did I come up with a plausible interpretation: There is more than one "most likely" case, and out of these two or more most likely cases, there is a subcase in which there is "a price-induced shift toward electricity for space heating." But, in the first line of page xiii, is "This case" a "case" in the meaning of "most likely case" (and thereby either identical with the most likely case or different from it), or is it a variation or subcase of the most likely case (and in which event, how can they both be "most likely?")? Presumably the full report would resolve my puzzlement, but the terminology in the summary is very confusing.

5. Even assuming my hypothesis about the meaning of "most likely case with a price-induced shift" is correct, I don't approve of your total agnosticism about the applicability or inapplicability of this case (subcase, variant) to the real world. For example, if ANGTS is built (and you seem to believe it will be), the maximum Fairbanks price of ANS natural gas (which is price-controlled, with FERC having already spoken on the form of tariff) can be forecast with a reasonable degree of confidence. Because ANS gas will be hooked up to the continental gas distribution network (and Cook Inlet gas will not be, or will be hooked up only through a higher-cost LNG system), we can also forecast within a reasonable range the price or opportunity cost (to an ANS producer or the state) of Cook Inlet gas received in exchange for ANS gas shipped through the pipeline. These prices will then set the floor cost of energy with which power from new facilities would have to compete for space-heating in those areas served by existing, expanded, or new gas distribution systems.

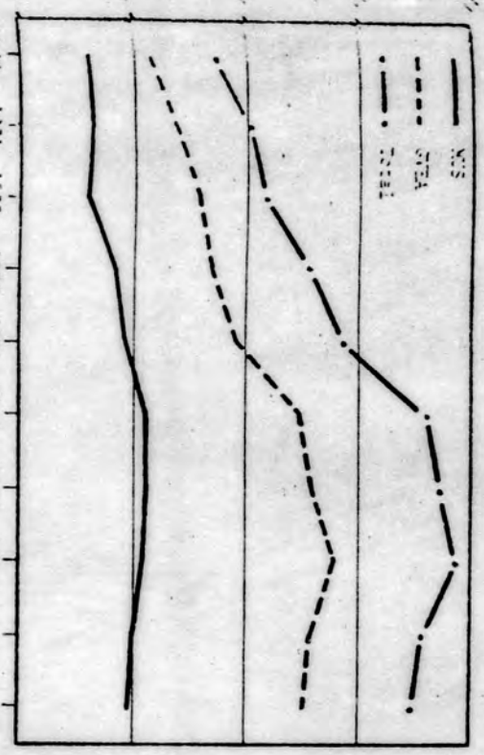
I haven't personally done the calculations, but my hunch is that even the most optimistic existing projections of electricty prices from new hydro or coal-fired facilities will be higher than these imputed gas prices (with appropriate adjustments for distribution costs and end-use efficiencies) at least through the turn of this Century. My hunch may be wrong, but before you give much prominence to this case (subcase, variant) you ought to make at least a rough calculation of its limiting conditions, lest you encourage your readers to waste time and money exploring an empty box.

In summary, I feel that some of the underlying assumptions of your most likely case(s) are not in fact the most likely, but that you did not (but should have) spoken in some way to the likelihood or unlikelihood of a shift to electric space-heating.

Sincerely,

Arlon R. Tussing

Figure 5
ELECTRIC HOURS (KWH) ELECTRICITY SOLD
GVEA and MUS
Fairbanks Area
1970 - 1979



Source: Golden Valley Electric Association; Fairbanks Municipal Utilities System.

Figure 6
STEAM HEAT CUSTOMERS AND SALES
Fairbanks Municipal Utilities System
1972-1979

Year	Customers				Consumption Millions of Pounds Sold
	Residential	Commercial	Other	Total	
1972	15	115	13	143	142
1973	14	109	15	138	155
1974	15	110	15	140	142
1975	15	111	15	141	151
1976	15	116	14	145	151
1977	17	115	14	146	139
1978	18	107	14	139	130
1979	18	106	16	140	121

Note: A pound of steam is equivalent to about 1,000 BTUs.

Source: Fairbanks Municipal Utilities System.

Figure 7
ELECTRICAL COSTS AND FUEL OIL PRICES
Actual Prices and Prices in Constant 1973 Dollars*
Fairbanks Area
Fall, 1973 to February, 1980

	Electrical Costs (Per 500 Kwh)						#2 Fuel Oil (Per Gallon)	
	MUS		GVEA		Average			
	Actual	1973 Dollars	Actual	1973 Dollars	Actual	1973 Dollars	Actual	1973 Dollars
Fall, 1973	$25.85	$25.85	$30.38	$30.38	$28.12	$28.12	--	--
Fall, 1974	--	--	--	--	--	--	$.477	$.430
Fall, 1975	--	--	--	--	--	--	.533	.427
Fall, 1976	32.00	23.56	31.48	23.17	31.74	23.36	.572	.421
Fall, 1977	--	--	--	--	--	--	.610	.421
February, 1978	38.50	24.82	35.41	22.83	36.96	23.82	.594	.383
Fall, 1978	39.30	25.33	40.27	25.96	39.79	25.65	.602	.388
February, 1979	42.50	25.06	40.27	23.74	41.39	24.40	.616	.363
Fall, 1979	42.50	25.06	44.19	26.05	43.35	25.56	.778	.459
January, 1980	42.50	23.78	44.19	24.73	43.35	24.26	.791	.443
February, 1980	42.50	NA	48.59	NA	45.55	NA	.817	NA

* The Anchorage Consumer Price Index (CPI) was used to compute the prices in terms of constant 1973 dollars.
NA Not available. The Anchorage CPI comes out every other month. The March CPI for Anchorage will not be available until the end of April.

Source: Community Information Center.

UNIVERSITY OF ALASKA
Institute of Social and Economic Research
707 "A" St., Suite 206
Anchorage, Alaska 99501
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May 16, 1980

Mark Wittow, Study Coordinator
House Power Alternatives Study Committee
Pouch V
Juneau, AK 99811

Robert Mohn
Alaska Power Authority
333 West 4th Avenue, Suite 31
Anchorage, AK 99501

Dear Mark:

Enclosed is a copy of the Executive Summary of our analysis of railbelt electricity requirements entitled "Electric Power Consumption for the Railbelt: A Projection of Requirements."

The remainder of the report, composed of a short text and a fairly lengthy series of appendices, is undergoing final review. The appendices will be available next week and the text the following week.

Sincerely,

O. Scott Goldsmith
Assoc. Professor of Economics

OSG/m
encl.

ALASKA POWER AUTHORITY

May 20, 1980

Dear Mark—

We have just received the executive summary of the energy demand forecast from the Institute of Social and Economic Research (ISER) and I am sending you a copy immediately. ISER is under contract to the House Power Alternatives Study Committee to produce energy demand forecasts for the Railbelt area. The effort is partially funded by the Alaska Power Authority, and the forecast will be used by Acres American in the feasibility study of the Susitna hydroelectric project.

Based on the executive summary the following summation can be made:

- Future growth of electric utility sales are forecasted to be slower than Alaskan historical growth rates, but will equal or exceed recent national electricity consumption growth projections.

- The forecasts indicate that electrical energy consumption in the year 2000 is likely to be about double what it is today.

- The forecasts are considerably lower than the previous forecasts that served as a basis of earlier studies of the Susitna hydroelectric project by the Corps of Engineers. Any impact of the ISER results on the viability of the Susitna project will not initially be known until the spring of 1981 nor finally known until the spring of 1982.

A workshop is scheduled Wednesday, June 11 in Anchorage to discuss the results of the ISER demand study. It is an educational workshop open to all interested groups and the general public. It is participatory in nature and will cover several things:

- ISER energy demand forecast.
- Conservation, load forecasting study, load management.
- More detail on alternatives study.

Morning: 9:00 a.m. - noon
Afternoon: 1:00 p.m. - 4:30 p.m.
Evening: 7:00 p.m. - 9:30 p.m.

The workshop will be at the Lucy Cuddy Center of the ACC campus.

The executive summary is currently the only part of the ISER report available. The complete report is expected in several weeks and is quite long (several hundred pages). For this reason, I plan to distribute copies to public libraries and to individuals upon request at a minimal charge for xeroxing. Please place you order for a complete report by calling me at 276-0001.

I encourage you to share this information with others by passing the executive summary to another person after you have read it.

This letter went to groups + organizations following Susitna studies, and to your subcontractors.

Sincerely,

Nancy

Nancy Blunck
Director, Public Participation Program
Susitna Hydroelectric Project

Enclosure

ARLON R. TUSSING & ASSOCIATES / 2720 Rainier Bank Tower / Seattle, Washington 98101 / (206) 447-0321

May 19, 1980

Mr. Robert J. Cross
Administrator
Department of Energy
Alaska Power Administration
Post Office Box 50
Juneau, Alaska 99802

Dear Mr. Cross:

Thank you for sending us a copy of your May 12 letter to Mark Wittow concerning the April 15 review draft of our Susitna report.

However, we received the letter after sending the final manuscript to the House Committee, and thus were not able to take account of your remarks in revising the report. While some of your substantive disagreements will undoubtedly remain, the final report makes it clear that we do not favor delaying any part of the Acres study pending further analysis. I am, in addition, sure that you will find the final report better written, better organized, and consequently easier "to get a handle on."

One area in which your criticism might have been useful when we put the report into final form concerns load management because your remarks indicate that we did not communicate our point clearly. We did not intend to imply that the current load factors of Railbelt utilities are unreasonably low, or that we presume a large latitude does in fact exist for leveling annual load patterns.

Not having studied the matter in any detail, our main concern was to identify the issue and call for its systematic investigation. Though I regret that our report may seem to imply too much.in its remarks on the potential for load leveling, I believe you presume too far in the opposite direction. Even if there were no latitude whatsoever for moderating

1220 19th Ave. N.W., Suite No. 201, Washington D.C. 20036 / 880 H St., Suite No. 210, Anchorage, Alaska 99501

the seasonal swing in electricity demand, the daily load variation on the annual peak day is still substantial. To the extent that the need for generating capacity is a function of the highest demand encountered on the peak day, load management unquestionably offers some opportunity to reduce capacity requirements. A savings of as little as (say) 5 percent of total capacity is worth taking note of, as that 5 percent of total capacity will always be a much larger part of the need for new (and higher-cost) capacity.

Perhaps our treatment of these issues in the review draft also encouraged some confusion between load factors and reserve margins as the target of load management measures. No one will quarrel with you about "the severe consequences of extended outages in winter," or the need for "a high level of redundancy" with gas turbine equipment. You do, however, go far beyond the known facts and beyond any analysis we have seen when you reject out of hand any possibility "that the load management and reserve questions tend to reduce the need for (or installed capacity at) the Susitna Project."

That some such latitude exists is beyond question. Whether that latitude is significant or not from a planning standpoint, I do not know. If any systematic analysis of this question exists that justifies your confidence that you already know the answer, please let us know. Otherwise, the great disparity between the cost of studying this issue and the cost of additional generating capacity seems to justify giving it some attention before making any commitment to new construction.

Our passing remarks on the outlook for natural gas supply were not sufficient, nor were they intended, to convince anyone that gas would indeed be available without restriction to railbelt utilities. We were, rather, pointing out that this is not a settled issue, and that the policy implied by PIUFA is not in itself a sufficent reason for Railbelt utilities to reject gas-fired generation as an alternative strategy.

The U.S. outlook for and policy regarding natural gas is, incidentally, an issue on which I have specialized for a number of years, and my views (which are quite complex) have

been presented in considerable detail elsewhere. Granted, the position expressed in the enclosed reprint ("The U.S. Outlook for Supplemental Gas") had few supporters two years ago, but it now has a notable constituency in the United States Senate, for example. Influential members like Bennett Johnston have been talking about outright repeal of PIFUA, and perceptions of gas supply and demand have shifted sufficiently that the Act could not be passed if it were before Congress today. The most likely outlook, however, is for ERA, under pressure from industry, Congress, and common sense, to progressively liberalize its interpretation of PIFUA, and perhaps for Congress to set back the 1985 and 1990 benchmarks, even indefinitely.

Once again, our intent in the Susitna report was not to propose that the Alaska Power Authority or the legislature adopt our view rather than the one expressed in existing legislation, but to demand that the future availability of gas (and the risks that flow from taking it for granted) be considered in the same framework and with the same analytical rigor as demand forecasts for the Railbelt and the cost and scheduling estimates for Susitna (and the risks that flow from acting upon these forecasts and estimates).

Finally, I am sorry we didn't catch the technical errors you referred to at the end of your letter, as you had pointed them out to us earlier.

Enclosed is a copy of our final report.

Sincerely,

Arlon R. Tussing

cc Mr. Mark Wittow

ALASKA POWER AUTHORITY

DATE: April 24, 1980

SUBJECT: Budget additions to Task 12 that result from overall changes to Plan of Study

Anticipated changes in the overall plan of study would impact the public participation program in several ways. The following additions are requested and are supported from evaluation comments received at four community meetings the week of April 14-17, 1980.

A. Reprinting of the Task 1 section of the plan of study. Reprint 350 copies and distribute widely for review. postage $4000 too much

B. Action System

The original level of effort covered in the plan of study appears to be much less than the program as modified is likely to demand.

People at the community meetings asked very in-depth questions, difficult to answer with a simple yes or no, or by xeroxing applicable sections of the plan of study. The development of effective and adequate responses to all questions is a must. An additional suggestion came from all four communities to have a question and answer column in newspapers on a regular basis. Responses developed could be printed on a regular basis in community newspapers in a question and answer format. No $39,750

C. Getting Information to the People

Evaluations of the community meetings indicate a tone was set of openess of information, a desire to get objective information to the public , a desire to have it easy to read and understand, and a desire to have it in a timely manner.

Comments such as:

- mail progress reports to all of us as soon as developments happen
- detailed information pamphlets for the public
- should like to have more visual projections of the alternatives

Mailing lists are being developed of the general public. There are 7000 on the Anchorage list. 95% of these said they do not belong to a group likely to testify pro or con on Susitna. Similar mailing lists are to be developed in Fairbanks, Talkeetna and the Mat Su Borough.

No

Three mailings (10,000 in each mailing). $40,500

D. Preparation of visual materials and handout information for the presentation of alternatives at the ~~June 1979~~ SPRING 1982 decision point.

With the additional work being conducted on alternatives, additional funds are requested to visually present the information to the general public. No $17,500

E. Talkeetna Citizens Group

Talkeetna people expressed strong concern for activities in their "backyard." No other community is currently impacted in the same way that Talkeetna is. Rumors do exist, and a need was strongly expressed by Talkeetna people to have information on a regular basis just as soon as it was developed.

One specific suggestion was to have an informal citizen group of 5 to regularly sit down with Acres and Power Authority staff and discuss important issues, separate fact from fiction, and insure that people are being heard and responded to, and information is current.

Costs of this include travel, per diem and staff time. Five visits are anticipated. No $10,000

F. More workshops and meetings

Two more series of meetings are scheduled for Fairbanks, Talkeetna and Anchorage. No additional meetings are being scheduled at this time.

8 workshops are budgeted but they are all scheduled in Anchorage.

A major issue that surfaced in Fairbanks, Talkeetna and Anchorage had to do with trust and credibility of those doing the study work.

Comments ranged from "who are they", "are they qualified to do the work", "can we meet with them face to face" to "how seriously will alternatives be considered".

Opportunities to talk face to face are needed to respond to the trust and credibility issue.

Funds would allow travel and per diem costs to be covered by attendance of 3 persons from Fairbanks, two from Talkeetna at the eight workshops held in Anchorage. Overall this is more cost effective than moving workshops to Fairbanks and Talkeetna.

The Public Participation office is working directly with groups in the three communities to identify the best people: those willing and interested in spending time in dialogue, and those willing to share information with other groups in their community. No $8200

TOTAL $119,950

MAY 8 RECD

Fairbanks Environmental Center

218 DRIVEWAY
FAIRBANKS, ALASKA 99701
(907) 452-5021

5 May 1980

Representatives Brian Rogers and Hugh Malone
Co-Chairmen
House Power Alternatives Study Committee
Pouch V
Juneau, Alaska 99811

Dear Brian and Hugh;

We are writing in response to your Committee's recently released report: "Susitna Hydropower: A Review of the Issues", by Arlon R. Tussing and Associates.

The Tussing report states in a concise, authoritative manner many of the concerns which we and others have expressed about the Acres American Plan of Study (POS) of the Susitna hydropower project. We fully concur with the conclusion that the POS is in need of a major overhaul if Alaskans are to make an informed decision about the most appropriate electrical energy future for the railbelt. In light of this, we offer the following suggestions which we feel can help remedy the current inadequacies in the Acres plan.

1.) The Tussing report includes detailed recommendations for changes in the POS to ensure adequate consideration of alternative power sources. Approximately $1 million would be required to expand the power alternatives section. We urge you to work for this funding as an addition to the $7.5 million appropriation (in H.B. 570) for continuation of the Acres studies.

