RESOLUTION OF THE
***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
REGARDING OLD HARBOR CONSERVATION EASEMENT HYDROELECTRIC PROJECT

We, the undersigned, duly authorized members of the *Exxon Valdez* Oil Spill Trustee Council ("Council"), after extensive review and after consideration of the views of the public, find as follows:

1. By Resolutions dated November 2, 1994 and March 31, 1995 the Council authorized the expenditure of *Exxon Valdez* oil spill settlement funds for the purchase of lands in fee simple by the United States and a conservation easement on additional lands by the United States and the State of Alaska ("State") on Kodiak Island from the Old Harbor Native Corporation ("OHNC").

2. Pursuant to those Resolutions OHNC, via two separate transactions, conveyed fee simple title to certain lands to the United States, acting through the Fish and Wildlife Service ("Service"), and conservation easements on the same lands to the State. OHNC also conveyed a separate conservation easement to the Service and the State on other lands. The conservation easements generally prevent development of the lands.

3. The Alaska Village Electric Cooperative, Inc. ("AVEC") has proposed to construct a hydroelectric project (the "Project") to provide power to the residents of the village of Old Harbor, Alaska, which project would be located on the lands acquired in fee simple by the Service. The Project would violate the terms and conditions of one of the conservation easements held by the State.

4. The Project would also take water from a stream upstream from where the stream crosses land that is subject to the conservation easement conveyed to the State and the United States.

As approved by the Federal Energy Regulatory Commission ("FERC"), the Project does not violate the terms and conditions of that conservation easement.

5. The Project has been subjected to extensive public, governmental agency, and environmental review as required by the National Environmental Policy Act, and a copy of the final Environmental Assessment ("EA") is attached to this Resolution (Attachment A). The EA concludes that, because of the small area affected and the abundance of undisturbed similar habitat within the surrounding refuge, vegetation and habitat impacts are considered to be minor. Impacts on salmon and wildlife are also considered to be minimal.

6. The Project was also subject to public, governmental agency, and environmental review as required by the FERC licensing process. A copy of the FERC license is attached to this Resolution (Attachment B). It concludes that the Project will not interfere with or be inconsistent with the purposes for which the Kodiak National Wildlife Refuge was created. It also requires that AVEC prepare and implement the following plans: erosion and sediment control plan, channel geomorphology and habitat monitoring plan, plan to monitor water temperature, adult and juvenile fisheries monitoring plans, hazardous spill prevention and minimization plan, and a bear safety plan. In addition the FERC license restricts the dates for instream construction, requires that the Project operate as run-of-river with a maximum diversion of 13.2 cubic feet per second with a constant discharge regardless of power demand, provide flow continuation, require ramping rates, and comply with restrictions on scheduled maintenance.

7. The Project has been reviewed by the Service, Fish and Game, and the National Marine Fisheries Service of the United States Department of Commerce ("NMFS") as part of NEPA compliance and the FERC licensing process. Although not required by the FERC license, AVEC has

also agreed to fund a Trust with $25,000 for future environmental mitigation for the Project. The Trust will be administered jointly by AVEC, the Service, Fish and Game, and NMFS.

8. The Project also has the benefit of reducing the dependence upon and consumption of fuel by the village of Old Harbor for production of electricity, which will reduce air pollution and the likelihood of fuel spills.

9. Because the Project would violate the provisions of one of the conservation easements held by the State, OHNC and AVEC have asked the State to amend the terms and conditions of that conservation easement to the extent necessary to construct, operate, and maintain the Project on the proposed site as shown on the attached map and in accordance with the FERC application. The State can amend the conservation easement only upon a finding by the Commissioner of the Department of Natural Resources that the amendment is in the best interests of the State, and the Commissioner of the Alaska Department of Fish and Game must concur in the determination. Because the conservation easement in question was acquired with funds provided by the Council, the State has inquired as to whether the Council supports amending the easement solely to the extent necessary to permit the construction, operation, and maintenance of the Project.

10. The Project may cause water temperature changes that would require that a pond be constructed at some future date to allow the water discharge temperatures to equalize. The pond would be constructed outside the footprint for the Project shown on the attached map. The amendment to the State's conservation easement would require that the size and location of the pond be approved by Fish and Game.

THEREFORE, be it resolved that we support an amendment to the conservation easement conveyed by OHNC to the State of Alaska solely to permit the construction, operation, and maintenance of the Project as licensed by FERC, so long as the Project is constructed in accordance with the terms and conditions of the FERC license at the location on the attached map (Attachment C), except that if a pond is necessary to equalize water temperatures, the location and size of the pond must be approved by Fish and Game.

Approved by the Council at its meeting of May 3, 2001 held in Juneau and Anchorage, Alaska, as affirmed by our signatures affixed below:

DAVE GIBBONS
Supervisor, Chugach National Forest
USDA Forest Service

CRAIG TILLERY
Assistant Attorney General
State of Alaska

DAVID B. ALLEN
Alaska Regional Director,
U.S. Fish and Wildlife Service
U.S. Department of the Interior

JAMES BALSIGER
Director, Alaska Region
National Marine Fisheries Service

FRANK RUE
Commissioner
Alaska Department of
Fish and Game

MICHELE BROWN
Commissioner
Alaska Department of
Environmental Conservation

Attachments: Final Environmental Assessment dated June 26, 2000 (Attachment A)
FERC license dated December 12, 2001 (Attachment B)
Site map (Attachment C)

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alaska Village Electric Cooperative, Inc. Project No. 11690-001, Alaska

NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL ASSESSMENT

(June 26, 2000)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission) regulations, 18 CFR Part 380 (Order No. 486, 52 F.R. 47897), the Office of Energy Projects has reviewed the application for an original license for the Alaska Village Electric Cooperative, Inc.'s (AVEC) proposed Old Harbor Hydroelectric Project, and has prepared a Final Environmental Assessment (FEA). The project would be located near the city of Old Harbor, Alaska on Kodiak Island, predominantly on the Kodiak National Wildlife Refuge.

On January 19, 2000, the Commission staff issued a draft environmental assessment (DEA) for the project and requested that comments be filed with the Commission within 45 days. Comments on the DEA were filed by the National Marine Fisheries Service, Alaska Department of Fish and Game and polarconsult alaska, inc and are addressed in the FEA.

The FEA contains the staff's analysis of the potential environmental impacts of the project and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

Copies of the FEA are available for review in the Commission's Public Reference Room, Room 2A, at 888 First Street, N.E., Washington, D.C. 20426, and may also be viewed on the web at http://www.ferc.fed.us/online/rims.htm (please call (202) 208-2222 for assistance).

David P. Boergers
Secretary

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

June 26, 2000

To the Agency/Party Addressed:

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's regulations, 18 CFR Part 380 (Order No. 486, 52 F.R. 47897), the Office of Energy Projects staff has reviewed the application for, and prepared the enclosed Final Environmental Assessment (FEA) on licensing the proposed Old Harbor Hydroelectric Project. The project would be located near the city of Old Harbor, Alaska on Kodiak Island, predominantly on the Kodiak National Wildlife Refuge.

This FEA contains the Commission staff's analysis of the environmental impacts of the proposal and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action significantly affecting the quality of the human environment.

Copies of the FEA are available for review in the Commission's Public Reference Room, Room 2A, at 888 First Street, N.E., Washington, D.C. 20426, and on the web at http://www.ferc.fed.us/online/rims.htm [please call (202) 208-2222 for assistance].

Enclosure: Final Environmental Assessment

Attachment A
Environmental Assessment

FINAL ENVIRONMENTAL ASSESSMENT FOR HYDROPOWER LICENSE

Old Harbor Hydroelectric Project

FERC No. 11690-001

Alaska

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Licensing and Compliance
888 First Street, NE
Washington, D.C. 20426

and

U.S. Department of the Interior
Fish and Wildlife Service
Region 7
1011 East Tudor Rd.
Anchorage, AK 99503

June 2000

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APPENDIX A

RESPONSE TO COMMENT LETTERS ON THE DRAFT ENVIRONMENTAL ASSESSMENT

SUMMARY

The Alaska Village Electric Cooperative (AVEC) proposes to construct and operate the 500-kilowatt (kW) Old Harbor Hydroelectric Project on the southeastern coast of Kodiak Island, near the city of Old Harbor, Alaska. The project would be located predominantly on lands within the Kodiak National Wildlife Refuge, including lands recently sold by the Old Harbor Native Corporation (OHNC), now owned by the United States in fee and subject to use restrictions on development, including hydro. The project would also occupy lands owned by the OHNC and Old Harbor.

The environmental analysis documented in this final environmental assessment (FEA) is a cooperative effort between the U.S. Fish and Wildlife Service (FWS) of the U.S. Department of the Interior (Interior) and the Federal Energy Regulatory Commission (Commission). Reference in this document to "we" should be understood to be the two agencies' collective statements or conclusions, unless otherwise stated.

This final environmental assessment considers the effects of issuing an original hydropower license for this project and recommends conditions the Commission staff believe should be a part of any license issued. We considered the recommendations of resource agencies and others in the preparation of this final Environmental Assessment (DEA). We analyze the effects of AVEC's proposed project construction and operation and two alternative actions: (1) AVEC's proposal with our recommended environmental measures, and (2) no action.

The proposed Old Harbor Project would affect two basins whose dividing boundary is near Old Harbor. The project intake would be located on the East Fork of Mountain Creek, a headwaters tributary of the Barling Bay Creek Basin. This basin flows to saltwater at Barling Bay. The remainder of the project would be located on the Lagoon Creek Basin, and flows from the powerhouse would discharge into Lagoon Creek. Lagoon Creek flows to a saltwater lagoon and into Sitkalidak Strait.

Our analysis shows that our preferred alternative would be to issue an original license for the project, as proposed by AVEC, with our recommended modifications, that include the following environmental protective and mitigative measures: (1) prepare and implement a final erosion and sediment control plan; (2) operate the project as run-of-river; (3) prepare and implement a plan to monitor compliance with the run-of-river operation; (4) prepare and implement a biotic monitoring program; (5) report project outages that reduce flows in Lagoon Creek to fish and wildlife resource agencies; (6) prepare and implement a final tailrace design; (7) conduct annual project review meetings with resource agencies; (8) employ an environmental compliance monitor during construction; (9) prepare and implement a hazardous spill prevention plan; (10) allow site access to agency fish and wildlife personnel; (11) prepare and implement a revegetation plan using native species; (12) use only preservative-free or pressure-treated wood timbers in wetland areas; (13) prepare and implement a bear safety plan; (14) prepare and implement an eagle protection plan; (15) prepare and implement an access control plan for the trail to the intake; (16) prepare and implement a recreation plan; and (17) if unknown archeological deposits are uncovered at the project, cease construction and consult with the State Historic Preservation Officer and the OHNC.

On the basis of our independent analysis, we conclude that issuing an original license for the Old Harbor Project, with the environmental measures that we recommend, would not be a major federal action significantly affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF ENERGY PROJECTS
DIVISION OF ENVIRONMENTAL AND ENGINEERING REVIEW
and
U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
REGION 7

Old Harbor Hydroelectric Project
FERC No. 11690-001, Alaska

I. APPLICATION

On May 14, 1999, Alaska Village Electric Cooperative, Inc. (AVEC) filed with the Federal Energy Regulatory Commission (Commission) an application for a license to construct, operate, and maintain the 500-kilowatt (kW) Old Harbor Hydroelectric Project (Old Harbor Project or project). AVEC also filed with their application an applicant-prepared environmental assessment for the proposed project. The project would be located on Mountain Creek and Lagoon Creek watersheds on the southeastern coast of Kodiak Island, near Old Harbor, Alaska (figure 1). The project would be located predominantly on lands within the Kodiak National Wildlife Refuge (refuge), including lands recently sold by the Old Harbor Native Corporation (OHNC) for inclusion in the refuge, now owned by the United States in fee, and subject to development restrictions, including hydropower. The project would also occupy lands owned by the OHNC and Old Harbor. The project would generate up to 3.427 megawatthours (MWh) of electrical energy per year at full capacity.

II. PURPOSE OF ACTION AND NEED FOR POWER

A. Purpose of Action

The Commission must decide whether or not to issue a hydropower license to AVEC for the project, and what conditions should be placed on any license

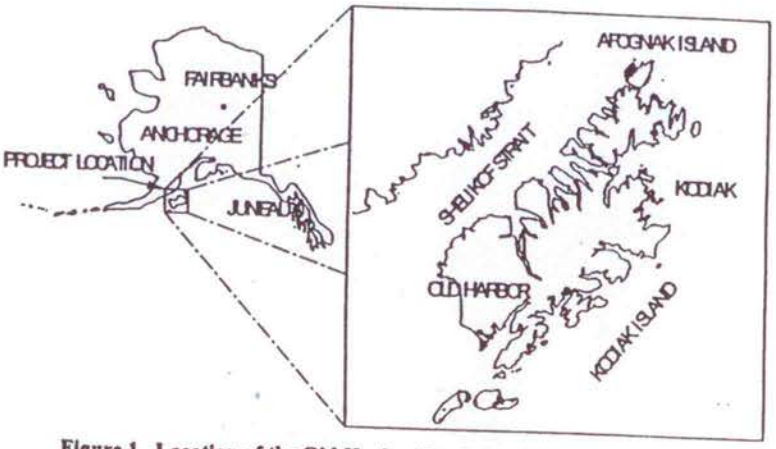

Figure 1. Location of the Old Harbor Project. (Source: AVEC 1999)

issued. Issuing a license would allow AVEC to construct and operate the project for a term of up to 50 years, making available electric power from a renewable resource. The FWS must decide whether or not to issue a right-of-way permit for the project to occupy refuge lands, and what conditions are needed to ensure adequate protection and utilization of the refuge if the Commission grants a new license.

In deciding whether to issue any license, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and development purposes for which licenses are issued, the Commission must give equal consideration to the purposes of energy conservation, the protection, mitigation of, damage to, and enhancement of, fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality. This EA reflects the above considerations.

The environmental and economic effects of construction and operation of the project, as proposed by AVEC, are assessed in this EA. The effects of a no-action alternative are also considered.

B. Need for Power

Old Harbor, like most rural Alaskan communities, is isolated from major power producing centers and thus relies on a small set of diesel generators and barged-in diesel fuel to supply its power needs. Currently, fuel must be barged in 2-3 times per year during periods of extremely high tides. Due to these constraints, the amount of fuel delivered is limited by the time of tide and the small pipe size. Larger barges would not be any more effective in fuel delivery. This causes higher fuel costs because of the additional handling, time constraints, planning, and preparation required. When a shipment is missed, usually because of weather or suppliers not being available at high tide, any remaining supply is restricted to generators and public buildings, and residents must bring in fuel in 55 gallon drums on their fishing boats from the city of Kodiak to heat their homes. This added fuel handling can increase the amount spilled.

For these reasons, there is a need to provide a more economical and reliable source of power than the current system. Without this project, Old Harbor would continue using diesel generation. Additionally, the project would lessen the community's use of non-renewable fossil fuels, lessen air emissions from burning diesel, and give the community the opportunity to lower the cost of electricity over time.

The small amount of power generated and the city's isolation equates to high power costs for the community. Fuel is one of the biggest expenditures. Currently the cost of power is partially subsidized by the State of Alaska. This subsidy is likely to end in the future. Old Harbor would benefit greatly from this project as it would isolate the community from fuel price increases and, in the long term, reduce the overall cost of power.

The utility currently generates an average of about 86 kW throughout the year (751,000 kWh). Peak loads are about 195 kW, and occur in the winter. Load growth has been 2.1 percent annually from 1992 - 1996. A recent economic analysis (Locher 1998) predicted load growth to continue at a rate of 2.0 percent. A detailed discussion of the proposed project's economics is found in Section VI, Developmental Analysis.

III. PROPOSED ACTION AND ALTERNATIVES

A. AVEC's Proposal

1. Project Facilities

AVEC proposes to construct the following project structures (figure 2):

(a) an 86-foot-long by 7-foot-high uncontrolled diversion structure, constructed with galvanized steel frames with Ekki wood stop logs, at elevation of 840 feet above mean sea level (fmsl);

(b) an intake structure with a trash rack;

(c) a 30-foot-long by 8-foot-wide by 6-foot-high steel, wood and concrete de-sander box, with screens to catch suspended debris and a bypass gate for flushing the screens and accumulations of sand and gravel;

(d) a 9,800-foot-long penstock made up of 3,200 feet of 20- to 18-inch-diameter high density polyethylene pipe and 6,600 feet of 16-inch-diameter steel pipe;

(e) a bypass system, joining the penstock just upstream of the turbine, with a separate tailrace, parallel to the turbine tailrace, to direct water in the penstock, not needed for power generation, to a submerged container to dissipate dissolved gases and moderate daily flow fluctuations (figure 3);

(f) a 625-square-foot metal powerhouse on concrete footing and slab, with one 500-kW impulse turbine;

(g) a deflector plate system for flow continuation during rapid shutdowns;

(h) a 5,500-foot-long buried transmission line;

(i) a 5,500-foot-long access road; and

(j) related appurtenances.

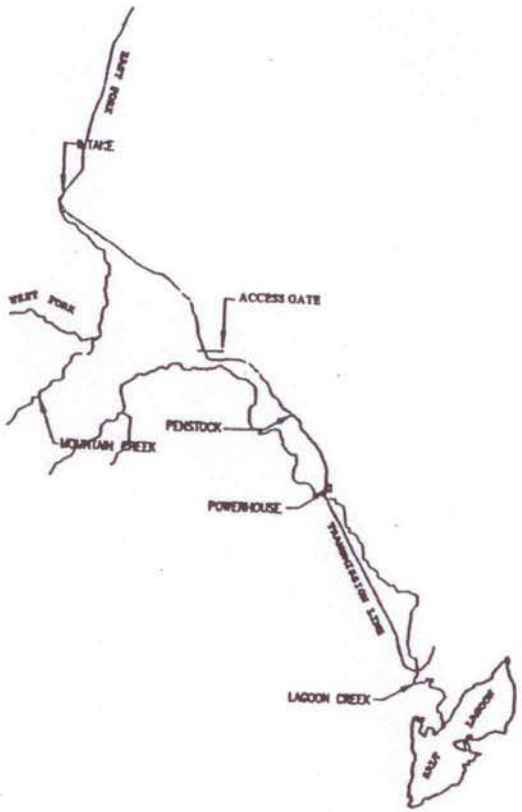

Figure 2. Proposed project facilities. (Source: AVEC 1999 as modified by Commission staff)

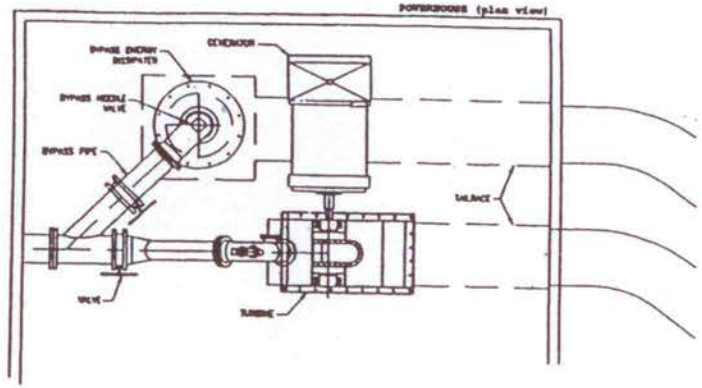

Figure 3. Turbine bypass system and tailraces. (Source: AVEC 1999 as modified by Commission staff)

2. Project Operation

AVEC proposes a run-of-river operation. Flows up to 13.2 cubic feet per second (cfs) would be continuously diverted, regardless of power demand, from the East Fork of Mountain Creek (East Fork), a tributary of Barling Bay Creek (figure 4), transported across a basin boundary, and discharged into Lagoon Creek about 3,500 feet from the diversion. Old Harbor would withdraw 0.2 cfs from the penstock upstream of the powerhouse to supply residents with potable water. Within the powerhouse a bypass system would be installed several feet upstream of the turbine to direct any flows not needed for power generation into a tailrace leading to Lagoon Creek. Flows used for generation would discharge from the turbine, through a second tailrace to Lagoon Creek.

Flows in the East Fork in excess of 13.2 cfs would overflow the diversion, flowing through Mountain Creek and Barling Bay Creek to Barling Bay.

During periods of low flows, or excess demand, the hydro project would be augmented by the existing diesel generating facility. Automated project controls would signal the start and stop of the diesel generators, so that the project would always displace diesel power generation. When projected peak loads for the day are expected to meet or exceed the output of the project, a diesel generator would start. When flows are projected to meet short term (about 6 hours) peak loads, the project would signal for the shutdown of diesel generation.

3. Proposed Environmental Measures

AVEC proposes to: [1]

- install a gate to hinder unauthorized all terrain vehicle (ATV) access to the refuge (figure 2);

- construct a tailrace to dissipate energy, slow velocity and prevent migrating fish from entering the tailrace;

[1] From AVEC's application for license and modifications made at a meeting conducted by Commission staff with the resource agencies and AVEC (Commission 2000).

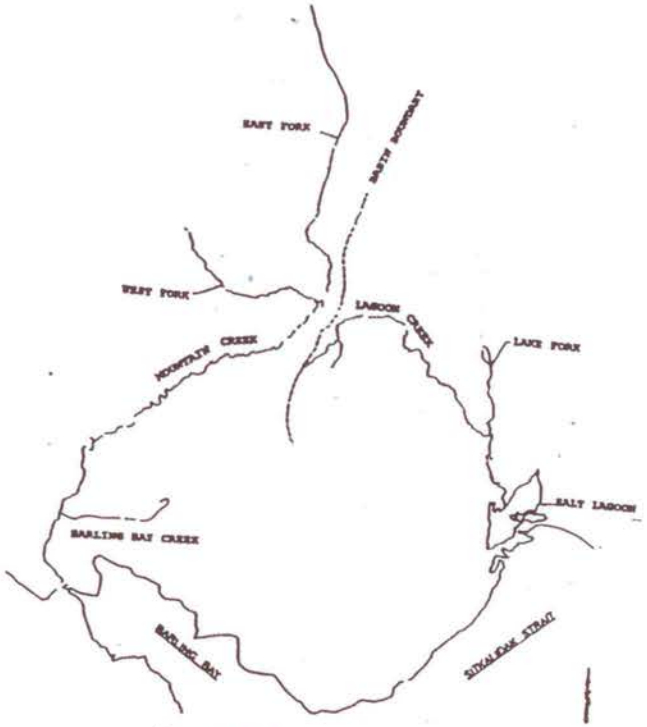

Figure 4. Barling Bay and Lagoon Creek basins. (AVEC 1999 as modified by Commission staff)

- increase fish habitat in Lagoon Creek by diverting water from the East Fork to Lagoon Creek;
- operate the project as a run-of-river facility which follows natural hydrologic fluctuation;
- avoid daily flow fluctuations by installing a bypass system to re-regulate and dissipate penstock discharges not needed to meet power demand;
- install water temperature gages to monitor water temperatures;
- install a stream gage in Lagoon Creek to monitor water flows;
- conduct salmon surveys to assess the project's impacts;
- ramp flows at 2 inches per hour (in/hr) during scheduled shutdowns
- conduct spring maintenance between mid-May and mid-June, after ice out, when the natural flows in Lagoon Creek at the powerhouse are at least 10 cfs;
- conduct fall maintenance between mid-October and the end of November prior to ice formation;
- conduct channel and habitat monitoring using the protocol developed by the U.S. Forest Service (USFS) for National Forests in Alaska;
- include the results of aerial surveys conducted by ADF&G's commercial fisheries staff of two nearby streams with AVEC's fisheries monitoring reports of Lagoon Creek;
- install silt barriers at various sites during construction;
- build bridges over streams and construct other soil erosion prevention measures;
- install a de-sander box to return gravel to the East Fork;
- bury the transmission line for avian protection;

- locate project facilities to avoid any disturbance to archeological sites; and
- use local labor for construction and maintenance.

