PRELIMINARY PERMIT APPLICATION

For

Sweetheart Lake Hydroelectric Project
Juneau, Alaska

Submitted by:

Juneau Hydropower, Inc.
PO Box 22775
Juneau, AK 99802

July 27, 2009
(a) Initial Statement

Before The Federal Energy Regulatory Commission

Application for Preliminary Permit

(1) Juneau Hydropower, Inc. applies to the Federal Energy Regulatory Commission for a preliminary permit for the proposed Sweetheart Lake water power project, as described in the attached exhibits. This application is made in order that the applicant may secure priority of application for a license for the project under Part I of the Federal Power Act while obtaining the data and performing the acts required to determine the feasibility of the project and to support an application for a license.

(2) The location of the proposed Project is:

The approximate Longitude is 133.41.07 degrees West.
The approximate Latitude is 57.56.37 degrees North.

State: Alaska
County: Located in the City and Borough of Juneau, Alaska, an organized Borough of the State of Alaska.
Nearby Town: Juneau, Alaska
Stream or other body of water: Lower Sweetheart Lake and its outlet, Sweetheart Creek, which discharges from Lower Sweetheart Lake and dispenses into Gilbert Bay.

(3) The exact name, business address, and telephone number of the applicant is:

Juneau Hydropower, Inc.
PO Box 22775
Juneau, AK 99802
Phone: 907-789-2775
The exact name, business address and phone of each person authorized to act as agent for the applicant in this application are:

Duff Mitchell, Business Manager  
PO Box 22775 Juneau, AK  99802  
Phone 907-789-2775  
e-mail:  duff.mitchell@juneauhydro.com

(4) Juneau Hydropower, Inc. is a domestic corporation and is not claiming preference under section 7(a) of the Federal Power Act.

(5) The proposed term of the requested permit is 36 months.

(6) There are no known existing dams or other project facilities.

The following exhibits are filed herewith and are hereby made a part of this application:

Exhibit 1  DESCRIPTION OF THE PROJECT
Exhibit 2  DESCRIPTION OF STUDIES TO DETERMINE THE FEASIBILITY OF THE PROJECT
Exhibit 3  PROJECT MAPS
(b) EXHIBIT 1 - DESCRIPTION OF THE PROPOSED PROJECT

(1) PROJECT FEATURES

The proposed Project would be located southeast of the City of Juneau, Alaska. Development of hydroelectric power at the site will include:

**Dam.** A new dam approximately 500 ft long and 90 feet high comprised of a concrete core and rock face would be constructed at the outlet of Lower Sweetheart Lake.

**Spillway.** An overflow relief spillway would be provided for discharge from the storage reservoir as well as a low flow control device to provide for ecological stream flows as necessary.

**Tunnel.** Water would be withdrawn via an intake structure located at the upper tunnel portal at elevation 550 ft on the north bank of lower Sweetheart Lake. The intake and upstream tunnel portal would be located just upstream of the dam. The tunnel would be 12 ft diameter, and 10,390 ft long, constructed at a 5.7 percent grade. The upper 8,740 ft would be unlined, and the lower 1,650 ft would be lined. The lower tunnel portal would be at elevation 29 feet, adjacent to the powerhouse.

**Penstock.** The lower section of the 12 ft diameter tunnel would be lined with a 9 ft diameter steel penstock, connecting to the powerhouse. The penstock would be 1,650 ft long. There would be a rock trap in the tunnel just upstream of the penstock.

**Powerhouse.** The powerhouse would be located at elevation 29 feet, approximately 100 ft below the lower Sweetheart Falls. The powerhouse location is approximately 2,000’ east of the confluence of Sweetheart Creek and Gilbert Bay. The powerhouse would be approximately 60 ft wide, 100 ft long and 35 ft high constructed with concrete walls and a metal roof. The powerhouse would have two Francis turbines, each with a total rated head of roughly 600 feet, and a designed flow capacity of 300 to 400 cubic feet per second (cfs).

**Tailrace.** Discharge from these units would be directed by a short tailrace into Sweetheart Creek, approximately 100 ft below the lower Sweetheart Falls.
Dock and Access Road. The Project is separated from the nearest town of Juneau by Stephens Passage. The only access for either construction or long-term operation and maintenance of the Project will be via boat or aircraft. A new road to the powerhouse site would be constructed from a new dock/landing location on the eastern shore of Gilbert Bay near the powerhouse. Construction access to the powerhouse and lower tunnel would be provided by boat, seaplane and/or helicopter in association with the road system. Construction access to the dam site would be through the tunnel, and seaplane and/or helicopter.

