

H

B

2022

THE LEGISLATURE OF THE STATE OF ALASKA
THIRTEENTH LEGISLATURE

FISCAL NOTE

I. REQUEST

Bill/Resolution No. HB 232
 Title Authorizing Chester Lake Hydro, approving project costs: efd
 Requested by Rep Ringstad Date May 2, 1983

II. FISCAL DETAIL

Agency Affected Commerce & Economic Development - Alaaka Power Auth
 Program Category Affected _____
 BRU, Program, O: Subprogram(s) Affected _____
 (Note: If more than one budget component is affected, separate line-item amounts and funding for each component in the analysis section.)

EXPENDITURES (Thousands of Dollars)

	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88
100 PERSONAL SERVICES						
200 TRAVEL						
300 CONTRACTUAL						
400 COMMODITIES						
500 EQUIPMENT						
600 LAND & STRUCTURES						
700 GRANTS, CLAIMS, ETC.						
TOTAL		-0-	-0-	-0-		

FUNDING (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER (Specify Source)						
		-0-	-0-	-0-		

POSITIONS

FULL TIME						
PART TIME						
TEMPORARY						

III. ANALYSIS (See Fiscal Note Preparation Instruction, Section III)

IV. DATE May 2, 1983 PREPARED BY Rep. John Ringstad
 AGENCY House Resources

Original: Legislative Finance PHONE 465-3775
 cc: Budget and Management
 Prime Sponsor (First Legislator Named)

INITIAL ANALYSIS

HB 232 "An Act authorizing the Chester Lake Hydroelectric project and approving the project construction cost under AS 44.83.185(c); and providing for an effective date

Section 1 authorizes the hydro project, and approves a construction cost of \$13,200,000 under the provisions of AS 44.83.185(c), which is the subsection of the Alaska Power Authority chapter requiring legislative authorization of proposed power projects.

Section 2 provides an immediate effective date.

SUMMARY OF CHESTER LAKE HYDRO - METLAKATLA

The proposed Chester Lake Dam and hydro project would solve two problems for the Metlakatla Indian Community: replacement of a very dilapidated dam which is now the only water source for the community, and provide a much-needed source of energy.

The existing Chester Lake Dam has been labeled "hazardous, dangerous, and dilapidated" and is essential for storage and distribution of the Community's water source. Metlakatla is attempting to obtain a water and sewer construction grant (50% match) to replace this dam.

The community's power is currently provided by Purple Lake Dam which is rated at a capacity of 3 megawatts with an additional 3 megawatts provided by the Quarry Diesel Plant which has two generators rated at 1.5 megawatts each. This combination of hydro and diesel does not meet the criteria known as "prime power" and particularly during times of draught and low water flow, the community comes dangerously close to running short of power. With an additional 45 houses projected to be added to the community as well as the community college, trailer park, swimming pool, and church, power needs are going to become critical in the near future should there be a period of low water flow. Metlakatla is a community which is not easily connected to power supplies from other communities.

In 1977, Metlakatla contracted with R.W. Rutherford and Associates and their recommendation was to create a storage project as Chester Lake with a power capacity of 2 1/2 megawatts. Other alternatives which were looked at were adding additional diesel units and heating-oil-fired turbines.

In 1981, the legislature appropriated one million dollars for a feasibility study with the understanding that Metlakatla would enter into an agreement with the Alaska Power Authority to take over the contract. Because of its unusual legal status as an Indian Reservation, Metlakatla was exempted from the requirement of a Federal Energy Regulatory Commission license.

Of the one million dollars, \$350,000 has been expended to produce a report entitled "Chester Lake Project Feasibility Report" prepared by Harza Engineering Company in May 1982 for the Alaska Power Authority and Metlakatla Power and Light. This report examines several alternatives including wood waste generation, Triangle Lake development, increasing the number of diesel generators and the Chester Lake water storage project. The report recommends the "run-of-river" alternative which is a lower-cost alternative for development of Chester Lake for hydro and water supply combined with utilizing the existing Purple Lake facility to be operated to provide extra water storage for periods of low-water flow. In addition, this recommendation calls for maintaining the existing diesel generation.

Metlakatla is proposing to construct a new concrete Arch Gravity Dam in the vicinity of the existing Chester Lake Dam with a steel primary main distribution tube connecting the existing completed portion of the system. This system services the entire Metlakatla Indian Community, the Annette Island Packing Company, the Annette Hemlock Mill and the Annette Island School District. This project will assure an adequate supply of uncontaminated potable water for the population of Metlakatla.

Assuming that Metlakatla is identified as a grant recipient for a water and sewer construction grant and receives 50% grant funds to construct a new water supply dam, additional funds will be required to complete the dam and to finance the Chester Lake Hydroelectric Project.

Of the one million appropriated in the FY 82 budget, \$650,000 remains to be used for design work. State law, however, precludes the expenditure of funds for design work until authorizing legislation is passed for the entire project. The bill which has just been drafted by Representative McBride would accomplish this. In addition, Metlakatla has been awarded a 5 1/2 million dollar REA loan for 35 years. However, this money cannot be disbursed until sufficient financing has been allocated for the entire project. In the Governor's proposed FY 84 budget, \$5,449,000 is proposed for Chester Lake Hydro Development. This, combined with the REA loan, would be sufficient to get the project underway this year. This would leave approximately 3.2 million to be appropriated by future legislatures unless, however, Metlakatla qualifies for a DEC construction grant to fund half the cost of the Water Supply Dam, which would reduce the amount of the project.

