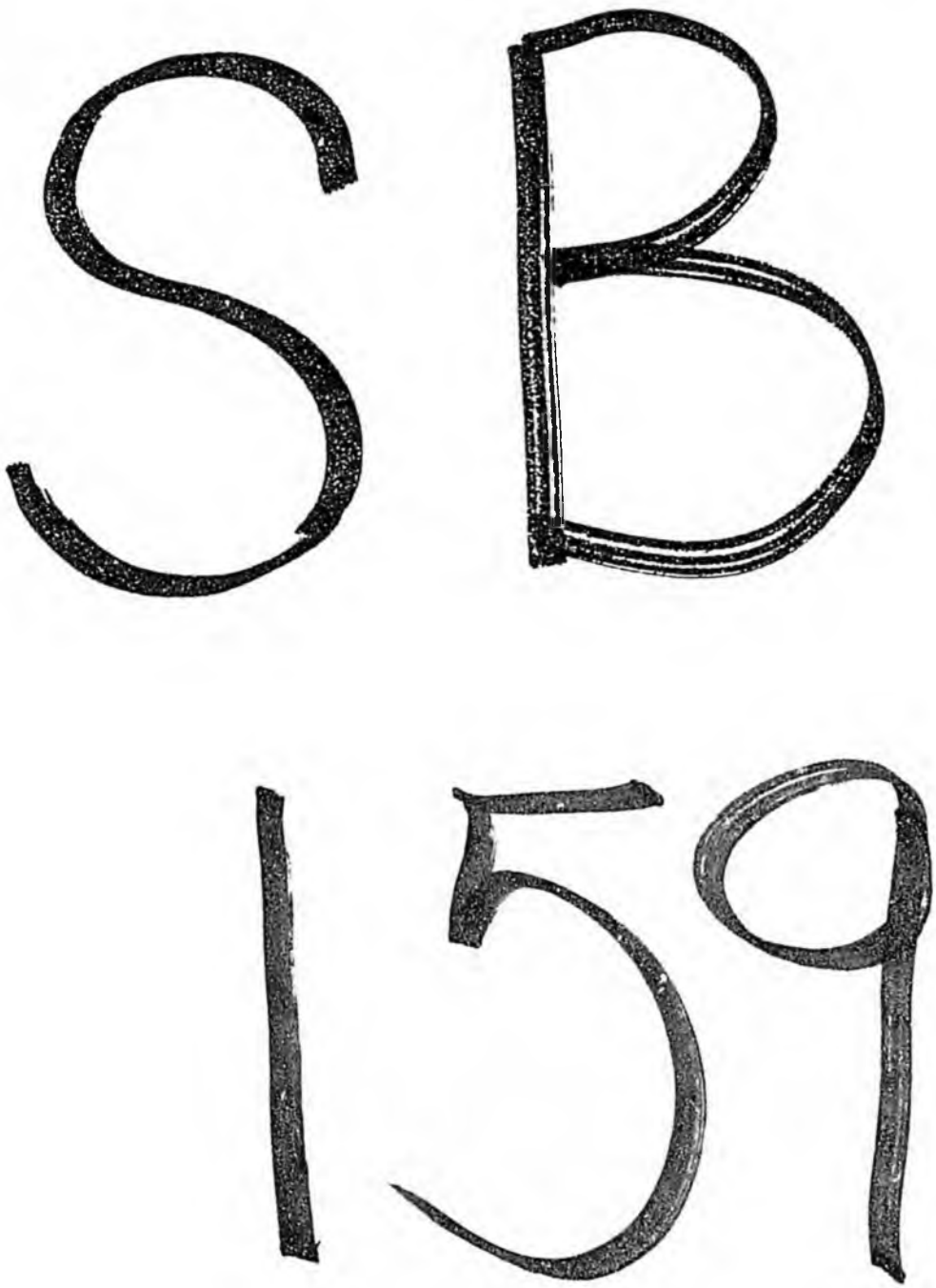

HOUSE COMMITTEE REPORT

(9)

Date referred: 3/13/87 FURTHER REFERRALS: Finance

DATE: 4/24/87

The Resources Committee has considered SB 159

"An Act amending an appropriation to the Alaska Power Authority for the Bradley Lake Hydroelectric Project; and providing for an effective date."

RECOMMENDS:

[ ] replace with _____ [ ] the same title

[ ] attached amendment(s) [ ] a new title

[ ] do pass

[ ] do not pass

[✓] no recommendation

[ ] individual recommendations

[ ] additional referral to the _____ Committee

ADOPTS: [ ] _____ letter of intent

ATTACHES NEW FISCAL NOTE(s):

[ ] fiscal impact [✓] same as previous fiscal note published _____

[ ] zero fiscal note

[ ] zero with analysis [ ] same as previous zero fiscal note published _____

SIGNING DO PASS:

Sam Cotten

Mike Navarre

SIGNING OTHER RECOMMENDATIONS:

Hannah Sawyer No rec.

Dick Shultz No Rec

Cliff Davidson no rec

Willie Konteah - Do not pass

Sam Cotten

Chairman's signature

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

P.O. Box Y, State Capitol
Juneau, Alaska 99811-3100
Mail Stop 3100
(907) 465-3991

March 18, 1987

MEMORANDUM

TO: Representative Sam Cotten

FROM: Ginny Fay and Gretchen Keiser
Legislative Analysts

RE: Railbelt Energy Analysis
Research Request 87.114

As presented in the House Research Agency Railbelt Energy Analysis outline, this memorandum covers **Railbelt energy demand** and the **Bradley Lake project feasibility analysis.** The first section of the memorandum provides information on Railbelt energy demand and utility capacity. This discussion is followed by an examination of the Bradley Lake feasibility analysis prepared by the Division of Policy in the Governor's Office. The final section recalculates Bradley Lake net benefits based on revised projections of Railbelt energy demand and capacity requirements and other assumptions incorporated in the Division of Policy's analysis.

SUMMARY OF FINDINGS

- This analysis of Railbelt energy demand is based on an examination of projected peak demand, capacity reserve requirements capacity retirement schedules, the Alaska Department of Revenue's statewide population forecast, and Public Utility Regulatory Policy Act (PURPA) facilities planned in the Railbelt area.[1] Because of the influence of population on energy demand, there is no basis for forecasting a near-term increase in energy consumption while population in the Railbelt is declining (page 3).

- Actual 1986 net generation and peak demand were seven percent less than APA projections. Our forecast, for the years 1987 through 2010, incorporates this initial decline in energy consumption. It

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[1]Public Utility Regulatory Policy Act (PURPA) electrical power production in this memorandum generally refers to small power production and cogeneration facilities as defined and regulated by Chapter 1 of the Federal Energy Regulatory Commission, PURPA of 1978.

also incorporates further reductions in energy demand as a result of near-term population declines. The APA forecast, prepared in 1985, has not been subsequently adjusted for lower actual use in 1986. The APA forecast for required production capacity overestimated required capacity by 12.1 percent in 1986 and is 33.9 percent above our adjusted forecast by the year 2001 (pages 3-6).

- For the Railbelt as a whole, existing electrical production capacity (plus PURPA generators) will satisfy peak and reserve requirements until the year 2000. There will be over 28 percent more capacity than required for reserve margins until 2000 as a result of: 1) past power plant construction based on earlier population growth projections; and 2) lower reserve requirements as a result of integrating stand-alone systems (pages 6-18).

- Following revisions to assumptions regarding the costs to complete Bradley Lake and the projected Cook Inlet gas prices and escalation rates, the Division of Policy's analysis concluded that Bradley Lake is still economically feasible and is likely to be less expensive than alternative gas generation over the 50-year period of analysis (pages 18-20).

- The division's assumptions regarding gas prices appear to be reasonable. However, we disagree with the division's fundamental assumption regarding future Railbelt energy demand and their conclusion that additional capacity will be needed by 1991. We believe the division's analysis addresses the issue as "which is the less expensive option to construct excess capacity?" instead of "what is the least cost means of meeting projected Railbelt demand for electrical power?" (page 20).

- Following revisions to assumptions regarding gas plant fuel efficiencies and cost to complete Bradley Lake, we recalculated the net savings of Bradley Lake under three scenarios. The base case scenario, which assumes (as the Division of Policy did) that new power is needed by 1991, projects Bradley Lake net savings of $86 million--virtually identical to those projected by the Division of Policy. Our second scenario, which delays Bradley Lake or gas plant construction until power is needed, indicates that Bradley Lake would not be economically feasible if completion of the project were delayed until Railbelt energy demand warranted new capacity in the late 1990s (pages 21-24).

- Our third scenario--which compares Bradley Lake if constructed as currently scheduled with a gas plant constructed when power is needed in the late 1990s--projects considerably lower Bradley Lake net savings of $36 million. The positive net savings indicate that

the project should proceed, although from a public policy perspective, the relatively low net savings increase the risk that in retrospect we will have made a poor decision if forecast gas prices are only slightly lower than assumed (page 23).

- The analysis is sensitive to changes in other assumptions to varying degrees. The analysis is most sensitive to assumptions which directly affect annual fuel costs--including the gas turbine fuel efficiency assumption (pages 24-27).

RAILBELT ENERGY DEMAND AND CAPACITY REQUIREMENTS

This analysis of Railbelt energy demand is based on an examination of projected and peak demand, capacity reserve requirements, and retirement schedules that were developed by the Alaska Power Authority (APA). The demand projections and capacity retirement schedules were prepared by the APA based on estimates obtained from Railbelt utilities. In addition, we examined the Department of Revenue's (DOR) historic and forecast population numbers and information from the Alaska Public Utilities Commission (APUC) on Public Utility Regulatory Policy Act (PURPA) facilities planned in the Railbelt region.

Our analysis also looks at electrical energy demand and power plant capacity from a regional rather than individual utility standpoint. This perspective is used because the existing Alaska Intertie Agreement and proposed Bradley Lake Project Power Sales Agreement provide an interconnected, organizational framework and facilities for energy planning in the Railbelt as a region as opposed to stand-alone public utilities. Furthermore, the Railbelt Energy Fund is intended to provide energy services to residents of the region rather than to individual utilities in the Railbelt.

Energy Demand

In analyzing Railbelt energy demand, we reviewed historic net generation and the APA's projected demand (Attachment A). These trends were examined in light of historic and projected state population figures (Table 1) and actual 1986 net generation and peak demand (Table 2).[2] The historic energy generation and population figures, as well as numerous models of energy demand, indicate that population is a primary variable in determining energy demand levels. **Because of the influence of population on energy demand, there is no basis for forecasting a near-term increase in energy consumption while population in the Railbelt is declining.** We, therefore, adjusted the energy demand forecast to reflect this projected population decline.

---

[2]The Alaska Department of Revenue historic and forecasted number of Permanent Fund Dividend check recipients is used as a proxy for state population trends.

TABLE 1
ALASKA STATE POPULATION* 1981 - 1999

YEAR	DIVIDEND RECIPIENTS (in thousands)
1981	430.1
1982	478.8
1983	486.8
1984	483.1
1985	520.9
1986	530.8
1987	527.2
1988	525.8
1989	528.1
1990	530.3
1991	532.5
1992	534.6
1993	536.8
1994	538.9
1995	541.1
1996	543.3
1997	545.5
1998	547.8
1999	549.9

* Based on the number of Permanent Fund dividend check recipients.

Source: Alaska Department of Revenue, March 1987.

Prepared by the House Research Agency, March 1987 (POP; 861217-29).

TABLE 2

PROJECTED* AND ACTUAL 1986 RAILBELT PEAK DEMAND AND CAPACITY AND RESERVE REQUIREMENTS.

UTILITY	PROJ. 1986	ACTUAL 1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CAPACITY REQUIREMENTS																										
Anchorage																										
ML&P	184.2	181.0	181.6	[illegible]		[illegible]	143.0	143.7	144.4	145.1	145.9	146.6	147.3	148.1	148.8	149.6	150.3	151.1	151.8	152.6	153.3	154.1	54.9	155.6	156.4	157.2
CEA (retail)	191.3	180.6	176.5	[illegible]	[illegible]	176.7	180.6	181.5	182.4	183.3	184.2	185.1	186.1	187.0	187.9	188.9	189.8	190.8	191.7	192.7	193.6	194.6	195.6	196.6	197.5	198.5
AEA	80.3	81.5	83.5	85.3	86.7	91.0	91.5	91.9	92.4	92.9	93.3	93.8	94.3	94.7	95.2	95.7	96.2	96.7	97.1	97.6	98.1	98.6	99.1	99.6	100.1	100.6
Subtotal	445.8	443.1	441.6	439.7	441.4	413.0	415.1	417.1	419.2	421.3	423.4	425.5	427.7	429.8	432.0	434.1	436.3	438.5	440.7	442.9	445.1	447.3	449.5	451.8	454.1	456.3
Kenai Peninsula		74.+																								
HEA	79.0	88.4	87.7	91.0	87.8	68.1	68.4	68.7	69.1	69.4	69.8	70.1	70.5	70.8	71.2	71.5	71.9	72.3	72.6	73.0	73.3	73.7	74.1	74.4	74.8	75.2
CEC	7.0	6.3	6.2	6.2	6.2	6.3	6.3	6.3	6.4	6.4	6.4	6.5	6.5	6.5	6.6	6.6	6.6	6.7	6.7	6.7	6.8	6.8	6.8	6.9	6.9	7.0
Subtotal	86.0	94.7	93.9	97.2	94.0	74.4	74.7	75.1	75.4	75.8	76.2	76.6	77.0	77.3	77.7	78.1	78.5	78.9	79.3	79.7	80.1	80.5	80.9	81.3	81.7	82.2
Fairbanks																										
FMUS	29.3	28.6	28.3	28.2	28.3	28.5	28.5	28.7	28.9	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	30.5	30.7	30.8	31.0	31.1	31.3	31.4
GVEA	85.8	85.2	84.3	84.1	84.4	84.8	85.2	85.6	86.0	86.5	86.9	87.3	87.8	88.2	88.7	89.1	89.5	90.0	90.4	90.8	91.4	91.8	92.3	92.7	93.2	93.7
Subtotal	115.1	113.8	112.7	112.3	112.8	113.2	113.8	114.4	114.9	115.5	116.1	116.7	117.2	117.8	118.4	119.0	119.6	120.2	120.8	121.4	122.0	122.6	123.2	123.9	124.5	125.1
TOTAL PEAK DEMAND	646.9	601.6	597.6	595.8	598.2	600.5	603.5	606.6	609.6	612.5	615.7	618.8	621.9	625.0	628.1	631.3	634.4	637.6	640.8	644.0	647.2	650.4	653.7	657.0	660.3	663.6
RESERVE REQUIREMENTS																										
Anchorage	----	124.5	123.1	122.9	123.4	123.9	124.5	125.1	125.8	126.4	127.0	127.7	128.3	128.9	129.6	130.2	130.9	131.5	132.2	132.9	133.5	134.2	134.9	135.5	136.2	136.8
Kenai	----	22.4	22.2	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.9	23.0	23.1	23.2	23.3	23.4	23.6	23.7	23.8	23.9	24.0	24.1	24.3	24.4	24.5	24.6
Fairbanks	----	34.1	33.9	33.7	33.8	34.0	34.1	34.3	34.5	34.7	34.8	35.0	35.2	35.4	35.5	35.7	35.9	36.1	36.2	36.4	36.6	36.8	37.0	37.2	37.3	37.5
TOTAL RESERVE REQUIREMENT	----	181.1	179.3	178.7	179.4	180.2	181.1	182.0	182.9	183.8	184.7	185.6	186.6	187.5	188.4	189.4	190.3	191.3	192.2	193.2	194.2	195.1	196.1	197.1	198.1	199.1
TOTAL SYSTEM CAPACITY REQUIREMENT	784.7	778.8	774.5	777.6	780.7	784.6	788.5	792.5	796.4	800.4	804.4	808.4	812.5	816.6	820.6	824.7	828.9	833.0	837.2	841.4	845.6	849.8	854.0	858.3	862.6	
AEA FORECAST	879.3	937.2	919.8	926.4	951.1	952.4	973.6	992.3	1004.3	1004.3	1004.3	1008.7	1022.8	1064.6	1084.6	1104.1	—	—	—	—	—	—	—	—	—	
Percent Excess Demand in AEA Forecast	10.7	16.8	16.0	19.1	21.9	22.7	23.6	25.2	26.1	25.5	24.8	24.8	25.9	30.4	32.2	33.9	—	—	—	—	—	—	—	—	—	

* Based on AEA and Railbelt utilities' forecast demand

Sources: Alaska Power Authority, Alaska Public Utilities Commission, Railbelt Utilities, Alaska Dept. of Revenue.

Prepared by the Alaska Research Agency, March 1987 (Demand2; 861217-29).

Actual 1986 net generation and peak demand were seven percent below APA projections. We substituted actual 1986 energy usage for the APA forecast in Table 2. In subsequent years, population projections were used as an indicator of the direction and magnitude of changes in energy demand.[3] The Department of Revenue forecasts a decline in population between 1986 and 1989; the Alaska population is not expected to return to 1986 levels until approximately 1991.[4] Based on this forecast, Table 2 shows a similar decline in Railbelt energy demand for the year. 1987 through 1989.

Beginning in 1990, demand increases proportionally to the slight 0.5 percent annual increase in population until the year 2000. This projection closely coincides with Chugach Electric Association's revised demand forecast of 0.55 percent annual growth as presented in the Division of Policy's feasibility analysis. Projected electrical energy demand for the years 1991 through 2010 is based on a 0.5 percent compounded growth rate.

Utility Capacity and Retirement Schedules

Information on current Railbelt standing capacity and retirement is presented in Tables 3 - 5 for the subregions of Anchorage, the Kenai Peninsula, and Fairbanks. These tables are identical to those prepared by the APA with the exception of the addition of three PURPA power plants planned in the Anchorage area and one PURPA power plant planned in the Fairbanks area. Plant retirement schedules have not been altered because the utilities believe these November 1985 Susitna hydroelectric project retirement projections continue to be valid.[5]

The utilities' retirement schedule of installed capacity is referred to as conditional retirement. It is the anticipated date that generating turbines require replacement or rebuilding. Conditional retirement is influenced by both physical and economic factors. Physical factors include the level of facility usage and the consequent "wearing out" of equipment. Because it is possible to completely or partially rebuild natural gas turbines, their retirement schedules can be incrementally adjusted. These conditional retirement dates can, therefore, be influenced significantly by economic and technological factors such as the price of natural gas and fuel efficiency of equipment.

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[3]Because the majority of the state's population resides in the Railbelt, we believe these statewide numbers are a reliable indicator of changes in the Railbelt population.

[4]The 1986 number is based on the number of residents who claimed a Permanent Fund Dividend check for that year. They could, however, have left the state before the end of calendar year 1986.

[5]Richard Emerman, Economist, Alaska Power Authority, Anchorage, personal communication, March 4, 1987.

TABLE 3
POWER PRODUCTION CAPACITY AND RETIREMENT IN ANCHORAGE

Unit name	Unit Owner	Principal Fuel	Generating Capacity (MW)	Retirement Date
Eklutna	APAd	Hydro	30.0	----
AMLPCT#1	AMLP	NG	16.2	1990
AMLPCT#2	AMLP	NG	16.2	1990
AMLPCT#3	AMLP	NG	19.9	1991
AMLPCT#4	AMLP	NG	33.8	1992
AMLPCC#56	AMLP	NG	47.5	1999
AMLPCC#76	AMLP	NG	109.3	1999
AMLPCT#8	AMLP	NG	87.0	2009
BEL CT#1	CEA	NG	16.1	1994
BEL CT#2	CEA	NG	16.1	1994
BEL CT#3	CEA	NG	49.5	1999
BEL CT#4	CEA	NG	10.0	1996
BEL CT#5	CEA	NG	67.3	1999
BEL CC#68	CEA	NG	100.6	2007
BEL CC#78	CEA	NG	100.6	2007
INT CT#1	CEA	NG	14.3	1996
INT CT#2	CEA	NG	14.3	1996
INT CT#3	CEA	NG	19.9	1996
PURPA#1*	MSE	Peat	20.0	2025
PURPA#2*	MSV	WC	20.0	2025
PURPA#3**	SGI	Coal	50.0	2027

* Anticipated start-up date is 1990.
** Anticipated start-up date is 1992.

Legend:
APAd= Alaska Power Administration
AMLP= Anchorage Municipal Light and Power
CEA= Chugach Electric Association
MSE= MatSu Energy
MSV= MatSu Valley
SGI= SGI, Inc.
CT= Combustion Turbine
NG= Natural Gas
WC= Wood Chips

Source: Alaska Power Authority, February 1987; Alaska Public Utilities Commission, March 1987.

Prepared by the House Research Agency, March 1987 (Anchorage; 861217-29).

TABLE 4
POWER PRODUCTION CAPACITY AND RETIREMENT ON THE KENAI PENINSULA

Unit Name	Unit Owner	Principal Fuel	Generating Capacity (MW)	Retirement Date
BERNCT#1	CEA	NG	8.9	1988
BERNCT#2	CEA	NG	18.4	1997
BERNCT#3	CEA	NG	27.2	2004
BERNCT#4	CEA	NG	27.2	2004
COOPER LAKE	CEA	Hydro	17.4	----
SOLDOTCT#1	AEG&T	NG	38.5	2011
SELDIC#1-4	HEA	OIL	2.1	2000
SESIC#1-3	SES	OIL	5.5	1995

Legend:
CEA= Chugach Electric Association
AEG&T= Alaska Electric Generation and Transmission Cooperative
HEA= Homer Electric Association
SES= Seward Electric System
CT= Combustion Turbine
NG= Natural Gas
IC= Internal Combustion

Source: Alaska Power Authority, February 1987; Alaska Public Utilities Commission, March 1987.

Prepared by the House Research Agency, March 1987 (Kenai; 861217-29).

TABLE 5
POWER PRODUCTION CAPACITY AND RETIREMENT IN FAIRBANKS

Unit Name	Unit Owner	Principal Fuel	Generating Capacity (MW)	Retirement Date
CHENST#1	FMUS	Coal	5.1	2000
CHENST#2	FMUS	Coal	2.0	2000
CHENST#3	FMUS	Coal	1.5	2000
CHENCT#4	FMUS	Oil	6.1	1987
CHENST#5	FMUS	Coal	20.0	2005
CHENCT#6	FMUS	Oil	26.1	2006
FMUSIC#1	FMUS	Oil	2.8	1992
FMUSIC#2	FMUS	Oil	2.8	1992
FMUSIC#3	FMUS	Oil	2.8	1992
HEALST#1	GVEA	Coal	25.0	2002
HEALIC#2	GVEA	Oil	2.6	1997
NOPOCT#1	GVEA	Oil	60.9	2006
NOPOCT#2	GVEA	Oil	60.9	2007
ZENCT#1	GVEA	Oil	18.0	2001
ZENCT#2	GVEA	Oil	18.0	2002
DSLIC#1-8	GVEA	Oil	14.7	1996
PURPA#1**	AEM	WC	25.0	2025

*Chena Units #1-4 Not Currently Operating
** Anticipated start-up date is 1990.

Legend:
FMUS= Fairbanks Municipal Electric Association
GVEA= Golden Valley Electric Association
AEM= AEM, Inc.
ST= Steam Turbine
CT= Combustion Turbine
IC= Internal Comustion
WC= Waste Coal

Source: Alaska Power Authority, February 1987; Alaska Public Utility Commission, March 1987.

Prepared by the House Research Agency, March 1987 (Fairbanks; 861217-29).

In general, declines in energy demand tend to postpone the retirement of equipment because the facility is used less, thereby decreasing physical wear. In addition, declines in the price of natural gas reduce the overall cost of plant operation which reduces the desirability of capital investments that increase operational efficiency. The reverse would also be true--increased usage accelerates the physical wearing out of equipment and higher fuel costs makes investment in newer, more efficient equipment relatively more cost-effective than the incremental rebuilding of less efficient equipment. Because these retirement schedules are "moving targets", time constraints for this analysis prevent a thorough examination of these schedules.

The Railbelt generating capacity, net of retirement, was altered to include four planned PURPA facilities in the Railbelt area. Three of these plants (PURPA # 1 - 3, Table 3) are to be built in the Anchorage area; the fourth (PURPA # 1, Table 5) is to be built in the Fairbanks area. The APUC currently has dockets open for these facilities which are scheduled to come on line in approximately 1990. At least two of these PURPA facility corporations have entered into power sales discussions with utilities in the Railbelt.[6] Because of the stage of development of these plants, their estimated 115 megawatts of installed capacity was included in our capacity calculations.[7]

The APA's reserve capacity calculations were also adjusted in our analysis. Reserve capacity in the continental United States is usually set at 15 to 20 percent of peak demand for a totally integrated system (i.e., one which makes possible the sharing of capacity through transmission lines). The contiguous states are also divided into seven reliability councils which provide an organizational structure for the sharing of generating capacity. The ability to share power also allows the sharing of reserve capacity and results in the relatively small percentage of peak demand reserve capacity.

