

LEG. FINANCE - BILLS 1979 - 1980 1252

SB. 63 cont. , 1252

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF-STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

February 12, 1979

MEMORANDUM

TO: Representative Ernie Haugen
House Finance Committee

FROM: *[Signature]* Logan, Director
Legislative Finance Division

SUBJECT: RRDF Appropriations

The following list sets out the FY 79 projects funded by appropriations from the Renewable Resources Development Fund:

NATURAL RESOURCES

Big Delta Agricultural Development Project	Ch. 171	\$4,793,000
Cadastral Land Surveying (Homestead Act)	Ch. 113	\$2,027,400
Pilgrim Hot Springs Geothermal Project	Ch. 163	\$ 245,000
Agricultural Loan Fund	Ch. 113	\$ 200,000
		<u>\$7,265,400</u>

FISH AND GAME

Kodiak Shellfish Pots	Ch. 113	\$ 36,000
Tutka Lagoon Bunkhouse	"	100,000
East Creek Bunkhouse	"	150,000
Kenai Salmon Trap Study	"	50,000
Water Source Inventory	"	60,000
Arctic Inventory Airplane	"	75,000
Deer Mt. Hatchery Equipment	"	82,700
Hidden Falls Hydro Project	"	650,000
Beaver Falls Rearing Expansion	"	76,000
		<u>\$1,279,700</u>

Representative Ernie Haugen

February 8, 1979

REVENUE

Commercial Fish/Agriculture
Bank-fiscal note funding

Ch. 113
Ch. 159

\$2,000,000

\$2,000,000

\$10,545,100

JHH:pw

MEMORANDUM

Alison Farnan
Jay Hogan

TO: Senate Resources Committee

DATE: January 29, 1979

FILE NO:

TELEPHONE NO:

FROM: Bob Palmer *Bob Palmer*
Special Projects Coordinator
Office of the Governor

SUBJECT: Senate Bill 62 -
Supplementation Appropriation
for the Delta Barley Project

Here is additional back-up material for Senate Bill No. 62.

It was my understanding that this material had been submitted with the legislation, but apparently that was in error.

Attachment

Note:

The items for pesticide and herbicide research are included as a result of the Senate Resources Committee in their discussion of the bill at the hearing on January 26.

SENATE BILL NO. 62

Fiscal Note Information

Clearing

\$5,736,000

The \$2.7 million appropriated from SB 413 last year was earmarked for the first phase of the clearing of the tracts. This amount (\$5,36,000) is to complete the clearing, through final berm burning and clean-up. Use of the total \$8,436,000 is as follows:

Contract Administration \$200,000

Clearing Contracts
49,915 acres @ \$165 \$8,236,000

Contracts are administered through the Delta Project under the Office of the Governor, Special Projects Office. All costs will be returned to the State through already signed repayment agreements by the farmers.

Note: The acreage figure stated above is the best available estimate of acreage to be cleared. The performance contract calls for clearing of at least 90 percent of the Class II and Class III soils on each tract. Until more detailed soil surveys are completed, the exact acreage of Class II and Class III soils will not be known.

Road Construction

Eighteen miles of road to be constructed for farm access within the project, to Local Roads and Service Trails Specification, with a 12" gravel surface. Cost is estimated by the Department of Transportation at \$60,000 per mile, or \$1,080,000 for the project. Construction will be through DOT.

Test Marketing

\$900,000 for purchase of grain in 1979 for test marketing. This will enable purchase of 7,500 tons of barley and 500 tons of rapeseed. The purchase fund is returned when the purchased products are sold. Of the 7,500 tons of barley produced, approximately 2,500 tons will be of high quality and available for export sale if such sale is necessary to keep open export market channels. Eighty percent of the rapeseed will be exported, since there is no local market.

Administration

Salaries:		
	Pollock	\$41,820
	Carney	36,120
Fringe (25%):		19,485
Travel:		11,000 *
Other (Office and supplies):		<u>19,500</u>
TOTAL		\$127,925

Extension Service

\$63,178

Pays salary, travel, fringe and all related costs for a full-time farm extension agent for the Delta area. A contract with the U of A will be explored as a means of coordinating this program with their extension program.

Pesticide and
 Herbicide Research

Professional pesticide specialist (12 mos.)	\$31,900
Technician/Grade 12	19,500
Two months' clerical	2,700
Staff benefits	11,900
Travel, Contractual services	800
Commodities	1,000
Equipment, Pick-Up, Miscellaneous	8,500
TOTAL	<u>\$78,500</u>

Soil Testing

Extensive soil testing will be necessary to accurately determine the acreage of Class II and Class III soils and to measure soil nutrient availability as the Delta Junction farm soils change from permafrost to productive agricultural soils.

Commercial fertilizers will be the single largest annual operating expense. The rate and nutrient mix of the fertilizer application must be based on scientific evaluation of the existing soil fertility, not guesses.

Miscellaneous

a. Grain Conveyors \$10,000 each	\$20,000
b. Forage Cubing and Drying	22,000
c. Market Development Work	<u>43,200</u>
TOTAL	\$85,200

Explanation:

- a. Grain conveyors would be purchased to provide capability of handling grain in Delta for both local and export trade, and at the port to load vessels.
- b. To determine economic and technical parameters of use of existing and future heat sources, off grades of field crops, and other material to manufacture forage cubes and pellets.
- c. Market development. \$25,000 for market consultant and \$18,200 for the U of A, travel and State's contribution for a symposium next year. This amount may be matched by a Federal grant. The market consultant and U of A contracts include local and export market work, establishment of feed trials and coordination of market efforts with Federal agencies.

January 17, 1979

President of the Senate
Alaska State Legislature
Juneau, Alaska 99811

Dear Mr. President:

Under the authority of art. III, sec. 18, of the Alaska Constitution, I am transmitting a supplemental appropriation bill to provide the necessary funding to carry forward the Delta Agricultural Development Project. Since Phase I of the land clearing funded by Chapter 171 SLA 1978, is likely to be completed and Phase II begun before July 1, 1979, I am submitting this legislation in the form of a supplemental appropriation. Allocations in sec. 1 of the bill are as follows:

1. The \$5.736 million figure is an estimate based on the best available information.

2. Road construction costs are calculated on the basis of \$60,000 per mile (from the Department of Transportation, Fairbanks Office) times 18 miles.

3. The \$900,000 requested for test marketing of barley and rapeseed will be recaptured, except for the transportation cost from farm to tidewater, and returned to the General Fund.

4. Administration costs are as detailed. A staff person presently in the Department of Commerce and Economic Development would transfer to the Special Projects Office to assume operational management of the Delta Project. Another person has been hired as an elevator and marketing specialist to oversee the design construction and development of the storage, transportation, and test-marketing system.

5. Growing conditions are sufficiently different between Fairbanks and Delta Junction, and the 200-mile round-trip travel poses so large a

penalty, that it is necessary to have an Extension Service office located in Delta Junction.

It will be extremely important to the new farmers of the area that they have the best available crop-growing information readily available. An Extension Service office in the area is a necessity.

6. Extension soil testing will be necessary as the Delta Junction farm soils change from permafrost to a producing soil. Commercial fertilizers will be the single largest annual operating expense. The rate and nutrient mix of the fertilizer must be based on scientific evaluation of the existing soil fertility -- not guesses.

7. Miscellaneous expenses including contractual, marketing, travel and equipment.

Section 3 of the bill will appropriate up to an additional \$900,000 of program receipts derived from the test marketing of the barley and rapeseed. This second \$900,000 will provide for further marketing and transportation. It is anticipated that a large portion of it too will be recaptured.

Sincerely,

JSH

Jay S. Hammond
Governor

Original sponsor: Rules/Governor

Offered: 4/27/79
Referred: Finance

Funding Information

General Fund \$8,527,923
Other Funds -0-
\$8,527,923

1 IN THE SENATE BY THE RESOURCES COMMITTEE
2 HOUSE CS FOR CS FOR SENATE BILL NO. 62
3 IN THE LEGISLATURE OF THE STATE OF ALASKA
4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL

6 For an Act entitled: "An Act making miscellaneous appropriations for the
7 development of agriculture; and providing for an effective
8 date."

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

10 * Section 1. The sum of \$8,110,803 is appropriated from the general fund
11 to the special projects office, Office of the Governor, to continue funding
12 the Delta agricultural development project. The sum appropriated shall be
13 allocated as follows:

14	(1) Final phase of clearing in the Delta	
15	agricultural development project	\$5,736,000
16	(2) Road construction	1,080,000
17	(3) Purchase fund for test marketing and	
18	transporting barley and rapeseed	900,000
19	(4) Administration of the Delta	
20	agricultural development project	127,925
21	(5) Extension services to farmers	63,178
22	(6) Pesticide and herbicide research	78,500
23	(7) Baseline soil testing	40,000
24	(8) Miscellaneous costs	85,200

25 * Sec. 2. The sum of \$267,120 is appropriated from the general fund to
26 the Department of Natural Resources, division of agriculture, to be paid as a
27 grant to the Koyukon Development Corporation for expansion of farm projects.

28 * Sec. 3. The sum of \$150,000 is appropriated from the general fund to
29 the Department of Natural Resources, division of agriculture, to be paid as a

1 grant to the Kuskokwim Native Association for expansion of farm projects.

2 * Sec. 4. The unexpended and unobligated portion of the appropriation
3 made in sec. 1 of this Act lapses into the general fund June 30, 1981.

4 * Sec. 5. This Act takes effect immediately in accordance with AS 01.10.-
5 070(c).

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Original sponsor: Rules/Governor

Offered: 3/12/75
Referred: Rules

Funding Information

General Fund -0-
Other Funds \$8,620,803
\$8,620,803

1 IN THE SENATE

BY THE FINANCE COMMITTEE

2 CS FOR SENATE BILL NO. 62 (Finance) am

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL

6 For an Act entitled: "An Act making supplemental appropriations to the
7 special projects office, Office of the Governor, to
8 continue funding the Delta agricultural development
9 project; and providing for an effective date."

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

11 * Section 1. The sum of \$4,000,000 is appropriated from the general fund
12 and \$4,070,803 from the renewable resources development fund to the special
13 projects office, Office of the Governor, to continue funding the Delta agri-
14 cultural development project. The sum appropriated shall be allocated as
15 follows:

16 (1) Final phase of clearing in the Delta	
17 agricultural development project	\$ 5,736,000
18 (2) Road construction	1,080,000
19 (3) Purchase fund for test marketing and	
20 transporting barley and rapeseed	900,000
21 (4) Administration of the Delta	
22 agricultural development project	127,925
23 (5) Extension services to farmers	63,178
24 (6) Pesticide and herbicide research	78,500
25 (7) Miscellaneous costs	85,200

26 * Sec. 2. The sum of \$400,000 is appropriated from the renewable
27 resources development fund to the special projects office, Office of the
28 Governor, to be paid as a grant to the Koyukon Development Corporation for
29 expansion of farm projects.

1 * Sec. 3. The sum of \$150,000 is appropriated from the renewable
2 resources development fund to the special projects office, Office of the
3 Governor, to be paid as a grant to the Kuskokwim Native Association for
4 expansion of farm projects.

5 * Sec. 4. The unexpended and unobligated portion of the appropriations
6 made in this Act lapse into the renewable resources development fund June 30,
7 1981.

8 * Sec. 5. This Act takes effect immediately in accordance with AS 01.-
9 10.070(c).