The Alaska Power Authority is preparing a detailed analysis of the project and will be sending it down to us this week. However, according to Brent Perrie of APA, the figure which was included in the bill (\$13,200,000) is very close to the cost estimates they are developing.

CHESTER LAKE PROJECT

Annette Island, Alaska

Study Reveals Feasibility of 2.5 MW Hydro Project

Economic Source of Power For Metlakatla Power and Light

In November, 1981, Harza Engineering Company was retained by the Alaska Power Authority (APA) to conduct a feasibility study of the proposed Chester Lake Hydroelectric Project. Harza engineers and scientists worked closely with the APA project manager and Metlakatla Power and Light (MP & L) management. The study included:

- review and update of an existing Definite Project Report of 1977
- consideration of alternative developments of the Chester Lake resource
- consideration of other means of meeting the forecast electrical loads
- evaluation of the project on technical, economic, financial and environmental bases
- forecast of electrical load
- economic and financial analyses of alternative heating technologies

An exploratory drilling program was conducted by a Harza subcontractor, with a Harza geologist supervising the drilling, from mid-November to mid-December, 1981.

Electric Power History

Electric power to Metlakatla on Annette Island was first provided in 1927. Electrical generation consisted of the one unit, 150-kW Chester Lake Hydroelectric Project. In 1937 a second unit of 250-kW was added.

Two 1,000-kW units were installed at the Purple Lake Hydroelectric Project in 1956, and a third 1,000-kW unit was added in 1962. Chester Lake Hydroelectric Project then ceased operation. Its penstocks and powerhouse have since been abandoned, but the concrete dam continues to maintain Chester Lake at its present elevation of 845 for municipal water supply for Metlakatla (population approximately 1,000). A 1976 inspection found the dam to be in disrepair with substantial leakage, and replacement was recommended. Diesel powered generating units rated at 1,500-kW were



Existing Chester Lake water supply dam. An inspection report favored replacement, and Harza recommended a new concrete arch-gravity dam downstream.

installed at the Quarry Diesel Plant in 1967 and 1970.

Alternative Projects Considered

Principal alternative projects identified were:

- 1) continued use of diesel generation
- 2) installation of additional capacity and raising the reservoir at the Purple Lake Hydroelectric Project
- 3) the Triangle Lake Hydroelectric Project on northeastern Annette Island
- 4) installation of a wood-fired steam-electric plant near Metlakatla

Diesel generation alternative would consist of continued use of two existing 1.5-MW diesel generators at the Quarry Diesel Plant. This alternative was ruled out because of the increasing cost of fuel.

The Purple Lake alternative was not economically feasible because additional generating capacity would not provide substantial new energy, and raising the

reservoir would not be needed due to existing capability to regulate most of the available runoff.

Triangle Lake alternative would consist of a hydro project to develop the head between the lake and Hassler Harbor on the Revillagigedo Channel. It was not as attractive as Chester Lake because it would be more expensive.

Woodwaste generation alternative would generate power by using woodwaste produced by an existing sawmill to fuel a nearby steam-electric plant. Due to intermittent sawmill operations creating an unreliable source of fuel and the high cost of this energy, woodwaste generation was ruled a less favorable alternative to the others.

Economic Analysis

Economic analysis for the project is based on criteria established by the APA in accordance with State feasibility study regulations. A "base case" plan, a "preferred" plan and a "second most preferred" plan were developed.

The power market would continue to

be served by the existing Purple Lake Hydroelectric Project supplemented by diesel units under the base case plan. The preferred plan would be the Purple Lake Project supplemented by the Chester Lake Project. The second most preferred plan would be the Purple Lake Project supplemented by the Triangle Lake Project.

Recommended Project

Based on economic analyses, the recommended development is the 2.5-MW Chester Lake Project, which will serve residential, small commercial customers, and a sawmill.

Principal elements include:

- a concrete arch-gravity dam, across Waterfall Creek at the outlet of Chester Lake and downstream of the existing water supply dam, which will raise the lake level to El. 885, creating a reservoir with 4,180 acre-feet of live storage
- an uncontrolled spillway in the center of the dam with a design discharge capacity of 1,000 cfs
- a single-port intake and a gated emergency outlet conduit, located on the upstream face of the dam
- a 28-inch diameter penstock 2,800 feet long, connecting the intake to the powerhouse
- a powerhouse containing one Francis type turbine and a generator rated at 2,500-kW
- a substation, containing a step-up transformer built adjacent to the powerhouse, will transmit power to the Metlakatla Power and Light transmission system over a 12.5-kV wood pole transmission line 2,700 feet long