At the opposite end of the reserve capacity spectrum are stand-alone systems, which are common in Alaska. For smaller stand-alone systems such as a one-diesel generator in a rural community, 100 percent backup is not unusual. For larger communities with multiple generators which are not integrated with other power facilities, reserve capacity equal to the capacity of the largest single generator is the general rule. With the development of an integrated system through the construction of interties, the Railbelt has the ability to reduce required reserve capacity.[8]

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[6]Michael Travella, Utilities Engineer, Alaska Public Utilities Commission, personal communication, March 6, 1987.

[7]These electrical power generating facilities and the Federal Energy Regulatory Commission, Public Utilities Regulatory Policies Act of 1978 (PURPA) may warrant further analysis, which this agency can conduct upon request.

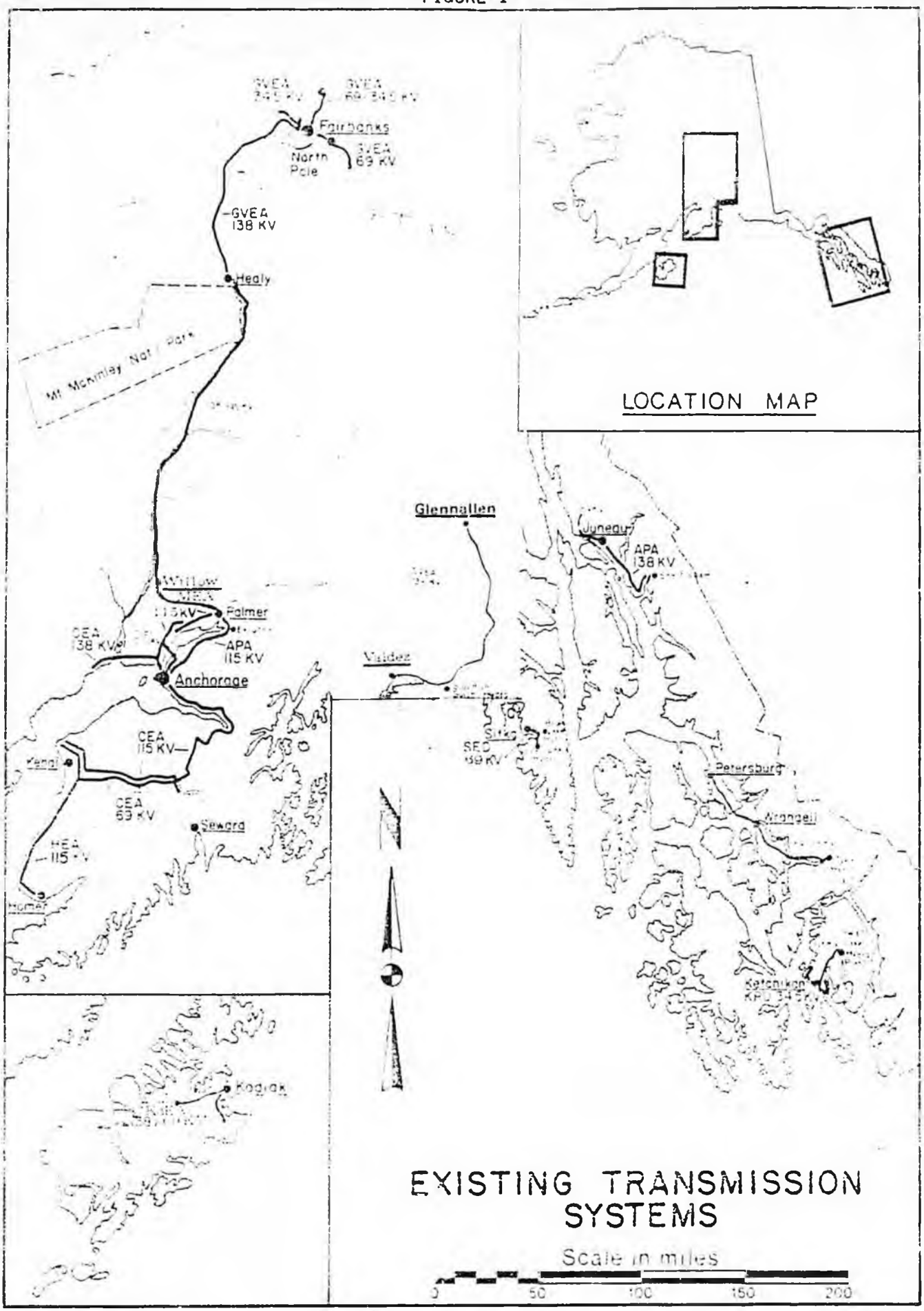
[8]Michael Travella, Utilities Engineer, Alaska Public Utilities Commission, personal communication, March 10, 1987.

All utilities in the Railbelt are currently connected via an intertie system (Figure 1). Following the completion of the Anchorage-Fairbanks intertie, the Alaska Intertie Agreement was signed in December 1985 by Chugach Electric Association, Alaska Municipal Light and Power, Golden Valley Electric Association, Fairbanks Municipal Utility System, and the Alaska Electrical Generation and Transmission Corporation. In this agreement, each utility agreed to a required 30 percent reserve margin. Based on this intertie agreement, the fact that the Railbelt is now an integrated system, and a comparison with national standards, we believe that a 30 percent reserve capacity margin is a reasonable and conservative reserve capacity margin. This analysis, therefore, uses a 30 percent reserve requirement rather than the 40 percent used by the APA.[9]

---

[9]Our analysis also calculated required reserve capacity on a subregional basis (i.e., Anchorage, Kenai, and Fairbanks). This implies that utilities in a subregion will share their reserve capacity via the ability to share power over interties. The APA used this same approach in their Railbelt energy requirements forecast (Table A.2, Attachment A).

FIGURE 1



Source: "Alaska Electric Power Statistics, 1960-1984," Alaska Power Authority, 1985.

Sept. 1985

Capacity vs. Demand

Combining our demand forecast with utility capacity and retirement schedules for the Railbelt and for the Anchorage, Kenai Peninsula, and Fairbanks subregions (Figures 2 - 5), the required schedules for additional capacity are apparent. **For the Railbelt as a whole, existing capacity (plus planned PURPA generators) satisfies projected peak and reserve demand until the year 2000.**[10] Electrical generation capacity exceeds required reserve by more than 28 percent until the year 2000 as a result of: 1) past plant construction based on earlier population growth projections; and 2) lower reserve requirements as a result of integrating stand-alone systems. Similarly for the Anchorage subregion, there is adequate capacity until the year 2000.[11] On the Kenai Peninsula, there is sufficient capacity until the year 2005; there is also substantial excess capacity until 1998. In the Fairbanks area, existing capacity can provide energy services until 2007. There will be approximately 65 percent excess capacity (over required reserve) in Fairbanks until 2003.[12]

A comparison of our demand analysis with APA's forecast (Table 2) shows that APA's forecast is 18.6 percent higher in 1988 and diverges to 33.9 percent higher in 2001. These differences occur primarily because the APA 1) does not take into account a decline in population and energy demand from 1986 through 1989 and 2) overestimates reserve capacity requirements. The implication of these results is that **90 megawatts of additional electrical generation capacity are not required in the Railbelt until the late 1990s.**

---

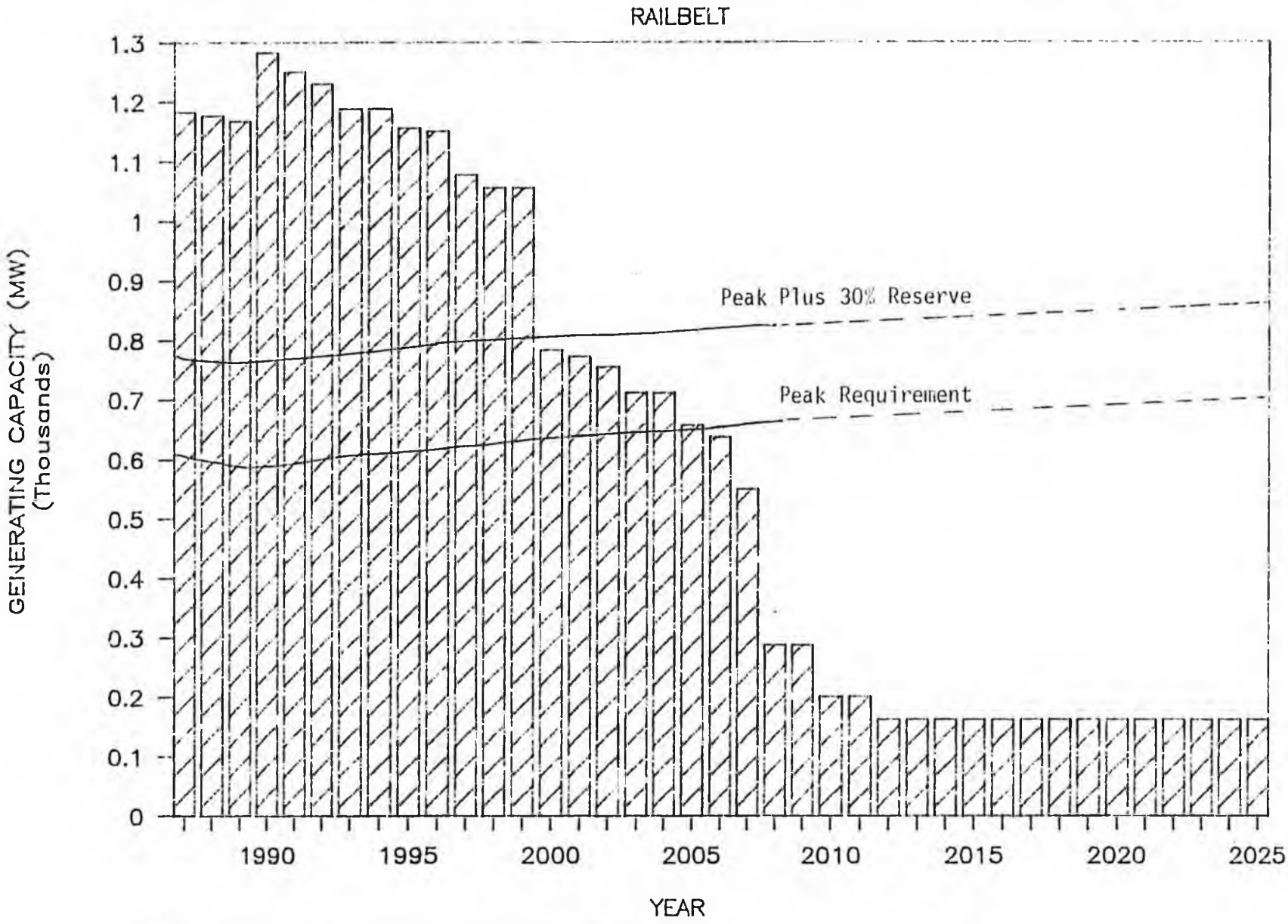
[10]Capacity is sufficient to meet projected Railbelt power requirements until 2000 even without the 115 MW expected to be generated by the PURPA power facilities.

[11]There is some discrepancy between the retirement dates for the two CEA 100.6 MW gas turbines. The APA schedule their retirement on a 30-year lifespan (2007) while CEA plans retirement in 1997 and 1999. Because of the excess production capacity in Anchorage and the rest of the Railbelt, however, this discrepancy does not alter the year 2000 result. If, however, PURPA power is not included, additional capacity would be required in 1998. In our benefit-cost analysis, we used the year 1998.

[12]Discussions with Chuck Canterbury, Fort Richardson, Public Affairs Office for the Alaska Division (March 11, 1987), indicate that the military has no intention of purchasing power from utilities in Fairbanks. They have purchased a small amount in the past to more conveniently service two buildings. In the past, until the decline in the price of fuel oil, GVEA has purchased military power.

FIGURE 2

GENERATING CAPACITY NET OF RETIREMENT

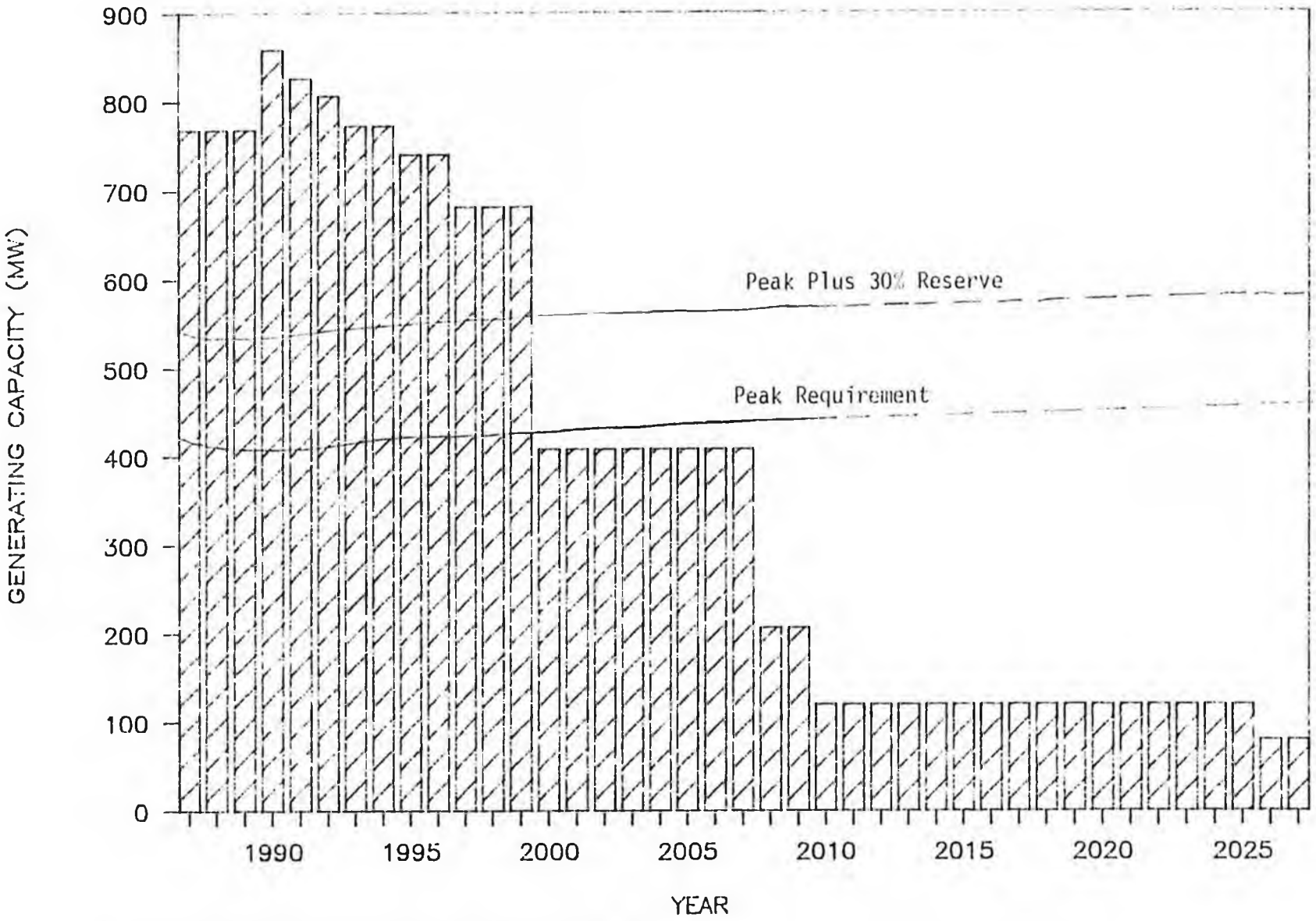


Prepared by the House Research Agency, March 1987.

FIGURE 3

GENERATING CAPACITY NET OF RETIREMENT

ANCHORAGE

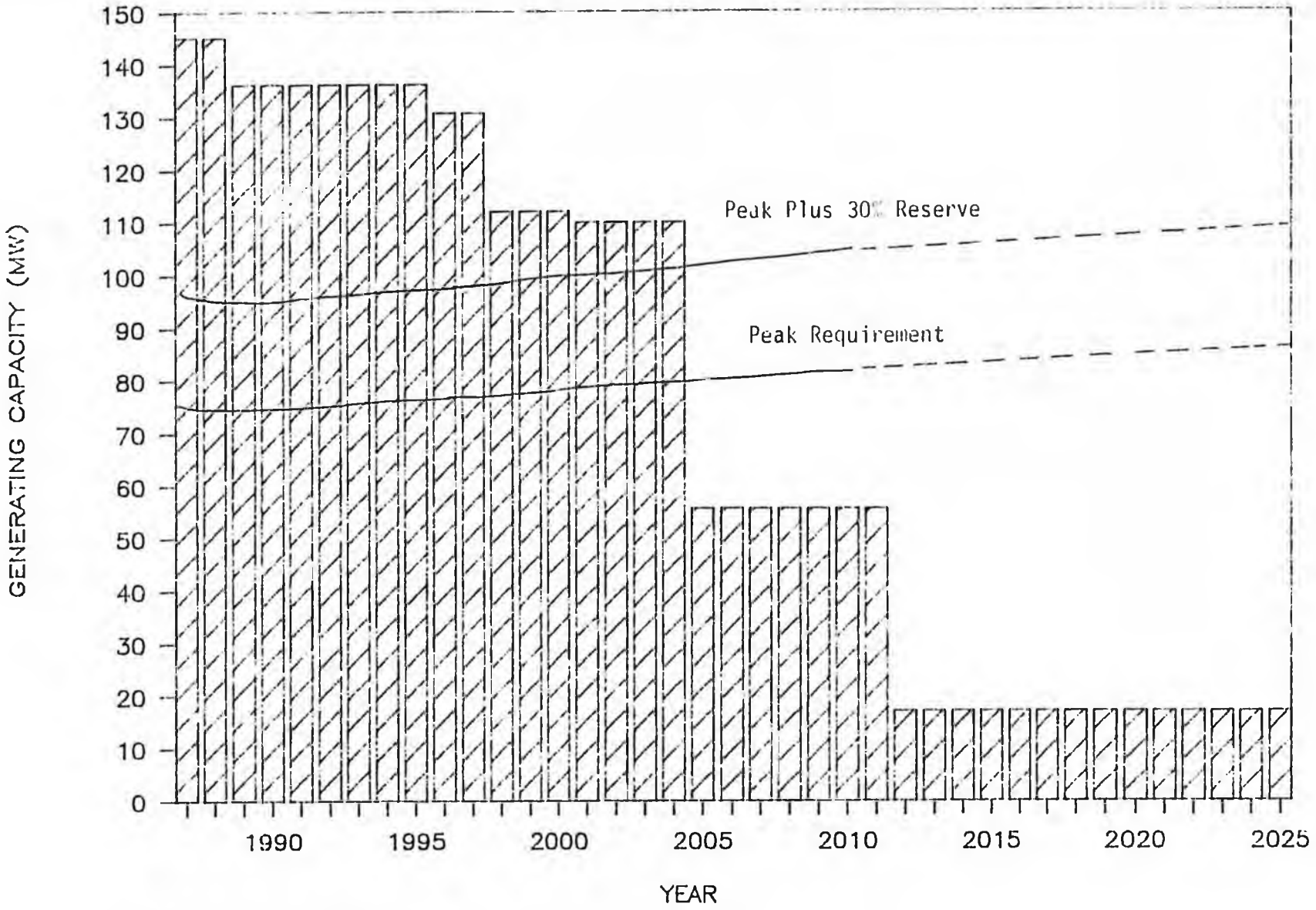


Prepared by the House Research Agency, March 1987

FIGURE 4

GENERATING CAPACITY NET OF RETIREMENT

KENAI

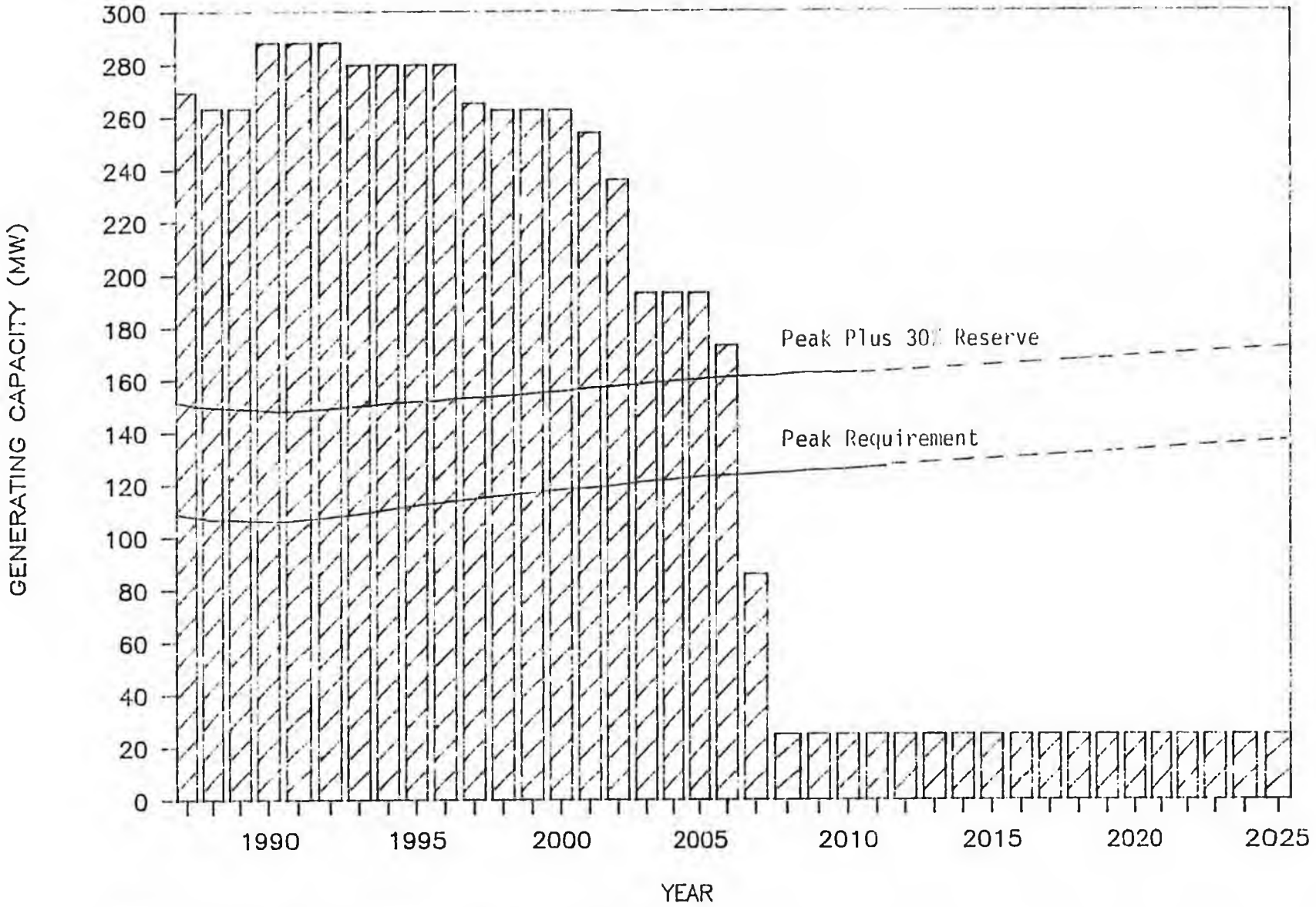


Prepared by the House Research Agency, March 1987.

FIGURE 5

GENERATING CAPACITY NET OF RETIREMENT

FAIRBANKS



Prepared by the House Research Agency, March 1987.

The feasibility analysis of the Division of Policy was based on the assumption that additional increments of generation capacity are necessary in 1991. Our examination of the Bradley Lake project economic feasibility refers to the scenario under this assumption as the "base case." As a result of our energy demand analysis, we also consider two other options as follows: 1) delaying both the Bradley Lake project and the construction of alternative natural gas facilities until they are needed in 1998; and 2) completing the Bradley Lake project as currently scheduled, while delaying gas plant construction until 1998.

Our capacity and demand analysis does not take into account the potential for further energy demand reductions through load management, more efficient use of energy, technological improvements, and energy conservation. It is likely that future capacity construction could be delayed past the year 2000 through improved energy management and utilization. This, however, would be unlikely if the State subsidizes capacity construction because the subsidization of power production and consumption often results in the inappropriate or wasteful use of energy resources.