RECORDS CERTIFICATION



I, the undersigned, an employee of the State of Alaska, do hereby certify that the microfilm images on this microform are accurate reproductions of the original records of the State of Alaska as accumulated during the regular course of business, and that it is the established policy and practice of this State to microfilm its records and to dispose of the original records after microfilm reproductions have been made.

James O. Smith
Signature of Camera Operator

3/20/90
Date

COMMITTEE REPORT HOUSE

FURTHER:

April 19, 1979

Date: 4/29/79

Mr. Speaker:

The Committee on FINANCE has had SB 63

"An Act making a special appropriation to the Alaska Power Authority for the Susitna Hydro-electric Project; eff. date."

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

do pass do not pass

do pass with attached amendments(s)

replace with ^{House} CS for SR 63 (Fin) same title new title
and recommends that it do pass

AND attaches a "Letter of Intent" New Fiscal Note

reports it back without recommendation

referred to the _____ Committee

**MEMBERS SIGNING
DO PASS**

Freeman
Rogers
Horn
DeBalle
Montgomery

**MEMBERS HAVING
OTHER RECOMMENDATIONS:**

Smith No Rec

Freeman
Vice CHAIRMAN

Original sponsor: Rules/Governor

Funding Information

General Fund	\$8,528,000
Other Funds	-0-
	<u>\$8,528,000</u>

1 IN THE SENATE BY THE FINANCE COMMITTEE
2 HOUSE CS FOR SENATE BILL NO. 63 (Finance)
3 IN THE LEGISLATURE OF THE STATE OF ALASKA
4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL
6 For an Act entitled: "An Act making appropriations to the Office of the
7 Governor, to the Alaska Power Authority for feasibility
8 studies for the Susitna hydroelectric project, and to
9 the Legislative Affairs Agency; and providing for an
10 effective date."

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

12 * Section 1. (a) The sum of \$8,178,000 is appropriated from the general
13 fund to the Office of the Governor for the purpose of paying costs of a
14 portion of the Phase I feasibility studies of the Susitna hydroelectric
15 project. The governor may not spend or obligate the sum appropriated in this
16 section unless either

17 (1) federal legislation is enacted providing in substance for an agree-
18 ment to repay the sum appropriated

19 (A) if the report issued as a result of the studies demon-
20 strates that the Susitna hydroelectric project is not feasible; or

21 (B) if the report demonstrates the project is feasible and
22 the Alaska Power Authority is not able to borrow money to pay construc-
23 tion costs of the project, including the costs of the report, based on
24 the security of the project or its revenue within three years of the
25 completion of the report; or

26 (2) a plan is developed that the Alaska Power Authority considers
27 a reasonable alternative program for accomplishing the work required to
28 produce a complete application to the Federal Energy Regulatory Commission
29 for a license to construct the project.

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(d) The sum appropriated may be spent or obligated by the governor, if either of the events described in (a)(1) or (2) of this section occurs on or before January 1, 1980.

(c) The program to be developed under (a)(2) of this section shall include the specific site work and public involvement required to develop needed environmental, economic and technical information, and must include an independent analysis of seismic potential and related design factors.

* Sec. 2. The sum of \$150,000 is appropriated from the general fund to the Alaska Power Authority for the purpose of paying the costs of developing the alternative program referred to in sec. 1(a)(2) of this Act.

* Sec. 3. The sum of \$200,000 is appropriated from the general fund to the Legislative Affairs Agency to contract for an independent study, in consultation with the Alaska Power Authority, to analyze (1) existing assumptions and findings concerning the power needs and population growth projections of the railbelt area; and (2) possible energy supply alternatives, including the proposed Susitna hydroelectric project. The alternatives shall include but are not limited to smaller hydroelectric, coal and gas-fired plants. A report shall be submitted to the legislature by February 1, 1980.

* Sec. 4. The unexpended and unobligated portions of the appropriations made by this Act lapse into the general fund June 30, 1980.

* Sec. 5. This Act takes effect immediately in accordance with AS 01.10.-070(c).

Original sponsor: Rules/Governor

Offered: 4/19/79
Referred: Finance

Funding Information

General Fund	\$8,328,000
Other Funds	-0-
	<u>\$8,328,000</u>

1 IN THE SENATE

BY THE RESOURCES COMMITTEE

2 HOUSE CS FOR SENATE BILL NO. 63

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL

6 "For an Act entitled: "An Act making appropriations to the Office of the
7 Governor and to the Alaska Power Authority for feasi-
8 bility studies for the Susitna hydroelectric project;
9 and providing for an effective date."

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20 (B) if the report demonstrates the project is feasible and
21 the Alaska Power Authority is not able to borrow money to pay construc-
22 tion costs of the project, including the costs of the report, based on
23 the security of the project or its revenue within three years of the
24 completion of the report; or

25 (2) a plan is developed that the Alaska Power Authority considers
26 a reasonable alternative program for accomplishing the work required to
27 produce a complete application to the Federal Energy Regulatory Commission
28 for a license to construct the project.

29 (b) The sum appropriated may be spent or obligated by the governor, if

58 63



DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

REPLY TO
ATTENTION OF:

NPAEN-LS

6 NOV 1978

Mr. Eric Yould
Executive Director
Alaska Power Authority
333 West 4 Avenue
Suite 31
Anchorage, Alaska 99501

Dear Mr. Yould:

Attached are budget figures required for the first twelve-month effort of feasibility studies as outlined in the Susitna Hydropower Plan of Study. Figures are presented on a quarterly obligation schedule and as such, run higher than the expenditure schedule outlined in the Plan of Study.

This budget is based on the assumptions that:

1. Authorization for funding will be given by the Alaska State Legislature not later than 15 February 1979.
2. Funds will be provided to the Alaska District, Corps of Engineers not later than 15 March 1979.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jay K. Soper".

JAY K. SOPER
Chief, Engineering Division

1 Incl
as

CORRECTION

**THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY**

Original sponsor: Rules/Governor

Offered: 4/19/79
Referred: Finance

Funding Information

General Fund	\$8,328,000
Other Funds	-0-
	<u>\$8,328,000</u>

1 IN THE SENATE

BY THE RESOURCES COMMITTEE

2 HOUSE CS FOR SENATE BILL NO. 63

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL

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22 tion costs of the project, including the costs of the report, based on
23 the security of the project or its revenue within three years of the
24 completion of the report; or

25 (2) a plan is developed that the Alaska Power Authority considers
26 a reasonable alternative program for accomplishing the work required to
27 produce a complete application to the Federal Energy Regulatory Commission
28 for a license to construct the project.

29 (b) The sum appropriated may be spent or obligated by the governor, if

1 either of the events described in (a)(1) or (2) of this section occurs on or
2 before January 1, 1980.

3 (c) The program to be developed under (a)(2) of th's section shall
4 include the specific site work and public involvement required to develop
5 needed environmental, economic and technical information, and must include an
6 independent analysis of seismic potential and related design factors.

7 * Sec. 2. The sum of \$150,000 is appropriated from the general fund to
8 the Alaska Power Authority for the purpose f paying the costs of developing
9 the alternative program referred to in sec. 1(a)(2) of this Act.

10 * Sec. 3. The unexpended and unobligated portions of the appropriations
11 made by this Act lapse into the general fund June 30, 1980.

12 * Sec. 4. This Act takes effect immediately in accordance with AS 01.10.-
13 070(c).

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SB 63



DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

REPLY TO
ATTENTION OF:

NPAEN- 15

6 NOV 1978

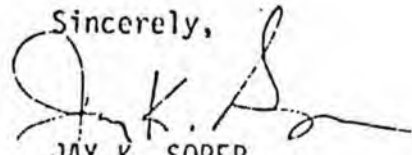
Mr. Eric Yould .
Executive Director
Alaska Power Authority
333 West 4 Avenue
Suite 31
Anchorage, Alaska 99501

Dear Mr. Yould:

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This budget is based on the assumptions that:

1. Authorization for funding will be given by the Alaska State Legislature not later than 15 February 1979.
2. funds will be provided to the Alaska District, Corps of Engineers not later than 15 March 1979.

Sincerely,

JAY K. SOPER
Chief, Engineering Division

1 Incl
as

BUDGET FOR CALENDAR YEAR 1979

<u>ACTIVITY CATEGORY</u>	<u>JAN-MAR</u>	<u>APR-JUN</u>	<u>JUL-SEP</u>	<u>OCT-DEC</u>	<u>TOTAL</u>
SURVEY	\$35,000	\$460,000	\$490,000	\$73,000	\$1,058,000
HYDROLOGY	73,000	150,000	196,000	130,000	549,000
ENVIRONMENTAL	20,000	22,000	2,000	2,000	46,000
RECREATION	2,000	19,000	2,000	2,000	25,000
PLAN FORMULATION	16,000	30,000	13,000	*****	59,000
POWER STUDIES	10,000	30,000	*****	*****	40,000
FOUNDATIONS & MATERIALS	200,000	921,000	1,390,000	320,000	2,831,000
DESIGN	65,000	223,000	116,000	179,000	583,000
REAL ESTATE	5,000	14,000	4,000	*****	23,000
CULTURAL	5,000	82,000	2,000	2,000	91,000
FIELD CAMP	750,000	500,000	125,000	125,000	1,500,000
REPORTS, REVIEWS PUBLIC PARTICIPATION	5,000	14,000	4,000	*****	23,000
BIOLOGICAL	10,000	262,000	649,000	223,000	1,144,000
POWER MARKET STUDIES	<u>5,000</u>	<u>162,000</u>	<u>11,000</u>	<u>28,000</u>	<u>206,000</u>
<u>TOTAL:</u>	\$1,201,000	\$2,889,000	\$3,004,000	\$1,084,000	\$8,178,000

Original sponsor: Rules/Governor

Offered: 4/19/79
Referred: Finance

Funding Information

General Fund	\$8,328,000
Other Funds	-0-
	<u>\$8,328,000</u>

1 IN THE SENATE

BY THE RESOURCES COMMITTEE

2 HOUSE CS FOR SENATE BILL NO. 63

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL

6 "For an Act entitled: "An Act making appropriations to the Office of the
7 Governor and to the Alaska Power Authority for feasi-
8 bility studies for the Susitna hydroelectric project;
9 and providing for an effective date."

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

11 * Section 1. (a) The sum of \$8,178,000 is appropriated from the general
12 fund to the Office of the Governor for the purpose of paying costs of a
13 portion of the Phase I feasibility studies of the Susitna hydroelectric
14 project. The governor may not spend or obligate the sum appropriated in this
15 section unless either

16 (1) federal legislation is enacted providing in substance for an agree-
17 ment to repay the sum appropriated

18 (A) if the report issued as a result of the studies demon-
19 strates that the Susitna hydroelectric project is not feasible; or

20 (B) if the report demonstrates the project is feasible and
21 the Alaska Power Authority is not able to borrow money to pay construc-
22 tion costs of the project, including the costs of the report, based on
23 the security of the project or its revenue within three years of the
24 completion of the report; or

25 (2) a plan is developed that the Alaska Power Authority considers
26 a reasonable alternative program for accomplishing the work required to
27 produce a complete application to the Federal Energy Regulatory Commission
28 for a license to construct the project.

29 (b) The sum appropriated may be spent or obligated by the governor, if

1 either of the events described in (a)(1) or (2) of this section occurs on or
2 before January 1, 1980.