B. Federal Land Management Conditions

Because the project would occupy lands within the Kodiak National Wildlife Refuge, the U.S. Department of the Interior has the authority to issue mandatory conditions under Section 4(e) of the Federal Power Act (FPA). [2] In addition, Section 4(e) of the FPA prohibits the Commission from licensing a project that interferes or is not consistent with the purpose for which the refuge was created. Interior states that mandatory terms and conditions pursuant to Section 4(e) have not been developed at this time; however, the U.S. Fish and Wildlife Service (FWS) would evaluate the need for Section 4(e) terms and conditions during the preparation of the NEPA document fulfilling Title XI of the Alaska National Interest Lands Conservation Act (ANILCA). If deemed appropriate, the FWS would submit Section 4(e) terms and conditions to the Commission at that time. ANILCA is discussed in Section IV.H, Consultation and Compliance.

C. Fish and Wildlife Agency Recommendations

National Marine Fisheries Service (NMFS) Recommendations. By letter dated August 10, 1999, NMFS filed recommendations pursuant to Section 10(j) of the FPA. Modified recommendations were filed by letter dated February 29, 2000, and submitted at a meeting conducted by Commission staff with resource agencies on April 26, 2000 (Commission 2000). Summarized, NMFS recommends that AVEC:

- Develop and submit for review and comments at least 60 days before project implementation: A comprehensive erosion control and revegetation plan that includes silt fences; procedures to limit erosion; revegetation on all impacted ground with native plant species; monitoring to ensure revegetation reaches 50 percent of natural vegetation densities within one year; monitoring and fixing any drainage or erosion problems and replanting if densities are not met; time restrictions for in-water work and stream crossings to meet the Alaska Department of Fish and Game (ADF&G) recommendations; and repairing any stream bank damage using biorehabilitation techniques that mimic native vegetation densities and species.

[2] 16 USC. 791a-825r

- Develop and submit for approval and review 6 months before plant operation begins, a comprehensive monitoring plan that includes, but need not be limited to:

  1. A stream gage to be operated for a minimum of 5 years just below the powerhouse.

  2. Continuously recording temperature gages for up to 5 years, depending on results, at 6 sites: (a) the diversion site on the East Fork; (b) just upstream of the powerhouse on Lagoon Creek; (c) downstream of the powerhouse at the beginning of adequate spawning habitat; (d) just upstream of the confluence of Lagoon Creek and the Lake tributary (Lake Fork) of Lagoon Creek; (e) the Lake Fork just above its confluence with Lagoon Creek; and (f) downstream of the confluence of Lagoon Creek and the Lake Fork.

  3. Fish surveys as follows: (a) spawning surveys of three reaches: (I) Lagoon Creek upstream of its confluence with the Lake Fork, (ii) the Lake Fork, and (iii) Lagoon Creek downstream of its confluence with the Lake Fork. Identify by species and count live and dead fish. Conduct surveys for 5 years twice per month during August, September and October or, depending on periodicity and typical life history of fish present, as recommended by the ADF&G; (b) juvenile fish trapping at times recommended by the ADF&G, in the same three segments as the spawning surveys, to quantify changes in juvenile fish numbers, using standard soak times, consistency of placement, and standard methodology; and (c) two streams in the immediate area, surveyed by the ADF&G annually, with similar characteristics to Lagoon Creek as control streams to compare Lagoon Creek fish production.

  4. Conduct channel and habitat monitoring using the protocol developed by the for national forests in Alaska, in project years 0, 3, and 5, using tier 2 for the survey measures, except for riparian vegetation and undercut banks where tier 3 would be used. Methods to include photos and wetted area, calculation of any post-project increase in wetted area downstream of the powerhouse, and identification of abnormal erosion or changes in channel morphology.

  5. Annual reviews of monitoring results with the applicant and agencies to interpret results and adjust the monitoring. Monitoring results to be provided 30 days prior to the meeting.

- Require mitigation to address problems identified by monitoring.

- Divert no more than 13.2 cfs from Mountain Creek into Lagoon Creek.

- Divert a constant amount of water through a bypass system regardless of power demand.

- Schedule maintenance that reduces water flow to meet ADF&G time restrictions.

- For any unscheduled maintenance, report to the agencies the date, duration of reduction, volume of cfs reduction, reason for occurrence, and measures for prevention of reoccurrence.

- Ramp flows at a rate of 2 inches per hour (in/hr) during scheduled shutdowns.

NMFS further recommends that any interested party may petition the Commission to add new conditions or amend these terms and conditions as necessary to protect, mitigate, and enhance fish, wildlife, and their habitat pursuant to Section 10(j) of the FPA.

Interior Recommendations. By letter dated September 10, 1999, the U.S. Fish and Wildlife Service (FWS), representing Interior, filed recommendations pursuant to Section 10(j) of the FPA. Modifications were submitted at a meeting conducted by Commission staff with the resource agencies on April 26, 2000 (Commission 2000). Summarized, Interior recommends that AVEC:

- Operate the project as run-of-river, defined as instantaneous outflows from the impoundment (as turbine discharge, spillage, direct releases, and/or leakage) equal to the instantaneous inflow to the impoundment, up to 13.2 cfs, allowing an active storage of up to 0.4 acre-feet above the diversion dam.

- Prepare and implement a biotic monitoring plan, after consulting and obtaining approval from the fish and wildlife agencies, and file it with the Commission at least 6 months before the start of any land-disturbing or land-clearing activities. Allow the agencies at least 30 days lead time, by written notification, to comment and reach agreement with the applicant before filing with the Commission. Implement study designs approved in advance by the fish and wildlife agencies and convene an annual meeting with the agencies to review study results and project operations. Submit final plans, approved by the fish and wildlife agencies,

to the Commission for approval at least 30 days before the scheduled date to initiate the planned activities. Include in the biotic monitoring plan:

1. Continuously recording temperature gages operated for at least 1 year prior to project construction and for up to 5 years after the start of project operations, depending on results, to measure pre- and post-project intergravel water temperatures at a minimum of 6 locations (see NMFS recommendation No. 2). Summarize and submit temperature data to the fish and wildlife agencies annually, and if the agencies determine that the temperatures during project operations vary from the range of measured pre-project temperatures and pose a potential negative affect on the spawning, incubation, and/or rearing of anadromous fishes, develop and implement a mitigation plan, approved by the fish and wildlife agencies. On a scheduled basis, at least once a year, the applicant and agencies shall meet to review study results and identify courses of action. If fish production is significantly reduced as a result of project operations, reopen and amend the license to construct facilities or modify operations as needed to release water at temperatures that do not impact fish production in Lagoon Creek.

2. Conduct channel and habitat monitoring using the protocol developed by the USFS for national forests in Alaska, in project years 0, 3, and 5, using tier 2 for the survey measures, except for riparian vegetation and undercut banks where tier 3 would be used. Include photos of each cross section site and measurements of the wetted area. Calculate any post-project increase in the wetted area of Lagoon Creek from the tailrace outfall downstream to its confluence with the Lake Fork. Identify abnormal erosion or changes in channel morphology. Bioremediate excessive streambank or channel erosion as a result of increasing flow in Lagoon Creek to stabilize streambanks and channel.

3. Conduct adult fish escapement counts in Lagoon Creek for each anadromous species at least once per period during each of seven sampling periods to enumerate runs of spawning coho, pink and chum salmon (July 16-31, Aug 1-15, Aug 16-31, Sept 1-15, Sept 16-30, Oct 1-15, and Oct 16-30). Conduct surveys at least 7 days apart. Follow ADF&G protocols for standardization and indexing of peak foot survey counts. Prepare a study design for approval by the fish and wildlife agencies. Submit reports to the agencies annually. In the survey results, document numbers of live and dead fish by species by stream segment as follows: (a) Lagoon Creek upstream of its confluence with the Lake Fork; (b) Lake Fork upstream of its confluence with Lagoon Creek; and Lagoon Creek downstream of its confluence with the Lake Fork to the ocean.

Conduct juvenile fish sampling using non-lethal techniques, identifying fish by species, fork length, and numbers captured. Record and summarize the results according to the same three stream segments used for the adult spawning surveys. Use standardized sampling methods, times, and locations. Design sampling to identify any increase in rearing habitat made available by the project and fish utilization of such habitat. After identification, measuring and enumeration, release the fish unharmed at their point of capture. The study design shall be approved by the fish and wildlife resource agencies in advance. Submit reports to the agencies annually.

Continue adult spawning and juvenile monitoring for at least a 5-year period after the first phase of the project becomes operational. If different project operations are implemented that modify the flow regime, require continued studies for up to an additional 5 years after the second phase or new flow operations are implemented.

- Divert no more than 13.2 cfs from the East Fork into Lagoon Creek at any given time. Install and maintain a continuously recording flow device to monitor flows within the anadromous fish reaches in Lagoon Creek during and following construction phases for a period of up to 5 years, depending on results. Measure discharge in compliance with standards established by the U.S. Geological Survey (USGS) and record data at each site at a frequency of not less than 15 minute intervals. After construction of the project, record, summarize and submit streamflows monthly for the first year of operation and annually thereafter to the fish and wildlife resources agencies. If a rating curve or any other regression relationship is used to calculate discharge, submit to the agencies annually or whenever a shift in the rating curve occurs, whichever occurs first, the data used to build this regression relationship.

- Provide fail-safe and redundant backup provisions in project design and operation to insure that instantaneous instream flows are provided during powerhouse outages, including routine maintenance periods, emergency project shutdowns, and interruptions in the power grid. Provide the capacity for indefinite flow continuation during powerhouse outages. Include remote monitoring and operation of all project components in the project design and operations.

- Consult with fish and wildlife agency representatives on the need for an annual project review meeting, if any one of the agencies deem the meeting necessary, schedule a meeting on a date mutually agreed upon to review study results,

evaluate the need for continued studies and study modifications, review project operations that affect fish and wildlife, and identify courses of action based on those results. Provide reviews of reports and compliance with all license stipulations. Record the minutes of these and related meetings, and circulate the draft of the minutes to attendees for review comments, and approval within 14 days following a meeting. Submit the final minutes and other evidence of the consultation, along with any recommendations and comments by the fish and wildlife agencies and the licensee to the Commission. If a new or modified course of action is proposed as a result of the annual meeting, further review may be required. Hold additional meetings if unforseen effects of project operations warrant such meetings.

- At least 6 months before the start of any land-disturbing or land-clearing activities, file a detailed plan for establishing an interest-bearing escrow account to mitigate for currently unforseen impacts on fish, wildlife and water quality associated with construction and operation of the project. Allow the fish and wildlife resource agencies at least 30 days, by written notification, to comment and reach agreement with the applicant, before the plan is submitted to the Commission. Determine jointly with the ADF&G, FWS and NMFS the amount of money to be placed in the account. Establish a resource agency council composed of representatives from the ADF&G Habitat and Restoration Division, FWS and NMFS, which would determine the type, cost, and location of mitigation projects. Make the funds available to the council. The council would notify the licensee before any funds are withdrawn from the account and the licensee would have the right to audit expenditures to ensure compliance with its purpose. The principal and accumulated interest would remain in escrow for the term of the license, unless unanimously determined by the council members and the licensee that the account may be closed and any remaining funds returned to the licensee.

- Employ a qualified environmental compliance monitor (ECM) during project construction, with authority to ensure strict compliance with the provisions of the license, cease work and change orders in the field as deemed necessary; and make pertinent and necessary field notes on environmental compliance monitoring by the licensee. Write jointly with the agencies the position description of the ECM, including qualifications, duties, and responsibilities.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain written approval from the agencies regarding the licensee's final plan to control erosion and slope instability, revegetate disturbed areas,

particularly the area of the penstock crossing the state's conservation easement, minimize the quantity of sediment introduced into Lagoon Creek from project construction and operation, and limit instream construction to between May 15 and July 15 in the East Fork and between early June and July 15 in Lagoon Creek. Allow the agencies at least 30 days, by written notification, to comment and reach agreement with the applicant before the plans are submitted to the Commission. Base the plan on the actual site geological, soil and groundwater conditions and on the project design, and include at a minimum: (a) a description of the actual geological, soil and groundwater site conditions related to various project features; (b) final preventative measures based on the licensee's draft ESCP; (c) detailed descriptions, functional design drawings, and specific topographic locations of all control measures and methods, stream setback distances, and stabilization methods for spoil material and temporary construction access trail; and (d) a revegetation plan for all disturbed areas to include locations of treatment areas, plant species and planting methods to be used, planting densities, fertilizer formulations, seed test results, application rates, and a specific implementation schedule and details for monitoring and maintenance programs. Submit the final plan, approved by the agencies, to the Commission at least 30 days before the scheduled date to initiate activities related to the plan.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain approval from fish and wildlife resource agencies regarding the licensee's final fuel and hazardous spill plan to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operations. Allow the agencies 30 days by notification in writing to enable them to comment and reach agreement with the applicant before the plans are submitted to the Commission. Submit the final plan, approved by the agencies, to the Commission at least 30 days before the scheduled date to initiate activities related to the plan.

- Allow fish and wildlife resource agency representatives, who show proper credentials, to have free and unrestricted access to, through, and across access routes leading to project lands, all project lands and all project works.

- At least 6 months before the start of any land-disturbing or land-clearing activities, file with the Commission a bear safety plan to avoid possible conflicts between bears and humans in the project area during construction and operation. Include, at a minimum: (a) instructions that minimize possible conflict; (b) instructions to minimize encounters and avoid areas often used by bears, if possible; (c)

instructions for keeping construction sites and refuse areas clean; (d) installing bear-proof garbage receptacles and other measures during construction periods to prevent bears from obtaining food or garbage; and (e) procedures to deal with problem bears. Allow at least 30 days for the fish and wildlife resource agencies to comment and make recommendations prior to filing the plan. Include the reasons, based on site-specific information for any recommendation the licensee does not adopt.

ADF&G Recommendations. By letter dated August 20, 1999, ADF&G filed recommendations pursuant to Section 10(j) of the FPA. Modified recommendations were filed by letter dated March 3, 2000, and submitted at a meeting conducted by Commission staff with resource agencies on April 26, 2000 (Commission 2000). Summarized, ADF&G recommends that AVEC:

- Operate the project as run-of-river where the instantaneous outflow from the impoundment (as turbine discharge, spillage, direct release, and/or leakage) is equal to instantaneous inflow into the impoundment, up to 13.2 cfs, with an active storage volume of up to 0.4 acre-feet of water above the diversion dam.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain approval from ADF&G and other fish and wildlife resource agencies for a final biotic monitoring plan. Formulate and implement the agency-approved plan to address any or all of the project's potential effects on biological resources. Allow ADF&G at least 30 days, by written notification, to comment and reach agreement with the applicant before submitting the plan to the Commission. Obtain advance approval from ADF&G and the other agencies. Convene an annual meeting to review annual study results and project operations. Submit final plans to the Commission at least 30 days before the scheduled date to initiate activities related to the plan. Provide funds for the design, implementation, and monitoring/maintenance and place the funds in an independent interest bearing escrow account as a license requirement. Determine, jointly with the ADF&G, FWS and NMFS, the amount of money to be placed in the account. Include in the monitoring plan:

1. Water temperature monitoring to determine long-term project effects on fish production in Lagoon Creek. Operate continuously recording temperature gages for at least 1 year prior to construction and up to 5 years after project operation begins, depending on results, to measure stream water intergravel temperature at a minimum of 6 locations (see NMFS recommendation No. 2).

Summarize temperature data and submit to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist and the Division of Habitat and Restoration office in Anchorage annually. Formulate and implement an ADF&G-approved mitigation plan to address any or all potential effects, in consultation with ADF&G, FWS and NMFS, if ADF&G determines that during project operations, water temperatures in Lagoon Creek spawning areas vary from the range of measured pre-project values and pose a potential negative effect on the spawning, incubation, and/or rearing of anadromous fishes. Meet on a scheduled basis, at least once a year, with the agencies to review study results and identify courses of action (see below). If fish production is significantly reduced as a result of project operations, construct the necessary facilities or modify operations to release water at temperatures that do not impact fish production in Lagoon Creek. The Commission shall re-open and amend the license if fish production is significantly reduced as a result of project operations.

2. Conduct channel and habitat monitoring using the protocol developed by the USFS for national forests in Alaska, in project years 0, 3, and 5, using tier 2 for the survey measures, except for riparian vegetation and undercut banks where tier 3 would be used. Include photos of each cross section site and measurements of the wetted area. Calculate any post-project increase in the wetted area of Lagoon Creek from the tailrace outfall downstream to its confluence with the Lake Fork. Identify abnormal erosion or changes in channel morphology. Bioremediate excessive streambank or channel erosion as a result of increasing flow in Lagoon Creek to stabilize streambanks and channel.

3. Conduct adult fish escapement counts in Lagoon Creek of each anadromous species, to enumerate runs of spawning coho, pink and chum salmon, at least once per period during each of seven sampling periods (Jul 16-31, Aug 1-15, Aug 16-31, Sep 1-15. Sep 16-30, Oct 1-15, and Oct 16-30). Conduct the surveys at least 7 to 10 days apart. Follow ADF&G protocols for standardization and indexing of peak foot survey counts. Obtain advance approval from ADF&G for a study design. Submit a report to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist and the Division of Habitat and Restoration office in Anchorage annually. Continue monitoring for at least 5 years after the first phase of the project becomes operational. Continue studies for an additional 5 years after the second phase or new flow operations are implemented, if different project operations are implemented that modify the flow regime. Document the numbers of live and dead fish by species and by three stream segments (Lagoon Creek upstream of its confluence with the Lake Fork, Lake Fork of Lagoon Creek

upstream of its confluence with Lagoon Creek, Lagoon Creek downstream of its confluence with the Lake Fork all the way to the ocean).

Sample juvenile fish using non-lethal capture techniques and identify by species, fork length and numbers captured. Record and summarize the results according to the three stream reaches used to document adult spawning data. Use standardized sampling methods, times and locations. Design sampling to identify any increase in rearing habitat made available by the project and fish utilization of such habitat. Release the captured juvenile fish unharmed at the point of capture. Obtain advance approval from ADF&G for a study design. Submit a report to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist and the Division of Habitat and Restoration office in Anchorage annually. Continue monitoring for at least 5 years after the first phase of the project becomes operational. Continue studies for an additional 5 years after the second phase or new flow operations are implemented, if different project operations are implemented that modify the flow regime.

- Divert no more that 13.2 cfs of water from the East Fork into Lagoon Creek at any given time. Monitor and evaluate erosion and fish production in Lagoon Creek as specified above, as well as any mitigative actions determined to be needed by ADF&G and other fish and wildlife resource agencies. Install and maintain continuously recording stream flow devices to monitor flows within the anadromous fish reaches in Lagoon Creek during and following construction phases. Continue flow measurements for up to 5 years, depending on results. Record stage/flows at each site at a frequency of no less than 15-minute intervals, in compliance with standards established by the USGS. Record, summarize, and submit monthly for the first year of operation and annually thereafter to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist. Submit to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist the data used to build any rating curve or regression relationship annually and whenever a shift in the rating curve is observed, whichever occurs first.

- Provide fail-safe and redundant backup provisions in project design and operation to insure that instantaneous instream flows are provided during powerhouse outages, including routine maintenance periods, emergency project shutdowns, and interruptions in the power grid. Provide the capacity for indefinite flow continuation during powerhouse outages. Include remote monitoring and operation of all project components in the project design and operations.

- Coordinate and consult with the fish and wildlife agency representatives, including ADF&G, regarding the need for annual project review meetings. If any of the fish and wildlife agencies deem a meeting is necessary, hold a meeting at least 60 days preceding the anniversary date of the license, or other annual date mutually agreed upon by the parties. At the meeting, review the study results, need for continued studies and study modification, project operations that affect fish and wildlife, and identify courses of action required based on those results. Review reports and compliance with all license stipulations. Record the minutes of these and related meetings. Circulate the draft minutes to attendees, within 14 days following a meeting, for review comments, and approval. Include in or with the final minutes editorial and other comments received within 14 days after receipt of the draft minutes. Within 60 days following a meeting, submit the final minutes and other evidence of the consultation, along with any recommendations and comments made by ADF&G and other fish and wildlife agencies to the Commission. Hold additional meetings if project operations require such meetings. If a new or modified course of action is proposed as a result of an annual meeting, obtain written approval of the plan from resource agencies and submit the plan to the Commission for its written approval. Approval from the Commission must be received at least 30 days before the scheduled date for the licensee to initiate activities related to the plan. Implement the plan upon written approval by the Commission. The Commission will halt project implementation if agreement is not reached.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain approval from fish and wildlife resource agencies for a final plan for establishing an interest-bearing escrow account to mitigate for fish, wildlife, and water quality impacts associated with construction and operation of the project. Make the funds in the account available to a resource agency council composed of representatives for the ADF&G Habitat and Restoration Division, FWS and NMFS. Determine jointly with the agencies the amount of money to be placed in the account. Allow the ADF&G and other agencies at least 30 days, by written notification, to comment and reach agreement with the applicant before submitting the plans to the Commission. Submit the plans to the Commission at least 30 days before the scheduled date to initiate activities related to the plan. Implement the plan upon written approval of the Commission. The Commission will halt project implementation if agreement is not reached.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain approval from ADF&G and other fish and wildlife resource

agencies for a final plan to adhere to the ESCP and fuel and hazardous substances spill plan (see below) during construction. Include in the plan: (a) provisions and resources to employ a qualified ECM during construction with the authority to ensure strict compliance with the provisions of the license, cease work and change orders in the field as deemed necessary, and make pertinent and necessary field notes on monitoring compliance by the licensee; (b) a position description for the ECM, including qualifications, duties, and responsibilities; and (c) provisions to hold a meeting between the licensee and agencies annually to review and evaluate results of all monitoring activities and reports, make necessary adjustments of project monitoring to meet resource needs, and decide on continuation of monitoring. Allow the ADF&G and other fish and wildlife resource agencies at least 30 days, by written notification, to enable us to comment and reach agreement with the applicant before submitting the plans to the Commission. If agreement is not reached the Commission will halt project implementation.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain written approval from fish and wildlife resource agencies for a final plan to control erosion and slope instability, revegetate disturbed areas, particularly in the area of the penstock crossing of the state's conservation easement, minimize the quantity of sediment introduced into Lagoon Creek from project construction and operation, and limit instream construction to between May 15 and July 15 in the East Fork and between early June and July 15 in Lagoon Creek. Allow the ADF&G and other fish and wildlife resource agencies at least 30 days, by written notification, to comment and reach agreement with the applicant before the plans are submitted to the Commission. Base the plan on actual-site geological, soil and groundwater conditions and on the project design, and include, at a minimum, the following: (a) a description of the actual geological, soil and groundwater site conditions related to the project features; (b) final preventative measures based on the licensee's draft ESCP; (c) detailed descriptions, functional design drawings, and specific topographic locations of all control measures and methods, stream set back distances, and stabilization methods for spoil material and temporary construction access trails; and (d) a revegetation plan for all disturbed areas including the locations of treatment areas, plant species and planting methods to be used, planting densities, fertilizer formulations, seed test results, application rates, and a specific implementation schedule and details for monitoring and maintenance programs. Submit the agency-approved plan to the Commission at least 30 days before the scheduled date to initiate activities related to the plan. Implement the plan commencing written approval by the Commission. If agreement is not reached, the Commission

will halt project implementation.

