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# **Existing Generating Facilities And Planned Additions for the Railbelt Region of Alaska**

**Volume VI**

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**September 1982**

**Prepared for the Office of the Governor  
State of Alaska  
Division of Policy Development and Planning  
and the Governor's Policy Review Committee  
under Contract 2311204417**

 **Battelle**  
Pacific Northwest Laboratories

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## PREFACE

The State of Alaska commissioned Battelle to investigate potential strategies for future electric power development in Alaska's Railbelt region. The results of the study will be used by the Office of the Governor to formulate recommendations for electric power development in the Railbelt.

The primary objective of the study is to develop and analyze several alternative long-range plans for electric energy development in the Railbelt region. Each plan is based on a general energy development strategy representing one or more policies that Alaska may wish to pursue. The analyses of the plans will produce forecasts of electric energy demand, schedules for developing generation and conservation alternatives, estimates of the cost of power, and discussions of the environmental and socioeconomic characteristics for each plan.

This report (Volume VI of a series of seventeen volumes, listed below) describes electric generating facilities currently existing and scheduled to be added in the Railbelt region. Several sources were used to develop the lists of current generating facilities presented in this report. In most cases, the utilities themselves furnished the data on the number of units and their nameplate capacities. Other information, such as the retirement date, forced outage rate, and maximum capacity factor, was assumed on the basis of national operating statistics.

### RAILBELT ELECTRIC POWER ALTERNATIVES STUDY

- Volume I - Railbelt Electric Power Alternatives Study: Evaluation of Railbelt Electric Energy Plans
- Volume II - Selection of Electric Energy Generation Alternatives for Consideration in Railbelt Electric Energy Plans
- Volume III - Executive Summary - Candidate Electric Energy Technologies for Future Application in the Railbelt Region of Alaska
- Volume IV - Candidate Electric Energy Technologies for Future Application in the Railbelt Region of Alaska
- Volume V - Preliminary Railbelt Electric Energy Plans

- Volume VI - Existing Generating Facilities and Planned Additions for the Railbelt Region of Alaska
- Volume VII - Fossil Fuel Availability and Price Forecasts for the Railbelt Region of Alaska
- Volume VIII - Railbelt Electricity Demand (RED) Model Specifications
- Volume IX - Alaska Economic Projections for Estimating Electricity Requirements for the Railbelt
- Volume X - Community Meeting Public Input for the Railbelt Electric Power Alternatives Study
- Volume XI - Over/Under (AREEP Version) Model User's Manual
- Volume XII - Coal-Fired Steam-Electric Power Plant Alternatives for the Railbelt Region of Alaska
- Volume XIII - Natural Gas-Fired Combined-Cycle Power Plant Alternative for the Railbelt Region of Alaska
- Volume XIV - Chakachamna Hydroelectric Alternative for the Railbelt Region of Alaska
- Volume XV - Browne Hydroelectric Alternative for the Railbelt Region of Alaska
- Volume XVI - Wind Energy Alternative for the Railbelt Region of Alaska
- Volume XVII - Coal-Gasification Combined-Cycle Power Plant Alternative for the Railbelt Region of Alaska

### SUMMARY

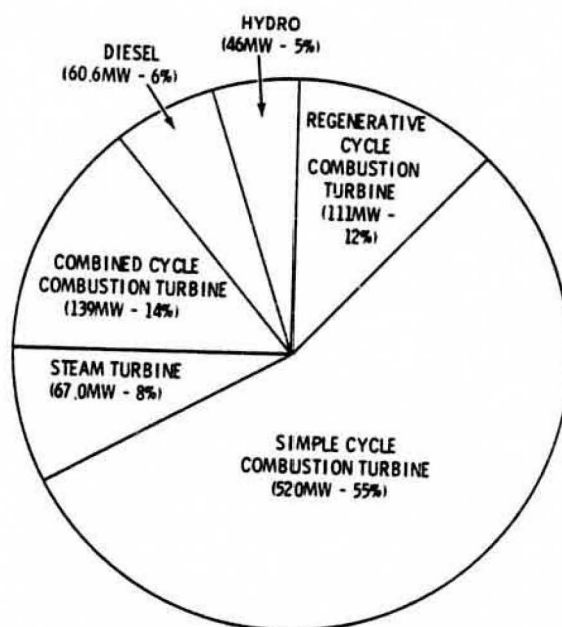
The total nameplate generating capacity for each of the Railbelt utilities by type of generating capacity is presented in Table S.1. As shown in this table, the Anchorage-Cook Inlet area had a total of 621.5 MW of capacity, and the Glennallen-Valdez area had 303.65 MW of capacity in 1980. Of the total 944.05 MW capacity, the majority is simple-cycle combustion turbine (520.45 MW or 55%). The relative mix of technologies is shown in Figure S.1. The total nameplate generating capacity for the military installations is summarized in Table S.2.