3 (c) The program to be developed under (a)(2) of this section shall
4 include the specific site work and public involvement required to develop
5 needed environmental, economic and technical information, and must include an
6 independent analysis of seismic potential and related design factors.

7 * Sec. 2. The sum of \$150,000 is appropriated from the general fund to
8 the Alaska Power Authority for the purpose of paying the costs of developing
9 the alternative program referred to in sec. 1(a)(2) of this Act.

10 * Sec. 3. The unexpended and unobligated portions of the appropriations
11 made by this Act lapse into the general fund June 30, 1980.

12 * Sec. 4. This Act takes effect immediately in accordance with AS 01.10.-
13 070(c)

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Funding Information:
General Fund: \$ 8,178,000
Other Funds: -0-
\$ 8,178,000

Introduced: 1/19/79
Referred: Resources and
Finance

BY THE RULES COMMITTEE BY
REQUEST OF THE GOVERNOR

1 IN THE SENATE

2 SENATE BILL NO. 63

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 ELEVENTH LEGISLATURE - FIRST SESSION

5 A BILL

6 For an Act entitled: "An Act making a special appropriation to the Alaska
7 Power Authority for the Susitna Hydroelectric Project;
8 and providing for an effective date."

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

10 * Section 1. The sum of \$8,178,000 is appropriated, subject to the con-
11 ditions set out in sec. 2 of this Act, from the general fund to the Alaska
12 Power Authority for the purpose of providing a reserve for revenue bonds to
13 be issued by the authority to finance Phase I feasibility studies of the
14 Susitna Hydroelectric Project.

15 * Sec. 2. The appropriation in sec. 1 of this Act is conditioned upon
16 (1) repayment, of the full amount appropriated, to the State of Alaska when
17 it is no longer required, due to the availability of other funding, for the
18 purpose specified; and (2) payment of any earnings on the amount appro-
19 priated in sec. 1 to the State of Alaska.

20 * Sec. 3. This Act takes effect immediately in accordance with AS 01.-
21 10.070(c).

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29



DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

REPLY TO
ATTENTION OF:

NPAEN-US

28 June 1978

Mr. Eric Yould
Executive Director
Alaska Power Authority
333 West 4th - Suite 31
Anchorage, Alaska 99501

Dear Mr. Yould:

I am pleased to submit in response to your 19 January letter the final Susitna Plan of Study prepared by the Alaska District, Corp of Engineers, for the State of Alaska, under provisions of Title 3, the Intergovernmental Cooperation Act of 1968.

The report incorporates the comments developed by other State agencies, which you provided, in particular those prepared by the Department of Fish and Game. As a result, the intensity of some of the biological studies has been expanded to help identify the magnitude of the resources that will be affected by the Susitna project. The total increase is \$1,886,000 for biological activities.

To offset some of this increase, activities under the categories of survey and foundation and materials have been decreased as the result of the exercise presently under way at the Natana damsite in obtaining information as requested by the President's Office of Management and Budget (OMB). To respond to OMB's review comments on the 1976 Feasibility Report, test borings and geological data are being compiled which reduced the content of several activities outlined in the September 1977 POS draft. This reduction amounted to \$1,150,000 which helped hold the overall cost increase to \$736,000. The total study cost is now \$24.1 million. The price level index was held at September 1977.

The Plan of Study retained the 46-month period to conduct the project feasibility studies based on a 1 May start. Several months of advanced preparation will be required before initiating the activities to allow

NPAEN-US
Mr. Eric Yould

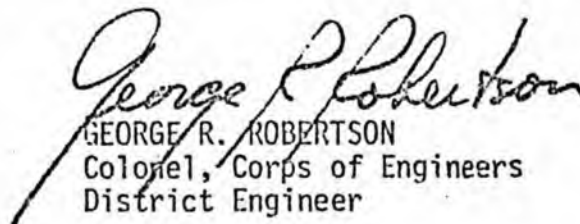
28 June 1978

early mobilization of a camp facility and commence other contract activity actions to assure implementation at the beginning of the summer field season.

The studies will insure optimal basin and system generation planning along with a reasonably accurate cost estimate for the first phase of basin development. These studies represent approximately 25 percent of the total engineering and design effort envisioned for a two-dam complex.

The activities defined in this document have been developed to adequately address determination of project feasibility. The project feasibility analysis program does include suggestions and comments received from various agencies, both Federal and State, and I feel that the program will provide the information necessary for the State to determine desirability of proceeding into construction of a hydroelectric facility in the upper Susitna River basin.

Sincerely yours,


GEORGE R. ROBERTSON
Colonel, Corps of Engineers
District Engineer



DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

REPLY TO
ATTENTION OF:

WPAEN-US

28 June 1978

Mr. Eric Yould
Executive Director
Alaska Power Authority
333 West 4th - Suite 31
Anchorage, Alaska 99501

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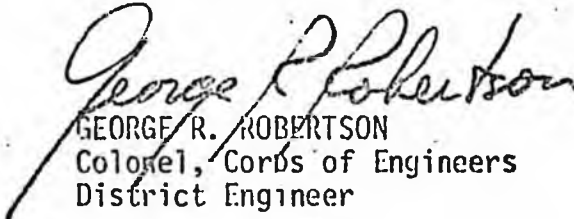
28 June 1978

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Sincerely yours,


GEORGE R. ROBERTSON
Colonel, Corps of Engineers
District Engineer

PLAN OF STUDY
for
SUSITNA HYDROPOWER
FEASIBILITY ANALYSIS

PREPARED FOR THE STATE OF ALASKA

BY

ALASKA DISTRICT

U.S. ARMY CORPS OF ENGINEERS

JUNE 1978

ACKNOWLEDGEMENTS

This plan of study for Susitna hydroelectric project feasibility planning was prepared with the assistance of personnel from the North Pacific Division, Corps of Engineers; the Seattle, Portland, and Walla Walla Corps of Engineer Districts; the U.S. Army Cold Regions Research and Engineering Laboratory; the U.S. Army Corps of Engineers Waterways Experiment Station; the U.S. Geological Survey; and the Geophysical Institute of the University of Alaska as well as the State agencies that reviewed and commented on the draft. Each of these agencies contributed valuable input in their respective fields of expertise. Also, the numerous comments offered by agencies, groups, and individuals during previous feasibility studies of hydroelectric development on the Susitna River were helpful in formulating this program of additional study.

Cover photo, showing Portage Creek 3 miles downstream from Devil Canyon Dam site, from the Alaska Department of Fish and Game.

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EXECUTIVE SUMMARY

This plan of study (POS) prepared by the Alaska District Corps of Engineers for the State of Alaska presents a program of activities for project feasibility analysis of hydropower development in the Upper Susitna River Basin. It provides a description of each activity along with a cost estimate for its completion. The POS fulfills a Federal planning requirement while also providing the State of Alaska an overview of the planning activities associated with a large scale water resource project. The authority for proceeding with this joint State-Federal planning program is contained in Section 203 of the Water Resources Development Act of 1976 enacted by the 94th Congress. Funding for preparation of the POS was provided by the State of Alaska on 30 June 1977.

Existing electrical generation within the study area is produced almost exclusively by fossil fuel thermal resources. However, as these resources become more scarce, and perhaps very expensive, and as the energy demand increases to a projected 15 billion kilowatt hours by the year 2000, the advantage of non-cost-inflating, renewable energy, such as hydropower, becomes apparent. A feasibility report completed by the Corps of Engineers in 1976 outlined a number of alternative plans for developing the hydropower potential of the Upper Susitna Basin and identified the most economical plan, consisting of a system of two dams--a 635-foot-high concrete thin arch dam at Devil Canyon and an 810-foot-high earthfill dam at Watana, with 365 miles of transmission line. This system is capable of developing 6.1 billion kilowatt hours of firm annual energy, roughly triple the energy consumed in Anchorage and Fairbanks in 1974. While the 1976 feasibility report provided sufficient data to support the need and economic feasibility of a plan to develop the hydroelectric potential of the Upper Susitna Basin, it was recognized that additional field data and more detailed studies would be required. The POS outlines the additional studies required to determine the most cost-effective plan, and its environmental impacts.

The activities outlined in the POS have a total estimated cost of \$24.1 million over a time frame of 46 months. The schedule is based on early notification of program initiation and timely receipt of study funds to allow mobilization for field explorations prior to

the summer season and arrangements for access to the sites. A critical path method network (CPM) shows the interrelationship of some 202 activities and indicates those activities and timing most critical for completion of the project feasibility analysis. Early acquisition of field data about foundation conditions, stream flows, and topographic surveys during the short summer months is very important.

Study management of physical and fiscal progress must be rigorously maintained throughout the 46-month period. Periodic progress reports and a report of expenditures would be provided the State of Alaska for their information and review. The project feasibility analysis activities have been programmed through three progressive steps: (1) preliminary screening, (2) detailed feasibility studies, and (3) detailed design studies for Watana, access road, and transmission system.

Preliminary Screening: In step 1 of the study, a number of potential damsites and combinations of different dams and heights would be evaluated to identify the most economical and environmentally acceptable plan based on a preliminary calculation of benefits and costs. During this study phase, the best plan identified in the 1976 feasibility report, Watana constructed initially followed by construction of Devil Canyon, would be reexamined. This first step is estimated to cost \$4.3 million and be completed in 7 months. In order to meet the overall study schedule of 46 months, field work needed in later phases of the study has been scheduled concurrently with the preliminary study phase and these costs are included in the subtotal of \$4.3 million. Results of the preliminary phase will provide the first important decision point as to whether the study should continue into the second step of detailed feasibility studies.

Detailed Feasibility Studies: Detailed studies would be concentrated on the best plan identified in the preliminary screening. Costs and benefits would be refined using more accurate data obtained from ongoing field work. This second step is estimated to cost \$16.7 million and be completed in 25 months after completion of the initial step. As indicated above, additional field work would continue during this phase of the study and these costs have been included in the subtotal of \$16.7 million. Also included are concurrent activities required for detailed design studies. Completion of the detailed feasibility report will provide a firm basis for recommending for or against construction of the project, whether Federally funded, State supported under Section 203, or totally financed by the State of Alaska.

Detailed Design Studies: Assuming a favorable showing of feasibility in step 2, the last step would be detailed design of any dams, powerhouses, access roads, and some 365 miles of double circuit transmission lines and substations to deliver power to the Anchorage and Fairbanks

load centers. A detailed and accurate cost estimate for construction of the initial element in a dam system will be provided to enable a decision on funding and initiation of construction. The third step is estimated to cost \$3.1 million and be completed in an additional time frame of 14 months after completion of step 2.

The above estimates of cost and time for completion of the three steps are based on the findings and recommendations contained in the 1976 feasibility report, and envision a continuation of that planning study leading to the ultimate construction of the project.

At the end of any of the three program steps, Susitna hydroelectric development could be determined to lack economic or environmental justification. Such a conclusion would result in the termination of the planning program and in Federal assumption of responsibility for expended funds. Otherwise, the study costs would be borne by the State of Alaska. Assuming a favorable recommendation, detailed plans and specifications for the first construction contract could be undertaken immediately thereafter.