- At least 6 months before the start of any land-disturbing or land-clearing activities, consult and obtain approval from the fish and wildlife resource agencies for a final fuel and hazardous spill plan to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operation. Allow the ADF&G and other agencies 30 days, by written notification, to comment and reach agreement with the applicant before the plans are submitted to the Commission. Submit to the Commission for approval at least 30 days before the scheduled date to initiate activities related to the plan. Implement the plan when approved by the Commission. If agreement is not reached, the Commission will halt project implementation.

- Allow free and unrestricted access to, through, and across access routes leading to project lands, all projects lands and project works to ADF&G employees who show proper credentials.

D. Staff's Recommended Modifications of AVEC's Proposal

Based on agency and other comments that have been filed, and our analysis in Sections V, VI and VII, we are recommending some modifications and additions to AVEC's proposed project and mitigations, which are summarized below:

- prepare and implement a final ESCP;

- prepare and implement a plan to monitor compliance with a run-of-river operation;

- prepare and implement a plan to monitor intergravel temperatures in Lagoon Creek for 1 year prior to construction and up to 5 years after the start of operations;

- prepare and implement a channel and habitat monitoring plan using the protocol developed by the USFS for national forests in Alaska to monitor the project's effects on salmonid habitat in Lagoon Creek;

- prepare and implement a plan to conduct spawning surveys of coho, pink and chum salmon in Lagoon Creek for up to 5 years after the start of operations;

- prepare and implement a plan to conduct annual juvenile fish surveys in Lagoon Creek for up to 5 years after the start of operations;

- prepare and implement a plan for continuously recording flows in Lagoon Creek for up to 5 years after the start of operations;
- report all project outages that result in a flow reduction in Lagoon Creek to the fish and wildlife agencies;
- design and install a tailrace screen that reduces attraction and prevents injury to migrating salmonids;
- conduct annual meetings with resource agency personnel for the duration of post-license biotic monitoring studies to evaluate the results and need for continued monitoring;
- prepare and implement a hazardous spill prevention plan;
- employ an ECM during construction with the authority to ensure compliance with the ESCP and hazardous spill prevention plan and cease work and change orders in the field if needed;
- allow site access to agency fish and wildife personnel;
- prepare and implement a revegetation plan using native species to the greatest extent practical;
- use only preservative-free or pressure-treated wood timbers or planks in wetland areas;
- prepare and implement a bear safety plan;
- prepare and implement an eagle protection plan;
- prepare and implement an access control plan for the trail to the intake;
- prepare and implement a recreation plan; and
- if unknown archeological deposits are uncovered at the project, cease construction and consult with the State Historic Preservation Officer and the OHNC.

E. No Action Alternative

Under the no-action alternative, the Commission would deny a license for the proposed Old Harbor Project. The project would not be built, and no change to the existing environment would occur. No energy from the proposed project would be generated. The no-action alternative is the benchmark from which we compare the proposed action and any action alternatives.

F. Alternatives Considered but Eliminated from Detailed Study

AVEC considered the following alternatives, which represent various configurations of the project features, but eliminated them from detailed study. The alternatives, and the reasons they were eliminated from more detailed evaluation, are as follows:

Dual intakes

A project using one intake on the East Fork and a second intake on the West Fork of Mountain Creek, was considered and rejected because diverting and conveying water from both forks of Mountain Creek would require extensive tunneling and/or rock excavation that would be too costly. A second intake on Midway Creek, a small stream west of Old Harbor, was found to cost more than the proposed project and produce less power.

Big Creek Basin

Running the penstock to Big Creek Basin, east of the Lagoon Creek Basin, was evaluated and rejected because the cost of connecting the Old Harbor water system to the project would be much more expensive.

Smaller turbine

Installing a maximum turbine capacity of 330 kW, instead of 500 kW, was evaluated and rejected because a 500 kW project could provide more power without much additional cost.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

The following entities responded to the public notice requesting comments, final terms and conditions, recommendations and prescriptions, issued by the Commission on June 15, 1999, and extended on August 19, 1999.

ENTITY	DATE OF LETTER
Kodiak Island Borough	July 19, 1999
National Marine Fisheries Service	August 10, 1999
Old Harbor, Alaska	August 12, 1999
Old Harbor Native Corporation	August 18, 1999
Alaska Department of Fish and Game	August 20, 1999
U.S. Department of the Interior	September 10, 1999

By letter dated October 25, 1999, AVEC responded to the comments and recommendations of the above entities.

B. Interventions

In addition to filing comments, Commission regulations allow that organizations and individuals may petition to intervene and become a party to the licensing proceedings. The deadline for filing motions for intervention for the project was August 31, 1999. The following entities filed for intervener status:

ENTITY	FILING DATE
National Marine Fisheries Service	August 16, 1999
U.S. Department of the Interior	August 17, 1999
Alaska Department of Fish and Game	August 19, 1999

Interior's motion for intervention stated that it was in opposition to the project, but an amended motion filed on September 17, 1999, clarified that Interior does not oppose the project.

C. Scoping

Scoping Document 1 (SD1), which requested comments on issues to be addressed in the EA, was distributed to concerned agencies and individuals on April 8, 1998. The Commission issued a notice that the project was ready for scoping on April 14, 1998. A public scoping meeting was held in Old Harbor, Alaska on May 12, 1998, following a site visit; and an interagency meeting was held in Anchorage, Alaska on May 14, 1998. The following letters were received during the scoping period:

ENTITY	DATE OF LETTER
National Marine Fisheries Service	May 15, 1998
LASER	June 1, 1998

Based on the discussions during the meetings and the written comments, there were no revisions to SD1, and no second Scoping Document was issued. We address their environmental concerns in appropriate sections of the EA.

D. Comments on the Draft Environmental Assessment

On January 19, 2000, Commission staff issued a draft environmental assessment (DEA) for the project. Comments were received from the following entities:

ENTITY	DATE OF LETTER
National Marine Fisheries Service	March 2, 2000
Alaska Department of Fish and Game	March 3, 2000
polarconsult alaska, inc.	April 14, 2000

Appendix A contains the comments and our responses. This FEA includes the changes made as a result of our considerations of these comments.

E. Water Quality Certification

By letter dated May 20, 1999, AVEC requested water quality certification under Section 401 of the Clean Water Act by submitting to the Alaska Department of Environmental Conservation (ADEC) a copy of their application for a U.S. Army Corps of Engineers (Corps) permit to discharge dredged or fill material into navigable waters under Section 404 of the Clean Water Act. By agreement between the Corps and the ADEC, an application for the Corps permit may also serve as application for water quality certification. The ADEC received this request on May 20, 1999. The ADEC has waived water quality certification of Commission-licensed hydroelectric projects (letter from Michele Brown, Commissioner, Alaska Department of Environmental Conservation, Juneau, Alaska; August 2, 1999).

F. Coastal Zone Management Act (CZMA)

The Alaska Division of Governmental Coordination (ADGC) notified AVEC that it initiated a review of the project for the Alaska Coastal Management Program on July 2, 1999 (letter to Daniel Hertrich, polarconsult alaska, inc., Anchorage, Alaska; from

Jennifer Nolan Wing, Project Review Coordinator, Division of Environmental Coordination, Anchorage, Alaska; July 23, 1999).

G. Section 18 Fishway Prescription

Section 18 of the FPA states that the Commission shall require construction, maintenance and operation by a licensee of such fishways as the Secretaries of Commerce and Interior may prescribe. Interior states that currently, upstream and downstream passage of fish past the project is not a management objective for Mountain Creek. Should management objectives change and subsequently require fish passage, Interior states that the licensee should provide appropriate upstream and/or downstream fishways. Interior further states that it reserves the authority to prescribe the construction, operation and maintenance of fishways pursuant to Section 18 of the FPA. Interior requests that its reservation be acknowledged in any license issued for the project.

Although fishways have not been prescribed by Interior at this time, it is appropriate for the Commission to include a license article which reserves the Commission's authority to require any fishways Interior may prescribe in the future. We recognize that future fish passage needs and management objectives cannot always be predicted when the license is issued.

H. Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal agencies, such as the Commission, to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) identified under the Magnuson-Stevens Act. On April 22, 1999, the Fishery Management Plan for the Salmon Fisheries for Alaska was amended to designate freshwater EFH as waters currently or historically accessible to five salmon species. Three of the five salmon species (coho, chum and pink salmon) are found in Mountain Creek and Lagoon Creek, the two streams affected by the proposed project. By letter dated February 11, 2000, we requested that NMFS, representing the Secretary of Commerce, submit any recommendations regarding EFH for the Old Harbor Project. No recommendations were received.

As required by the Magnuson-Stevens Act we identify (see table 1) the sections of our EA that incorporate the EFH assessment.

Table 1. Corresponding sections of the Commission staff's Environmental Assessment and the Essential Fish Habitat Assessment for the Old Harbor Project. (Source: Commission staff)

Essential Fish Habitat Assessment	Final Environmental Assessment
Description of proposed action	Sections III(A)(1) and III(A)(2)
Analysis of cumulative effects	Section V(B)
Analysis of project-specific effects	Sections V(C)(1) through (7)
Commission staff's view of the effects	Sections V(C)(1) through (7), VII, VIII, IX, and X
Proposed mitigation	Sections III(A)(3) and III(D), Sections V(C)(1) through (7), and VII.

I. Alaska National Interest Land Conservation Act (ANILCA) [3]

ANILCA seeks to preserve units of federal lands in Alaska that contain nationally significant natural, scenic, historic, archaeologic, geologic, scientific, wilderness, cultural, recreational, and wildlife values. The refuge is a designated conservation system unit pursuant to ANILCA. Recognizing that the state's transportation and utility systems are largely undeveloped, Title XI of ANILCA provides for an orderly decision making process whereby the existing authorities would approve or disapprove applications for these systems within conservation system units and minimize adverse impacts of any approved system. To ensure the effectiveness of this decision making process, all federal agencies with jurisdiction to grant authorization without which the project could not be established or operated, are required to cooperate to prepare and issue an EA evaluating the impacts of the proposed project within nine months from the date AVEC applied to Interior for a right of way [4] permit for the project (May 20, 1999). Within four months from the date of a Finding of No Significant Impact or, if significant impacts are found, a final environmental impact statement, each appropriate federal agency shall make an

[3] 16 USC. 3101

[4] FWS right-of-way permits are issued for 30 years (letter from Pamela Bergmann, Acting Regional Environmental Officer, Office of the Secretary, Anchorage, Alaska; September 10, 1999).

independent decision to approve or disapprove the project.

We have identified the Commission, Corps and Interior as the federal agencies that would cooperate on a joint environmental document. The Corps, however, opted not to participate in the EA (confirmation letter to Don P. Kuhle, Regulatory Branch, U.S. Army Corps of Engineers, Anchorage, Alaska; March 1, 2000).

J. Land Covenants

The project site includes lands within the refuge that were purchased by the *Exxon Valdez* Oil Spill Trustee Council (Trustee Council) in 1995 from the OHNC, as part of a comprehensive federal and State of Alaska program to restore natural resources injured by the *Exxon Valdez* oil spill (letters from Paul Gates, Regional Environmental Officer, U.S. Department of the Interior, Anchorage, Alaska, February 22, 1996; C. Wayne Dolezal, Habitat Biologist, Alaska Department of Fish and Game, Anchorage, Alaska, August 20, 1999; Pamela Bergmann, Acting Regional Environmental Officer, U.S. 40Department of the Interior, Anchorage, Alaska, September 10, 1999). These lands are now owned in fee by the United States. Restrictions on the use of these lands are contained in a warranty deed from the OHNC to the United States, and a conservation easement from the OHNC to the State of Alaska (figure 5). These covenants generally prohibit activities such as the construction of buildings or fences and the manipulation or alteration of natural water courses.

After consultation with the U.S. Department of Justice, the state and Interior agree that the parties to the land transaction (OHNC, State of Alaska and United States), have the discretion to jointly modify the covenants for a particular project if it is compatible with the restoration and conservation purposes of the covenants (letter to C. Walter Ebell, Esq., Jamin, Ebell, Bolger, and Gentry, Seattle, Washington; from (jointly signed) Craig J. Tillery, Assistant Attorney General, Alaska Department of Law, and Barry N. Roth,

Attorney-Advisor, Conservation and Wildlife Division, Office of the Solicitor, U.S. Department of the Interior; December 1996). The state and Interior request that the Trustee Council concur with any modifications to the covenants as long as the Trustee Council remains in existence. Any decision to modify the covenants by the state and United States, would be dependent on the results of studies that assess the proposed project's impact and the outcome of the Commission's licensing process.

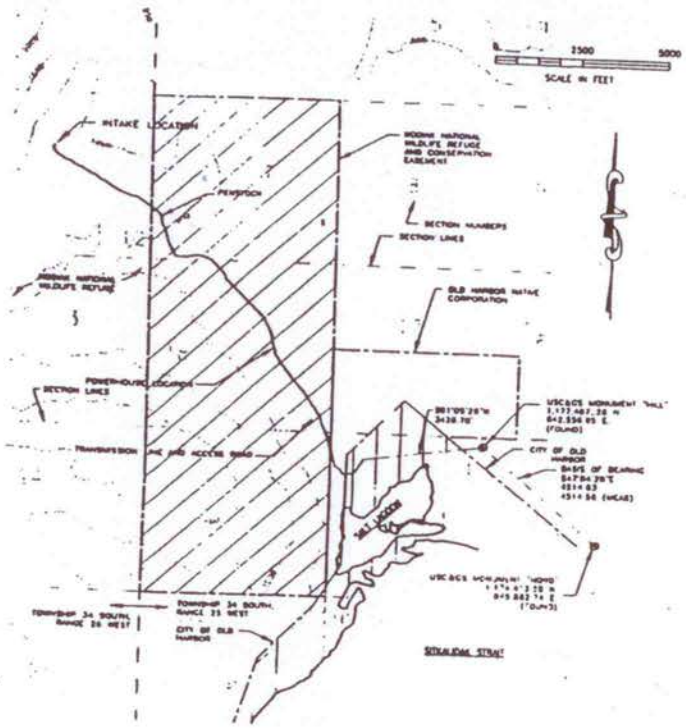

Figure 5. Ownership of project lands. (Source: AVEC 2000)

AVEC filed a complete description of the easement for the project's transmission line, powerhouse site, and penstock route with the Commission (letter from Daniel Hertrich, P.E., polarconsult alaska, inc., Anchorage, Alaska; April 14, 2000). This letter and the easement description may be viewed on the web at http://www.ferc.fed.us/online/rims.htm (please call (202) 208-2222 for assistance).

V. ENVIRONMENTAL ANALYSIS [5]

In this section, we first describe the general environmental setting of the project area. We then discuss the cumulative and site-specific effects of the resources affected by the project including effects of the proposed action, action alternatives, and no action.

In our detailed assessment of each relevant resource, we first describe the affected environment -- which is the existing condition and the baseline against which to measure anticipated changes of the proposed project and any action alternative -- and then we discuss environmental effects of the project including proposed protection, mitigation, and enhancement measures. In this section we also make recommendations for measures that do not have a substantial economic effect on the project. Our recommendations for the measures that have effects on other power or non-power resources are found in Section VII, Comprehensive Development and Recommended Alternatives.

A. General Description of the Old Harbor Project Area

Old Harbor, Alaska, is a small community on the southeast coast of Kodiak Island, 70 miles southwest of the city of Kodiak and 322 miles southwest of Anchorage.

The climate of the Kodiak Islands is dominated by a strong marine influence. There is little or no freezing weather, moderate precipitation, and frequent cloud cover and fog. Temperatures generally remain within 24 to 60 degrees Fahrenheit (° F). Severe storms are common from December through February. Annual precipitation is 60 inches.

The proposed project would affect two basins with a dividing boundary near Old Harbor. The project intake would be located on the East Fork, a headwaters tributary of the Barling Bay Basin. Most of the penstock and other project facilities would be located in the Lagoon Creek Basin, and flows from the powerhouse would discharge into Lagoon

[5] Unless otherwise indicated, the source of our information is AVEC's application for license, and supplemental filings by the applicant.

Creek.

The East and West Forks of Mountain Creek, converge at an elevation of about 500 fmsl. The total drainage area for Mountain Creek is approximately 8.024 square miles (sq mi). The East Fork and West Fork drainage areas are 1.79 and 2.60 sq mi, respectively, and together account for 55% of the total drainage area of Mountain Creek. Because they occupy high mountain valleys, however, they receive more precipitation as snow than the remainder of the drainage. There is a small glacier at the far end of the East Fork near the intake site.

After the confluence of the East and West Forks, Mountain Creek drops about 450 fmsl, over about 2 miles, through a very steep-walled and rugged canyon. Below the canyon, it flows another 1.5 miles over a nearly flat alluvial fan consisting of large amounts of permeable gravel. During mid to late summer in most years all of the surface water flowing out of the canyon becomes subsurface though this alluvial fan, resulting in a dry channel surface. The stream often changes course in immense spring floods. Mountain Creek joins Barling Bay Creek near its confluence with the tide water at Barling Bay. This is a high energy deposition area where the channels are unstable and migrate during major flood events. Depending on tide level, and the current course of Mountain Creek, the mouth of Mountain Creek empties from 0 to 3,000 feet upstream of the mouth of Barling Bay Creek. Barling Bay Creek is a river that has a drainage area of about 16 sq mi.

Lagoon Creek begins at about 700 fmsl and drains from a mountain behind Old Harbor. Its drainage area is about 1.44 sq mi, and it flows about 2 miles to the powerhouse site. From the powerhouse site the stream flows through cottonwood and alder stands in a relatively flat expanse along the talus of the mountain. In late summer and fall, streamflows in this reach often flow subsurface through permeable gravel deposits. About 4,200 feet downstream of the powerhouse, a spring fed tributary, Lake Fork, joins Lagoon Creek and contributes year-round flows.

Lagoon Creek empties into a 82-surface acre tidally influenced lagoon called Salt Lagoon. The Salt Lagoon is fed by Lagoon Creek and another small spring creek, not in the Lagoon Creek drainage. The Salt Lagoon drains through a road culvert into Sitkalidak Strait. During low tides the water level in Salt Lagoon is higher than the tide and the Lagoon drains fairly rapidly through the culvert. During high tides the level of the Lagoon matches the level in the strait and water flows into the lagoon through the culvert.

B. Scope of Cumulative Effects Analysis

According to the Council on Environmental Quality's regulations for implementing NEPA, an action may cause cumulative impacts on the environment if its impacts overlap in time and or space with the impacts of other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time to include hydro power and other land and water development activities.

Public use

In SD1, we identified recreation as a resource that could be cumulatively affected because project construction could allow increased access to the refuge. Based on our review of use of the refuge, however, we have concluded that recreation would not be cumulatively affected. Rather, we believe that the project could increase public access to refuge land, which could result in indirect effects to wildlife and vegetation on refuge land. We discuss the project's effects on wildlife and vegetation in Section V.C.3, Terrestrial Resources.

Under the current refuge management designation, "minimal management " (FWS 1987), local residents can access refuge lands, including the project site, for subsistence activities that include hunting, fishing, trapping, and berry picking. Local residents are also permitted to use traditional camping areas in the refuge. Public use of the refuge is allowed for hunting, fishing, and trapping; wildlife observation; and environmental education (FWS 1987). Public access to the refuge is by boat, airplane and foot, but ATV use is not authorized on the refuge. If the proposed project is permitted, lands within the right-of-way would be designated as the Old Harbor Hydroelectric Site, and management designation would be changed to "moderate management". Specific limitations would authorize only the activities necessary to allow development and operation of the hydroelectric facility. The authorized uses for the public would not change, and no additional public facilities would be developed on the site.

As required by Section 810 of ANILCA, FWS prepared an evaluation of the effects of the proposed project on subsistence. Based on this analysis, no foreseeable and significant decreases in the abundance or distribution of harvestable resources, and no foreseeable limitations on harvester access are expected to result from the issuance of a right-of-way permit for the proposed project.

Hydropower development

The ADF&G asked us to address concerns about the cumulative socioeconomic and environmental impacts of this and other existing and proposed hydropower projects on Kodiak Island and how they may impact one another if connected by an intertie. Table 2 lists the status and location of other hydropower projects on Kodiak Island.

Table 2. Status and Location of Hydroelectric Projects on Kodiak Island. (Source: Commission staff)

PROJECT	FERC NO.	LOCATION	CAPACITY (KW)	STATUS
Old Harbor	11690	Barling Bay Basin and Sitkalidak Strait	500	Proposed
Terror Lake	2743	Terror and Kizhuyak River Basins	20,000	License in effect
Dry Spruce	1432	Spruce Bay Basin	75	License in effect
Twin Basins	11611	Kizhuyak River Basin	500,000	Preliminary permit in effect
One Mile	1299	Uganik River Basin	8	Non-operational - license expired
Uganik	2026	Uganik River Basin	30	Non-operational - license expired
Terror River	11139	Terror River Basin	3,000	Preliminary permit expired - no application filed
Leanne Lake	11497	Kizhuyak River Basin	2,800	Preliminary permit expired - no application filed
Parks	None	Spiridon Bay Basin	8	Existing - not under Commission jurisdiction
Port Lions	None	Kizhuyak River Basin	200	Proposed - not under Commission jurisdiction

At present, Kodiak Island has three operating hydropower projects, (Terror Lake, Dry Spruce, and Parks); and two proposed projects (Old Harbor and Port Lions). One

preliminary permit is in effect (Twin Basins). Of the six active sites, five are located in the northern half of the island. The sixth, Old Harbor, is located on the southeastern part of the island. There are no other projects, existing or proposed for the Barling Bay and Lagoon Creek Basins.