**TABLE S.1. Total Nameplate Generating Capacity - Railbelt Utilities (1980) - MW**

|                                       | <u>CCCT<sup>(a)</sup></u> | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u>   | <u>Total</u> |
|---------------------------------------|---------------------------|---------------|--------------|-------------|-------------|-------------|--------------|
| <b>Anchorage - Cook Inlet Area</b>    |                           |               |              |             |             |             |              |
| Alaska Power Administration           | 0                         | 0             | 30           | 0           | 0           | 0           | 30           |
| Anchorage Municipal Light and Power   | 139                       | 0             | 0            | 0           | 74.5        | 0           | 213.50       |
| Chugach Electric Association          | 0                         | 0             | 16           | 111         | 244         | 0           | 371.50       |
| Homer Electric Association            | 0                         | 1.5           | 0            | 0           | 0           | 0           | 1.5          |
| Matanuska Electric Association        | 0                         | 0             | 0            | 0           | 0           | 0           | 0            |
| Seward Electric System                | <u>0</u>                  | <u>5.5</u>    | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>0</u>    | <u>5.5</u>   |
| Subtotal                              | 139                       | 7.0           | 46           | 111         | 318.5       | 0           | 621.5        |
| <b>Fairbanks - Tenana Valley Area</b> |                           |               |              |             |             |             |              |
| Fairbanks Municipal Utilities System  | 0                         | 8.25          | 0            | 0           | 28.35       | 29.0        | 65.6         |
| Golden Valley Electric Association    | 0                         | 23.75         | 0            | 0           | 170.80      | 25.0        | 219.55       |
| University of Alaska - Fairbanks      | <u>0</u>                  | <u>5.50</u>   | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>13.0</u> | <u>18.50</u> |
| Subtotal                              | 0                         | 37.50         | 0            | 0           | 199.15      | 67.0        | 303.65       |
| <b>Glennallen - Valdez Area</b>       |                           |               |              |             |             |             |              |
| Copper Valley Electric Association    | <u>0</u>                  | <u>16.10</u>  | <u>0</u>     | <u>0</u>    | <u>2.8</u>  | <u>0</u>    | <u>18.9</u>  |
| TOTAL                                 | 139                       | 60.6          | 46           | 111         | 520.45      | 67.0        | 944.05       |

- (a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

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**FIGURE S.1.** Relative Mix of Electrical Generating Technology - Railbelt Utilities - 1980

TABLE S.2. Total Nameplate Generating Capacity - Railbelt Military Installations (1980) - MW

|                                | <u>CCCT</u> (a) | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u>    | <u>Total</u> |
|--------------------------------|-----------------|---------------|--------------|-------------|-------------|--------------|--------------|
| Anchorage - Cook Inlet Area    |                 |               |              |             |             |              |              |
| Elmendorf AFB                  | 0               | 2.1           | 0            | 0           | 0           | 31.5         | 33.6         |
| Fort Richardson                | <u>0</u>        | <u>7.2</u>    | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>18.0</u>  | <u>25.2</u>  |
| Subtotal                       | 0               | 9.3           | 0            | 0           | 0           | 49.5         | 58.8         |
| Fairbanks - Tenana Valley Area |                 |               |              |             |             |              |              |
| Eielson AFB                    | 0               | 0             | 0            | 0           | 0           | 8.75         | 8.74         |
| Fort Greeley                   | 0               | 5.5           | 0            | 0           | 0           | 0            | 5.5          |
| Fort Wainwright                | <u>0</u>        | <u>0</u>      | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>22.0</u>  | <u>22.0</u>  |
| Subtotal                       | <u>0</u>        | <u>5.5</u>    | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>30.75</u> | <u>36.25</u> |
| TOTAL                          | 0               | 14.8          | 0            | 0           | 0           | 80.25        | 95.05        |

- (a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

## 1.0 INTRODUCTION

The Railbelt area currently consists of three noninterconnected load centers; the Anchorage-Cook Inlet area, the Fairbanks-Tenana Valley area, and the Glennallen-Valdez area.<sup>(a)</sup> In the Anchorage-Cook Inlet and Fairbanks-Tenana Valley areas several utilities and military installations are interconnected. The Glennallen-Valdez area has only a single utility, the Copper River Electric Association, Inc. The utilities and military installations for which data are included in this report are shown below:

### Anchorage-Cook Inlet Area

#### Utilities

Alaska Power Administration  
Anchorage Municipal Light and Power  
Chugach Electric Association, Inc.  
Homer Electric Association, Inc.  
Matanuska Electric Association, Inc.

#### Military Installations

Elmendorf AFB  
Fort Richardson

### Fairbanks-Tenana Valley Area

#### Utilities

Fairbanks Municipal Utilities System  
Golden Valley Electric Association, Inc.  
University of Alaska-Fairbanks

#### Military Installations<sup>(b)</sup>

Eielson AFB  
Fort Greeley  
Fort Wainwright

- (a) Glennallen and Valdez were scheduled to be interconnected in 1981 and are considered as a single load center for the purpose of this analysis.  
(b) Clear Air Force Station generates its own power but is not connected to the other systems. Due to the mission of this station, future connection is not anticipated.

Glennallen-Valdez Area

Utility

Copper Valley Electric Association, Inc.

Industries having their own generating facilities were not considered in this analysis since they typically do not market power.

## 2.0 EXISTING GENERATING FACILITIES AND PLANNED ADDITIONS FOR THE RAILBELT AREA

As mentioned earlier, the Railbelt area has three noninterconnected load centers: the Anchorage-Cook Inlet Area, the Fairbanks-Tenana Valley area; and the Glennallen-Valdez area. In the following section, the existing generating facilities and planned additions for each of these areas are presented and briefly discussed.