PURPOSE

The function of the plan of study is to delineate the engineering, economic, social, and environmental studies associated with planning for the Upper Susitna River Basin hydroelectric project, as a prelude to State participation under Section 203 of the 1976 Water Resources Development Act. The study will provide a description of activities to be performed, an estimate of cost and time for accomplishment of these activities, an indication of the activity interdependence, and a schedule of program activities that can serve as a management tool during the study effort. Should the State of Alaska desire to work toward development of the Upper Susitna Basin outside the provisions of the 1976 Water Resource Development Act, the plan of study will serve as a guide in assessing other proposals for analyzing the economic feasibility and environmental impact of the project.

AUTHORITY

The Corps of Engineers is participating in accordance with a Memorandum of Understanding, dated 30 June 1977, between the United States of America and the State of Alaska for preparation of a "Study Outline, Susitna Project." The memorandum directs that,

"The Secretary of the Army, acting through the District Engineer, Alaska, shall prepare a study outline for the Susitna Project for the purpose of detailing the Scope of Work required to provide engineering, environmental, economical, and social information relating to the subject project under the provisions of Title 3, Public Law 90-577, 16 October 1968, the Intergovernmental Cooperation Act of 1968."

Studies considered in the Plan of Study were authorized by Public Law 94-587, entitled "Water Resources Development Act of 1976" enacted by the 94th Congress on 22 October 1976.

The authorizing legislation provided for two options for the conduct of Phase I studies. Section 160 states that,

"The Secretary of the Army, acting through the Chief of Engineers, is authorized to undertake the Phase I design memorandum stage of advanced engineering and design of the project for hydroelectric power on the Susitna River, Alaska, in accordance with the recommendations of the Board of Engineers for Rivers and Harbors in its report dated June 24, 1976, at an estimated cost \$25,000,000. This shall take effect upon submittal to the Secretary of the Army by the Chief of Engineers and notification to Congress of the approval of the Chief of Engineers."

The possibility for State of Alaska funding of Phase I studies is provided for by Section 203(e) which states,

"The Secretary is authorized to make expenditures from the [Alaska Hydroelectric Development Fund] for the Phase I design memorandum stage of advanced engineering

and design for any project ... Alaska that meets the requirements of Subsection (a)(2) of this Section, if appropriate non-Federal public authorities, approved by the Secretary, agree with the Secretary, in writing, to repay the Secretary for all the separable and joint costs of preparing such design memorandum, if such report is favorable. Following the completion of the Phase I design memorandum stage of advanced engineering and design under this subsection, the Secretary shall not transmit any favorable report to Congress prior to being repaid in full by the appropriate non-Federal public authorities for the costs incurred during such Phase I. The Secretary is also authorized to make expenditures from non-Federal funds deposited in the fund as an advance against construction costs."

Funds were provided for preparation of the Plan of Study by the State of Alaska on 30 June 1977.

PROBLEMS & NEEDS

Most of the present commercial electrical power in the Southcentral Railbelt area is derived from fossil fuel thermal and turbine generation. The Anchorage-Cook Inlet area had a total installed capacity of 504.8 megawatts (MW) in 1976. Natural gas fired turbines were the predominant energy source with 434.9 MW of installed capacity. Hydroelectric capacity of 45 MW was available from the Eklutna and Cooper Lakes projects. Steam turbines comprised 14.5 MW of capacity, and diesel generation, mostly in standby service, accounted for the remaining 10.4 MW.

The Fairbanks-Tanana Valley area commercial utilities had a total installed capacity of 222.2 MW in 1976. Oil-fired gas turbine generation provided the largest block of power with a capacity of 136.6 MW. Steam turbines provided 53.5 MW of power and diesel generators contributed 32.1 MW.

Recent electrical power growth rates have been in the neighborhood of 14 percent annually, and although these rates are projected to decline to 7 percent beyond 1980, the year 2000 Railbelt power requirements are estimated to be 15 million megawatt-hours energy and 3,170 megawatts peaking capacity.

Estimated Railbelt Area Power Requirements

	<u>1976</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>
Capacity (MW)	569	870	1,670	3,170
Energy (GWH)	2,550	3,980	7,620	15,000

While increased power capability is the need which precipitated the 1972 U.S. Senate Committee on Public Works resolution which authorized the Corps of Engineers feasibility study, other problems and needs have also been identified. These include the need to preserve natural areas, to conserve or enhance fish and wildlife resources, to respond to problems of flood damage and air pollution, to expand recreation opportunities, and to conserve fossil fuels.

It would be presumptuous to assume that any single water resources plan could satisfy all the water-related needs of a region. Even if the plan could respond to the full range of water-related problems, there are often economic, social, and other needs that must be recognized. It is therefore necessary to select a more limited set of compatible needs to which the water resources plan can respond. In other words, the extent to which desirable functions of a multipurpose project could be developed is highly dependent upon which various purposes are compatible.

Needs which the project development could help satisfy, but which may be contrary to the objective of power development, include the improvement of small boat and deep draft navigation conditions, augmentation of municipal water supplies, and development of an extensive irrigation system. The plans for power development are also relatively unresponsive to the desire for preservation of what could be termed the "Alaskan way of life," including prevention of further population growth, prevention of additional industrialization, and curtailment of urban expansion.

PROJECT DESCRIPTION

The plan of development recommended by the Corps of Engineers in 1976 consists of two dams and related reservoirs and powerplants to be constructed on the Upper Susitna River with transmission facilities to provide power to the Anchorage and Fairbanks load centers.

Watana and Devil Canyon were the two projects recommended in 1976. These two projects could produce 6.1 billion kilowatt hours (kWh) firm annual energy, 800 million kWh average annual secondary energy, and 1,392,000 kilowatts of dependable capacity based on a 50 percent system load factor. Watana, the first project to be built under this plan of development, would consist of an 810-foot-high earthfill structure located at river mile 165. The reservoir would extend 54 miles upstream and have a surface area of 43,000 acres. The total storage capacity would be 9,624,000 acre-feet after 50 years of sediment inflow. The useable storage capacity would be 6,100,000 acre-feet. Devil Canyon, 32 miles downstream of Watana, would be a concrete thin-arch dam with a maximum structural height of 635 feet. Construction of the Devil Canyon project after completion of Watana would be phased to meet the projected electrical energy demands of the Railbelt area. The Devil Canyon reservoir would inundate 7,550 acres and 28 miles of natural river, and would provide 1,050,000 acre-feet of storage capacity. Intake structures would be situated to allow a maximum power pool drawdown of 175 feet, but when operated in conjunction with the upstream Watana reservoir, Devil Canyon annual drawdown would normally be less than 5 feet.

The transmission line would be approximately 365 miles in length consisting of double towers, each carrying a single conductor three-phase circuit. About 25 percent of the energy would be provided to the Fairbanks load centers, with 75 percent being utilized in the Anchorage area. A basin map shows the location of the two dams (Figures 1 and 2). Detailed layouts of Devil Canyon and Watana are shown on Figures 3 and 4.



FIGURE 1. ERTS satellite photograph of the Upper Susitna River with the general location of the Devil Canyon and Watana Projects shown in the circles. Devil Canyon project, on the left, is roughly 65 miles upstream from Talkeetna, and Watana is 32 miles above Devil Canyon. Shown in the upper right corner of the photo are the glaciers of the Alaska Range, which provide much of the flow for Susitna River.

PART I. INTRODUCTION

The Interim Feasibility Report of the Upper Susitna River Basin Project was completed by the Alaska District Corps of Engineers (Corps) in 1976. Alaska Power Administration (APA) provided the transmission system and power market analyses for that report.

Upon completion of the 1976 report, it was submitted by the Corps to the Office of Management and Budget (OMB) for review. In September 1977, OMB requested the Corps to obtain additional data prior to submitting the report to Congress. The requested data were to; (1) provide additional geologic data for the Watana damsite; (2) reanalyze the cost estimate contingency factor; (3) reanalyze area development benefits; and (4) reanalyze the projected construction schedule. There were also questions regarding power supply and demand, including sensitivity to development of a large block of power, which fell into APA's area of responsibility.

This report is to provide an updated power market analysis and address OMB concerns. It takes advantage of three years additional data on power usage, effects of the oil embargo, and other factors. Specifically, it was decided to: (1) update the power demand forecasts reflecting additional data since the 1976 report; (2) update the transmission and project OM&R costs; (3) prepare load/resource analyses to determine timing of major generation and transmission investments and reflect the resulting impact on power system costs; (4) prepare system power cost analyses

that would show annual system-wide costs of power with and without the Upper Susitna Project; (5) examine the value of an Anchorage to Fairbanks interconnection with and without Susitna; (6) prepare a subanalysis of the feasibility of delivering Susitna power to the Valdez-Glennallen area; (7) determine the power rates and marketability of Susitna power compared with alternative generation methods; and (8) prepare detailed responses to the OMB questions that fell in APA's areas of responsibility.

APA provided to the Corps for their report purposes: updated transmission system costs and project OM&R estimates; load estimates; detailed load/resource and system cost analyses with and without Susitna project; and proposed responses to OMB questions pertinent to APA areas of responsibility.

The Corps' current proposal for the Upper Susitna Project is essentially the same as Plan 5 presented in the 1976 report; a two phase, two-dam complex including Watana and Devil Canyon dams and power plants, with the Watana phase and a transmission system interconnecting Anchorage and Fairbanks coming on line first. Power production facilities include Watana dam, reservoir, and powerplant, and Devil Canyon dam, reservoir, and powerplant. Watana dam would be an earthfill structure with reservoir normal water surface elevation of 2,185 feet, and the powerplant would have 795 MW capacity. Devil Canyon dam would be a double-curvature concrete-arch structure with maximum pool elevation of 1,450 feet, and would provide water for a 778-MW powerplant. The transmission system would be constructed in conjunction with the first stage (Watana), and,

as planned, would be totally required for system reliability. The system would include two parallel 230-kv single circuit lines from Watana to Devil Canyon (30 miles), two parallel single-circuit 345-kv lines from Devil Canyon to Pt. McKenzie (Anchorage - 135 miles), and two parallel single circuit 230-kv lines from Devil Canyon to Ester-Gold Hill (Fairbanks - 198 miles).

Several significant changes were made by the Corps from the 1976 report:

(1) The Devil Canyon dam design and costs are presented for both a gravity structure and a thin-arch concrete structure. The 1976 report was based on a thin-arch concrete structure.

(2) The construction period for Watana was increased from 6 to 11 years, Devil Canyon from 4 to 7 years; and the Anchorage-Fairbanks intertie scheduled for 1991--three years prior to Watana POL.

(3) Watana dam (earth fill) was redesigned based on new geologic data.

The APA power market report incorporates certain assumptions that differ from the Corps plan, namely:

(1) Design power generation capacity:

The Corps design capacity is based on critical year primary energy and 50 percent annual plant factor (1,392 MW). The APA load/resource analyses

assume a design capacity based on average annual energy and 50 percent plant factor (1,573 MW). APA analyses include both primary and secondary energy as well as firm and non-firm power.

(2) Transmission intertie schedule:

The Corps plans show a 1991 on-line date for the transmission intertie. The APA load/resource and system cost analyses examine alternative on-line dates of 1990, 1992, and 1994. However, the APA financial analyses are consistent with the Corps schedule.

(3) For Devil Canyon Design:

The APA system cost and financial analyses assume the thin arch design for Devil Canyon as presented in the 1976 report, rather than the more costly gravity structure alternative currently proposed by the Corps. A separate analysis demonstrates the effect of the gravity dam alternative on cost of power.

The term "1976 report" is used throughout this report. This term refers to the Corps of Engineers Interim Feasibility Report on the Upper Susitna project dated December 1975 and revised June 1976. It also refers to APA's Power Market analysis dated 1975 and included as Appendix G in the revised Interim Feasibility Report.