2.) The decision-making schedule must be revised. As the Tussing report observes, the "Go-No Go" decision scheduled in the POS for early next year is far more than just a decision to continue with the studies. According to Eric Yould, Executive Director of the Alaska Power Authority, this decision will in fact be interpreted as the "final decision on whether to proceed with the project", ("Dam backers speak out" - Anchorage Daily News, April, 1980).

Under the current POS, "Go-No Go" decision will be based on an incomplete consideration of alternatives, economic and financial feasibility. A "Go" decision at this point will guarantee increased political momentum to fund construction of the Susitna project, even before the studies are completed.

We strongly urge that the POS be revised so that this decision is not made until the expanded studies in these areas are completed, at the earliest in June of 1982. These revisions should be a specific condition of any appropriations to continue the Acres studies. This would also allow the "Go-No Go" decision to be based on the POS

environmental studies, rather than the current plan to evaluate impacts from generalized approximations.

3) We wholeheartedly endorse the continued oversight of the POS by your Committee.

We would strongly support appropriation of the $1 million mentioned above to your Committee for contracting the expanded alternative studies. We are greatly impressed with the high quality and objectivity of the Committee's work to date and feel it is important to continue it as a different and balancing perspective to that of Acres and the Power Authority.

In summary, we feel that any appropriation for continuation of the Acres studies should include additional funds to incorporate the recommendations contained in the Tussing report and should stipulate a revised decision-making schedule.

Thanks for your continued efforts to insure a complete and objective evaluation of all possible energy futures for Alaska.

Sincerely,

Jeff

Jeff Weltzin
Energy Coordinator

cc: Governor Jay S. Hammond
Eric Yould - APA
Rep. Sally Smith
Rep. Joe McKinnon

ALASKA POWER AUTHORITY

333 WEST 4th AVENUE - SUITE 31 - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-2715

May 9, 1980

The Honorable Hugh Malone
House of Representatives
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Representative Malone:

Thank you for your letter of May 5, 1980 concerning Susitna appropriations.

I do not agree with your position regarding the $3.3 million needed to insure full year funding for Susitna activities. While all of our Susitna contracts are indeed subject to the availability of funds as you have suggested, the implication of your position is that we can stop and start this program at will. I reiterate that this is a very complex undertaking and is the product of painstaking planning and coordination. In the event that Susitna does prove to be the best option, but supplemental funds are not available on a timely basis, the wording of our contracts will be of little value. My point is, adequate lead time is necessary to insure resources are available to accomplish the myriad of tasks that must be performed. If termination did occur but funds were later appropriated, the administrative process alone needed to reinstate the numerous people working on this project both in the State and private sector would be a veritable nightmare leading to lost time and increased cost to the program.

I hope that you will reconsider your recommendation.

Sincerely,

Eric P. Yould

Eric P. Yould
Executive Director

cc: Ron Lehr
Representative Meekins
Senator Sackett

May 24, 1980

Governor Jay Hammond
Pouch A
Juneau, Alaska 99811

Re: HB 424 additional funding for Acres Susitna study

Dear Governor Hammond:

This letter is written on behalf of the Susitna Study Group, a loose-knit, informal association of Anchorage area residents who are concerned with the current approach to assessing the feasibility of building large hydroelectric dams on the Susitna River as against alternative methods for meeting Railbelt demands for power and heat. Many of our concerns were expressed during the Anchorage public meeting in which the Acres Plan of Study (POS) was presented, and many of the same concerns were well articulated in Mr. Tussing's review of the POS.

Easily the most strongly and frequently expressed concern was that the POS allocated far too little time and money to the exploration of the costs and risks of alternative sources and/or techniques for meeting power demands, and to a realistic comparison of these with the costs and risks of a Susitna dam or dams. From a total study budget of $29,604,249, $13.5 million of which will be spent prior to a Go/No-go decision to proceed with Susitna dam(s), only $359,200 is allocated to studying demand forecasts, power generation alternatives, power expansion sequences and plant mix, and impact assessment. This strongly indicates that the decision has already been made, and that the study's real purpose is to supply justification to Alaskan ratepayers and taxpayers and federal agencies for the decision to build Susitna dams. If this is not the case, it most certainly <u>appears</u> to be, and if a more balanced approach is not taken, the credibility of the entire study will forever be in question. If, as Mr. Tussing suggests, a high level of controversy surrounding the extraordinarily expensive Susitna project (supported by a small base of ratepayers) is inevitable, it would be better for all concerned if a timely, in-depth, and at least superficially fair study of the need for Susitna dam existed to support the government's decision.

We are aware that the Director of the Alaska Power Authority has, by letter to you of April 25, 1980, requested additional funding for the Acres study, in part for more extensive study of alternatives, and that this request has now been passed by the legislature as a part of HB 424. We endorse this as a step in the right direction, and urge you to sign the bill.

It also appears that the APA is attempting to come to grips with the perhaps more serious problem in the POS, that of the insufficient time frame within which power demand factors and alternatives are to be studied. Under the current Plan, many, if not all of the alternatives or combination of alternatives will be positively ruled out prior to any real assessment of the costs and risks of the Susitna project itself (including in-depth exploration of the financing and marketability questions surrounding Susitna). If this situation is not remedied, the POS will remain unsatisfactory despite increased funding. HB 424 partially addresses this concern by requiring continued study of several alternatives, rather than just one, after the initial February, 1981 Go/No-go decision. We view this as a great improvement, but not necessarily as a final solution. We hope that the APA, the legislature, and yourself will be flexible in the direction of further analysis of alternatives or combinations of them if conditions or the interim results of the study warrant this in 1981 or beyond.

In this context, we would note that the decentralized power production alternative study is working under particularly difficult constraints. While natural gas and coal have been studied in extensive detail, decentralized energy systems are suffering from a critical lack of basic data. This is reflected in both the Draft Power Development Plan and the report to the Power Alternatives Committee. If the viability and comparative advantages of decentralized energy systems are to be given a fair appraisal within the bounds of Acres' study, it is imperative that a sizable financial committment be made to develop the data. It was not clear to us from Mr. Yould's letter whether decentralized alternatives will be given the attention necessary for meaningful comparison.

In short, we are encouraged by the responsiveness of the APA to criticisms of the POS, and support the increased funding embodied in HB 424.

Thank you for your attention.

Sincerely,

James T. Brennan

called and a constitutional amendment must be proposed subject to voter approval. All existing general law municipalities were incorporated with voter approval. Therefore a change in law affecting the powers authorized at the time of incorporation must be approved or disapproved by the voters affected, just like a constitutional amendment to the Constitution of Alaska would have to be.

for Independence

Herring

Dear Editor:

I saw headlines in yesterday's paper stating "House passes bill on Herring Fisheries."

At first glance a fisherman would say, "At long last they are going to stop this insane waste of our Herring resource."

Then as we read farther, we

developed to near extinction now. The authorities ran the Salmon fishermen out of the rivers 75 years ago because they were killing the Salmon in the act of spawning. Then Halibut fishing was stopped in the winter time to protect the spawning Halibut.

Still the Herring fishermen are allowed to go into shallow water when the Herring school up to spawn and there is no escape.

size?

Squintingly,
Betsy Flood

Editor's Note: We'd like to hear from other readers about this to find out if a consensus exists. We shrank the comics to allow us to get other features on the page and to conserve newsprint during the shortage this year. Let us hear more about it.

My Turn

Juneau Empire 3/27/80

Consumption Crisis

By Borough Assemblymember
KEVIN HARUN
Fairbanks, Alaska

The Susitna hydro project is at best a stopgap measure and at worse a catalyst for the same inefficiencies and wastes of our present power generation system.

The Interior is faced with two crucial dilemmas: 1) the high cost of electricity poses a terrible burden upon the public and 2) although coal has high potential for power generation in the Interior, we have environmental and/or inflationary cost problems associated with fossil fuel generation.

Clearly, we've got to take action to help Interior citizens. We've got to help wean people off fossil fuels and find suitable substitutes. Hydropower is most definitely one piece needed to complete the energy puzzle. Susitna, however, in itself is the wrong project at the wrong time. Also, commencement of this project without looking at the root cause of our energy problems is comparable to stepping on an accelerator without possessing a steering wheel.

First off, we're in the midst of a "consumption crisis", not an "energy crisis". Even though we as a state are flush with excess billions and seemingly countless energy resources, the energy supply is not limitless, and its utilization is not without high lifestyle costs. The root of the problem is that we as Alaskans have a great inefficiency and waste in our utilization of electric power. The average Alaskan's consumption of electricity is high when compared with the average American's, which is twice as high as the West German's per capita consumption. West Germany, I'll remind you, is a leading industrial nation far from having a low standard of living. West Germany in turn has roughly twice the per capita consumption of New Zealand, which could hardly be considered an impoverished nation. One fact we all should learn is that our standard of living is not dependent upon how much net energy we produce, but rather upon how efficiently we consume what we produce.

Or energy efficiency in Interior Alaska is in a shambles. We have constructed public white elephants which radiate heat at 40 below. Meanwhile, our citizens are forced to bear the brunt of poorly insulated homes, antiquated heating systems, and poorly managed utilities which result in high electricity bills.

The Susitna project is touted as a panancea which will enable citizens to unplug from dirty, inflationary fossil fuel and plug into reasonably cheap, inflation-proof hydro. In actuality, Susitna won't solve the inefficiency and waste problem which is the root cause of the dilemma. Rather, it will exacerbate these inefficiencies by conning the public and industry into believing that there is no need to convert and conserve. Also, it could result in the development of energy intensive infrastructures which result in further demand, requiring further large scale projects. It's the same scenario of dependency as anywhere else in the lower 48, and it's about time we woke up to the act that we're merely repeating mistakes made elsewhere. Ultimately, we've got to realize that we cannot produce our way out of a consumption crisis.

Looking at Susitna: even if one assumes the Corps of Engineers' dubious predictions that our net energy consumption in the Interior will increase 10 times in 15 years, there is then going to have to be a heck of a lot of new capitalization between now and the time Susitna comes on line (merely to meet this projected demand). If this capitalization takes place, how are our local utilities going to be able to plug into Susitna when they're still tied to paying off the other capitalization? This raises the question, who will actually utilize and benefit from the project? It's very questionable whether the public ever will.

Incidentally, as a footnote, percapita consumption has been declining over the past few years in Fairbanks. Fairbanks' top energy consumption this winter has been approximately 100 megawatts. Susitna would provide two increments of 750 megawatts each for a total output of 1500 megawatts. I should mention that during the non-peak summer months that the Fairbanks area consumes only 30-plus megawatts. Susitna is the largest hydro project proposed by the U.S. Army Corps of Engineers, though larger projects have been constructed by other federal agencies.

Susitna does have the advantage of being inflation-proof, but this advantage accrues to any hydro project, not just Susitna. Which brings me to my final point: There is an alternative to placing the public and consumer at the mercy of one centralized bureaucracy. There is an alternative which could truely increase community and individual self-reliance.

The alternative: 1) The development of regional hydro projects which have a lower megawatt capacity, which result in less centralization, which can be brought on line in less time, at less cost, in smaller increments as needed. The Corps has identified 64 potential regional hydro sites many of which are promising and of a more appropriate scale than Susitna. The Chakachamna site for example, appears to be an ideal smaller hydro site, producing roughly one quarter of the output of Susitna and being ideally situated near the Beluga coal region.

2) Most importantly as an alternative: A commitment to a massive program of energy retrofits of public building, homes etc. Specifically, the state should set an example in its own public buildings. Studies have shown it is much cheaper to produce a kilowatt through conservation than through new power generation. Conservation does not mean hardship and/or turning out the lights and turning down the thermostats. It means giving people the appropriate technology to become less dependent on utilities such as GVEA. Specifically: insulation, shutters, retrofits of electric water heaters, cogeneration, use of waste heat etc. It means giving the public the tools to cope with the impending national consumption crisis which government cannot ultimately save us from.

There are other benefits from this more decentralized approach to power development. Imagine all the local employment and construction we could create if we pumped even one-half of the four billion cost of Susitna into enegy retrofits, and the other half into more appropriately scaled projects.

Clearly, we've got to take action to help relieve the public of these utility burdens. I look to the State legislature to provide a solution addressing the root causes of the delimma, rather than postponing the day of realization.

The views expressed herein represent my personal views and do not represent an official position by the Fairbanks North Star Borough.

Department Of Energy
Alaska Power Administration
P.O. Box 50
Juneau, Alaska 99802

May 12, 1980

Mr. Mark Wittow, Coordinator
Power Alternatives Study Committee
c/o Malone
Pouch V
Juneau, AK 99811

Dear Mark:

I appreciate your courtesy in furnishing us copies of the Susitna study reports as they come out.

Most recent is the April 15, 1980, review draft, "Susitna Hydropower: A Review of the Issues," by Tussing and Associates. I've read this through a couple of times, and it is hard to get a handle on it.

In my opinion, the set of recommendations for additional study based on the review of the ACRES study plan is bad advice. One could spend ten times as much as Tussing recommends, but the decision makers would still face all the major uncertainties about the future. The ACRES plan provides a coherent review of available alternatives, including Susitna. This will benefit from many years of study by others, both in Alaska and elsewhere. There is ample opportunity to review power demand estimates prior to construction decisions. Because this is a staged project, there's good opportunity to adjust to future changes--for example, by deferring latter stages if the loads turn out less than expected. Each of the major uncertainties will be considered separately by the interested parties as the studies progress (utilities and financial institutions as examples of other interested parties). I just don't think the additional work recommended by Tussing will add all that much.

In some cases the views expressed in the report don't seem credible. For example, I don't quite agree that the most likely scenario for the Alaska Railbelt involves decline and fall after a few years.

The discussion on natural gas supplies (pp. 54-55) seems quite misleading. The alleged radical change in U.S. gas supplies is in fact a rather small reduction in total U.S. consumption (1979 use of 19.49 trillion cubic feet was the smallest since 1969), along with a continuing decline in reserves (U.S. has a 10-year supply of proven reserves at

current consumption levels), in spite of very significant increase in drilling activities. U.S. short-range policies are encouraging substitution of gas for oil where that is possible as a measure to reduce oil imports. I've seen no evidence of policies to back off from the objectives of the Powerplant and Fuel Use Act objectives.

I personally feel that State planning should not anticipate natural gas will be an available, long-term alternative for major power supplies.

A couple of the technical areas that bother me are the presentations on load management and reliability.

The principal reason that Alaskan utility systems have low annual system load factors is the huge disparity between energy requirements in the summer and the winter. This has something to do with cold weather and short daylight hours in winter at northerly latitudes--something that load management doesn't control very well. Summer loads are typically around 60 percent of loads during the colder part of the winter. On a daily and weekly basis, system load factors for the Alaska Railbelt are really quite high--80 percent is not unusual. That's not to say we shouldn't pay attention to load management (the Railbelt utility managers have not been idle on this subject). I do think the Tussing report greatly distorts this particular issue.

The suggestion that the reliability standards now used may be too high is irresponsible, in my opinion. Many factors bear on the actual amount of the reserves an Alaskan utility must carry including the severe consequences of extended outages in winter. Experience in dealing with gas turbine equipment dictates a high level of redundancy. For example, the Alyeska pipeline design incorporates essentially 100 percent backup through redundancy of pumping units.

The impression I get is that the authors are suggesting that the load management and reserve questions tend to reduce need for (or installed capacity at) the Susitna Project. I think this is wrong since neither program would materially impact total electrical energy requirements, and reduction in the hydro capacity would reduce energy production capability.

Finally, a couple of minor corrections in references to Alaska Power Administration:

> At pages 18 and 21, change "Power Administration" to "Power Authority."
>
> At page 4, the report is in error in statement that the 1974 APA report recommended construction of a two dam plan.

At page 86, add "AML&P" to list of Alaska Power Administration--Eklutna customers.

I do hope the final of this report looks a little different from the present draft.

Sincerely,

R. J. Cross

Robert J. Cross
Administrator

cc: Arlon Tussing & Associates
Seattle, WA

SUSITNA...

Join us on our mailing list

Studies currently being conducted by the Alaska Power Authority will vitally affect future energy needs of most Alaskans.

Indications are that development of hydroelectric power along the Susitna River can provide a large portion of energy for the Anchorage and Fairbanks areas and communities between.

The current concept is a two-dam proposal, but the Authority also is studying a variety of energy sources. Some of the "non-traditional" sources include geothermal, solar, wind, biomass, and generation of energy from wood and municipal waste.

Studies are being conducted on feasibility of small hydroelectric units, as well as natural gas, coal and tidal possibilities.

A recommendation will be sent to the governor in early 1981 by the Alaska Power Authority Board, setting down its proposals to supply adequate energy to the railbelt.

We need your help in preparing a mailing list of persons and organizations interested in the energy future of Alaska.

Please fill out the back of this card if you would like to be included on our mailing list to receive further information from time to time.