### 2.1 ANCHORAGE-COOK INLET AREA

The Anchorage-Cook Inlet area has three rural electric cooperative associations (REAs), two municipal utilities, a Federal Power Administration, and two military installations. They are listed below:

- Alaska Power Administration (APA) - U.S. Department of Energy
- Anchorage Municipal Light and Power (AML&P) - Municipal Utility
- Chugach Electric Association (CEA), Inc. - REA
- Homer Electric Association (HEA), Inc. - REA
- Matanuska Electric Association (MEA), Inc. - REA
- Seward Electric System (SES) - Municipal Utility
- Elmendorf AFB - Military
- Fort Richardson - Military

All of these organizations, with the exception of MEA, have electrical generating facilities. MEA buys its power from the Chugach Electric Association. HEA and SES have relatively small generating facilities that are used for standby operation only. They also purchase their power during normal operations from the Chugach Electric Association. Total nameplate generating capacity for these utilities is presented in Table 2.1. Total nameplate generating capacity for the two military installations in the Anchorage-Cook Inlet area, Elmendorf AFB and Fort Richardson, are presented in Table 2.2.

Further information about specific generating plants and units for each of the utilities and military installations discussed in this report is contained in Appendix A.

TABLE 2.1. Total Nameplate Generating Capacity - Railbelt Utilities (1980) - MW

|                                     | <u>CCCT</u> <sup>(a)</sup> | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u> | <u>Total</u> |
|-------------------------------------|----------------------------|---------------|--------------|-------------|-------------|-----------|--------------|
| Alaska Power Administration         | 0                          | 0             | 30.0         | 0           | 0           | 0         | 30.0         |
| Anchorage Municipal Light and Power | 138.9                      | 2.2           | 0            | 0           | 89.5        | 0         | 230.6        |
| Chugach Electric Association        | 0                          | 0             | 16.5         | 120.10      | 287.31      | 19.0      | 442.91       |
| Fairbanks Municipal Utility System  | 0                          | 8.25          | 0            | 0           | 28.35       | 28.5      | 65.10        |
| Golden Valley Electric Association  | 0                          | 17.95         | 0            | 0           | 163.4       | 25.0      | 206.35       |
| Homer Electric Association          | 0                          | 2.095         | 0            | 0           | 0           | 0         | 2.095        |
| Seward Electric System              | 0                          | 5.5           | 0            | 0           | 0           | 0         | 5.5          |
| TOTAL                               | 138.9                      | 35.995        | 46.5         | 120.10      | 568.56      | 72.5      | 982.555      |

- (a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

TABLE 2.2. Total Nameplate Generating Capacity Anchorage-Cook Inlet Area Military Installations (1980)

|                 | <u>CCCT<sup>(a)</sup></u> | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u>   | <u>Total</u> |
|-----------------|---------------------------|---------------|--------------|-------------|-------------|-------------|--------------|
| Elmendorf AFB   | 0                         | 2.1           | 0            | 0           | 0           | 31.5        | 33.6         |
| Fort Richardson | <u>0</u>                  | <u>7.2</u>    | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>18.0</u> | <u>25.2</u>  |
| TOTAL           | 0                         | 9.3           | 0            | 0           | 0           | 49.5        | 58.8         |

(a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

Presently, three additional generating facilities are planned for the Anchorage-Cook Inlet area. The Bradley Lake hydroelectric facility will have a rated capacity of 90 MW with an expected average annual energy production of 347,000,000 kWh. It is presently anticipated to come on-line in 1988. Under current plans, it is to be a Federal project built by the Corps of Engineers and operated by the Alaska Power Administration.

AML&P is planning to add a 73.6-MW combustion turbine unit at Station 2 in 1982. CEA is planning to add a waste heat recovery steam turbine at the Beluga plant in 1982. This unit will have a generating capacity of approximately 54 MW.

## 2.2 FAIRBANKS-TENANA VALLEY AREA

The Fairbanks-Tenana Valley area has one REA cooperative, one municipal utility, a university generation system, and three military installations. They are listed below:

Fairbanks Municipal Utilities System (FMUS) - Municipal Utility  
 Golden Valley Electric Association (GVEA), Inc. - REA  
 University of Alaska, Fairbanks - University  
 Eielson AFB - Military  
 Fort Greeley - Military  
 Fort Wainwright - Military

Clear Air Force Station is located in this area but is not interconnected with the distribution grid.

Total nameplate generating capacity for the utilities is presented in Table 2.3 and capacity for the military installations is presented in Table 2.4

There are no firm plans for capacity additions in the Fairbanks-Tenana Valley Area.

### 2.3 GLENNALLEN - Valdez Area

The Glennallen-Valdez area has a single REA, the Copper Valley Electric Association, Inc. Their capacity as of 1980 is shown in Table 2.5. The Copper Valley Electric Association has a hydroelectric generating project under construction at Solomon Gulch. This facility is expected to come on-line in 1981 with a capacity of 12 MW.

**TABLE 2.3.** Total Nameplate Generating Capacity Fairbanks-Tenana Valley Area Utilities (1980)

|                                      | <u>CCCT<sup>(a)</sup></u> | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u>   | <u>Total</u> |
|--------------------------------------|---------------------------|---------------|--------------|-------------|-------------|-------------|--------------|
| Fairbanks Municipal Utilities System | 0                         | 8.25          | 0            | 0           | 28.35       | 29.0        | 65.6         |
| Golden Valley Electric Association   | 0                         | 17.95         | 0            | 0           | 170.80      | 25.0        | 213.75       |
| University of Alaska                 | <u>0</u>                  | <u>5.50</u>   | <u>0</u>     | <u>0</u>    | <u>0</u>    | <u>13.0</u> | <u>18.50</u> |
| TOTAL                                | 0                         | 31.70         | 0            | 0           | 199.15      | 67.0        | 297.85       |