Part II. SUMMARY

Current studies have updated and revised the power market analyses of the 1976 Upper Sustina Report (1976 report). New estimates of power requirements through the year 2025 have been prepared. The following Railbelt totals are detailed in Part V. Trended values offer an interesting comparison but are not presented as part of the forecast. The trend is an average annual growth of 12.3 percent resulting from 12.7 percent for the Anchorage area and 10.5 percent for the Fairbanks area.

Railbelt Area Energy Forecast

(GWH)

		1977				
		(Historic)	1980	1990	2000	2025
Utility	Trend @ 1973-77 annual					
	growth		(3,215)	(10,270)	(33,000)	(601,000)
	High		3,410	8,200	16,920	38,020
	Mid	2,273	3,155	6,110	10,940	17,770
	Low		2,920	4,550	7,070	8,110
National						
Defense	High		348	384	425	544
	Mid	338	338	338	338	338
	Low		330	299	270	210

Self-Supplied

Industry	High		170	2,100	3,590	8,490
	Mid	70	170	630	1,460	3,470
	Low		141	370	550	1,310
Total	High		3,928	10,684	20,935	47,054
	Mid	2,681	3,663	7,078	12,738	21,578
	Low		3,391	5,219	7,890	9,630

The 1976 report used energy and power estimates based on data through December 1974. The new analyses benefit from three full years of additional data through December 1977. This provides a full four years of "post oil-embargo" data--especially significant from the viewpoint of identifying conservation trends. Evidence of conservation shows in the Anchorage-Cook Inlet area growth comparisons before and after the 1973-74 fuel crisis. The 1970-73 average annual growth in net generation dropped from 14.2 percent to 12.7 percent in the 1973-77 period. The decrease was more dramatic for per capita net generation: A drop from 8 percent to 3.8 percent.

Data on area load characteristics were updated and new estimates of monthly energy distribution were made. The conclusion was that the assumption of 50 percent plant factor for powerplant sizing is still valid.

A further review of possible power supply alternatives was made including oil and natural gas, coal, alternative hydro projects, nuclear, wind, geothermal, and tide. It was again concluded that coal-fired steamplants are the most logical alternatives for major railbelt area power supplies in the timeframe of the proposed Susitna project.

New estimates of power costs from coal-fired steamplants were prepared using results of several recent studies. They indicate:

Investment costs of \$1,620-1,860/kw

Unit cost of power of 5.2-6.4¢/kwh (including transmission to load center)

A set of load/resource and annual system cost analyses were performed to examine the effects of Susitna and the transmission intertie from an overall power system approach. These analyses were needed to provide responses to OMB questions regarding: (1) the value of an interconnected transmission system between Anchorage and Fairbanks; (2) scheduling of major powerplants; and, (3) sensitivity of developing large blocks of power. APA's response to the OMB questions are appended. Three cases were analyzed using three projected load growth estimates:

Case 1. A without Susitna Project and without transmission intertie situation assuming all generating capacity to be supplied by coal-fired steamplants.

Case 2. Same as case 1 but with transmission intertie.

Case 3. A with Susitna Project and with intertie situation assuming additional generating capacity supplied by coal-fired steam plants. The load/resource analyses showed the schedule of new plant additions needed for all three cases for 1978-2011.

The system cost analyses compared annual power system costs for all three cases assuming 0 percent and 5 percent inflation rates. The analyses showed savings in annual system costs between 1990 and 2011 with the Susitna project will be \$2.23 billion. Average power system rates for year 2000 assuming no inflation will be:

	<u>¢/KWH</u>		
	Case 1	Case 2	Case 3
Load	Without Susitna	Without Sustina	With Susitna
Forecast	or Intertie	With Intertie	and Intertie
<u>High</u>	7.0	6.4	5.8
<u>Mid</u>	7.0	6.6	5.7
<u>Low</u>	6.6	6.7	6.4

For the medium energy use range, system rates compared to those without Susitna or interconnections will be 5.7 percent less with interconnection and 18.6 percent less with Susitna. The analyses showed Susitna will result in cheaper power cost to Anchorage and Fairbanks in all load growth cases. It also shows that the project power could be fully used under all projected power demand cases.

In comparison with the 1976 report, investment costs are 89 percent (\$1.567 billion) greater. Contributing factors are interest rate increase from 6 5/8 to 7 1/2 percent (13 percent), total construction period increase from 6 years to 10 years (40 percent), inflation, and redesign of Watana dam and powerplant facilities. New construction costs estimates for Watana dam are estimated to be 72 percent (\$595 million) greater, and combine the effects of both design quantity changes and unit cost inflation. Construction cost estimates for Devil Canyon facilities (thin-arch concrete) and the transmission system were updated primarily by indexing, and increased 54 percent (\$233 million) respectively (total \$315 million). The total interest during construction increase is 265 percent (\$657 million).

Financial analyses were prepared to demonstrate annual revenue requirements and probable unit cost of power for the Upper Susitna project. The analyses used Federal repayment criteria of 50 years at a 7 1/2 percent interest rate.

The market for firm energy was approximated by load growth after Susitna power becomes available, plus market made available through retirement of older plants. During early years of operation, project energy in excess of firm sales was assumed marketable as secondard energy for fuel replacement at a value of 1.2¢/kwh, based on estimated future coal costs. The actual value is probably significantly higher, which would tend to increase project revenues and reduce the long-term firm energy rates.

Based on Fiscal Year 1979 Federal interest rate of 7 1/2 percent and repayment of all principal and interest within 50 years after the last unit is installed, revenue requirements and resulting rate are:

	<u>\$ million</u>
Capital and O&M	242.3
Fuel replacement sales	<u>-11.3</u>
Net revenue required	231.0
Average rate	4.7¢/kwh

Rates were calculated for variations of the Corps selected plan:

	Rate ¢/kwh
Basic plan for medium load growth:	
a. With intertie 1990, and Devil Canyon arch dam	4.7
b. Above plan with Devil Canyon gravity dam	4.9
c. Above plan with intertie in 1994	4.6

A comparison of the rate for Sustina at 4.7 cents per kilowatt-hour with the coal fired steamplant alternative at 5.2 to 6.4 cents per kilowatt-hour shows Sustina is less costly.

The Glennallen-Valdez area has been considered as a market area supplementary to the Railbelt. The Copper Valley Electric Association (CVEA) plans to construct a Glennallen-Valdez transmission line and the presence of the pipeline terminal in Valdez with its related economy has made this area a more attractive market since the 1976 report. Service to the area would require a 138-kv line from Palmer to Glennallen (136 miles). Market factors of the area are subject to fluctuation. Potential industrial loads are difficult to project at this time, but service to utility loads can be evaluated for a probable range of demands. Energy costs to serve the incremental market area would range from 2.6¢/kwh to 1.3¢/kwh for a range of loads from 150 to 300 kwh per year in addition to the project energy cost of 4.7¢/kwh. Inclusion of the market area costs with other project costs for a single project-wide rate would not adversely affect the rate.

PART III. POWER MARKET AREAS

Throughout its history of investigations, the Upper Susitna River Basin Project has been of interest for hydroelectric power generation because of its central location to the Fairbanks and Anchorage areas. These areas have Alaska's largest concentrations of population, economic activity, services, and industry. Under any plan of development, major portions of the project power will be utilized in these two areas. Additionally, the basic project transmission system servicing Anchorage and Fairbanks could provide electric service to present and future developments between the two cities.

The potential major market areas are the Anchorage-Cook Inlet area and the Fairbanks-Tanana Valley area.

Anchorage-Cook Inlet

This area includes the developed areas of the Matanuska Valley, Greater Anchorage Area, and Kenai Peninsula.

This general area has been the focal point for most of the State's growth in terms of population, business, services, and industry since World War II. Major building of defense installations, expansion of

April, 1979

Concerns About the Susitna Hydro-Project

1. The projected energy demand used by the Army Corps of Engineers is totally unrealistic.

The need for the large amounts of electric power that will be provided by the Susitna River Dams Project has not been demonstrated. Total residential industrial electrical energy consumption in the railbelt area was about 1.9 billion kilowatt hours (KWH) in 1977. The two Susitna dams will produce 6.9 billion KWH, over 3-1/2 times the amount of energy needed to meet 1977 consumption. The Army Corps of Engineers has continued to use the highly inflated and unrealistic growth projections made by the Alaska Power Administration (APA) to justify the Susitna project. [Public involvement in APA's (a federal bureaucracy) projections has been conspicuously lacking, and APA has commonly manipulated statistics to suit their needs and bolster their arguments for excessively large future energy demands.] For example, when APA has projected energy demands for the Alaska railbelt (i.e., the Anchorage-Fairbanks area), they have included the energy needs of the Kenai Peninsula and of the military. In fact, the power needs of the Kenai Peninsula will primarily be met by the Bradley Lake hydro-project. The military in Alaska has always generated its own power in the past and very probably would not use a centralized, highly vulnerable energy source such as Susitna, in the future.

The APA's projected growth patterns include a doubling to tripling of railbelt population in less than 20 years and a continued annual increase in per capita energy consumption of 3% or more per year. These projections result in energy demands of four to ten times present needs by 1995. The most recent trends in population growth and energy conservation in Alaska make such projections totally unrealistic. In fact, statistics from Golden Valley Electric Association (GVEA), the major commercial utility in the Fairbanks region, show that their per customer energy consumption is declining in Fairbanks. During the past three-year period, GVEA residential and commercial/industrial per customer usage has declined at average rates of 12.5%/year and 5.5%/year, respectively. Statistics from Anchorage utilities and from APA show that the annual increases in per customer usage have tapered significantly in the Anchorage area over the past three years. Total energy consumption in the Fairbanks area actually declined in 1978. Present energy consumption in Fairbanks is running considerably below what had been projected for this community in the Corps of Engineers' initial feasibility study.

The Corps of Engineers has overestimated future power needs before. This occurred when justifying the construction of the Snettisham dam near Juneau. The dam was built by the Army Corps of Engineers and is administered by the Alaska Power Administration. Although brought on line in 1973, the Juneau Power Utility is buying only one-fifth of the total capacity of the project. Consequently, the cost of power to the utility company is over twice the rate the Corps originally anticipated. Because of the slow growth in load, in order to cover the interest rates on the bonds that funded this project, it is expected that the price will again be increased in 1985 by 75 to 80 percent. With a much bigger project such as the Susitna, such a mistake would be a financial disaster.

4-17-79 Testimony of Virginia Dal Piaz
Alaska Conservation Society
presented to House Resources Committee

No matter what the increase or decrease in energy consumption will be, the Susitna Project will not come on until the turn of the century. Utility companies will be required to build new power plants to meet the needs before the Susitna could come on line. Susitna power then represents an enormous glut of energy. In order to make the project economically feasible, the Corps will have to find a way to sell the excess power. Their proposed solution is rapid industrialization and the introduction of some highly energy intensive industries to the railbelt. Some of their proposals are a bauxite processing plant, a uranium enrichment plant, mineral processing plants, coal gasification plants, liquid natural gas plants, oil refineries, etc. Not only is this highly speculative (coal gasification plants are not yet a reality), but such industrialization is totally incompatible with the expressed opinions of the majority of Alaskans who do not desire rapid large-scale industrial growth. The Susitna project, in fact, represents a de facto imposition of an accelerated growth plan upon Alaska which is totally contrary to Alaska's desire for planned growth and control over their future. No consideration appears to have been given to the impact which doubling and tripling the population in less than 20 years will have on land use in the railbelt area and the large increase in hunting pressure in the surrounding region and throughout the State, nor to the environmental impact of such large industrialization to the railbelt area.