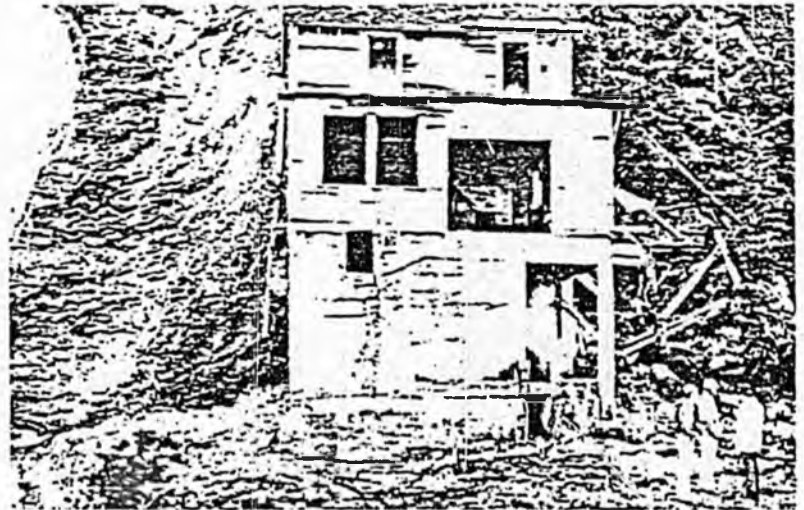
Cost of energy from the entire generation system and from the Chester Lake Project alone were estimated under four alternative financing plans and also computed for each of three alternative developments of Chester Lake and for the most likely and low load growth scenarios.

Environmental Aspects

In 1980, the REA conducted an environmental assessment on the Chester Lake Hydroelectric Project. Analysis of the air, water, and land resources in the affected area showed the project will have no significant effect on floodplains, wetlands, prime agricultural lands, threatened or endangered species, or known historical and archeological sites.

Project Financing

Project owner, MP & L, applied to REA for a loan for the project. The APA has also applied to the Alaska state legislature for a loan, and when financing is approved, project design can begin.



Inspection of abandoned Chester Lake powerhouse by Harza engineers. Feasibility study recommendation was for a new reinforced concrete powerhouse containing one unit rated at 2,500-kW.



Chester Lake proposed project area. The new dam, recommended in Harza's feasibility study, would be located at the outlet of the lake. Town of Metlakatla is in the background.

Chester Lake Project Highlights

Dates: Feasibility study, 1981

Key personnel: Project manager, K. Leonardson; lead civil engineer, G.J. Kocian; load forecasts and economic analysis, B. Trouille; geologists, D.D. Wilson, D.A. Frey.

Subcontractors: Exploratory drilling, Salisbury and Dietz, Inc., Spokane, WA. Surveying, Charles Pool and Associates, Inc., Ketchikan, AK.

Alaska Power Authority Contact: Brent N. Petrie.

division of budget and management shall include a recommendation to the governor and legislature for approval or disapproval of the project based on the division's review of the feasibility study and plan of finance for compliance with the requirements of AS 44.83.181(b) — (d).

(d) The report required by (c) of this section shall be prepared and submitted not later than 60 days after the feasibility study and plan of finance for a proposed project have been received by the division of budget and management.

(e) The report required by (c) of this section shall include a financial analysis of the proposed project of the authority that evaluates proposed bond resolutions or other financial arrangements or financial plans, security plans and arrangements, cost and demand uncertainties, and debt volume, as they relate to the total direct and indirect indebtedness of the state. In preparing the financial analysis required by this section the division of budget and management may use the services of outside agencies or institutions that are not otherwise involved in the project. (§ 24 ch 83 SLA 1980; am § 7 ch 133 SLA 1982)

Effect of amendments. — The 1982 amendment, effective June 25, 1982, added subsection (e).

Sec. 44.83.185. Submission to the legislature. (a) The authority shall submit a feasibility study and plan of finance for a proposed new project to the legislature. When the report of the division of budget and management examining the feasibility study and plan of finance is completed as required by AS 44.83.183, it shall be submitted to the legislature.

(b) The authority may not proceed with work on the engineering or design phase of a proposed new project for which legislative approval is required until the legislature approves the proposed new project. However, the authority may proceed with the engineering or design work necessary to meet the requirements for submission of a license application for the proposed new project to the Federal Energy Regulatory Commission without obtaining legislative approval of the proposed new project.

(c) The legislature shall consider and must approve all proposed new projects except proposed new projects that are exempt under AS 44.83.187. The legislature may approve a proposed new project only by enacting law that authorizes the project and approves a construction cost for that project. (§ 24 ch 83 SLA 1980; am § 8 ch 133 SLA 1982)

Effect of amendments. — The 1982 amendment, effective June 25, 1982, substituted "that authorizes the project and approves a construction cost for" for "authorizing" in the second sentence of subsection (c).