- 
- (a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

**TABLE 2.4.** Total Nameplate Generating Capacity, Fairbanks-Tenana Valley Area Military Installations (1980)

|                 | <u>CCCT</u> <sup>(a)</sup> | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u>    | <u>Total</u> |
|-----------------|----------------------------|---------------|--------------|-------------|-------------|--------------|--------------|
| Eielson AFB     | 0                          | 0             | 0            | 0           | 0           | 8.75         | 8.75         |
| Fort Greeley    | 0                          | 5.5           | 0            | 0           | 0           | 0            | 5.5          |
| Fort Wainwright | 0                          | 0             | 0            | 0           | 0           | 22.0         | 22.0         |
| <b>TOTAL</b>    | <b>0</b>                   | <b>5.5</b>    | <b>0</b>     | <b>0</b>    | <b>0</b>    | <b>30.75</b> | <b>36.25</b> |

(a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

**TABLE 2.5.** Total Nameplate Generating Capacity Glennallen-Valdez Area (1980)

|                                          | <u>CCCT</u> <sup>(a)</sup> | <u>Diesel</u> | <u>Hydro</u> | <u>RCCT</u> | <u>SCCT</u> | <u>ST</u> | <u>Total</u> |
|------------------------------------------|----------------------------|---------------|--------------|-------------|-------------|-----------|--------------|
| Copper Valley Electric Association, Inc. | 0                          | 16.10         | 0            | 0           | 2.8         | 0         | 18.9         |

(a) CCCT - Combined-Cycle Combustion Turbine  
 Diesel - Diesel Cycle  
 Hydro - Hydraulic Turbine  
 RCCT - Regenerative Cycle Combustion Turbine  
 SCCT - Simple Cycle Combustion Turbine  
 ST - Steam Turbine

APPENDIX A

EXISTING AND PLANNED GENERATING FACILITIES FOR  
RAILBELT UTILITIES AND MILITARY INSTALLATIONS

## APPENDIX A

### EXISTING AND PLANNED GENERATING FACILITIES FOR RAILBELT UTILITIES AND MILITARY INSTALLATIONS

Tables A.1 through A.11 present the existing and planned capacity data for the utility and military installations in the Anchorage-Cook Inlet area, the Fairbanks-Tenana Valley area and the Glennallen-Valdez area. Matanuska Electric Association, Inc. has no existing or planned generating facilities, so it has not been included in the following tables.

#### NOTES FOR EXISTING AND PLANNING CAPACITY DATA TABLES

1. Prime Mover:

The power source for the generating unit.

Diesel - Diesel Cycle

SCCT - Simple Cycle combustion Turbine

RCCT - Regenerative cycle Combustion Turbine

ST - Steam Turbine

CCCT - Combined-Cycle Combustion Turbine

Hydro - Hydraulic Turbine

2. Fuel Type:

The primary fuel type used by the generating unit.

Dist. - Distillate Fuel Oil (Includes diesel fuel oil and turbine fuel)

NG - Natural Gas

Coal - Coal

Resid - Residual Fuel Oil

3. Fuel Supply:

The company or field supplying the fuel.

NEN - Nenana Coal Field

AGAS - Alaska Gas and Service Co.

NP - North Pole Refinery

Prod - Direct Purchase from Beluga Producers

LS - Local Suppliers

4. Installation Date:

The year the generating unit was installed/came on-line.

5. Retirement Date:

The year the unit is planned to be retired. The following lifetimes have been assumed for the various types of generating units. These lifetimes are the same as those assumed by Acres American Inc. (1981), with the exception of the lifetime for natural-gas-fired gas turbines. Acres uses a 30-year lifetime, while a 20-year lifetime will be assumed in this analysis. This reduced lifetime was selected to more accurately reflect the current Alaska Public Utilities Commission ruling that the useful depreciated life of a simple-cycle gas turbine is 16 2/3rds years.

|                                |            |
|--------------------------------|------------|
| Large Steam Turbines (>100MW)  | = 30 years |
| Small Team Turbines (<100MW)   | = 35 years |
| Oil-Fired Gas Turbines         | = 20 years |
| Natural-Gas-Fired Gas Turbines | = 20 years |
| Diesels                        | = 30 years |
| Combined-Cycle Units           | = 30 years |
| Conventional Hydro             | = 50 years |

6. Nameplate Capacity (MW):

The rated or nameplate capacity of the unit.

7. Generating Capacity at 0°F (MW):

Actual generating capacity at 0°F. In most cases this is essentially the same as the nameplate capacity. However, generating capacity for combustion turbine capacity increases as the ambient temperature decreases. Since the system load also increases with decreases in ambient temperature, this increased capacity can be used to meet peak system load. In most cases the nameplate capacity

is given for a standard temperature of 60°F. The increase in generating capacity from 60°F to 0°F is approximately 25%. In other cases, the nameplate capacity is given for a standard temperature of 35°F. The increase in generating capacity from 35°F to 0°F is approximately 15%. These factors were used to compute the generating capacity of combustion turbine capacity at 0°F given the nameplate capacity if utility data have not been obtained or if they were not available.