ECONOMIC FEASIBILITY OF BRADLEY LAKE: THE DIVISION OF POLICY'S ANALYSIS

In this section, we review the February 25, 1987 feasibility analysis prepared by Jack Kreinheder of the Division of Policy (DP) in the Governor's Office. The DP analysis was directed toward the decision of whether to complete the Bradley Lake project at its marginal cost--defined as the total project cost less costs incurred or obligated to date [sunk costs]--or to suspend or abandon the project and pursue gas generation or other alternatives. As indicated by DP, a marginal cost analysis is appropriate at this time because the Bradley Lake sunk costs could not be applied toward gas generation if Bradley were terminated; the gas generation alternative would have to be constructed from scratch.

Simply put, the analysis compares the cost to complete Bradley Lake with the cost of providing the equivalent 90 megawatts of power under a gas generation alternative.[13] Costs in both cases are presented in 1986 dollars. The analysis assumes that a 90 MW gas turbine alternative would be constructed in 1989 and 1990 if Bradley Lake were not completed. The net benefits of finishing Bradley Lake are expressed as savings in millions of 1986 dollars, once the costs of the gas alternative have been subtracted from the Bradley Lake costs.

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[13] The Division of Policy analysis revises an August 1986 Stone and Webster Engineering feasibility prepared for the Alaska Power Authority (APA). The DP incorporated different assumptions for Bradley Lake costs and natural gas prices and calculated net benefits using the APA's model.

The DP concluded that Bradley Lake "is still economically feasible and that completing the project is likely to provide lower long-term power costs than alternative gas generation." However, the projected net benefits of Bradley Lake are much lower than those calculated under earlier analyses, primarily because of the dramatic decline in current and projected Cook Inlet natural gas prices. The key assumptions underlying DP's conclusion are discussed below.

Costs to complete Bradley Lake. The costs of the Bradley Lake project have been adjusted downward to take into account the following:

- **sunk costs estimated at roughly $75 million,** including $45 million already spent on the project and $30 million as a midpoint estimate of project termination expenses and site restoration costs which would be required by FERC if Bradley Lake were terminated;

- **projected savings of $28 million on the total construction cost** due to lower inflation and lower construction costs. The Alaska Power Authority's preliminary revised cost estimate for Bradley Lake is $328 million, compared with the original 1983 estimate of $356 million; and

- **estimated savings of $30 million in financing costs** because of the APA's use of short-term, variable rate notes, coupled with arbitrage earnings on the reinvestment of the note proceeds.

The above items result in a $133 million reduction in the cost of completing Bradley Lake. As DP's analysis indicates, the original project costs of $408 million ($356 million construction + $52 million financing costs) can be reduced by almost one-third to a cost of about $275 million to complete Bradley Lake.

Cook Inlet Natural Gas Prices. As you are aware, natural gas prices have declined dramatically since the original 1983 Stone and Webster Engineering feasibility analysis of the Bradley Lake project. Gas received under Enstar's 1982 gas contract--which ties the gas price to the price of fuel oil at Tesoro's Nikiski refinery--has declined 37 percent from $2.32/mcf (in 1982) to $1.47/mcf (in January 1987). As indicated in the Division of Policy's analysis, the key questions are: 1) what is the likely price of gas under new Cook Inlet gas contracts; and 2) what is the most probable rate, or range of rates, at which gas prices will increase in the future.

The DP analysis calculated Bradley Lake net savings under a range of base gas prices ($1.10 to $1.70/mcf) and a range of real price escalation rates (0 to 2 percent).[14] Chugach Electric Association (CEA) recently paid $1.70/mcf in short-term contracts with Beluga field producers; the consensus places the upper limit for the base price of new gas supplies at $1.70/mcf. The DP suggests that a base price of $1.50/mcf appears to be a good mid-range figure. With respect to real escalation rates, views vary but the DP analysis referenced forecasts of gas prices by the Department of Revenue and CEA. According to Revenue's December 1986 petroleum revenue forecast, Cook Inlet gas prices are expected to track crude oil prices, which assume an average 2.0 percent real escalation rate between 1987 and 2003. The CEA's gas price forecasts are fairly close to Revenue's.

In summary, the DP analysis calculated a series of projected net benefits which incorporate the lower cost to complete Bradley Lake as well as a range of base gas prices under real escalation rates ranging from 0 to 2 percent. Attachment B presents the DP projections of net savings; the economic feasibility of Bradley Lake (even under the lower cost estimate) remains very sensitive to gas prices and their rate of escalation. For example, at a base price of $1.60/mcf and two percent real escalation, Bradley Lake is estimated to be $85 million cheaper in 1986 dollars than the gas alternative. At a one percent real escalation rate and a base price of $1.60/mcf, however, Bradley net savings drop by about $55 million. As noted by the division, each 10 cent/mcf change in base gas prices alters the Bradley net savings by about $15 million. Despite the uncertainties, **the division concludes that "...current gas price forecasts by the Department of Revenue and Chugach Electric suggest that Bradley Lake is still likely to be less expensive than [alternative] gas generation over the 50 year period of analysis."**

A REEXAMINATION OF BRADLEY LAKE NET SAVINGS UNDER KEY ENERGY ASSUMPTIONS

Based on our review of the above analysis, we conclude that the Division of Policy's assumptions regarding the base gas prices and projected escalation rates appear reasonable. However, we question the division's fundamental assumption regarding future Railbelt energy demand and the timing of installation of additional capacity. **Our analysis of Railbelt energy demand and capacity requirements indicates that, even without Bradley Lake, new gas**

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[14] The Division of Policy analysis does not add a delivery charge to the wellhead price of gas; it assumes that new gas generation will be located near a producing field (e.g., the Bernice Lake substation near Marathon's Steelhead platform). A 40 cent/mcf delivery charge (used in the August 1986 Stone and Webster feasibility) would increase costs of the gas alternative and enhance the projected net benefits of Bradley Lake by about $65 million.

generation will probably not be needed until the late 1990s. This conclusion stems from: 1) lower near-term energy demand forecasts due to population declines; and 2) lower reserve capacity requirements because of existing regional interties. In light of this conclusion, we believe that the division's analysis must be reexamined.

In this section, we first present our analysis of Bradley Lake net benefits, expressed as savings, under three scenarios:[15]

1. The base case incorporates the Division of Policy's implicit assumption that 90 MW of additional gas generation will be needed in 1991 if Bradley Lake is not completed. We altered the division's cost to complete Bradley Lake to be $283 million--the revised construction cost of $328 million minus the $45 million already spent on construction. If the decision were made to abandon Bradley Lake and proceed with gas generation, the cost of the gas alternative would include the estimated $30 million in Bradley Lake termination and site restoration costs.

2. Assuming that 90 MW of new power is not needed until the late 1990s, the second scenario provides a comparison of Bradley Lake and the gas alternative if construction of both were delayed and power commenced in 1998. The cost to complete Bradley Lake includes expenses to mothball the project in 1987 and reactivate the project in the mid-1990s. As above, the gas alternative includes the cost of termination and site restoration at Bradley Lake as well as gas plant construction costs in 1996-97. Since neither project would begin producing power until 1998 under this scenario, we extend the period of analysis until the year 2048 in order to provide a 50-year period of costs for analysis.

3. The third scenario assumes that the Bradley Lake project is completed under the current schedule at an estimated cost of $283 million. However, we believe that the decision to complete Bradley Lake must be weighed against alternative gas generation which would be constructed later in the 1990s and begin producing power in 1998 when it was needed. While this feasibility analysis does not provide a year-for-year comparison, it does present a calculation of today's decision to complete Bradley Lake. In effect, this scenario calculates the merits of the public policy decision to proceed with Bradley Lake.

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[15]Detailed tables for each of these scenarios are included in Attachment C.

Base Case Scenario. Based on an analysis of Chugach Electric Association's projections, the Division of Policy concluded that new gas generation will likely be installed by 1990 if Bradley Lake were not completed. Under this scenario, Chugach Electric indicates that a new 87 MW gas plant would likely be constructed and become part of the base load capacity, thereby delegating older, less fuel efficient turbines to peak loading.[16]

We recalculated the net present costs of Bradley Lake and the gas generation alternative under this base case of power needed (from either source) by 1991. In the process of verifying the APA/DP model, we made slight modifications to the spreadsheet formulas but did not alter the analytical approach. Our base case scenario, however, incorporates two notable changes in underlying assumptions. First, we believe that the gas generation's fuel efficiency should reflect the effective heat rate of a new gas turbine (approximately 11,500 Btu/kwh), rather than the 13,000 Btu/kwh rate used in the APA/DP model. It is appropriate to compare "new" Bradley Lake power with power produced at the fuel efficiency of a new turbine, rather than under a blended, less efficient rate (of 13,000 Btu/kwh) based on the combined use of new and old turbines.

The second change incorporated into the APA/DP model was to alter the cost to complete Bradley Lake to equal $283 million. This represents the preliminary revised construction cost ($328 million) minus the expenses to date ($45 million). If the decision were made to terminate Bradley Lake, an estimated $30 million in termination and site restoration expenses would be incurred in order to then proceed with the gas generation alternative. We, therefore, include these Bradley Lake termination and site restoration costs as a cost to the gas alternative.

As shown in Table 6, the Bradley Lake net savings under our base case scenario equal $85.8 million--virtually the same as those presented by the Division of Policy. The cost savings gained through greater gas turbine fuel efficiencies incorporated into our base case are cancelled by the termination and site restoration costs added to the gas alternative if the decision were made to abandon Bradley and proceed with gas generation.

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[16]Tom Martin, Director of Planning, Chugach Electric Association, personal communication, March 9, 1987.

TABLE 6
BRADLEY LAKE NET SAVINGS UNDER VARIOUS SCENARIOS
(Million $)

SCENARIO	NET PRESENT COST		BRADLEY LAKE NET SAVINGS
	GAS ALTERNATIVE	BRADLEY LAKE	
I. Base Case w/Power in 1991	$330.4	$244.6	$85.8
IA. Base Case under Revised Demand Forecast	315.7	229.9	85.8
II. Construction Delay w/Power in 1998	280.6	406.7	(126.0)
III. Bradley Lake now vs Gas Plant in 1998	280.6	244.6	36.0

Note: All scenarios assume a base price of $1.60/mcf; zero delivery charge; 2.0 percent escalation rate; 11,500 Btu/kwh heat rate; 4.5 percent inflation; and $400/kw gas plant construction costs.

The base case scenario incorporates the flawed assumption that 90 MW of additional power will be needed in 1991. Our demand analysis concludes, instead, that an additional increment of production capacity will not be needed until the late-1990s. Therefore, the construction of either Bradley Lake or the gas alternative would result in the early retirement of existing generation capacity. It is assumed that Bradley Lake or a new, more efficient gas turbine would result in lower costs through the displacement of older, less efficient gas generation production. Because the cost reductions are the same for both types of new power, Bradley Lake net savings do not change for this base case under revised demand forecast scenario (Table 6). The net present costs, however, decline by roughly $15 million for both Bradley Lake and the gas alternative.

Delay Construction Scenario. The net savings of Bradley Lake become negative under our second scenario in which construction of both Bradley Lake and the gas plant alternative are delayed several years until Railbelt energy demand catches up with existing capacity and new generating capacity

is warranted. As shown in Table 6, the net present cost of Bradley Lake (if construction were delayed until 1994-1997) nearly doubles from $245 million in our base case to $407 million.

Under this scenario, we assume Bradley Lake construction costs of $415 million during the period 1994-97 [i.e., the 1987 estimated cost to complete Bradley of $283 million inflated at 4.5 percent annually plus an estimated $30 million in additional expenses (administration, licensing, and contracting). We estimate that the project would require $554 million in long-term taxable bonds, issued in 1993 at 10 percent interest, in order to cover construction costs as well as four years of debt service payments prior to project revenues commencing in 1998. Bradley Lake costs would increase dramatically due to the loss of the favorable short-term financing presently in place. On the other hand, the net present cost of the gas alternative drops if construction is delayed--primarily because fuel savings during the period of delay more than offset the gas plant's increased financing costs (which are relatively minor compared with those for Bradley Lake).[17] As shown in Table 6, the Bradley Lake net savings under this scenario are projected to be a negative $126 million. **On the basis of this analysis, it does not appear to be economically feasible to delay Bradley Lake and reactivate the project in the mid-1990s.**

Bradley Lake in 1991 vs Delayed Gas Construction Scenario. Our third scenario calculates the net present cost of Bradley Lake constructed under the current schedule and the net present cost of the gas plant alternative if it were delayed until needed. The net savings to be gained from completing Bradley Lake decline to about $36.0 million. From a public policy perspective, we suggest that this scenario presents a mathematical formulation of the real question: What is the benefit (or cost) of proceeding with Bradley Lake at this time, despite forecasts which suggest that the project is not needed for several years? **Based on this analysis, the positive net savings of Bradley Lake indicate that the project should proceed. However, the net savings are not outstanding--and in retrospect could become marginal or negative if gas base prices and/or price escalation rates are lower than assumed.**

Net Savings under Various Assumptions

We recalculated the net savings projected for the Bradley Lake project under varying assumptions (gas plant construction costs, turbine heat rate, inflation rate, and discount rate) in order to determine the sensitivity of the analysis to changes in these assumptions. Table 7 summarizes the net savings as these assumptions are varied under the base case scenario and the "Bradley Lake now vs. delayed gas construction" scenario which we believe to be most accurate representation of the current public policy choice.

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[17] We assume that gas plant construction in the mid-1990s would be financed by taxable revenue bonds at a 10 percent interest rate. The 10 percent interest rate was assumed for delayed gas plant construction in both the second and third scenarios.

TABLE 7
BRADLEY LAKE NET SAVINGS UNDER VARYING ASSUMPTIONS
(Millions $)

SCENARIO/ASSUMPTION	NET PRESENT COST — GAS ALTERNATIVE	NET PRESENT COST — BRADLEY LAKE	BRADLEY LAKE NET SAVINGS
Scenario I: Base Case w/ Power in 1991	$330.4	$244.6	$85.8
Construction Costs of $350/kw	325.0	244.6	80.4
Heat Rate of 13,000 Btu/kwh	359.9	244.6	115.2
Inflation Rate at 5.0 percent	327.9	231.5	96.4
Discount Rate			
3.0 percent	369.3	264.0	105.2
4.0 percent	297.4	227.2	70.2
12.0 percent	100.8	88.5	12.3
Scenario III: Bradley Lake now vs Gas Plant in 1998	280.6	244.6	36.0
Construction Costs of $350/kw	275.1	244.6	30.5
Heat Rate of 13,000 Btu/kwh	304.5	244.6	59.9
Inflation Rate of 5.0 percent	278.4	231.5	46.8
Discount Rate			
3.0 percent	318.8	264.0	54.8
4.0 percent	248.4	227.2	21.2
5.0 percent	197.8	197.4	0.5

Note: Both scenarios assume a base gas price of $1.60/mcf; zero delivery charge; 2.0 percent escalation rate; 11,500 Btu/kwh heat rate; 4.5 percent inflation; and $400/kw gas plant construction costs.

The Division of Policy's analysis assumed that **construction costs for a gas plant** would run $400/kw (in 1986 dollars). The range of construction costs is apparently estimated at $350 to $450/kw, based on construction costs experienced by Alaska Electric Generation & Transmission and Anchorage Municipal Light & Power during the past few years. Lowering the cost assumption to $350/kw, however, has a fairly insignificant effect on the cost analysis. Under either scenario, the present cost of the gas alternative would be about $5.5 million lower at a construction cost of $350/kw.

As noted previously, we assumed a **new gas turbine fuel efficiency** ("heat rate") of 11,500 Btu/kwh in our three scenarios. On the other hand, the APA/DP model assumed a heat rate of 13,000 Btu/kwh to reflect newer gas turbines at 11,500 Btu/kwh (effective rate) operating as base capacity coupled with older, less existing turbines at 15,000-16,000 operating only when demand peaks. As shown in Table 7, using this higher, "blended" heat rate increases the fuel consumption under the gas alternative in both scenarios significantly and enhances the Bradley Lake net savings. The **net savings analysis is very sensitive to the gas turbine fuel efficiency and other assumptions which directly affect annual fuel costs.**

Annual Inflation Rate. The APA/DP model assumed 4.5 percent annual inflation over the 50-year period of analysis. In the January 1987 Revenue Sources report, the Department of Revenue projected an inflation rate of 3.89 percent in FY 87, 4.58 percent in FY 88-FY 92, 5.23 percent in FY 93 - FY 97, and 5.42 percent thereafter. If we substitute an annual inflation rate of 5.0%, the Bradley Lake net savings under both scenarios in Table 7 increase by about $11 million. Higher inflation rates lower the net present costs of both the gas alternative and Bradley Lake. However, higher inflation favors Bradley Lake to a greater extent because most of Bradley Lake's annual costs are fixed debt service payments, which (in 1986 dollars) become cheaper in the future. In contrast, a smaller portion of the gas alternative's annual costs are fixed.

The Discount Rate. In order to calculate the net present cost during the 50-year period of analysis, one must employ a discount rate which adjusts future cash flows to a value in current dollars. The APA/DP model employed a discount rate of 3.5 percent, which is apparently the discount rate routinely used by the U.S. Army Corps of Engineers to reflect the historic real cost of government spending.

The gas alternative operational costs are higher in later years (even when adjusted to 1986 dollars) because gas prices are assumed to escalate at a real rate of 2.0 percent, whereas Bradley Lake costs (in 1986 dollars) decline over the period of analysis. A **lower discount rate** emphasizes the relative weight of future costs and enhances the outlook of Bradley Lake. For example, under both scenarios shown in Table 7, Bradley Lake net savings increase by about $19 million when the discount rate is reduced to 3.0 percent.

On the other hand, a higher discount rate tends to lower the net savings of Bradley Lake because it deemphasizes future expenditures. For example, a discount rate of 4.0 percent lowers the net savings of Bradley Lake in both scenarios by about $15 million. The sensitivity of the analysis to the discount rate becomes particularly significant when Bradley Lake's net savings are relatively low--as under the third scenario. A discount rate of 5.0 percent under this scenario produces zero net savings, whereas a 12.0 percent discount rate under the base case still results in a positive net benefit (see Table 7). The analysis indicates, however, that the net savings of Bradley Lake remain positive under discount rates within a reasonable range of 3.0 to 4.0 percent.

CONCLUSION

It has been stated that Bradley Lake was not conceived as an emergency power project needed to meet Railbelt energy demand. Instead, it was intended to provide the Railbelt with an alternate power source free from the vagaries of fossil fuel price escalation. As the price of natural gas has declined, however, the projected net savings of the Bradley Lake project have eroded considerably. Our analysis indicates that the public policy choice today is to either proceed with Bradley Lake as currently scheduled or abandon the project. Delaying Bradley for several years--so that Railbelt energy demand could "catch up" with capacity--would be too costly relative to a less expensive gas alternative.

If the Bradley Lake project is to be completed as scheduled, we conclude that it will probably provide net savings over the 50-year period of analysis. However, in order to more accurately project the benefits of the projects, we believe that an analysis computing the actual cost of all power consumed in the Railbelt under the different scenarios would be required. However, this type of analysis would require a great deal of data-gathering from the seven Railbelt utilities, the APUC, and the APA. The time-consuming nature and inherent difficulties of this type of analysis probably explain why it has not already been conducted.

At this time, we reiterate our conclusion that the Bradley Lake project will probably produce power more cheaply than gas generation over the 50-year period we analyzed. Nevertheless, the net savings are certainly less than the proposed State contribution of roughly $164 million.[18] Furthermore, the analysis is extremely sensitive to natural gas prices and their escalation. Because the projected net savings of Bradley Lake are now relatively low, there is a high risk that its completion would be a poor public policy decision if gas prices prove to be only slightly lower than assumed. The public risk grows considerably greater as the net savings projected for Bradley Lake decline. Beyond the initial State cash contribution, the Railbelt electric customers will ultimately bear the costs of today's decision regarding Bradley Lake power.

Attachments

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[18]The State contribution assumes the revised cost of $328 million minus $164 million (one-half of $328 million) to be contributed by Railbelt utilities.

ATTACHMENT A

TABLE A.1
NET GENERATION OF ALASKA RAILBELT UTILITIES, 1976 - 1986

UTILITY	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Anchorage Municipal Light & Power (AMLP)	444.9	420.3	443.1	473.1	486.6	485.3	579.5	592.5	654.0	934.4	938.6
Chugach Electric Association (CEA)	1,054.5	1,179.7	1,308.6	1,401.0	1,434.1	1,467.7	1,718.4	1,781.8	1873.3	1,859.3	1,692.3
Alaska Power Administration (APAD)	118.0	203.5	180.1	171.1	184.3	222.7	147.9	149.9	164.6	150.0	154.8
Anchorage-Cook Inlet Subtotal	1,617.4	1,803.6	1,931.8	2,045.2	2,105.0	2,175.7	2,445.8	2,524.2	2,691.9	2,943.7	2,785.7
Fairbanks Municipal Utility System (FMUS)	123.3	128.5	124.7	124.7	125.6	126.1	140.7	146.9	140.2	101.0	96.8
Golden Valley Electric Association (GVEA)	344.7	353.5	341.5	322.9	317.7	316.9	350.3	346.2	401.1	408.0	420.6
Fairbanks Area Subtotal	468.0	481.7	466.2	447.6	443.3	443.0	491.1	493.1	541.3	509.0	517.4
RAILBELT TOTAL	2,085.4	2,285.3	2,398.0	2492.8	2,548.3	2,618.7	2,936.9	3,017.3	3,233.2	3,452.7	3,303.1

Source: Alaska Power Authority, "Alaska Electric Power Statistics, 1960-1985,"; Railbelt Utilities.

Prepared by the House Research Agency, March 1987 (Demand; 861217-29).