Project Title Chester Lake		Type	Location Annette Island		Agency ID #	Elect Dist S	Start Date 7-1983	Complete Date 12-1986		
Cash Flow		Operating Impact		First Op. Yr. 86	Ult. Annual Yr. 87	Funding Information				
Y 84	5,449.0	Funding Source	Fed. Rec.			Agency FY		Gov. FY 84	FY	FY
Y 85	0,301.0		Gen. Fund			1002	Fed. Rec.			
Y 86	13,750.0		Other			1004	Gen. Fund	5,449.0	5,449.0	
Y			Proj. Rev	9.50	100.00		U.S. Bonds			
Y			Total	9.50	100.0		Total	5,449.0	5,449.0	
TOTAL		Positions (FIE)				Priority	Prior Year 83-10	Agency 84-10	November 84-8	
Special Features	One of Several Phases <input type="checkbox"/>	External Funding Source <input type="checkbox"/>	Funds to Enable Completion <input checked="" type="checkbox"/>	Contingent Upon Other Projects <input type="checkbox"/>	Site Owned? <input type="checkbox"/>	Utilities Available? <input type="checkbox"/>	Access Available? <input type="checkbox"/>			
Project Description: COMMUNITY The Chester Lake project would serve the community of Metlakatla on Annette Island which is about twenty miles to the southwest of Ketchikan. The U.S. Congress designated the island, the Annette Islands Reserve in 1891. The predominantly native citizens of Metlakatla did not elect to establish a village corporation to select and receive patent to their lands under the Alaska Native Claims Settlement Act, and now it is the only Indian reservation remaining in Alaska. Fishing, logging and lumber processing are the major economic activities on the island. The community owned cannery and cold storage employ up to 260 people during the operating season. Logging on the island is done by contractors who employ mostly non-island residents. The lumber mill processes logs shipped from Thorne Bay on Prince of Wales Island, and in 1981-82 was modified to handle small logs for customer cutting. The mill can employ 140 people and run 2 shifts per day.					Project Justification: <u>NEED</u> Since 1976, energy demand in Metlakatla has fluctuate from year to year. During that period the lowest sales were 12,600 MWH in 1979, and a high sales figure of 14,900 MWH in 1980. The Purple Lake storage project has met most of the demand, and diesel generation has provided from 10% to 26% of annual needs depending on peaking needs and water availability at Purple Lake. Over the last six years diesel has met an average of 19.7% of the electrical energy requirements. The entire community including the cannery, cold storage, and lumber mill are served by Metlakatla Power and Light. The industrial customers have diesels installed for emergency back-up only. Several projects underway or completed in 1982 will change the energy demand picture from 1981. These changes are: 1. 24 new HUD houses are under construction and at least five (5) other homes have been completed.					

35a PROPOSED PROJECT
Chester Lake hydroelectric
Project Title

CATEGORY Power Development
AGENCY Alaska Power Authority
PROGRAM Energy Development
PROPOSED FUNDING YEAR FY 1984

Page 1 of 9
Revised Date

FY 84
000148

PROJECT DESCRIPTION (CONTINUED):

Federal government employment dropped drastically to about 20 employees with the departure of the U.S. Coast Guard air station in 1977. The state school district, with an average of 30 employees, and the local government, with about 80 full-time and temporary employees, are the major governmental employers.

The Metlakatla Indian Community has operated its own power system beginning in 1927 with the installation of a 150 KW unit Chester Lake hydroelectric project. In 1937 a second 250 KW unit was added. Development of the Purple Lake hydroelectric project was begun in the early 1950's and two 1,000 KW units began operation in 1956. A third 1,000 KW unit was added at Purple Lake in 1962. With the development of Purple Lake the 400 KW Chester Lake plant was decommissioned in 1956. The latest additions to the power system were two 1,500 KW diesel generators at the quarry diesel plant, the first in 1967, and the latest in 1979.

Studies to replace the diesel generation with hydropower began in the mid-1970's. A feasibility study of several sites contracted by the community was completed in 1977, and recommended redevelopment of Chester Lake. The community encountered delays in project licensing and funding which has led to substantial increases in project cost. The community has received an exemption to licensing from the Federal Energy Regulatory Commission (FERC), and has received a Corps of Engineers 404 permit to construct. The Rural Electrification Administration (REA) had authorized a \$5,480,000 loan for the project but there was concern from the community and REA that this may not be sufficient. In 1981, the community requested

PROJECT JUSTIFICATION (CONTINUED):

2. The school district has completed construction of an electrically heated swimming pool with an installed peak heating demand of 2,600 KW. Average demand is estimated at 400 KW.
3. Docks have been installed within the new breakwater and lights and electrical hookups have been installed
4. The LPK spruce mill has installed equipment to handle small logs for dimension lumber which will increase consumption when operating.
5. The cultural center, which burned in 1981, is being rebuilt.

A highly probable planned addition within the next three years are plans of the cold storage to increase freezing capacity by 50%.

Installation of 36 HUD housing units are being planned for 1983, whereas the most likely forecast estimated 20 new residential customers for the period 1983-1985.

A less likely development that was included only under a high scenario was redevelopment of the existing building at the Annette airport for commercial use.

Metlakatla is unique for small rural Alaskan villages in that much of the space heating needs are met by electric resistance space heaters supplemented by wood stoves. As the result of energy audits and weatherization efforts underway in 1982, and an expectation that new housing will be more heavily insulated and use more efficient electrical

35b PROPOSED PROJECT
(Continued)

Chester Lake
Project Title

CATEGORY POWER DEVELOPMENT

AGENCY ALASKA POWER AUTHORITY

PROGRAM ENERGY DEVELOPMENT

PROPOSED FUNDING YEAR FY 84

Page 2 of 9

Revised Date

FY 84

000149

PROJECT DESCRIPTION (CONTINUED):

construction funding through the Alaska Power Authority (APA). \$1,000,000 was appropriated in SB 26 for "feasibility studies, preconstruction design, and engineering" of the Chester Lake project among others.

During late 1981 and early 1982, the Power Authority contracted for a detailed feasibility study update of the Chester Lake as well as investigation of other hydro and non-hydro alternatives to fulfill state requirements for feasibility studies in the event state financing might be utilized for the Chester Lake project. The alternatives considered are discussed under Item IV, "Alternatives."

PROJECT STATUS

Geotechnical field investigations began in November 1981, and concluded in mid-December. They were conducted under severely adverse conditions which included rain, snow, ice, 80 MPH winds, and freezing rain which glazed the drilling equipment and work areas. The geotechnical work concluded that the powerhouse site recommended in the 1977 report was not prudent to develop due to steeply residing talus deposits in the area and identified better rock conditions near the original 1927 powerhouse. Cores from the drilling work are now stored in a warehouse at the Annette airport.

