

Department of Energy Port Graham Woody Biomass Feasibility Study

October 25, 2006

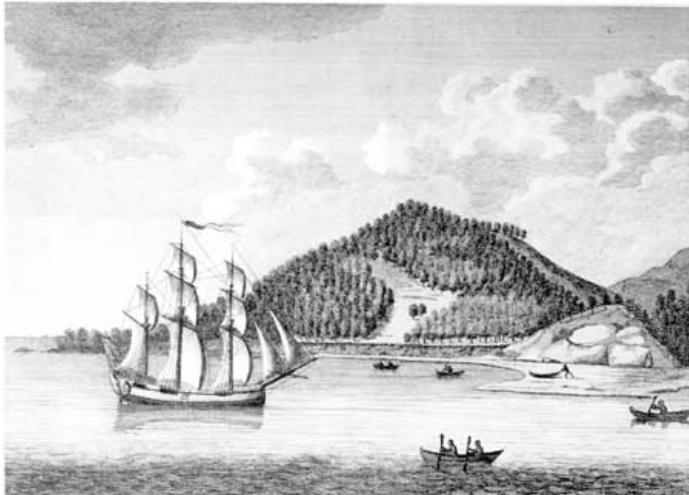


- Pat Norman, Chief
- Olga Fomin, Second Chief
- Fran Norman, Tribal Administrator
- Violet Yeaton, Environmental Specialist
- Charlie Sink, Technical Representative

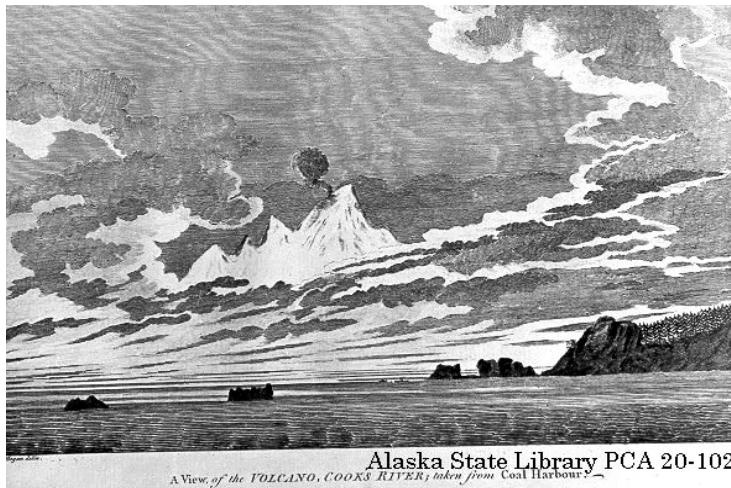
Port Graham Feasibility Study

- Port Graham Village Council is the contractor
- University of South Dakota's Energy & Environmental Research Center is the subcontractor, with project managers Darrin Schmidt and Kerryanne Leroux
- Charlie Sink, Chugachmiut Director of Enterprise and Trust Resources is the Technical Representative with help from Chugachmiut's forester Tom Hines

Port Graham, Alaska



Coal Harbor, near Port Graham, 1786



Alaska State Library PCA 20-102
A View of the VOLCANO, COOKS RIVER, taken from Coal Harbour.

View of Volcano taken from Coal Harbor

- Port Graham lies on the lower tip of the Kenai Peninsula of Alaska.
- Nearby, Nanwalek was the site of the first Russian fort built on the North American continent (1781).
- Today there are approximately 200 residents