Table A2

TOTAL RAILBELT
ENERGY REQUIREMENTS

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
ANCHORAGE MUNICIPAL LIGHT AND POWER	869.8	884.6	895.7	891.7	882.1	894.3	892.6	913.4	934.5	915.3	954.8	918.0	967.0	1,011.6	1,037.6	1,044.1
CHUGACH ELECTRIC ASSOCIATION (DETAIL)	933.7	976.9	978.2	998.3	1,000.1	996.0	1,016.7	1,016.5	1,048.6	998.3	1,009.9	1,020.4	1,033.3	1,049.7	1,068.8	1,091.2
HOPER ELECTRIC ASSOCIATION	384.7	391.7	391.7	396.7	376.5	417.2	427.2	432.2	412.2	401.6	412.2	417.2	417.2	422.2	427.2	432.2
MATANUSKA ELECTRIC ASSOCIATION	478.1	475.2	476.0	476.5	425.9	432.7	433.7	442.8	470.3	471.3	472.1	479.5	483.1	488.2	510.4	527.6
CITY OF SEWARD	34.9	34.9	41.2	43.4	45.6	46.0	46.7	47.7	48.8	49.2	49.5	49.9	50.3	50.9	51.5	52.2
SYSTEM LOSSES	155.7	161.8	162.7	163.7	163.4	164.3	167.5	172.0	172.3	165.3	167.3	169.1	171.0	173.9	177.1	180.9
TOTAL (GWH)	1969.2	2010.5	2047.2	2068.7	2011.5	2054.1	2091.7	2141.2	2150.2	2085.7	2110.9	2134.1	2154.9	2192.8	2234.9	2284.6
FAIRBANKS MUNICIPAL UTILITY SYSTEM	168.2	172.1	174.6	176.3	177.9	180.3	189.6	192.8	198.6	200.5	204.3	208.6	212.8	217.0	221.4	225.8
GOLDEN VALLEY ELECTRIC ASSOCIATION	561.5	531.0	541.2	542.2	577.3	592.7	606.4	624.9	641.7	658.9	676.5	694.6	713.2	732.3	752.0	772.1
HOPER ELECTRIC ASSOCIATION	430.0	435.0	435.0	430.0	434.3	435.0	506.0	510.0	490.0	479.4	490.0	495.0	495.0	500.0	505.0	510.0
CHUGACH ELECTRIC ASSN	384.7	391.7	391.7	396.7	376.5	417.2	427.2	432.2	412.2	401.6	412.2	417.2	417.2	422.2	427.2	432.2
RESAT	33.3	33.3	33.3	33.3	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8
MATANUSKA ELECTRIC ASSN (TOTAL)	478.1	475.2	476.0	476.5	479.2	486.0	487.0	498.1	523.6	524.6	525.4	527.8	538.4	548.5	563.7	586.9
CHUGACH ELECTRIC ASSN	478.1	475.2	476.0	476.5	425.9	432.7	433.7	442.8	470.3	471.3	472.1	479.5	483.1	488.2	510.4	527.6
RESAT (RESALE LOAD)	0.0	0.0	0.0	0.0	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3
CITY OF SEWARD	34.9	34.9	41.2	43.4	45.6	46.0	46.7	47.7	48.8	49.2	49.5	49.9	50.3	50.9	51.5	52.2
TOTAL	3,536.9	3,652.3	3,697.0	3,720.2	3,781.9	3,851.6	3,913.0	4,003.4	4,054.1	4,021.5	4,077.9	4,132.5	4,199.0	4,284.9	4,377.0	4,477.2

CAPACITY REQUIREMENTS

PEAK DEMAND

ANCHORAGE MUNICIPAL LIGHT AND POWER	164.0	166.7	166.9	166.2	166.3	167.1	169.2	172.1	174.1	170.1	179.9	182.4	185.9	190.5	195.4	200.2
CHUGACH ELECTRIC ASSOCIATION /2 c/o./	191.3	196.4	197.0	197.4	198.1	195.6	199.0	202.2	200.6	191.3	193.5	195.6	198.0	201.2	204.8	208.1
FAIRBANKS MUNICIPAL UTILITY SYSTEM	29.3	30.0	30.6	31.2	32.1	33.4	34.4	35.4	36.5	37.6	38.7	39.9	41.1	42.3	43.6	44.9
GOLDEN VALLEY ELECTRIC ASSOCIATION	85.8	92.3	99.4	107.0	109.8	112.8	115.8	118.9	122.1	125.4	128.7	132.2	135.7	139.3	143.1	146.9
HOPER ELECTRIC ASSOCIATION	79.8	81.0	81.5	84.0	87.0	90.0	94.0	97.0	93.0	92.0	93.0	94.0	95.0	96.0	97.0	97.5
MATANUSKA ELECTRIC ASSOCIATION	90.3	94.9	96.5	93.6	95.5	96.4	97.5	99.3	105.8	94.9	95.7	96.5	97.0	97.5	99.7	101.2
SEWARD	7.0	7.0	10.0	11.0	12.4	12.5	12.7	13.3	13.6	13.7	13.8	13.9	14.0	14.1	14.2	14.3
TOTAL SYSTEM PEAK	646.7	670.3	681.9	690.4	701.2	712.8	722.6	738.2	747.7	733.0	743.3	754.4	765.7	780.9	797.7	811.1

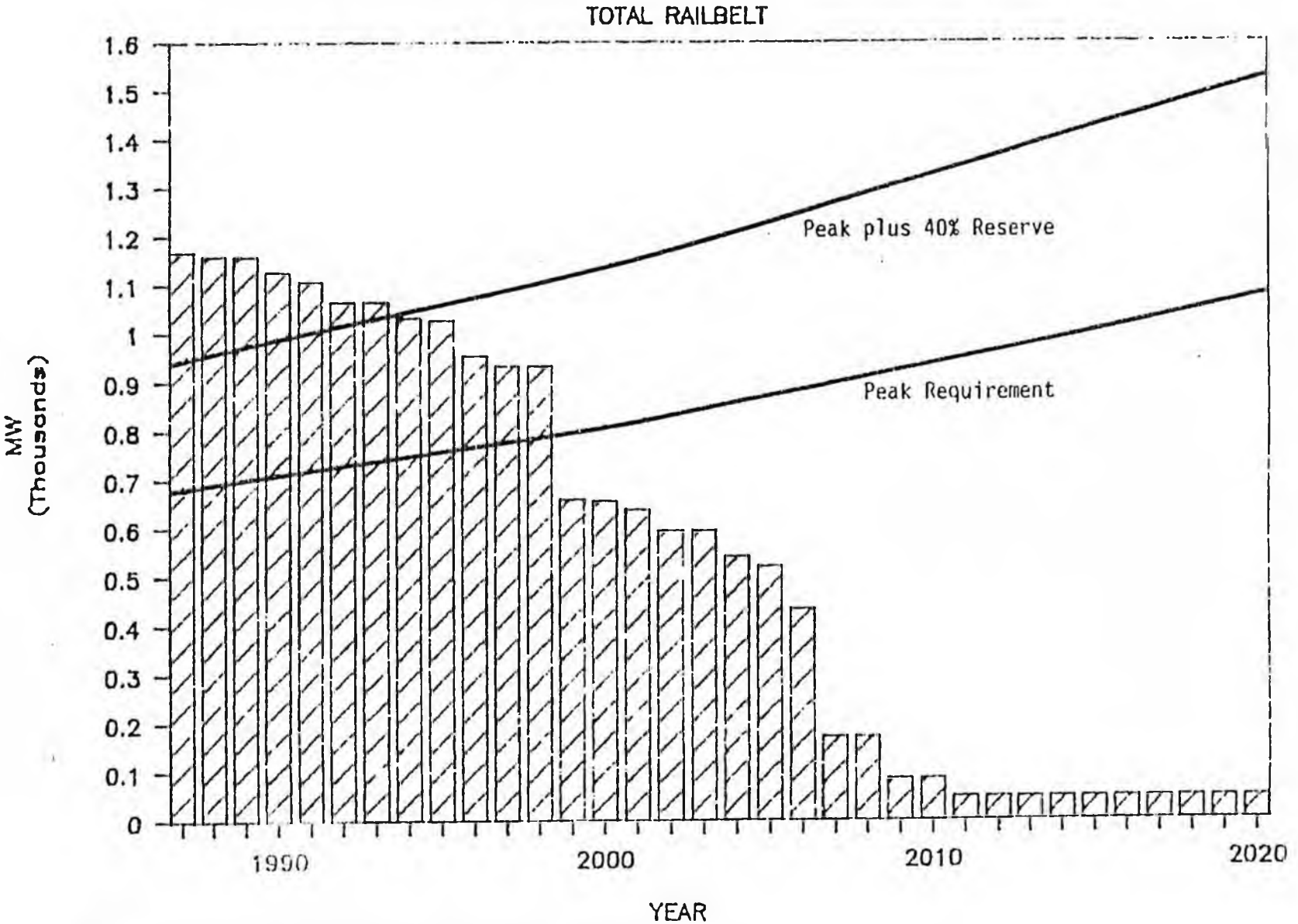
RESERVE REQUIREMENTS

ANCHORAGE AREA	135.7	138.0	138.1	137.7	138.0	137.7	139.1	142.1	141.8	139.3	140.7	142.4	144.3	144.8	150.0	153.1
FAIRBANKS AREA	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	85.9	85.9	85.9
KENAI PENINSULA	36.0	36.0	36.0	36.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0
TOTAL RESERVE REQUIREMENT	232.6	234.9	237.0	234.1	249.9	249.6	251.0	254.0	253.7	251.2	252.6	254.3	256.2	283.7	286.9	290.1
TOTAL SYSTEM CAPACITY REQUIREMENT	879.3	907.2	918.9	926.4	951.1	962.4	973.6	992.2	1,004.3	984.1	995.9	1,008.7	1,022.8	1,064.6	1,084.4	1,104.1

Alaska Power Authori
January 1987

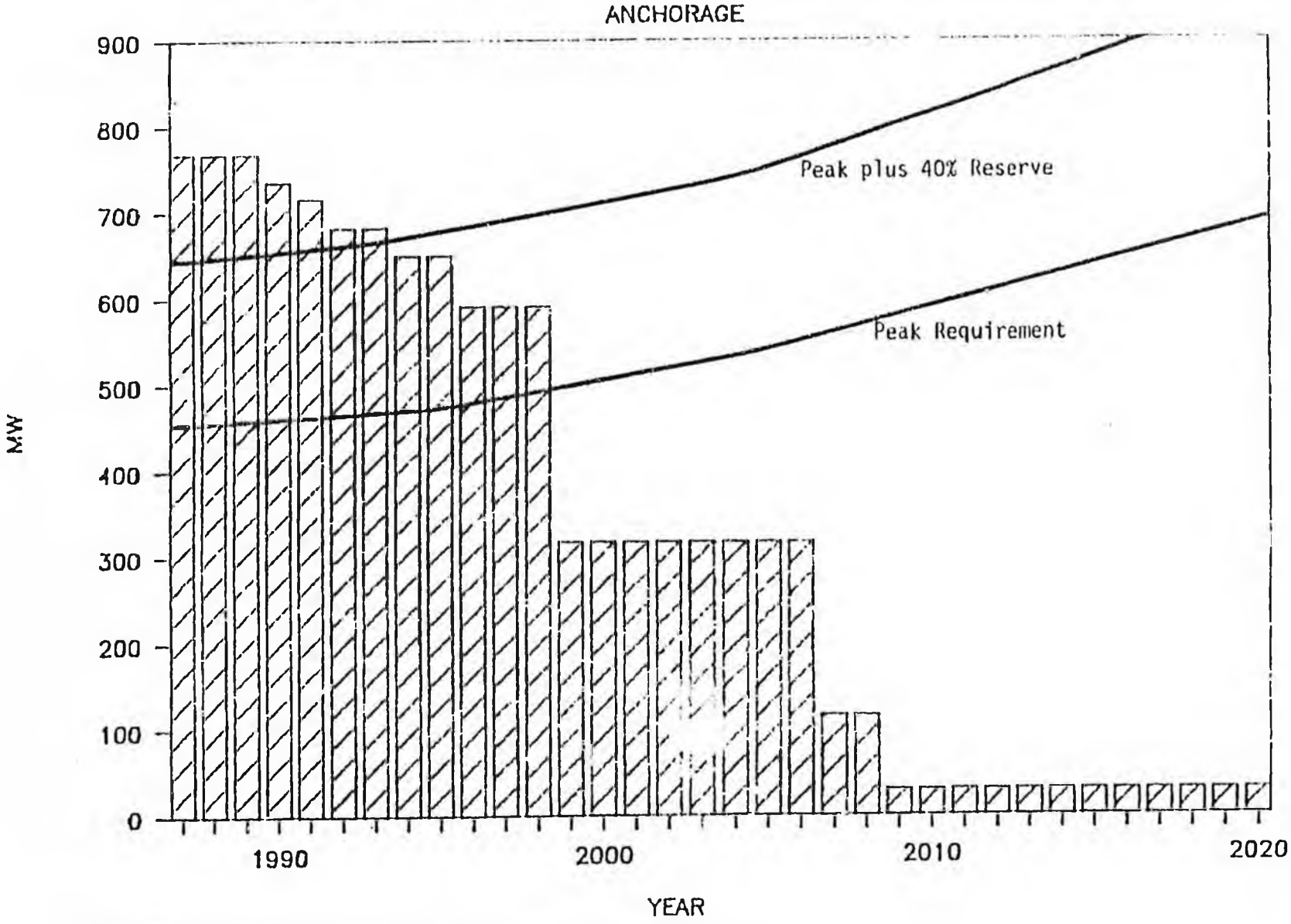
Note: This forecast is being used for: Preliminary Economic Assessment of Railbelt Transmission Alternatives

EXISTING CAPACITY NET OF RETIREMENTS



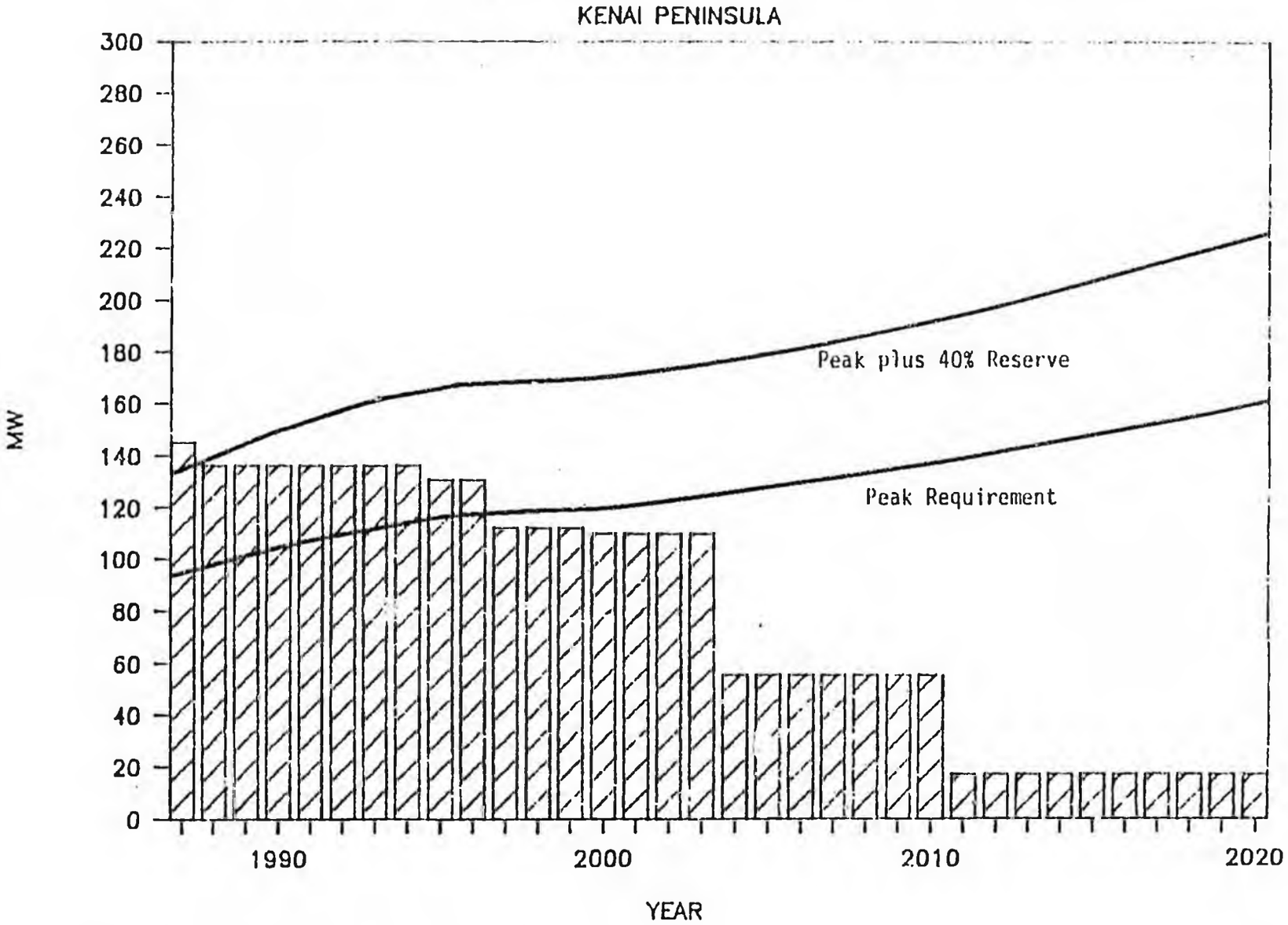
Prepared by the Alaska Power Authority, February 1987.

EXISTING CAPACITY NET OF RETIREMENTS



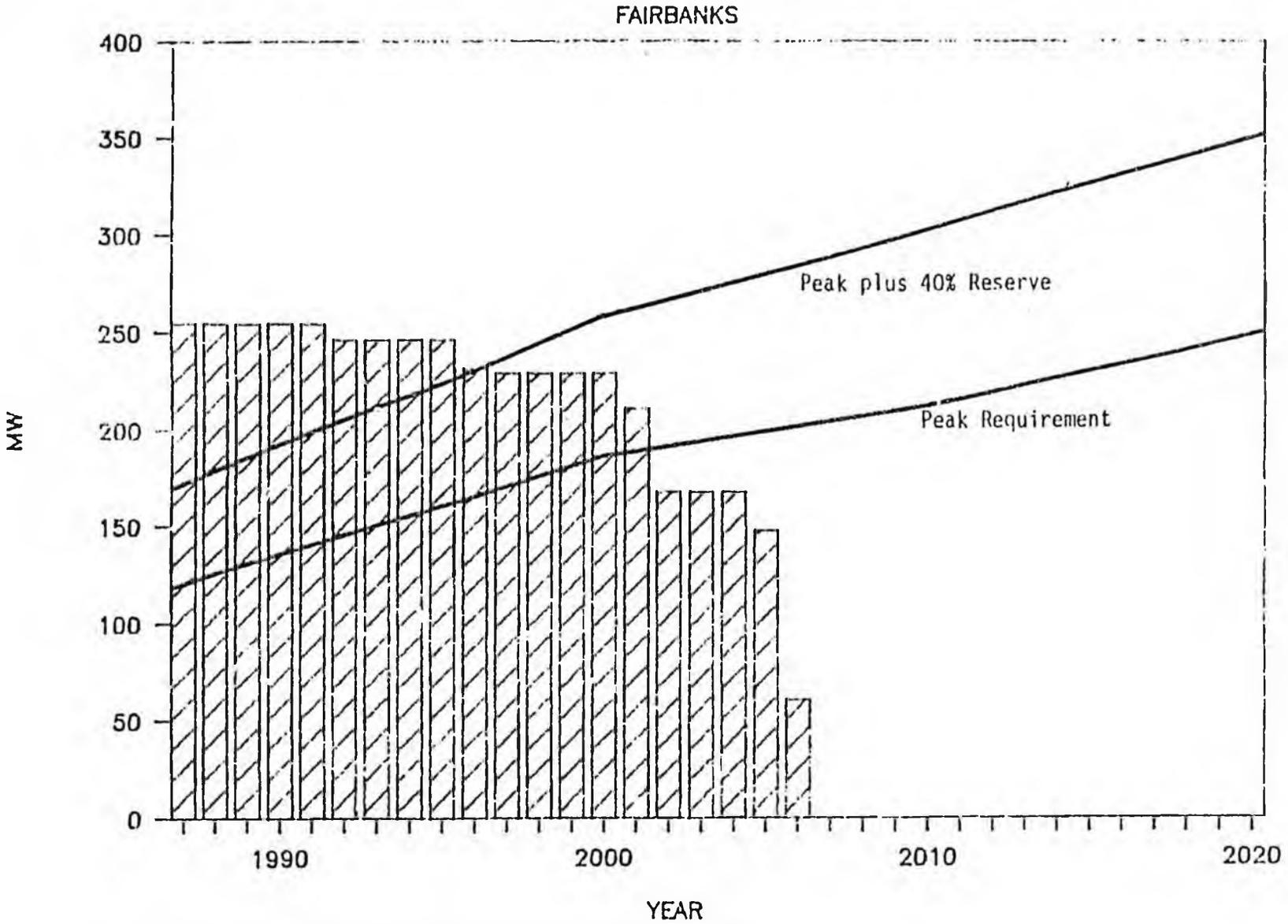
Prepared by the Alaska Power Authority, February 1987.

EXISTING CAPACITY NET OF RETIREMENTS



Prepared by the Alaska Power Authority, February 1987.

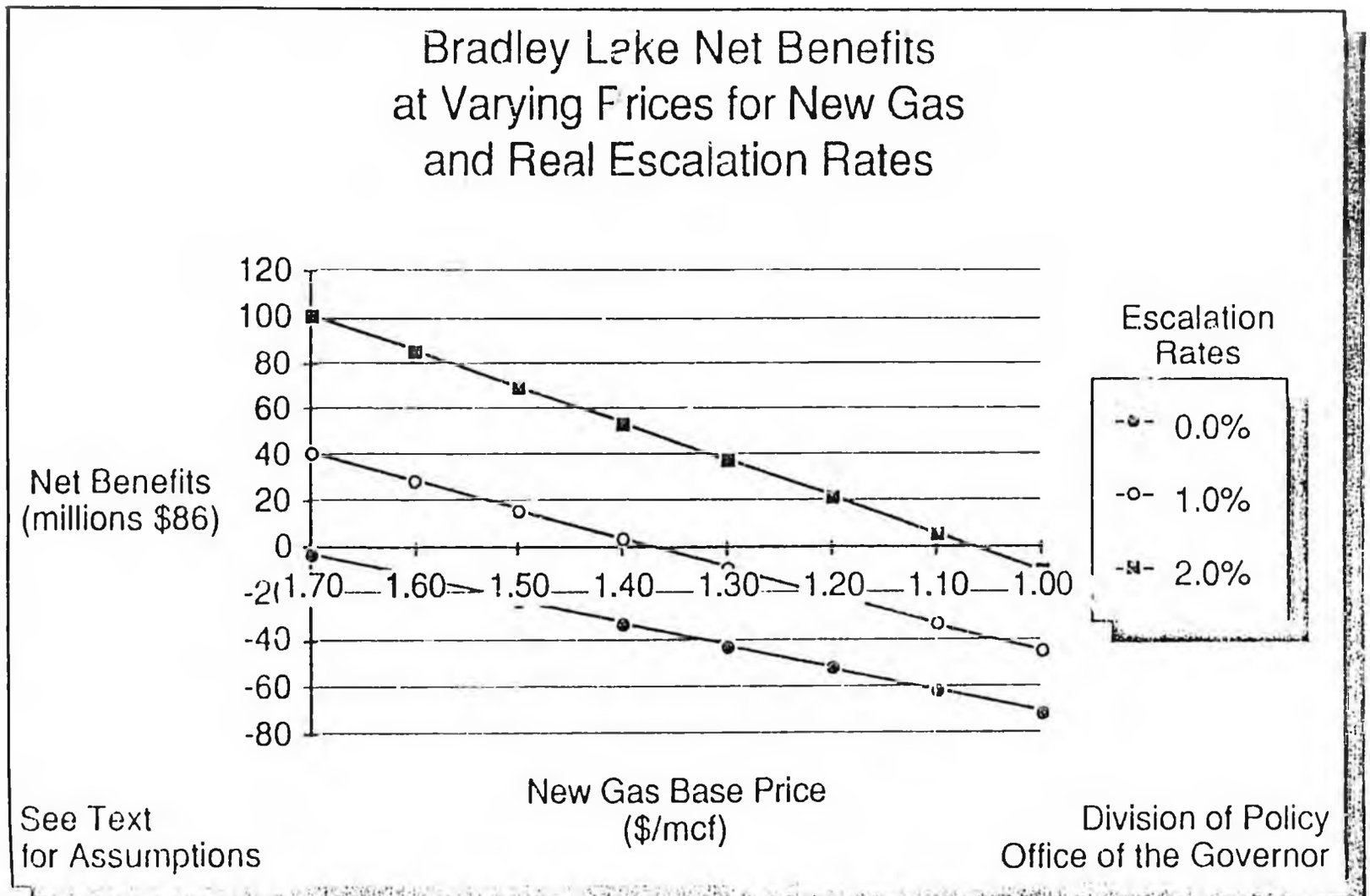
EXISTING CAPACITY NET OF RETIREMENTS



Prepared by the Alaska Power Authority, February 1987.