Executive Director
er Authority

RETURN WITH YOUR UTILITY BILL

George M. Sullivan, Mayor
Municipality of Anchorage

name _____

mailing address _____

_____

_____

1. Regarding the Susitna hydroelectric proposal, which of the following best describes your position:

- ☐ haven't decided because don't know enough about it
- ☐ know something about it but undecided
- ☐ generally in favor
- ☐ generally against

2. How long have you lived in Alaska?

- ☐ less than 4 years
- ☐ 4 to 14.9 years
- ☐ 15 years or more

3. In what part of Anchorage do you live?

- ☐ Gov't. Hill, North Mountain View, Downtown, Fairview
- ☐ Inlet View, Turnagain
- ☐ South Mountain View and Muldoon north of DeBarr
- ☐ Muldoon south of DeBarr, Lake Otis, University
- ☐ Spenard
- ☐ South Anchorage, east of Seward Highway
- ☐ South Anchorage, west of Seward Highway
- ☐ Eagle River/Chugiak

4. Do you ☐ *own home* ☐ *rent* ☐ *other*

5. Do you belong to any groups which are likely to testify at a public hearing on the Susitna hydroelectric proposal?

- ☐ yes; if yes, which ones? _____

_____

_____

- ☐ no

RETURN WITH YOUR UTILITY BILL

Regional Summary
Alaska Capacity and Net Generation
1977, 1978, 1979 Preliminary

REGION/Sector	1977 Capacity KW	1977 Net Gen MWH	1978 Capacity KW	1978 Net Gen MWH	77-78 Growth %	1979 Capacity KW	PRELIMINARY 1979 Net Gen MWH	78-79 Growth %
SOUTHEAST								
Utility	143,335	318,515	150,635	332,173	4.3	156,735	355,926	7.2
Industrial	67,125	300,000	67,125	302,957	1.0	67,125	305,265	0.8
Total	210,460	618,515	217,760	635,130	2.7	223,860	661,191	4.1
SOUTHCENTRAL								
Utility	556,383	1,920,710	642,883	2,052,305	6.9	717,533	2,150,386	4.8
Nat. Def.	55,726	153,868	55,726	164,574	7.0	55,726	156,404	-5.0
Industrial	107,890	317,845	113,685	376,028	18.3	113,685	376,028	0
Total	719,999	2,392,424	812,294	2,592,907	8.4	886,944	2,682,818	3.5
YUKON								
Utility	302,250	501,774	293,532	486,612	-3.0	295,132	464,125	-4.6
Nat. Def.	86,625	232,352	86,625	217,967	-6.2	86,625	207,253	-4.9
Industrial	12,000	25,677	16,825	37,853	47.4	16,825	37,853	0
Total	400,875	759,803	396,982	742,432	-2.3	398,582	709,231	-4.5
ARCTIC-NORTHWEST								
Utility	24,579	44,905	25,746	47,701	6.2	26,111	48,295	1.3
Nat. Def.	6,940	20,771	6,940	19,470	-6.3	6,190	18,254	-6.2
Industrial	170,325	245,513	198,800	458,072	86.6	198,800	458,072	0
Total	201,844	311,190	231,486	525,243	68.8	231,101	524,621	-0.1
SOUTHWEST								
Utility	22,417	42,174	24,552	47,337	12.2	24,652	47,705	0.8
Nat. Def.	49,200	139,600	56,150	124,800	-10.6	56,150	115,936	-7.1
Total	71,617	181,774	80,702	172,137	-5.3	80,802	163,641	-4.9
ALASKA								
Utility	1,048,964	2,828,079	1,137,348	2,966,129	4.9	1,220,163	3,066,437	3.4
Nat. Def.	198,491	546,591	205,441	526,811	-3.6	204,691	497,847	-5.5
Industrial	402,915	983,144	442,010	1,269,410	29.1	442,010	1,271,718	0.2
Total	1,650,370	4,357,815	1,784,799	4,762,350	9.3	1,866,864	4,836,002	1.6

PRELIMINARY - 1979 ENERGY AND POWER DATA - PRELIMINARY

Type - Place	Installed Capacity (KW)	Net Generation (MWH)
SOUTHEAST		
Utility - Juneau	73,282	141,134
Ketchikan	29,623	84,800
Haines/Skagway	6,905	12,521
Petersburg	7,150	21,546
Wrangell	7,745	13,994
Sitka	14,600	49,872
Other Southeast	17,430	32,060
Total	156,735	355,926
Industrial - Total	67,125	305,265
TOTAL SOUTHEAST	223,860	661,191
SOUTHCENTRAL		
Utility - Anch/Cook Inlet	664,299	2,030,604
Glennallen/Valdez	17,746	41,264
Kodiak Island	25,903	60,520
Other Southcentral	9,585	17,998
Total	717,533	2,150,386
National Defense - Anch. Area	49,726	133,878
Kodiak Area	6,000	22,526
Total	55,726	156,404
Industrial - No. Kenai	24,980	94,620
Valdez	40,000	54,750
Other	48,705	226,658
Total	113,685	376,028
TOTAL SOUTHCENTRAL	886,944	2,682,818
YUKON		
Utility - Fairbanks Area	280,331	443,736
Other Yukon	14,801	20,389
Total	295,132	464,125
National Defense - Fairbanks Area	77,000	181,247
Other Yukon	9,625	26,006
Total	86,625	207,253
Industrial - Total	16,825	37,853
TOTAL YUKON	398,582	709,231
ARCTIC-NORTHWEST		
Utility - Barrow	5,150	10,200
Kotzebue	4,825	10,432
Nome	5,880	14,398
Other Arctic-NW	10,256	13,265
Total	26,111	48,295
National Defense - Barrow	2,250	8,000(e)
Other Arctic-NW	3,940	10,254
Total	6,190	18,254
Industrial - Total	198,800	458,072
TOTAL ARCTIC-NORTHWEST	231,101	524,621
SOUTHWEST		
Utility - Bethel	8,400	16,560
Dillingham	2,900	7,016
Naknek	1,550	7,238
Other Southwest	11,802	16,891
Total	24,652	47,705
National Defense - Total	56,150	115,936
TOTAL SOUTHWEST	80,802	163,641
TOTAL ALASKA		
Utility	1,220,163	3,066,437
National Defense	204,691	497,847
Industrial	396,425	1,177,218

1978 ENERGY AND POWER DATA

Type - Place	Installed Capacity (KW)	Net Generation (MWH)
SOUTHEAST		
Utility - Juneau	73,282	128,314
Ketchikan	29,623	84,711
Haines/Skagway	6,905	12,740
Petersburg	6,555	19,182
Wrangell	7,745	13,325
Sitka	9,100	42,362
Other Southeast	17,425	31,539
Total	150,635	332,173
Industrial - Total	67,125	302,957
TOTAL SOUTHEAST	217,760	635,130
SOUTHCENTRAL		
Utility - Anch/Cook Inlet	590,699	1,933,926
Glennallen/Valdez	17,746	43,835
Kodiak Island	26,128	58,120
Other Southcentral	8,310	16,424
Total	642,883	2,052,305
National Defense - Anch. Area	49,726	142,096
Kodiak Area	6,000	22,478
Total	55,726	164,574
Industrial - No. Kenai	24,980	94,620
Valdez	40,000	54,750
Other	48,705	226,658
Total	113,685	376,028
TOTAL SOUTHCENTRAL	812,294	2,529,907
YUKON		
Utility - Fairbanks Area	280,331	466,557
Other Yukon	13,201	20,056
Total	293,532	486,612
National Defense - Fairbanks Area	77,000	192,287
Other Yukon	9,625	25,680
Total	86,625	217,967
Industrial - Total	16,825	37,853
TOTAL YUKON	396,982	742,433
ARCTIC-NORTHWEST		
Utility - Barrow	5,150	10,191
Kotzebue	4,825	10,033
Nome	5,880	13,915
Other Arctic-NW	9,891	13,562
Total	25,746	47,701
National Defense - Barrow	3,000	9,000(e)
Other Arctic-NW	3,940	10,470
Total	6,940	19,470
Industrial - Total	198,800	458,072
TOTAL ARCTIC-NORTHWEST	231,486	525,243
SOUTHWEST		
Utility - Bethel	8,400	18,217
Dillingham	2,900	6,262
Naknek	1,685	5,971
Other Southwest	11,567	16,887
Total	24,552	47,337
National Defense - Total	56,150	124,800
TOTAL SOUTHWEST	80,702	172,137
TOTAL ALASKA		
Utility	1,137,348	2,966,129
National Defense	205,441	526,811

International Brotherhood of Electrical Workers

TELEPHONE
(907) 272-6571
TELEX 25-250

I. M. (IKE) WALDROP JR.
BUSINESS MANAGER • FINANCIAL SECRETARY

Local 1547

2702 DENALI STREET
ANCHORAGE, ALASKA 99503

JORGE C. HIX
PRESIDENT

10 March 1980

Representative Hugh Malone
Pouch V, State Capitol
Juneau, Alaska 99811

Dear Representative Malone:

The enclosed message from Chugach Electric was published as a full page ad in the Anchorage Daily News on March 10, 1980 and shamefully points out the fact that almost all Alaskans living in the Railbelt area, from Fairbanks to Seward, are living at the mercy of the oil companies. Undoubtedly, this condition will exist until such time as our hydroelectric potential is developed.

Hydroelectric projects such as Devils Canyon on the Susitna River would have a stabilizing effect on the cost of electrical energy in the Alaska Railbelt area for the next three-hundred (300) years and would practically eliminate the need for messages such as that contained on the enclosed material.

Senate Bills 294 and 385 will be coming up for consideration in the near future. Your favorable consideration for passage will be greatly appreciated by all consumers in the Railbelt area.

Best wishes.

Sincerely,

I. M. WALDROP, JR.
Business Manager

IMW/tm

Enclosure

WHILE IN SESSION:
POUCH V
JUNEAU, ALASKA 99811
(907)465-4925

HOME:
BOX K - COLLEGE
FAIRBANKS, ALASKA 99708
(907)456-2037

BRIAN ROGERS

Alaska State Legislature

March 3, 1980

TO: Speaker Terry Gardiner

FROM: Rep. Brian Rogers

RE: Travel & Per Diem for Rich Seifert

Dear Mr. Speaker,

As I have understood that HB 687 (Energy Center) is up for consideration in the House Resources Committee on Tuesday (March 4th) at 3:00 PM, I am requesting your approval of travel and per diem for Rich Seifert to testify on the bill as an expert witness.

The request is for air fare round trip from Fairbanks and two days per diem.

Thanks very much.

Sincerely,

Representative Brian Rogers

February 26, 1980

To: Russ Meekins, Chairman, House Finance Committee
From: Hugh Malone

Re: Supplemental appropriation for the Susitna Hydroelectric Project Phase I Study.

I am against providing this money to the Alaska Power Athority during fiscal year 80. As you know, I sponsored HB 570, which appropriates the same amount (7.5 million) to the Authority in fiscal year 81. I have discussed the matter with Mr. Yould of the A.P.A., and have reviewed the timetable for the Phase I Study. I can find no reason for the authority to receive this money now, instead of during FY 81. The eight million dollars appropriated in last year's SB 63 still remains largely unspent.

Before appropriating any money to the Authority for the Susitna project, the Finance Committee should review the timetable of the study plan. The appropriations need to be made in a manner that allows for proper legislative oversight.

I also stress the importance of continuing direct legislative oversight of the project by appropriating enough money (probably $90,000) to the House Research Agency to continue the critical work begun by the House Power Alternatives Committee.

Please let me know if you wish to discuss this at greater length.

HM

(HB 570 attached)

WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON 99164

DEPARTMENT OF ECONOMICS

January 14, 1980

Mr. Jim Rhode
C/O Simmons
1627 Evergreen
Juneau, Alaska

Dear Mr. Rhode:

Our discussion of the Susitna River project and Alaska economics in general was quite interesting and has whetted my appetite for finding out more about both. The project and its alternatives sound both challenging and intriguing.

I suggested that I should write indicating the work I have done regarding utilities and in the area of benefit-cost and production economics. Three areas of work have been particularly relevant:

1. Econometric analysis for John Landon of cost functions for various electric utilities and transmission networks. Dr. Landon was a colleague at the University of Delaware and now heads the District of Columbia Office for National Economic Research Associates. The analysis was published in the Southern Economic Journal and in a volume edited by David Huettner.
2. Benefit-Cost analysis on the 200 mile fishing limit with Professor Lee Anderson of the University of Delaware.
3. Numerous cost functions and production functions for manufacturing and agriculture.

Some of the persons that I know well and would expect to be useful in undertaking this project are:

1. Professor John Landon, noted above.
2. Professor David Huettner, University of Oklahoma, an expert on utility cost functions.
3. Professor Gardner Brown, University of Washington, author of a number of studies on Alaskan dams. exaggerated - participated in study of Lamprey
4. Professor Thomas Halvorsen, University of Washington, author of studies on energy costs.
5. Dr. Thomas, Zepp, Commissioner, Oregon State Utility Commission.
6. Dr. Hugh Knox, U.S. Department of Energy.

I am looking forward to hearing from you on the progress of the dam study. If you need any more information or have any other attractive work to be done, please let me know.

Best regards,

Mark Schmitz

Mark Schmitz
Associate Professor

509. 335 . 3564

Kay Rosier

Alaska State Legislature

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REPRESENTATIVE BILL MILES

2/5/80

Hugh & Brian -

I note in your Susitna report that certain work will not be available until May.

When briefly discussing the scope of work during the interim with Work Witton, I commented in that much of the work was late in starting. I hoped it would not hold up the project. He indicated that it would now. I trust this is still the case. If not, please let me know.

Bill

02-0018 (Rev. 10/76)

STATE of ALASKA

MEMORANDUM

TO: Ron Lehr, Director
Division of Budget & Management
Office of the Governor

DATE: January 23, 1980

FILE NO: RP 80-350X

TELEPHONE NO:

FROM: George Matz, Budget Analyst
Division of Budget & Management
Office of the Governor

SUBJECT: Alaska Power Authority Request to Establish Seven Positions for the Susitna River Feasibility Study

The Alaska Power Authority (APA) requests permission to establish seven CIP positions for work directly related to and funded by the Susitna River Hydroelectric Project Feasibility Study. Positions requested for project management include: Project Engineer, Field Auditor II, Project Inspector, and Secretary I. Positions requested for a public information program include an Information Officer III, Administrative Assistant III and Clerk IV. All positions will be located in Anchorage.

Funding for each of these positions will come from the Susitna River Hydroelectric Project Feasibility Study which was appropriated $8,528,000 in the FY 80 Capital Budget.

The feasibility study is expected to take 2½ years and require another $21,084,280 in funds. The appropriation was to the Office of the Governor, but contracted to the APA by RSA. Although the APA has responsibility for the timely and satisfactory completion of the study, a majority of the effort has been contracted to a private engineering firm, ACRES American. The project management position will oversee performance by ACRES and sub contractors to assure the State that the feasibility study objectives and tasks are met. Responsibilities for each position are as follows:

Project Engineer - The Project Engineer will have lead resonsibility for monitoring the performance of the contractor and subcontractors and will provide the Division of Energy and Power Development with information relevant to energy planning.

Project Inspector - the Project Inspector will monitor the performance of study activities on Native lands as well as affirmative action minority hiring for the project and will provide project reports to the Cook Inlet Native Corporation.

Field Auditor II - the Field Auditor will review the accounting and financial procedures of contractors to assure the State of accurate and timely cost controls.

Secretary I - The Secretary will provide secretarial and clerical support to the project management staff.

A significant part of the feasibility study is the public information program. The APA has decided to conduct the public information program rather than delegating this responsibility to ACRES. In addition to providing the public with information via workshops, news releases, and literature, a system will be established to provide timely and detailed answers to all study questions submitted by the public. In essence, the public information program will provide a public forum which addresses future energy strategies for the Railbelt. Positions required for this level of effort include the following:

Information Officer III - This position will be responsible for overall management of the program, and for organizing a number of planned public meetings and workshops.

Administrative Assistant III - The Administrative Assistant will be responsible for researching, writing and producing much of the written information which is being planned. Emphasis will be placed on translating technical data to laymen's terms. A memo from Nancy Blunck (see attached) lists the responsibilities of this position.

Clerk IV - The Clerk will provide secretarial and clerical support for the public information program. It should be noted that only one third of this position is expected to be devoted to clerical duties. In addition, one third of this position's time will be spent on writing/editing and the remaining one third on research/investigation. Consequently, the professional to clerical ratio will be about eight to one.

All of these positions and the approximate level of funding was in the Plan of Study which predicated the FY 80 capital appropriation for the Susitna River Hydroelectric Project Feasibility Study. These positions will expire on the RSA completion date which is March 31, 1981 unless additional funding becomes available.

Your approval is recommended.

George Matz, Budget Analyst
Division of Budget and Management

Approved this 29 day of Jan, 1980.