2. The economic feasibility of the Susitna project is highly questionable.

Even when using the Corps' very conservative cost estimate of \$2.6 billion, economic feasibility has been judged as marginal. The Susitna project would involve two dams, each one larger than the Hoover Dam. The project would be the biggest and most expensive ever attempted by the Corps. It would also be the first large-scale hydro-project ever attempted by the Corps in a subarctic region, an environment notorious for its engineering difficulties. Compounding the engineering problems is the fact that the dam sites will be located in a highly active seismic region. Dealing with such problems can easily lead to significant cost overruns on the project.

The Office of Management and Budget (OMB) has shown that if the Susitna project has a cost overrun of as low as 30%, the benefitcost ratio would be less than unity, making the project economically unfeasible. The Snettisham Dam in Juneau, Alaska, had a cost overrun of 36%, over and above inflation, and it was a much smaller project. A study made for the U.S. Senate showed that large custom engineering projects, such as Susitna, have cost overruns, over and above inflationary costs, of between 50 and 500%. In Alaska the best cost estimates for construction of the oil pipeline, based on all the final environmental stipulations, was \$2.5 billion. The end costs were \$9 billion, a cost overrun of 300%.

Several additional hidden costs have not yet been brought up or discussed by the Corps. For example, the Susitna project is going to be a highly centralized source of electrical energy. The major metro area,

Fairbanks and Anchorage, and communities along the railbelt cannot and will not rely solely on this source; otherwise they would become vulnerable to any malfunction at the dam sites or along the power links. In fact, the utilities are required by Federal law to have reserve power on hand equal to the largest generating plant on the line. Such backup electrical generation systems will have to be built and maintained, and will add significantly to the overall costs of the project.

Such costs have not yet been factored into overall cost-effectiveness; and neither have the additional costs of engineering the dams against large earthquakes and a subarctic environment. There are also many of us who feel that the costs of environmental damage and potential hazards should be factored into the equation. For example, almost 40% of Cook Inlet's salmon harvest comes from the Susitna River. This is more than a \$15 million per year industry, almost 5% of the yearly benefits of the dam project at peak production. Recent research by the Alaska Department of Fish and Game has indicated that severe impacts to the fishery may occur with the construction of the dams.

OMB has raised several other important questions regarding the feasibility of the Susitna project. The Corps has yet to adequately answer these questions. OMB's comments have been appended to the testimony and deserve serious consideration.

We as Alaskans are deeply concerned about who will have to pay the inevitable cost overruns associated with a project of such massive scale. If the Federal Government does not foot the bill of cost overruns, then the burden must inevitably fall onto the Alaskan railbelt electrical utility rate payers, and with the strong possibility of State Government involvement, onto all Alaskan taxpayers.

3. The potential seismic risks are significant.

The seismic hazards come from two factors. The first is that the two huge dams and their associated reservoirs will be located in an area that is well-recognized for its high degree of seismic activity. The second is that the reservoirs themselves can induce seismic activity.

Much of the present seismic activity in the region appears to be connected to the well-known Denali fault system. This fault lies between 40 to 50 miles from the proposed dam sites and follows an arcuate path to the north and west of the Susitna basin (see accompanying map).

Of greater concern is the recently recognized Susitna fault, an active fault which crosses the Susitna River immediately west (less than 5 miles) of the proposed site for the Watana dam. At least 5 moderate earthquakes (and many smaller ones) have occurred on or near this fault within the past six years. The fault extends from the Susitna Glacier in the Delta Range to the south of the Talkeetna River, a distance of over 60 miles. This region is a zone of crustal weakness and the fault is thought to be acting as a splay off the Denali fault system.

Compounding the problem of the natural seismicity in the area will be the loading caused by the impoundment of water behind the dams. It is a well-known fact that reservoirs commonly induce seismicity. Rather

severe earthquakes, up to magnitude 6.4, have accompanied the filling of reserves at a number of dams around the world including places which had previously been aseismic. In one case, a reservoir-induced earthquake at Konya Dam in India caused severe property damage and the loss of 200 lives.

The Susitna dams and their reservoirs will lie on opposite sides of the active Susitna fault with the upper part of the Devil's Canyon reservoir actually overlying a portion of the fault. The high loading and water from these reservoirs could very possibly trigger strain energy which had been stored in the rocks prior to impoundment could result in a massive earthquake whose epicentral region is likely to lie within the immediate vicinity of the Susitna dams.

The following is a quote from J. P. Rothe's "Fill a Lake, Start an Earthquake," New Scientist, 39, 75-78, 1968:

"It is by now clear that one can cite specific cases where tremors, some of which are severe enough to produce extensive damage, are caused by the construction of dams. When he builds these. Man plays the role of the Sorcerer's Apprentice: in trying to control the energy of rivers, he brings about stresses whose energy can be suddenly and disastrously released."

Wendell V. Mickey, who was Chief of the Seismology Division of NOAA, recommended that "no dam should be built within the disturbed zone of an active fault."

If a huge earthquake causes physical damage to either dam, the potential exists for massive floods to sweep down the lower Susitna River. Such floods could swamp the Parks Highway and the Alaska Railroad and devastate the communities along this transportation corridor--Gold Creek, Talkeetna and others. Even if direct physical damage does not occur to the dams, earthquake-generated ground motions and landslides into the reservoir could generate tsunami-like waves that could overtop the dams and result in flooding down the river. The earthquake itself could also cause direct damage to communities near the epicenter.

The Corps claims they have upgraded their design so that the dams will withstand an 8.5 magnitude earthquake whose epicenter is 40 miles away and is at a depth of 20 miles. More recently the Corps has finally recognized the severe seismic hazard in the immediate vicinity of the proposed dam sites. Much of their proposed Phase I feasibility study centers around exploring this problem.

It's debatable whether the Corps can really design the dam structures to withstand the severe ground accelerations near the epicenter of a large earthquake and still preserve the overall cost effectiveness of the project. The more massive the structure, the more likely it will be able to withstand an earthquake, but size can add considerably to the costs.

A further problem, and potentially more serious one, is that there is no way to fully evaluate beforehand the effect that reservoir loading will have on the active Susitna fault. This can only be done during the actual filling of the reservoir. If the impoundment of water at Watana and Devil's Canyon begins causing an increase in the frequency and intensity of earthquakes, the Corps will most certainly be compelled, in the interests of public safety, to stop the filling of the reservoirs.

Earthquakes could be induced even after the reservoirs are filled, particularly if there are large fluctuations in water level. Such fluctuations will occur yearly at Susitna because, during the peak energy demand months, the winter months, water flow into the reservoirs will be lowest.

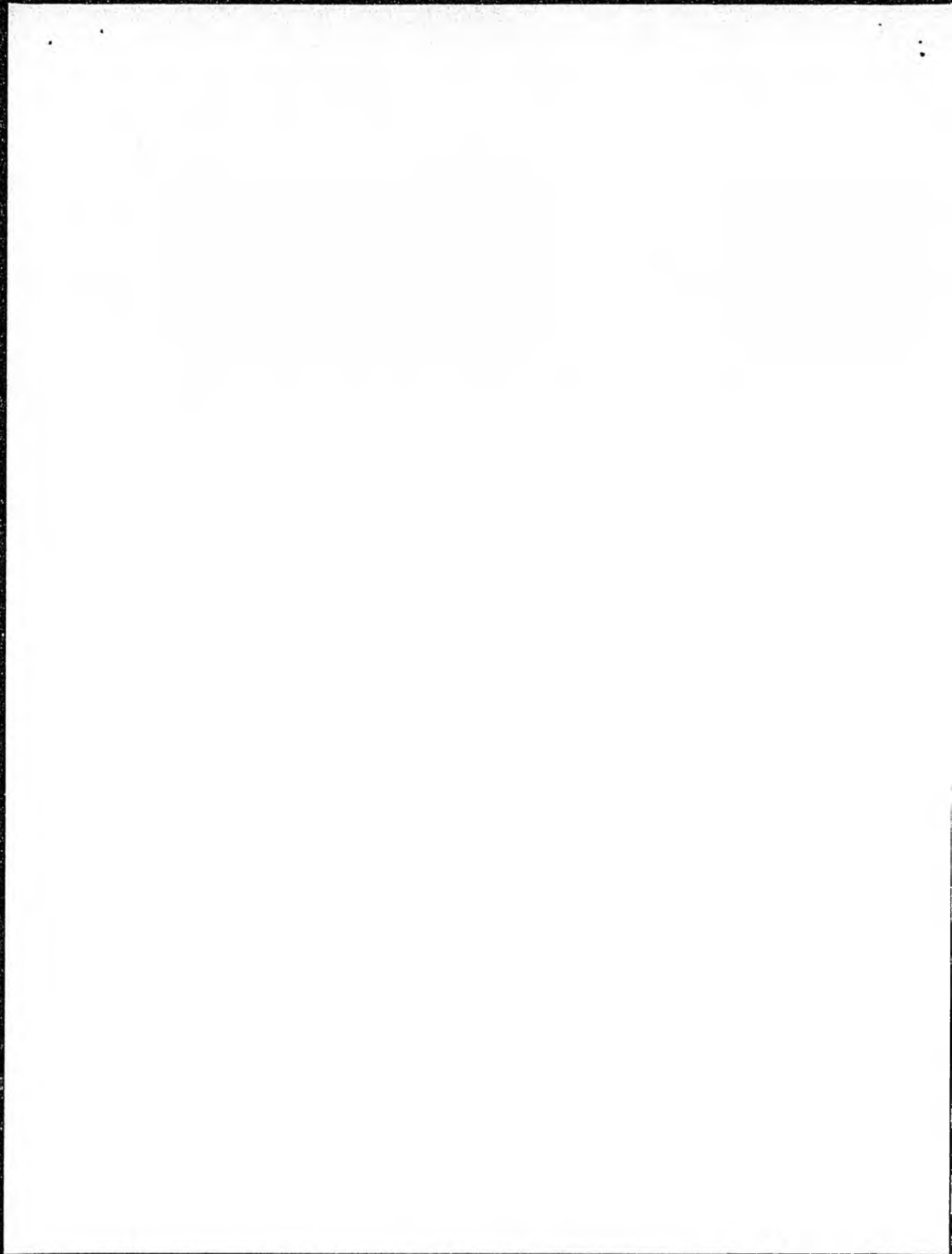
Most Alaskans are not prepared to take the almost inevitable seismic risk in order to secure electrical energy whose need has yet to be demonstrated.

4. The Susitna project poses a significant threat to the region's fisheries and wildlife.

We believe that the effects of the Susitna project on fisheries and wildlife have been severely underplayed by the Corps. Our brief talks with biologists have alerted us to the probability that the project could drastically reduce the Susitna River's salmon production, seriously reduce Nelchina Basin moose and caribou stocks, and as a result, decrease recreational opportunity while simultaneously increasing local recreation pressures on remaining wildlife. A full and careful evaluation of these aspects must be undertaken by competent people before getting into the Susitna dam project.