ATTACHMENT B

FIGURE 1


Bradley Lake Net Benefits
at Varying Prices for New Gas
and Real Escalation Rates
Net Benefits
(millions $86)
120
100
80
60
40
20
0
-20
-40
-60
-80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
New Gas Base Price
($/mcf)
Escalation
Rates
0.0%
1.0%
2.0%
See Text
for Assumptions
Division of Policy
Office of the Governor

ATTACHMENT C

TABLE C.1 BASE CASE SCENARIO:
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)
Base Capital Cost Excluding IDC ($1986/net kw):	$400												
		1987	0.0							$1.63			
Capacity (net kw):	90,000	1988	0.0							1.66			
		1989	18.0							1.70			
Construction Period (years):	2	1990	18.0	4.1						1.73			
Total Bonds:	$48.6	1991		4.0	1.0	0.5	7.5	13.0	3.5	1.77	2.0	20.2	22.2
Bond Term (yrs):	20	1992		3.8	1.0	0.5	7.7	13.0	3.5	1.80	2.0	19.3	21.3
Long-Term Interest Rate:	8.0%	1993		3.6	1.0	0.5	7.8	13.0	3.5	1.84	2.0	18.5	20.5
Bond Payment (1989$):	$4.9	1994		3.5	1.0	0.5	8.0	13.0	3.5	1.87	2.0	17.7	19.7
		1995		3.3	1.0	0.5	8.1	13.0	3.5	1.91	2.0	16.9	18.9
Inflation Rate:	4.5%	1996		3.2	1.0	0.5	8.3	13.0	3.5	1.95	2.0	16.2	18.2
Reinvest Rate:	6.0%	1997		3.0	1.0	0.5	8.4	13.0	3.5	1.99	2.0	15.5	17.5
Discount Rate:	3.5%	1998		2.9	1.0	0.5	8.6	13.1	3.5	2.03	2.0	14.8	16.8
		1999		2.8	1.0	0.5	8.8	13.1	3.6	2.07	2.0	14.2	16.2
		2000		2.7	1.0	0.5	9.0	13.2	3.6	2.11	2.0	13.6	15.6
		2001		2.6	1.0	0.5	9.1	13.2	3.6	2.15	2.0	13.0	15.0
Fixed O&M Cost		2002		2.4	1.0	0.5	9.3	13.3	3.6	2.20	2.0	12.4	14.4
($1986/kw/yr):	$11.25	2003		2.3	1.0	0.5	9.5	13.4	3.6	2.24	2.0	11.9	13.9
		2004		2.2	1.0	0.5	9.7	13.5	3.6	2.29	2.0	11.4	13.4
Variable O&M Cost		2005		2.1	1.0	0.5	9.9	13.6	3.7	2.33	2.0	10.9	12.9
($1986/kwh):	$0.0014	2006		2.1	1.0	0.5	10.1	13.7	3.7	2.38	2.0	10.4	12.4
		2007		2.0	1.0	0.5	10.3	13.8	3.7	2.43	2.0	10.0	12.0
New Turbine Heat Rate		2008		1.9	1.0	0.5	10.5	13.9	3.8	2.47	2.0	9.5	11.5
(BTU/kwh):	11,500	2009		1.8	1.0	0.5	10.7	14.0	3.8	2.52	2.0	9.1	11.1
		2010		1.7	1.0	0.5	10.9	14.2	3.8	2.57	2.0	8.7	10.7
Wellhead Gas Price		2011		1.6	1.0	0.5	11.1	14.3	3.9	2.62	2.0	8.4	10.4
($1986/MMBTU):	$1.60	2012		1.6	1.0	0.5	11.4	14.5	3.9	2.68	2.0	8.0	10.0
Gas Delivery ($86):	$0.00	2013		1.5	1.0	0.5	11.6	14.6	4.0	2.73	2.0	7.7	9.7
Real Wellhead Price		2014		1.4	1.0	0.5	11.8	14.8	4.0	2.79	2.0	7.3	9.3
Escalation Rate:	2.0%	2015		1.4	1.0	0.5	12.1	15.0	4.1	2.84	2.0	7.0	9.0
		2016		1.3	1.0	0.5	12.3	15.2	4.1	2.90	2.0	6.7	8.7

TABLE C.1 BASE CASE SCENARIO:
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)
Cash Flow for Base		2017		1.3	1.0	0.5	12.6	15.3	4.2	2.96	2.0	6.4	8.4
Construction Cost:		2018		1.2	1.0	0.5	12.8	15.5	4.2	3.02	2.0	6.1	8.1
1987	0%	2019		1.2	1.0	0.5	13.1	15.7	4.3	3.08	2.0	5.9	7.9
1988	0%	2020		1.1	1.0	0.5	13.3	16.0	4.3	3.14	2.0	5.6	7.6
1989	50%	2021		1.1	1.0	0.5	13.6	16.2	4.4	3.20	2.0		2.0
1990	50%	2022		1.0	1.0	0.5	13.9	16.4	4.4	3.26	2.0		2.0
		2023		1.0	1.0	0.5	14.1	16.6	4.5	3.33	2.0		2.0
		2024		0.9	1.0	0.5	14.4	16.9	4.6	3.40	2.0		2.0
		2025		0.9	1.0	0.5	14.7	17.1	4.6	3.46	2.0		2.0
Load Factor:	47%	2026		0.9	1.0	0.5	15.0	17.4	4.7	3.53	2.0		2.0
Annual Energy (gwh):	369.2	2027		0.8	1.0	0.5	15.3	17.6	4.8	3.60	2.0		2.0
Transmission Cost		2028		0.8	1.0	0.5	15.6	17.9	4.9	3.68	2.0		2.0
($1986 Millions):	$0.0	2029		0.7	1.0	0.5	15.9	18.2	4.9	3.75	2.0		2.0
		2030		0.7	1.0	0.5	16.2	18.5	5.0	3.82	2.0		2.0
BRADLEY LAKE		2031		0.7	1.0	0.5	16.6	18.8	5.1	3.90	2.0		2.0
Cost to Complete:	$283.0	2032		0.7	1.0	0.5	16.9	19.1	5.2	3.98	2.0		2.0
Debt Service (30 yr):	$25.1	2033		0.6	1.0	0.5	17.2	19.4	5.3	4.06	2.0		2.0
		2034		0.6	1.0	0.5	17.6	19.7	5.3	4.14	2.0		2.0
NP COST GAS	$300.4	2035		0.6	1.0	0.5	17.9	20.0	5.4	4.22	2.0		2.0
+ term & site restoration	$30.0	2036		0.5	1.0	0.5	18.[illegible]	20.4	5.5	4.31	2.0		2.0
NP COST GAS	$330.4	2037		0.5	1.0	0.5	18.7	20.7	5.6	4.39	2.0		2.0
		2038		0.5	1.0	0.5	19.0	21.1	5.7	4.48	2.0		2.0
NP COST BRADLEY	$244.6	2039		0.5	1.0	0.5	19.4	21.4	5.8	4.57	2.0		2.0
NET SAVINGS BRADLEY	$85.8	2040		0.5	1.0	0.5	19.8	21.8	5.9	4.66	2.0		2.0

NOTE: The analysis is based on a model originally developed by the Alaska Power Authority.

Prepared by the House Research Agency, March 1987 (Newbragas; 861217-29).

TABLE C.2 BASE CASE SCENARIO UNDER REVISED DEMAND FORECAST:
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	FUEL SAVINGS ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)
Base Capital Cost Excluding IDC ($1986/net kw):	$400													
		1987	0.0								$1.63			
Capacity (net kw):	90,000	1988	0.0								1.66			
		1989	18.0								1.70			
Construction Period (years):	2	1990	18.0	4.1							1.73			
Total Bonds:	$48.6	1991		4.0	1.0	0.5	7.5	2.6	10.4	2.8	1.77	2.0	20.2	19.6
Bond Term (yrs):	20	1992		3.8	1.0	0.5	7.7	2.7	10.3	2.8	1.80	2.0	19.3	18.6
Long-Term Interest Rate:	8.0%	1993		3.6	1.0	0.5	7.8	2.7	10.3	2.8	1.84	2.0	18.5	17.8
Bond Payment (1989$):	$4.9	1994		3.5	1.0	0.5	8.0	2.8	10.2	2.8	1.87	2.0	17.7	16.9
		1995		3.3	1.0	0.5	8.1	2.8	10.2	2.7	1.91	2.0	16.9	16.1
Inflation Rate:	4.5%	1996		3.2	1.0	0.5	8.3	2.9	10.1	2.7	1.95	2.0	16.2	15.3
Reinvest Rate:	6.0%	1997		3.0	1.0	0.5	8.4	2.9	10.1	2.7	1.99	2.0	15.5	14.6
Discount Rate:	3.5%	1998		2.9	1.0	0.5	8.6		13.1	3.5	2.03	2.0	14.8	16.8
		1999		2.8	1.0	0.5	8.8		13.1	3.6	2.07	2.0	14.2	16.2
		2000		2.7	1.0	0.5	9.0		13.2	3.6	2.11	2.0	13.6	15.6
		2001		2.6	1.0	0.5	9.1		13.2	3.6	2.15	2.0	13.0	15.0
Fixed O&M Cost		2002		2.4	1.0	0.5	9.3		13.3	3.6	2.20	2.0	12.4	14.4
($1986/kw/yr):	$11.25	2003		2.3	1.0	0.5	9		13.4	3.6	2.24	2.0	11.9	13.9
		2004		2.2	1.0	0.5	.'		13.5	3.6	2.29	2.0	11.4	13.4
Variable O&M Cost		2005		2.1	1.0	0.5	9.9		13.6	3.7	2.33	2.0	10.9	12.9
($1986/kwh):	$0.0014	2006		2.1	1.0	0.5	10.1		13.7	3.7	2.38	2.0	10.4	12.4
		2007		2.0	1.0	0.5	10.3		13.8	3.7	2.43	2.0	10.0	12.0
New Turbine Heat Rate		2008		1.9	1.0	0.5	10.5		13.9	. 8	2 47	2.0	9.5	11.5
(BTU/kwh):	11,500	2009		1.8	1.0	0.5	10.7		14.0	3.8	2.52	2.0	9.1	11.1
		2010		1.7	1.0	0.5	10.9		14.2	3.8	2.57	2.0	8.7	10.7
Wellhead Gas Price		2011		1 5	1.0	0.5	11.1		14.3	3.9	2.62	2.0	8.4	10.4
($1986/MMBTU):	$1.60	2012		1.6	1.0	0.5	11.4		14.5	3.9	2.68	2.0	8.0	10.0
Gas Delivery ($86):	$0.00	2013		1.5	1.0	0.5	11.6		14.6	4.0	2.73	2.0	7.7	9.7
Real Wellhead Price		2014		1.4	1.0	0.5	11.8		14.8	4.0	2.79	2.0	7.3	9.3
Escalation Rate:	2.0%	2015		1.4	1.0	0.5	12.1		15.0	4.1	2.84	2.0	7.0	9.0
		2016		1.3	1.0	0.5	12.3		15.2	4.1	2.90	2.0	6.7	8.7

TABLE C.2 BASE CASE SCENARIO UNDER REVISED DEMAND FORECAST:
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	FUEL SAVINGS ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)
Cash Flow for Base		2017		1.3	1.0	0.5	12.6		15.3	4.2	2.96	2.0	6.4	8.4
Construction Cost:		2018		1.2	1.0	0.5	12.8		15.5	4.2	3.02	2.0	6.1	8.1
1987	0%	2019		1.2	1.0	0.5	13.[illegible]		15.7	4.3	3.08	2.0	5.9	7.9
1988	0%	2020		1.1	1.0	0.5	13.3		16.0	4.3	3.14	2.0	5.6	7.6
1989	50%	2021		1.1	1.0	0.5	13.6		16.2	4.4	3.20	2.0		2.0
1990	50%	2022		1.0	1.0	0.5	13.9		16.4	4.4	3.26	2.0		2.0
		2023		1.0	1.0	0.5	14.1		16.6	4.5	3.33	2.0		2.0
		2024		0.9	1.0	0.5	14.4		16.9	4.6	3.40	2.0		2.0
		2025		0.9	1.0	0.5	14.7		17.1	4.6	3.46	2.0		2.0
Load Factor:	47%	2026		0.9	1.0	0.5	15.0		17.4	4.7	3.53	2.0		2.0
Annual Energy (gwh):	369.2	2027		0.8	1.0	0.5	15.3		17.6	4.8	3.60	2.0		2.0
Transmission Cost		2028		0.8	1.0	0.5	15.6		17.9	4.9	3.68	2.0		2.0
($1986 Millions):	$0.0	2029		0.7	1.0	0.5	15.9		18.2	4.9	3.75	2.0		2.0
		2030		0.7	1.0	0.5	16.2		18.5	5.0	3.82	2.0		2.0
BRADLEY LAKE		2031		0.7	1.0	0.5	16.6		18.8	5.1	3.90	2.0		2.0
Cost to Complete:	$283.0	2032		0.7	1.0	0.5	16.9		19.1	5.2	3.98	2.0		2.0
Debt Service (30 yr):	$25.1	2033		0.6	1.0	0.5	17.2		19.4	5.3	4.06	2.0		2.0
		2034		0.6	1.0	0.5	17.6		19.7	5.3	4.14	2.0		2.0
NP COST GAS	$285.7	2035		0.6	1.0	0.5	17.9		20.0	5.4	4.22	2.0		2.0
+ term & site restoration	$30.0	2036		0.5	1.0	0.5	18.3		20.4	5.5	4.31	2.0		2.0
NP COST GAS	$315.7	2037		0.5	1.0	0.5	18.7		20.7	5.6	4.39	2.0		2.0
		2038		0.5	1.0	0.5	19.0		21.1	5.7	4.48	2.0		2.0
NP COST BRADLEY	$229.9	2039		0.5	1.0	0.5	19.4		21.4	5.8	4.57	2.0		2.0
NET SAVINGS BRADLEY	$85.8	2040		0.5	1.0	0.5	19.8		21.8	5.9	4.66	2.0		2.0

NOTE: The analysis is based on a model originally developed by the Alaska Power Authority.

Prepared by the House Research Agency, March 1987 (Bradgas1; 861217-29).

TABLE C.3 DELAY OF BRADLEY LAKE AND GAS GENERATION ALTERNATIVE:
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)	REAL RATE cents/Kwh
Base Capital Cost Excluding IDC ($1986/net kw):	$400													
		1987	0.0							$1.63				
Capacity (net kw):	90,000	1988	0.0							1.66				
		1989	0.0							1.70				
Construction Period (years):	2	1990	0.0							1.73				
Total Bonds:	$69.3	1991	0.0							1.77				
Bond Term (years):	20	1992	0.0							1.80				
Long-Term Interest Rate:	10.0%	1993	0.0							1.84				
Bond Payment (1997$):	$8.1	1994	0.0							1.87		41.3	41.3	11.2
		1995	0.0							1.91		39.5	39.5	10.7
Inflation Rate:	4.5%	1996	18.0							1.95		37.8	37.8	10.2
Reinvest Rate:	6.0%	1997	18.0	5.0				5.0	1.4	1.99		36.2	36.2	9.8
Discount Rate:	3.5%	1998		4.8	1.0	0.5	[illegible]	14.9	4.0	2.03	2.0	34.6	36.6	9.9
		1999		4.6	1.0	0.5	8.8	14.9	4.0	2.07	2.0	33.2	35.2	9.5
Fixed O&M Cost		2000		4.4	1.0	0.5	9.0	14.9	4.0	2.11	2.0	31.7	33.7	9.1
($1986/kw/yr):	$11.25	2001		4.2	1.0	0.5	9.1	14.9	4.0	2.15	2.0	30.4	32.4	8.8
		2002		4.0	1.0	0.5	9.3	14.9	4.0	2.20	2.0	29.1	31.1	8.4
Variable O&M Cost		2003		3.9	1.0	0.5	9.5	14.9	4.0	2.24	2.0	27.8	29.8	8.1
($1986/kwh):	$0.0014	2004		3.7	1.0	0.5	9.7	14.9	4.0	2.29	2.0	26.6	28.6	7.7
		2005		3.5	1.0	0.5	9.9	15.0	4.0	2.33	2.0	25.5	27.5	7.4
New Turbine Heat Rate		2006		3.4	1.0	0.5	10.1	15.0	4.1	2.38	2.0	24.4	26.4	7.1
(BTU/kwh):	11,500	2007		3.2	1.0	0.5	10.3	15.1	4.1	2.43	2.0	23.3	25.3	6.9
		2008		3.1	1.0	0.5	10.5	15.1	4.1	2.47	2.0	22.3	24.3	6.6
		2009		3.0	1.0	0.5	10.7	15.2	4.1	2.52	2.0	21.3	23.3	6.3
Wellhead Gas Price		2010		2.8	1.0	0.5	10.9	15.3	4.1	2.57	2.0	20.4	22.4	6.1
($1986/MMBTU):	$1.60	2011		2.7	1.0	0.5	11.1	15.4	4.2	2.62	2.0	19.6	21.6	5.8
Gas Delivery ($86):	$0.00	2012		2.6	1.0	0.5	11.4	15.5	4.2	2.68	2.0	18.7	20.7	5.6
Real Wellhead Price		2013		2.5	1.0	0.5	11.6	15.6	4.2	2.73	2.0	17.9	19.9	5.4
Escalation Rate:	2.0%	2014		2.4	1.0	0.5	11.8	15.7	4.3	2.79	2.0	17.1	19.1	5.2
		2015		2.3	1.0	0.5	12.1	15.9	4.3	2.84	2.0	16.4	18.4	5.0

TABLE C.3 DELAY OF BRADLEY LAKE AND GAS GENERATION ALTERNATIVE:
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)	REAL RATE cents/KWH
Cash Flow for Base		2016		2.2	1.0	0.5	12.3	16.0	4.3	2.90	2.0	15.7	17.7	4.8
Construction Cost:		2017		2.1	1.0	0.5	12.6	16.2	4.4	2.96	2.0	15.0	17.0	4.6
1987	0%	2018		2.0	1.0	0.5	12.8	16.3	4.4	3.02	2.0	14.4	16.4	4.4
1988	0%	2019		1.9	1.0	0.5	13.1	16.5	4.5	3.08	2.0	13.7	15.7	4.3
1989	0%	2020		1.8	1.0	0.5	13.3	16.7	4.5	3.14	2.0	13.2	15.2	4.1
1990	0%	2021		1.7	1.0	0.5	13.6	16.9	4.6	3.20	2.0	12.6	14.6	4.0
1991	0%	2022		1.7	1.0	0.5	13.9	17.1	4.6	3.26	2.0	12.0	14.0	3.8
1992	0%	2023		1.6	1.0	0.5	14.1	17.3	4.7	3.33	2.0	11.5	13.5	3.7
1993	0%	2024		1.5	1.0	0.5	14.4	17.5	4.7	3.40	2.0		2.0	0.5
1994	0%	2025		1.5	1.0	0.5	14.7	17.7	4.8	3.46	2.0		2.0	0.5
1995	0%	2026		1.4	1.0	0.5	15.0	17.9	4.9	3.53	2.0		2.0	0.5
1996	50%	2027		1.3	1.0	0.5	15.3	18.2	4.9	3.60	2.0		2.0	0.5
1997	50%	2028		1.3	1.0	0.5	15.6	18.4	5.0	3.68	2.0		2.0	0.5
		2029		1.2	1.0	0.5	15.9	18.7	5.1	3.75	2.0		2.0	0.5
Load Factor:	47%	2030		1.2	1.0	0.5	16.2	18.9	5.1	3.82	2.0		2.0	0.5
Annual Energy (gwh):	369.2	2031		1.1	1.0	0.5	16.6	19.2	5.2	3.90	2.0		2.0	0.5
Transmission Cost		2032		1.1	1.0	0.5	16.9	19.5	5.3	3.98	2.0		2.0	0.5
($1988 Millions):	$0.0	2033		1.0	1.0	0.5	17.2	19.8	5.4	4.06	2.0		2.0	0.5
		2034		1.0	1.0	0.5	17.6	20.1	5.4	4.14	2.0		2.0	0.5
BRADLEY LAKE		2035		0.9	1.0	0.5	17.9	20.4	5.5	4.22	2.0		2.0	0.5
Cost to Complete:	$415.1	2036		0.9	1.0	0.5	18.3	20.7	5.6	4.31	2.0		2.0	0.5
Construction (years):	4	2037		0.9	1.0	0.5	18.7	21.0	5.7	4.39	2.0		2.0	0.5
Total Bonds:	$553.9	2038		0.8	1.0	0.5	19.0	21.4	5.8	4.48	2.0		2.0	0.5
Debt Service (30 yr):	$58.8	2039		0.8	1.0	0.5	19.4	21.7	5.9	4.57	2.0		2.0	0.5
		2040		0.8	1.0	0.5	19.8	22.1	6.0	4.66	2.0		2.0	0.5
NP COST GAS	$250.6	2041		0.7	1.0	0.5	20.2	22.4	6.1	4.75	2.0		2.0	0.5
+ term & site restoration	$30.0	2042		0.7	1.0	0.5	20.6	22.8	6.2	4.85	2.0		2.0	0.5
NP COST GAS	$280.6	2043		0.7	1.0	0.5	21.0	23.2	6.3	4.95	2.0		2.0	0.5
		2044		0.6	1.0	0.5	21.4	23.6	6.4	5.05	2.0		2.0	0.5
NP COST BRADLEY	$406.7	2045		0.6	1.0	0.5	21.9	24.0	6.5	5.15	2.0		2.0	0.5
NET SAVINGS BRADLEY	($126.0)	2046		0.6	1.0	0.5	22.3	24.4	6.6	5.25	2.0		2.0	0.5
		2047		0.6	1.0	0.5	22.7	24.8	6.7	5.35	2.0		2.0	0.5
		2048		0.5	1.0	0.5	23.2	25.3	6.8	5.46	2.0		2.0	0.5

NOTE: The analysis is based on a model originally developed by the Alaska Power Authority.

Prepared by the House Research Agency, March 1987 (Bradgas3; 861217-29).

TABLE C.4 DELAY OF GAS GENERATION ALTERNATIVE
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)
Base Capital Cost Excluding IDC ($1986/net kW):	$400												
		1987	0.0							$1.63			
Capacity (net kW):	90,000	1988	0.0							1.66			
		1989	0.0							1.70			
Construction Period (years):	2	1990	0.0							1.73			
Total Bonds:	$69.3	1991	0.0							1.77	2.0	20.2	22.2
Bond Term (years):	20	1992	0.0							1.80	2.0	19.3	21.3
Long-Term Interest Rate:	10.0%	1993	0.0							1.84	2.0	18.5	20.5
Bond Payment (1997$):	$8.1	1994	0.0							1.87	2.0	17.7	19.7
		1995	0.0							1.91	2.0	16.9	18.9
Inflation Rate:	4.5%	1996	18.0							1.95	2.0	16.2	18.2
Reinvest Rate:	6.0%	1997	18.0	5.0				5.0	1.4	1.99	2.0	15.5	17.5
Discount Rate:	3.5%	1998		4.8	1.0	0.5	8.6	14.9	4.0	2.03	2.0	14.8	16.8
		1999		4.6	1.0	0.5	8.8	14.9	4.0	2.07	2.0	14.2	16.2
		2000		4.4	1.0	0.5	9.0	14.9	4.0	2.11	2.0	13.6	15.6
Fixed O&M Cost ($1986/kw/yr):	$11.25	2001		4.2	1.0	0.5	9.1	14.9	4.0	2.15	2.0	13.0	15.0
		2002		4.0	1.0	0.5	9.3	14.9	4.0	2.20	2.0	12.4	14.4
		2003		3.9	1.0	0.5	9.5	14.9	4.0	2.24	2.0	11.9	13.9
Variable O&M Cost ($1986/kwh):	$0.0014	2004		3.7	1.0	0.5	9.7	14.9	4.0	2.29	2.0	11.4	13.4
		2005		3.5	1.0	0.5	9.9	15.0	4.0	2.33	2.0	10.9	12.9
New Turbine Heat Rate		2006		3.4	1.0	0.5	10.1	15.0	4.1	2.38	2.0	10.4	12.4
(BTU/kwh):	11,500	2007		3.2	1.0	0.5	10.3	15.1	4.1	2.43	2.0	10.0	12.0
		2008		3.1	1.0	0.5	10.5	15.1	4.1	2.47	2.0	9.5	11.5
		2009		3.0	1.0	0.5	10.7	15.2	4.1	2.52	2.0	9.1	11.1
Wellhead Gas Price		2010		2.8	1.0	0.5	10.9	15.3	4.1	2.57	2.0	8.7	10.7
($1986/MMBTU):	$1.60	2011		2.7	1.0	0.5	11.1	15.4	4.2	2.62	2.0	8.4	10.4
Gas Delivery ($86):	$0.00	2012		2.6	1.0	0.5	11.4	15.5	4.2	2.68	2.0	8.0	10.0
Real Wellhead Price		2013		2.5	1.0	0.5	11.6	15.6	4.2	2.73	2.0	7.7	9.7
Escalation Rate:	2.0%	2014		2.4	1.0	0.5	11.8	15.7	4.3	2.79	2.0	7.3	9.3
		2015		2.3	1.0	0.5	12.1	15.9	4.3	2.84	2.0	7.0	9.0

TABLE C.4 DELAY OF GAS GENERATION ALTERNATIVE
BRADLEY LAKE NET SAVINGS ANALYSIS

ANALYSIS PARAMETERS		YEAR	CAPITAL COST ($86 MLN)	DEBT SERVICE ($86 MLN)	FIXED O&M ($86 MLN)	VARIABLE O&M ($86 MLN)	FUEL COST ($86 MLN)	TOTAL COST ($86 MLN)	REAL RATE (C/KWH)	REAL WELLHEAD GAS PRICE ($86/MMBTU)	BRADLEY O&M ($86 MLN)	BRADLEY DS ($86 MLN)	TOTAL BRADLEY ($86 MLN)
Cash Flow for Base		2016		2.2	1.0	0.5	12.3	16.0	4.3	2.90	2.0	6.7	8.7
Construction Cost:		2017		2.1	1.0	0.5	12.6	16.2	4.4	2.96	2.0	6.4	8.4
1987	0%	2018		2.0	1.0	0.5	12.8	16.3	4.4	3.02	2.0	6.1	8.1
1988	0%	2019		1.9	1.0	0.5	13.1	16.5	4.5	3.08	2.0	5.9	7.9
1989	0%	2020		1.8	1.0	0.5	13.3	16.7	4.5	3.14	2.0	5.6	7.6
1990	0%	2021		1.7	1.0	0.5	13.6	16.9	4.6	3.20	2.0		2.0
1991	0%	2022		1.7	1.0	0.5	13.9	17.1	4.6	3.26	2.0		2.0
1992	0%	2023		1.6	1.0	0.5	14.1	17.3	4.7	3.33	2.0		2.0
1993	0%	2024		1.5	1.0	0.5	14.4	17.5	4.7	3.40	2.0		2.0
1994	0%	2025		1.5	1.0	0.5	14.7	17.7	4.8	3.46	2.0		2.0
1995	0%	2026		1.4	1.0	0.5	15.0	17.9	4.9	3.53	2.0		2.0
1996	50%	2027		1.3	1.0	0.5	15.3	18.2	4.9	3.60	2.0		2.0
1997	50%	2028		1.3	1.0	0.5	15.6	18.4	5.0	3.68	2.0		2.0
		2029		1.2	1.0	0.5	15.9	18.7	5.1	3.75	2.0		2.0
Load Factor:	47%	2030		1.2	1.0	0.5	16.2	18.9	5.1	3.82	2.0		2.0
Annual Energy (gwh):	369.2	2031		1.1	1.0	0.5	16.6	19.2	5.2	3.90	2.0		2.0
Transmission Cost		2032		1.1	1.0	0.5	16.9	19.5	5.3	3.98	2.0		2.0
($1986 Millions):	$0.0	2033		1.0	1.0	0.5	17.2	19.8	5.4	4.06	2.0		2.0
		2034		1.0	1.0	0.5	17.6	20.1	5.4	4.14	2.0		2.0
BRADLEY LAKE		2035		0.9	1.0	0.5	17.9	20.4	5.5	4.22	2.0		2.0
Cost to Complete:	$283.0	2036		0.9	1.0	0.5	18.3	20.7	5.6	4.31	2.0		2.0
Debt Service (30 yr):	$25.1	2037		0.9	1.0	0.5	18.7	21.0	5.7	4.39	2.0		2.0
		2038		0.8	1.0	0.5	19.0	21.4	5.8	4.48	2.0		2.0
NP COST GAS	$250.6	2039		0.8	1.0	0.5	19.4	21.7	5.9	4.57	2.0		2.0
+ term & site restoration	$30.0	2040		0.8	1.0	0.5	19.8	22.1	6.0	4.66	2.0		2.0
NP COST GAS	$280.6												
NP COST BRADLEY	$244.6												
NET SAVINGS BRADLEY	$36.0												

NOTE: The analysis is based on a model originally developed by the Alaska Power Authority.

