

ALASKA POWER AUTHORITY

ANCHORAGE ALASKA

CHAKACHAMNA HYDROELECTRIC PROJECT

INTERIM FEASIBILITY ASSESSMENT REPORT, MARCH, 1983

1.0

INTRODUCTION

This report has been prepared in accordance with the terms of Contract 82-0294 dated August 3, 1981 between the State of Alaska/Department of Commerce and Economic Development/Alaska Power Authority and Bechtel Civil & Minerals, Inc. in connection with services for performing interim feasibility assessment studies of the Chakachamna Hydroelectric Project. As its title indicates, the report is of an interim nature. It is based upon previously published information regarding the project, and on data acquired and derived during a study period extending from the fall of 1981 to December 1982. Its objectives are to summarize the information derived from the studies, to provide a preliminary evaluation of alternative ways of developing the power potential of the project, to define that power potential, and to report on the estimated cost of construction, and to provide a preliminary assessment of the effects that the project would have on the environment.

The initial engineering, geological, and environmental studies were conducted during the fall of 1981, and the findings of these studies were summarized in an interim report dated November 30, 1981. Although the data

collected and study period up to that time were rather limited by the short time base, some rather clear indications emerged as to the manner in which it was considered that development of the project should proceed.

One aspect that became evident was that a much more extensive and populous fishery uses the waters in the project area than had been earlier realized or anticipated. This led to an amendment of the above mentioned contract in which the requirements for completion of the feasibility report and application to the Federal Energy Regulatory Commission for a license to construct the project were deleted from the scope of work. Continuing studies of the fishery in the waters of the project area were authorized as were the development of conceptual designs for fish passage facilities at the outlet of Chakachamna Lake plus the preparation of estimates of their construction costs and those of the McArthur tunnel assuming that it could be excavated by tunnel boring machine.

As may be seen by reference to Figure 1-1, Chakachamna Lake lies in the southern part of the Alaska Range of mountains about 85 miles due west of Anchorage. Its water surface lies at about elevation 1140 feet above mean sea level.

The project has been studied and reported upon several times in the past. The power potential had been estimated variously from about 100,000 kw to 200,000 kw firm capacity, depending on the degree of regulation of the outflow from Chakachamna Lake and the hydraulic head that could be developed.

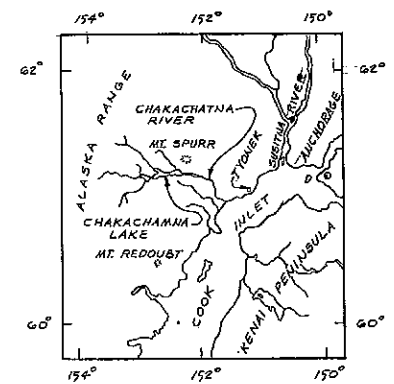
Two basic alternatives can be readily identified to harness the hydraulic head for the generation of electrical energy. One is by a twelve mile tunnel more or less parallel to the valley of the Chakachatna River. This river runs out of the easterly end of the lake and descends to about elevation 400 feet above sea level where the river leaves the confines of the valley and spills out onto a broad alluvial flood plain. A maximum hydrostatic head of about 740 feet could be developed via this alternative.

The other alternative is for development by diversion of the lake outflow through a ten mile tunnel to the valley of the McArthur River which lies to the southeast of the lake outlet. A maximum hydrostatic head of about 960 feet could be harnessed by this diversion. Various means of development by these two basic alternatives are discussed in the report on the basis of the present knowledge of the site conditions.

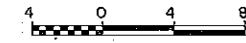
The 1982 environmental studies confirmed the importance of the fishery using waters in the project area and expanded the data base concerning it. The basic elements of the recommended mode of development were conceived, these being for development via the McArthur River with a concrete lined machine bored tunnel and with fish passage facilities that would permit fish to ascend into the lake or to travel downstream from the lake into the Chakachatna River. Three samples of rock collected from the surface, two from the general vicinity of the proposed power intake site at Chakachamna Lake and one from near the powerhouse site by the McArthur River, were tested in The Robbins Company laboratory at Kent, Washington. The results indicated that the rock sampled,

would be suitable for boring, but since the test data from samples taken at the surface can sometimes be misleading, and since no geological studies have yet been performed along the planned tunnel alignment, it must be assumed at the present time that the tunnel can be bored and additional geological studies will be needed before it can be firmly recommended that the tunnel be bored by machine. The rock test data was used for guidance in estimating the cutter penetration rate in assessing the estimated cost of excavating the tunnel by boring machine.

For the assessment of environmental factors and geological conditions in the project area, Bechtel retained the services of Woodward-Clyde Consultants.



VICINITY MAP



SCALE : 1" = 4 MILES

- NOTES:
- 1) TOPOGRAPHY IS FROM USGS QUADRANGLE MAPS
 - 2) VERTICAL DATUM IS MEAN LOWER LOW WATER
 - 3) HORIZONTAL GRID IS UNIVERSAL TRANSVERSE MERCATOR PROJECTION, 1927 NORTH AMERICAN DATUM

No.	DATE	REVISION	BY	CHKD	ENGR	PROJ	PROJ
ALASKA POWER AUTHORITY ANCHORAGE, ALASKA							
CHAKACHAMNA HYDROELECTRIC PROJECT							
LOCATION PLAN							
BECHTEL CIVIL & MINERALS, INC. SAN FRANCISCO							
DESIGNED	DRAWN	CHECKED					
ENGR SUPV <i>[Signature]</i>	PROJ ENGR <i>[Signature]</i>	APP'D <i>[Signature]</i>					
JOB No.		DRAWING No.		REV.			
14879		FIGURE 1-1		B			