8. Heat Rate (Btu/kWh):

Average annual heat rate for the unit based upon typical operation. The following heat rates have been tentatively assumed for the various types of prime movers if utility data have not been obtained or if they were not available.

|                                       |        |
|---------------------------------------|--------|
| Diesel Cycle                          | 10,500 |
| Simple Cycle Combustion Turbine       | 15,000 |
| Regenerative Cycle Combustion Turbine | 10,000 |
| Combined-Cycle Combustion Turbine     | 8,500  |
| Steam Turbine (less than 20 MW)       | 12,000 |
| Steam Turbine (greater than 20 MW)    | 10,000 |

9. Forced Outage Rate:

This is the probability that a plant will not operate when called upon to generate power. The forced outage rate does not include scheduled maintenance. The following forced outage rates have been tentatively assumed:

|                                       |      |
|---------------------------------------|------|
| Diesel                                | 0.10 |
| Simple Cycle Combustion Turbine       | 0.10 |
| Regenerative Cycle Combustion Turbine | 0.10 |
| Combined-Cycle Combustion Turbine     | 0.10 |
| Steam Turbine                         | 0.10 |
| Hydro                                 | 0.05 |

10. Maximum Annual Capacity Factor:

The maximum annual capacity factor is the percent of time the generating unit is available. This includes both maintenance and forced outages. For purposes of this project, the following equation should be satisfied.

$$MACF = (1 - FOR) (1 - AMR)$$

where

MACF = maximum annual capacity factor

FOR = forced outage rate

AMR = annual maintenance rate.

The following maximum annual capacity factor and annual maintenance rates have been assumed:

|                                       | <u>AMR</u> | <u>MACF</u> |
|---------------------------------------|------------|-------------|
| Diesel                                | 0.10       | 0.81        |
| Simple Cycle Combustion Turbine       | 0.10       | 0.81        |
| Regenerative Cycle Combustion Turbine | 0.10       | 0.81        |
| Combined-Cycle Combustion Turbine     | 0.10       | 0.81        |
| Steam Turbine                         | 0.10       | 0.81        |
| Hydro                                 | 0.05       | 0.95        |

Maximum annual capacity factors for hydroelectric plants vary depending upon site hydrologic conditions.

11. Loading Order/Operating Mode:

The typical loading order or operating mode for the generating unit (peaking, intermediate, base, load following, etc.).

TABLE A.1. Existing and Planned Capacity Data

UTILITY: Alaska Power Administration

| <u>Plant/Unit</u> | <u>Prime Mover</u> | <u>Fuel Type</u> | <u>Fuel Supply</u> | <u>Installation Date</u> | <u>Retirement Date</u> | <u>Nameplate Capacity (MW)</u> | <u>Generating Capacity @ 0°F (MW)</u> | <u>Average Annual Heat Rate (Btu/kWh)</u> | <u>Forced Outage Rate</u> | <u>Maximum Annual Capacity Factor</u> | <u>Comments</u> |
|-------------------|--------------------|------------------|--------------------|--------------------------|------------------------|--------------------------------|---------------------------------------|-------------------------------------------|---------------------------|---------------------------------------|-----------------|
| <u>EXISTING</u>   |                    |                  |                    |                          |                        |                                |                                       |                                           |                           |                                       |                 |
| Eklutna           | Hydro              | --               | --                 | 1955                     | 2005                   | 30.0                           | --                                    | --                                        | 0.01                      | 0.95(a)                               | --              |
| <u>PLANNED</u>    |                    |                  |                    |                          |                        |                                |                                       |                                           |                           |                                       |                 |
| Bradley Lake      | Hydro              | --               | --                 | 1988                     | 2038                   | 90                             | 90                                    | --                                        | 0.01                      | 0.95(b)                               | --              |

(a) Average annual energy production for Eklutna is approximately 147,875,000 kWh. This is equivalent to an annual load factor of 0.56.

(b) Average annual energy production from Bradley Lake is expected to be approximately 347,000,000 kWh. Of this total, 315,000,000 kWh will be firm energy and 32,000,000 kWh will be secondary. The equivalent annual load factor is 0.44.

TABLE A.2. Existing and Planned Capacity Data

## UTILITY: Anchorage Municipal Light and Power

| Plant/Unit      | Prime Mover | Fuel <sup>(a)</sup> Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments         |
|-----------------|-------------|--------------------------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|------------------|
| <u>EXISTING</u> |             |                          |             |                   |                 |                         |                                |                                    |                    |                                |                  |
| Station #1      |             |                          |             |                   |                 |                         |                                |                                    |                    |                                |                  |
| Unit #1         | SCCT        | NG/Dist                  | AGAS/LS     | 1962              | 1982            | 14.0                    | 16.25                          | 14,000                             | 0.10               | 0.81                           | Reserve/Peaking  |
| Unit #2         | SCCT        | NG/Dist                  | AGAS/LS     | 1964              | 1984            | 14.0                    | 16.25                          | 14,000                             | 0.10               | 0.81                           | Reserve/Peaking  |
| Unit #3         | SCCT        | NG/Dist                  | AGAS/LS     | 1968              | 1988            | 18.0                    | 18.0                           | 14,000                             | 0.10               | 0.81                           | --               |
| Unit #4         | SCCT        | NG/Dist                  | AGAS/LS     | 1972              | 1992            | 28.5                    | 32.0                           | 12,500                             | 0.10               | 0.81                           | --               |
| Diesel 1(b)     | Diesel      | Dist                     | LS          | 1962              | 1982            | 1.1                     | 1.1                            | 10,500                             | 0.10               | 0.81                           | Black Start Unit |
| Diesel 2(b)     | Diesel      | Dist                     | LS          | 1962              | 1982            | 1.1                     | 1.1                            | 10,500                             | 0.10               | 0.81                           | Black Start Unit |
| Station #2      |             |                          |             |                   |                 |                         |                                |                                    |                    |                                |                  |
| Unit #5         | SCCT        | NG/Dist                  | AGAS/LS     | 1974              | 1994            | 32.3                    | 40.0                           | 12,500                             | 0.10               | 0.81                           | --               |
| Unit #6(c)      | CCST        | --                       | --          | 1979              | 2009            | 33.0                    | 33.0                           | --                                 | 0.10               | 0.81                           | --               |
| Unit #7         | SCCT        | NG/Dist                  | AGAS/LS     | 1980              | 2000            | 73.6                    | 90.0                           | 11,000                             | 0.10               | 0.81                           | --               |
| <u>PLANNED</u>  |             |                          |             |                   |                 |                         |                                |                                    |                    |                                |                  |
| Station #2      |             |                          |             |                   |                 |                         |                                |                                    |                    |                                |                  |
| Unit #8         | SCCT        | NG/Dist                  | AGAS/LS     | 1982              | 2002            | 73.6                    | 90.0                           | 12,500                             | 0.10               | 0.81                           | --               |