Ron Lehr, Director
Division of Budget and Management
Office of the Governor

Fryer - waste heat

APHC - needs planning

Wind - nonexistent

Small hydro - extensive
(microhydro - under 500 KW)

primary - Healy south + east

wood resource - tremendous | significant envi. impact

300 - 500 million barrels of oil
annually - 6 million barrels

state - need active management | certification

Solar - active - minimal | / streamline permitting
hot water only
not enough for space heating

passive - too expensive for residential
8000 + architects, add. work

[illegible] - [illegible]

peat -

coal - dirt, but nonrenewable

- coal plant at Belzoni necessary

tidal power - only huge projects possible - technology feels control

geothermal - largely unavailable

waste heat - potential in FL
capital intensive

solid waste - refuse - Anch. 35 MW
(negative value) competitive w/coal
- could be burned at coal plant

January 19, 1980

To: Representative Brian Rogers
From: Mark Wittow
Re: Expected Energy Legislation, 1980 session

I have summarized below what probably will be the major energy issues confronting the legislature this session. As always, one never knows what will crop up, or drop beneath the floorboards.

1. Conservation

A bill is currently being drafted, under the sponsorship of you and Rep. Miles, that would establish a comprehensive state energy conservation policy and set up a variety of incentives for the more efficient use of energy. The bill's key features:

a. A voluntary residential and commercial audit program, to be designed by the state DEPD and administered through the municipailities.

b. A conservation loan program, for home improvements.

c. Policy guidelines and tax incentives to encourage coegeneration of heat and electricty, and the use of waste heat.

d. A requirement that all state-financed construction meet a minimum performance standard.

e. A requirement that all public buildings be designed to maximize energy efficiency, and that all existing buildings be audited and corrective measures taken to improve their efficiency.

f. The elimination of the motor fuel tax for gasahol.

g. A variety of more technical provisions, such as allowing the FNSB to accept federal funds for housing rehabilitation, changes in the wording of the requirements for the state's long-term energy plan.

A number of other measures have been proposed by AkPIRG, and will be considered as amendments during committee markup:

a. A requirement that lending institutiions collect data on energy costs as part of their loan application process.

b. Inclusion of solar-oriented provisions in local zoning codes.

c. A grant program for conservation and solar investments.

d. A statewide mandatory retrofit program for <u>all</u> homes and businesses, financed by the state.

The Miles/Rogers conservation bill should be introduced during the latter half of next week.

The administration is expected to introduce conservation legislation legislation next week. Their program contains nothing of substance not in the House legislation, and is focused around "energy tax credits," whatever those turn out to be, conservation loans and state facility

retrofit.

A number of other conservation measures will be dealt with through the appropriation process. These include funding for the conservation loan and audit programs, the creation of an economist position at the APUC to study innovative rate design and possible additional funds for some of the federal conservation programs.

The House and the Administration seem to be in general agreement on the basic outline of a state conservation program, with the House in the lead on the issue at this point. The main points of the program also have the support of groups such as the municipal league, the utilities and private industry, although no one supports limitations on their freedom of action (meaning that the waste heat provisions will face opposition).

The program to retrofit state buildings appears as part of the Governor's supplemental budget, with 25 million dollars requested. An estimated 200 million dollars will be spent over the next six years, including 34 million in FY 81. I was told that the governor intended to use general fund money for the entire retrofit program -- but the memo entitled "Legislative Leadership Briefing Budget Overview" (1-14-80) shows a FY 80/81 bond package of 18.1 million for "Energy Conservation/ Facilities Upgrade Bonds."

I have begun the process of preparing a bond package for the cost of retrofitting all public and municipal buildings in the state.

2. Alaska Energy Resource Development Institute

A bill is now being drafted, under the sponsorship of you and Speaker of the House Gardiner, to create the Alaska Energy Resource Development Institute. AERDI would be an independent public corporation designed to promote the development of energy technologies. It would receive its initial funding from the state, and would seek project funding from federal, state and private sources. One of the Institute's main goals would be to broaden and increase employment opportunities for Alaskans. It would also be expected to encourage innovation and help individuals and business bring new ideas to the commercial stage.

The areas that AERDI is expected to pursue: enhanced petroleum recovery, increased efficiency in coal combustion, hydrogen use and storage technologies, applications of wind and small hydro power in Alaska, alternative liquid fuels, waste heat and cogeneration, fuel cells, heat pumps andother promising renewable energy technologies. AERDI is being established at a time when huge amounts of federal funds are available for energy research and development, to bring those funds to Alaska, and to use our own energy revenues for long-term economic and technological development.

3. Funding for Alternative Energy Projects

The governor has proposed that DEPD receive 350,000 dollars and DOTPF receive $500,000 for community-level resource research, development

and demonstration projects. Almost a half million dollars will be available for small-scale power projects using local resources of under one megawatt. The governor has also proposed a funding increase for the northern technology program ($150,000 total), although his intentions are clouded by the executive order moving the entire Council to the Dept. of Env. Conservation.

Whether or not AERDI is established, the House is expected to be extremely sympathetic towards funding worthwhile alternative energy research, development and demonstration projects. The University has proposed an Energy Research Institute; many of the projects included in their package would be worth funding. These include fuels research, wind energy, biomass reduction, local utilization of arctic coal and waste heat programs.

3. Rural Problems

A variety of proposals are up in the air in the House and Senate which deal with the problem of high energy costs in bush villages. These include electric lifeline rates, heating and diesel fuel subsidies, and alternative energy utilization. The administration has proposed bulk fuel purchase loans, at five million dollars, and a bulk fuel storage facility acquisition program, at 750,000 dollars. Additional federal appropriations to the various energy emergency funds have been proposed by the governor.

4. Susitna Hydroelectric Project

The Alaska Power Authority will soon distribute the revised Phase I plan of study proposal by Acres American for public comment. The governor has asked that 7.5 million dollars be appropriated for the Phase I studies in his supplemental request, although most of the 8.1 million from last year's appropriation is still available. The new supplemental request was made because "the power authority is ready to spend it," according to my administration sources. Representative Malone introduced a House bill to appropriate the same amount in the FY 81 budget, along with continued funding for the alternatives study ($90,000) and money for geophysical mapping by the University ($110,000).

The Power Alternatives Study is reviewing the potential of energy conservation, alternative energy sources and natural gas in meeting Railbelt energy needs. The Study also includes a comprehensive report by ISER on future energy demand in the Railbelt, and is being partially funded by the APA as part of the Susitna Phase I work. Study Committee consultants have helped develop the House conservation legislation. Energy Probe has detailed the need for more knowledge of Railbelt houseing stock characteristics in their analysis of the ISER demand model.

5. Natural Gas

The focus has shifted from Northwest demands for the state to join in gas line financing to the need for examinations of options for use of our royalty gas. The Governor is making a lot of noise

about reviewing the possibility for petrochemical development, but little has been done. The use of the gas for power generation needs to be examined, and will be addressed in rough terms in the Power Alternatives Study report. More attention needs to be paid to mundane tasks such as figuring out the best offtake points, and to the lack of knowledge about all potential instate uses for the gas. I wish there was more to report in this paragraph, but proposals for action are lacking.

I have not covered proposals for the conditioning plant.

6. Oil and Gas Leasing Policy and Five Year Plan

The Interim Committee's analysis of the Beaufort sale and the proposed five year lease schedule shows that the Dept. of Natural Resources has very little of the data they need to conduct lease sales in a manner that will protect the state's interest. They are farther behind for upcoming sales than they were at this time last year for the Beaufort sale. They have almost no seismic information for upcoming sale areas. Although they have requested increased funding for leasing preparations, I don't have details on what they plan to do with the money.

(You may want to comment on the use of profit share bidding at the Beaufort sale, and its value for bringing the state greater revenues from oil and gas, as well as spreading them out for more responsible management.)

****

I think I've covered everything, but I'll keep checking and let you know if anything new comes up. As far as presenting this information, I'd stress two points:

1. Your efforts in writing energy conservation legislation will help reduce the operating costs of state government, and may help prevent the later imposition of coercive measures in emergency situations.

2. Your work on the Susitna project is designed to make sure that the tremendous investment required to build the dam won't result in huge costs to electricity users, and that the more economical ways of meeting energy demand are fully explored. The Power Alternatives Study Committee is also the only official public group maintaining critical oversight of the project, to ensure that it is built soundly, safely and at a proper size for future demand. The APA is too close to the project to maintain the necessary perspective.

January 21, 1980

To: Representative Brian Rogers
From: Mark Wittow MW

Addendum to 1-20-80 memo on energy issues

I have listed below a variety of issues relating to state energy policy that may be addressed this session. The primary issues were addressed in yesterday's note to you.

A. Natural Gas

1. Bonding Authority -- revise, abolish?
2. The necessity for an instate use study
3. Public examination of the resident hire issue, to exert the required pressure on NW for a good agreement.
4. The costs and benefits of trade to obtain gas liquids.

B. Oil and Gas Conservation Commission

1. Possible shakeup and/or expansion of the Commission
2. Continued funding for the Van Poolen reservoir study, which has gone way over budget andschedule. (It is still vital that the study be completed.)

C. Coal Royalties -- legislation will be submitted to raise the coal royalty to somewhere around 5%.

D. Oil Pollution Cleanup -- legislation on this subject, submitted by the Governor, will be taken up in the House Resources Committee next week.

E. Oil and Gas Unitization -- new legislation will be submitted by McKinnon/Chatterton, which will attempt to clear up the confusion (and resulting loopholes) between "exploratory" units and production units. DNR also has new unitization regulations, which will be impacted by the new legislation.

F. Alpetco -- no legislation action is expected, but research is being conducted to determine the validity of LaRocca's charges in last week's All-Alaska Weekly. (by the House Research Agency)

G. Alternative Energy Sources -- legislation is expected on financing of small hydro, and general state support for small hydro, geothermal, and solar systems.

H. ETC. -- The impact of the PacLNG proposal on Cook Inlet gas prices may be considered.
Due to the increased Sadlerochit production, a small state royalty oil sale will be held soon, with approval by the legislature required.

The major issues of conservation, rural energy problems, AERDI, Susitna, alternative energy projects and the five-year lease schedule were covered in the original memo.

MEMORANDUM

January 22, 1980

To: Bob Speed, Speaker's Office
From: Mark Wittow MW

You have asked me to report on my work on energy issues this session. I am working with Representatives Rogers and Malone as coordinator of the Power Alternatives Study (funded as part of the Susitna Hydroelectric Project). Most of the legislation I am helping prepare has been inspired by the study.

A. Energy Conservation

I have put together a comprehensive energy conservation bill, under the sponsorship of Representative Miles and Rogers. The bill is intended to be a replacement for HB364, although both will be considered in the Resource Committee markup. The key features of the bill:

1. A residential and commercial audit program -- auditors will be trained and/or certified by the Division of Energy and Power Development; the program will be administered through the minicipalities, with costs reimbursed by the state (excepting a $25 fee paid by the auditee). The program is voluntary, but will help support the requirement described below in #4. and #7

2. A conservation loan program, administered through the Division of Business Loans, that would make loans of up to $10,000 for home improvements leading to greater energy efficiency.

3. Policy guidelines and tax incentives to encourage the use of waste heat and cogeneration.

4. A requirement that all state-financed construction meet a minimum performance standard.

5. A requirement that all public buildings be designed to maximize energy efficiency, and that all existing (public) buildings be audited and corrective measures taken to improve their energy efficiency. +life-cycle costing.

6. The elimination of the motor fuel tax for gasohol.

7. A requirement that banks collect data on energy costs as part of their loan process.

8. A directive that state offices recycle renewable matierals, such as paper, cans and glass, whenever possible.

9. A provision allowing second class boroughs to accept federal housing rehabilitation funds.

10. Changes in the wording of the state's long-term energy plan, placing more emphasis on conservation.

Additional provisions that will be consdiered as amendments during

grant,

February 5, 1980

To: David Rogers, Counsel, House Resources
From: Mark Wittow, Power Alternatives Study Coordinator

Re: Summary of House Energy Conservation Bill

A bill establishing a comprehensive state energy conservation policy will be introduced in the House at the end of this week. The bill uses a variety of mechanisms to accomplish the goal of more efficient energy use.

State facilities are required to set an example, both by design and operation. Life-cycle costing for all state facilities will be done, with audits and recommendations for retrofitting. All state-financed facilities will be required to meet minimum performance standards. In addition, the statutory guidance for the development of a state energy "plan" will be modified to include an analysis of energy efficiency measures, and a requirement to develop the detailed data base necessary for informed decisions.

A variety of incentives for adoption of more efficient energy use in the private sector are established in the legislation. The existing residential tax credit for conservation measures will be expanded and made payable. Businesses which adopt conservation measures, including cogeneration and waste heat use, will receive large tax credits. A statewdie audit program, designed by the state and administered through municipalities/or public or private businesses and/, will help provide guidance to homeowners and businesses. A low-interest loan program to aid in the financing of residential energy conservation measures is also established in the House bill.

In sum, the bill subsidizes the cost of making improvements for greater energy efficiency, in both new construction and retroffiting old buildings. Where state money is involved, certain minimum standards would be mandated. The short-term subsidies are provided as way of easing the immediate burdens that result in long-term savings to individuals, the state and the nation from the wiser use of energy.

A Short History of the Tall Dos Rios Dam:

Crisis on the Eel

by T. H. Watkins

On the Middle Fork of the Eel River, 600 miles north of Los Angeles, the U.S. Army Corps of Engineers and the California Department of Water Resources want to build a dam. Its name would be Dos Rios, and it would be 730 feet high. Its purposes are defined by the Corps of Engineers as follows: to "reduce substantially future flood damages in the Eel River Basin; provide additional water supply to meet the State of California Water Project requirements which are required by about 1985; provide a potential for hydroelectric power; and meet the expanding public need for water oriented outdoor recreational opportunities." The entire project appears to be an enormous miscalculation.

I THE POWERS OF OBFUSCATION

The dam would destroy one of the few living rivers left in California. It would flood Round Valley, the town of Covelo, the Round Valley Indian Reservation, more than 400 archeological sites, and 14,000 acres of agricultural land potentially worth over three million dollars annually. The dam will cost far more than the $398,000,000 projected by the Corps, and the project's annual cost may exceed any beneficial return by as much as 25 percent. Its water would be at least as expensive, and possibly more expensive, than water from any one of several alternate sources. Only 5 percent of the project is allocated to flood control. The dam is expected to produce only 4,800 kilowatts of hydroelectric power. Finally, the so-called "recreational opportunities" have the surrealistic quality of something out of *Alice in Wonderland*.

The project is facing some stiff competition. In addition to the Sierra Club, organizations and individuals who have expressed opposition or serious misgivings include the Mendocino County Board of Supervisors; the people of Covelo; the Indians of the Round Valley Reservation; the Save the Eel River Association; California Tomorrow; State Senator Randolph Collier; the Mendocino County Farm Bureau; the State Department of Fish and Game; the Mendocino County Flood Control and Water Conservation District; the State Department of Parks and Recreation; and many state newspapers, among them the San Francisco *Chronicle* and the Sacramento *Bee*. The State Senate's nine-member Committee on Water Resources on February 6 of this year reversed its earlier 6 to 3 recommendation of the project to a 5 to 4 vote against it.

The Dos Rios Project, then, is neither popular nor realistic, but the Corps and the DWR, convinced of the infallibility of their logic and determined to have their way, are going to exert every ounce of their considerable muscle to obtain a go-ahead from the state.

The Corps of Engineers began eying the Eel River's development potential during the 1950's and received Congressional authorization for intensive studies of the region in 1956, following a period of particularly damaging floods. Expanded authorizations followed, and in 1964 the Corps received the support of the California Department of Water Resources. In December 1967 the Corps issued an *Interim Report* to the Army's Board of Engineers for Rivers and Harbors.

The *Report* called for a dam on the Middle Fork of the Eel three miles upstream from the town of Dos Rios—a "multiple-purpose" earthfill dam to be the largest in California, with a reservoir capacity of 7,600,000 acre-feet of water and an estimated total cost of $398,000,000. California itself would be obligated to contribute a minimum of $153,000,000 to construct the Grindstone Diversion Tunnel 21 miles through the Coast Range to carry water to Grindstone Creek in Glenn County, and from there to the Sacramento Delta Pool and ultimately to Los Angeles and the Metropolitan Water District.

The *Report* justifies the whole proposal by invoking the familiar "benefit-cost ratio," a device of statistical legerdemain which pits the cost of the project against the benefits to be derived from the sale of water ($26,100,000 annually by the Corps' estimate), the savings in flood damage ($1,500,000), the sale of hydroelectric power ($210,000), and recreational uses of the reservoir ($1,210,000). Based on these figures, the benefit-cost ratio was calculated to be 1.9 to 1—$1.90 in benefits for every $1 of cost. This may seem to be a comforting figure, until the *Report* itself is scrutinized—as it was shortly after its appearance by Professor Gardner B. Brown, Jr. of the University of Washington Department of Economics, at the request of the Round Valley Conservation League.