Prepared by the House Research Agency, March 1987 (Bradgas2; 861217-29).

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

REQUEST

Bill/Resolution No.: SB 159
Title: Act amending appropriation to the Alaska Power Authority for the Bradley Lake Project
Sponsor: Rules Committee
Requester: Governor

FISCAL DETAIL

Agency Affected: Alaska Power Authority
BRU: Dept. of Commerce & Econ. Development

Components: _____

EXPENDITURES/REVENUES : (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL	0.0	0.0	0.0			
REVENUE						

FUNDING : (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER	50,000.0	0.0	0.0	0.0	0.0	0.0
TOTAL	50,000.0	0.0	0.0	0.0	0.0	0.0

POSITIONS :

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS : Attach a separate page if necessary

See attachment.

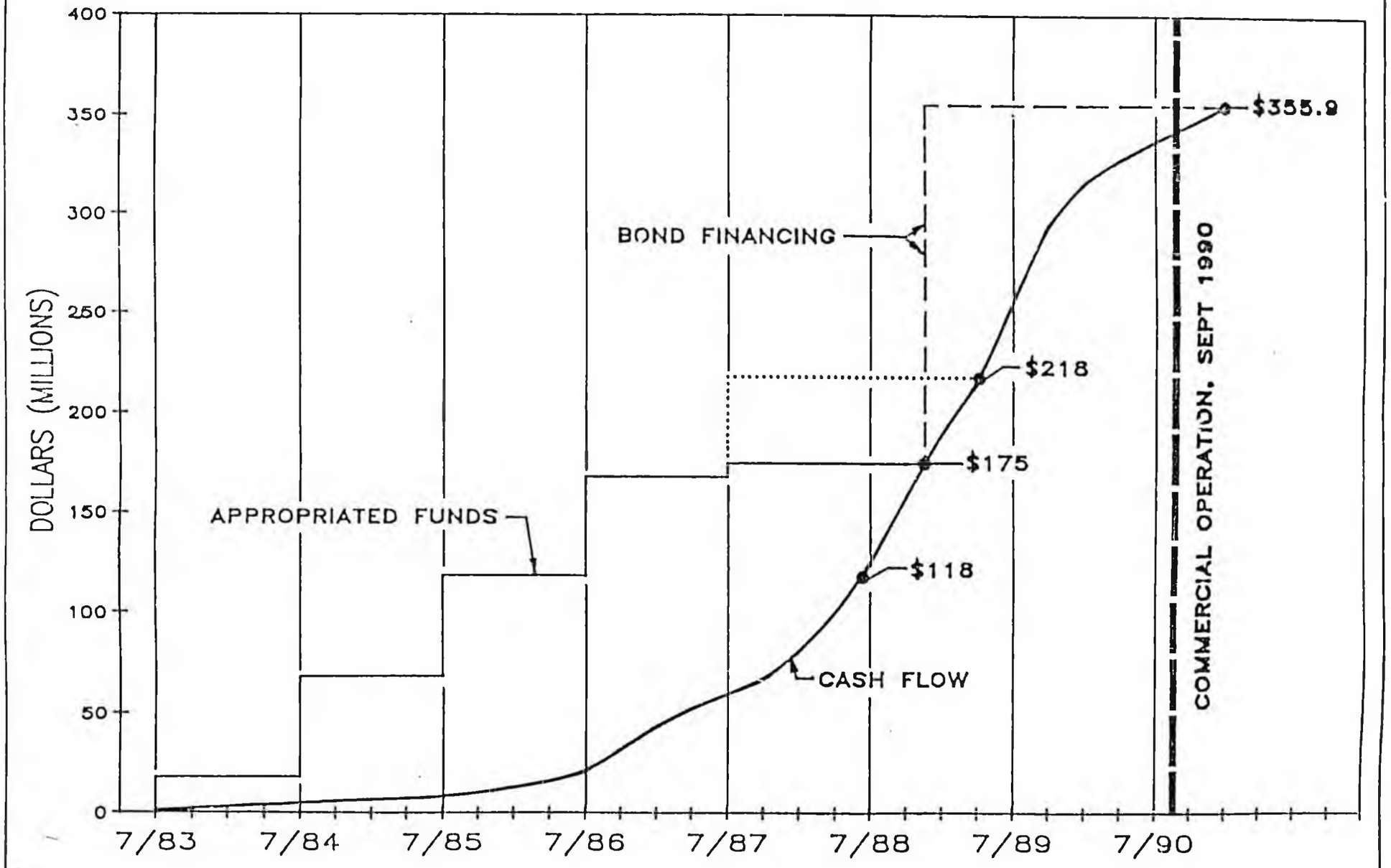
Prepared by: Robert E. LeResche, Executive Director Phone: 465-3575
Division: Alaska Power Authority Date: 4/7/87

Approved by Commissioner: _____ Date: _____
Agency: _____

Distribution (by Agency preparing fiscal note):
- Legislative Finance
- Legislative Sponsor
- Requestor
- Office of Management and Budget
- Impacted Agency(ies)

9/16/86

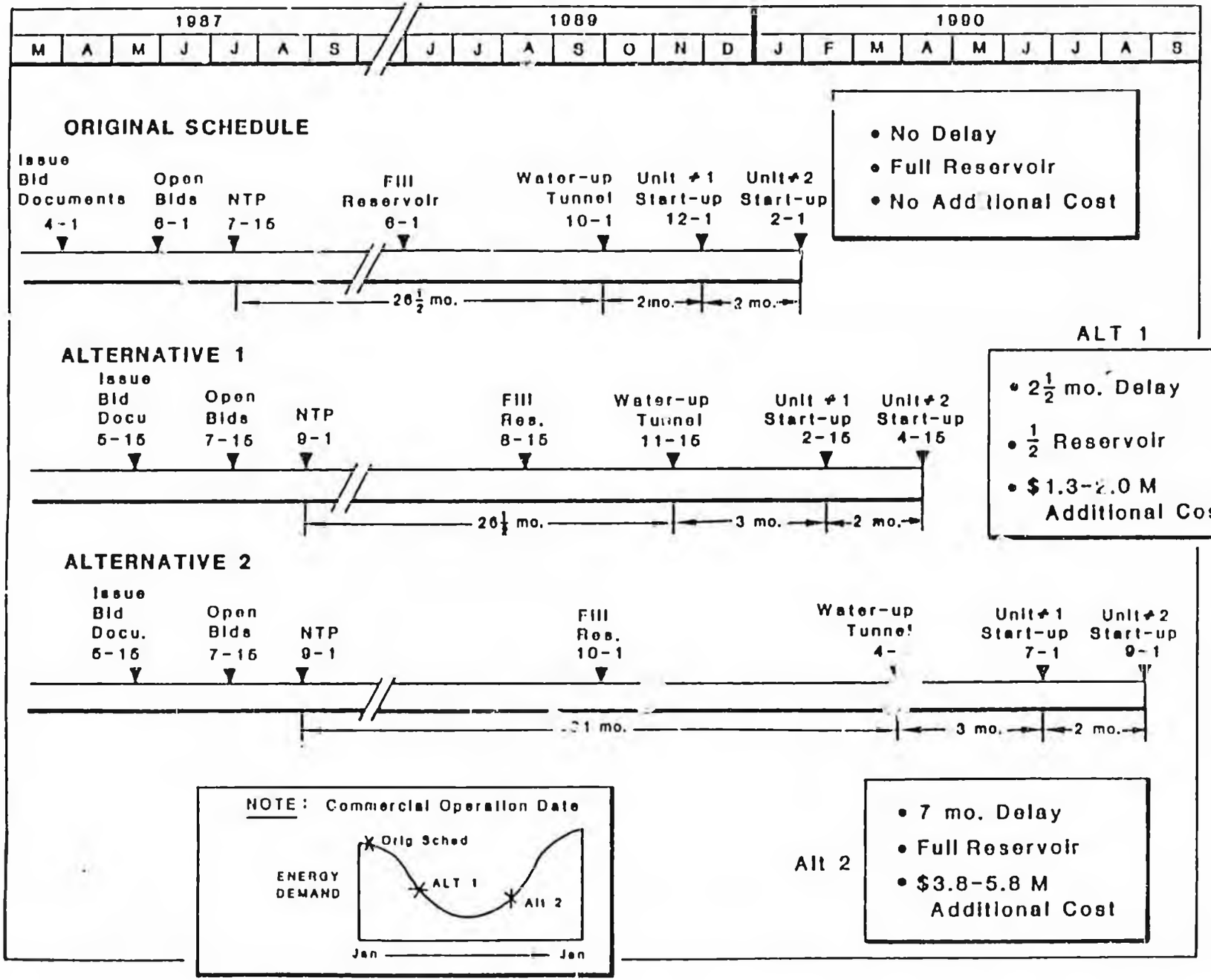
ALTERNATE #2
CASH FLOW



BRADLEY LAKE HYDROELECTRIC PROJECT, MARCH 1987

Alaska Power Authority

BRADLEY SCHEDULE ALTERNATIVES



ADVANTAGES TO ALTERNATIVE #2 SCHEDULE

1. Brings project on-line consistent with the seasonal increase in utility energy demand requirements. (Sept. vs. April)

2. Provides added flexibility to project scheduling for contract advertising/award.

3. Provides additional "float" in the General Civil Contract as well as the Powerhouse Contract which will help accommodate unforeseen changes without impacting project completion, thereby reducing potential claims.

4. Allows additional construction time to complete "critical path" work which reduces construction risks and may result in more favorable bids.

5. Estimated additional project cost of $3.8-5.8 million is based escalation of construction costs for seven (7) months less additional arbitrage interest earnings. This figure does not reflect a possible reduction in bid prices or potential lessening of claims exposure.

BRADLEY LAKE PROJECT

TOTAL COST IF TERMINATED

Expenditures Through March 31, 1987	$	52.4 million
Additional Expenditure Through May 1987		5.0 million
Contract Termination Costs		4.4 million
Site Restoration Cost		8.0–33.0 million
TOTAL		$ 69.8–94.8 million

STEVE COWPER
GOVERNOR

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

March 3, 1987

The Honorable Jan Faiks
President of the Senate
Alaska State Legislature
P.O. Box V
Juneau, AK 99811

Dear Senator Faiks:

Under the authority of art. III, sec. 18, of the Alaska Constitution, I am transmitting a bill that amends an appropriation to the Alaska Power Authority -- ch. 128, SLA 1986, page 8, line 7, in the amount of $50,000,000 -- by changing the funding source from the general fund to the Railbelt Energy Fund (AS 37.05.153).

AS 37.05.153, the law outlining the purpose of the Railbelt Energy Fund, specifies that the legislature may appropriate money from the fund to assist in meeting railbelt energy needs. As the Bradley Lake Hydroelectric Project is designed to reduce the long-term cost of power to railbelt consumers, my Administration is recommending that funding for the project be appropriated from the Railbelt Energy Fund.

Sincerely,

Steve Cowper
Governor

HO. 58

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

SENATE
BILL VERSION: SB 159
PUBLISH DATE: 3/3/87

REQUEST:

Revision Date:
Title: Act amending appropriation to the AK Power Authority for Bradley Lake Project
Sponsor: Rules Committee
Requester: Governor

Agency Affected: Commerce & Economic Dev.
BRU: Alaska Power Authority
Component:

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL	50,000.0	0.0	0.0	0.0	0.0	0.0
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER	50,000.0	0.0	0.0	0.0	0.0	0.0
TOTAL	50,000.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS:

The Railbelt Energy Fund is an appropriate source of available funding for the Bradley Lake Hydroelectric Project in FY 88, as provided for in AS 37.05.153.

Prepared by: Gloria Manni, Director
Division: Acctg. & Admin./AK Power Authority
Phone: 561-7877
Date: 3/2/87

Approved by Commissioner: Robert LeResche
Agency: Executive Director, APA
Date: 3/2/87

Distribution (by preparer):
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- Legislative Sponsor
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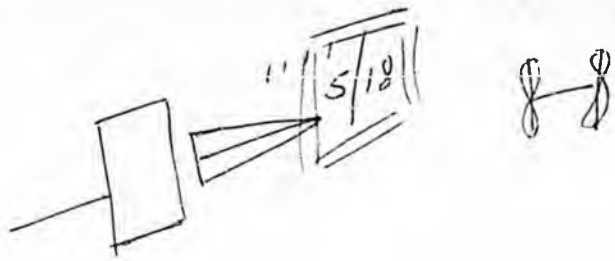
- Impacted Agency(ies)
- Senate Secretary

Introduced: 3/3/87
Referred: Finance

wo1377s



BY THE RULES COMMITTEE BY REQUEST OF THE GOVERNOR

IN THE SENATE

SENATE BILL NO. 159

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act amending an appropriation to the Alaska Power Authority for the Bradley Lake Hydroelectric Project; and providing for an effective date."

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

* Section 1. Section 3, ch. 128, SLA 1986, page 8, line 7, is amended to read:

Appropriation Item	General Fund	Other Funds
Alaska Power Authority -- Bradley Lake Hydroelectric Project	$50,000,000	[$50,000,000] $50,000,000

* Sec. 2. The funding source of this amended appropriation is the Railbelt Energy Fund (AS 37.05.153).

* Sec. 3. This Act takes effect immediately under AS 01.10.070(c).

Offered: 4/8/87
Referred: Resources & Finance

5-0423B

Original sponsors: Coghill and Szymanski

IN THE SENATE

BY THE LABOR AND COMMERCE COMMITTEE

CS FOR SENATE BILL NO. 109 (L&C)

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the rural electrification revolving loan fund."

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

* Section 1. FINDINGS AND INTENT. (a) Although the rural electrification revolving loan fund has existed since 1981, it has not adequately met the purpose for which it is intended. The principal reason for that failure has been regulations that have, at least in part, opposed the purpose of this program. The purpose of this program is to assist electric utilities and their consumers in extending pioneer electric distribution lines into developing rural areas.

(b) The legislature finds that

(1) the installation of pioneer electric distribution lines is essential to the orderly development of areas that are suitable and appropriate for development; frequently it is prohibitively expensive for the utilities and their consumers to build the necessary distribution lines in anticipation of sufficient development to make the lines feasible;

(2) it is in the public interest for the state to assist in financing distribution lines in areas where development is expected; the appropriate role of the state in regard to the lines is that of assuming the risk that the anticipated development will in fact occur;

(3) populated areas along state highways that have a source of central station electric service available for distribution are expected to develop further and loans from this program to construct pioneer distribution lines along those state highways are appropriate, and should be given

priority for one-half of the funds available.

(c) It is the intent of the legislature that all existing regulations relating to this loan program be reconsidered and that they be amended to conform to this Act.

* Sec. 2. AS 44.83.361(b) is amended to read:

(b) The authority may make loans from the rural electrification revolving loan fund to electric utilities certified by the Alaska Public Utilities Commission. A loan from the fund may be made only for the purpose of extending new electric service into an area of the state that an electric utility may serve under a certificate of public convenience and necessity issued by the Alaska Public Utilities Commission. A loan may be made from the fund to an electric utility if the utility invests the money necessary to provide one pole, one span of line, one transformer, and one service drop for each consumer for whom immediate service would be provided by the extension of electric service. Applications for loans to extend service along state highways shall be given priority on one-half of the funds available for loans under this section. However, a loan may not be made from the fund unless

(1) the loan is recommended by a loan advisory committee appointed under AS 44.83.363; and

(2) the extension of electric service would provide immediate service to at least three consumers.

* Sec. 3. AS 44.83.361(c) is amended to read:

(c) A loan from the rural electrification revolving loan fund shall bear an annual rate of interest of two percent of the unpaid balance of the loan. Interest received on a loan made under this section must be transferred annually (MONTHLY) to the commissioner of revenue for deposit in the general fund. The unpaid balance on a loan

made under this section remaining after 30 years may be forgiven.

* Sec. 4. AS 44.83.363 is amended to read:

Sec. 44.83.363. LOAN ADVISORY COMMITTEE. When an application for a rural electrification loan is submitted to the authority under AS 44.83.361, the authority shall appoint a local advisory committee from persons residing in the area that the applicant utility is certified to serve. The loan advisory committee shall consider the loan application, and shall recommend whether the loan application is to be approved or disapproved. A favorable recommendation from the loan advisory committee shall be based on a determination that development in the area of the proposed extension of electric service is likely to provide for full repayment of the loan under AS 44.83.361(d) within 30 [10] years. In making that determination the committee shall consider

(1) permanence of the premises to be served by the extension;

(2) land use patterns in the area;

(3) access for the line that would be installed with loan proceeds;

(4) availability of other utility service in the area; and

(5) the financial [ECONOMIC] feasibility of the extension of electric service with the proceeds of the loan.

Original sponsors: Coghill and Faiks

IN THE SENATE BY THE RESOURCES COMMITTEE

CS FOR SENATE BILL NO. 205 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the Railbelt energy council; and providing for an effective date."

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

* Section 1. Section 2(b), ch. 30, SLA 1986, is amended to read:

(b) Membership on the council consists of two members appointed by the governor; two senators appointed by the president of the senate; two members of the house of representatives appointed by the speaker of the house; the executive director of the Alaska Power Authority; and one representative from each of the seven Railbelt utilities.

* Sec. 2. Section 3, ch. 30, SLA 1986, is amended to read:

Sec. 3. This Act is repealed June 30, 1988 [1987].

* Sec. 3. The Railbelt energy council, created in sec. 2, ch. 30, SLA 1986, shall report to the legislature by February 15, 1988, on the progress made towards implementing the recommendations contained in the council's first report dated January 24, 1987.

* Sec. 4. This Act takes effect immediately under AS 01.10.070(c).

Alaska Power Authority

RAILBELT INTERTIE BENEFITS

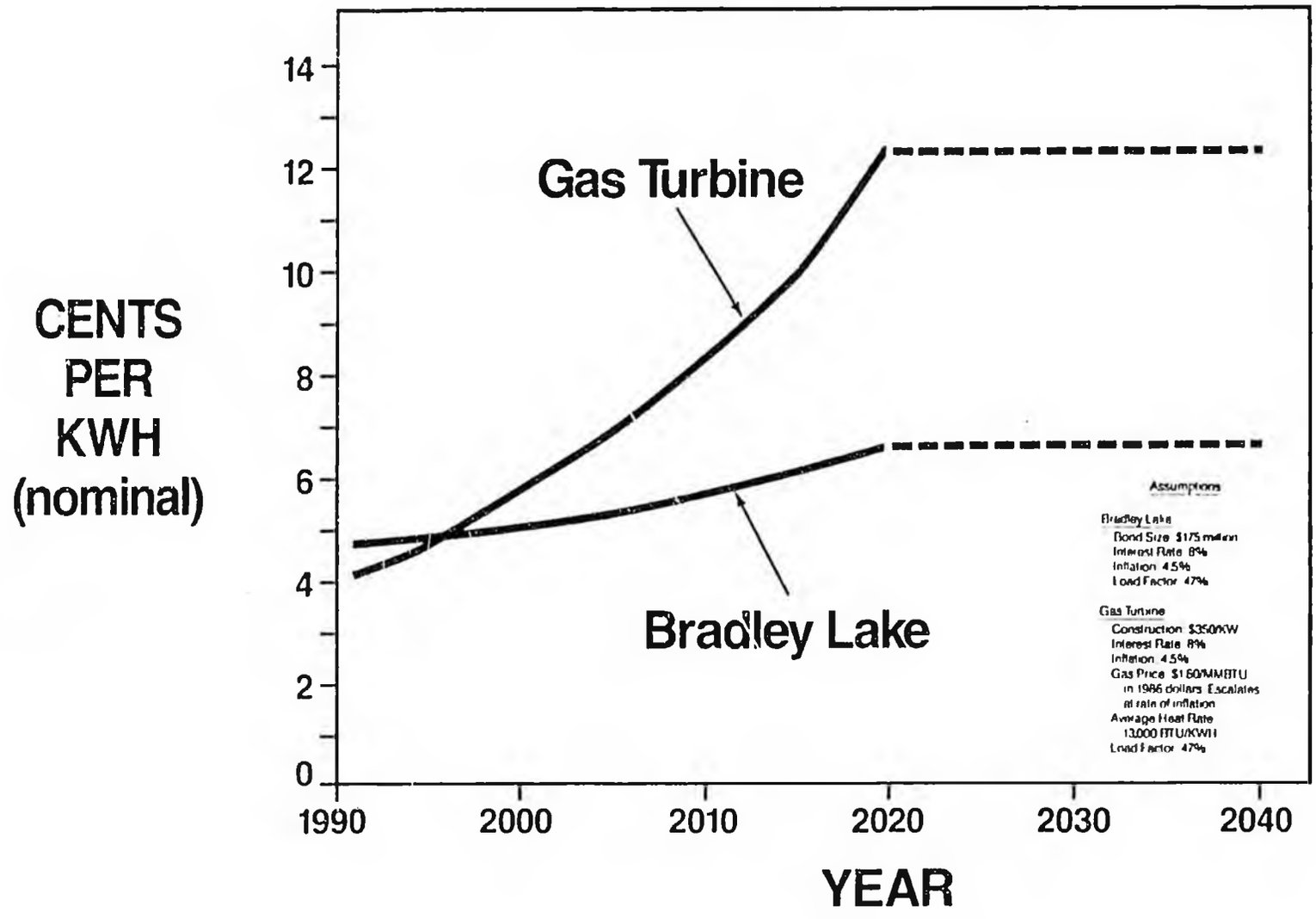
Quantified

- Economy Interchange
- Reserve Sharing
- System Efficiency
- Siting Flexibility for New Plants

Not Quantified

- System Reliability
- Increased Utility Coordination
- Distribution of Bradley Lake Benefits
- Enhanced Competition Among Fuel Suppliers

BRADLEY LAKE vs. GAS TURBINE PROJECTED RATES



BRADLEY LAKE PROJECT

TOTAL COST IF TERMINATED

Expenditures Through March 31, 1987	$	52.4 million
Additional Expenditure Through May 1987		5.0 million
Contract Termination Costs		4.4 million
Site Restoration Cost		8.0–33.0 million
TOTAL		$ 69.8–94.8 million

REPORT OF THE

RAILBELT ENERGY COUNCIL

TO THE

FIFTHTEENTH ALASKA STATE LEGISLATURE

FIRST SESSION

January 24, 1987

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RAILBELT ENERGY COUNCIL MEMBERSHIP

LEGISLATIVE MEMBERS

Senator Jan Faiks (Chairman, REC), Anchorage

Senator Jack Coghill, Nenana

Representative Sam Cotten, Eagle River

Representative Steve Frank, Fairbanks

GOVERNOR'S APPOINTEES

Mano Frey, Executive President, Alaska State AFL&CIO

Steven Lewis, President, PETROSTAR

UTILITIES' MEMBERS

RON GARZINI, City Manager,
Seward Electric System

VIRGIL GILLESPIE, General Manager,
Fairbanks Municipal Utilities System

MIKE KELLY, General Manager,
Golden Valley Electric Association

RICK NEWLAND, General Manager,
Chugach Electric Association

JAMES PALIN, General Manager,
Matanuska Electric Association

TOM STAHR, General Manager,
Anchorage Municipal Light & Power

KENT WICK, General Manager,
Homer Electric Association Utilities
(Vice-Chairman, REC)

EXECUTIVE SUMMARY

In 1986, the Alaska Legislature created the Railbelt Energy Council (REC) and charged it with addressing five areas of concern dealing with the Railbelt energy needs (Ch 30, SLA 1986). The Council membership consists of two members appointed by the Governor; two senators appointed by the President of the Senate; two members of the House of Representatives appointed by the Speaker of the House; and one representative from each of the seven interconnected Railbelt utilities. The Council was to report its recommendations to the Legislature by February 15, 1987.