(a) All AMLBP SCCTs are equipped to burn natural gas or oil. In normal operation they are supplied with natural gas from AGAS. All units have reserve oil storage for operation in the event gas is not available.

(b) These are black-start units only. They are not included in total capacity.

(c) Units #5, 6, and 7 are designed to operate as a unit combined-cycle plant. When operated in this mode, they have a generating capacity at 0°F of approximately 139 MW with a heat rate of 8500 Btu/kWh.

TABLE A.3. Existing and Planned Capacity Data

## UTILITY: Chugach Electric Association

| Plant/Unit<br>EXISTING | Prime<br>Mover | Fuel<br>Type | Fuel<br>Supply | Installation<br>Date | Retirement<br>Date | Nameplate<br>Capacity<br>(MW) | Generating<br>Capacity<br>@ 0°F (MW) | Average<br>Annual Heat<br>Rate (Btu/kWh) | Forced<br>Outage<br>Rate | Maximum<br>Annual Capa-<br>city Factor | Comments   |
|------------------------|----------------|--------------|----------------|----------------------|--------------------|-------------------------------|--------------------------------------|------------------------------------------|--------------------------|----------------------------------------|------------|
| <b>Beluga</b>          |                |              |                |                      |                    |                               |                                      |                                          |                          |                                        |            |
| Unit #1                | SCCT           | MG           | Prod.          | 1968                 | 1988               | 14.0                          | 16.1                                 | 15,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #2                | SCCT           | MG           | Prod.          | 1968                 | 1988               | 14.0                          | 16.1                                 | 15,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #3                | RCCT           | MG           | prod.          | 1973                 | 1993               | 51.0                          | 53.0                                 | 10,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #4                | SCCT           | MG           | Prod.          | 1976                 | 1996               | 9.3(a)                        | 10.7                                 | 15,000                                   | 0.10                     | 0.81                                   | Jet Engine |
| Unit #5                | RCCT           | MG           | Prod.          | 1975                 | 1995               | 60.0                          | 58.0                                 | 10,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #6                | SCCT           | MG           | Prod.          | 1976                 | 1996               | 62.0                          | 68.0                                 | 15,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #7                | SCCT           | MG           | Prod.          | 1977                 | 1997               | 62.0                          | 68.0                                 | 15,000                                   | 0.10                     | 0.81                                   | --         |
| <b>Bernice Lake</b>    |                |              |                |                      |                    |                               |                                      |                                          |                          |                                        |            |
| Unit #1                | SCCT           | MG           | AGAS           | 1963                 | 1983               | 7.5                           | 8.6                                  | 23,400                                   | 0.10                     | 0.81                                   | --         |
| Unit #2                | SCCT           | MG           | AGAS           | 1972                 | 1992               | 16.5                          | 18.9                                 | 23,400                                   | 0.10                     | 0.81                                   | --         |
| Unit #3                | SCCT           | MG           | AGAS           | 1978                 | 1998               | 23.0                          | 26.4                                 | 23,400                                   | 0.10                     | 0.81                                   | --         |
| <b>Cooper Lake</b>     |                |              |                |                      |                    |                               |                                      |                                          |                          |                                        |            |
| Unit #1, 2             | Hydro          | --           | --             | 1961                 | 2011               | 16.0                          | 16.0                                 | --                                       | 0.05                     | 0.95(h)                                | --         |
| <b>International</b>   |                |              |                |                      |                    |                               |                                      |                                          |                          |                                        |            |
| Unit #1                | SCCT           | MG           | AGAS           | 1964                 | 1984               | 14.0                          | 14.0                                 | 40,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #2                | SCCT           | MG           | AGAS           | 1965                 | 1985               | 14.0                          | 14.0                                 | 40,000                                   | 0.10                     | 0.81                                   | --         |
| Unit #3                | SCCT           | MG           | AGAS           | 1970                 | 1990               | 17.0                          | 18.0                                 | 40,000                                   | 0.10                     | 0.81                                   | --         |

TABLE A.3. Existing and Planned Capacity Data (contd)

## UTILITY: Chugach Electric Association

| Plant/Unit         | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments |
|--------------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|----------|
| <u>Knik Arm(c)</u> |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Unit #1            | ST          | NG        | AGAS        | 1952              | 1987            | 0.5                     | 0.5                            | --                                 | 0.10               | 0.81                           | --       |
| Unit #2            | ST          | NG        | AGAS        | 1952              | 1987            | 3.0                     | 3.0                            | --                                 | 0.10               | 0.81                           | --       |
| Unit #3            | ST          | NG        | AGAS        | 1957              | 1992            | 3.0                     | 3.0                            | --                                 | 0.10               | 0.81                           | --       |
| Unit #4            | ST          | NG        | AGAS        | 1957              | 1992            | 3.0                     | 3.0                            | --                                 | 0.10               | 0.81                           | --       |
| Unit #5            | ST          | NG        | AGAS        | 1957              | 1992            | 5.0                     | 5.0                            | --                                 | 0.10               | 0.81                           | --       |
| <u>PLANNED</u>     |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Beluga Unit 8(d)   | CCST        | --        | --          | 1982              | 2012            | 54                      | 54                             | --                                 | --                 | --                             | --       |
| Bernice Lake #4    | SCCT        | NG        | AGAS        | 1982              | 2002            | 23.0                    | 26.4                           | 12,000                             | 0.10               | 0.81                           | --       |

(a) Beluga Unit #4 is a jet engine used for peaking only. It is not included in total capacity.