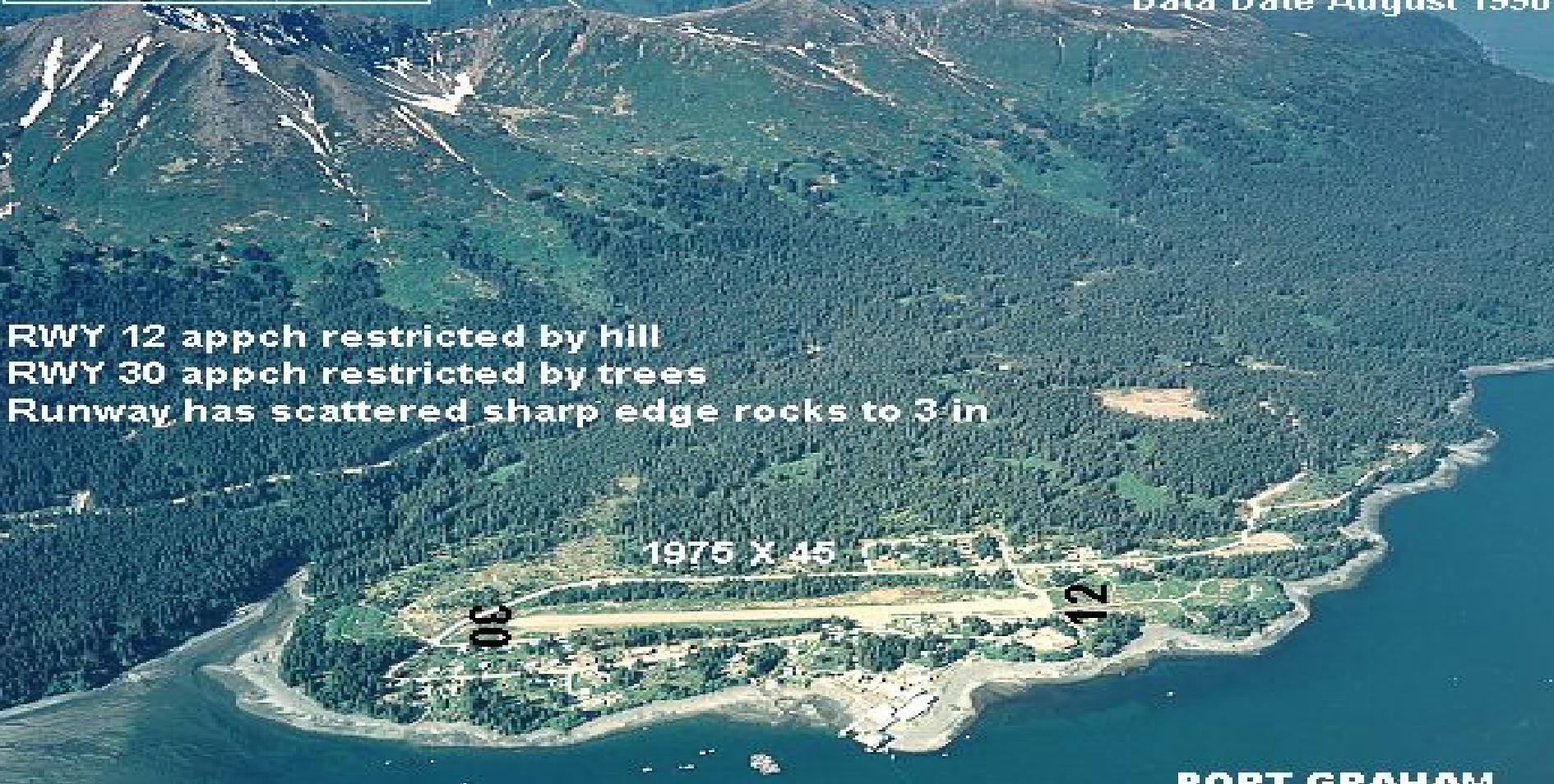
PORT GRAHAM (PGM)

PGM CTAF 122.9

ELEVATION 93
N59 20.90W151 49.89

COOK INLET

Photo Date June 1996
Data Date August 1998



ENGLISH BAY (KEB)

Port Graham, Alaska

- Port Graham Village is administered by an IRA federally recognized Tribe formed during the Alaska Native Claims Settlement Act (ANCSA) December 18, 1971.



ANCSA

- ANCSA established recognition of approximately 225 Tribes in the State of Alaska comprising 12 geographic and ethnic regions.
- Each Tribe generally coincided with a geographic community that existed during creation of the act.

ANCSA

- Congress, in seeking to create something different for Alaska, separated the federal recognized tribes from their land base and instead created for-profit Native corporations to hold and manage Indian lands.

ANCSA

- Tribes in the Tribal communities were given a small land base.
- Community occupants were given title to their townsite lots. If they were Tribal, they received “Restricted” trust lots.
- Eligible Tribal members who showed use and occupancy were given trust Native allotments.



ANCSA

- Surrounding these communities, the Native village corporations selected lands for which they received surface title.
- Adjacent to these lands, each of 12 Regional corporations selected land and received subsurface rights to those lands and those of the village corporations.