Using the *Report's* own facts and statistical methods, Brown calculated a .6 to 1 benefit-cost ratio—$.60 in benefits for every $1 of cost. The actual cost of the Dos Rios Project, he said, was underestimated by at least 12 percent (adding $47,000,000 to the total), and the benefits were variously *over*-estimated: water supply benefits by more than 60 percent (an annual revenue loss of about $18,500,000), flood control benefits by 17 percent (a $260,000 loss), hydropower benefits by 20 percent (a $40,000 loss), and recreation benefits by 10 percent (a $120,000 loss).

Round Valley — the Indians called it "Meshakai," the Valley of the Tall Grass

The Corps replied to Brown's analysis of its *Report* on October 17, 1968 when Colonel Frank C. Boerger presented a 41-page "Statement" before a joint public hearing of the California Senate and Assembly Committees on Water Resources. Critics of the *Interim Report* were disposed of quickly: "In some of the testimony presented on the Dos Rios Project we have found that some facts have been introduced in a negative context so that it is not always clear that they are facts. . . ." After issuing this masterpiece of obfuscation, Colonel Boerger dismissed the ability of anyone but a Corps specialist to comprehend the mysterious institutional expertise compiled in the *Report*, implying that an economist like Gardner Brown has no business questioning the economics of dam building, mainly because he has never built a dam and couldn't possibly be expected to know what was going on.

"Judging from its response," Brown said in November, "the Corps of Engineers seems to be more concerned about justifying its original position than with making a genuine attempt to meet economically the water needs of Californians. Its reply, in my judgment, reflects an abrogation of public responsibility. . . . Through misquotation, selective omission, and other debating tricks, the Corps of Engineers has attempted to circumvent rather than confront the issues involved."

Those issues are large ones.

II MYTHS, REALITIES AND CREDIBILITY GAPS

Of the numerous cost underestimates—$47 million worth, or 12 percent of the project's actual construction costs—a few are the most glaring. The *Interim Report* has allowed only a 20 percent contingency for price inflation between 1967, when the project was first proposed, and 1980, the year it is expected to be completed, assuming no delays—but during the *past* 13 years, according to the Bureau of Reclamation, construction costs of similar projects have actually risen some 30 percent. Round Valley, the *Report* claims, can be purchased for $12,200,000, even though the Corps' own ally, the Department of Water Resources, has admitted that it can't be had for less than $25,000,000.

The Corps based its interest payments for the dam on the proposition that it would take seven years to complete; again, the DWR expectation of nine years would seem to be more reasonable. And, as a final blow, President Lyndon Johnson, shortly before leaving office, proclaimed that the interest rate for projects such as Dos Rios should be raised from 3¼ percent to 4⅝ percent—which, according to the Corps' figures, would propel the interest and amortization costs from $14,900,000 to $21,000,000 a year. It remains to be seen what effect this change in interest rates will have on the project's attractiveness.

There is nothing new in all this. One study of the agency's past record has shown that the actual costs in 167 flood control projects have been as much as *double* those estimated by the Corps at the time they were authorized. "No private construction company could have remained in business with such a performance record," Gardner Brown pointed out, and while the economist prudently kept his under-estimate figure at 12 percent, a concerned taxpayer might wonder somewhat uneasily how close to 100 percent wrong the Corps might actually be in regard to Dos Rios.

It is when one contemplates the benefits that the Corps assumes will be forthcoming from the Dos Rios Project, however, that the whole argument for its existence breaks down. Only 5 percent of the project is allocated to flood control, even though the Corps has been waving this benefit in the taxpayers' eyes as if it were the main purpose of the dam. The dam's futility as a flood control device is indicated by

Middle Fork Eel River, at the damsite

Photos by Chuck Kennedy

the Mendocino County District Engineer's contention that had the Dos Rios dam been in existence during the great flood of 1964, the crest of the flood would have been lowered only two feet at the lower reaches of the river—from 30 feet to 28 feet. In any case, the dam would only provide standard flood control if it operated in conjunction with huge levees in the Eel River delta and a second large dam at English Ridge which is still on the drafting boards. Finally, the *Report* assigns a flood control benefit to Round Valley itself—*which the dam will place under 300 feet of water.*

Only 1 percent of the project is allocated to hydropower benefits. Its 4,800 kilowatts of power would supply only 263 average homes—hardly enough to mention.

A little over 4 percent has been allocated to recreation uses, predicated on the Corps' assumption that the lake created by the dam, together with a proposed "Indian Museum," will draw upwards of 2,000,000 tourist visits a year—but what possible recreational delights could be provided by a lake whose surface level could fluctuate as much as 150 feet in either direction as Dos Rios water is stored, then flushed out during the summer through the Grindstone Diverson Tunnel? Moreover, while the Corps has claimed it will take only eight years to fill the lake, William Penn Mott, California's Director of Parks and Recreation, has said it will take from 10 to 35 years, and has said further that "the state was going to be adamant in its refusal to undertake recreation maintenance and operation under the Dos Rios Project," according to the Ukiah *Daily Journal*. Altogether, the Corps' cheerful prediction of a recreation benefit exceeding $1,000,000 a year seems overblown.

In the face of such facts, the *real* purpose of the Dos Rios dam is obvious. It is designed to be an enormous tub where water for use in other parts of the state is to be collected and distributed— again, a questionable "benefit."

The Corps claims a water benefit based on the delivery of 900,000 acre-feet of Dos Rios water annually to the California State Water Project, even though the *Report* itself only claimed 700,000 acre-feet and the DWR has stated that except during dry years Dos Rios will export no more than 250,000 acre-feet. This water, the Corps maintains will be sold for $26.00 per acre-foot, a price it claims is sufficiently competitive to make Dos Rios water profitable and saleable. The price includes a $1 charge for transporting the water from Grindstone Creek to the Delta Pool, but the Corps has not included in its figures the additional cost of conveying the water from the Delta Pool to the terminus of the California Aqueduct ($46 per acre-foot), and from there to the principal purchaser, the Metropolitan Water District ($15 per acre-foot). These factors raise the *actual* price of Dos Rios water to $87 per acre-foot.

There is every reason in the world to believe that by 1985, or shortly thereafter, sufficient water from alternate sources is going to be available in Southern California at prices considerably cheaper than Dos Rios' $87. Desalinization of ocean water is the most dramatic potential alternative. Recent studies compiled by the U.S. Bureau of Reclamation to ascertain California water needs after 1980 (expected completion date of the Central Arizona Project) have determined that by 1995 it will be possible to produce, through the use of nuclear power, desalinated water for $32.00 per acre-foot. If a maximum of $20.00 per acre-foot is added for conveyance cost (maximum because the water can be pro-

duced locally) the potential price for desalinated water in 1995 will still be $35 less than that for Dos Rios water.

Other alternatives are noted in an August 1968 report by the DWR entitled *Present and Future Water Supply and Demand in the South Coast Area.* This report makes several flat statements that severely undermine the justification for Dos Rios. According to the figures used in this report, the present and future water supplies of Southern California are in good condition: "Contrary to general opinion that there would be a supplemental water demand by 1990, present and future supply is adequate to 2000. This ten-year difference has important economic consequences, since it means that investment in new importation facilities [including the High Dos Rios Dam] can be postponed 10 years longer than was anticipated." By 2020, Southern California's water demand, according to the DWR report, will be about 5,800,000 acre-feet anually, while the supply of available water will be about 5,432,000 acre-feet. The DWR says the deficiency of 368,000 acre-feet can be compensated by the utilization of one or all of several sources, none of them outside Southern California: (1) the increased use of existing ground water, which the report says amounts to 960,000 acre-feet per year; (2) the reclamation and re-cycling of 500,000 acre-feet of waste water; and (3) the transfer of some 500,000 acre-feet of unused entitlement water from the California Water Project into ground basin storage—all methods whose cost would be far below that involved in building a 730-foot dam and carrying water 600 miles from Dos Rios.

The ones who will pay the most for Dos Rios water are those who need it most—the taxpayers of Southern California. Not only will they have to pay most of the project's cost if it is approved, they will pay more for Dos Rios water than for desalinated water. Prices for water from the several alternate sources mentioned above vary, but are generally expected to be lower than Dos Rios'.

III WATER, LAND AND PEOPLE

Money is money, but there are other values to be considered in regard to the Dos Rios Project, few of them measurable in greenbacks. A river would be destroyed. The dam would back water up in the canyons of the Middle Fork of the Eel for miles, and the flow of the main branch would be crippled.

The Eel is one of the few rivers in California with a summer steelhead run. The damage to fish life from the dam has already been admitted by the Corps, which proposes a hatchery to mitigate the loss of 8,000,000 chinook salmon eggs and 2,000,000 steelhead eggs. The Department of Fish and Game says this is not enough: such a hatchery would have to produce more than three times that number of eggs, given the salmon's uncommon sensitivity to disease and the inconsistent record of such hatcheries in the past. Similarly, the Corps proposes to mitigate the ecological losses resulting from the inundation of the river's canyons by purchasing 14,000 acres of land to replace wildlife habitat. Again, the Department of Fish and Game says this is not enough: at least 22,000 acres are needed. The fact of the matter is simple—the ecology of an entire region is going to be wiped out, to be replaced by a statistically convenient one-for-one land and salmon egg swap.

The Corps has been equally cavalier in its attitude toward the people most intimately involved in the project—the 1100 residents of Covelo and the 350 Indians of the Round Valley Reservation. The Corps proposes to rebuild the town of Covelo on a more convenient location, ignoring the fact that since the town's economy is inextricably tied to the agricultural pursuits of Round Valley, its very reason for existence will vanish with the valley's flooding. The Corps' treatment of Round Valley's Indians, moreover, has all the sinister overtones of the nineteenth century. It plans to pick them up wholesale and move them to a mountaintop reservation, where none of them have ever lived, exchanging two acres of mountainous land for every acre of valley land taken away. There, those who wish to continue subsistence farming may do so on plots of marginally arable land; others will be instructed in the maintenance and supervision of an Indian Museum where, among other things, genuine tourists may watch genuine Indians weaving genuine blankets.

The Indians, understandably, object. They are a people of pride and independence. They have done well living on the edges of the white man's hectic world, working with the farmers of the valley and retaining withal that sense of identity with the land around them that made the California Indian the most serenely natural being ever to inhabit the boundaries of the state. They consider the Corps' plan an insult, as they should. The Covelo Indian Council has described the proposal as a "disruption of heritage," and rejected it outright as being "unfair and unjust to the Covelo Indian Community." As a final insult, "Lake Dos Rios" would flood 400 ancient Indian burial sites, some that may be 9000 years old, a prospect loudly deplored by anthropologists and archeologists.

What is the price of a lost heritage, or of history aborted?

The Dos Rios Project is illogical, ruinously expensive, predictably obsolete, and brutally destructive. Its very proposal places the economic framework of the second phase of the California Water Project under suspicion.

"Continue until you get to the end, then stop," the Red Queen told Alice. It is time to stop the Corps of Engineers and the Department of Water Resources, and the place to stop is Dos Rios, before the integrity of the whole North Coast region is violated piecemeal, from the Eel to the Klamath.

It can be done. It was done at Marble Canyon on the Colorado. Enough public pressure exerted on the California Legislature during its current session can block any state approval of Dos Rios and halt the grinding course of water resource development in California. The choice is simple enough: we either want an intelligent, economical, and genuinely workable plan for the solution to our water problems, or the most expensive and useless plumbing system in the history of the world.

T. H. Watkins is managing editor of The American West.

ECONOMIC EVALUATION OF THE PROPOSED TUCKS ISLAND PROJECT

Prepared for

Environmental Defense Fund

by

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SUMMARY

In 1962 the Tocks Island project was authorized for construction. The original investment cost of the project, about 90 million dollars, has grown to a figure of 259 million dollars as of Fiscal Year 1972. Over this same period the estimated annual benefits from recreation, water supply, power and flood control have increased from just under 12 million dollars to approximately 24.8 million dollars, according to the Corps. Presently the Tocks Island project is said to return $1.90 for every dollar spent for a benefit-cost ratio of 1.9 to 1.

This report concludes that the Tocks Island project is not economically feasible because it provides only 60 cents worth of benefits for every dollar spent.

The findings of this report are as follows:

(1) Annual recreation benefits have been overestimated by more than 6 million dollars, about one-fourth of total project benefits, because the Corps has transgressed the will of Congress by planning the construction of more than 25 recreation areas when it has explicit authorization to provide only 4 major areas.

(2) It has overestimated the annual water supply benefits by about 5 million dollars because the Corps failed to choose the lowest cost alternative as required by Senate Document 97.

(3) It has overestimated the annual power benefits by more than 1.5 million dollars, again because the Corps failed to choose the least cost technique for providing power.

(4) It has underestimated the investment cost of recreation facilities. The National Park Service, the agency required by law to manage the recreation facilities at the Delaware Gap National Recreation Area, estimates an investment cost 2.8 times larger than the Corps for comparable sites.

(5) The environmental study of the Tocks Island region prepared for the Delaware River Basin Commission estimates that the investment cost of waste treatment facilities at DGNRA is more than six times larger than the Corps' figure.

(6) The Corps has failed to evaluate the Tocks Island project in terms of a 50-year life in violation of Senate Resolution 281.

(7) The Corps has used a discount rate for evaluating the project which is more than 2 percentage points lower than the rate applied in evaluating contemporary projects, as established by the Water Resources Council. The rate is more than 4 percentage points lower than the lowest rate advocated by professional economists in their testimony before the 1969 Joint Economic Committee.

(8) Finally, the Corps has overestimated the length of the recreation season; overestimated the value of a recreation day; failed to estimate accurately the impact of drought conditions and resulting drawdown on recreation attendance; overestimated the annual flood control benefits; underestimated recreation activity in the Tocks Island area in the absence of the project; underestimated the cost of operating, maintaining and replacing recreation facilities; and underestimated the consequences of inclement weather on attendance at the beach facilities.

RECREATION BENEFITS AND COSTS

In broad perspective recreation benefits for the Tocks Island project are obtained by estimating the total annual recreation days associated with the project and applying a dollar value to each day. Generally, there would have been recreation days in the absence of the project and these too would have had value. Total annual project recreation benefits are the difference between benefits with and without the project.

During recent hearings regarding appropriations for 1972[1] (page 1040), the Corps claimed annual recreation benefits of 11.7 million dollars. There is no statutory basis for this estimate. The Corps has assumed that recreationists will use facilities for which neither it nor the Park Service is authorized to construct. According to a study by the Comptroller General of the United States, (GAO Report), "H.D. 522 authorized $10.2 million for Corps-funded recreational facilities"--an amount which has escalated because of inflation and the addition of sewage treatment facilities due to changed standards.[2] The Senate Sub-committee on Public Works in Senate Committee Report 1045 "believes that the (recreation) facilities provided shall not exceed those contemplated in H.DOC. 522 without further Congressional action."[3] To our knowledge no such action has been taken. Since the Corps agrees that the National Park Service does not have authority to build the additional sites called for in the Corps' analysis, indeed National Park Service has explicit funding limitations, the benefit-cost analysis in this study will be limited to the following five recreation areas; Sandyston, The Cliffs, Flatbrook, Dingman's Creek and Tocks Island. We have been told in personal communication from both the Corps and the National Park Service (NPS) that these sites are those currently planned for development.

We shall argue in this section that the Corps has overestimated the length of the peak recreation season thereby producing an overestimate of recreation benefits; it has underestimated the necessary investment in recreation facilities to meet the postulated design load; it has overestimated the value of a recreation day; it has underestimated the number of recreation days without the project; and it has overestimated the annual recreation benefits by its failure to adjust for a decrease in the demand for recreation during the draught years. Finally, costs have been underestimated by assuming an unreasonable length of life of facilities.

Weather Affects Adjustment

The Corps has a fairly involved calculation which permits the determination of the annual number of visitors for any given design capacity. The calculation involves assumptions about the length of the normal recreation season, fourteen weeks or ninety-eight days; the peak day attendance; the number of different parties that use the same facilities on a given day, or the rate of turnover, 1.15; and the fraction of total use during the normal season, 76.1 percent. These estimates seem to have been guided by the visitation records during 1966 of eight Pennsylvania parks.[4] Essentially the Corps' formula states that every unit of design capacity will serve 73 visitor days per year excluding sightseers.