More than 20% of the State's total moose harvest comes from the game unit surrounding the proposed Susitna project. The Alaska Department of Fish and Game considers the Nelchina Basin within which the Susitna project will be located, one of the most important game areas in the State, providing large numbers of game animals and roadside access for hunters and viewers. A very significant part of fall and winter moose habitat used by moose in this unit would be covered by the impoundments. This could mean a considerable reduction in moose numbers which would limit hunting and viewing opportunities.

The calving grounds for the Nelchina caribou herd (20,000 animals) are near the proposed impoundment sites. Movement of animals to and from the calving ground could be impeded by the reservoirs. Considerable mortality to the herd could result during the crossings. More likely, as with reindeer in Norway, they may cease migrating. The ensuing limitation of range can be expected to cause a drastic plunge in their population. Most non-migrating herds number in the hundreds. The feasibility study itself could adversely affect the caribou herd. The study would build a road to the dam sites, creating access for many people. Ensuing trails could lead people directly into the calving grounds. In 1978 close to 3,000 people applied for permits to hunt the Nelchina caribou herd.



Adjacent to these lands, in McKinley Park, the McKinley caribou herd has deteriorated badly. It is questionable whether it will ever recover. The Nelchina caribou herd of 20,000 animals is really the only other herd of account in the Interior. With the pipeline already affecting the Western Arctic herd and the threat of oil and gas development in the Arctic National Wildlife Range that could disastrously affect the Porcupine herd, we may find in the future that the Nelchina herd is of national significance.

Thirty-eight percent of the Cook Inlet salmon harvest comes from the Susitna. The Susitna River is the highest producing river into Cook Inlet of all salmon species, save the sockeye. It is the second or third highest producer of sockeye salmon. In the winter the Susitna runs clear, and thus it is satisfactory for the rearing of juvenile salmon which move into it at that time. The dam would probably cause the winter waters to run silty and, thus, would be unsatisfactory for that purpose. This condition would affect the entire length of the river down to the mouth. Also, the probable decrease in water level downstream from the dam to the mouth during summer would reduce the existence of and access to spawning sites.

5. An adequate analysis of Alaska's choices of alternate energy paths has not yet been made.

To construct and become dependent upon a single, centralized energy source is contrary to what we consider to be good energy planning for Alaska. Rather, we feel that energy sources should be decentralized and varied. Several alternatives are available for Alaska and need to be investigated in greater detail before becoming locked into a Susitna project. At least 32 alternate smaller-scale hydro-power sites have been identified in the Alaskan railbelt area. In-depth studies of these potential hydro-sites is conspicuously lacking. To our knowledge, only cursory studies have been made and these were done during the late 1940's. Smaller-scale hydro holds a distinct advantage over Susitna. Such projects could come on line much sooner and could be incremented in to meet energy demands as they occur. We feel that a thorough evaluation of this alternative hydro-power path is needed before proceeding with Susitna.

Proper insulation of homes and businesses and other conservation measures can lead to tremendous savings of energy. Further, although many people find it hard to believe, solar power in Alaska is becoming increasingly practical. New homes are being designed to take advantage of passive solar heating and solar heated water tanks in the Fairbanks area have been shown to be competitive with electrically heated water tanks. Because they are labor intensive, such conservation alternatives can significantly increase local employment. Furthermore, purchase of construction materials for such improvements would greatly benefit local business and add to the diversification of local economies.

Another alternative which has not yet been fully explored, is the potential of direct use of natural gas for home heating, water heating,

and cooking in Alaska. Such direct use of natural gas has been shown to be twice as efficient as using gas-generated electricity for these same purposes. Studies have shown increased use of natural gas for home space heating in the Anchorage area. This trend is expected to continue into the foreseeable future.

The New Carter Water Policy requires that the federal agency considering a dam must prepare a nonstructural or demand reducing alternative. No effort has been made by any agency to do this.

Summary

We feel that the Army Corps of Engineers, the Alaska Power Administration and the Alaska Power Authority (a state agency) are overstepping the bounds of their authority in their attempts to circumvent the State's planning process, by trying to impose an energy policy onto the State. We further feel that the seriousness of the problems regarding economic feasibility, financing, geologic hazards, and environmental risks warrant delay of any action on the Susitna project until:

1. An independent evaluation of the Corps' projected construction costs, economic feasibility, financing and geologic-environmental risks can be made.
2. Alaska's energy alternatives and choices of paths for growth and development are fully examined.
3. The Alaskan citizenry has been made fully aware of the implications of Susitna power and of what alternate choices are available.
4. The public is allowed to participate in choosing the direction in which the State is to proceed.

QUESTIONS ON THE ECONOMIC FEASIBILITY OF THE SUSITNA PROJECT, ALASKA
PUT FORTH BY THE OFFICE OF MANAGEMENT AND BUDGET

There are a number of areas where additional information on the Susitna Project is needed to provide an adequate basis for assessing its engineering and economic feasibility. These areas are as follows:

1. Watana site geology and test borings

The cost estimates for Watana have been derived without benefit of any test borings at the Watana Site. This is a departure from standard Corps practice, which calls for exploratory drilling at all sites before projects are proposed for authorization. Test borings would provide more reliable data on which to base cost estimates and on which to assess any potential seismic problems. The Watana Site is located near the Susitna fault and also within 50 miles of the Denali fault-- an area where major earthquakes have occurred in the past.

2. Contingency estimates

A standard 20% contingency factor was used in arriving at cost estimates. A contingency of 30% could result in reducing the benefit cost ratio to 1. A larger contingency factor could reduce the ratio below unity. The recently completed Snettisham project in Alaska cost 36% more than original estimates, after correction for inflation.

A review of the 20% contingency factor should be undertaken in light of the best existing information on comparable projects and project locations.

3. Area redevelopment benefits

These benefits are a correction for the use of otherwise unemployed labor during construction. Though standard procedures permit this benefit category for power projects, it would seem that such benefits should not be accepted in the Susitna Report because private development for power purposes would produce equivalent benefits.

An evaluation of the validity of the use of ARA benefits in the Susitna Report should be made.

4. Construction schedule

The 11-year construction schedule for the Watana project, based on preliminary inspection of comparable projects, appears to be on the short side. A longer schedule of 14 years appears more reasonable because of (1) normal slippages and (2) a three-year peak construction schedule that calls for more work to be put in place on a single site than the Corps has ever accomplished in similar time periods. This should be reexamined and its effects on the project B/C ratio calculated.

5. Supply estimates

The analysis of the without project condition needs to be expanded considerably to clearly analyze the following:

1. Why, with natural gas projected to be in such short supply, the Anchorage utilities have only contracted for 55% of proved reserves or 25% of estimated ultimate reserves.
2. The sensitivity of the analysis to the collapse of OPEC and the cost of shipping oil to the East Coast.
3. The necessity for an Anchorage-Fairbanks intertie at a cost of \$200-300 M.
4. Scheduling of powerplants and the reduced risk of building small increments.

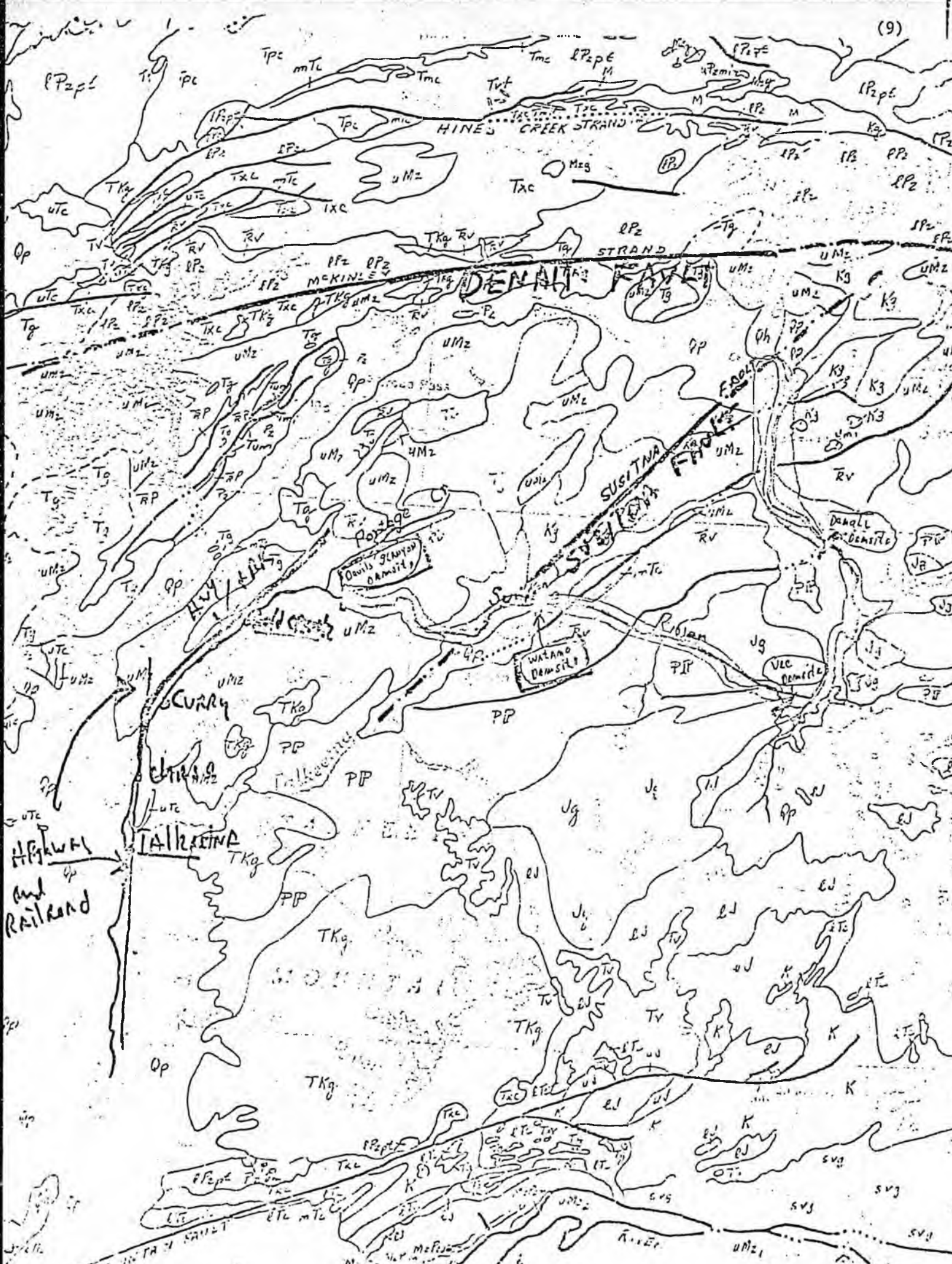
6. Demand estimates

The analysis of load growth should be more specific with respect to:

1. Increasing use by consumers; and,
2. Increasing number of consumers.
3. Industrial growth, i.e., where does Alaska's comparative advantage lie outside the area of raw materials and government functions?

7. Sensitivity analysis

Power demand should be subjected to a sensitivity analysis to better assess the uncertainties in development of such a large block of power. The typical utility invests on the basis of an 8-10 year time horizon. The Susitna plan has an 11-16 year horizon in face of risks that loads may not develop and the option of wheeling power to other markets is not available. It should be noted that the power demand for Snettisham was unduly optimistic when it was built. This resulted in delays in installing generators. A similar error in a project the size of Susitna would be much more costly and would have a major adverse effect on the project's economics.