We find that the environmental effects of the Old Harbor Project, combined with the effects of the other licensed projects on the island, would still be minor because of the limited affected area and distance from other projects. We are unaware of any proposal for a Kodiak Island intertie, so we are unable to evaluate any specific impacts.

C. Proposed Action and Other Action Alternatives

In this section, we discuss the effects of the proposed project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze specific environmental issues.

1. Geology and Soil Resources

a. Affected Environment

The upper portion of the project area (from the powerhouse to the intake) is typical of the mountainous regions of Kodiak Island. Active erosion is evident at the base of the steep talus slopes. The soils are shallow (1 to 2 feet deep) over slate and sandstone. The small depressions and valleys in the area fill with water and peat to form wetlands (U.S. Department of the Interior, Map MF 674). In the lowlands, beginning at the access trail to the powerhouse, the area consists of alluvial deposits overlain by several feet of a mixed organic and gravel soil. Wetlands are also common in these areas with moss and peat overlying soil and gravel. Active erosion is not evident in these areas.

Most of the streams appear to meander rather quickly in the low lying areas and streambanks exhibit erosion. Where the streams are in wooded areas there are lots of uprooted and fallen trees lying in or across the stream due to the eroding banks.

b. Environmental Impacts and Recommendations

Land-disturbing activities associated with construction of the project could cause erosion and sedimentation.

AVEC proposes to develop an ESCP to prevent erosion and sedimentation during construction.

Interior and the ADF&G recommend that AVEC consult and obtain approval from the fish and wildlife agencies for a final ESCP to control slope instability, revegetate disturbed areas, and minimize the quantity of sediment introduced into Lagoon Creek resulting from project construction and operations. The agencies recommend that the final ESCP include a description of actual geological, soil and groundwater site conditions related to the project features; final preventative measures based on AVEC's draft ESCP; detailed descriptions, functional design drawings, and specific topographic locations of all control measures and methods, stream set back distances, and stabilization methods for spoil material and temporary construction access trails; and a revegetation plan to include a complete prescription for revegetating all disturbed areas.

NMFS recommends that AVEC prepare a comprehensive erosion control and revegetation plan that includes silt fences to limit the project footprint and eliminate runoff to the stream; procedures to limit erosion of bare ground, such as matting or mulch; revegetation of all impacted ground using only native plant species; revegetation monitoring; fixing any drainage or erosion problems and replanting if 50 percent vegetation densities are not met; timing restrictions for in-water work and stream crossings that meet the ADF&G recommendations, and using bioremediation techniques that mimic native vegetation densities and species to repair any stream bank damage.

By letter dated March 3, 2000, ADF&G recommends that instream construction occur between early June, after fry have emerged, and mid-July, before spawning.

Staff analysis

At a meeting held on April 26, 2000, ADF&G explained that they allow instream construction starting in mid-May where coho are not present because chum and pink salmon emerge earlier than coho. Where coho are present, however, no instream construction can occur until early June. Because no coho are present at the intake site, NMFS, FWS, ADF&G and AVEC agreed that instream construction in the East Fork of Mountain Creek could begin as early as May 15, with construction at Lagoon Creek beginning in early June.

Land-disturbing activities associated with construction of the proposed project could cause erosion and sedimentation, including increased erosion of streambanks along Lagoon Creek. We agree with the agencies that the steep slopes and amount of

precipitation could have potentially major impacts if a plan is not in place and properly implemented. Therefore, prior to land-disturbing activities, we recommend that AVEC develop a site-specific ESCP in consultation with the NMFS, FWS and ADF&G, including the measures recommended by the agencies. Because AVEC has already proposed a draft ESCP, we don't believe the preparation of a final ESCP, with our recommended measures, would be a significant cost. Fisheries resources could be harmed by sedimentation if instream construction occurred from spawning through emergence of salmonids. Because a restriction on instream construction dates would not significantly affect project economics, we recommend that AVEC restrict instream construction to between May 15 and July 15 at the intake site and between early June, after fry have emerged, and July 15 at Lagoon Creek for the protection of aquatic resources. We discuss the need for a revegetation plan in Section V.C.3, Terrestrial Resources, and make our recommendation regarding revegetation measures in Section VII Comprehensive Analysis and Recommended Alternative.

c. Unavoidable Adverse Impacts

With the development and implementation of an ESCP, construction impacts would be short term and minimal.

2. Aquatic Resources

a. Affected Environment

Water Quantity

From July 1993 through May 1996, the ADNR, Division of Mining and Water Management, maintained a stream gage on Mountain Creek about 150 feet downstream from the confluence of the East and West Forks. From this data and the proposed project's proportion of the drainage area, adjusted for higher than normal precipitation during the gaging period, the average flow at the proposed intake site is estimated to be 16 to 18 cfs (Carrick and Ireland 1996).

AVEC recorded streamflows in the East Fork, at the proposed intake site (figure 6), from June 15, 1998, through June 3, 1999; and in Lagoon Creek at the proposed powerhouse site (figure 7) from May 14, 1998, through June 3, 1999. AVEC estimates the average annual flow at the proposed powerhouse site to be 13.4 cfs, based on its gaging results.

As figures 6 and 7 show, flows from both the East Fork and Lagoon Creek are highly variable, and at times, may not have surface flows at the intake or powerhouse sites, respectively.

Water Rights

On May 20, 1999, AVEC filed an application with the Alaska Department of Natural Resources for a water right of 8.5 million gallons per day (12.5 cfs) from Mountain Creek to operate the project.

Water Quality

Table 3 shows water quality data from water collections taken at the intake and powerhouse sites on August 13, 1996.

Table 3. Water quality data from the proposed intake and powerhouse sites. (Source: AVEC 1999)

Parameter	Mountain Creek (Intake)	Lagoon Creek (Powerhouse)	Detection Limit	Units
Calcium	1.95	1.48	0.2	mg/L
Magnesium	0.499	0.295	0.2	mg/L
Potassium	2.78	2.35	NA	mg/L
Silicon	2.09	1.84	0.5	mg/L
Sodium	1.61	2.13	0.5	mg/L
Nitrate-N	0.100	0.119	0.1	mg/L
Total Kjeldahl Nitrogen	0.312	0.485	0.2	mg/L
Total Phosphorous	0.02	0.016	0.01	mg/L
Temperature	43	53.3	NA	°F
Conductivity	24	36.5	NA	µmhos
Dissolved Oxygen	6.8	7.5	NA	ppm

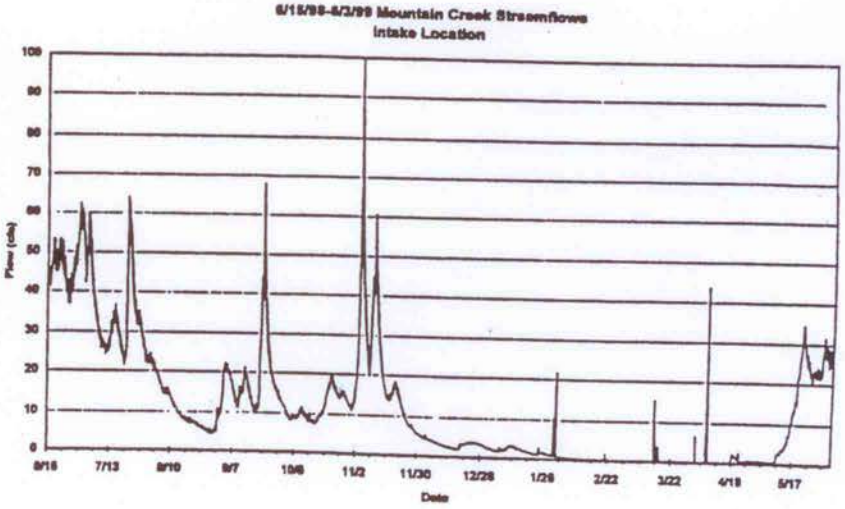

Figure 6. Streamflows at the proposed intake site (Source: AVEC 1999a).

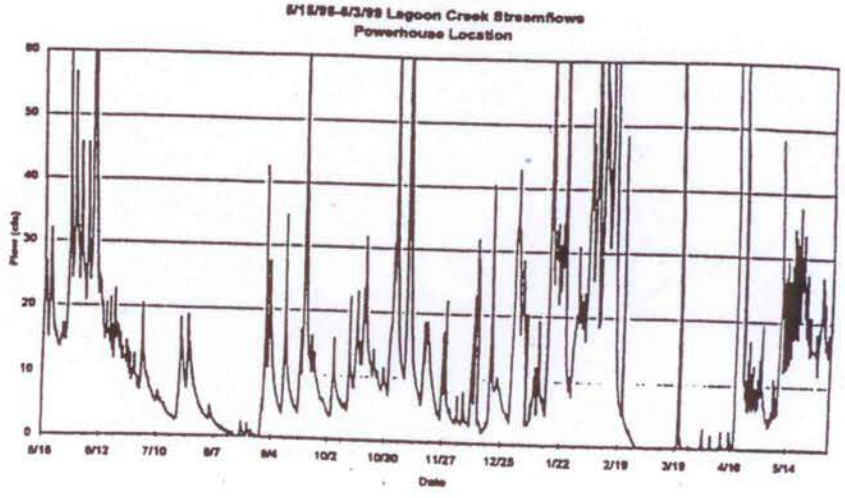

Figure 7. Steamflows at the proposed powerhouse site (Source: AVEC 1999a).

Fisheries

The ADF&G *Catalog* (1999) does not identify the East or West Fork of Mountain Creek as anadromous streams, however, it shows that Mountain Creek supports coho, pink and chum salmon to a point near the center of section 22, about 2.5 miles downstream from the proposed intake site on the East Fork, and about 1 mile upstream from Mountain Creek's confluence with Barling Bay Creek. Lagoon Creek is identified in the *Catalog* (1999) as supporting coho, pink and chum salmon, and Dolly Varden upstream to the northwest corner of section 18 (about 3,200 feet upstream of the proposed powerhouse site).

AVEC's consultant conducted fisheries surveys on the East Fork [6] and Lagoon Creek on August 9, and September 3 and 23, 1996; and August 13 and 14 and October 6, 1998 (White 1996, 1996a, 1998). Methods included observations and counts from helicopter and foot, electrofishing and minnow traps. During all surveys, no fish were observed in the East Fork.

In 1996 spawning surveys counted a total of 11,200 adult pink and 80 adult coho salmon in Barling Bay Creek. In Mountain Creek, juvenile coho and Dolly Varden were observed about 2 miles downstream of the confluence of the East and West Forks. In 1996 and 1998, the most downstream 0.75 mile of Mountain Creek had only subsurface flows. Access during fall migration probably occurs during periods of precipitation because juvenile fish were observed above the dry section. The survey results for October 6, 1996, suggest that most migrating salmon bypass Mountain Creek to spawn in Barling Bay Creek. The usable spawning area of Mountain Creek was estimated at 119,715 sq ft (White 1996a), by measuring 28 cross sections upstream of its confluence with Barling Bay Creek and observing bed size and characteristics. Stream gaging also shows that, even during periods of average rainfall, water exiting the canyon goes subsurface from mid-July through the end of October.

Based on rainfall, stream gaging and runoff analysis it is likely that the lower reaches of Mountain Creek remain dry through the winter and early spring. Peak flows that occurred during flooding in June 1998 were estimated at 1,000 cfs at the exit of the canyon. The flooding uprooted large trees and changed the course of the stream between

[6] Past reports and drawings have referred to the East Fork of Mountain Creek as Mountain Creek, Hydro Creek, Barling Bay Creek tributary and Barling Bay Creek.

4,200 and 6,600 feet upstream from its confluence with Barling Bay Creek. Near the confluence, the stream overflowed the main channel and dumped large quantities of gravel over a wide area to the north and south of the confluence. The current configuration of Mountain Creek joins Barling Bay Creek at its high tide level.

In 1996, spawning surveys of Lagoon Creek, 118 adult chum and 2 [7] adult pink salmon were counted (White 1996a). Adult coho salmon were observed in the Salt Lagoon on September 23, 1996, but had not yet entered Lagoon Creek to spawn. Juvenile coho and Dolly Varden were also captured in Lagoon Creek. In 1998, four adult chum and 30 adult pink salmon were observed in Lagoon Creek. The Lake Fork tributary of Lagoon Creek supports chum salmon. In both years, a 1-mile reach in Lagoon Creek, including the proposed powerhouse site had no surface flows. The usable spawning area of Lagoon Creek was calculated as about 92,250 sq ft (White 1996a), by measuring 32 cross sections downstream of the powerhouse site and observing bed size and characteristics.

The June 1998 flooding caused some bank erosion, uprooting of trees, and some channel changes downstream of the powerhouse site totaling about 1,350 feet in length; but these changes were of a much smaller scale than the changes that took place at Mountain Creek. Peak flows at the powerhouse site during the flooding were estimated at about 100 cfs.

The Lake Fork joins Lagoon Creek about 3,800 feet upstream from the Salt Lagoon. It appears to be spring fed and have continuous surface flows. A frequently-used ATV trail crosses Lagoon Creek in two locations near the Lake Fork confluence.

b. Environmental Impacts and Recommendations

Project Operation

Sudden flow decreases can strand fish and invertebrates and dewater redds, resulting in mortality from dessication and increased predation. Sudden increases can flush aquatic organisms and detritus from the stream.

AVEC proposes a run-of-river operation that would continuously divert 13.2 cfs, or inflow to the project, if less; and continuously release through the powerhouse the

[7] White (1998) reports this number as 20 adult pink salmon.

volume of water diverted, less 0.2 cfs withdrawn by Old Harbor for domestic use.

NMFS recommends that AVEC divert no more than 13.2 cfs from East Fork, and maintain a constant discharge into Lagoon Creek regardless of power demand. Interior, and ADF&G recommend that AVEC operate the project as run-of-river whereby outflow from turbine discharge, spillage, direct releases, and /or leakage is equal to the instantaneous inflow at the impoundment. Operating as they recommend, Interior and ADF&G have concluded that only 0.4 acre-feet of water would collect upstream from the diversion.

Staff analysis

AVEC's proposal would operate the project as recommended by the agencies. We agree that a run-of-river operation would avoid sudden changes in the rate of flow in Lagoon Creek, protecting aquatic resources. Therefore, we recommend that AVEC operate the project as proposed. We also recommend that AVEC, in consultation with the NMFS, Interior, ADF&G, and USGS, prepare a plan to monitor compliance with the run-of-river proposal. We believe that the cost of this plan would be minimal because project inflows and discharges could be calculated from operational records.

We also considered whether a diversion of up to 13.2 cfs from the East Fork would adversely impact the anadromous fishery in Mountain Creek and Barling Bay Creek. Mountain Creek provides some rearing habitat for juvenile salmon in a 2,100-foot reach about 6,000 ft upstream from its confluence with Barling Bay Creek, but does not measurably contribute to fisheries production in Barling Bay Creek. Therefore, we conclude that the project diversion would not measurably affect anadromous fish in Barling Bay Creek.

Biotic Monitoring

Flow increases can cause channel and habitat alterations. Local residents claim that the number of salmon in Lagoon Creek has declined noticeably since the installation of a road culvert between the Salt Lagoon and Sitkalidak Strait (Jim Nestic, Public Works Director, Old Harbor, Alaska; personal communication with polarconsult alaska, inc.; 1988).

AVEC and the resource agencies have agreed to cooperate on a four-part biotic monitoring program to document changes to Lagoon Creek from the project's diversion of 13.2 cfs from Mountain Creek. The four parts of the program include: (1) water

temperature monitoring; (2) geomorphology and erosion monitoring; (3) adult spawning surveys; and (4) juvenile fish surveys. In addition, they agree to gage streamflow in the anadromous reach of Lagoon Creek coinciding with the biotic monitoring program. Because of differences in the monitoring methods and duration between AVEC and the agencies, we discuss the four parts of the biotic and streamflow monitoring program individually. The costs of biotic and streamflow monitoring are discussed in Section VI, Developmental Analysis, and we make our final recommendations in Section VII, Comprehensive Development and Recommended Alternative.

Water temperature monitoring

Natural selective pressures work to adjust the life histories of individual salmon populations to favor emergence at the optimum time for survival (Groot and Margolis 1991). If emergence is early, it may occur before enough food is available. With late emergence, their smaller size may result in fry being more susceptible to predation and competition for food from other species. Either early or late emergence, if realized, could affect the survival of the Lagoon Creek salmon. Changes in existing water temperature regimes, to which individual salmonid populations have adapted over time can change the timing of emergence, making fry populations susceptible to lower food availability and increased mortality.

AVEC proposes to develop a temperature monitoring plan that includes recording intergravel water temperatures for about 9 months prior to the start of construction and after construction for an unspecified period of time. The plan would specify the methods, sites, and duration of the post-construction monitoring. The 9 months of pre-construction data would be combined with ambient water temperatures of the tailwaters and Lagoon Creek and flow data to calculate a full year of pre-construction water temperatures.

NMFS, Interior and ADF&G recommend that water temperatures be continuously recorded at six sites for up to 5 years, depending on results, after the start of operations: (1) the diversion site; (2) a short distance upstream of the powerhouse on Lagoon Creek; (3) Lagoon Creek downstream from the powerhouse at the upstream reach of adequate spawning habitat; (4) Lagoon Creek a short distance upstream of the confluence of Lagoon Creek and the Lake Fork; (5) the Lake Fork a short distance upstream of its confluence with Lagoon Creek; and (6) Lagoon Creek downstream of the confluence of Lagoon Creek and the Lake Fork.

NMFS recommended that, if average temperatures in Lagoon Creek are lowered from pre-project average temperatures by more than 3 degrees Fahrenheit (° F) and fish

production has declined, mitigation may be appropriate; for example, AVEC could construct a pond at the tailrace to raise discharge temperatures before entering Lagoon Creek. At an April 26, 2000, meeting conducted by Commission staff with AVEC and the resource agencies, NMFS modified their recommendation to withdraw the 3-degree criteria.

Interior and ADF&G further recommend that temperatures be recorded at all six locations for at least 1 year prior to project construction.

Staff analysis

AVEC doesn't believe that the project would significantly affect the water temperature in Lagoon Creek, because any effect would occur at the powerhouse, in a reach that is generally dry during spawning season, and the flow from the Lake Fork would mitigate any temperature differences between the water temperature of the project discharge and the water temperature of Lagoon Creek. AVEC objects to collecting 1 year of pre-construction temperature data because it would delay construction and pre-construction ambient water temperatures can be derived from Lagoon Creek's natural temperatures in conjunction with streamflow data. As an alternative, AVEC proposes to install temperature gages in fall 1999 and collect up to 9 months of pre-construction temperature data.

Water temperature data collected by AVEC showed that the water temperature at the proposed intake site was 10 °F colder than at the powerhouse site. As figures 6 and 7 show, the project's discharge to Lagoon Creek during the fall spawning period could exceed the natural flow in Lagoon Creek. Once the project is operational, Lagoon Creek could receive colder water in volumes equal to, or exceeding, natural flows. Lower water temperatures can work to lengthen the incubation period.

The accumulation of temperature units or degree days [8] from the time of egg fertilization determines the time of fry emergence from the gravel. Relatively small changes in the water temperature regime can cause significant variation in hatching and emergence times when accumulated over a period of months. Incubating salmon eggs have some ability to compensate for changes in temperature regimes (Groot and Margolis

[8] A degree day represents the number of degrees above 0 degree Celsius (°C) for a 24-hour period. For example, if the water temperature for the first day of incubation is 8 °C, it would contribute 8 degree days.

1991). Such adaptations allow the fry to emerge at the same time each year even though the natural temperatures vary from year to year. It is unknown, though, to what extent the salmon in Lagoon Creek would be able to compensate for an altered temperature regime. If a 10 °F differential in water temperatures between Lagoon Creek and the discharge from the powerhouse is maintained, long-term effects of the temperature regime within the spawning gravels would be unavoidable.

Lagoon Creek supports spawning for coho, pink and chum salmon. Adult pink and chum were observed in August and September in Lagoon Creek. Coho salmon spawn later than the other two species, primarily in October and November. Emergence can vary from spring through mid summer depending on the climate and species. Coho salmon may not emerge until mid-July and could remain in Lagoon Creek to rear. Because the total spawning, incubation and emergence period for these species may span an 11-month period each year, water temperature impacts from the project could occur almost year round.

Salmonid incubation and emergence timing is dependent on intergravel temperatures, which can vary widely from ambient water temperatures. We know of no method of accurately calculating intergravel temperatures from ambient water temperatures.

AVEC's construction schedule allows for completion by fall 2000, based on a license issuance in January 2000. This schedule, however, would need to be revised if a license were issued to AVEC. Some post-license plans, such as the ESCP and hazardous spill prevention plan, would need to be consulted with resource agencies and submitted to the Commission for approval before the start of construction. These factors, combined with AVECs estimated time to obtain materials and equipment, indicate that 1 year's temperature data need not interfere with project construction.

During a meeting held on April 26, 2000, the Commission staff and resource agencies discussed the effects of introducing colder water from Mountain Creek to fish resources in Lagoon Creek. The seasonal effects on intergravel water temperatures, existing literature on the effects of temperature changes on salmon incubation, and whether these effects vary by species were considered. Participants concluded that long-term monitoring would be used to show differences of overwintering temperatures between at the intake and powerhouse sites. If temperatures are shown to be similar, project impacts to the salmon resources would be minimized. If water temperature at the intake is significantly lower than above the powerhouse, and the Lagoon Creek fish population shows a decline, measures to mitigate reduced water temperatures may be

needed. The agencies' representatives weren't able to conclude that a temperature change of 3 ° F, as recommended by NMFS, would be sufficient to need mitigation.

Geomorphology and erosion monitoring

Because the average annual streamflow in Lagoon Creek is 13.4 cfs, additions of up to 13 cfs to Lagoon Creek would at times equal or exceed the flow in the channel below the powerhouse.

AVEC doesn't believe that the project would significantly alter the Lagoon Creek channel, except to potentially add surface flow in a reach that seasonally flows subsurface under existing conditions resulting in a less variable channel. To monitor any changes in the channel, AVEC initially proposed to select two cross section sites downstream of the powerhouse site, one site upstream and one site downstream of a bend, to survey, using standard land surveying equipment and techniques. AVEC would also document by photograph the channel at each survey and surveys would be conducted after runoff in the spring and in late fall. During a meeting held on April 26, 2000, with the resources agencies and Commission staff, AVEC modified their proposal in agreeing with NMFS, ADF&G, and Interior to survey channel and habitat using the protocol developed by the USFS for national forests in Alaska.

NMFS, Interior, and ADF&G initially recommended that AVEC document any channel and habitat changes to Lagoon Creek during operational years 3 and 5 by repeating the 32 of the cross section measurements taken in Lagoon Creek during AVEC's fisheries survey, when flows in Lagoon Creek are 13 cfs over the flows that occurred during the pre-project survey. The agencies also recommended that in years 3 and 5 of project operation, AVEC calculate the wetted area below the powerhouse and identify abnormal erosion or changes in channel morphology. NMFS, Interior and ADF&G modified their recommendation at the April 26, 2000, to recommend that AVEC conduct post-construction monitoring using the protocol developed by the USFS for national forests in Alaska. ADF&G suggests using tier 2 of the protocol, except that tier 3 would be used for riparian vegetation and under cut banks.