We take issue here with the assumption regarding the length of the normal recreation season. According to the Pennsylvania park record, the length of the normal recreation season was 92 days and it will be assumed that this is the more current estimate. As a consequence, the annual number of recreation

days stated by the Corps should be decreased by 6 percent to account for this change in the length of recreation season.[5]

We believe that an intensive study would reach the conclusion that the true length of the recreation season /is overestimated by a factor greater than 6 percent for the following reasons. The Corps' facilities are strongly oriented toward providing beach recreation days. The beaches are designed to meet 85 percent of the design load, Table 2. Demand for these days is much more sensitive to cold and rainy weather than for other types of recreation days, in particular, the dominant type provided by the Pennsylvania parks. Bad weather effectively decreases the length of normal recreation season. In the past five years (1966-1970), 28 percent of the summer days have had some rain in the Highpoint Park area in the Northwest tip of New Jersey and 8 percent of the days had maximum temperatures less than 75°.[6]

Underestimated Investment Costs

Nearly a decade has elapsed since the Delaware Gap National Recreation Area (DWGNRA) was authorized, more than 5 million dollars has been spent in planning and revising the Tocks Island project, yet there is no agreement between the Corps, the Agency which will build the recreational facilities, and the National Park Service, the authorized manager of the facilities. There is, in short, no agreement on how many recreational facilities should be constructed, what sort of facilities to provide and where to locate them. The environmental impact statements submitted by each Agency is consistent with regard to the design load for each of the designated areas, a curious fact since there ought to be some connection between the quantity, type and location of facilities and the number of people these facilities can handle.

TABLE 1

NPS RECREATION INFORMATION

Area	Total Investment Cost[1]	Design Load[2]
Minisink and Milford Sections	$ 38,926,000	53,605

$\frac{\text{Investment cost}}{\text{Design Load}}$ = $720

1) National Park Service, "Delaware Water Way Developed Area Plan Drawing No. 620-40007 Estimate," September 1970.

2) National Park Service, "Draft Environmental Statement, Delaware Water Gap National Recreation Area," October 6, 1971, pp. 3, 3a.

TABLE 2

CORPS RECREATION INFORMATION

Area	Total Investment Cost[1] Dollars	Design Load[2]	Beach Facilities People[2]
Flatbrook Sandyston	1,624,000	6,510	6,400
Sandyston	6,133,000	15,030	13,000
Dingman's Creek	2,418,000	9,150	7,100
The Cliffs	3,770,000	10,675	10,000
Facilities at Dam	270,000	1,645	
Total	14,215,000	43,010	36,500

$\frac{\text{Investment Cost}}{\text{Design Load}} = \$330$

1) Corps, General Design Memorandum, No. 3, p. V-26.

2) United States Corps of Army Engineers, Tocks Island Lake Development: A Comprehensive Evaluation of Environmental Quality, Table 3-6.

Since the National Park Service is the agency responsible for managing the recreation area and facilities, it is reasonable to assume, as we have here, that the recreation facilities ought to be built to meet that Agency's design standards.

According to a recent plan, National Park Service intends to invest about 39 million dollars on facilities which the National Park Service says are adequate to meet a design load of about 53,000 visitors, Table 1. Thus the National Park Service investment cost per unit of design load is about 720 dollars. On the other hand, the Corps, in planning for a recreation design load of 43,010, anticipates investing about 14 million dollars, Table 2. The Corps' investment cost per unit of design load is 330 dollars. The National Park Service estimate is more than 2.8 times higher than the Corps and we use this factor in adjusting the estimated recreation investment costs upward. This adjustment has the effect of increasing by 1,780 million dollars the 50-year annual cost at a 5-3/8 percent rate of interest. This is the rate of interest used to evaluate federal water projects in 1971.

Several points bear mentioning about this calculation. First, according to the National Park Service estimates, the cost per unit of design load in the "Wiatbrook Section" is more than 1,200 dollars. Therefore, the figure in Table 1 used to obtain a value of 720 dollars per unit of design load is not the highest one can find. Second, there is reason to believe that the investment cost of recreation facilities submitted by the Corps in its EEO Report does not correspond to the facilities it plans to construct. The cost figures in this Report are relevant for the inclusion of the Van Campens area and the exclusion of the Wiatbrook area.[7] The difference is minor but it does reflect the haste with which the EEO Report was put together. Third, ideally one should have made the above calculations for

the same areas. This was not possible because the pieces in the jigsaw puzzle do not match up. Consider the Cliffe area. The Corps and the National Park Service evidently agree that there ought to be 550 picnic sites according to their respective EEO Reports. However, the Design Memorandum of the Corps, the most recent detailed estimate provided by the Corps calls for only 190 sites while the latest Natinal Park Service estimate, provided by the Washington office of the National Park Service calls for 300 sites. In addition to lack of consistency, Park Service does not have a design for facilities at three of the five proposed sites. Thus it was not possible to make the ideal comparison. Finally, one can compare the current relationship between peak day attendance and yearly attendance to obtain an insight about the implicit necessary design load. Taking this year's expected attendance at DWGNRA this year's typical Sunday attendance at DWGNRA and using the Corps' method for calculating required facilities, one finds that the number of planned facilities is just about 100 percent too small. According to National Park Service estimates, attendance in 1971 will be about one million while peak day attendance is estimated to have been 30,000. Adjusting downward to exclude sightseers following the practice of the Corps, the comparison is therefore between 600,000 annual visitors versus 24,000 visitors on a peak day. Had the Corps planned facilities to meet the peak day attendance of 24,000, it would then have estimated annual attendance excluding sightseers at about 1.6 million and claimed benefits for that many people when, in fact, only 800,000 people came, excluding sightseers. One can construct reasons why these calculations are biased against the Corps' procedures but all the biases together would not erase an error of more than 100 percent. We cite this

contrast between hypothesized and present visitation but do not use the 100 percent error factor in our further numerical analysis.

Underestimated Replacement Costs

According to House Document No. 522, annual replacement expenses for recreation facilities were estimated on the assumption that one-third of the facilities will be replaced every 25 years.[7] This statement is equivalent to assuming that the length of life of recreational facilities averages 50 years. Annual recreational replacement expenses based on this assumption, using 1968 prices are said to be 122 thousand dollars. At 1970 prices, the basis for the calculations in this analysis, the cost is 147 thousand dollars. Since we have argued that investment in facilities has been underestimated by a factor of 2.8, additional replacement expenses are 1.8 times the original estimate. More significantly, recreational facilities do not last 50 years. Picnic tables become firewood for irresponsible recreationists, boat launching facilities are damaged by people and consumed by nature. Not even sanitary facilities have an expected life of 50 years and no sensible man would argue that paved parking lots need replacement at the rate of once every one-half century. In a recent study, the expected life of new recreation facilities was calculated to be less than 25 years.[9] Using this figure, as we do, doubles the rate of replacement.

Making the two adjustments referred to above and adding them to the other replacement expenses yields a total annual replacement cost of 543 thousand dollars at 1970 prices.

Overestimate of Annual Attendance

According to Table 2, the design load for the initial recreational facilities is 43,010. According to the 1969 Design Memorandum No. 3, this figure multiplied by 73 provides an estimate of annual design attendance. Numerically, it is 3.14 million days. Sightseers are assumed to be equal to one-fourth this number or 780,000. Total visitation, according to these figures equals 3.92 million visitor days. In contrast, the Corps inexplicably now claims that the design load is 48,760 and annual attendance is 4.2 million.[10] We accept our estimate since it rests on more detailed documented data supplied to us by the Corps.

Recreation Days Without A Project

Ideally, recreation analysis should be done on a with and without project basis. This means that one estimates the number of recreation days without the project for the length of the project life. The value of these days is estimated, as is the cost of providing these days. Then a similar procedure is followed for estimating the benefits and costs of recreation with the project. Both benefits and the costs of recreation without the project are subtracted from the benefits and costs with project to obtain the project's net recreation contribution. To our knowledge future benefits and costs without the project never have been calculated carefully for this project. Moreover, to our knowledge, no field survey of existing recreation was made before the project was authorized. Estimating future benefits and costs without the project is a very difficult task and will not be attempted here. Instead, we shall assume that the value of all future additional recreation benefits is just matched by the cost of providing such benefits on the without project basis. We suspect this assumption results in a

serious overestimate of the project's recreation benefits. We here limit our criticism to the Corps' estimate of current recreation days without the project. According to the 1969 Design Memorandum [11], present visitation at the five currently planned recreation sites was 113,900 out of an estimated 183,000 for the total area. These figures were estimated in 1957 according to the CAO Report and surely there has been growth of visitation in the area during the past fourteen years. We shall assume that the annual growth rate was about 3.5 percent or the rate implicit in the Corps' statement that recreation needs in the Delaware River Basin should increase seven-fold between 1955-2010[12]. At that rate of growth, current visitation in the relevant area without the project amounts to about 185,000 days. We further assume that each day is worth $1.30 for reasons explained below. Therefore, the annual recreation benefit without the project is $240,500. Several comments about the revised estimate are warranted. First, it is not true, contrary to statements by the Corps, that recreation days without the project would not have grown in past years because the land is privately owned. If recreation needs in the Delaware River Basin are growing as smartly as the Corps says they are, then surely it would be in the interest of private enterprise to meet these needs in the absence of the project. The privately owned land argument is a specious one.

Second, in a letter to the Controller General, dated November 28, 1969, Robert Gordon, Special Assistant to the Secretary of the Army, reported that the net increase of visitation in state parks located close to Tocks and providing similar types of recreation averaged about 1 percent per year from 1960-1968.[13] Thus, he argued the original estimate of recreation days cannot be far off the mark. Either need for public recreation is not growing at the rate the Corps uses to justify Tocks, in which case the project ought to be desauthorized, or the needs are growing

as the Corps says and the rate of growth used in this section should be accepted. We suspect that if Pennsylvania park attendance grew only at the reported rate of 1 percent per year it was simply because developed facilities did not expand and existing facilities were used at capacity levels. There are no compelling reasons why attendance at the Tocks Island area could not grow in the absence of developed facilities since present recreation activity is natural resource oriented and does not rely heavily on developed facilities.

The Value of a Recreation Day

The Corps has assumed that visitors will participate in various activities in the following fashion.

TABLE 3

ANALYSIS OF A VISITOR DAY VALUE*

Activity	% of Visitors	$ Value	$ Benefit
Sightseeing	20	$ 0.65	$ 0.130
Fishing	6	1.20	0.072
Camping	7	1.40	0.098
Hunting	4	2.50	0.100
Swimming and Picnicking	50	1.50	0.750
Power Boating	9	1.50	0.135
Sailing and Canoeing	3	1.50	0.045
Hiking and Nature Study	1	2.00	0.020
Total	100		$ 1.350

* E E Q Supplement, p. 15.

This distribution together with assumed values of the day of each activity produce a weighted average daily value of $1.35. It will be noted that 4 percent of total visitation is ascribed to hunting days, each day valued at $2.50. Since about 4.2 million visitors are expected, according to the Corps, this implies more than 168,000 hunting days annually. However, it has been widely reported that expected hunter days are far less than this number. The most recent estimate is about 32,000 hunter days.[14] Reducing the number of hunter days to this figure, reduces the weighted value of the visitor day by five cents if the excess hunters are placed in the sightseeing category. We assume that the value of a recreation day is $1.30

Recreation Losses Due to Extreme Drought Effects

According to the E E O Report submitted by the Corps, a severe drought comparable to that which occurred during five and one-half years between 1962 and 1967 can be expected to occur once in fifty years. "In the event of a recurrence of a serious drought, the water supply requirements of the populous northeastern region served by this project dictates that this lake will be drawn down for water supply purposes to an extent that its recreational use will be curtailed."[15] A year of extreme drought will reduce the elevation of the pool to 356 feet reducing the upriver end of the lake to 22.7 miles above the Tocks Island Dam and exposing 8,845 acres of shoreline, more than twice the amount exposed in a normal year.[16] The effect of this dramatic drawdown both on the magnitude of annual visitation and on the value of a recreation day during a period of severe drought has not been adequately considered. We have arbitrarily assumed that a severe drought will reduce the value of annual recreation benefits during a five-year period by 40 percent. A drawdown of this magnitude is not likely to attract sightseers which comprise 20 percent of total visitation, nor is a

reservoir under these conditions likely to attract intensive beach use which, we emphasize, comprises 85 percent of the design load facilities. If the extreme drought occurs during the mid-point of the project's fifty year life, the annualized value of the extreme drought effect amounts to about 142 thousand dollars.

Summary

The table below summarizes the revised recreation benefits in this section. Limiting our analysis to only those facilities which Congress has authorized and using the Corps formula for converting design load to expected annual attendance, reduces annual recreation benefits from the Corps' reported 11.7 million dollars to about 5 million dollars. The value is further reduced by 6 percent or about 305 thousand dollars to account for losses due to rainy and cold weather at this beach resort. Our estimated value of recreation days foregone because of the project is 240,500 dollars. Finally, adjusting for the effects that drought has on reducing the demand for recreation as explained in the text yields a final revised annual recreation benefit of 4.4 million dollars.

TABLE 4

REVISED ANNUAL RECREATION BENEFITS

	Dollars	Millions of Dollars
Basic Gross Annual Recreation Benefit		5.096
Loss Due to Rainy and Cold Weather	$ 305,500	
Value of Recreation Days Foregone	$ 240,500	
Adjust Gross Annual Recreation Benefit		4.550
Loss Due to Extreme Drought Effects	$142,500	
Gross Annual Recreation Benefit		4.408

ANNUAL FLOOD CONTROL BENEFITS

Annual flood control benefits are equivalent to the reduction in damages achieved by containing peak flood flows in the Tocks Island reservoir. Damage categories include residential, commercial, industrial, utilities, and transport. Additionally, the greater flood control protection occasioned by the construction of Tocks will encourage the protected land to be put to higher value uses. This is called a land enhancement benefit. Annual flood control benefits are estimated by the Corps to amount to 2.194 million dollars throughout the life of the project.[17] This is an inflated estimate for six reasons. First, in the above reference, flood control storage is said to be 323,500 acre feet[18], but at this level of storage, annual flood control benefits are 1.982 million dollars according to the Corps.[19] The 2.194 million dollar figure occurs only if a storage level of 394,300 acre feet is provided.

Second, land enhancement benefits are not national benefits. Land enhancement occurs when productive activities shift from one location to another. If it can be argued that a move to a better location increases the value of that location, it must also be argued that that move away from another location decreases the value of that location. In other words, while the flood plain may gain, the neighboring uplands or other regions in the United States lose. Thus the 93 thousand dollar annual enhancement benefit is a gross benefit from which losses in other areas must be deducted. Only the incremental gain can be attributed to the project. Nowhere does one find a careful explanation of which parcels of land will receive enhanced activities and nowhere is there a clear description about which particular economic activities will relocate. Thus there is little basis on which to build a revised estimate. We arbitrarily set the revised figure at 10 percent of the original estimate. Since the amounts involved are trivial in magnitude, less than one percent

of annual benefits, the essential point of this discussion is that the Corps' procedure in question produces an inflated estimate of enhanced benefits.

Third, one component of the commercial damages category is loss of sales or services as a result of the floods. Surely this is not a valid measure of a national loss. If, because of the flood, a new car dealer does not sell a car at the time of the flood, the customer may purchase that same car after the flood from the same dealer. Alternatively, the car may be purchased from another dealer outside the flood plain. In each case there are no national losses. What one dealer loses, another gains or what a dealer loses today he gains later.

Loss of sales is not a valid measure of economic loss. Only the loss of value added by the enterprise in question should be counted in the event of truly lost sales. If a bread truck does not deliver the baked goods because it cannot get to the store and the bread is neither bought at that store or another store, only the foregone profits on the bread should be counted as a loss since foregone employee wages due to the flood have been accounted for elsewhere. Again, lack of detail in the Corps reports makes it difficult to revise the states figures. Commercial damages are said to be 17.3 million dollars out of total damages amounting to 95.6 million dollars or about 18 percent, but loss of sales is only one component of the commercial damages. We arbitrarily assume that commercial damages should be revised downward by 10 percent resulting in a reduction of total damages of 1.8 percent.

Fourth, as a consequence of constructing Tocks Island project, development in the flood plain will grow faster than if Tocks Island had not been built. The Weston study states that "The Tocks Island region of the Delaware river basin is experiencing rapid economic development, in large part due to the two federal projects, the Tocks Island Reservoir and DWGNRA."[20] The same conclusion is reached in the E E O Report.[21] Thus while Tocks may decrease flood damages occurring to existing development, it causes damages to that development which occurs because of the existence of Tocks.

This is a cost of the project which the Corps did not estimate. Nevertheless, it is a true national loss which can be avoided only if 100 percent flood protection is provided at all times. We simply note but do not attempt to estimate the actual cost of this factor. It is the responsibility of the Corps to rectify this omission.

Table 5 below summarizes the revised estimate of annual flood control benefits.

TABLE 5

FLOOD CONTROL BENEFITS*

CORPS

323,500 A.f Storage

1968 prices

Annual Damage Reduction	1.888
Annual Enhancement	.093
Total Flood Control Benefits	1.982

REVISED FLOOD CONTROL BENEFITS

Annual Damage Reduction	1.854
Annual Enhancement	.009
Total Flood Control Benefits	1.863
Total Flood Control Benefits 1970 prices	2.241

* See text for references.