The Council addressed the organizational and financial aspects as well as reviewed various alternatives for meeting the future energy needs of the Railbelt. The Council was unable to conduct the review of the alternatives in as great a detail as originally anticipated because of a freeze placed on the $2.5 million appropriation to the Alaska Power Authority (APA) for that specific purpose. Despite these difficulties further exacerbated by the declining oil prices and state revenues, the Council has addressed the major issues and unanimously approved its findings and recommendations. They are summarized below.

FINDINGS:

1. DECREASING OIL PRICES AND STATE REVENUES ARE CAUSING SIGNIFICANT CHANGES IN THE FORECASTED RAILBELT ENERGY REQUIREMENTS FOR THE NEXT SEVERAL YEARS. THE IMPACT OF THESE DEVELOPMENTS ON LONG-TERM GROWTH IS UNCLEAR.

2. DUE TO BUDGETARY LIMITATIONS, STATE PARTICIPATION IN FUTURE ENERGY PROJECTS WILL BECOME MORE CONSTRAINED.
3. INCREASING THE UTILIZATION AND EFFICIENCY OF THE EXISTING RAILBELT GENERATION AND TRANSMISSION RESOURCES REPRESENTS THE BEST SOLUTION IN THE NEAR TERM.
4. IMPROVING COOPERATION AND COORDINATION AMONG RAILBELT UTILITIES WILL INCREASE THE RELIABILITY AND COST EFFECTIVENESS OF THE REGION'S ELECTRIC SYSTEM.
5. THE LEGISLATURE ESTABLISHED THE RAILBELT ENERGY FUND FOR THE SOLE PURPOSE OF FINANCING ENERGY PROJECTS IN THE RAILBELT REGION.

MAJOR RECOMMENDATIONS:

1. CREATION OF A REGIONAL GENERATION AND TRANSMISSION TYPE UTILITY ORGANIZATION IS IN THE BEST INTEREST OF THE RAILBELT CONSUMERS AND SHOULD CONTINUE TO BE SUPPORTED BY ALL CONCERNED.
2. THE ALASKA POWER AUTHORITY SHOULD CONTINUE TO PERFORM ITS RAILBELT FUNCTIONS UNTIL THE LEGISLATURE AND ADMINISTRATION COMPLETE THEIR REVIEW AND DETERMINE THE APA'S FUTURE ROLE AND STRUCTURE.
3. THE COUNCIL RECOMMENDS THAT THE UTILITIES SHOULD HAVE REPRESENTATION ON THE ALASKA POWER AUTHORITY BOARD OF DIRECTORS.
4. CONSTRUCTION OF THE BRADLEY LAKE HYDROELECTRIC PROJECT SHOULD CONTINUE IN ACCORDANCE WITH A PLAN OF FINANCE AND POWER SALE AGREEMENTS PREVIOUSLY APPROVED OR AS MAY BE MODIFIED BETWEEN APA AND THE RAILBELT UTILITIES. ALL RAILBELT UTILITIES SHOULD BE GIVEN AN OPPORTUNITY TO PARTICIPATE IN THE BRADLEY LAKE PROJECT.

5. A PORTION OF THE RAILBELT ENERGY FUND SHOULD BE APPROPRIATED FOR THE COMPLETION OF THE ANCHORAGE-KENAI PENINSULA AND ANCHORAGE-FAIRBANKS INTERTIES IN CONJUNCTION WITH THE COMPLETION OF THE BRADLEY LAKE PROJECT.

6. THE BURDEN OF PROOF FOR DEMONSTRATING A COMPELLING NEED FOR ANY ADDITIONAL ENERGY PROJECT BEYOND BRADLEY LAKE AND THE RAILBELT INTERTIES, FOR WHICH STATE FINANCIAL ASSISTANCE IS BEING SOUGHT, IS ON THE PROJECT SPONSOR(S) AND SHOULD INCLUDE A CREDIBLE PLAN OF FINANCE AS WELL AS PUBLIC POLICY CONSIDERATIONS JUSTIFYING THE STATE ASSISTANCE.

7. AN ENERGY PROJECT REVOLVING FUND SHOULD BE ESTABLISHED, UTILIZING ANY MONIES REMAINING IN THE RAILBELT ENERGY FUND. A METHOD TO REPLENISH THE FUND SHOULD BE DEVELOPED WITH AFFORDABILITY TO THE RATEPAYER AS THE KEY TO ANY SUCH REPAYMENT PLAN.

INTRODUCTION

The Railbelt Energy Council was created by the Alaska Legislature (Chapter 30, SLA 1986) during the 1986 Legislative session. The Council was created in response to requests from the Railbelt utilities and other interested parties concerned that with the demise of the Susitna River Hydroelectric Project (Watana and Devil Canyon dams) early in 1986, the Railbelt's energy needs would not be met. The terms of financing for the Susitna project were found to be unacceptable due to its large capital cost and decreasing State revenues, although the project still appears economically feasible over the long run.

The demise of the two-dam Susitna project left the Railbelt Energy Program in question and with the problem of how best to utilize some $280 million designated as part of the state's equity in that project.

Another issue that had to be addressed dealt with the perception that the cooperation and coordination among the Alaska Power Authority and the seven interconnected Railbelt utilities was not as effective as deemed necessary for formulating the most efficient solutions to Railbelt energy needs.

In general then, the Council was created to address the organizational, generation, transmission and financial issues as they related to the Railbelt energy problems. The statutorily specified issues are addressed later in this report. Pending completion of the Council's

work, the Legislature placed all of the remaining Susitna Project funds into the Railbelt Energy Fund (REF) (Chapter 29 & 41, SLA 1986) while retaining the sole authority for making appropriations from it. Further, as a way of assisting the Council, the Legislature appropriated $2.5 million from REF to the APA for conducting a review and evaluation of Railbelt electric power alternatives (Chapter 42, SLA 1986).

While the Council has addressed the five areas mandated by statute, the report is not as comprehensive as desired largely because of two unplanned events. First, the previous Administration froze most of the $2.5 million appropriation to the APA that was to be used to review and evaluate Railbelt electric power alternatives. Second, the decline of economic growth has substantially delayed the need for future generation facilities in the Railbelt.

Despite these obstacles, the Council has been able to forge unified positions on a number of major issues dealing with the Railbelt energy problems. The Council feels that implementation of its recommendations will go a long way toward assuring Railbelt consumers--who represent three fourths of the State's population--of more reliable and low cost electrical energy. Further, utilization of the REF for energy projects in the Railbelt will restore some of the regional equity originally envisioned under the Energy Program for Alaska.

The Findings and Recommendations of this report are keyed to the five specific reporting requirements of the statute (Ch. 30, Sec 2, SLA 1986). Each of the five parts under Findings & Recommendations is headed with one of the statute requirements, which is underlined for easier identification.

FINDINGS & RECOMMENDATIONS

1. Recommend the best options for planning, financing, constructing, and managing electric power facilities in the Railbelt area.

   A. Planning. The Railbelt Energy Council finds that a well coordinated planning effort among those responsible for supplying the service is absolutely essential to assure that the Railbelt customers will have the most reliable, efficient and economic electric supply system. While there are many interested parties that have much valuable input to offer to the planning process, THE FACT REMAINS THAT THE RESPONSIBILITY FOR SUCH PLANNING REMAINS WITH THE RAILBELT UTILITIES AND THE ALASKA POWER AUTHORITY. The Council should not be expected to become a substitute for such a planning entity.

   THE COUNCIL BELIEVES THERE MUST EXIST A FORMAL ORGANIZATION of all interconnected Railbelt utilities. The creation of such a regional utility organization should continue to be supported by the responsible agencies, the Legislature and the Administration as being in the best interest of the Railbelt consumers.

While the Council recognizes that in the long-term the optimal solution would be a regional generation and transmission (G&T) utility organization, it is also aware that technical and political considerations may preclude such a solution in the short-term. Therefore, as an interim solution the Council recommends that:

1. The Railbelt utilities and APA work diligently toward establishing a regional organization as soon as possible.

2. Pending any change in its role and/or structure, the APA should continue to administer and perform its existing programs and functions relative to the Bradley Lake and the Railbelt interties projects.

3. The APA Board of Directors be immediately reorganized to include direct utility representation.

The Council recommends that the role of APA be re-evaluated. Two issues that should be taken into consideration in this review are the pending formation of a regional G&T utility and a significantly smaller state budget. Such a review by the Legislature and the Administration should begin during the 1987 session and provide for the Railbelt utility input.

B. Financing. The Council finds that it is not appropriate to recommend financing options without first having a specific project proposal. In general terms, the Council believes tha each project will have some unique aspect and the optimal financing plan will have to be custom tailored after specific economic feasibility and all relevant financial factors have been identified and public policy aspects considered. The Council recognizes that new State capital project funds will most likely remain scarce in the immediate future.

Therefore, THE COUNCIL RECOMMENDS THAT THE LEGISLATURE CONSIDER THE FINANCING OPTIONS FOR EACH NEW PROJECT SEPARATELY AND ENSURE OPTIMAL USE OF THE STATE AND PRIVATE EQUITY FUNDS.

Specifically, THE COUNCIL RECOMMENDS THAT THE LEGISLATURE CONTINUE TO SUPPORT THE PREVIOUSLY APPROVED BRADLEY LAKE HYDROELECTRIC PROJECT NOW UNDER CONSTRUCTION.

The Bradley project has already been deemed economically and environmentally feasible and has received licensing approval from the Federal Energy Regulatory Commission. Construction was begun in the summer of 1986. The State of Alaska has appropriated approximately $168 million for the project, $50 million of which was frozen after the 1986 Legislative session.

The Railbelt Energy Council unanimously supports timely completion of the Bradley project and supports full additional funding of $50 million for a total appropriation of $218 million as previously approved by the Legislature and which was in effect at the time of the signing of conditional power sales agreements. Changes to the existing plan of finance should be contemplated only after a careful evaluation of the impact they would have on the existing power sale agreements, but with the recognition that all seven interconnected Railbelt utilities should have direct access to the Project through completion of the Anchorage-Fairbanks and Anchorage-Kenai Peninsula interties.

Further, THE COUNCIL RECOMMENDS THAT A PORTION OF THE RAILBELT ENERGY FUND BE USED TO COMPLETE THE ANCHORAGE TO FAIRBANKS AND ANCHORAGE TO KENAI PENINSULA INTERTIES. The Council finds that the completion of these interties will allow all of the Railbelt utilities to more equally share the benefits of the Bradley Lake project as well as provide more reliable and less costly electric service to all consumers in the region.

C. Constructing. The Council finds that the owner or owners of a power project should retain the responsibility and authority to decide how best to construct it. Unless and until its role and/or structure are changed, the APA should

retain responsibility for the completion of the Bradley Lake Project and the Interties. The APA should closely coordinate its activities with the Railbelt utilities.

If at some future date there should come into being a regional utility organization, then any projects constructed by it should be accomplished totally under that organization's control.

D. Managing. The Council finds that in general the utilities are best qualified to operate and maintain the power supply facilities and recommends that the APA policy of contracting out such operations to local utilities be continued. The Council further recommends that management decisions, which are normally the prerogative of the owner and which could impact ratepayers, be closely coordinated among the owners, operators and users.

On the issue of divestiture, the Council finds that the transfer of the federal Eklutna Hydroelectric project to local utility or utilities makes sense only if the purchase price and terms are favorable to consumers and other interested parties. Accordingly, the Council recommends that the appropriate Railbelt utilities continue to pursue the divestiture process until the sale is consumated or it becomes clear that the process will not be successful due to political and other constraints.

2. Examine all alternatives and recommend the best method for meeting projected Railbelt energy demand.

As previously mentioned, the Council was unable to thoroughly examine a wide spectrum of energy alternatives because funds for energy alternative studies were frozen. In addition, the Council finds that the dramatic decline in oil prices since the end of the 1986 Legislative Session has had a profound effect on near-term Railbelt energy forecasts. For the near future, this seems to indicate that unless there is a significant upturn in the economy, there may not be a need for major new power plant additions after the completion of the Bradley Lake and Interties projects and excluding any existing plant replacements.

Given these circumstances, THE COUNCIL FINDS THAT THE PRUDENT STRATEGY TO FOLLOW AT THIS TIME IS TO INCREASE THE UTILIZATION AND OPERATIONAL EFFICIENCY OF THE EXISTING RAILBELT GENERATION AND TRANSMISSION FACILITIES AND THOSE UNDER CONSTRUCTION. Specifically, this should include timely completion of the Bradley Project, constructing a new Anchorage-Kenai Peninsula intertie, upgrading the Anchorage-Fairbanks intertie, implementation of various conservation measures and extending the life of existing power plants.

There are many benefits of an improved transmission system. Some of these are not easily quantifiable into dollars. Examples of such benefits include improved reliability, decreased

standby generation requirements, flexibility of buying from lowest cost generation source, the increased competition due to greater access to alternative generation methods and facilitation of general economic development requirements. THEREFORE, THE COUNCIL RECOMMENDS THAT THESE PUBLIC POLICY ISSUES BE CONSIDERED AS AN IMPORTANT PART OF THE DECISION MAKING PROCESS IN ADDITION TO THE TRADITIONAL BENEFIT/COST ANALYSIS.

The Council finds that electricity has become a necessity and a prerequisite to improving the quality of life for the rural residents. While the Council recognizes that extending the electrical service to all rural residents is neither practical, nor desired by some of them, it finds that extension of such services along state routes and interties, on a priority basis, would be highly desirable. Accordingly, the Council believes that the Legislature and the Administration should adopt policies and appropriations designed to achieve that goal, thereby enhancing the economic development potential of the rural residents while concurrently improving their quality of life.

3. Recommend alternative financing plans for assisting the private sector and public utilities to meet the future energy needs of the Railbelt area.

The Council has in this report made specific recommendations covering methods of financing for Bradley Lake and the Interties. The Council recognizes that State revenues have severely declined and that no new generation, in addition to the Bradley Lake and

Interties projects may be needed in the near future. The Council generally supports construction of future power supply projects by the municipalities, utilities or the private sector.

The Council further recommends that the burden of proof for making a compelling case for State participation in any project rest with the project sponsor(s) to include demonstrating that private financing is not feasible or available and that public policy considerations warrant financial assistance by the State.

THE COUNCIL FINDS THAT THE LEGISLATURE ESTABLISHED THE RAILBELT ENERGY FUND FOR THE SOLE PURPOSE OF FINANCING ENERGY PROJECTS IN THE RAILBELT REGION. Accordingly, THE COUNCIL RECOMMENDS THAT A PLAN OF FINANCE BE DEVELOPED TO ASSURE THAT THESE FUNDS ARE USED SOLELY FOR THEIR INTENDED PURPOSE AND THAT REPLENISHMENT OF THE FUNDS BE CONSIDERED A KEY ELEMENT IN ANY SUCH PLAN.

4. Determine whether a regional generation and transmission utility organization can operate to the best interests of utility consumers.

As alluded to under Finding 1A, the Council is aware that previous studies have demonstrated that a regional power supply utility organization is in the best interest of consumers.

Currently, work is being pursued by the Railbelt utilities toward a regional generation and transmission utility organization. This includes a formal generation and transmission organization study and a possible modification of the existing Alaska Electric Generation & Transmission cooperative by-laws to accommodate further expansion.

The Council is convinced that a regional generation and transmission utility organization makes sense and that the goal is worthwhile pursuing despite potential implementation problems. Pending a successful resolution of the issue, the Council recommends that the APA become a formal member of any organization designated to deal with the Railbelt energy issues.

5. Cooperate with the Alaska Power Authority to examine the feasibility and desirability of energy projects.

The Council notes that APA and the utilities are already cost sharing in the study of the Anchorage-Kenai Peninsula Intertie feasibility. The Council finds that freezing of the $2.5 million (except for the $150,000 for the Anchorage-Kenai Peninsula Intertie feasibility study) designated for studying the Railbelt electric power alternatives limited the Council's ability to review and evaluate Railbelt electric power alternatives such as coal, gas, conservation, Devil Canyon, and other hydro generation options.

Should the Legislature desire additional analysis to determine whether any of the above options are desirable, the Council would recommend that a highly qualified team be assembled to prepare plans of finance to determine whether the projects are able to be financed before proceeding with a feasibility analysis. The Council believes that this sequence would preclude needless expenditure of funds on detailed feasibility studies for projects which are not able to be financed despite being economically feasible.

While the Council finds that restructuring the APA Board of Directors is the best solution to assuring improved cooperation and coordination between the Railbelt utilities and the APA, should the Legislature desire to extend the life of REC for any reason, then the APA should be made a full member.

HOUSE RESEARCH
RAILBELT ENERGY ANALYSIS

	Completion Date
I) Railbelt Energy Demand	March 18, 1987
A) Projected Railbelt Electrical Demand	
B) Demand for Bradley Lake Power	
C) Existing Installed Capacity and Retirement Schedules in Light of Current Revised Demand Forecasts.	
II) Bradley Lake Project	March 18, 1987
A) Examination of OMB's Feasibility Analysis	
B) Economic Feasibility Compared to Gas Alternative	
III) PURPA Generating Facilities	April 9, 1987
A) Regulatory background	
B) Bradley Lake Project Financing and Power Sales Agreements	
IV) Additional Issues	
A) Long-Term Gas Availability for Power Generation	April 10, 1987
B) Bradley Lake Restoration Requirements by FERC	
V) Transmission Lines	May 1, 1987
A) Kenai-Anchorage Transmission Line:	
1) Current and Projected Electrical Demand in Kenai and Anchorage	
2) Power Displacement: Generating Capacity	
3) Existing Line Reliability and Upgradability	
4) Natural Gas Price Differential Between Kenai and Anchorage	
5) Cost of Four Alternate Routes	

Completion Date

B) Anchorage-Fairbanks Intertie — May 1, 1987
   1) Current and Projected Electrical Demand in Anchorage and Fairbanks
   2) Current Intertie Usage/Revenue Sharing, Reliability
   3) Impact of Fuel Oil Prices on Intertie Usage

C) Review/Critique Alaska Power Authority Transmission Lines Analyses — May 1, 1987

D) Cost/Benefit Analyses for Transmission Lines — May 1, 1987
   1) Anchorage-Kenai
      a) No change
      b) Upgrade existing line
      c) New line

   2) Anchorage-Fairbank
      1) No change
      2) Total upgrade
      3) Upgrade sections over time

VII) **Financing Mechanisms for Bradley Lake and Transmission Lines** — May 1, 1987

A) Identify Existing Funding Sources
   1) Railbelt Energy Fund
   2) Accrued Interest
   3) Remainder of Bradley Appropriations
   4) Bond Market

B) Financing Scenarios
   1) Examine various financing mechanisms with respect to State contribution, consumer rates, and the long-term integrity of a Railbelt Energy Fund
   2) Bradley Lake Project Only
      a) Utilities pay $175 million bond, State pays remainder
      b) State contributes larger subsidy
      c) Four-dam pool loan concept
   3) Bradley Lake Plus Kenai and/or Fairbanks Intertie(s)
      a) Spend all of Railbelt Energy Fund
      .
      .
      z) Railbelt Fund as a revolving loan fund to pay for tranmission lines over time

RAILBELT ENERGY PLAN

April 8, 1987

Last year, after the Susitna Hydroelectric Project was cancelled, the Legislature established the Railbelt Energy Fund and the Railbelt Energy Council. The purpose of the Railbelt Energy Fund was to reserve approximately $280 million, previously earmarked for Susitna, for other Railbelt energy projects. A major purpose of the Railbelt Energy Council was to recommend such projects.

In creating the Railbelt Energy Fund and the Railbelt Energy Council, legislators and administration officials made one thing very clear to the seven electric utilities in the region: They needed to agree on a plan of action and they needed to work with and through the Railbelt Energy Council.

This has been done.

For the first time ever, all seven Railbelt utilities, which together serve more than three quarters of the State's population, have agreed on a Railbelt energy development plan. That plan consists of two basic elements: Completion of the Bradley Lake Hydroelectric Project and completion of a solid Railbelt transmission intertie system.

The plan was unanimously recommended by the Railbelt Energy Council in its January 24, 1987, report to the Legislature. Moreover, the plan has been endorsed by a broad Railbelt coalition that includes business, labor and government leaders. Many local governments and chambers of commerce throughout the Railbelt have passed formal resolutions of support.

Among the governmental entities are the Anchorage Municipal Assembly, Fairbanks City Council, Matanuska-Susitna Borough, Wasilla City Council, Palmer City Council, Kenai Peninsula Borough, Homer City Council, Kenai City Council and Soldotna City Council, as well as the Kenai Caucus and Unified Fairbanks organizations. Labor supporters include the Alaska AFL-CIO and its 48 unions and affiliates, including the International Brotherhood of Electrical Workers Local 1547, and Teamsters Union Local 959. Local chambers of commerce that have passed resolutions include Anchorage, Fairbanks, Wasilla, Palmer, Big Lake, Willow, Talkeetna, Kenai, North Kenai and Homer. The Alaska State Chamber of Commerce has made the Bradley Lake project and the intertie system one of its highest legislative priorities.

THE PROJECTS

The Bradley Lake Project is a 90-megawatt hydroelectric facility under construction near Homer. It is scheduled for completion in 1990, and is designed to accommodate future enlargement to 135 megawatts. The Railbelt transmission system has two components: Upgrade of the existing 138-kilovolt Anchorage-Fairbanks transmission line to 345 kilovolts, and construction of a 230-kilovolt circuit from Anchorage to the lower Kenai Peninsula.

Bradley Lake was originally estimated to cost $408 million, including financing. That figure is now down to $350 million, and may drop even more given the sluggish economy and lower than expected inflation growth. The interties are estimated to cost $200 million. That figure, too, could drop.

BENEFITS

Separate studies by the Division of Policy in the Governor's Office, the House Research Agency and the Alaska Power Authority all show positive benefits for Bradley Lake and the interties, even when considered on their own.

A February 25, 1987, analysis by the Division of Policy and a March 18, 1987, analysis by the House Research Agency both estimate savings of approximately $85 million for Bradley Lake over the natural gas-fired generation alternative. Even under a much more conservative and unlikely scenario where the gas alternative would be delayed from the early 1990s to 1998, the House Research Agency analysis still projects savings of $36 million for Bradley Lake.

A March 1987 economic analysis prepared by a private consultant for the APA shows total quantifiable benefits of $423 million for the Anchorage-Fairbanks and Anchorage-Kenai Peninsula interties combined. This does not count other, less quantifiable benefits such as increased power system reliability and the facilitation of economic development.

Although the utilities believe the benefits cited in the above studies are understated, and that savings may be even higher, all the work to date agrees that Bradley Lake and the interties have a positive value as independent projects. When considered together, the benefits are even greater. Among the benefits of the combined Bradley Lake-intertie plan are these:

-- Long-term electric rates will be lower than otherwise for the majority of consumers in the State.

-- Regional power reliability will be significantly improved.

-- Generation resources, including future development, will be more diversified.

-- Economic development opportunities, including jobs, will be substantially enhanced.

-- Regional cooperation and coordination will be improved, as already evidenced through the establishment of the Railbelt Energy Council and the Railbelt energy coalition.

BRADLEY LAKE

The major benefit of the Bradley Lake project is the assurance of a stable, long-term supply of low-cost power, to be shared throughout the Railbelt utilizing the proposed intertie system. Because of higher capital costs, hydroelectric power is initially more expensive than that from fossil fuel plants. However, Bradley Lake energy is expected to become cheaper than the least-cost alternative of natural gas within the first five to seven years of Bradley's operation. The real payoff is that hydroelectric projects like Bradley Lake will last up to 100 years, compared to 20 or 30 years for gas turbines and other fossil-fuel generation facilities.