Staff analysis

AVEC measured channel cross sections at the proposed powerhouse site when flows were 13 cfs and 25.5 cfs. This 100 percent increase in flow volume resulted in a 23-percent increase in wetted perimeter, indicating that increasing flows would not necessarily result in a corresponding increase in habitat or wetted channel. Because of

channel armoring, no increase in bed load movement was noticeable with the increased flows.

After flooding in June 1998, AVEC estimated peak flows in Lagoon Creek and used a representative cross section measurement to show that the addition of 13 cfs to peak flows would increase the average depth in Lagoon Creek by 1.3 inches, the average velocity from 4.2 to 4.3 feet per second (fps), and bed load transport by 3.0 percent, indicating that diverting an additional 13 cfs to Lagoon Creek would not cause a significant increase in erosion or channel shaping at peak flows. AVEC also states that because of channel alterations from the 1998 flooding, their 32 cross section measurements from 1996 do not represent present conditions. AVEC is concerned that channel changes resulting from post-license flooding could be erroneously attributed to the project if 1996 cross sections were replicated after the project starts operation.

While it's likely the diverted flows may not have significant effects when Lagoon Creek flows are very high or low, we believe there would be some flow range when the project flows could contribute to channel shaping or erosion. Bankfull flows, roughly estimated as 3 times the average annual streamflow, are characterized as channel-forming flows (Leopold 1994). For Lagoon Creek, this would be about 40 cfs, indicating that when Lagoon Creek flows are about 27 cfs, an additional inflow of 13 cfs could have some erosion or channel changing effects. These effects could continue until the natural Lagoon Creek flows are sufficiently high to control bed load movement regardless of whether the project is discharging additional flow into the reach. The relationship between the channel-forming flow and the average annual flow may vary by drainage area, however, there would be some range of flows in Lagoon Creek in which the diverted flows could affect the channel conditions, including salmonid habitat, in Lagoon Creek. Therefore, we agree that monitoring erosion and channel changes is necessary.

During the April 26, 2000, meeting, ADF&G explained that the USFS used their protocol to conduct rapid surveys of many streams, so it is designed to work through a stream survey relatively quickly. ADF&G estimates it could be completed in 2 days once the methodology is familiar and would include the substrate and riffle/pool frequency counts that are of special interest to the agencies. At the meeting, AVEC stated that they were familiar with the protocol and agreed it would be appropriate for determining project impacts. AVEC, ADF&G, NMFS and FWS agreed that AVEC would survey Lagoon Creek upstream and downstream of its confluence with Lake Fork in project years 0, 3, and 5, using tier 2 of the USFS protocol, that tier 3 would be used for riparian vegetation and undercut banks.

Fisheries Surveys

The addition of 13 cfs to Lagoon Creek could impact fisheries production and habitat use.

AVEC proposes to monitor adult fish during the year of construction and for 3 years following construction, and juvenile fish during the year of construction and for 2 years following construction.

Interior and ADF&G recommend seven annual sampling periods to enumerate runs of spawning coho, pink and chum salmon: Jul 16-31, Aug 1-15, Aug 16-31, Sep 1-15, Sep 16-30, Oct 1-15, and Oct 16-30. The agencies recommend conducting surveys that are 7 to 10 days apart, following ADF&G protocols for standardization and indexing of peak foot survey counts. The survey results would include counts of live and dead fish, by species by three stream segments: (1) Lagoon Creek upstream of its confluence with the Lake Fork; (2) Lake Fork upstream of its confluence with Lagoon Creek; and (3) Lagoon Creek downstream of its confluence with the Lake Fork all the way to the ocean.

Interior and ADF&G recommend that AVEC sample juvenile fish using non-lethal capture techniques and record species, fork length, and numbers captured, in the same three stream segments as for the adult spawning counts. The agencies recommend using standardized sampling methods, times and locations to allow quantification of changes in juvenile fish numbers, any post-project increases in rearing habitat and fish use of such habitat made available by the project.

For adult and juvenile surveys, Interior and ADF&G would have study designs approved in advance by the ADF&G, and the reports submitted to the fish and wildlife agencies annually. ADF&G also recommends separate annual reports for the ADF&G Statewide and Instream Flow Coordinator and Hydrologist and the Division of Habitat and Restoration office in Anchorage. The agencies further recommend that sampling continue for at least 5 years after the first phase [9] of the project becomes operational, and if different project operations are implemented that modify the flow regime, the studies would be conducted for at least 5 years after the new operations are implemented.

NMFS recommends adult spawning surveys for 5 years twice per month during August, September, and October, or as recommended by the ADF&G, if different

[9] AVEC has not proposed a phased project.

depending on periodicity and typical life history of fish present. Live and dead fish would be counted and the species identified. Juvenile fish trapping should be conducted at times recommended by the ADF&G to identify any changes in numbers, according to standard soak times, consistency of placement, and standard methodology. Two streams in the immediate area with similar characteristics to Lagoon Creek would be selected as baseline or control streams to compare Lagoon Creek fish production. NMFS recommends using two stream that are surveyed yearly by ADF&G.

Staff analysis

AVEC and the resources agencies agree that monitoring water temperatures, channel erosion and geomorphology, and salmon numbers and habitat is needed to determine the project's effects to the salmon fishery. Of concern is whether the post-project monitoring should continue for 2 to 3 years as proposed by AVEC, or 5 years as recommended by the agencies. If adverse impacts are shown, or there is a change to project operations, the agencies recommend additional monitoring.

The first year of operation would include start-up testing and, potentially, adjustments to determine the best approach for synchronizing the operational components. Additionally, salmon may not return to Lagoon Creek for 3 or 4 years after emergence, so that emergents during the first year of operation would not be surveyed as adults unless post-project monitoring continued for longer than 3 years. We believe that a 5-year sampling period is appropriate because it would include at least one full life cycle for each of the salmonid species being monitored.

The agencies recommend methods that would allow comparison of survey results after the start of project operation to other surveys, and would use the results of such comparisons to recommend modifications to project facilities or operations, if the agencies conclude that the project negatively impacts the salmon fishery in Lagoon Creek. At a meeting conducted by Commission staff with the resource agencies and AVEC, held on April 26, 2000, the issue of using nearby streams as control streams was discussed. ADF&G explained that their commercial fisheries division conducts annual aerial surveys of Kodiak Island streams. The number of streams surveyed and survey timing varies from year to year depending on weather and funding. The same streams may not be surveyed each year and surveys may not be conducted during peak spawning periods. ADF&G described the aerial surveys as adequate only for showing gross trends in the numbers of spawning fish.

AVEC agreed to include the results of ADF&G's aerial surveys of two nearby

streams conducted by ADF&G's commercial fisheries staff with AVEC's annual fisheries monitoring report. AVEC, NMFS, ADF&G, and FWS agreed that ADF&G's aerial surveys of nearby streams would be used only as a gross indicator of trends in recruitment. The participants further agreed that comparisons of ADF&G's aerial surveys to AVEC's ground surveys of Lagoon Creek could not be used as a sole basis for determining the project's effects on fisheries. AVEC and the three agencies agreed that ADF&G's aerial surveys could be used only in conjunction with temperature, habitat, and other site specific monitoring when determining any project effects on fisheries production. AVEC's pre-filing and post-construction surveys would be compared to the aerial surveys of nearby streams for the same years and precipitation records would be used to identify if the surveys were conducted during a dry year.

We agree that monitoring conducted according to standardized protocols is necessary.

Flow gaging

AVEC proposes to use a recording stream depth gage to collect depth and flow data for use in any biotic monitoring effort, but objects to a minimum period of time to keep the gage in place. AVEC believes that other sources of data, such as adjusted data from another USGS gaging station on Kodiak Island, would be used to monitor stream flows.

NMFS recommends that a stream gage be installed just below the powerhouse and operated for a minimum of five years to collect accurate flow measurements for assessing effects on water temperature, spawning area availability, incubation of eggs, and erosion.

Interior and ADF&G recommend that AVEC install and maintain a continuously recording gage to monitor flows within the anadromous reach of Lagoon Creek, to ensure that no more that 13.2 cfs are diverted from the East Fork at any given time. The agencies recommend that flows be monitored during and after construction for up to 5 years, depending on results. The agencies further recommend that discharge measurements comply with USGS standards and be recorded at 15-minute intervals or less; and discharge data be recorded, summarized, and submitted monthly for the first year of operation and annually thereafter to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist. If using a rating curve or any other regression relationship to calculate discharge, the agencies recommend that the data used to build this regression relationship be submitted to the ADF&G Statewide and Instream Flow Coordinator and Hydrologist annually, and whenever a shift in the rating curve is observed, whichever

occurs first.

Staff analysis

The agencies' recommendation for a recording gage to monitor flows corresponds with their recommended 5-year biotic monitoring period. A gage would incorporate the most reliable method of flow monitoring to be used in conjunction with any water temperature, geomorphology and erosion, and salmon surveys. A gage measuring flows in the anadromous reach in concert with other biotic monitoring would be beneficial in assessing the project's effects on salmonid habitat, including temperature and area, and channel changes. We do not believe that using adjusted data from a USGS gage on the island would provide an accurate estimate of flows in Lagoon Creek. A stream gage in the anadromous reach, though, could not ensure that only 13.2 cfs is diverted from Mountain Creek because it would record the flow at the gage, rather than the project discharge. We recommend that any gage used comply with USGS standards.

Compliance with the 13.2 cfs maximum flow requirement would be determined by implementation of the run-of-river operations monitoring plan discussed above in Section V.C.2, Aquatic Resources. Compliance monitoring would continue for the duration of any license issued.

We discuss the costs of using a stream gage with biotic monitoring in Section VI, Developmental Analysis, and make our final recommendation in Section VII, Comprehensive Development and Recommended Alternative.

Flow continuation and ramping shutdowns for scheduled maintenance

When a project shuts down, flows to downstream resources can be interrupted.

For turbine outages, AVEC proposes to use jet deflectors to continue any required flows. As designed, the turbine and bypass system valves would be synchronized so that, if a long-term outage occurred at the turbine, flows would be simultaneously reduced at the jet deflectors and increased in the bypass system until all flow is exiting the powerhouse through the bypass system. If the bypass system is shut down, the reverse actions would occur and flows would continue at the deflectors. AVEC does not propose to continue flows if the penstock or intake require a shutdown, but would schedule maintenance to minimize impacts on fish. AVEC also proposes to automate operations and provide for remote monitoring.

At a meeting with the resource agencies held April 26, 2000, AVEC added the following provisions to their proposal: (1) clean debris and gravel from the desander between mid-May and mid-July, after ice out in the spring; (2) clean grass and debris from screens between mid-October and mid-November, prior to ice forming; (3) conduct maintenance during high flow periods; (4) limit maintenance periods to less than 8 hours in any given day; (5) consult with the agencies prior to conducting routine maintenance during other times; (6) decrease project discharge at a rate of 2 inches per hour (in/hr) when the project shuts down for scheduled maintenance and (6) not dewater the penstock during routine maintenance.

ADF&G and Interior recommend that AVEC provide a fail-safe and redundant backup system to ensure that any required instantaneous flows would be released throughout routine maintenance periods, emergency project shutdowns, and interruptions in the power grid. They also recommend that the project design and operations include remote monitoring and operation of all project components. ADF&G recommends a 2-in/hr ramping rate when the project is shut down for scheduled maintenance.

NMFS recommends that AVEC report to the agencies, any emergency maintenance or breakdown that reduces project flow to Lagoon Creek, including the date, duration of reduction, volume of reduction in cfs, reason for occurrence, method to prevent any future occurrence, and any other pertinent information. NMFS further recommends that AVEC ramp flow decreases over a 3-hr period when shutting down the project for scheduled maintenance.

Staff analysis

In the DEA, we found that the agencies' recommendation for a fail-safe and redundant backup system could not be reasonably implemented because a second conveyance system would be needed to maintain the trans-basin diversion during intake and penstock outages. At the April 26, 2000, meeting, the agencies clarified that they intended their recommendation to apply to powerhouse outages only. ADF&G stated that the reach between the powerhouse site and Lake Fork confluence usually dewaters under existing conditions, but after the project begins operation, adult salmon would be moving into the reach to spawn. ADF&G's greatest concern is that fry would not be out of the gravel by June 1, and the reach downstream of the powerhouse must not be dewatered before the fry are out of the gravel.

AVEC explained that spring and fall maintenance is needed to avoid unscheduled outages. At the April 26, 2000, meeting, AVEC and the agencies agreed that, based on

data available to date, 10 cfs may be adequate to avoid dewatering the gravel and streambed. Therefore, any effects of interruptions for maintenance should be minimized if at least 10 cfs were flowing in Lagoon Creek, excluding project discharges. The participants further agreed that fall maintenance would be conducted from mid-October to the end of November with flows at or above 10 cfs.

Project discharges would provide additional wetted area for spawning and rearing salmonids in the reach between the powerhouse site and the Lake Fork confluence. A shutdown that interrupts discharges from the powerhouse would return these areas to pre-project flow conditions, and depending on the season and precipitation, may eliminate surface flow. The result could dewater redds and strand fry and juveniles brought into the reach by project flows. Figure 7 shows that existing flows at the powerhouse site average above 10 cfs for the entire period of May 15 through July 15, and are lower during October and November.

We agree that a minimum flow of 10 cfs during maintenance is appropriate to protect fisheries and further, that providing a minimum flow of 10 cfs during the brief periods of maintenance, as proposed by AVEC, would not affect project economics. Therefore, in addition to AVEC's proposed measures for scheduled maintenance, we recommend, to protect fishery resources in Lagoon Creek, that: (1) spring and fall maintenance be conducted between May 15 and July 15, and mid-October to the end of November, respectively; (2) project shutdowns for maintenance be ramped at 2 in/hr; and (3) spring and fall maintenance occur when a minimum flow of 10 cfs is present in Lagoon Creek. We further recommend that AVEC continue during all scheduled and unscheduled powerhouse outages through their proposed bypass system and/or jet deflectors. Our recommendation is consistent with AVEC's proposal and would allow AVEC some flexibility in scheduling routine maintenance at the project, so we don't believe adopting measures to minimize the risk to aquatic resources would be a significant cost to AVEC.

NMFS's recommendation to ramp scheduled shutdowns over a 3-hr period would provide a downramping rate of 4.3 cfs per hour (cfs/hr). ADF&G said that criteria developed by the State of Washington (Hunter 1992) would require a rate of 1 in/hr during the spring maintenance period; however, because the species in Lagoon Creek are somewhat less sensitive than some of the species used to establish the Washington rates, ADF&G thinks a 2-in/hr rate would adequately protect aquatic resources during spring and fall maintenance periods. At the April 26, 2000, meeting, AVEC agreed that a 2-in/hr rate would be acceptable for project purposes.

Emergency shutdowns could reduce flows in Lagoon Creek below the powerhouse up to the amount being diverted at the time of the shutdown. We recognize that emergency shutdowns of the intake and penstock cannot be anticipated and that some losses could occur. We are unable to assess the level of any potential losses, however, because we are unable to assess the extent of fisheries' enhancements that may result of the diversion of additional flow into Lagoon Creek. Any impacts from an emergency shutdown would correspondingly reduce any enhancements from the project operation. The extent of any impacts would vary based on the volume of other surface flows in Lagoon Creek, time of year, and duration of the outage.

We agree with NMFS that AVEC should report any shutdowns resulting in reduced project flows to Lagoon Creek to the agencies, and recommend that AVEC's report include the date, duration of reduction, volume of reduction in cfs, reason for occurrence, method to prevent any future occurrence and any other pertinent information.

As proposed by AVEC nearly all of the project's operations would be controlled automatically. Logs and operating parameters would be stored on a computer in the powerhouse and accessible remotely over phone lines. Needle position sensors would control flows through the intake, bypass system, and turbine. The turbine would match power demand by maintaining a constant line frequency and the sensors would control the flow of water by opening or closing the needle valves. Only periodic maintenance items, equipment failure, and conditions exceeding the projects capacity to control would require an operator. Such items that would require an operator include:

- oiling, greasing, and changing the fluid of the mechanical components;
- replacement of failed controls and sensors; and
- cleaning of the intake and de-sander when debris loads are excessive.

We agree with Interior and ADF&G that AVEC should incorporate the automated and remote features for the project as proposed.

Tailrace

AVEC proposes to design the dual tailraces incorporating boulders to dissipate energy and slow velocity, and a stainless steel fish screen with 1.5-inch maximum openings to prevent inmigrating adults from entering the tailrace. AVEC estimates that the design would have a maximum tailrace velocity of 2 fps.

ADF&G is concerned because the proposed screen and tailrace design would

prevent fish from entering the tailrace, but may not reduce attraction to tailrace outflows. Consequently, ADF&G states that fish jumping at the screen could be injured or killed. ADF&G offers to work with AVEC, [19] on a final tailrace plan that, when implemented, would prevent salmon from entering or attempting to enter the tailrace.

Staff analysis

At an April 26, 2000, meeting with the resource agencies, AVEC presented a detailed explanation of their proposed turbine bypass and dual tailrace system. ADF&G suggested that tailrace attraction flows could be minimized by installing a series of pickets in Lagoon Creek around the discharge point. AVEC agreed that ADF&G's recommended solution would be acceptable for project purposes.

We agree with AVEC and ADF&G that salmon entering the tailrace could be injured and/or delay spawning, and that a tailrace barrier or screen is appropriate. Because AVEC has included the tailrace plan in the construction costs of the project, we believe that modifications such as installing pickets around the discharge point could be made without a significant cost increase. Installing the pickets in Lagoon Creek could adequately reduce the discharge velocities without losing operating head. Therefore, we recommend that AVEC, FWS, NMFS and ADF&G work together to design tailrace components that reduces attraction and prevents injury to migrating salmonids and submit the design to the Commission for approval.

Project review meetings

Interior and ADF&G recommend that AVEC consult with fish and wildlife agency representatives about the need for an annual review meeting. If any of the fish and wildlife agencies deem a meeting is necessary, they recommend that AVEC hold a meeting at least 60 days before the anniversary of the license, or other mutually agreeable date, to review study results, evaluate the need for continued studies and study modifications, review project operations that affect fish and wildlife, and identify courses of action required based on the results. Interior and ADF&G recommend that reports and compliance with all license stipulations be reviewed. They recommend that AVEC record the minutes of these and related meetings and circulate a draft of the minutes to attendees for review, comment and approval within 14 days following a meeting. Within

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[19] ADF&G's offer to jointly design a tailrace exclusion with AVEC was not made under Section 10(j) of the FPA.

60 calendar days of a meeting, AVEC would submit the final minutes and other evidence of the consultation, along with any recommendations and comments by the fish and wildlife agencies, and the licensee to the Commission.

NMFS also recommends annual project review meetings, with monitoring results provided to the agencies at least 30 days prior to the meeting.

AVEC has not responded to the agencies' recommendation for annual meetings.

Staff analysis

The agencies state that an annual meeting is a beneficial forum for AVEC and the agencies to work together to review and interpret monitoring results and discuss potential project-related impacts and courses of action to further protect or enhance fisheries resources.

We agree that an annual meeting would allow AVEC and the resource agencies to jointly adapt monitoring programs according to resource needs. We, therefore, recommend that AVEC contact NMFS, FWS and ADF&G annually to determine if the agencies believe that a meeting is necessary. If so, we recommend that AVEC hold a meeting with the agencies to review the results of studies, evaluate the need for continued studies and study modifications, review project operations that affect fish and wildlife, and identify future courses of action based on the results. AVEC should use the agencies' recommended time frames for meetings and meeting reports, unless other time frames are mutually agreeable among the participants.

We're not clear if Interior and ADF&G's recommendation to review all license stipulations refers to stipulations in the context of the ACMP consistency review or stipulations in a broader context of license conditions. In any event, we do not agree that it would be necessary, or even appropriate, to review all license stipulations or conditions. Based on the agencies' rationale for recommending annual meetings, we would expect any annual meeting to focus on project-related fisheries issues and any ongoing monitoring. We envision that these meetings would review the results of any monitoring conducted during the prior year and evaluate any need for continued monitoring or protection and enhancement measures, if warranted based on monitoring results. Additional protection and enhancement measures and supporting documentation would be submitted to the Commission, and implemented only after approval by the Commission. After post-construction monitoring is completed and any measures based on monitoring results have been implemented, we recommend that annual meetings be

discontinued.

Escrow account

Interior and ADF&G recommend that an interest bearing escrow account be established. This account would be used to mitigate any unforseen impacts caused by project construction or operation which could not be alleviated by a change in operations. They also recommend that AVEC work with Interior and ADF&G to prepare a detailed plan for use of this fund. A resource management council including representatives from NMFS, FWS and ADF&G would be established to authorize expenditures. As recommended, AVEC and the agencies would jointly determine the amount of money to be placed in the account and the council would determine the type, cost and location of mitigation measures. The principal and accumulated interest would remain in escrow for the term of the license, unless unanimously determined by the council and AVEC that the account could be closed and any remaining funds returned to AVEC. The council would notify AVEC before any funds are withdrawn and allow AVEC to audit expenditures.

AVEC objects to an escrow account because the Commission would inspect the project on a regular basis and could impose a financial penalty for non-compliance with the license. AVEC further states that it is a non-profit cooperative and budgets annually for the operation and maintenance of 47 power plants and associated facilities. AVEC's annual revenues are approximately $20,000,000 per year and are calculated to cover a wide range of operating costs. AVEC believes it has the resources to maintain the project in good order including any extraordinary response that might be needed to control erosion or stabilize slopes.

Staff analysis

The agencies' recommendation to establish a fund was discussed at a meeting with the resources agencies held April 26, 2000. ADF&G pointed out that AVEC's proposed gate to bar all-terrain vehicles would be sited on refuge lands to utilize the location that would be most effective at preventing access around the gate. This location would result in general access to portions of AVEC's maintenance trail and the refuge. The agencies believe that funds should be available to manage the easement lands in the event that increased recreation or other factors resulted in misuse of the land. No consensus was reached by the meeting participants to establish such a fund.

The agencies make and we recommend a variety of prudent and viable measures to protect fish and wildlife resources during project construction and operation; including

preparation of a final ESCP, hazardous spill prevention plan, run-of-river operation, and monitoring measures to identify and remedy any effects of the project. We believe that our measures would be sufficient to protect fish and wildlife and mitigate any project impacts. If monitoring shows that the project is adversely affecting resources, the Commission may direct AVEC to modify project operations or facilities. Further, if during the term of a license documentation supporting additional measures is presented, the Commission could reopen the license, and after notice and opportunity for hearing, require additional measures of AVEC. We have no reason to believe that AVEC would not be able to fund any future measures as may be required by the Commission. Therefore, we do not see a need for the account and do not recommend that AVEC establish an escrow account.

Environmental Compliance Monitor

AVEC proposes to hire personnel, of whom agencies would be notified, to be responsible for compliance with the provisions of the license, as well as safety and hazardous substance compliance, and have the authority to control the construction of the project.