A draft report was released in February 1982 and a public meeting was held in Metlakatla. The cost of the storage project alternative with road access to the new powerhouse location was estimated to cost about \$14,000,000 in January 1982 dollars. This compared to a 1977 estimate for a slightly different project of about \$3,600,000 in 1977 dollars. The 1977 estimates were likely low. Options to reduce capital costs were

PROJECT JUSTIFICATION (CONTINUED):

appliances per customer, per customer residential consumption was forecast to decrease under both low and most likely forecasts.

Low Forecast

YEAR	SALES (MWII)	PEAK LOAD (KW)	AVERAGE ANNUAL GROWTH RATE (SALES)
1980	14,888	4,770	
1985	17,260	5,036	3.0%
1990	17,570	5,127	0.4%
2000	19,060	5,561	0.8%

Most Likely Forecast

YEAR	SALES (MWII)	PEAK LOAD (KW)	AVERAGE ANNUAL GROWTH RATE (SALES)
1980	14,888	4,770	
1985	19,140	5,580	5.2%
1990	20,360	5,940	1.2%
2000	23,370	6,820	1.4%

A 50-year present worth analysis was prepared for diesel, for a 2.5 MW storage project, and for a 2.5 MW run-of-river project using the following parameters:

Discount rate = 3.0%, Fuel escalation = 2.6%
January, 1982, capital cost of \$13,140,000 for the storage project.
\$9,100,000 for the run-of-the river project.

CATEGORY POWER DEVELOPMENT

AGENCY ALASKA POWER AUTHORITY

PROGRAM ENERGY DEVELOPMENT

PROPOSED FUNDING YEAR FY 84

35b PROPOSED PROJECT
(Continued)

Chester Lake

Project Title

Page 3 of 9

Revised Date

FY 84

000150

PROJECT DESCRIPTION (CONTINUED):

discussed and various operating modes were discussed. One option which was reviewed included a run-of-the river project at Chester Lake with a lower dam, rather than a storage project which involved a higher dam. Other options were also discussed and investigated over the next several months.

In May 1982, a final report was released with detailed discussion of other project options and alternative generating plans and follow-up public meetings were held in Metlakatla in June 1982. The Chester Lake project still was the most economical long term alternative. Metlakatla Indian Community has indicated a preference for construction of the higher dam, storage alternative, while APA staff recommended the lower dam, run-of-the river alternative based on potential financial risk and joint operating characteristics with the Purple Lake hydro plant. One of Metlakatla's concerns is that the run-of-the river project leave sufficient water storage for the community water supply. This stipulation can be met.

Independent cost estimates for each alternative were completed in July 1982 and evaluated by APA staff. The original engineer's estimate and independent cost estimator's estimate varied by less than one percent. APA staff included an estimate of construction camp costs on top of the engineers estimates and the January 1982, cost of each alternative are as follows:

Chester Lake Storage Project - 2,500 KW - \$13,815,000
 Chester Lake Run-of-River Project - 2,500 KW - \$9,611,000

PROJECT JUSTIFICATION (CONTINUED):

50 Year Cumulative Present Worth (1982\$).

<u>OPTION</u>	<u>LOW FORECAST</u>	<u>COST/ COST RATIO</u>	<u>MOST LIKELY</u>	<u>COST/ COST RATIO</u>
Purple Lake and diesel base case	\$35,740,000		\$54,344,000	
Purple Lake and Chester Lake storage and diesel	\$24,253,000	1.47	\$30,951,000	1.76
Purple Lake and Chester Lake run-of-river and diesel	\$21,153,000	1.69	\$31,332,000	1.73

ALTERNATIVES CONSIDERED

The following generation alternatives were considered

1. Purple Lake with additional diesel generation as needed.
2. Purple Lake expansion
 - a. Increase height of existing dam to raise lake level.
 - b. Construct new dam to increase catchment area.
 - c. Increase peaking capability by adding a fourth turbine and generator.

351b PROPOSED PROJECT
(Continued)

Chester Lake
Project Title

CATEGORY POWER DEVELOPMENT

AGENCY ALASKA POWER AUTHORITY

PROGRAM ENERGY DEVELOPMENT

PROPOSED FUNDING YEAR FY 84

Page 4 of 9

Revised Date

FY 84

000151

PROJECT DESCRIPTION (CONTINUED):

Of the original \$1,000,000 appropriation, \$350,000 was used for the feasibility update, alternatives evaluation, and independent cost estimating. The balance of \$650,000 remains unexpended.

Metlakatla Indian Community has petitioned the Power Authority to begin the engineering design of the Chester Lake project with the \$650,000 remaining, so equipment might be ordered and construction get underway by July 1983. They have requested that APA request funds in its FY 84 budget for full construction funding of the Chester Lake project. On their own initiative Metlakatla has applied to the Rural Electrification Administration for a loan as a back-up to state funding of the project. A formal response from APA is needed on Metlakatla's request. APA staff feels the law may be unclear on whether the balance can be used for design, since the SB 26 appropriation was for "feasibility studies, preconstruction designs, and engineering" and as 44.03.185(b) states "the Power Authority may not proceed with engineering or design of a proposed new project until the legislature approves the proposed new project."