(b) Average annual energy production for Cooper Lake is approximately 42,000,000 kWh. This is equivalent to an annual load factor of 0.30.

(c) Knik Arm units are old and have higher heat rates. They are not included in total.

(d) Beluga Units #6, 7, and 8 will operate as a unit combined-cycle plant in 1982. When operated in this mode, they will have a generating capacity of about 178 MW with a heat rate of 8500 Btu/kWh. Thus, Units #6 and 7 will be retired from "gas turbine operation" and added to "gas combined-cycle operations."

TABLE A.4. Existing and Planned Capacity Data

UTILITY: Homer Electric Association

| Plant/Unit      | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments |
|-----------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|----------|
| <u>EXISTING</u> |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Seldovia        | Diesel      | Dist.     | LS          | 1957              | 1987            | 1.50                    | 1.50                           | 10,500                             | 0.10               | 0.81                           | Standby  |
| <u>PLANNED</u>  |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
|                 | None        |           |             |                   |                 |                         |                                |                                    |                    |                                |          |

TABLE A.5. Existing and Planned Capacity Data

UTILITY: Seward Electric Association

| Plant/Unit      | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments |
|-----------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|----------|
| <u>EXISTING</u> |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| ALCO            | Diesel      | Dist.     | LS          | 1965              | 1985            | 3.0                     | 3.0                            | 10,500                             | 0.10               | 0.81                           | Standby  |
| END             | Diesel      | Dist.     | LS          | 1976              | 1996            | 2.5                     | 2.5                            | 10,500                             | 0.10               | 0.81                           | Standby  |
| <u>PLANNED</u>  |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
|                 | None        |           |             |                   |                 |                         |                                |                                    |                    |                                |          |

## A.10

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**TABLE A.7. Existing and Planned Capacity Data**  
**UTILITY: Golden Valley Electric Association**

| Plant/Unit        | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments                 |
|-------------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|--------------------------|
| <b>EXISTING</b>   |             |           |             |                   |                 |                         |                                |                                    |                    |                                |                          |
| Healy Coal        | ST          | Coal      | HEW         | 1967              | 2002            | 25.0                    | 25.0                           | 13,200                             | 0.01               | 0.92                           | --                       |
| Healy Diesel      | Diesel      | Dist.     | LS          | 1967              | 1987            | 2.75                    | 2.75                           | 10,500                             | 0.01               | 0.81                           | Peaking/Black Start Unit |
| <b>North Pole</b> |             |           |             |                   |                 |                         |                                |                                    |                    |                                |                          |
| Unit #1           | SCCT        | Dist.     | LS          | 1976              | 1996            | 64.7                    | 65.0                           | 14,000                             | 0.022              | 0.81                           | --                       |
| Unit #2           | SCCT        | Dist.     | LS          | 1977              | 1997            | 64.7                    | 65.0                           | 14,000                             | 0.015              | 0.81                           | --                       |
| <b>Zendher</b>    |             |           |             |                   |                 |                         |                                |                                    |                    |                                |                          |
| GT 1              | SCCT        | Dist.     | LS          | 1971              | 1991            | 18.4                    | 18.4                           | 15,000                             | 0.10               | 0.81                           | --                       |
| GT 2              | SCCT        | Dist.     | LS          | 1972              | 1992            | 17.4                    | 17.4                           | 15,000                             | 0.10               | 0.81                           | --                       |
| GT 3              | SCCT        | Dist.     | LS          | 1975              | 1995            | 2.8                     | 3.5                            | 15,000                             | 0.10               | 0.81                           | --                       |
| GT 4              | SCCT        | Dist.     | LS          | 1975              | 1995            | 2.8                     | 3.5                            | 15,000                             | 0.10               | 0.81                           | --                       |
| Combined Diesel   | Diesel      | Dist.     | LS          | 1960-70           | 1995            | 21.0                    | 21.0                           | 10,500                             | 0.10               | 0.81                           | --                       |
| <b>PLANNED</b>    |             |           |             |                   |                 |                         |                                |                                    |                    |                                |                          |
|                   | None        |           |             |                   |                 |                         |                                |                                    |                    |                                |                          |

TABLE A.8. Existing and Planned Capacity Data

UTILITY: University of Alaska - Fairbanks

| Plant/Unit | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments |
|------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|----------|
| S1         | ST          | Coal      | NEN         | --                | --              | 1.50                    | 1.50                           | 12,000                             | 0.10               | 0.81                           | --       |
| S2         | ST          | Coal      | NEN         | 1980              | --              | 1.50                    | 1.50                           | 12,000                             | 0.10               | 0.81                           | --       |
| S3         | ST          | Coal      | NEN         | --                | --              | 10.0                    | 10.0                           | 12,000                             | 0.10               | 0.81                           | --       |
| 01         | Diesel      | Dist.     | LS          | --                | --              | 2.75                    | 2.75                           | 10,500                             | 0.10               | 0.81                           | --       |
| 02         | Diesel      | Dist.     | LS          | --                | --              | 2.75                    | 2.75                           | 10,500                             | 0.10               | 0.81                           | --       |