Native Allotments

Near Port Graham And Nanwalek



0 0.5 1 1.5 2
Miles



Allotments



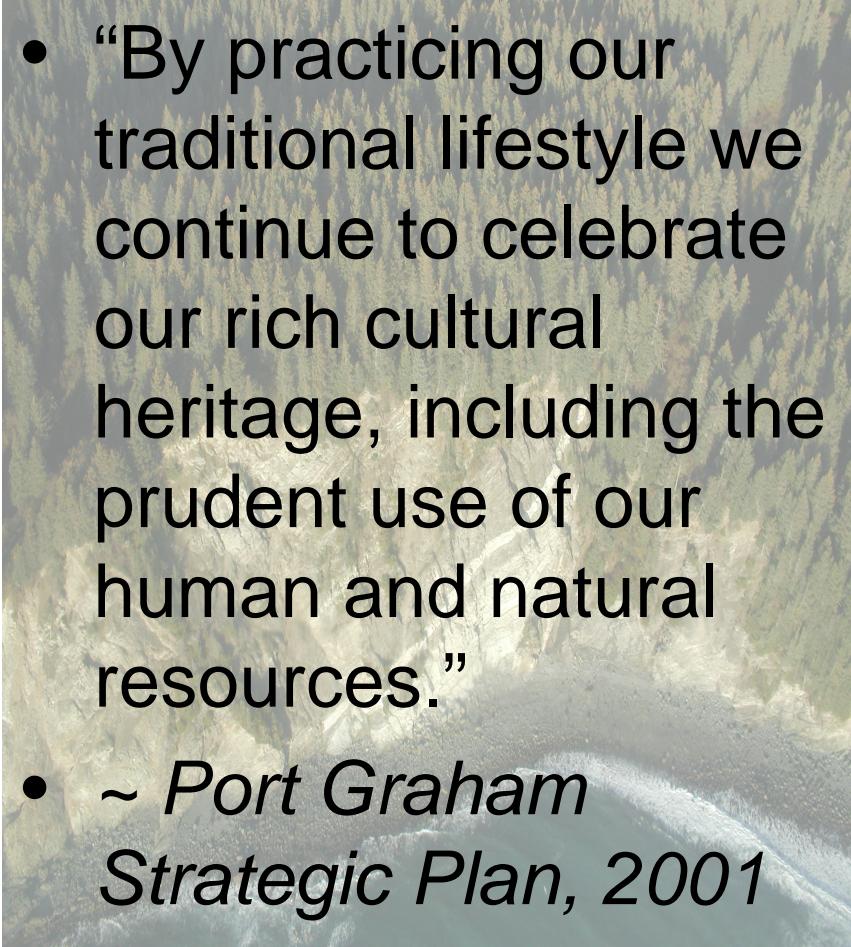
Nanwalek

Port
Graham



Port Graham Biomass Study

Objectives

- 
- “By practicing our traditional lifestyle we continue to celebrate our rich cultural heritage, including the prudent use of our human and natural resources.”
 - ~ *Port Graham Strategic Plan, 2001*

- Reduction in living costs
- Secure growth
- Economic Development
- Utilization of lands
- Help prevent sale of Native allotments
- Better Tribal integration in management of Native lands
- Energy alternatives

Port Graham Interest in Biomass

- Secure growth
 - Prevent loss of residents
 - Provide for future residents

- Vision
- *To maintain and protect our cultural and traditional values, to guarantee our future, to promote our physical well-being and safety while striving to be socially and economically self-sufficient, developing the village, protecting our resources and continuing to advance our way of life.*

Port Graham Interest in Biomass



- Economic Development
 - Port Graham Cannery
 - Port Graham Hatchery
 - Port Graham Village Corporation timberlands
 - Native allotment timberlands
 - Private enterprise

Port Graham Interest in Biomass



- Reduction in living costs
 - Electricity is single-phase 220 volts from Bradley Lake Hydroelectric project
 - Heating is done by oil fired furnaces
 - Diesel fuel is barged into the community, currently around \$4.00/ gal number 2 grade

Port Graham Interest in Biomass



- Utilization of Lands
 - Port Graham Tribal members are concerned about their cultural traditions and traditional use of their lands
 - They would also like to seek ways to better utilize their lands without endangering their way of life

Port Graham Interest in Biomass

- Help prevent sale of Native allotments
 - Allotments are generally under utilized
 - Owners and new gift deeded owners have, at times, monetary needs
 - Tribe desires to maintain their cultural association with the land and the owners



Port Graham Interest in Biomass

- Better Tribal integration in management of Native lands—a Tribal IRMP
 - Corporate and Native allotment landowners and managers
 - Currently, Native owned lands are contiguous
 - Desire by the Tribe to maintain their culture and Native identity