APA staff are preparing the detailed findings and recommendations and will recommend the run-of-the river project for construction.

PROJECT JUSTIFICATION (CONTINUED):

3. Triangle Lake 3.0 MW project.
4. Woodwaste generation.
5. Chester Lake
 - a. 2.5 MW storage project
 - b. 2.5 MW run-of-river project
 - c. 1.5 MW run-of-river project

In addition, since space and water heating is the largest component of the residential load, the following space and water heating alternatives were considered:

1. Electric resistance
2. Fuel Oil
3. Wood at varied costs
4. Heat pumps

Electric heat with wood supplement appeared to be the least cost heating alternative for this market area.

KEY ISSUES

There is a large amount of electric space heating in the market area which can be expected to be more sensitive to rate increases than other electrical energy end uses. This is a concern in trying to balance the project cost, kW/h cost, and expected market reactions to higher costs. This is a concern when selecting a run-of-the river project or a more expensive storage project with more firm energy. If the Chester Lake project is financed with bonds or loan funds, then a guarantee for purchase of some minimum amount

351b PROPOSED PROJECT
(Continued)

Chester Lake
Project Title

CATEGORY	POWER DEVELOPMENT
AGENCY	ALASKA POWER AUTHORITY
PROGRAM	ENERGY DEVELOPMENT
PROPOSED FUNDING YEAR	FY 84

Page 5 of 9
Revised Date

FY 84

000152

PROJECT DESCRIPTION (CONTINUED):

PROJECT JUSTIFICATION (CONTINUED):

of energy will be necessary to cover debt service. This could be accommodated by operating a Chester Lake run-of-the river project as a base load facility with the balance of base load and peaking met by Purple Lake and diesel generation.

The community has indicated a preference for a storage project while APA staff recommends a run-of-river project. Adequate water supply storage can still be provided with the run-of-the river project.

The legislature needs to formally authorize this project if state funds are to be used for any further design and/or construction of this project.

OUTPUT

Installed Capacity (KW):	2,500
Firm/Dependable Capacity (KW):	Run-of-river
Plant Factor:	.44
Average Annual Generation (KWH):	9,800,000
Firm Annual Generation (KWH):	6,600,000

EXISTING SYSTEM (Most Recent Year)

Generation By Type:

Generation Type	Installed Capacity (KW)	Dependable Capacity (KW)	Net Generation (KWH)
Hydro	3,000	2,000	13,523,000
Diesel	3,000	1,500	2,255,000
TOTAL	6,000	3,500	15,778,000

CATEGORY POWER DEVELOPMENT
 AGENCY ALASKA POWER AUTHORITY
 PROGRAM ENERGY DEVELOPMENT
 PROPOSED FUNDING YEAR FY 84

35b PROPOSED PROJECT
(Continued)

Chester Lake
Project Site

Page 6 of 9

Revised Date

FY 84

000153

PROJECT DESCRIPTION (CONTINUED):

PROJECT JUSTIFICATION (CONTINUED):

Energy Sales (KWII): 13,456,000
 Peak Demand (KW): 4,200
 Year of Data and Source: 1981 Alaska Power Administration Electric Power Statistics

ENERGY COST

Average Cost (Revenue ÷ Total Net Generation): 6.4¢/KWII
 Year of Data and Source: 1981, Revenue from Alaska Power Administration
 Unsubsidized Residential Rate: 7.4¢/KWII

SERVICE AREA

Metlakatla population: 1,110
 Source of Data and Date: U.S. Census, Metlakatla Indian Community, Pacific Rim Planners, 1980

ENERGY FORECAST

Energy

Year	Sales	Generation (KW)	Growth rate (Sales) ^{2/}
1985	19,140,000	22,010,000	
1990	20,360,000	23,410,000	1.2%
2000	23,370,000	26,000,000	1.4%

CATEGORY POWER DEVELOPMENT
 AGENCY ALASKA POWER AUTHORITY
 PROGRAM ENERGY DEVELOPMENT
 PROPOSED FUNDING YEAR FY 84

Page 7 of 9
 Revised Date

FY 84

000154

35b PROPOSED PROJECT
 (Continued)

Chester Lake

Project Title

PROJECT DESCRIPTION (CONTINUED):

PROJECT JUSTIFICATION (CONTINUED):

ANNUAL SALES GROWTH RATE, LAST FIVE YEARS

<u>Year</u>	<u>MWH</u>	<u>% Change</u>
1976	13,597	
1977	14,835	+ 9.0%
1978	14,564	- 2.0%
1979	12,608	-13.0% <u>3/</u>
1980	14,888	+18.0% <u>3/</u>
1981	13,546	- 9.0%

1976 - 1980 trend +1.0%/year
 1977 - 1981 trend -1.9%/year

PEAKLOAD FORECAST

<u>Year</u>	<u>Peak Load (KW)</u>	<u>Installed Capacity</u>		
		<u>Hydro</u>	<u>Diesel</u>	<u>Total</u>
1980	4,770	5,500	500	6,000
1985	5,580	5,500	3,000	8,500
1990	5,940	5,500	3,000	8,500
2000	6,820	5,500	3,000	8,500

PREVIOUS PROJECT APPROPRIATIONS

<u>Bill Number</u>	<u>Amount</u>
SB 26 Feasibility and Design	\$1,000,000 (\$650,000 remaining)

ESTIMATE OF PROJECT COST (Design, Construction Management, Capital Cost, Owner's Cost, and Contingencies)