To monitor the effectiveness of the final ESCP, adherence to the fuel and hazardous substances spill prevention plan, and protect natural resources during construction, Interior and ADF&G recommend that AVEC hire a qualified ECM with the authority to: (1) ensure compliance with the provisions of the license; (2) cease work and change orders in the field as deemed necessary; and (3) make pertinent and necessary field notes on environmental compliance monitoring by the licensee. The agencies further recommend that AVEC, in coordination with the fish and wildlife agencies, write the position description of the compliance monitor, including qualifications, duties, and responsibilities.

Staff analysis

The Lagoon Creek watershed provides habitat for salmon, Kodiak brown bear, and other fish and wildlife resources that could be negatively affected during construction through noncompliance with environmental measures. Given the remoteness of the area, we believe that providing an ECM during project construction would help protect the resources of the area.

Before any construction activity could begin, AVEC would be required to comply with the Commission's Construction Quality Control Inspection Program (QCIP). The

QCIP requires a plan for inspecting and monitoring erosion control and other measures to protect the environment in the project area including, where appropriate, an onsite monitor for construction activities. Monitors may be given the authority to cease work and may be present part time or full time as justified by the QCIP plan. Requirements for the plan include a position description for any monitors, with a description of all duties, responsibilities, and authorities. AVEC's QCIP plan would be submitted to the Commission's Regional Director in Portland, Oregon for approval.

We discuss the costs of providing an ECM in Section VI, Developmental Analysis, and make our final recommendation in Section VII, Comprehensive Development and Recommended Alternative.

Hazardous substances

Interior and ADF&G recommend that AVEC consult, and obtain approval from, the fish and wildlife resource agencies for a fuel and hazardous substances spill prevention plan to help prevent and minimize any effects associated with the handling of fuel and other hazardous substances during proposed project construction and operation.

Spills of fuel and other hazardous substances during the construction and operation of projects can adversely affect aquatic resources. We agree that a plan would lessen the chance of a spill occurring and, should a spill occur, provide steps to prevent or minimize effects on aquatic resources. We, therefore, recommend that AVEC prepare and implement a fuel and hazardous substances spill prevention plan. The plan would be developed in consultation with NMFS, FWS and ADF&G. Procedures for handling hazardous substances are a necessary part of the project's construction costs, so we don't believe that developing a plan would significantly increase costs.

Site inspection

Interior and ADF&G recommend that fish and wildlife agency representatives, who show proper credentials, have free and unrestricted access to, through and across access routes leading to project lands, all project lands and all project works.

AVEC did not respond to the agencies' recommendation to allow agency representatives access to the project site and works.

Resource agencies manage fish and wildlife resources in the Mountain and Lagoon Creek watersheds. Therefore, we recommend that AVEC allow representatives of the

NMFS, FWS and ADF&G, who show proper credentials, free and unrestricted access to project lands and works in the performance of their official duties, to the extent that AVEC has authority from any land holders to allow access. For safety and liability reasons, however, we recommend that advance notification be required.

Consultation

NMFS recommends that AVEC submit their draft revegetation plan to NMFS at least 60 days before project implementation and their biotic monitoring plans 6 months before plant operation begins. NMFS recommended revegetation plan is discussed in V.C.3, Terrestrial Resources.

Interior and ADF&G recommend that: (1) AVEC initiate consultation on their recommended plans with the resource agencies at least 6 months prior to land-disturbing activities; (2) resource agencies be able to approve plans; (3) resource agencies be allowed 30 days lead time, in writing, for agency comment and consultation; (4) plans be submitted to the Commission at least 30 days before the scheduled date to initiate activities related to the plan; (4) plans be implemented after written approval is received from the Commission; and (5) if agreement on the plan is not reached, project implementation be halted.

Staff analysis

We recommend that the Commission's standard consultation requirements, which include most of those recommended by the agencies, be included in any license issued to AVEC. That is AVEC would: (1) develop a plan in consultation with specified resource agencies; (2) prepare a draft plan, after consultation with the agencies; (3) submit the draft plan to resource agencies, allowing agency personnel a minimum of 30 days to provide comments and recommendations; (4) prepare a final plan based on the agencies' input; (5) file the final plan with the Commission, for approval, along with agencies' comments and recommendations on the draft plan, including an explanation of how the agencies' comments and recommendations have been accommodated by the final plan; and (6) implement the plans after being notified by the Commission that they have been approved.

Construction-related plans must generally be filed with the Commission 90 to 180 days prior to any ground-disturbing or land-clearing activities. We do not recommend that AVEC be required to routinely initiate consultation 6 months before an activity because plans may vary in depth and subject. We do not recommend that the

Commission halt construction if an agreement on a plan is not reached through the consultation process, because the Commission would determine whether or not a license violation exists, and if so, any measures that may become necessary to establish compliance. We don't recommend that the agencies have approval authority over plans because their concerns would be submitted with AVEC's filing and addressed by Commission staff when a plan is approved or modified. In any event, the Commission reserves the right to modify and finally approve any plan submitted.

Amendment of license articles

NMFS recommends that any interested party may petition the Commission to add new conditions or amend the terms and conditions submitted as necessary to protect, mitigate and enhance fish, wildlife and their habitat pursuant to FPA Section 10(j).

This is a legal issue which would be addressed by the Commission in any license issued to AVEC for the project.

C. Unavoidable Adverse Impacts

The diversion of up to 13.2 cfs into Lagoon Creek could cause long-term temperature changes and/or erosion in Lagoon Creek that could affect salmon and salmonid habitat downstream of the powerhouse. With our recommended operational and biotic monitoring plans, however, these affects should be minimal. During emergency outages of the intake or penstock, some salmon could be stranded and redds dewatered downstream of the powerhouse. We are unable to accurately estimate any potential effects, however, because we won't know to what extent, if any, the diversion would enhance salmon and salmon habitat below the powerhouse. We recommend scheduling maintenance during times that would minimize any adverse affects on salmon and salmon habitat below the powerhouse. We also recommend continuing flows during any powerhouse outages, scheduled or unscheduled.

3. Terrestrial Resources

a. Affected Environment

Open black cottonwood/Kenai birch forest with an understory of willow and alder dominates the riparian vegetation at lower elevations near the powerhouse and along the access route. The black cottonwood forest transitions to a dense tall alder/willow shrub community as the penstock moves out of the riparian zone of the Lagoon Creek and up

the mountain, which gradually thins with increasing elevation to a subalpine grass/moss/lichen dominated midslope habitat, intermixed with willows and alders along the upper portions of the penstock and at the project intake (about 1,000 fmsl).

Wetlands in the project area are small, generally isolated, and scattered depressions and valleys that fill with water and peat. At the higher elevations, the wetlands are dominated by moss overlying peat to the depth of solid bedrock. In the low-lying areas near the powerhouse, they are mostly grass and peat overlying soil and gravel. Wetlands are also associated with a few active springs emerging from talus slopes above Lagoon Creek. Lagoon Creek empties into a salt lagoon dominated by various grasses and other emergents.

Habitats in the project area support a diverse array of wildlife. Over 250 species of fish, birds, and mammals have been recorded on the refuge and adjacent areas (FWS 1987). Common mammals in the project area include Kodiak brown bear, Sitka black-tailed dear, mountain goat, and others. Surveys for brown bear, black-tailed dear, and mountain goats have not been conducted. However, most of the refuge is considered optimum brown bear habitat (FWS 1987). Intensive aerial surveys in the Kiliuda Bay (located about 2 miles east of the project) and Shearwater Peninsula areas found a relatively high density of brown bears (270 bears/1,000 sq kilometers; Barnes and Smith 1997). Brown bear densities in the Old Harbor Project area are expected to be similar to those found at Shearwater Peninsula and Kiliuda Bay areas of Kodiak Island. The midslope habitat, through which most of the penstock would traverse, contains bear dens at or near 1,000 feet elevation and is habitat prevalently used for denning by brown bears on the southwest side of Kodiak Island (Van Daele et al. 1990). The Big Creek, east of Lagoon Creek and within 1 mile of construction activities, is a good tributary for salmon spawning and, thus, is prime habitat for brown bears. Brown bears also feed on subalpine vegetation within the proposed construction zone and fish in Lagoon Creek during the autumn coho salmon run. Habitats along the penstock are also important summer habitat for black-tailed deer does and fawns and are used by both sexes in the winter. Mountain goats are primarily found on the high peaks above the project, but traverse the project area when traveling between peaks.

Over 160 species of birds have been recorded on the refuge, 80 of which may nest on the refuge (FWS 1997). Thirty species of birds were observed in habitats adjacent to the project or nearby during site surveys conducted in August 1996 and June 1998. The most common birds observed were the fox sparrow, Wilson's sparrow, and savannah sparrow. Bald eagles, an abundant nesting species on the refuge (over 200 nesting pairs; FWS 1997), nest in the large cottonwoods adjacent to Lagoon Creek near the

powerhouse. One active nest and three old nests were observed in this area. The active eagle nest is about 380 feet from the access road. Two young were observed in the nest on August 9, 1996. The closest inactive nest to the powerhouse is about 600 feet away from the access road.

Other birds of particular concern in the project area include the marbled murrelet, Kittliz's murrelet, and harlequin duck. None of these species were observed during limited site surveys conducted on August 9, 1996 (MacIntosh 1996) and June 15 and 16, 1998 (Eskelin 1998). No surveys of Mountain Creek were conducted. However, Eskelin concluded that elevation and habitat conditions along Mountain Creek and Lagoon Creek were not suitable for Kittliz's murrelet, and not typical of nesting habitat of the marbled murrelet. No harlequin ducks were observed in Lagoon Creek or in Sitkalidak Strait, suggesting that their use of the area may be limited. However, given the limited survey effort caution must be applied in interpreting these results. Suitable habitat, which includes remote mountainous streams, may be present for the harlequin duck in both Mountain and Lagoon Creeks.

During the scoping process, we received a letter from LASER, an organization that includes members who work, live, hunt, fish, and seek recreation with their families in the vicinity of the proposed project. LASER urged that a Habitat Evaluation Procedure (HEP) analysis be conducted under appropriate FWS criteria to calculate the Habitat Units (HU) at the project site, both before and after project construction and operation. LASER urges no net loss of HUs. We did not require AVEC to conduct a HEP analysis because the procedure is model-driven and requires a significant amount of data collection and management. We felt that the expense of data collection and modeling was not commensurate with the size of the project. Further, no resource agency commented that a HEP was needed. Our recommended mitigation for land disturbances is found in Section VII, Comprehensive Development and Recommended Alternative.

b. Environmental Impacts and Recommendations

Vegetation Impacts

Project construction would result in the loss or disturbance of about 16 acres of vegetation. Activities resulting in that disturbance include using heavy equipment (backhoe, bulldozer) to dig a trench and bury the penstock, to construct the powerhouse, to construct and grade the access trail, to bury the transmission line and phone line within the access trail, and to transport equipment. Vegetation disturbance would also result from driving four-wheel ATVs within the penstock right-of-way during construction to

transport equipment and personnel. Disturbed sites would also include spoil deposits along the penstock, presumably within the penstock right-of-way. Estimates of vegetation disturbance along the penstock and access road conservatively assumes a 60-foot right-of-way, not all of which would require complete clearing in all areas. During operation, vegetation disturbance would be primarily limited to within the access trail during trips to the intake for maintenance.

AVEC originally proposed a 30-foot-wide right-of-way for the penstock, transmission line and phone line. AVEC submitted a revised request for a 60-foot-wide right-of-way to allow the construction and maintenance trail to follow the natural land contour as much as possible and avoid the need to cut and fill areas that a 30-foot right-of-way would require. AVEC stated the maintenance trail would not be widened beyond the initial proposal, but the full 60-foot corridor could be used when turning around construction equipment. During a meeting held with the resource agencies on April 26, 2000, FWS stated that FWS engineers have reviewed AVEC's plans for the project and concluded that a 30-foot right-of-way would be too narrow to meet construction and maintenance needs. ADF&G, USFWS and NMFS agreed with AVEC that a 60-foot right-of-way is reasonable because it would allow the construction and maintenance trail to follow natural land contours, which would not be as disruptive to the landscape. Therefore, we conclude that a 60-foot-wide right-of-way would minimize vegetation disturbance by allowing greater flexibility in routing the construction corridor.

AVEC would also prepare and implement a soil erosion control plan that includes burying as much exposed penstock as possible and re-seeding all disturbed areas with a mixture of 60 percent Bering hair grass, 30 percent arctic red fescue, and 10 percent annual rye, applied at 1.5 pounds per 1000 square feet. A 20-20-10 fertilizer formula would be applied at 475 pounds per acre to promote growth. [11]

Interior and ADF&G recommend a revegetation plan as part of the soil erosion control plan that includes (a) location of treatment areas, (b) plant species and planting methods to be used, (c) planting densities, (d) fertilizer formulations, (e) seed test results, (f) application rates, and (g) a specific implementation schedule and details for monitoring and maintenance programs.

NMFS recommends that AVEC prepare as part of its soil erosion control plan a

[11] AVEC's proposal was developed in consultation with the Alaska Plant Materials Center.

revegetation plan that includes (a) using only native plant species, (b) monitoring with a goal of achieving 50 percent of natural vegetation densities within one year, and (c) rehabilitating any stream bank damage using biorehabilitation techniques that mimic native vegetation densities and species.

Because of the small area affected (16 acres) and abundance of undisturbed similar habitat within the surrounding refuge, vegetation and habitat impacts are considered to be minor. Measures proposed to minimize clearing and site disturbance effects would avoid impacts to surrounding habitat to the greatest extent possible and reduce unavoidable adverse impacts. AVEC's proposed seeding mixture is not composed of only native species. The mixture would assist in controlling erosion which may retard revegetation, be readily available, be tolerant of moist sites and adapted to a wide range of conditions, and tolerate flooding and foot traffic; but provide low to moderate wildlife/fishery habitat value (Muhlber and Moore 1998). Other native grasses and sedge species (Muhlber and Moore 1998) may be available or salvaged and subsequently used that would provide higher habitat value and better restore the disturbed areas to a more ecologically natural, self-sustaining condition, similar structurally and functionally to the surrounding "undisturbed" ecosystem. For example, vegetative mats, plugs, or sprigs may be used to provide sources of native plants that would otherwise be unavailable (Muhlber and Moore 1998). Cottonwoods, birch and alder provide important habitat components for fish and wildlife. Cottonwoods and birch readily colonize disturbed sites and should revegetate the penstock naturally. Cottonwoods, alder, and birch are also readily available and could be used effectively, if necessary, to stabilize streambank or channel erosion (Muhlber and Moore 1998).

Monitoring and maintenance of site rehabilitation efforts is also necessary to ensure success of vegetation planting. AVEC's proposal does not include vegetation monitoring efforts.

We believe the use of native plant materials for revegetation would benefit wildlife and fish resources and would assist in recovering and maintaining a natural appearance in the area of the penstock. We discuss the costs of the revegetation plan in Section VI, Developmental Analysis, and make our final recommendation in Section VII, Comprehensive Development and Recommended Alternative.

Wetland Impacts

Project facilities were sited and designed to minimize wetland and riparian crossings and to limit disturbance to these communities. Nonetheless, project

construction activities would result in the filling and clearing of about 1.3 acres of wetlands. Wetlands and riparian habitats would be permanently lost within the footprint of the access trail, powerhouse, and intake structure. In other areas, AVEC would allow the wetland and riparian vegetation to reestablish naturally (i.e. over the penstock and access-trail). AVEC would also implement the following measures to ensure that hydrological flow patterns important to maintaining wetlands are not significantly altered: (a) install drains where the penstock is not completely buried; (b) construct all weather wooden timber bridges across wetlands along the access trail in a manner that would allow water to continue to flow unimpeded; (c) construct low water crossings along the access trail that would allow run-off water to run over the trail; (d) install small bridges and/or culverts across continuously flowing streams so that the water flows under the trail; and (e) locate the bridges, powerhouse and access road high enough to be outside of the flood plain of Lagoon Creek.

No additional measures were recommended by the agencies. Interior requests[12] that AVEC commit to not using wood timbers or planks that are treated with any preservative containing creosote or pentachlorophenol where these planks or timbers would come in contact with wetlands or water bodies. If preservatives are used, only pressure treated application should be employed. Interior also requests that preservatives not be painted on, sprayed, or otherwise applied by surface application. These measures are suggested to prevent leaching of toxic chemicals that could be harmful to fish and wildlife. We agree with Interior and recommend that specifications in the final ESCP include stipulations that contractors not use in wetland areas lumber treated with preservatives containing creosote or pentachlorophenol or surface applied preservatives.

We also agree with AVEC that wetland areas have been avoided to the greatest extent practical. No additional measures are recommended.

Brown Bears

Brown bears are important and prized resources (for both consumptive and non-consumptive purposes) of the refuge and are important in the culture and subsistence of native people of Old Harbor. Project construction and operation would adversely affect brown bears by altering or eliminating potential denning and foraging habitat, through disturbance, and by increasing potential interaction with humans.

[12] Interior's request was not made under Section 10(j) of the FPA.

Project construction would result in a small loss (16 acres) of potential denning and foraging habitat through vegetation removal - less than 0.007 percent of the Kiliuda Bay geographic unit studied by Barnes and Smith (1997). Construction-related activities would have a greater effect on an unquantified area by disturbing feeding bears along Lagoon Creek during the salmon spawning runs (August through October: Barnes and Smith 1997), by disturbing denning bears during winter construction activities, by disturbing foraging or other activities in surrounding areas through the use of low-flying helicopters, blasting, and/or drilling, and by temporarily altering movement patterns. Brown bears are particularly sensitive to low-flying helicopters (Smith and Van Daele 1990). Disturbances can result in increased energy expenditures, reduced food intake, altered behavior, and den abandonment.

Construction-related effects would be short-term and limited in that: (a) AVEC's project construction activities would be completed in about 9 months if started in early January; (b) construction activities would be confined to a small area adjacent to Lagoon Creek and the East Fork (except noise from helicopters, blasting, and drilling would extend further); (c) helicopter use would be intense on a short-term basis (8 to 9 days for 10 hours around June or July to transport the penstock) and sporadic during the remainder of the year (0.5 to 1 day at a time to deliver miscellaneous items); (d) blasting and drilling would be isolated occurrences and may not be needed at all; (e) bears may be habituated to a certain level of low-impact disturbance due to the proximity of the project (primarily the powerhouse) to Old Harbor; and (f) normal behavioral, feeding, and denning patterns would return following construction because disturbance during operation would occur infrequently and would be localized, associated primarily with maintenance activities at the intake and powerhouse. Periodic maintenance activities would result in less than optimal use of available resources by brown bears for the life of the project. However, the effects should be minor given the limited affected area, abundance of surrounding resources, and availability of thick escape cover. Consequently, we conclude that disturbance effects from project construction and operation on brown bears would likely be minor. Construction-related disturbances were also determined to have minor impacts on brown bears during and following construction of the much larger 20-MW Terror Lake hydroelectric project - it took 3 years to construct this project located on the Terror River in northern Kodiak Island. Smith and Van Daele (1990) found that brown bears were apparently able to co-exist with intensive construction activity by making minor shifts to nearby areas with heavy cover and resumed use of available habitats following construction. Smith and Van Daele (1990) concluded that intrusive short-term development activity was accommodated without major detrimental effects because of abundant and varied food resources, as well as dense cover that allowed the bears to continue to use the area. While it is sometimes risky to extrapolate data from one project

to another given site-specific differences in habitat and use that might be present, we believe that because of proximity of the two projects, similarity of habitats, and abundance of undisturbed habitat and resources, it is reasonable to assume that similar effects would be noted at the Old Harbor Project.

Of greater concern would be the potential long-term adverse effects of any reduction of salmon in Mountain or Lagoon Creeks. Pacific salmon are an important component of brown bear diet (Barnes 1990). Limited sampling during 1996 and 1998 suggests that numbers of salmon spawning in Mountain Creek is small and spawning access is limited by lack of surface flows, thus Mountain Creek would likely represent a marginal fishery for brown bears (fish surveys are discussed in Section V.C.2, Aquatic Resources). In contrast, Barling Bay Creek, which Mountain Creek joins near its confluence with tide water, provides a much more desirable fishery for brown bears - providing large numbers of coho, pink and chum salmon. Reductions in flow to Mountain Creek and any concomitant decrease in spawning salmon numbers would have limited adverse impacts on bear food resources. Conversely, Lagoon Creek and the Lake Fork have good salmon fisheries, supporting coho, chum, and pink salmon, and Dolly Varden. AVEC postulates that increases in flow to Lagoon Creek would improve salmon spawning habitat and returning salmon, thus providing additional food resources. While this hypothesis may prove true, information on other factors influencing salmon production such as changes in stream temperature, water quality, availability of juvenile rearing habitat are not available to support this conclusion at this time. Monitoring of salmon numbers in Lagoon Creek would be useful in determining overall effects on available bear food supplies in Lagoon Creek. Salmon and habitat surveys are discussed in Section V.C.2, Aquatic Resources.

Project construction could also affect brown bears by increasing human/bear conflicts. Increased interactions with the construction workforce or increased public use due to enhanced access can result in bears being killed in defense of life and property (DLP). Next to sport hunting, DLP is the primary cause of bears killed by people on Kodiak Island; levels of human activity on the refuge are increasing, resulting in more bear/human conflicts, with as many incidences occurring near remote villages and on or near the coastline (FWS 1987, Smith et al. 1990). To reduce such conflicts and to protect brown bears, FWS recommends that AVEC prepare a bear safety plan that includes: (1) instructions for operating in bear country that minimize possible conflicts, (2) minimizing encounters and avoiding areas used by bears, (3) keeping construction sites and refuse areas clean, (4) installing bear-proof garbage receptacles and other measures to prevent bears from obtaining food or garbage, and (5) procedures to deal with problem bears. AVEC did not propose any measures to minimize human/bear conflicts, other than gating

or blocking ATV access which is discussed in greater detail below.

Similar measures, including adequate management of garbage, firearms restrictions, and education of workers at the Terror Lake Project were key factors in minimizing bear/human conflict and killing of bears (Smith and Van Daele 1990). The cost of a bear safety plan is presented in Section VI, Developmental Analysis and our recommendation is found in Section VII, Comprehensive Development and Recommended Alternative.

Bald Eagles

Project construction activities along the access road and the use of helicopters could result in the disturbance of nesting bald eagles. Construction of the access road and powerhouse would be within the line-of-sight of eagles nesting along Lagoon Creek. Work along the majority of the penstock and at the intake would not be visible because of intervening terrain. However, the use of helicopters to deliver materials to the penstock and intake would likely occur within the line-of-sight of nesting eagles and could disturb them. Helicopter use would likely occur during an 8 or 9 day period early in the construction phase and then for short durations later on, but would not likely begin before May 15. Interior notes that eagles will readily abandon their nests when disturbed prior to May 15 and disturbance through July 1 may cause nest failure. After that period fledglings are not as susceptible to minimal disturbance although direct helicopter flights would be excessive. The project is not likely to affect available food supplies because Lagoon Creek is too heavily wooded to provide suitable foraging and more suitable foraging is available away from construction activities in the bay.