Port Graham Interest in Biomass

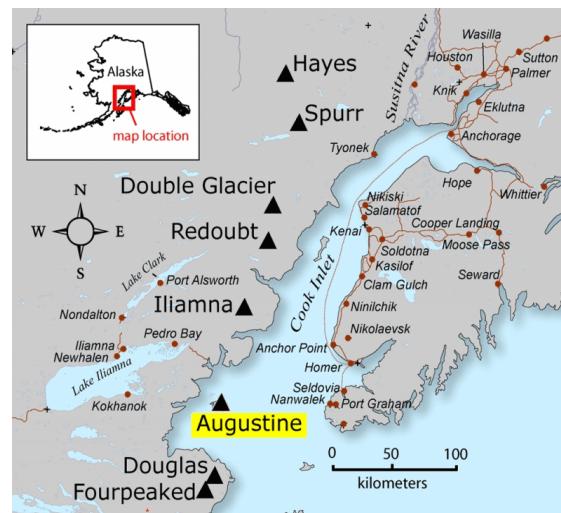


Augustine Volcano
Photo by Richard Waitt, U.S. Geological Survey, 1988



Steam and ash billow from Augustine Volcano
January 17, 2006

- Energy Alternatives
 - Coal
 - Hydro
 - Wind
 - Tidal
 - Geothermal



Port Graham Timber Quality and Availability



- 200,000 tons woody biomass available
- 4,000 tons per year at 50-year interval
- 40,000 acre forest resource accessible by old timber harvest road network
- Land is either Native allotment or Port Graham Native Corporation owned

Port Graham Energy Requirements--Residential

- Forced air or hot water for heat
- Diesel is primary energy source
- Wood stoves were traditionally used and are used when diesel prices are high
- Approximately 70 homes with an average 1,000 square feet per home



Port Graham Energy Requirements—Village Buildings

- Tribal Council Building
- Chugachmiut Clinic
- Native Corporation Office
- Public Safety Building,
and
- School
- Approximately 20,000
square feet
- Diesel boilers with water
base board heat



Port Graham Energy Requirements—Industrial

- Port Graham Village Corporation Cannery
 - 20,000-25,000 gallon diesel annually
 - About \$1 million per year to operate
 - Not in operation last year due to markets and not operated as a cannery but as a hatchery
- Hatchery
 - Hot water boiler used Jan-Feb for rise in ambient temperature for thermal mark on smolt



Port Graham Energy Requirements—Electrical Usage



- Estimated 2,000 MWh annual and 250 kW peak demand electrical use
- Four existing diesel generators for Port Graham and Nanwalek electricity back-up installed to operate 3-phase electricity to cannery operation
- Homer Electric Association has installed one of the generators

Potential Technologies and Options--Combustion

- Applications
 - Village building and home heating
 - Generation of steam/hot water for industrial processing
 - Logs, chips, or pellets as feed



Potential Technologies and Options--Combustion



- Small-scale combustion, i.e., outdoor furnaces
 - 50% efficient
 - Can be automated using pellets as feed
- Large-scale combustion
 - 75% efficient
 - Automation available with chips or pellets

Potential Technologies and Options--Gasification

- Applications
 - Village building and home heating
 - Village electricity production
 - Cogeneration of electricity and steam/hot water for heat or industrial processing
 - Overall electrical production efficiency is 13-17% on a higher heating value basis



Potential technologies and Options- -Biodiesel

- Biodiesel
 - Cannery can be modified to create fish oil biodiesel
 - Can use either form fresh fish or carcasses and other wastes
 - No processing facilities in Alaska, must build facility or ship oil out to be returned as biodiesel



Port Graham, 1940s. (Left to right: unknown, Phillip Anahonak, Murphey Meganack, Marvin Norman, Johnny Malchoff). Photograph by John Poling. Copyright Chugach Heritage Foundation

Estimated Potential Economics— Total Biomass Potential

- \$300,000 annual savings to provide heating for village buildings and homes plus electricity for the village and energy for cannery operation
- 5,000 tons wood annually, requiring 200 acres without clear-cutting



Estimated Potential Economics-- Combustion

- Combustion of wood chips for heating of village buildings and homes
 - Multiple small systems (outdoor furnaces)
 - \$100,000 annual savings (up to \$1,000 per home)
 - 800 tons/yr wood, requiring 30 acres w/o clear cutting
 - One large system
 - \$110,000 annual savings (up to \$1,000 per home)
 - 500 tons/yr wood, requiring 20 acres w/o clear cutting

Estimated Potential Economics-- Gasification

- Gasification of wood chips for electricity and/ or steam production
 - Village electricity
 - \$120,000 annual savings over HEA provided electricity (up to \$2,000 per home)
 - 4,000 tons/yr wood, requiring 160 acres w/o clear cutting
 - Cannery processing
 - \$60,000 annual savings over diesel
 - 600 tons/yr wood, requiring 25 acres w/o clear cutting

Estimated Potential Economics- Fish Oil Biodiesel



- \$2-\$3 per gallon potential based on current studies
- Cost of production needs to be \leq 90% cost of diesel to be economical
- 50,000 gallons required annually for village heating

Feasibility Ideas to Explore in Study

- We would like to think its feasible
- Biomass is there—but is the cooperation among landowners
- Which technology is appropriate
- What is the potential for growth
- Does the community and tribe really want biomass
- What about including the 3-village corps

Questions