35b PROPOSED PROJECT
(Continued)

.....Chester Lake.....
Project Title

CATEGORY POWER DEVELOPMENT
 AGENCY ALASKA POWER AUTHORITY
 PROGRAM ENERGY DEVELOPMENT
 PROPOSED FUNDING YEAR FY 84

Page 8 of 9

Revised Date

FY 84

000155

PROJECT DESCRIPTION (CONTINUED):

PROJECT JUSTIFICATION (CONTINUED):

Date of Estimate: January, 1982
 Type of Estimate: Feasibility
 Total Cost (Constant \$, Base Date): 9,720,000
 (January, 1982)
 Total Cost (Nominal \$, Inflation Rate): 13,750,000 (9%)
 Estimated Start of Construction: late 1983
 Estimated Year of Completion: early 1986
 Cash Flow (To cover obligations):

<u>Year</u>	<u>Constant \$</u>	<u>Nominal \$</u>
FY 84	9,720,000	13,750,000

NOTE: This project has been exempted from FERC licensing and the community has obtained all permits required.

- 1/ This is about 200,000 kwh below the average hydro generation from this plant.
- 2/ Primarily related to new housing and public sector loads (school, docks). Per capita consumption is forecast to decrease.
- 3/ 1979 and 1981 reflect partial operation of LPK spruce mill in those years.

CATEGORY POWER DEVELOPMENT
 AGENCY ALASKA POWER AUTHORITY
 PROGRAM ENERGY DEVELOPMENT
 PROPOSED FUNDING YEAR FY 84

Page 9 of 9
 Revised Date

FY 84

000156

35b PROPOSED PROJECT
 (Continued)
 Chester Lake

Project Title

000157

40' CONCRETE DAM

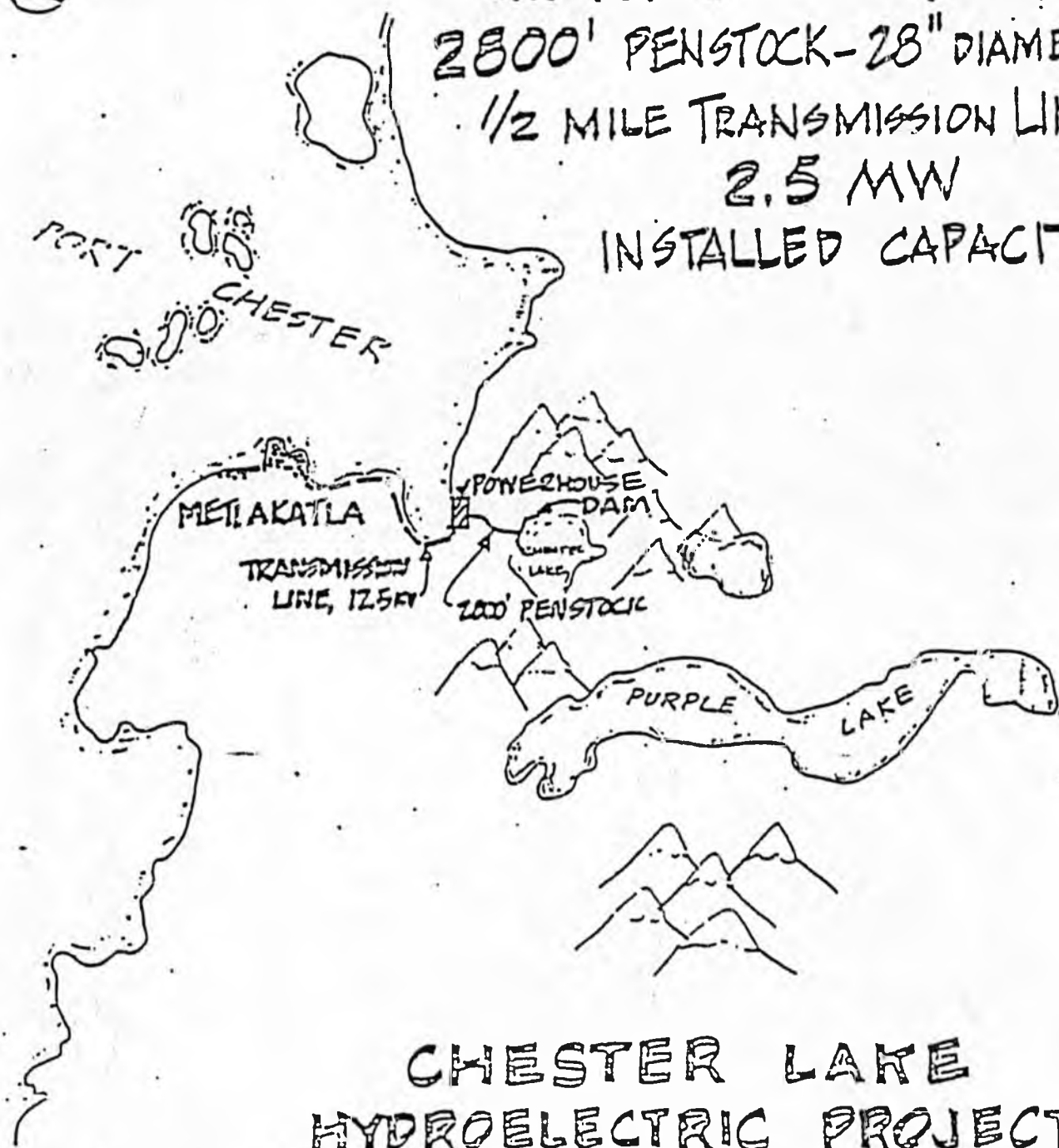
(NO POWER TUNNEL)

