Whittier Creek Hydroelectric

Grantees	City of Whittier (Local Government)
Technology Type	HYDRO
Region	Railbelt
AEDG Project Code	10051

REF Grants Received

Round	App	Grant Title	Grant #	AEA Project #	Phase	Start Date	End Date	Status
1	48	Whittier Creek Hydroelectric Reconnaissance	2195396	407043	Feasibility	8/20/08	5/1/12	Closed

Grant 2195396: Whittier Creek Hydroelectric Reconnaissance

Project Scope: The proposed work includes three technical tasks: 1) Research, review and evaluate past hydroelectric studies done in Alaska, especially the report that was generated for Whittier Creek at Whittier, Alaska during the late 1970's; 2) Install stream gauge and measure stream flow for two years; and 3) Analyze the data recorded by the United States Geological Survey (USGS) stream gauge for Whittier Creek. The results of this work will determine if the City of Whittier could benefit from generating their own electric power.

Task 1 will provide an interim report on Whittier Creek with July 2010 costs.

Research, review and evaluate the existing data, including the listed past publications, topo maps, and make a site visit to collect additional data on possible locations, including the USGS stream gauging data on Twenty-Mile River, a glacial feed river within 10 miles of Whittier. Results of this task will estimate the power available (kW) and the average annual energy (kWh) from Whittier Creek in addition to the capital cost and then estimate the cost of energy generated (in cents/kWh) to determine if the project is economical. Provide an interim report with costs. If the Interim Report results show the project is not economic in its cost of power compared to that provided by Chugach Electric, the grant funding for Whittier Creek will end. Re-programming of remaining grant funds to study other hydro sites will be subject to approval by the Alaska Legislature.

Following is a list of previous studies. USACE, Alaska District 1982. "Regional Inventory and Reconnaissance Study for Small Hydropower Projects - Southcentral, Alaska." USACE, Alaska District, 1979. "Regional Inventory and Reconnaissance Study for Small Hydropower Projects in Southeast Alaska." USACE, Alaska District, 1981. "Small-Scale Hydropower Reconnaissance Study Southwest Alaska." CH2M Hill Engineering of Alaska, 1979. "Reconnaissance Study of Hydropower Sites Near Cordova, Alaska."

Task 2 will include stream gauging Whittier Creek or possible other location and data collection.

Design of a hydroelectric facility on Whittier Creek or other location (Shakespear or Learnard Creek) would require detailed information on the flow regime at Whittier Creek. Therefore, work is proposed to develop this information through gauging the stream for a period of no less than one calendar year. The USGS will work with the Corps of Engineers to gauge the creek. The USGS will install a stream flow monitoring station including satellite telemetry or other means of automated data transmission (the new gauge shall be installed on Whittier Creek), run levels as needed to maintain gauge datum, collect continuous (15 minute) stream stage data, make six to eight discharge measurements annually to define and ensure the accuracy of the stage discharge rating and to help define winter stream flow under ice conditions, calculate daily mean discharge and additional statistical information, archive the stage and discharge data in the USGS data base. Recorded data and preliminary daily discharge will be provided to the Corps of Engineers upon request. Data will be finalized and published in the annual report, "Water Data Report-United States."

The cost for two years is approximately $60,000. If the stream gauge is installed on Whittier Creek before task one is successfully completed, then part of the first year cost may be shared with another project on Whittier Creek, depending upon the timing of the installation of the gauge. The Corps of Engineers would coordinate with the USGS and perform stream transport, erosion potential, and icing data during the gauging period.

Task 3 is data analysis and preliminary design concept.

Once the stream gauge data has been obtained from the USGS and rating curves have been developed, USACE will analyze the data to determine if the production of power is possible at Whittier Creek. Mean annual flow, mean monthly flow, 7-day, 2 year reoccurrence, low flow (both summer and winter), five points on the daily flow duration curve, peak flow, and the 100-year recurring interval will be calculated. These parameters will form the basis for estimating potential capacity and energy at the site. Twenty-Mile River data can be used to help correlate with the Whittier Creek flows to estimate historical Whittier Creek flows. The average annual energy will be calculated based on the net head and flow capacity at the site. From these calculations, a power plant capacity will be selected based on energy capabilities at Whittier Creek. Load characteristics would also need to be analyzed. From

there, several different preliminary alternatives will be developed. USACE, Alaska District would coordinate with the Corps center of expertise for hydroelectric generation, (Hydroelectric Design Center) in Portland, OR.

This grant will formulate preliminary alternatives, complete preliminary economic analysis by Jan 2012, determine power requirement forecast / load characteristics, develop power benefit stream and cost of energy (CORPS HH/ECON), identify physical works (plant description, site services, access, transmission lines, etc.), determine economic feasibility based upon avoided fuel costs (CORPS HH/ECON), identify critical issues, assess legal / institutional constraints (WIK), and assess licensing and environmental constraints (WIK).

A recon report will be provided to the Authority by May 2012 after it is reviewed by CORPS, City of Whittier, and the Authority. Preliminary mechanical and electrical work will be completed by Jan 2012.

Project Status: USACE completed an interim reconnaissance report of hydropower resources in the vicinity of Whittier in September 2011. The report concluded the available sites could not be developed economically when compared to the cost of railbelt power. The project is closed.

As of Nov. 30, 2013	Budget	Expenditures
Renewable Energy Funding	$39,471.00	$39,471.00
Other State Funding	$0.00	$0.00
Total State	**$39,471.00**	**$39,471.00**
Required Local Match	$34,285.00	$34,285.00
Federal Grant Funding	$0.00	$0.00
Total Project Costs	**$73,756.00**	**$73,756.00**