AVEC proposes to conduct surveys for nesting bald eagles before construction begins on the powerhouse or the access trail. If any are found, their position would be recorded and shown on a drawing with the project features. This information would be forwarded to the FWS with a request for guidelines regarding the construction as it relates to the presence of the eagle nests. If eagle nests are found, they most likely would be on the east side of Lagoon Creek based on past nest locations. At a minimum, AVEC proposes to direct helicopter flights close to the mountain on the west side of the stream so that there would be about a quarter of a mile distance between the helicopter path and the eagle nests. Interior has indicated a willingness to work with AVEC on actions to avoid impacts to eagles. AVEC's proposed actions are reasonable and would likely avoid severe impacts on nesting bald eagles. We recommend that AVEC prepare a final eagle protection plan, in consultation with FWS and ADF&G, that details methods and timing of surveys for nesting eagles, and specific actions that would be implemented to avoid

disturbance to nesting eagles, including timing of construction activities and helicopter use and flight paths to avoid disturbing nesting eagles. This plan should be filed with the Commission at least 90 days before land-disturbing activities would take place.

Other Wildlife Species

Similar to the effects discussed for the brown bear, construction activities would result in the loss of habitat used by a variety of wildlife including Sitka black-tailed dear, mountain goat, neo-tropical migrant birds, and other small mammals and furbearers. Construction activities would be temporary and the disturbance associated with these activities minor. However, project facilities would result in the permanent alteration of a small amount of habitat. Disturbance from maintenance activities would result in less than optimum use of available resources for wildlife for the life of the project. Disturbance of mountain goats should be minimal, however, because of their transient use of the project construction area; consequently, this species is not likely to be significantly affected by project construction or maintenance activities.

As we discussed for brown bears above, we believe impacts on wildlife to be minimal because of the limited area affected (16 acres), short-term intense construction period, and abundance of available undisturbed habitat. Revegetation of the project would help minimize adverse impacts. Our recommended use of native plants would also help return most of the affected land to useable state for wildlife much sooner. No additional measures were recommended by the agencies or AVEC, and we do not recommend any.

Access and ATV-Use

Historically, the project area has been used for occasional subsistence and hiking purposes. ATVs have used a large part of the project area for many years; use expanded into new areas, including the area of the project intake, during the course of project studies. ATV use and access into new areas of the refuge would likely continue because of the small access trail that would be built to service the penstock and intake structure. With increased access and ATV use comes the potential for greater disturbances to brown bears, deer, mountain goats, and other wildlife, potentially greater human/bear conflicts, increased DLP mortality of brown bears, and increased pressure from recreational and subsistence hunting. Additionally, ATV use results in the direct loss or degradation of habitat in remote areas of the refuge, destroys sensitive alpine vegetation, compacts soil, causes rutting and erosion of stream banks, and leaves long-term scars on the land which in turn degrades fish and wildlife habitat (Smith and Van Daele 1990, Smith et al. 1990,

Kasworm and Manley 1990, Mclellan 1990, FWS 1987). The use of ATVs is prohibited in Alaska refuges other than areas designated by the refuge manager or pursuant to the terms and conditions of a special use permit (FWS 1987). ATV use is also inconsistent with minimal management prescribed for the Kodiak National Wildlife Refuge (FWS 1987).

AVEC considered several alternatives to control public access created by the access trail to the intake. AVEC concluded that keeping ATVs off the access trail to the powerhouse is impractical. Even gates on the bridges would not be effective, given the relatively flat terrain and heavy existing use of the area, including Lagoon Creek. AVEC also considered constructing a gate just uphill from the powerhouse. To be effective, an existing trail through a nearby notch in the hillside would also need to be blocked with boulders or gated. However, this is a popular recreational access for local residents.

Instead, AVEC proposes to allow ATV traffic to the powerhouse, but to construct a gate at the top of a small steep hill along the penstock route about half way between the powerhouse and intake sites. Several notches would need to be blocked near the hill to prevent ATVs from circumventing the control structure. The terrain at the hill control is very difficult to negotiate. Only recently (May 1998) did local residents successfully make their way up to the intake area by using piles of alders for traction - a testament to the ingenuity and perseverance of local people with a desire to access the area. AVEC also proposes to monitor unauthorized access with AVEC's maintenance personnel. The maintenance person would look for signs of damage to the gate and other physical barriers, tracks in the vegetation outside of the existing access trail, and would notify AVEC of any unauthorized access. If the gates prove ineffective, AVEC would consult with the refuge manager on ways to prevent further access. This may involve improving the gate or adding additional barriers.

No agency filed recommendations for controlling ATV access.

We agree that some control of ATV access is necessary to prevent impacts to wildlife and vegetation and to maintain the wilderness character of the surrounding refuge lands. AVEC's proposed measures would likely control ATV access. We also agree that by allowing the local residents to use the access trail to the powerhouse, that some impacts currently occurring along Lagoon Creek may be reduced or eliminated. However, the specific details of AVEC's proposed measures still need to be developed. Therefore, we recommend that AVEC file with the Commission for approval, a final ATV access control plan, developed in consultation with ADF&G and FWS, that describes the locations and types of access control (gates, boulders, etc.), construction

methods and schedule, monitoring methods and schedule, and the measures that would be taken if access restrictions prove to be ineffective.

We don't believe the costs of implementing this plan would be significant, because AVEC has already proposed the measures to be implemented. ATV use where access is not controlled is discussed in V.C.5, Recreation and Land Use.

Summary

Project construction effects on wildlife and wildlife habitat should be relatively minor because of the limited area affected, short construction period, and availability of abundant and varied food resources and escape cover that would allow wildlife to continue to inhabit the project area and to return following construction. Our recommended measures for a revegetation plan that incorporates the use of native species to the greatest extent practical, a bear safety plan, an eagle protection plan, and access control plan would reduce and mitigate anticipated impacts to an acceptable level.

C. Unavoidable Adverse Impacts

Sixteen acres of vegetation and 1.3 acres of wetlands would be lost or altered by project construction. Some disturbance and temporary displacement of wildlife would be unavoidable during construction. These effects would be minimized by implementing our recommended measures for revegetation, bear and eagle protection, and ATV restrictions.

4. Threatened and Endangered Species

No federally-listed threatened and endangered species under Interior's jurisdiction occur in the project area (letter from Pamela Bergman, Acting Regional Environmental Officer, Office of the Secretary, U.S. Department of the Interior, Anchorage, Alaska; September 10, 1999).

The Snake River sockeye salmon (endangered), Snake River fall chinook salmon (threatened), Snake River spring/summer chinook (threatened), and stellar sea lion (endangered) are federally listed for Alaska marine waters; but would not be affected by the project because (1) these species do not occur in Lagoon or Mountain Creeks; (2) construction and operation would not require any work in the marine environment, other than shipping of equipment and materials, that could reduce or modify the foraging habitat of these species; and (3) no sea lion rookeries or haulouts are located in or near the project area.

We conclude for the reasons stated above that the project would have no effect on threatened and endangered species, and no further consultation pursuant to the Endangered Species Act is necessary.

5. Recreation and Land Use

a. Affected Environment

ATVs have used a large part of the project area for many years, including an existing trail that runs through a bog along the east side of Lagoon Creek to the proposed powerhouse site. This trail has two instream crossings used by ATVs in Lagoon Creek. One crossing is just downstream of the confluence of the Lake Fork and Lagoon Creek. ATVs also run either on the banks or in the stream for about 300 feet before crossing again just above the confluence. The existing trail runs near the proposed powerhouse site, and AVEC has used this trail to access the site.

To conduct studies for the proposed project, AVEC also created a new trail on the west side of Lagoon Creek that runs along the proposed penstock and transmission line routes to the intake site (AVEC 1999, Figure T-1, Appendix A). Local residents have started to use this new trail for hiking and ATV access to lakes in the Big Creek Basin.

b. Environmental Impacts and Recommendations

During construction, AVEC would improve the trails to the powerhouse and intake sites to use as roads to support construction activities.

After construction, AVEC proposes to improve the access road to the powerhouse, including bridging Lagoon Creek, and leave it as an improved feature. AVEC would allow the access road to the intake to revegetate naturally after construction, but would continue to maintain a 4-foot-wide trail for maintenance access by ATV to the penstock and intake. AVEC proposes to bar public ATV access by installing a gate about half way between the powerhouse and the intake, the first site on the trail where ATV's could be prevented from going around a gate and continuing to the intake. AVEC would continue to allow recreational ATV traffic to the powerhouse and above the powerhouse to the gate.

Interior is concerned that with improved access more areas would be vulnerable to

ATV use, allowing for increased take in wildlife, destruction of alpine vegetation, soil compaction, and rutting and erosion of stream banks that causes erosion and sedimentation.

Staff analysis

Keeping ATVs off the access road to the powerhouse is impractical. Even gates on the bridges would not be effective. ATV users would find other locations to cross Lagoon Creek so they could get on the access road. Local residents have asked that AVEC provide more areas for ATV use, and would want to use the improved access road because it would be an easier and faster way to get to the Big Creek Basin. By allowing ATVs to use the access road to the powerhouse and the new trail as far as the proposed gate, new damage to the streambanks and vegetation could be avoided. The damaged areas in the lowlands could recover and ATV use directly in Lagoon Creek and on its banks would probably be eliminated. We recognize that ATV access as far as the gate could cause an increase in ATV use that would have a negative impact on the surrounding environment. We believe, however, that permitting access could also provide a reasonable alternative to the current ATV use of the banks and streambed.

We agree with AVEC that the best method of preventing or minimizing ATV use of the access trail to the intake would be a gate. Our recommendation regarding AVEC's proposed gate is discussed in Section V.C.3, Terrestrial Resources.

Because the project would allow enhanced ATV access to the powerhouse site and above the powerhouse as far as the proposed gate, we recommend that AVEC develop a recreation plan in consultation with the FWS, NMFS, ADF&G, Old Harbor, and the OHNC. The plan would include methods and measures to protect the area from improper use yet still allow for recreational ATV use on the access road.

c. Unavoidable Adverse Impacts

Revegetation would not occur for about 4,400 feet on the 4-foot-wide penstock maintenance corridor because of permanent public ATV access. These effects would be minimized by our recommended recreation plan.

6. Cultural Resources

a. Affected Environment

Old Harbor falls within the traditional territory of the Koniag, one of three regional groups of the Alutiiq people. At historic contact, the Koniag inhabited coastal environments of the Kodiak Archipelago and the Alaska Peninsula. Other Alutiiq peoples, the Chugach and the Unegkurmiut, inhabited Prince William Sound and the outer coast of the Kenai Peninsula. In the Kodiak Archipelago, the cultural history of the Alutiiq is preserved in a multitude of archaeological sites. Dense prehistoric populations left large accumulations of cultural debris that have resisted decay in the region's persistently cool wet environment.

Archaeological evidence from southeast Kodiak Island, including the Old Harbor area indicates that people of the Ocean Bay tradition maintained residences in strategic locations that allowed them to take advantage of ecological variability. Residential sites of this period have been found mostly on mid-bay coastal locations where marine oriented hunter-gatherers could have moved efficiently between outer and inner bay environments in response to resource availability and traveling conditions.

Archaeological research in the Kodiak Archipelago began early in 1930. Anthropologist Ales Hrdlicka excavated a large prehistoric village site in Larsen Bay on the western side of Kodiak and conducted a cursory boat survey of the archipelago (Hrdlicka 1944). Early in 1960, the University of Wisconsin initiated the first major excavations designed to define Kodiak's prehistoric sequence. Much of their research was conducted along the southeastern coast of the archipelago in areas adjacent to Old Harbor. This led to the development of a cultural chronology which is still used today.

Early in 1980, Richard Jordan of Bryn Mawr College initiated a decade long project to clarify the social and economic implications of Kodiak cultural history. Jordan's regional perspective contributed much to the understanding of Kodiak social evolution and inspired many graduate students to continue studying Kodiak prehistory.

The OHNC has been an active sponsor of archaeological research in areas surrounding their community. A multi-year survey of Sitkalidak Island, southeast of Old Harbor, led to the discovery of more than 100 previously unknown sites and several small excavations that produced important artifact assemblages, giving Old Harbor residents an opportunity to participate in unearthing their heritage. In 1995, an Alutiiq owned museum and archaeological repository opened to provide local storage for the assemblage from many of these projects. This museum is funded and governed by representatives of eight Kodiak Native corporations, including the OHNC.

b. Environmental Impacts and Recommendations

AVEC conducted an archaeological survey in the areas outlined for the construction and operation of the project. The survey did not locate any prehistoric or historic cultural remains and concluded that it is unlikely that such remains exist in the construction corridor as surveyed. The survey goes on to say that if land-disturbing activities should reveal archaeological remains, that work should be immediately halted and the State Historic Preservation Officer (SHPO) notified.

The State of Alaska Historical Preservation Officer (SHPO) concurred with the findings of the cultural resources consultant's report entitled "Archaeological Survey for the Old Harbor Small Hydroelectric Project, Old Harbor, Alaska" (letter from Judith E. Bittner, State Historic Preservation Officer, October 27, 1999). The SHPO concluded that if project plans as described in the report change and go beyond the survey corridor, then additional archaeological survey work would be necessary.

Land-disturbing activities associated with project construction could uncover unknown archaeological deposits. Also, if it becomes necessary to deviate outside the surveyed area, additional archaeological surveys may be needed.

We agree with the findings of the archaeological survey and the SHPO. If it should become necessary for land-disturbing activities to take place outside the surveyed area, however, project construction should be stopped until additional studies can be conducted to ensure there would be no impact to cultural resources. Also, if land-disturbing activities associated with the construction of the project should uncover unknown archaeological deposits, the project should be stopped until AVEC can: (1) consult with the SHPO and the OHNC about the discovered sites; (2) prepare a site-specific plan, including a schedule, to evaluate the significance of the sites and to avoid or mitigate any impacts to sites found eligible for inclusion in the National Register of Historic Places; (3) base the site-specific plan on recommendations of the SHPO, OHNC, and Interior's Standards and Guidelines for Archeology and Historic Preservation; (4) file the site-specific plan for Commission approval, together with the written comments of the SHPO and OHNC; and (5) take the necessary steps to protect the discovered archeological or historic sites from further impact until notified by the Commission that all of these requirements have been satisfied.

c. Unavoidable Adverse Impacts

None.

7. Socioeconomics

a. Affected Environment

Currently, about 300 people live in the Old Harbor area and about 85 percent of the residents are Aleut (AVEC 1998). Adult unemployment is about 76 percent, and about one-third of households live below the poverty line. According to the 1990 census, the median household income is less than $17,000. A 2,000-foot runway and a seaplane serve air traffic, with flights available to Kodiak, Alaska. Harbor and docking facilities exist for 55 boats, and Seattle-based and local barge services are available.

b. Environmental Impacts and Recommendations

Initially, the residents of Old Harbor would be employed during the construction of the project. After the project becomes operational there would likely be power available for individuals, businesses and public entities to use some of this excess power at discounted rates. The resulting community improvements could include operating a currently idle freezer plant, building and operating an ice plant, providing electrical energy to the harbor, and heating public buildings. An ice plant would substantially increase the value of fish harvested. This could enable local fishermen to make the same amount of money by catching fewer fish, further conserving the resource.

Section 810 of ANILCA requires an evaluation by the land-managing agency (in this case Interior) of effects on subsistence hunting, fishing, and gathering resources and the subsistence lifestyle for any project that uses federal lands. Because parts of the project would use federal lands, Interior would prepare a subsistence evaluation for the project.

We believe that constructing and operating the project would not result in a significant restriction of subsistence resources because: (1) the project would have little effect on subsistence species; (2) any project effects would be identified through monitoring, (3) AVEC proposes to minimize unauthorized access to the upper project area by installing a gate to prevent ATV access and having maintenance personnel monitor the project area for unauthorized signs of access, and (4) the number of additional people that would enter the area would probably not be enough to affect subsistence resources.

Because the project's socioeconomic impacts would be primarily beneficial, we don't recommend any measures specifically addressing socioeconomics.

c. Unavoidable Adverse Impacts

None.

D. No-Action Alternative

Under the no-action alternative, the Old Harbor Project would not be constructed. There would be no changes to the physical, biological, or cultural resources of the area and electrical generation from the project would not occur. The power that would have been developed from a renewable resource would have to be replaced from nonrenewable fuels. The noise and air quality impacts of the existing diesel fuel-fired generation system would continue unabated or at increased levels as the local electrical demand increased. The risk of spills of diesel fuels would likewise continue at current or increasing levels. The financial benefits to the residents of Old Harbor in the form of lower electrical rates and to AVEC in terms of project operating revenues would not be realized.

VI. DEVELOPMENTAL ANALYSIS

The economic details of the project have been analyzed in two separate studies. The first study, "Old Harbor Hydroelectric Feasibility Study, Final Report" (polarconsult 1995) was prepared by polarconsult, the consultant that prepared AVEC's EA, and outlined the project location, features, potential generation, and economics. The second study, "Rural Hydroelectric Assessment and Development Study" Phase I and II reports, was prepared by Locher Interests LTD (Locher Interests LTD 1998). The phase II report was completed in January 1998.

We reviewed these two studies and the Developmental Analysis done on behalf of AVEC by polarconsult. Below, we discuss AVEC's and our analysis of the project..

AVEC's Analysis

AVEC estimates the project's cost to be $2,444,700. In its economic model, AVEC used a cost of $1,444,700 to reflect grants totaling $1,000,000. The load that the project would supply is reduced by 87,000 kWh from the 1998 level of 751,000 kWh. The reduction is due to Old Harbor's plan to switch from pumping its drinking water to having it supplied by the project at considerably higher pressure and without the power consumption.

In deriving the avoided power cost, AVEC used: (1) $0.90/gal for diesel fuel cost; (2) $450/kW for diesel capacity replacement every ten years; and (3) $84,870 per year for diesel O&M expenses.

Based on these assumptions and the economic parameters shown in table 4, AVEC says the project has present value net benefits of about $856,000 over the 35-year analysis period.

Table 4. Economic parameters used in AVEC's analysis. (Source: AVEC 1999, as modified by Commission staff)

Economic Parameter	Value
Hydro Price	$2,444,700
Hydro Loan Amount	$1,444,700
Hydro Loan Interest Rate	5.00%
Hydro Loan Period (years)	30
Interest Rate	5.00%
Inflation Rate	3.00%
Length Of Analysis (years)	35
City Energy Needs (kWh per year)	664,000
Load Growth	2.00%
Diesel Fuel Cost ($ per gal)	0.9
Fuel Cost Growth	0.00%
Diesel Efficiency ($ per kWh)	13.5
NPV Of Diesel Only	$4,430,906
NPV Of Diesel & Hydro	$3,574,810
Net Benefit	$856,096

To estimate the economic benefits for the project, we use a current costs method that is different from AVEC's. This method of analysis assumes that costs (diesel fuel, O&M, etc.) do not escalate but remain fixed at their first year values for the 30-year

period of analysis, while future benefits of the project are discounted at the assumed discount rate. This method yields lower benefits for the project, as shown below.

A. Power and Economic Benefits of the Project

To calculate the economic benefits of a utility-owned project, we compare the project costs -- for the project as proposed and the project with staff-recommended enhancements -- to the cost of obtaining the same amount of capacity and energy using other generation sources. Consistent with the Commission's approach to economic analysis, [13] we equate the value of project power benefits to the current cost the utility would have to pay for the same amount of energy and capacity using alternative generating resources; we don't consider any future inflation effects in our analysis.

We base our estimate of project benefits on AVEC's current cost of running its diesel fueled generators. These costs are: (1) $1.16/gal for the diesel fuel; (2) $450/kW to replace the 200 kW diesel generators every ten years; and (3) $84,870 annually in O&M expenses. We use $1.16/gal for fuel because it is the current cost; AVEC forecasted its fuel cost of $0.90/gallon.

We use the cost of the alternative power source as a threshold in our determination of positive or negative project power benefits. For any alternative we consider, a positive net annual power benefit shows how much less it would cost AVEC to use the project's power instead of diesel generation; a negative net annual benefit shows how much more it would cost.

We analyze the project's power benefits for the proposed project and for the staff-recommended alternative.

1. Economics of the Proposed Project

The estimated project cost is $2,477,700 ($2,444,700 for construction and $33,000 for the applicant's proposed mitigative measures). Because AVEC received grants totaling $1,000,000, the actual cost to AVEC is $1,477,700. In our analysis, we use this figure for the capital investment and AVEC's interest rate of five percent.

[13] See Mead Corporation, Publishing Paper Division, 72 FERC ¶ 61,027 (July 13, 1995).

Based on our economic parameters shown in table 5, the project, as proposed by AVEC, would have an annual cost of $183,000. The current annual value of power for the proposed project would be $174,800. To determine whether the proposed project is currently economically beneficial, we subtract the project cost from the value of the project power. We find that this project would have an annual cost of about $8,200 (13 mills/kWh), more than the current cost of the alternative source of power.

Table 5. Economic parameters used in Commission staff's analysis. (Source: Commission staff)

Economic Parameter	Value
Hydro Cost	$2,477,700
Hydro Loan Amount	$1,477,700
Hydro Loan Interest Rate	5.00%
Discount Rate	1.94%
Hydro Loan Period (years)	20
Inflation Rate	0.00%
Length Of Analysis (years)	30
City Energy Needs (kWh per year)	644,000
Load Growth	2.00%
Diesel Fuel Cost ($ per gal)	1.16
Fuel Cost Growth	0.00%
Diesel Efficiency (kW/gal)	13.5
Maximum Federal Tax Rate	34.00%
Local Tax Rate	0.50%

2. Economics of the Staff-Recommended Alternative

In addition to AVEC's proposal to mitigate impacts from project construction and operation, NMFS, Interior and ADF&G recommend additional measures. The costs for the measures we recommend are shown in table 6.

Table 6. Cost of staff-recommended environmental measures. (Source: Commission staff)

Enhancement/Mitigation Measure	Capital Cost	Annual Cost
Environmental Compliance Monitor (Interior and ADF&G)	$80,000	8,100
Upgrade AVEC's Biotic Monitoring Plan (NMFS, Interior, ADF&G)	$31,400	3,200
Upgrade Existing Gage (NMFS, Interior, ADF&G)	$3,000	300
Upgrade AVEC's Revegetation Plan (NMFS)	$7,500	750
Bear Safety Plan (Interior)	$2,500	250

The total annual cost of the project with the staff recommended measures would be about $192,330. Subtracting the annual project cost from the value of the project power ($174,800), we find that this project would have negative economic benefits over the license term of about $17,530 annually (27 mills/kWh) compared to alternative power.

B. Cost of Environmental Enhancement Measures

Table 7 is a summary of annual costs, power benefits and net benefits for AVEC's proposal and staff's recommended alternative.