2800' PENSTOCK-28" DIAMETER

1/2 MILE TRANSMISSION LINE, 125KV

2.5 MW

INSTALLED CAPACITY



CHESTER LAKE
HYDROELECTRIC PROJECT

9,800,000 KWH YEARLY AVERAGE
OUTPUT

ESTIMATED CONSTRUCTION PERIOD
LATE 1983 TO EARLY 1986



STATE OF ALASKA
OFFICE OF THE GOVERNOR

BILL ANALYSIS

Department Alaska Power Authority	Sponsor (Principal) McBride and Wendte	Bill Number HB 232
Department Position This bill is consistent with the approval steps needed to construct the Chester Lake Hydroelectric Project and is consistent with Alaska Power Authority recommendations to proceed with the Chester Lake Project		
Division Director	Date	Commissioner's Signature
		Date

GOVERNOR'S OFFICE USE

Comments:

Petition Noted

By _____ Date _____

SUMMARY

1. a) Related Bills (Similar or Conflicting) The Administration Budget Request.	1. b) Other Agencies Affected by Bill
2. a) Organizational Support for Bill Metlakatla Indian Community Metlakatla Power and Light Alaska Rural Electric Coop. Association	2. b) Organizational Opposition to Bill

3. Program Effects of Bill

This bill is consistent with Governor Sheffield's proposed capital budget which includes a request for first year construction funds for the 2.5 MW Chester Lake Project to serve Metlakatla. A feasibility study for the project was completed in 1982. The effect of this bill would be to allow detailed design, and subsequently, construction, of the project to proceed.

4. Fiscal Impact: None Fiscal Note Attached

5. Amendments Proposed:

To be consistent with the Governor's request and cost estimates, the authorization should be for \$13,750,000 rather than \$13,200,000.

6. Comments:

See attached page.

6. COMMENTS

Chester Lake first provided hydroelectric power for Metlakatla in 1927 with a small 150 KW unit and in 1937, a 250 KW unit was added. When the 3,000 KW Purple Lake project was installed in 1956 to serve Metlakatla the Chester Lake hydroelectric plant was abandoned and the reservoir has since been used only for village water supply. In the 1960's, 3,000 KW of diesel generation was added to the Metlakatla system. For several years, the Purple Lake hydroelectric project has been fully utilized and a greater portion of Metlakatla's energy needs are being met by diesel generation.

The Village of Metlakatla completed a study in 1977 which recommended redevelopment of the Chester Lake project, but subsequently had difficulty in arranging sufficient financing. The project has been exempted from Federal Energy Regulatory Commission licensing and the community has received other necessary permits for the project.

The 1981 Legislature appropriated \$1,000,000 for feasibility and engineering of the Chester Lake Hydroelectric Project to serve Metlakatla. The Power Authority expended \$350,000 for detailed studies of several alternatives to serve Metlakatla including:

1. Expansion of the existing Purple Lake Hydroelectric plant,
2. wood waste generation,
3. additional diesel generation,
4. a new hydroelectric project at Triangle Lake, and
5. two alternatives for a project at Chester Lake.

The Chester Lake project proved to be the most economical alternative. In addition to the Engineer's cost estimate, the Power Authority contracted a separate, independent cost estimate of the project during the summer of 1982. Based upon those two cost estimates, the Power Authority estimated the January 1982 feasibility level cost estimates to be \$9,720,000 for a 2.5 MW run-of-the-river project at Chester Lake and \$13,815,000 for a 2.5 MW storage project with a higher dam. Based upon economic analysis, the Power Authority staff recommends the low dam, run-of-the river project with some public water supply storage rather than the larger storage project. Based upon equipment procurement and construction beginning in January 1984, project completion by March 1986, and nine percent inflation, the total estimated construction costs are \$13,750,000. This estimate does not include any interest charges should bonding be required.

Additional References:

Chester Lake Project Feasibility Report, for Alaska Power Authority by Harza Engineering Company, May 1982.

STATE OF ALASKA
PRELIMINARY STATEMENT OF FISCAL IMPACT

Bill No: HB 232 Date on Bill: 3/2/83
 Title: An Act Authorizing Chester Lake Hydroelectric Project
 Sponsor: McBride and Wendte
 Requestor: _____

1. Estimated fiscal impacts on:

a. Expenditures:

(Thousands of Dollars)

	FY 83	FY 84	FY 85	FY 86
Capital		5,440.0	8,301.0	
Operating				95.0
Total				100.0

b. Revenues:

Revenue				95.0	100.0
---------	--	--	--	------	-------

2. Source of funds to offset fiscal impact of bill:

3. Assumptions:

4. Disclaimer:

This statement has not been reviewed by the OMB in the Office of the Governor. It does not represent the policy of the Sheffield Administration or the final estimate of fiscal impact.

Prepared By: Raymond J. Smith Phone: 276-0001
 Division: Alaska Power Authority Date: 3-11-83
 Approved by Commissioner: _____ Date: _____
 Department: _____

5. Distribution:

- Original to Legislative Finance
- Copy to OMB
- Copy to Sponsor
- Copy to Requestor

2/8/83