Other Structures. Operator housing and temporary construction staging areas may be included once the most suitable locations are identified by preliminary studies.

(2) RESERVOIR. The project would utilize the impoundment of Lower Sweetheart Lake, present surface elevation of 544 feet and surface area of 1414 acres, to a new surface elevation of 629 feet and surface area of 1635 acres. The result would create both added storage of approximately 129,693 acre-feet of additional storage, and add approximately 85 feet of gross head for a total of approximately 600 feet of head maximum.

The proposed project operation would fluctuate the surface elevation of the new impounded reservoir about 60 feet annually, which is an active storage capacity of approximately 93,500 acre-feet.

(3) TRANSMISSION LINES. Power generated by the Project would be transmitted by either a submarine-overhead combination 138kV transmission line (Option T-1) or an all submarine 138kV line (Option T-2). Both transmission options would start at the powerhouse and end at a connection point into an existing 138 kV line running from the Snettisham Hydropower facility to Juneau.

Option T-1 includes 0.4 miles overhead from the powerhouse to a new dock on the east shore of Gilbert Bay, 1.5 miles submarine from the dock to the west shore of Gilbert Bay, 5.5 miles overhead along the west shore of Gilbert Bay, around Sentinel Point, along the south shore of Port Snettisham, then 1.5 miles submarine across Port Snettisham entrance to the north shore of Port Snettisham at a location just east of Mist Island, and a connection onshore into the existing 138kV Snettisham to Juneau line.
Option T-2 includes 0.4 miles overhead from the powerhouse to a new dock on the east shore of Gilbert Bay, 8.0 miles submarine from the dock along the west side of Gilbert Bay, around Sentinel Point, southwest in the middle of Port Snettisham entrance to the north shore of Port Snettisham at a location just east of Mist Island, and a connection onshore into the existing 138kV Snettisham to Juneau line.

(4) INSTALLED CAPACITY AND ENERGY PRODUCTION

**Average Annual Energy Production.** The average annual energy production is estimated to be 136,000 megawatt hours (MWh).

**Installed Capacity.** Total installed capacity is estimated to be 30 megawatts (MW).

**Hydraulic Head.** Hydraulic head is estimated to be 600’.

**Turbines and Generators.** The powerhouse would house two 15MW Francis turbines with a total installed capacity of 30 MW.

(5) LANDS OF THE U. S. GOVERNMENT

The project would be located entirely within the Tongass National Forest on USFS lands owned by the United States government, with portions of the transmission line crossing State of Alaska and City and Borough of Juneau lands.
Juneau Hydropower, Inc. proposes to conduct studies to determine the Project feasibility. The exact nature and extent of these studies cannot be known until completion of early stage consultation with Alaska State and Federal resource agencies, and results of more detailed engineering calculations.

**(I) STUDY PLAN FOR TECHNICAL, ECONOMIC AND ENVIRONMENTAL FEASIBILITY EVALUATION**

**(i) Technical Studies**

**Hydrology.** Lower Sweetheart Lake had stream gaging established from 1915 through 1927. The stream gaging record was extended by the US Geological Service by estimating the monthly run off in the 1928-32 and 1949 to 1956 water years from records of the Long River near Juneau and determining a relationship between the monthly runoff of Sweetheart Creek and Long River in a period of overlapping records. The public documents from these sources will be the starting reference for a more detailed technical, economic and environmental feasibility study. Hydrologic data will be collected from existing records and new stream gaging and lake level monitoring efforts to obtain accurate data on Lower Sweetheart Creek stream flows and lake levels in Lower Sweetheart Lake. Preliminary surveys were conducted as part of earlier development studies and much of the existing data base should still be applicable.

**Generation.** A generation study will be performed to determine the exact size and type of turbine/generators, switchgear, transmission facilities and other electrical equipment.

**Engineering Feasibility.** Engineering feasibility studies will be performed in association with field surveys and topographic mapping to determine the constructiveness of the various project features in relation to subsurface conditions, vegetation and topography.

**Environmental Studies.** Environmental studies normally must address information needs in the following areas:

- Aquatic Resources
• Terrestrial Resources
• Water Use and Quality
• Geology and Soils
• Socioeconomics
• Cultural Resources
• Land Use and Recreation
• Aesthetics
• Geotechnical, Seismic and other Subsurface Investigations.