It is very important to remember that Bradley Lake will be more than an additional power source for the Railbelt. It will also be replacement power, because many of the region's existing gas-fired generation units will be wearing out in the early and mid-1990s.

The current plan, agreed to by all seven Railbelt utilities, is for the State and those utilities -- through long-term power sales agreements -- to split the cost of the project. Under the current $350 million cost estimate, the State's contribution would be $175 million, which is $43 million less than a previously agreed-to state equity share of $218 million. Should the cost of Bradley drop further, as many expect it will, the State's contribution would be reduced proportionately.

Of the $175 million from the State, $118 million already has been committed to project. The Governor has introduced legislation -- S.B. 159 and H.B. 165 -- to appropriate an additional $50 million from the Railbelt Energy Fund, to replace $50 million previously approved from the general fund but later rescinded. With the $118 million, the $50 million will bring the State's Bradley Lake contribution to $168 million, or within $7 million of the currently proposed $175 million. It is expected that the final $7 million will be appropriated by the current Legislature for fiscal 1988. Approximately $50 million already has been spent on the project, much of it for site preparation and support facilities.

THE INTERTIES

Construction has not yet begun on the interties, but studies are well under way. An economic analysis on both the southern and northern interties has been completed. So has a preliminary engineering feasibility study on the southern intertie, with the final report due in the very near future. An engineering feasibility study on the northern intertie is in progress, with a final report due in early May. It is important that environmental work commence this year so the transmission system can be in place when the Bradley Lake project comes on line, or as soon afterward as possible.

The Railbelt intertie system has a number of benefits, some quantifiable and some not easily quantifiable but nonetheless important. Here are some of them, as listed in the economic analysis:

Economy power interchanges -- The interties will permit the displacement of higher-cost generation in one area of the Railbelt with the lowest-cost generation from any other area. This will produce substantial savings for consumers.

Sharing of generation reserves -- The interties will allow one or more utilities to forego building or maintaining the amount of reserve generation capacity that would otherwise be necessary. Instead, those utilities could rely on reserves available elsewhere in the interconnected system.

Siting flexibility for new generation plants -- The interties will provide much greater flexibility in siting new generation plants within the Railbelt wherever the costs of operation -- including, importantly, fuel costs -- are the lowest.

Improved system reliability -- The interties will greatly improve electric system reliability throughout the Railbelt. For the first time, every Railbelt utility will have access to enough power from other systems to cope with any emergency or maintenance requirement. This will translate into fewer and briefer outages.

Increased system efficiency -- Transmission losses of electric energy are reduced in higher voltage circuits, such as the interties. It is estimated that line losses between Anchorage and the lower Kenai Peninsula will be reduced by 80 percent, while losses between Anchorage and Fairbanks will be reduced by 60 percent. Transmission loss reductions of this magnitude will result in many thousands of dollars in savings.

Increased utility coordination -- By virtue of its existence, a strong regional transmission grid will foster improved coordination and cooperation among Railbelt utilities. This will lead to increased participation in future generation and other power projects, with attendant sharing of costs and savings.

Distribution of Bradley Lake benefits -- The interties will enable all seven Railbelt utilities to directly participate in the Bradley Lake project, thereby spreading the costs and the benefits over a much wider base. With the limited existing transmission facilities, only Homer Electric Association and Chugach Electric Association could directly access Bradley Lake power.

Enhanced competition among fuel suppliers -- A major benefit of the interties is that they will improve access by all seven Railbelt utilities to a variety of generation fuel sources throughout the region. For example, power generation using cheaper wellhead natural gas on the Kenai Peninsula is presently constrained by a limitation in transmission capacity. With the interties, each utility will have a broader range of energy supply alternatives, and the utilities' bargaining positions with respect to potential fuel suppliers will be strengthened.

Another very important general benefit of the interties is that they will facilitate economic development and commerce, the results of which will be felt even beyond the Railbelt. In this respect, the interties are analogous to a highway, whose contribution to economic development and commerce is easily understood yet difficult to model. Where a highway carries motor vehicles, the interties will carry an equally essential commodity -- electric energy. Like good roads, a good electric transmission system is essential to a region's development.

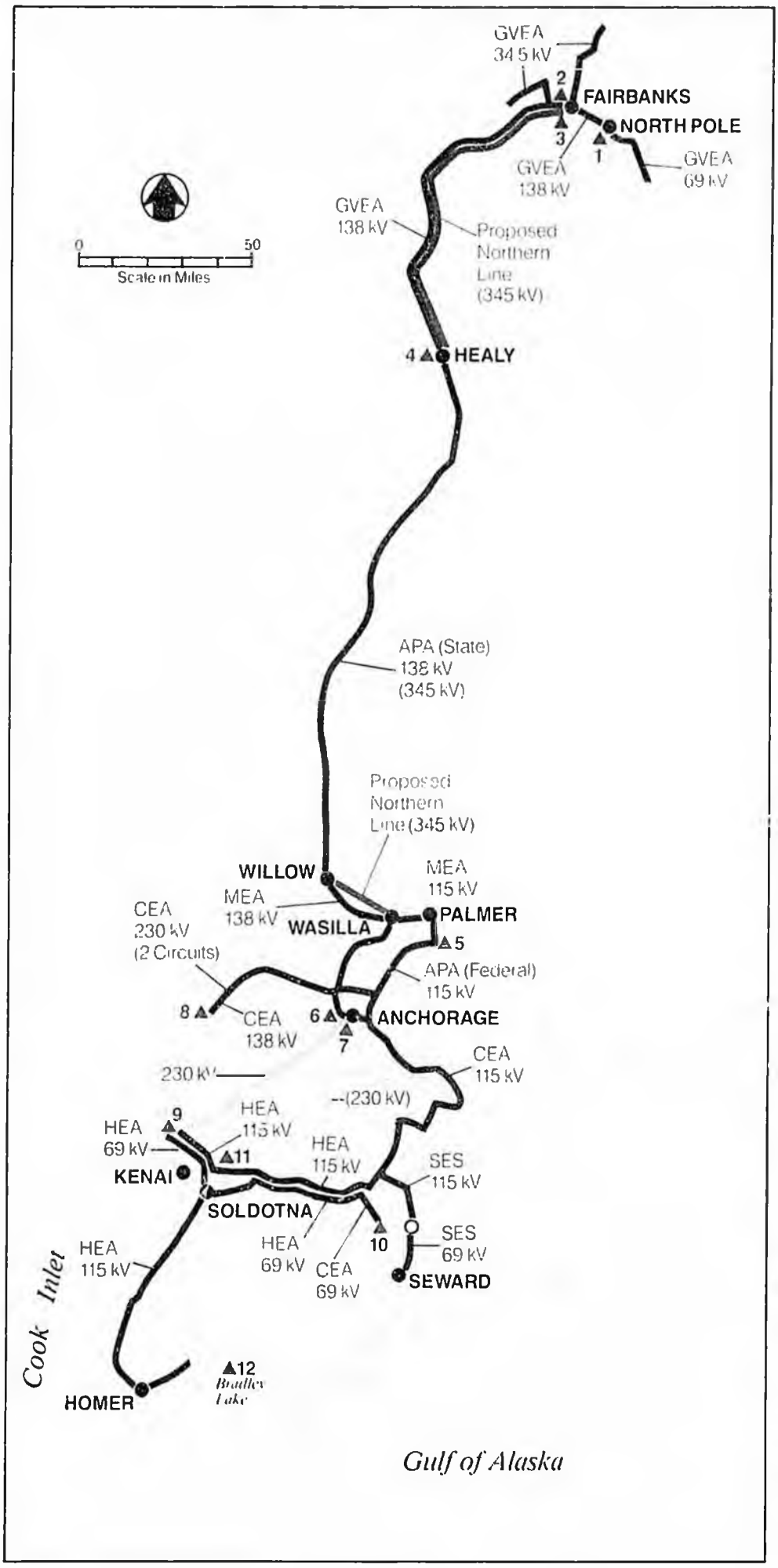
SUMMARY

The program to complete the Bradley Lake project and the Railbelt interties is sound. The projects will benefit the majority of Alaska's consumers, and there is unprecedented support from a broad spectrum of interests, including every electric utility in the region as well as labor, business and local government.

Both the Bradley Lake project and the interties are bona fide public works projects, and they will pay long-term dividends. The Railbelt's power supply network will be strengthened in a number of ways, including reliability and lower-cost generation in the future. The regional and statewide economies -- including the job sector -- will be stimulated during construction and for many years to come.

While there inevitably is disagreement over how best to use public funds, especially during times when revenues are less plentiful, there is a demonstrable need for the Bradley Lake project and the intertie system. This program fulfills a high public purpose.

:rbprog



Railbelt Generation and Transmission Systems

LEGEND

- Community
- ▲ Generation Station
- 2 Generation Station Identification Number
- 230 kV Line Capacity
- O Line Capacity Change
- Northern Line (Proposed)
- Fritz Creek Transmission Line (Proposed)
- Enstar Gas Pipeline Route (Proposed)
- Tesoro Products Line Route (Proposed)
- Transmission Line Route (Existing)

Prepared by ARECA

1. Oil Fired Generation — 121.8 mW — Golden Valley Electric Association — North Pole
2. Oil Fired Generation — 40.6 mW — Fairbanks Municipal Utilities System — Fairbanks
   Coal Fired Generation — 28.6 mW — Fairbanks Municipal Utilities System — Fairbanks
3. Oil Fired Generation — 51 mW — Golden Valley Electric Association — Fairbanks
4. Coal Fired Generation — 25 mW — Golden Valley Electric Association — Healy
5. Hydroelectric Generation — 30 mW — Alaska Power Administration (Federal) — Eklutna
6. Natural Gas Generation — 330 mW — Anchorage Municipal Light & Power — Anchorage
7. Natural Gas Generation — 49.4 mW — Chugach Electric Association — Anchorage
8. Natural Gas Generation — 360 mW — Chugach Electric Association — Beluga
9. Natural Gas Generation — 81.7 mW — Chugach Electric Association — Bernice Lake
10. Hydroelectric Generation — 17.4 mW — Chugach Electric Association — Cooper Lake
11. Natural Gas Generation — 38.5 mW — Alaska Electric Generation & Transmission — Soldotna
12. Hydroelectric Generation — 90 mW — Alaska Power Authority (State) — Bradley Lake

Alaska State Legislature

Senate Advisory Council

P.O. Box V
State Capitol
Juneau, Alaska 99811
Phone: (907) 465-3114

MEMORANDUM

TO: Representative S. Cotten
Capitol, Rm. 110

FROM: Kurt S. Dzinich KSD
Senior Advisor

DATE: March 3, 1987

RE: APUC vs APA Jurisdictional Dispute
Request #87-002503

In response to your request, I am providing you with a brief summary of the APA vs APUC dispute which resulted from the APUC legislation passed in 1986 i.e. AS 42.05.431(b). The dispute is whether APUC has the authority to review and approve wholesale power sale agreements or contracts between APA and a public utility.

Prior to 1986, the APUC did not have authority to review wholesale power sale agreements between APA and a public utility as defined in AS 42.05.720. With the passage of AS 42.05.431(b) in 1986, and according to the AG, the APUC now has that authority. I have attached copies of pertinent documentation for your information.

My research indicates that the controversial section was a result of a compromise between the APUC and the utilities and that the result was exactly opposite of what the utilities had intended, i.e. less power and authority for the APUC. The statute as it exists now could be very detrimental not only to the Bradley project power sale agreements, but to earlier power sale agreements between APA and the four-dam pool participants. Specifically, the statute will make it more difficult to obtain revenue bond financing because bond buyers are now faced with the prospect that APUC could require renegotiation of the terms at some uncertain, future date.

I believe that the only way out of this self-inflicted dilemma is through corrective legislation. Please let me know if there are further questions.

KSD:jts

Attachments

STATE OF ALASKA

STEVE COWPER, GOVERNOR

ALASKA PUBLIC UTILITIES COMMISSION
DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

420 L STREET
SUITE 100
ANCHORAGE, ALASKA 99501
(907) 276-6222

February 2, 1987

Honorable Grace Schaible
Attorney General
State of Alaska
Box K
Juneau, Alaska 99811

Dear Madame Attorney General:

This letter is to request a Formal Opinion on the issue of whether or not a wholesale power contract between the Alaska Power Authority (APA) and a regulated public utility is subject to the approval of the Alaska Public Utilities Commission (Commission). Although prior to 1986 it may have been clear that the Commission had no authority to approve such a contract, it appears that this may have changed with the passage of AS 42.05.431(b) in 1986.

This issue has been presented to the Commission in the context of a case involving an independent power producer who wishes to sell power to the Municipality of Anchorage d/b/a Municipal Light and Power Department (ML&P) pursuant to the Public Utility Regulatory Policies Act of 1978 and who has requested the Commission to prohibit ML&P from entering a contract for the purchase of power from the Bradley Lake Hydroelectric Project. A copy of our preliminary decision in that matter is enclosed. If you need any further information on the subject, please contact James Jackson, Hearing Officer, in this office.

I would respectfully request that primary responsibility for the drafting of the Opinion on this issue not be assigned to any of the Assistant Attorneys General assigned to either the APA or the Commission. In that way the Opinion cannot be questioned based on any alleged bias of the author.

I appreciate your assistance in this matter.

Sincerely,

Marvin R. Weatherly
Chairman

SLH

APPENDIX A
(U-86-96(3)

MEMORANDUM State of Alaska

TO Marvin R. Weatherly, Chairman
Alaska Public Utilities Commission
420 "L" Street #100
Anchorage, Alaska 99501

DATE February 18, 1987

FILE NO 663-87-0365

TELEPHONE NO: (907)465-3600

THRU

SUBJECT Power purchase contract between Alaska Power Authority and Municipal Light & Power

FROM Grace Berg Schaible
Attorney General

By: Richard D. Monkman
Assistant Attorney General

You have asked for our opinion on whether a power purchase contract between the Alaska Power Authority (Authority) and Municipal Light & Power (ML&P) is subject to approval by the Alaska Public Utilities Commission (Commission) under AS 42.05.431(b). In brief, our review indicates that the analysis in the Commission's Order No. 3 in Case U-86-96 is correct, and that this contract is subject to review by the Commission under AS 42.05.431(b).

First, it appears undisputed that the Authority is a "public utility" as that term is defined in AS 42.05.720(4)(A). The Authority is a public corporation empowered to operate and maintain power projects and "to enter into contracts with any person . . . for the purchase, sale, exchange, transmission, or use of power from a project[.]" AS 44.83.020; AS 44.83.080(5), (11). This fits squarely within the definition of a public utility: a corporation (including a public corporation) "that owns, operates, manages or controls any plant, pipeline or system for . . . furnishing, by generation, transmission or distribution, electrical service to the public for compensation[.]" AS 42.05.720(4)(A). 1/

The Authority is an unregulated public utility, exempt from the Commission's jurisdiction by operation of

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1/ The "public" is defined in AS 42.05.720(3)(B) as including "any utility" which resells power to a group of 10 or more consumers, a definition which would include Anchorage's Municipal Light & Power.

AS 44.83.090(b). The exemption was apparently intended to enhance the ability of the Authority to obtain bond financing for its projects. See 1984 Memorandum to Larry Crawford (July 31; C. Jones, AAG) ("APUC jurisdiction over APA power sales agreements"), attached, and legislative history cited therein.

However, while the Authority is exempt from Commission jurisdiction by AS 44.83.090(b), ML&P is not. ML&P is a regulated public utility and is subject to the Commission's jurisdiction. The exemption provided to the Authority by AS 44.83.090(b) specifically states that:

> Nothing in AS 44.83.101 -- 44.83.425 [the Alaska Power Authority statutes]. . . diminishes or otherwise alters the jurisdiction of the Alaska Public Utilities Commission with respect to any public utility, including any right the commission may have to review and approve or disapprove contracts for the purchase of electricity by a public utility.

AS 44.83.090(b) (emphasis supplied).

The question posed, therefore, is whether the Commission has "any right . . . to review and approve or disapprove contracts for the purchase of electricity" by ML&P, including the contract at issue.

Our 1984 memorandum concluded that the Commission did not have authority at that time to review, approve, or disapprove electric power purchase contracts by a public utility. 1984 Memorandum, supra (attached). 2/ Since the Commission did not have "any right . . . to approve or disapprove contracts for the purchase of electricity" by a public utility, electric power purchase contracts between regulated public utilities and the Authority were not subject to the Commission's review.

However, as you note, the legislature has since passed AS 42.05.431(b), sec. 5, ch. 104, SLA 1986. This section states

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2/ "[W]e can find no authority in AS 42.05 which would permit the Commission to review these wholesale purchase agreements from the point of view of the utility as a purchaser" (emphasis in original).

that a "wholesale power agreement between public utilities is subject to advance approval" of the Commission. The new statute gives the Commission the "right" to review electric power purchase contracts by regulated public utilities which was lacking at the time of our 1984 opinion.

The primary guide in statutory interpretation is "the language used, construed in light of the purpose of the enactment." Commercial Fisheries Entry Commission v. Apokedak, 680 P.2d 486, 489-90 (Alaska 1984). The proposed power purchase contract is "for the purchase of electricity by a public utility." AS 44.83.090(b). It is a contract between "public utilities," and all such contracts are "subject to advance approval of the commission." AS 42.05.431(b). The plain words of these statutes indicate that the proposed agreement would be subject to review and prior approval by the Commission.

The "purpose of the enactment" in this instance does not conflict with the plain language. The 1986 enactment of AS 42.05.431(b) was in House Bill 314, which began as a short "sunset" re-authorization bill for the Commission. HB 314 grew into a complex, lengthy, and controversial package of amendments to the Commission statute, see, e.g., 1986 House J. 3181-90, 3197-209, but was drastically shortened again before final passage. Compare HB 314 with CSHB 314(Fin) and SCS HB 314(Fin). AS 42.05.431(b) surfaced without comment in the House Finance Committee version of the bill, and remained unchanged in all material respects from the date of its introduction until final passage.

The only comment we have found on the purpose of this section is in a letter from Attorney General Brown to Governor Sheffield, reviewing HB 314 after it was passed by the legislature. The letter states, "The commission's authority to approve wholesale power agreements would be made explicit" by AS 42.05.431(b). Letter, June 4, 1986, A.G. File No. 883-86-0135. This is in accord with our conclusion that the plain meaning of the statute gives the Commission authority to review the contract at issue.

We note also that the powers of the Commission are to be "liberally construed." AS 42.05.141. Review of a ten-year electric power purchase contract by a regulated public utility appears to be within the authority of the Commission under AS 42.05.431(b). Therefore, we conclude that the Commission does have the authority to review this contract.

We are informed by the Authority that Commission review of its contract with ML&P will adversely affect the Authority's ability to obtain bond financing for the Bradley Lake hydroelectric dam project in a timely manner. We suggest that the Commission promptly contact the Authority and discuss possible legislative action which would resolve the situation in the best interests of the public.

RDM:nb

attachment

cc: Alaska Power Authority

MEMORANDUM State of Alaska

TO Larry Crawford
Executive Director
Alaska Power Authority

DATE July 31, 1984

FILE NO 166-568-84

TELEPHONE NO 276-3550

FROM Norman C. Gorsuch
Attorney General
By: Carolyn E. Jones
Assistant Attorney General

SUBJECT APUC jurisdiction over APA power sales agreements

You have asked what jurisdiction, if any, the Alaska Public Utility Commission (APUC) has to review and approve an agreement in which a local utility regulated by the APUC contracts to buy power from the Alaska Power Authority (APA). As we understand the facts, the APA anticipates selling and five local utilities intend to buy hydroelectric power generated by the "Four Dam Pool." One of the regulated utilities has questioned whether the APUC has jurisdiction to approve a wholesale agreement for hydroelectric power and the rates charged under the agreement. We conclude that the APUC has statutory jurisdiction to examine the terms of a local utility's wholesale power agreement with the APA only if the APUC has reason to investigate, as set out in AS 42.05.511 the local utility's management practices involved in entering the wholesale agreement. The APUC does not have authority to review rates or practices of the APA, and does not, in ordinary circumstances, approve a utility's wholesale power purchase agreements.

When the legislature first created the Alaska Power Authority, it provided that any contracts to sell power would be subject to review by the APUC. AS 44.56.090(8). This provision was consistent with the APUC's general authority, set out in AS 42.05.370 1/ to review contracts for the sale of electric power by a public utility because the APA was a public utility as defined in the APUC Act.

1/ AS 42.05.370 provides, in part,

> [E]very public utility shall file with the Commission . . . its complete tariff . . . and all classifications, rules, regulations, and terms and conditions under which it furnishes its services and facilities . . . to regulated or municipally owned utility for resale to the public, together with a copy of every special contract with customers which in any way affects or

(Footnote Continued)

Two years later, however, the legislature substantially amended AS 44.56.090 to provide, in part, that the APA would not be subject to the jurisdiction of the APUC. AS 44.56.090(b) (Renumbered in 1981 as AS 44.83.090(b). In his April 6, 1977 transmittal letter, Governor Hammond stated that the purpose of the proposed amendment was to clarify the relationship between the authority and the APUC by providing that the APUC would not have jurisdiction over the APA. Committee Report - House Finance, April 19, 1978 at . A review of the testimony before both the House and Senate Finance Committees reveals that the practical effect of this clarification was to eliminate problems the authority was having in financing its projects through the sale of bonds. Committee Minutes - House Finance, April 10, 1978 at 374; testimony of Eric Yould, Executive Director, Alaska Power Authority, id at 374, 376; testimony of Argetsinger, ("Bond people get very nervous when any outside agency gets into control.").

A second question is whether, in spite of AS 44.83.090(b), the APUC has jurisdiction to review the APA wholesale power agreements as part of its regulation of the purchasing utility. If so, the intent of AS 44.83.090(b) could be defeated. If the APUC has authority to approve or disapprove a wholesale power agreement that the purchasing utility intended to sign with the APA, the practical effect would be the same as if the APA had to submit the agreement to the APUC. The APA would not be able to market its bonds and finance construction of its power projects. Furthermore, while the APUC clearly has the authority to investigate a utility's rates when the utility is the selling utility, we can find no authority in AS 42.05 which would permit the APUC to review these wholesale purchase agreements from the point of view of the utility as a purchaser. See AS 42.05.141 (general powers and duties of APUC include investigating utility's rates and making and requiring just, fair and reasonable rates); AS 42.05.431 (APUC may fix just and reasonable rate after investigation and hearing).

The APUC does, however, have broad statutory authority to examine the management practices of a utility, AS 42.05.511 2/

(Footnote Continued)
relates to the serving utility's rates, tolls, charges, rentals, classifications, services or facilities.

2/ Sec. 42.05.511. Unreasonable management practices. (a)
(Footnote Continued)

. This broad authority has never been interpreted by the Alaska Supreme Court. It is conceivable that the APUC could rely on this power to investigate the wholesale power purchase agreement if it perceived that the utility had engaged in imprudent management by entering the APA agreement. This action, however, would have to be considered extraordinary, and be supported by some evidence of imprudence or inefficiency. Even if the APUC were to conduct such an investigation, it is not clear that disapproving or setting aside a wholesale power agreement with the APA would be a permissible remedy.

CONCLUSION

The APUC lacks the authority to approve or disapprove a wholesale power agreement by which the APA sells its hydroelectric power to a regulated electric utility. Once the APA and the purchasing utility have agreed to the sale and the rates charged under the agreement, no further authorization is necessary to enter into such an agreement. However, this conclusion does not suggest that the APUC would be precluded from examining the APA wholesale power agreements under its broad "management practices" authority in appropriate circumstances.

CEJ:cah

(Footnote Continued)
The commission may investigate the management of a public utility, including but not limited to staffing patterns, wage and salary scales and agreements, investment policies and practices, purchasing and payment arrangements with affiliated interests, for the purpose of determining inefficient or unreasonable practices which adversely affect the cost or quality of service of the public utility.

(b) Where unreasonable practices are found to exist, the commission may, after providing reasonable notice and opportunity for hearing, take appropriate action to protect the public from the inefficient or unreasonable practices and may order the public utility to take the corrective action the commission may require to achieve effective development and regulation of public utility services.

SENATE ADVISORY COUNCIL
POUCH V
JUNEAU, ALASKA 99811
465-3114

TO: Representative S. Cotten

FROM: Senate Advisory Council Staff

DATE: March 3, 1987

RE: Informational Release: Request # 87-002503
APUC vs APA Jurisdictional Dispute

Thank you for your recent request for assistance. Attached is the material you requested. This information will remain confidential unless we receive your approval for release.

Please check the appropriate box and return to Mail Stop 3100 or the above mailing address.

☐ I approve the release of this information.

☐ I approve the release of this information, but please remove my name.

☐ I do not approve the release of this information at this time.

If we can be of further service, please do not hesitate to contact us.

DATE _____ SENATOR _____