TABLE A.9. Existing and Planned Capacity Data

UTILITY: Fairbanks Municipal Utilities System

| Plant/Unit      | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments |
|-----------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|----------|
| <u>EXISTING</u> |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Chena           |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Unit #1         | ST          | Coal      | NEN         | 1954              | 1989            | 5.0                     | 5.0                            | 18,000                             | 0.10               | 0.81                           | --       |
| Unit #2         | ST          | Coal      | NEN         | 1952              | 1987            | 2.0                     | 2.0                            | 22,000                             | 0.10               | 0.81                           | --       |
| Unit #3         | ST          | Coal      | NEN         | 1952              | 1987            | 1.5                     | 1.5                            | 22,000                             | 0.10               | 0.81                           | --       |
| Unit #4         | SCCT        | Dist.     | LS          | 1963              | 1983            | 5.25                    | 6.6                            | 15,000                             | 0.10               | 0.81                           | --       |
| Unit #5         | ST          | Coal      | NEN         | 1970              | 2005            | 20.5                    | 20.5                           | 13,320                             | 0.10               | 0.81                           | --       |
| Unit #6         | SCCT        | Dist.     | LS          | 1976              | 1996            | 23.1                    | 28.8                           | 15,000                             | 0.10               | 0.81                           | --       |
| Diesel 1        | Diesel      | Dist.     | LS          | 1967              | 1987            | 2.75                    | 2.75                           | 12,150                             | 0.10               | 0.81                           | --       |
| Diesel 2        | Diesel      | Dist.     | LS          | 1968              | 1988            | 2.75                    | 2.75                           | 12,150                             | 0.10               | 0.81                           | --       |
| Diesel 3        | Diesel      | Dist.     | LS          | 1968              | 1988            | 2.75                    | 2.75                           | 12,150                             | 0.10               | 0.81                           | --       |
| <u>PLANNED</u>  |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
|                 | None        |           |             |                   |                 |                         |                                |                                    |                    |                                |          |

**TABLE A.10. Existing and Planned Capacity Data**

**UTILITY:** Military Installations - Fairbanks

[illegible]

TABLE A.11. Existing and Planned Capacity Data

UTILITY: Copper Valley Electric Association, Inc.

A.14

| Plant/Unit       | Prime Mover | Fuel Type | Fuel Supply | Installation Date | Retirement Date | Nameplate Capacity (MW) | Generating Capacity @ 0°F (MW) | Average Annual Heat Rate (Btu/kWh) | Forced Outage Rate | Maximum Annual Capacity Factor | Comments |
|------------------|-------------|-----------|-------------|-------------------|-----------------|-------------------------|--------------------------------|------------------------------------|--------------------|--------------------------------|----------|
| <u>EXISTING</u>  |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Glennallen       |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Units #1, #2     | Diesel      | Dist.     | LS          | 1959              | 1981            | 0.64                    | 0.64                           | 10,500                             | 0.10               | 0.81                           | --       |
| Unit #3          | Diesel      | Dist.     | LS          | 1963              | 1983            | 0.56                    | 0.56                           | 10,500                             | 0.10               | 0.81                           | --       |
| Units #4, #5     | Diesel      | Dist.     | LS          | 1966              | 1986            | 2.4                     | 2.4                            | 10,500                             | 0.10               | 0.81                           | --       |
| Unit #6, #7      | Diesel      | Dist.     | LS          | 1975-76           | 1996            | 5.2                     | 5.2                            | 10,500                             | 0.10               | 0.81                           | --       |
| Valdez           |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Units #1, #2, #3 | Diesel      | Dist.     | LS          | 1967              | 1987            | 1.8                     | 1.8                            | 10,500                             | 0.10               | 0.81                           | --       |
| Unit #4          | Diesel      | Dist.     | LS          | 1972              | 1992            | 1.9                     | 1.9                            | 10,500                             | 0.10               | 0.81                           | --       |
| Unit #5          | Diesel      | Dist.     | LS          | 1975              | 1995            | 1.0                     | 1.0                            | 10,500                             | 0.10               | 0.81                           | --       |
| Unit #6,         | Diesel      | Dist.     | LS          | 1975              | 1995            | 2.6                     | 2.6                            | 10,500                             | 0.10               | 0.81                           | --       |
| Unit #7,         | SCCT        | Dist.     | LS          | 1976              | 1996            | 2.8                     | 3.5                            | 14,500                             | 0.10               | 0.81                           | --       |
| <u>PLANNED</u>   |             |           |             |                   |                 |                         |                                |                                    |                    |                                |          |
| Solomon Gulch    | Hydro       | --        | --          | 1981              | 2031            | 12.0                    | 12.0                           | --                                 | 0.01               | 0.95(a)                        | --       |

(a) Average annual energy production from Solomon Gulch is expected to be approximately 55,000,000 kWh. Of this total 39,000,000 kWh will be firm energy and 16,000,000 will be secondary. The equivalent annual load factor is 0.52.

#### REFERENCES

Acres American Incorporated. 1981. Susitna Hydroelectric Project Development Selection Report. Prepared for the Office of the Governor, State of Alaska, Juneau, Alaska.