At this time, it can be assumed that baseline surveys for each of these resources or areas would need to be performed to support environmental reports in the license application material. Study plans for each resource will be developed as part of the licensing process.

(ii) No new roads are anticipated to be required to conduct any field studies for the purposes of evaluating the technical, economic and environmental feasibility of the Project. Field equipment for investigative purposes would be flown in by helicopter in conformance with USFS Special Use Permit requirements.

(2) WORK PLAN FOR NEW DAM CONSTRUCTION

(i) All study and investigative work would occur within the Project boundary identified for Lower Sweetheart Lake. No field work would occur without first obtaining appropriate state and federal approvals such as, but not limited to, a USFS Special Use Permit.

(ii) The following sequence of activity is proposed to develop a specific dam construction plan for a FERC license application.

4th Qtr 2009  Receive order issuing Preliminary Permit. Meet w/FERC and state/federal agencies to discuss project and identify studies. Design studies in consultation w/agencies and stakeholders.

2nd Qtr 2010 Begin first year field & office studies.

3rd Qtr Prepare Preliminary Application Document (PAD) & scope of work for second year studies.
1st Qtr 2011 File PAD & SD1, prepare and issue scoping public notices for
scoping meetings.

2nd Qtr Hold public scoping meetings.

3rd Qtr Conduct second year studies and technical field investigations.

4th Qtr Provide final study reports to agencies and participants.

1st Qtr 2012 Complete and submit draft application for license pre-filing
review & comment. Identify agency license terms & conditions
(PMEs).

2nd Qtr Conclude agency discussion of terms & conditions.

3rd Qtr Complete final feasibility study & prepare supporting design
report.

4th Qtr Prepare and file final license application with FERC.

(3) WAIVER

Juneau Hydropower, Inc. requests waiver of the requirement to present a
detailed new dam construction work plan and schedule at this time. The
investigative studies to occur during the preliminary permit period will not
adversely affect cultural resources or endangered species. Only minor
disturbances may occur as will be specified in any USFS Special Use permit
required for such studies. Access for study work will be accomplished by
boat, floatplane, or helicopter. No roads would need to be constructed for
study work.

(4) STATEMENT OF ESTIMATED COSTS AND FINANCING

(i) The estimated costs of carrying out and preparing the studies,
investigations, tests, surveys, maps and developing plans and specifications
for the Project and completing a FERC license application are estimated to
be approximately $3,000,000.

(ii) Financing is expected to come from a mix of sources, including
primarily private investment, State of Alaska energy development monies,
federal Department of Energy grant funds, and commercial bank financing.
The exact mix of financing will be determined as the licensing proceeds.
(d) EXHIBIT 3 - PROJECT MAPS

3.1 LOCATION MAP

3.2 PRINCIPAL PROJECT FEATURES

3.3.1 PROPOSED PROJECT BOUNDARY MAP

3.3.2 TRANSMISSION LINE ROUTE

3.3.3 WILDERNESS BOUNDARY
3.1 LOCATION MAP
3.2 PROPOSED PRINCIPAL PROJECT FEATURES

- PROPOSED TRANSMISSION LINE ALTERNATIVES
- PROPOSED DOCK & ACCESS ROAD
- PROPOSED POWER CONDUIT TUNNEL & PENSTOCK
- PROPOSED POWERHOUSE
- PROPOSED POWER CONDUIT TUNNEL INLET
- PROPOSED UNLINED POWER CONDUIT TUNNEL
- PROPOSED DAM
3.2 TUNNEL & PENSTOCK
3.3.2 PROPOSED ALTERNATIVE TRANSMISSION LINE ROUTES
This Preliminary Permit application is executed in the

State of ALASKA

County of CITY & BOROUGH OF JUNEAU

by: DUFF W. MITCHEL

(Address) PO BOX 32775 JUNEAU, AK 99802

being duly sworn, depose(s) and say(s) that the contents of this Preliminary Permit application are true to the best of (his or her) knowledge or belief. The undersigned applicant(s) has (have) signed the (application, etc.) this 29th day of July 2009.

JUNEAU HYDROPOWER, INC

Applicant(s)

By: 

Subscribed and sworn to before me, a Notary Public, authorized by the state to notarize documents of the State of ALASKA this day of July, 2009.

/SEAL/ [if any]

(Notary Public, or other authorized official)