Fifth, Table 6 indicates that the damage per residential property by the August 1955 flood was more than 2,800 dollars. There is no inexpensive way to check this figure which seems high. In any event, the procedure for estimating flood control benefits assumes that having apparently suffered these substantial damages, owners do not learn and will, in the absence of the project, simply rebuild the same structures in the flood plain. If this assumption is not true then annual damages to existing development in the next 100 years cannot be as large as is claimed, so damage reduction flood control benefits cannot be as large as is claimed. Alternatively stated, the actual techniques used by the Corps to estimate flood control benefits assume that individuals and corporations are incapable of learning about the economic hazards incurred by locating in the flood plain over the duration of 100 years despite the fact that they repeatedly suffer severe damage and that alternative public responses to this state of affairs--flood proofing, flood plain zoning, flood plain insurance--will not occur for the next century. We think these are curious assumptions to make and emphasize that if people do learn at all from experience, or, if public agencies would, in the absence of the project, make any effort to protect prospective flood plain inhabitants from incurring severe losses, then the Corps again has overestimated the annual flood control benefit.

Finally, according to Mr. Edward Rogers and Dr. Leo Eisel, the U.S. Geological Survey has determined that the most severe flood of record which occurred in August, 1955 was a once in 200 year flood not a once in 90 year event.[22] This change has the effect of stretching out over 200 years the estimated damage reduction the Corps claims occurs in 90 years. The numerical estimate of revised annual flood control benefits have not been adjusted to reflect the changed probability of occurrence of the 1955 flood. A rough consequence of such a change would be to halve the annual flood control benefits.

TABLE 6

RESIDENTIAL DAMAGES - AUGUST, 1955 FLOOD
OF THE DELAWARE RIVER *

Location	No. of Residential Properties Inundated	Tangible Residential Damages	Damage per Residential Property
Easton, Pa.	237	$ 436,300	$ 1,841
Phillipsburg, N.J.	32	33,800	1,056
Riegelsville, Pa.	134	269,300	2.010
New Hope, Pa.	146	229,700	1,573
Yardley, Pa.	223	794,600	3,563
Trenton, N.J.	358	1,399,800	3,910
Total	1,130	$3,163,500	$ 2,800

* House Document No. 522, Vol. III, Tables 1, 4.

POWER COSTS AND BENEFITS

The hydroelectric facilities at the authorized project will have an installed capacity of 70,000 kilowatts which will provide about 307 million kilowatt hours annually. The values of the energy and capacity were based on the cost of a privately-financed thermal alternative specified by the Federal Power Commission. Under some circumstances the values provided by the FPC are legitimate measures of power benefits. In the instance of Tocks, the use of such values by the Corps violates the procedures specified in Senate Document No. 97. For a purpose to be included in a project it must satisfy the following economic criterion: "There is no more economical means,. . .of accomplishing the same purpose. . .which would be precluded from development if the plan were undertaken."[23]

Jersey Central Power and Light Company proposed a plan which "produces essentially the same power and energy," for an investment cost of 7 million dollars, an amount 20 million dollars less than that proposed by the Corps.[24] Since the proposal by the Corps is not the least cost power alternative, it should be excluded from the project. This reduces the investment cost of the project by 27 million dollars at a 1968 price level. The annual power benefits are reduced to 1 million dollars, the amount the private utilities have agreed to pay for the right to generate energy from water developed at Tocks Island.

WATER SUPPLY BENEFITS

Recent annual water supply benefits have been variously estimated to range between 8 million dollars and 6.8 million dollars.[25] These benefits are based on the cost of providing equivalent water supply storage of 425,600 acre feet in a single purpose water supply reservoir at Tocks Island or Wallpack Bend.[26] However, these are not the least cost practical alternative sources of added water supply and for this reason the annual water supply benefits have been overestimated.

The Freeman, Mills and Kinsman study indicates that the least cost alternative water supply for northeastern New Jersey can be obtained by the use of high flow skimming, utilizing the off-stream Round Valley storage reservoir.[27] High flow skimming, as its name implies, entails withdrawing from the river, in this case the South Branch of the Raritan River, more than monthly requirements during high flow months, and storing the excess supply in the Round Valley reservoir. Freeman and his co-authors estimate that the economic cost of utilizing the excess storage in Round Valley is about 1/2 to 1 cent per thousand gallons in 1969 prices. The higher figure is equal to the Corps' estimate of the cost of water supply at Tocks Island based on 1970 prices.[28]

For purposes of this analysis, the highest cost estimate is doubled yielding an annual cost of 2.78 million dollars for 425,600 acre-feet annually. We accept the conclusion reached in the Freeman et al, study that the Tocks Island project does not serve an economically useful purpose of low flow augmentation. The Beltzville Dam guarantees a low flow of at least 2,700 cfs at Trenton. Also, we accept the conclusion that incremental waste treatment facilities can reduce pollution concentrations more cheaply than Tocks can.[29]

In summary, the annual water supply benefits are limited by the cost of the alternative or 2.78 million dollars.

ECONOMIC LOSSES

The Corps has a project cost category called "Economic Losses" which refers to the difference between the expected economic return from land privately owned and an implicit annual return when used in the Tocks Island project. The Corps assumes that the private rate of return on land is 6 percent. According to the Corps' calculations, based on a 1968 price level, economic losses amount to 937 thousand dollars annually. This is a substantial cost category amounting to about 9 percent of annual costs, yet the Corps does not substantiate its choice of a 6 percent private rate of return on land. Clearly this rate of return is too low for the private sector. Today one can purchase virtually riskless assets such as Treasury Bonds yielding better than 6 percent. The correct rate of interest used to estimate economic losses should include a risk premium. We assume that the private rate of return on land is 10 percent, ascribing to a risk premium of less than 4 percent.

There are no handy reference books one turns to for an estimate of the risk premium for a given investment. Our estimate was guided by the discussion of interest rates and risk by Hirshleifer and his co-workers who calculated the risk premium to be about 4.04 percent.[30] Rather than debate whether the private rate of return is 6, 10 or 15 percent, the Corps should have made and should now make a careful study of this economic problem which contributes so significantly to project annual costs.

Evaluated at a 10 percent private rate of return and a project discount rate of 5-3/8 percent, the estimated annual economic loss is 2.89 million dollars for the 50 year project based on a 1970 price level.

TOCKS ISLAND ANNUAL BENEFITS AND COSTS

In Table 7, the revised annual benefits and costs for the Tocks Island project are summarized. The revised evaluation assumes a 50-year life, 5-3/8 percent interest and assumes a 1970 price level, whereas the Corps has presented its analysis in the EEO Report and EEO Supplement assuming a 100-year life, 3-1/8 percent interest and assumes a 1968 price level. A shorter project life is chosen in accordance with Senate Resolution 281 which requires that plans for water resource projects recommended for authorization should include the following information:[31] "(3) Benefit-cost ratios calculated by using total tangible benefits and total tangible costs for 100 years and for 50 years, except where the economic life of the major project facility is less." The shorter life is the more sensible basis for making analysis in as much as we believe that private utilities do not use a longer period for comparable investments. An interest rate of 5-3/8 percent is used because there is no economic justification for judging this project on the basis of a 3-1/8 percent interest rate when other prospective federal projects considered today must pass a gauntlet of 5-3/8 percent. Why spend tax payers' money on a low yield project when it means excluding a higher yield project?

Each revised benefit and cost category has been discussed in earlier sections except for "interest during construction," an insignificant cost category and the annual cost of waste treatment." In this analysis, it has been assumed that it takes 10 years to complete the project whereas the Corps assumed that it takes 7 years. We do not doubt that it is physically possible to construct the Tocks Island project in 7 years. We do doubt that it is fiscally likely in view of the present (1971) intent of the President and Congress to reduce inflation, achieved,

in part, by slowing up expenditures on public works. Extending the period of construction increases annual cost slightly.

According to the Corps' Design Memorandum No. 3, the investment cost of the sewage system for the four major recreation sites is about 1.6 million dollars (1968 prices).[32] In contrast, the investment cost for liquid waste treatment designed to service DWGNRA is 25.1 million dollars according to the Weston study.[33] Since the Weston study assumes visitation of 10 million[34] and our estimate for the water related facilities is 39 percent of this, the capital cost is reduced accordingly to 9.84 million dollars. Readers will note that the Weston figure is more than six times larger than the Corps' cost of waste treatment.

The annualized difference between the two estimates is 568 thousand dollars and represents an underestimate of the true annual cost of waste treatment. If the investment cost is underestimated by a factor of six, there is reason to believe that the operation, maintenance and replacement expenses also have been underestimated. The Corps has not presented the expenditure categories in sufficient detail to make the necessary adjustment. The estimates in this analysis do not account for the cost of solid waste disposal, cost of diluting the treated effluent, the fair share of the recommended surveillance program, nor the cost of mitigating the potential problem of eutrophication in the reservoir should it occur.[35]

In summary, the Tocks Island project has a benefit-cost ratio of .6 to 1. For every dollar taxpayers spend on this project we expect project beneficiaries will receive 60 cents in return. The project is not economically feasible and should not be built. For purposes of comparison, the Corps' latest summary of the project is presented in Table 8. The Corps' estimate that the benefit-cost

ratio is 1.9 to 1. Only this figure and the annual benefits were given in the referense so a breakdown of annual costs cannot be made.

The results of our analysis applied to a range of interest rates in combination with either a 50-year or 100-year planning period are summarized in Table 9. The Tocks Island project is not economically feasible at any relevant interest rate. Naturally, the project looks best evaluated at a 3-1/8 percent rate of interest and a 100-year life, yet this alternative is only a slight improvement over the first case discussed--5-3/8 percent, 50-years--largely because annual economic losses rise rapidly as the interest rate falls.

TABLE 7

TOCKS ISLAND REVISED ANNUAL BENEFITS AND COSTS

5-3/8 percent interest
50-year life
1970 prices
Million Dollars

Revised Project Annual Benefits	
Recreation	4.408
Power	1.000
Water Supply	2.780
Flood Control	2.241
Total	10.439
Revised Project Annual Costs	
Basic Investment Cost	13.278
Added Amortized Investment for Recreation Facilities	1.780
Added Amortized Investment for Waste Treatment	.568
Economic Losses	2.890
Interest Cost During Construction	.036
Adjusted Operation and Maintenance Expenses	1.231
Adjusted Replacement Expenses	.543
Fish and Wildlife Losses	.500
Total Annual Cost	20.826
Benefit/Cost Ratio	.5/1

TABLE 8

CORPS ESTIMATES

TOCKS ISLAND ANNUAL BENEFITS AND COSTS[1]

3-1/8 percent interest
100-year life
1970 prices
Million Dollars

Project Benefits	
Recreation	11.708
Power	2.678
Water Supply	7.929
Flood Control	2.505
Total	24.820
Project Cost[2]	12.780
Benefit/Cost Ratio	1.9/1

1) Fiscal Year 1972 Appropriations Hearings, op. cit.

2) Annual project cost is estimated from a stated project B/C ratio of 1.9/1 and stated annual benefits. According to EEO Supplement, Table C-3, annual costs are:

	Million Dollars
Interest and Amortization	8.467
Operation and Maintenance	1.800
Replacements	.371
Economic Losses	.937
Total	11.575

Annual Benefits, 1968 prices, are 23.838 million dollars according to the same source.

TABLE 9

TOCKS ISLAND PROJECT REVISED ANNUAL BENEFITS AND COSTS

Million Dollars, 1970 Prices

	8% Interest 50 years	3-1/8% Interest 100 years	5-3/8% Interest 50 years	8% Interest 100 years	10% Interest 100 years	3-1/8% Interest 50 years
Recreation	4.408	4.408	4.408	4.408	4.408	4.408
Power	1.000	1.000	1.000	1.000	1.000	1.000
Water Supply	2.780	2.780	2.780	2.780	2.780	2.780
Flood Control	2.241	2.241	2.241	2.241	2.241	2.241
Total	10.149	10.149	10.149	10.149	10.149	10.149
Annualized Unadjusted Investment Cost	18.709	7.511	12.375	18.328	22.902	7.763
Annualized Interest & Cost During Construction	.075	.012	.033	.073	.114	.012
O & M Expenses	1.231	1.231	1.231	1.231	1.231	1.231
Replacements	.543	.543	.543	.543	.543	.543
Economic Losses	1.210	4.502	3.090	1.344	.000	4.435
Fish and Wildlife Losses	.500	.500	.500	.500	.500	.500
Added Annual Waste Treatment Cost	.498	.641	.580	.504	.445	.639
Added Recreation Investment Amortized	2.524	1.016	1.662	2.463	3.078	1.044
Total	25.290	15.956	20.014	24.986	28.813	16.167
B/C Ratio	.4/1	.6/1	.5/1	.4/1	.4/1	.6/1

FOOTNOTES

1. Xeroxed material given to Gardner Brown, Jr. by the U.S. Corps of Engineers, New York City Office and labeled by that office, "FY 72 Public Works Appropriations Hearings," p. 1040.

2. U.S., General Accounting Office, Review of Tocks Island Reservoir Project, Report to U.S. Senate, Subcommittee on Public Works, Committee on Appropriations, 1969, p. 16.

3. Ibid.

4. U.S., Army Corps of Engineers, Delaware River Basin, Tocks Island Reservoir, Pennsylvania, New Jersey, New York, Design Memorandum No. 3., Vol. 1, August 1969, Table V-3. Hereafter cited as: General Design Memorandum No. 3.

5. It can be argued that the first week in September (which the Pennsylvania study omitted) should be added in to give the Corps' original estimate. We argue that the weekdays in June prior to the days of school vacation should be omitted because these are not part of the normal recreation season. Time series observations for any arbitrarily chosen park will corroborate this assumption.

6. Estimate based on data for June, July and August contained in U.S. Department of Commerce, ESSA, Climatological Data.

7. According to U.S. Army Engineers, Additional Data in Support of Statement Facts, Delaware River Basin Tocks Island Lake, hereinafter cited as EEO Supplement, the investment cost of recreation facilities is 14,190,000 dollars, Table C-4. Xeroxed working sheets supplied by the New York Office of the Corps present the following information:

Recreation Facilities	Dollars
Sandyston Area	4,759,000
Van Campers Area	2,401,000
Dingman Creek Area	2,751,000
The Cliffs Area	4,029,000
Facilities at the Dam	250,000
	14,190,000

8. U.S., Delaware River Basin, New York, New Jersey, Pennsylvania and Delaware, House Document No. 522, 87 Cong., 2nd Sess., Vol. II, Appendix W, W-39.

9. Gardner Brown, Jr., "Pricing Seasonal Recreational Services," Western Economic Journal, 9 (June 1971).

10. Corps, EEO Supplement, 12, 14.

11. Table V-2.

12. U.S. Corps of Army Enginners, Tocks Island Lake Development: A Comprehensive Evaluation of Environmental Quality, (Philadelphia, 1971), p. I. Hereafter cited as: EEO Report.

13. U.S., Congress, House, Subcommittee of the Committee on Appropriations, Public Works for Water, Pollution Control, and Power Development and Atomic Energy Commission Appropriation Bill, Part I, 91st Cong., 2nd Sess., 1971, 289.

14. EEQ Report, Table 2-5.

15. Ibid, 1-11, 2-3.

16. U.S., Congress, House, Subcommittee of the Committee on Appropriations, Public Works for Water, Pollution Control, and Power Development and Atomic Energy Commission Appropriation Bill, Part IV, 91st. Cong., 2nd Sess., 1971, 499.

17. EEQ Supplement, Table C Series.

18. Ibid., 14.

19. General Design Memorandum No. 3, Supplement, Table E-6.

20. Roy Weston, Tocks Island Region Environmental Study (West Chester, Pennsylvania, April 1970), p. 1.

21. EEQ Report, 3-13.

22. See letter from Mr. Edward Rogers and Dr. Leo Eisel to Mr. Ralph Abele, Executive Secretary, Joint Legislative Air and Water Pollution Control and Conservation Committee, Harrisburg, Pennsylvania, November 18, 1971.

23. U.S., Congress, Senate, Policies, Standards and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources, Document No. 97, 87th Cong., 2nd Sess., 1962, p. 8.

24. Jersey Central Power & Light Company, et al, Third Amendment and Supplement to Application Approved August 1962, DRBC Docket No. D-62-2, for Approval of Kittatinny Mountain Project, March 1971, p. 2.

25. Fiscal Year 72 Public Works Appropriations Hearings, p. 1040; and EEQ Supplement, [illegible].

26. EEQ Supplement, pp. B-8, B-14.

27. Smith Freeman, Edwin Mills, David Kinsman, "Water Supply and the Tocks Island Dam," unpublished report, 1971.

28. U.S. Congressional Record, 93rd Congress, 1st. Sess., H4167.

29. Smith Freeman, et al.

30. Jack Hirshleifer, J. De Haven and J. Milliman, Water Supply (Chicago, 1960). In their discussion of public utilities they determined the riskless rate to be 4.25 percent (p. 144) and the interest rate excluding tax effects to be 8.29 percent (p. 146), which yields a risk premium of 4.04 percent. Although the numberical values can shift up and down, the real risk premiums should be stable throughout a decade in the absence of wars and plagues. The risk associated with public utility investment should not be smaller than the risk associated with property ownership. From another vantage point, it may be noted that the Wall Street Journal had an advertisement for debentures of the Cedar-Riverside Land Company guaranteed by the U.S. Government, yielding 7.2 percent for purchase at a price of 100 percent, December 10, 1971, 15.