H. Reame

Susitna Hydro Power

Plan of Study





DEPARTMENT OF THE ARMY

ALASKA DISTRICT, CORPS OF ENGINEERS

P.O. BOX 7002

ANCHORAGE, ALASKA 99510

REPLY TO
ATTENTION OF:

NPAEN-US

28 June 1978

Mr. Eric Yould
Executive Director
Alaska Power Authority
333 West 4th - Suite 31
Anchorage, Alaska 99501

Dear Mr. Yould:

I am pleased to submit in response to your 19 January letter the final Susitna Plan of Study prepared by the Alaska District, Corps of Engineers, for the State of Alaska, under provisions of Title 3, the Intergovernmental Cooperation Act of 1968.

The report incorporates the comments developed by other State agencies, which you provided, in particular those prepared by the Department of Fish and Game. As a result, the intensity of some of the biological studies has been expanded to help identify the magnitude of the resources that will be affected by the Susitna project. The total increase is \$1,886,000 for biological activities.

To offset some of this increase, activities under the categories of survey and foundation and materials have been decreased as the result of the exercise presently under way at the Watana damsite in obtaining information as requested by the President's Office of Management and Budget (OMB). To respond to OMB's review comments on the 1976 Feasibility Report, test borings and geological data are being compiled which reduced the content of several activities outlined in the September 1977 POS draft. This reduction amounted to \$1,150,000 which helped hold the overall cost increase to \$736,000. The total study cost is now \$24.1 million. The price level index was held at September 1977.

The Plan of Study retained the 46-month period to conduct the project feasibility studies based on a 1 May start. Several months of advanced preparation will be required before initiating the activities to allow

NPAEN-US
Mr. Eric Yould

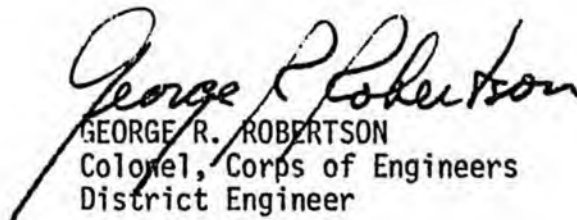
28 June 1978

early mobilization of a camp facility and commence other contract activity actions to assure implementation at the beginning of the summer field season.

The studies will insure optimal basin and system generation planning along with a reasonably accurate cost estimate for the first phase of basin development. These studies represent approximately 25 percent of the total engineering and design effort envisioned for a two-dam complex.

The activities defined in this document have been developed to adequately address determination of project feasibility. The project feasibility analysis program does include suggestions and comments received from various agencies, both Federal and State, and I feel that the program will provide the information necessary for the State to determine desirability of proceeding into construction of a hydroelectric facility in the upper Susitna River basin.

Sincerely yours,


GEORGE R. ROBERTSON
Colonel, Corps of Engineers
District Engineer

PLAN OF STUDY
for
SUSITNA HYDROPOWER
FEASIBILITY ANALYSIS

PREPARED FOR THE STATE OF ALASKA

BY

ALASKA DISTRICT

U.S. ARMY CORPS OF ENGINEERS

JUNE 1978

ACKNOWLEDGEMENTS

This plan of study for Susitna hydroelectric project feasibility planning was prepared with the assistance of personnel from the North Pacific Division, Corps of Engineers; the Seattle, Portland, and Walla Walla Corps of Engineer Districts; the U.S. Army Cold Regions Research and Engineering Laboratory; the U.S. Army Corps of Engineers Waterways Experiment Station; the U.S. Geological Survey; and the Geophysical Institute of the University of Alaska as well as the State agencies that reviewed and commented on the draft. Each of these agencies contributed valuable input in their respective fields of expertise. Also, the numerous comments offered by agencies, groups, and individuals during previous feasibility studies of hydroelectric development on the Susitna River were helpful in formulating this program of additional study.

Cover photo, showing Portage Creek 3 miles downstream from Devil Canyon Dam site, from the Alaska Department of Fish and Game.

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EXECUTIVE SUMMARY

This plan of study (POS) prepared by the Alaska District Corps of Engineers for the State of Alaska presents a program of activities for project feasibility analysis of hydropower development in the Upper Susitna River Basin. It provides a description of each activity along with a cost estimate for its completion. The POS fulfills a Federal planning requirement while also providing the State of Alaska an overview of the planning activities associated with a large scale water resource project. The authority for proceeding with this joint State-Federal planning program is contained in Section 203 of the Water Resources Development Act of 1976 enacted by the 94th Congress. Funding for preparation of the POS was provided by the State of Alaska on 30 June 1977.

Existing electrical generation within the study area is produced almost exclusively by fossil fuel thermal resources. However, as these resources become more scarce, and perhaps very expensive, and as the energy demand increases to a projected 15 billion kilowatt hours by the year 2000, the advantage of non-cost-inflating, renewable energy, such as hydropower, becomes apparent. A feasibility report completed by the Corps of Engineers in 1976 outlined a number of alternative plans for developing the hydropower potential of the Upper Susitna Basin and identified the most economical plan, consisting of a system of two dams--a 635-foot-high concrete thin arch dam at Devil Canyon and an 810-foot-high earthfill dam at Watana, with 365 miles of transmission line. This system is capable of developing 6.1 billion kilowatt hours of firm annual energy, roughly triple the energy consumed in Anchorage and Fairbanks in 1974. While the 1976 feasibility report provided sufficient data to support the need and economic feasibility of a plan to develop the hydroelectric potential of the Upper Susitna Basin, it was recognized that additional field data and more detailed studies would be required. The POS outlines the additional studies required to determine the most cost-effective plan, and its environmental impacts.

The activities outlined in the POS have a total estimated cost of \$24.1 million over a time frame of 46 months. The schedule is based on early notification of program initiation and timely receipt of study funds to allow mobilization for field explorations prior to

the summer season and arrangements for access to the sites. A critical path method network (CPM) shows the interrelationship of some 202 activities and indicates those activities and timing most critical for completion of the project feasibility analysis. Early acquisition of field data about foundation conditions, stream flows, and topographic surveys during the short summer months is very important.

Study management of physical and fiscal progress must be rigorously maintained throughout the 46-month period. Periodic progress reports and a report of expenditures would be provided the State of Alaska for their information and review. The project feasibility analysis activities have been programmed through three progressive steps: (1) preliminary screening, (2) detailed feasibility studies, and (3) detailed design studies for Watana, access road, and transmission system.

Preliminary Screening: In step 1 of the study, a number of potential damsites and combinations of different dams and heights would be evaluated to identify the most economical and environmentally acceptable plan based on a preliminary calculation of benefits and costs. During this study phase, the best plan identified in the 1976 feasibility report, Watana constructed initially followed by construction of Devil Canyon, would be reexamined. This first step is estimated to cost \$4.3 million and be completed in 7 months. In order to meet the overall study schedule of 46 months, field work needed in later phases of the study has been scheduled concurrently with the preliminary study phase and these costs are included in the subtotal of \$4.3 million. Results of the preliminary phase will provide the first important decision point as to whether the study should continue into the second step of detailed feasibility studies.

Detailed Feasibility Studies: Detailed studies would be concentrated on the best plan identified in the preliminary screening. Costs and benefits would be refined using more accurate data obtained from ongoing field work. This second step is estimated to cost \$16.7 million and be completed in 25 months after completion of the initial step. As indicated above, additional field work would continue during this phase of the study and these costs have been included in the subtotal of \$16.7 million. Also included are concurrent activities required for detailed design studies. Completion of the detailed feasibility report will provide a firm basis for recommending for or against construction of the project, whether Federally funded, State supported under Section 203, or totally financed by the State of Alaska.

Detailed Design Studies: Assuming a favorable showing of feasibility in step 2, the last step would be detailed design of any dams, powerhouses, access roads, and some 365 miles of double circuit transmission lines and substations to deliver power to the Anchorage and Fairbanks

load centers. A detailed and accurate cost estimate for construction of the initial element in a dam system will be provided to enable a decision on funding and initiation of construction. The third step is estimated to cost \$3.1 million and be completed in an additional time frame of 14 months after completion of step 2.

The above estimates of cost and time for completion of the three steps are based on the findings and recommendations contained in the 1976 feasibility report, and envision a continuation of that planning study leading to the ultimate construction of the project.

At the end of any of the three program steps, Susitna hydroelectric development could be determined to lack economic or environmental justification. Such a conclusion would result in the termination of the planning program and in Federal assumption of responsibility for expended funds. Otherwise, the study costs would be borne by the State of Alaska. Assuming a favorable recommendation, detailed plans and specifications for the first construction contract could be undertaken immediately thereafter.

PURPOSE

The function of the plan of study is to delineate the engineering, economic, social, and environmental studies associated with planning for the Upper Susitna River Basin hydroelectric project, as a prelude to State participation under Section 203 of the 1976 Water Resources Development Act. The study will provide a description of activities to be performed, an estimate of cost and time for accomplishment of these activities, an indication of the activity interdependence, and a schedule of program activities that can serve as a management tool during the study effort. Should the State of Alaska desire to work toward development of the Upper Susitna Basin outside the provisions of the 1976 Water Resource Development Act, the plan of study will serve as a guide in assessing other proposals for analyzing the economic feasibility and environmental impact of the project.

AUTHORITY

The Corps of Engineers is participating in accordance with a Memorandum of Understanding, dated 30 June 1977, between the United States of America and the State of Alaska for preparation of a "Study Outline, Susitna Project." The memorandum directs that,

"The Secretary of the Army, acting through the District Engineer, Alaska, shall prepare a study outline for the Susitna Project for the purpose of detailing the Scope of Work required to provide engineering, environmental, economical, and social information relating to the subject project under the provisions of Title 3, Public Law 90-577, 16 October 1968, the Intergovernmental Cooperation Act of 1968."

Studies considered in the Plan of Study were authorized by Public Law 94-587, entitled "Water Resources Development Act of 1976" enacted by the 94th Congress on 22 October 1976.

The authorizing legislation provided for two options for the conduct of Phase I studies. Section 160 states that,

"The Secretary of the Army, acting through the Chief of Engineers, is authorized to undertake the Phase I design memorandum stage of advanced engineering and design of the project for hydroelectric power on the Susitna River, Alaska, in accordance with the recommendations of the Board of Engineers for Rivers and Harbors in its report dated June 24, 1976, at an estimated cost \$25,000,000. This shall take effect upon submittal to the Secretary of the Army by the Chief of Engineers and notification to Congress of the approval of the Chief of Engineers."

The possibility for State of Alaska funding of Phase I studies is provided for by Section 203(e) which states,

"The Secretary is authorized to make expenditures from the [Alaska Hydroelectric Development fund] for the Phase I design memorandum stage of advanced engineering

and design for any project in Alaska that meets the requirements of Subsection (a)(2) of this Section, if appropriate non-Federal public authorities, approved by the Secretary, agree with the Secretary, in writing, to repay the Secretary for all the separable and joint costs of preparing such design memorandum, if such report is favorable. Following the completion of the Phase I design memorandum stage of advanced engineering and design under this subsection, the Secretary shall not transmit any favorable report to Congress prior to being repaid in full by the appropriate non-Federal public authorities for the costs incurred during such Phase I. The Secretary is also authorized to make expenditures from non-Federal funds deposited in the fund as an advance against construction costs."

Funds were provided for preparation of the Plan of Study by the State of Alaska on 30 June 1977.