31. U.S. Congress, Senate, Miscellaneous Reports on Public Bills, IV, Senate Reports, Report No. 1154, 85th Cong., 1st Sess., 1957, 5.

32. Design Memorandum No. 3, pp. VIII-40 - VIII-43.

33. Roy Weston, op. cit., V. 2, Table M-5. This is the cost of Alternative III, the one recommended for adoption. See p. 14.

34. Ibid., p. 1.

35. See Appendix N, "Eutrophication Analysis of the Tocks Island Reservoir," in the Roy Weston Study for further discussion of the eutrophication problem.

GARDNER M. BROWN, JR. OCT. 1978

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WATERFOWL AND WETLANDS: TOWARD BIO-ECONOMIC ANALYSIS. With Judd Hammack. (Johns Hopkins Press, 1974).

CLEANING UP EUROPE'S WATERS: ECONOMICS, MANAGEMENT, POLICIES. With Ralph Johnson. (Praeger Publishers, 1976).

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"The Substitutability of Natural Resources for Other Factors of Production."

"The Economic Value of Genetic Reservoirs"

"The Estimated Value of Non-Consumptive Uses of Wildlife"

"Hedonic Estimates of Wildlife Values"

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State of Washington Water Research Center	1975
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University of Washington Correspondence

INTERDEPARTMENTAL

Mr Mark Wilton

I've found several studies I did in the past and could dredge up two more if necessary for you to see.

Sincerely

Gardner Brown Jr

Mark

TESTIMONY ON THE SUSITNA HYDROELECTRIC PROJECT BEFORE THE ALASKA STATE SENATE.

By Borough Assemblymember Kevin A. Harun
Fairbanks, Alaska
March 7, 1980

The Susitna hydro project is at best a stopgap measure and at worse a catalyst for the same inefficiencies and wastes of our present power generation system.

The Interior is faced with two crucial dilemmas: 1) the high cost of electricity poses a terrible burden upon the public and 2) although coal has high potential for power generation in the Interior, we have environmental and/or inflationary cost problems associated with fossil fuel generation.

Clearly, we've got to take action to help Interior citizens. We've got to help wean people off fossil fuels and find suitable substitutes. Hydropower is most definitely one piece needed to complete the energy puzzle. Susitna, however, in itself is the wrong project at the wrong time. Also, commencement of this project without looking at the root cause of our energy problems is comparable to stepping on an accelerator without possessing a steering wheel.

First off, we're in the midst of a "consumption crisis", not an "energy crisis". Even though we as a state are flush with excess billions and seemingly countless energy resources, the energy supply is not limitless, and its utilization is not without high lifestyle costs. The root of the problem is that we as Alaskans have a great inefficiency and waste in our utilization of electric power. The average Alaskan's consumption of electricity is high when compared with the average American's, which is twice as high as the West German's per capita consumption. West Germany, I'll remind you, is a leading industrial nation far from having a low standard of living. West Germany in turn has roughly twice the per capita consumption of New Zealand, which could hardly be considered an impoverished nation. One fact we all should learn is that our standard of living is not dependent upon how much net energy we produce, but rather upon how efficiently we consume what we produce.

Our energy efficiency in Interior Alaska is in a shambles. We have constructed public white elephants which radiate heat at 40 below. Meanwhile, our citizens are forced to bear the brunt of poorly insulated homes, antiquated heating systems, and poorly manage utilities which result in high electricity bills.

The Susitna project is touted as a panacea which will enable citizens to unplug from dirty, inflationary fossil fuel and plug into reasonably cheap, inflation-proof hydro. In actuality, Susitna won't solve the inefficiency and waste problem which is the root cause of the dilemma. Rather, it will exacerbate these inefficiencies by conning the public and industry into believing that there is no need to convert and conserve. Also, it could result in the development of energy intensive infrastructures which result in further demand, requiring further large scale projects. It's the same scenario of dependency as anywhere else in the lower 48, and it's about

time we woke up to the fact that we're merely repeating mistakes made elsewhere. Ultimately, we've got to realize that we cannot produce our way out of a consumption crisis.

Looking at Susitna: even if one assumes the Corps of Engineers dubious predictions that our net energy consumption in the Interior will increase 10 times in 15 years, there is then going to have to be a heck of a lot of new capitalization between now and the time Susitna comes on line (merely to meet this projected demand). If this capitalization takes place, how are our local utilities going to be able to plug into Susitna when they're still tied to paying off the other capitalization? This raises the question, who will actually utilize and benefit from the project? It's very questionable whether the public ever will.

Incidentally, as a footnote, percapita consumption has been declining over the past few years in Fairbanks. Fairbanks' top energy consumption this winter has been approximately 100 megawatts. Susitna would provide two increments of 750megawatts each for a total output of 1500 megawatts. I should mention that during the non-peak summer months that the Fairbanks area consumes only 30+ megawatts. Susitna is the largest hydro project proposed by the U.S. Army Corps of Engineers, though larger projects have been constructed by other federal agencies.

Susitna does have the advantage of being inflation-proof, but this advantage accrues to any hydro project, not just Susitna. Which brings me to my final point: There is an alternative to placing the public and consumer at the mercy of one centralized bureaucracy. There is an alternative which could truely increase community and individual self-reliance.

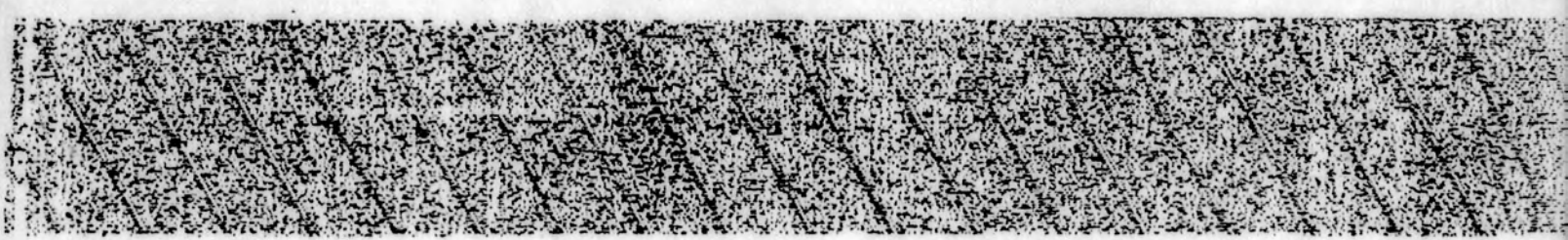
The alternative: 1) The development of regional hydro projects which have a lower megawatt capacity, which result in less centralization, which can be brought on line in less time, at less cost, in smaller increments as needed. The Corps has identified 64 potential regional hydro sites many of which are promising and of a more appropriate scale than Susitna. The Chakachamna site for example, appears to be an ideal smaller hydro site, producing roughly one quarter of the output of Susitna and being ideally situated near the Beluga coal region.

2) Most importantly as an alternative: A committment to a massive program of energy retrofits of public buildings, homes etc. Specifically, the state should set an example in its own public buildings. Studies have shown it is much cheaper to produce a kilowatt through conservation than through new power generation. Conservation does not mean hardship and/or turning out the lights and turning down the thermostats. It means giving people the appropriate technology to become less dependent on utilities such as GVEA. Specifically: insulation, shutters, retrofits of electric water heaters, cogeneration, use of waste heat etc. It means giving the public the tools to cope with the impending national consumption crisis which government cannot ultimately save us from.

There are other benefits from this more decentralized approach to power development. Imagine all the local employment and construction we could create if we pumped even one-half of the four billion cost of Susitna into energy retrofits, and the other half into more appropriately scaled projects.

Clearly, we've got to take action to help relieve the public of these utility burdens. I look to the State legislature to provide a solution addressing the root causes of the dilemma, rather than postponing the day of realization.

The views expressed herein represent my personal views and do not represent an official position by the Fairbanks North Star Borough.



Fairbanks Environmental Center
218 DRIVEWAY
FAIRBANKS, ALASKA 99701
(907) 452-5021

February 29, 1980

Dear Mark,

Please find enclosed the oral version of the testimony I gave to the Senate Resources Committee in Anchorage. I am in the process of completing detailed written testimony to be submitted to the same committee and will also send you a copy.

I am also preparing arguments against the funding of the Anchorage/Fairbanks Intertie until the decision of the Susitna Hydro project is made. I feel the theoretical advantages of this intertie are not justified. This is based on my conclusion that the main benefit of replacing oil generation with gas generation will be null and void with the new coal and waste-heat capacity that could come on line in the next couple of years. When you consider that with the U. of Ak. 10 MW turbine, the possibility of utility use of military generation and funding of the waste-heat project will ensure that GVEA could have at least 60 MW of non-oil generation capacity alot sooner then the Intertie. Am I full of shit on this? I will send you the completed arguments next week(by 3/7/80).

Thanks,

Jeff

Fairbanks Environmental Center

218 DRIVEWAY
FAIRBANKS, ALASKA 99701
(907) 452-5021

16 February 1980

TO: Honorable Committee Members of the Senate Resources Committee

FROM: Jeff Weltzin

RE: S.B. 294, 295 & 385

Recent debate on the energy future of Alaska's railbelt area has mainly focused on the proposed Devil Canyon Upper Susitna Hydro-electric Project. The proponents of this project voice its many advantages which when viewed in retrospect seem to be the attributes of all hydro developments in general and not just the Susitna Hydro Project.

The benefits of the Susitna Hydro Project have been well publicized, but its many impacts on downstream fisheries, wildlife habitat, the Alaskan lifestyle and the State's economy have received little study or public exposure.

The railbelt area of Alaska is energy-rich. There are numerous potential hydro sites within it. Many coal deposits with the most noticeable being the Healy fields and the Beluga fields just southwest of Anchorage. Geothermal, wind, natural gas, solar, tidal and conservation energy round out a most amazing variety of energy resources available to the railbelt area.

The most evident conclusion is that we have great flexibility in choosing energy resources to be developed. This flexibility could allow us to evaluate the benefits and costs and choose energy developments that minimize social and environmental effects while still meeting our need for electrical energy.

Which then brings us to the Fairbanks Environmental Center's main objection to S.B. 294, 295 & 385. These bills make a mockery of any rational decision-making process to choose the best energy sources for the railbelt area. Instead, this proposed legislation totally usurps the feasibility study process and reduces this whole process to the traditional methods used for most hydro in the lower 48. It's called "pork barrel" or sometimes "whole hog".

We at F.E.C. cannot understand why these bills were introduced at this time when it is quite evident that the feasibility study process which has just begun, has been designed to take the shortest amount of time possible. If the intention of these bills is to force negligence of this project's potential problems, then we would have no choice but to oppose in any way possible progress of this project until all the potential impacts have been adequately addressed.

A review of this project's potential impacts show that the Susitna River is the highest producing river contributing to the Cook Inlet salmon fisheries. In the winter the Susitna River runs clear, allowing juvenile salmon to leave the de-watered tributaries and sloughs and rear in the main channels. Fish and Game has stated that the proposed dams would ensure year-round siltations of the main channels and regulated flow rates that could produce potential dramatic adverse effects on salmon production.

The Susitna basin,bordered by the Parks, Denali and Richardson highways, is one of the last major hunting areas where a hunter does not need to charter a plane to hunt. In 1979, 5600 hunters applied to hunt caribou in this area. Twenty-three percent of last year's statewide moose take occurred in this area. The proposed permanent access from both the Parks and Denali highways,plus the transmission line corridor and eighty-two miles of flooded river basin, could have large impacts on this, the State's most heavily hunted region.

The active Susitna fault goes right through the middle of the proposed Susitna hydro project. Five moderate earthquakes and many smaller ones occurred along this fault in the last six years. Many more earthquakes have been registered along the major Denali fault, which lies within 40 miles of the dam sites. Compounding this problem is the filling of reservoirs, which often induces earthquakes, sometimes of large magnitude. With the proposed Susitna reservoirs lying on either side of the active fault, the situation here could be particularly dangerous.

Since 1975 Fairbanksans have showed a very positive response to the energy crisis. For the last four years, Golden Valley Electric Association's per customer rate of electrical consumption has been decreasing at 14.5% per year. Because of this, GVEA will not need any new generation until after 1990. This trend clearly shows that the tremendous electrical growth projections used to justify the Susitna project are already off 42% to 58% for projected 1980. The Alaska Power Administration's "Upper Susitna River Project Power Market Analysis" projected peak demand for 1980 to be between 142 MW and 158 MW, while the latest actual figures from Fairbanks' utilities show a demand of only 100 MW.

The overestimation of future needs show that the justification for Susitna Hydro is still an important question.

These potential adverse impacts and uncertainties, plus the project's enormous price tag,mandate a much more careful look than allowed by S.B. 294 & 295.

There is no need for the Anchorage/Fairbanks Intertie in the next ten years. The theoretical advantages of this intertie which would occur before the start-up of the Susitna project are very marginal. If the advantages of reserve-capacity sharing and the replacement of cheaper natural gas generation for more expensive production were very substantial, the utilities would have proposed

this action years ago. Clearly, the intent of S.B. 385 is to take a back-door approach to getting the Susitna project started before the study phase is finished.

Communities along the corridor will not be able to hook-up to this express transmission line because of the .5 to .75 million dollar per sub-station cost - the only benefit of this proposal would be to Fairbanks. Fairbanks could replace 34 MW of peak oil-generated capacity with cheaper Anchorage capacity. No studies have been done to show that Anchorage utilities will indeed have the excess capacity on a regular basis to even ensure that this benefit will occur.

A much more reliable alternative to replacing Fairbanks' expensive oil generation would be to take the proposed money for the Intertie and fund GVEA's proposed waste heat generation plans at Alyeska pump stations 7, 8, 9 & 10. If all four stations were built, they would provide 28 MW of inflation-proof capacity to Fairbanks.

The question of an intertie is premature. In light of the proposed extensive studies to be conducted by Acres American on this subject, it seems truly unwise to rush the intertie before we really know what is needed.

In conclusion, if the intent of this committee is to get Alaska on a renewable energy path and to avoid major social and environmental problems, we suggest the following actions:

1) Postpone action on S.B. 294, 295 & 385 until the feasibility studies to be conducted by Acres American are finished.

2) Fund or help GVEA fund their proposed waste-heat utilization project at pump stations 7, 8, 9 & 10.

3) Fund and direct the A.P.A. to begin preliminary feasibility studies of the Chakachatna River 60 miles S.W. of Anchorage. This potential hydro site could have a firm capacity of 300 to 400 MW and avoid the major environmental problems the Susitna project might have.

4) Fund and direct the A.P.A. to begin preliminary feasibility studies of hydro sites in the Interior region such as the Totatlanika River.

Honorable committee members, please do not eliminate the great flexibility we have in developing our energy resources. The environmental community strongly supports a renewable energy future for Alaska. We would support your efforts wholeheartedly if you choose other hydro sites for study along with the Susitna project. We have the time and tools to develop a model renewable power generation system for Alaska. But by reducing the decision-making process to a simplistic one, where Susitna hydro is the only answer to Alaska's energy needs, you will destroy this opportunity and produce polarization of Alaska's citizenship.

HOUSE POWER ALTERNATIVES
STUDY COMITTEE
610F GRUENING BUILDING
UNIVERSITY OF ALASKA
FAIRBANKS, ALASKA 99701
479-7692

November 21, 1979

Dear Consultants and Other Interested Parties:

The following is a schedule for consultant studies.

Deadline	Consultant	Task	Stage of Development
1979 Dec. 31	Arlon Tussing	Overall Review	Draft
1980 Jan. 1	Center for Policy Studies	Alternative Energy Source Potential	Draft
7	Center	Legislative Recommendations	
7	Energy Probe	ISER forecast critique	Preliminary Evaluation
15	Center	End-use	Draft
21	Brad Tuck	Demand Fore. Critique	Interim Report
31	Gregg Erickson	Natural Gas Report	Draft
Feb. 1	Center	End-use	Final
15	Center	Conservation Effect	Draft
15	Arlon Tussing	Overall Review	Final
Mar. 1	Center	Conservation	Final
1	Center	Railbelt map on Resource Potential	
1	Center	Intra-project report Alt. Energy Potential	Final
1	Center	Policy Implementation and Management	Draft
1	Brad Tuck	ISER Critique	Final
1	ISER	Demand Forecast	Draft
7	Gregg Erickson	Natural Gas Report	Final
Apr. 1	Center	Policy Implementation and Management	Final
1	Energy Probe	Sensitivity Analysis on Elect. Demand	
May 1	Energy Probe	Demand Critique	Final
15	ISER	Demand Forecast	Final

Enclosed are mailing labels for all the consultants and other people who should be kept informed of the progress of the Committee. Any reports submitted (draft or final) should be mailed to all.

Sincerely,

Glenda J. Strawder