Table 7. Cost summary of AVEC's proposal and staff's recommended alternative. (Source: Commission staff)

Alternative	Project Cost	Power Benefits	Net Benefits
	$/year(mills/kWh)		
AVEC's Proposal	- 183,000 (276)	174,800 (263)	- 8,200 (13)
Staff's Recommendation	- 192,330 (290)	174,800 (263)	- 17,530 (27)

We note that the development cost for the project is greater than the current cost of energy. Project economics, however, is only one of the many public interest factors that is considered in determining whether or not to issue a license. Developing the Old Harbor Project may be desirable for other reasons, such as to diversify the mix of energy sources in the area, to promote construction-related jobs in the area, and to provide a fixed-cost source of power.

C. Diesel Fuel

If licensed, the project would reduce the current diesel-fueled electric power generation, and thereby conserve nonrenewable fossil fuels and reduce the emission of noxious byproducts caused by the combustion of fossil fuels. If the hydroelectric project were not licensed, about 150 tons of diesel fuel would have to be used annually to generate the 644 MWh needed for the Old Harbor area. The annual amount of carbon dioxide - the main contributor to the greenhouse effect - would increase by 450 tons. The project would benefit air quality and the environment because the need for fossil fuel generation would be minimized.

VII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When the Commission reviews a proposed project, the environmental (recreational, fish and wildlife, and other non-developmental values of the involved waterway) are balanced equally with its electrical energy and other developmental values. In determining whether, and under what conditions to license a project, the Commission must weigh the various economic and environmental tradeoffs involved in the decision. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway for all beneficial public uses.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the proposed project, with our recommended measures, as the preferred option. We recommend this option because: (1) issuance of an original license for the Old Harbor Project would allow AVEC to generate renewable power and provide a dependable source of electrical energy to Old Harbor; (2) the project would avoid the need for an equivalent amount of diesel-powered facilities in Old Harbor; (3) the project would help to conserve these nonrenewable resources and limit atmospheric pollution; and (4) the recommended environmental measures would protect water quality, fish, terrestrial, historic and cultural resources, and maintain multiple use and management of project lands within the project area. Accordingly, we believe that our alternative would be best adapted to a comprehensive plan for making use of the water power resources of the Mountain and Lagoon Creek watersheds, while concurrently protecting other natural resource values and uses.

We recognize that the economic benefit of our preferred option results in a net annual benefit that is negative; that is, the cost of project power would exceed the likely alternative by 27 mills/kWh. However, we make our recommendation consistent with the Commission's policy of not basing the decision of license issuance solely on the basis of economic projections, but we consider all developmental and nondevelopmental values of a project. [14] Therefore, we recommend that an original license should be issued for the Old Harbor Project. Our recommended measures for an original license are listed below.

Our recommended alternative contains five measures that would affect the economics of the project because their costs are substantial: (1) prepare and implement biotic monitoring plans for intergravel temperatures, geomorphology and erosion, spawning surveys of coho, pink and chum salmon, and juvenile fish surveys; [15] (2) prepare and implement a plan to monitor streamflows in the Lagoon Creek anadromous reach in concert with biotic monitoring; (3) employ an ECM during project construction; (4) prepare and implement a revegetation plan; and (5) prepare and implement a bear safety plan.

Biotic monitoring plans

We recommend that AVEC prepare and implement a biotic monitoring program by preparing, in consultation with the NMFS, FWS and ADF&G, a separate plan to monitor each of the following: intergravel water temperatures, channel and habitat, salmon spawning surveys, and juvenile fish surveys.

We recommend that AVEC prepare and implement a plan to collect intergravel water temperature data at the six sites identified by the agencies, for 1 year prior to construction and up to 5 years after the start of operation, depending on results. We believe this monitoring is necessary to identify any project effects on salmon based on the temperature and seasonal flow variations between the East Fork and Lagoon Creek, 11-month-long salmonid incubation and emergence periods in Lagoon Creek, and number of years before these salmon species return to freshwater to spawn. Because intergravel temperatures may vary widely under existing conditions, the plan must include criteria for determining to what extent temperature variations below the powerhouse are project-related.

[14] See 82 FERC 61,030(1998).

[15] The agencies recommend one biotic monitoring plan with four components. We recommend each of the four components as a separate plan because each component would have several elements that would require tracking.

We recommend that AVEC prepare and implement a stream channel and habitat monitoring plan to document the project's effects on the Lagoon Creek channel and habitat conditions. Channel and habitat monitoring would take place in the anadromous reach of Lagoon Creek using the protocol developed by the USFS for streams in national forests in Alaska, in the spring after runoff and late fall during years 0, 3, and 5 after the start of project operations. We believe this monitoring is necessary because the additional diversion of up to 13.2 cfs into the anadromous reach of Lagoon Creek at times could result in channel-changing flow conditions and cause erosion.

We recommend that AVEC prepare and implement two plans to document the project's effects on salmon in Lagoon Creek. One plan would provide for annual spawning surveys of coho, pink and chum salmon for at least 5 years after the start of project operations, to be conducted in the three reaches and during the seven time periods recommended by Interior and ADF&G. The second plan would provide for annual juvenile fish surveys, as recommended by the resource agencies, for at least 5 years after the start of project operations. We believe these adult and juvenile surveys are needed because of the potential for project operations to adversely affect salmon species in Lagoon Creek.

Temperature and channel habitat are critical components for a healthy salmon fishery, and salmon surveys are important to determine whether the existing Lagoon Creek salmon fishery would change as a result of project operations. Therefore, our recommended monitoring is necessary to protect salmon in Lagoon Creek. Further, the benefit of this monitoring in protecting the Lagoon Creek salmonid fishery is worth its estimated annual cost of $3,200. If post-license monitoring, done in consultation with the NMFS, FWS and ADF&G shows that modifications to project operations or facilities are needed to protect salmon resources, the Commission may direct AVEC to modify the operations or facilities.

Streamflow gaging

We recommend that AVEC prepare and implement a stream gaging plan, in consultation with NMFS, FWS, ADF&G and USGS to collect streamflow or stage data according to USGS standards, for up to 5 years, depending on results. The plan would provide for AVEC to distribute the data to the fish and wildlife agencies, including the ADF&G components according to ADF&G's recommendation. Installing the gage would allow all biotic monitoring results to be correlated with flows in the anadromous reach to

determine the effects of the project's trans-basin flow diversion. Therefore, we find the stream gaging plan is a necessary component of monitoring the project effects, and the benefits of this measure would be worth its estimated annual cost of $300.

Provide an ECM

We recommend that AVEC employ an ECM to be on-site, full time during construction activities, and that the ECM have the authority to cease work and ensure compliance with any environmental measures required during construction. An on-site ECM would assure that project construction would not adversely affect resources by enforcing compliance with construction-related environmental measures. We further find that, given the remoteness of the area and the sensitivity of the resources to be protected during construction warrant an on-site, full time, therefore, the benefits of this measure is worth its estimated annual cost of $8,100.

Revegetation plan

We recommend that AVEC prepare and implement a revegetation plan at an estimated annual cost of $750, because if disturbed areas are not revegetated, erosion of the landscape could worsen and wildlife habitat could deteriorate. Non-native plant species may spread beyond the seeded area to displace native plants, eventually reducing the diversity of the vegetation. Therefore, we find that revegetation, using native plants to the extent practical, is necessary for the protection of wildlife resources. AVEC would prepare a final revegetation plan, in consultation with NMFS, FWS and ADF&G, based on site-specific conditions, using native vegetation to the greatest extent practical, and where appropriate, would not interfere with site operation and maintenance. This plan would be completed prior to any land disturbing activities and would be included as part of AVEC's final soil erosion control plan. The plan would contain all the elements identified in NMFS, FWS and ADF&G's recommendations, including a monitoring and maintenance plan. The monitoring plan would include criteria by which to judge success of the revegetation efforts and measures that would be implemented if desired vegetation goals are not achieved. More than one year may be necessary to evaluate the success of revegetation efforts, depending on the success of the revegetation efforts. However, such monitoring would not likely need to exceed three years following initial planting or subsequent revegetation efforts. We find that the benefits of this measure to mitigate disturbances from construction would be worth its estimated annual cost of $750.

Bear safety plan

We recommend that AVEC prepare and implement a bear safety plan to minimize human/bear conflicts and protect bears during construction. Bears are thought to be present in high density on the refuge, and defense of life and property during bear/human interactions is the second highest cause of bears being killed by humans. Therefore, we find that this measure is necessary to protect bears during construction and would be worth its estimated annual cost of $250.

VIII. RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Under the provisions of the FPA, each hydroelectric license issued by the Commission shall include conditions based on the recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. Section 10(j) of the FPA states that whenever the Commission finds that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the agency's recommendations, expertise, and statutory responsibilities.

We believe that our recommendations contained in this EA are consistent with those filed by the federal and state fish and wildlife agencies (table 8). Recommendations that are considered outside the scope of Section 10(j) have been considered under Section 10(a) of the FPA and are addressed in the specific resource section of this document. Recommendations subject to Section 10(j) are discussed below.

Under Section 10(j) of the FPA, we made a preliminary determination that three measures recommended by the agencies were inconsistent with the FPA; replicating AVEC's 1996 cross sections and using ADF&G's aerial surveys for monitoring, and providing flow continuation during all outages. By letters dated February 29, and March 3, 2000, NMFS and ADF&G, respectively, disagreed that our recommendations would be adequate to protect fisheries resources at Lagoon Creek. We did not receive a response from FWS.

On April 26, 2000, Commission staff conducted a meeting with NMFS, FWS, ADF&G, and AVEC to attempt to resolve the inconsistencies. At this meeting, AVEC and the resources agencies agreed: (1) to use the draft protocol developed by the USFS for national forests in Alaska to monitor channel and habitat in Lagoon Creek; (2) that AVEC would include with its annual fisheries monitoring report the results of ADF&G's aerial surveys for two streams near Lagoon Creek as a gross indicator of fisheries production; and (3) AVEC would continue to divert flows into Lagoon Creek during all

powerhouse outages by using the jet deflector and implementing its proposed turbine bypass system, schedule spring maintenance when Lagoon Creek flows are at least 10 cfs, and downramp at a rate of 2 in/hr to perform scheduled maintenance.

First, we made a determination that a recommendation by NMFS, FWS and ADF&G that AVEC replicate its 1996 cross section measurements of Lagoon Creek in project years 3 and 5 may be inconsistent with the substantial evidence standard of Section 313(b) of the FPA. We found that the recommendation, intended to determine any project-related effects on channel and habitat changes, may not be supported by substantial evidence because flooding in June 1998 changed the channel to the extent that the cross sections do not represent current conditions.

At the meeting, ADF&G presented the draft protocol developed by the USFS for stream monitoring to Commission staff (USFS 1999), and the agencies recommended that AVEC use the USFS protocol in lieu of their original recommendation to replicate the 1996 cross sections. We find that the protocol is designed to conduct rapid stream surveys, offers several tiers of effort which can be tailored to the survey needs, and includes the substrate and riffle/pool frequency counts that are of special interest to the agencies. Therefore, we find that substantial evidence exists to support the modified recommendation and, in Section VII of the FEA, we recommend that the USFS protocol be adopted to monitor stream channel and habitat in Lagoon Creek.

Second, we made a preliminary determination that a recommendation made by NMFS that post-construction monitoring include the results of ADF&G's annual aerial surveys of two streams similar to Lagoon Creek may be inconsistent with the substantial evidence standard of section 313(b) of the FPA. NMFS recommended this measure to determine any project effects on fisheries production and habitat use by comparing AVEC's monitoring results in Lagoon Creek with ADF&G's aerial recruitment surveys from similar streams. We found that NMFS's recommendation may not be supported by substantial evidence because the index streams were not identified and ADF&G had not committed to surveying streams in the project area.

At the meeting, ADF&G presented information about the annual aerial recruitment surveys of Kodiak Island streams conducted by its commercial fisheries staff, including the methods and purpose as a gross indicator of fisheries production. NMFS modified its recommendation to state that ADF&G's aerial surveys would not be used alone for determining any project effects, but only in concert with project specific monitoring data. We agree that having a gross indicator for production for other streams in the project area could be useful to determine whether any large scale increases or decreases in recruitment

for Lagoon Creek are found in similar streams in the area. Therefore, we find that substantial evidence exists to support the modified recommendation and, in Section VII of the FEA, we recommend that AVEC include with their annual fisheries monitoring report for Lagoon Creek, ADF&G's aerial survey results for two similar streams.

Third, we made a preliminary decision that the recommendation by FWS and ADF&G that AVEC provide fail-safe and redundant back up provisions for flow continuation during outages may be inconsistent with the public interest standard of Section 4(e) and the comprehensive planning standard of Section 10(a) of the FPA. The agencies intended the recommendation to protect salmon by maintaining a wetted streambed below the powerhouse during outages. We found that the benefits of maintaining the trans-basin diversion during scheduled outages would not be worth the cost of a second conveyance system.

At the meeting, the ADF&G and FWS clarified that their recommendation for flow continuation during outages was intended to apply to powerhouse outages only, not to penstock or intake outages that could disrupt the trans-basin diversion. AVEC explained the spring and fall debris clearing maintenance that is necessary to avoid unscheduled outages. The agencies modified their original recommendation to allow maintenance to occur from May 15 through July 15 and mid-October through the end of November, when natural flows in Lagoon Creek are at least 10 cfs, to provide a wetted stream bed below the powerhouse. AVEC also presented a detailed explanation of their proposed turbine bypass system and jet deflectors that would ensure flow continuation through powerhouse outages. We believe that the combination of the jet deflector and AVEC's proposed turbine bypass system and a 10-cfs natural flow in Lagoon Creek during scheduled maintenance are adequate to provide flow continuation and fisheries protection during powerhouse outages. Therefore, we find that the modified recommendation meets the public interest and comprehensive planning standards of the FPA and, in Section V.C.2 of the FEA, we recommend that AVEC provide flow continuation during powerhouse outages.

In their letter dated February 29, 2000, NMFS submitted an alternative recommendation that AVEC ramp shutdowns for scheduled maintenance over a 3-hour period to protect fisheries during outages. At the April 26 meeting, ADF&G submitted an alternative recommendation that shutdowns be ramped 2 in/hr based on Hunter's (1992) findings, and NMFS modified their ramping recommendation to agree with ADF&G's ramping rate of 2 in/hr. We agree that a 2-in/hr downramping rate would benefit the Lagoon Creek fishery by preventing stranding, and in Section VII of the FEA, we recommend that the alternative recommendation that AVEC downramp flows at 2 in/hr

before performing scheduled maintenance be adopted.

We find that the any inconsistencies between the agencies' 10(j) recommendations and the FPA have been resolved as a result of the additional information and modified and alternative recommendations presented by the agencies and AVEC at the April 26, 2000, meeting.

Table 8 summarizes the fish and wildlife agency recommendations received by the Commission and the conclusions reached in this EA relative to these recommendations.

Table 8. Summary of fish and wildlife agency recommendations. (Source: Commission staff)

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(J)	ANNUAL COST	CONCLUSION
1. Develop a comprehensive erosion control and sedimentation control plan	NMFS FWS ADF&G	Yes	Minimal	Adopted
2. Timing restrictions for in-water work must meet ADF&G's recommendations. (Staff recommends adoption based on ADF&G's clarification of it's recommended timing restrictions as presented at the April 26, 2000, meeting.)	NMFS	Yes	N/A	Adopted
3. Develop a revegetation plan, using only native plant species on all impacted ground	NMFS FWS ADF&G	Yes	$750	Adopted
4. Prepare a bear safety plan to avoid possible conflicts between bears and humans in the project area during construction and operation.	Interior	Yes	$250	Adopted.
5. Hire an ECM and jointly write the position description with the agencies, including qualifications, duties and responsibilities.	Interior	Yes	$8,100	Adopted - as a requirement of the Commission's QCIP.

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(J)	ANNUAL COST	CONCLUSION
6. Prepare a plan to ensure adherence to ESCP and spill prevention plan, including employment of an ECM with the authority to cease construction and change orders in the field as deemed necessary.	Interior ADF&G	Yes	See #5	Adopted - as a requirement of the Commission's QCIP.
7. Consult and obtain approval from fish and wildlife resource agencies regarding the licensee's final fuel and hazardous spill plan to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operation.	Interior ADF&G	Yes	Minimal	Adopted - Commission would have final approval
8. Prepare a plan, for agency approval, to monitor any project effects on salmon by continuously recording water temperatures for a minimum of 5 years, depending on results, at six sites recommended by the resource agencies.	NMFS Interior ADF&G	Yes	$3,200	Adopted - Commission would have final approval, and final determination for whether the results warranted additional temperature monitoring.
9. Prepare a plan, for agency approval, to monitor project effects on salmon by conducting adult spawning surveys for at least 5 years after the start of project operations in three reaches, during seven separate periods, as recommended by the resource agencies.	NMFS Interior ADF&G	Yes	Included in #8	Adopted - Commission would have final approval, and determine if results warranted additional spawning surveys.

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(J)	ANNUAL COST	CONCLUSION
10. Prepare a plan, for agency approval, to monitor project effects on salmon by trapping juvenile fish in three reaches using non-lethal capture techniques, standardized methods, times, and locations, for identification, enumeration, and measurement.	NMFS Interior ADF&G	Yes	Included in #8	Adopted - Commission would have final approval, and determine if results warranted additional juvenile surveys.
11. Use two streams in the immediate area, surveyed by the ADF&G annually, with similar characteristics to Lagoon Creek as control streams to compare Lagoon Creek fish production. (Staff recommends adoption based on modification to 10(J) recommendation presented at the April 26, 2000, meeting.)	NMFS	Yes	N/A	Adopted - AVEC would include the ADF&G aerial survey results with their annual fisheries monitoring report.
12. Prepare a plan, for agency approval, to monitor project effects on salmon from changes in geomorphology and erosion. Surveys to include photos and wetted area, calculation of increase in wetted area below the powerhouse, identification of abnormal erosion or changes in channel morphology.	NMFS Interior ADF&G	Yes	Included in #8	Adopted - Commission would have final approval.
13. Conduct geomophology and erosion surveys by repeating pre-project cross sections of Lagoon Creek in years 3 and 5 of project operation when flows are 13 cfs over the flows during the pre-project cross-sections. (Staff recommends adoption based on modifications presented at he April 26, 2000, meeting.)	NMFS Interior ADF&G	Yes	N/A	Adopted

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(J)	ANNUAL COST	CONCLUSION
14. Develop and submit plans to resource agencies for approval and review six months before operation or construction begins, depending on plan.	NMFS Interior ADF&G	No- not a specific F&W measure	N/A	Not adopted- Commission would require a 30-day minimum consultation period.
15. Allow the agencies 30 days by notification in writing to enable them to comment and reach agreement with the applicant before the plans are submitted to the Commission. Submit the final plan, approved by the agencies, to the Commission at least 30 days before the scheduled date to initiate activities related to the plan.	Interior	No-not a specific F&W measure	Minimal	Adopted under 10(a).
16. Consult with the agencies annually about holding a project review meeting to review monitoring and stream gaging results and identify courses of action, including study modification and the need for continued studies. Results should be sent out at least 30 days before a meeting. If a new or modified course of action is proposed as a result of the annual meeting AVEC would prepare an implementation plan, to be approved by the resource agencies, and submit it to the Commission for review and approval.	NMFS Interior ADF&G	No-not a specific F&W measure	Included in # 8	Adopted under 10(a) - as a requirement of the biotic monitoring plans.

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(j)	ANNUAL COST	CONCLUSION
17. Record the minutes of annual project review meetings and circulate the draft of the minutes to attendees for review comments and approval within 14 days following a meeting. Submit the final minutes and other evidence of the consultation, along with any recommendations and comments by the fish and wildlife agencies and the licensee to the Commission.	Interior ADF&G	No - not a specific F&W measure	Minimal	Adopted under Section 10(a), although participants could establish other mutually agreeable time frames.
18. If a new or modified course of action is proposed as a result of the annual meeting, further review may be required. (ADF&G's recommendation states that further ACMP review may be required.) Hold additional meetings if unforseen effects of project operations warrant such meetings.	Interior ADF&G	No - not a specific F&W measure	N/A	Not adopted - Any proposed course must be submitted to the Commission for approval. ACMP reviews are independent of Commission reviews. Annual meetings would be discontinued after monitoring and any new measures based on monitoring results are implemented.
19. Summarize and submit temperature data to the fish and wildlife agencies annually, and if the agencies determine that the temperatures during project operations vary from the range of measured pre-project temperatures and pose a potential negative effect on the spawning, incubation, and/or rearing of anadromous fishes, develop and implement a mitigation plan, approved by the fish and wildlife agencies.	Interior ADF&G	No - Would give final authority to the agencies	N/A	Not Adopted - A temperature monitoring plan would be implemented. The Commission would determine whether the results warranted additional measures.

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(j)	ANNUAL COST	CONCLUSION
20. If fish production is significantly reduced as a result of project operations, the license shall be reopened. In consultation with the fish and wildlife agencies, the Commission will order the licensee to construct the necessary facilities or modify operations to release water at temperatures that do not impact fish production in Lagoon Creek.	Interior ADF&G	No - Commission determines whether a license is reopened and whether additional measures are appropriate	N/A	Not adopted - If post-license monitoring results show that the project adversely affects resources, the Commission may direct AVEC to modify project facilities or operations.
21. Address the problems identified by monitoring with actual mitigation, not limited to these examples: (1) if monitoring shows that decreased water temperatures detrimentally impact spawning and rearing, a pond should be constructed at the tailrace to raise water temperature before entering Lagoon Creek; and (2) if excessive erosion occurs, the streambanks should be biorehabilitated and/or the tailrace altered to reduce velocities.	NMFS	No - Commission determines whether additional measures are appropriate	N/A	Adopted under 10(a) - If post-license monitoring results show that the project adversely affects resources, the Commission may direct AVEC to modify project facilities or operations, including the examples in this recommendation.
22. Operate a recording (at intervals of 15 minutes or less) stream gage, for a minimum of 5 years just below the powerhouse.	NMFS Interior ADF&G	Yes	$300	Adopted
23. Make flow records available to resource agencies	NMFS Interior ADF&G	Yes	Minimal	Adopted

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(J)	ANNUAL COST	CONCLUSION
24. After construction of the project, record, summarize and submit streamflows monthly for the first year of operation and annually thereafter to the fish and wildlife resources agencies. If a rating curve or any other regression relationship is used to calculate discharge, submit to the agencies annually or whenever a shift in the rating curve occurs, whichever occurs first.	Interior ADF&G	No - not a specific F&W measure	Minimal	Adopted under 10(a)
25. Provide reviews of reports and compliance with all license stipulations.	Interior	No - not a specific F&W measure	N/A	Not adopted - review of fish and wildlife license requirements would be included with annual project meetings, but not other license requirements. Commission would determine compliance with requirements.
26. Operate the project as run-of-river where the instantaneous outflow from the impoundment (as turbine discharge, spillage, direct release, and/or leakage) is equal to the instantaneous inflow into the impoundment, up to 13.2 cfs.	Interior ADF&G	Yes	Minimal	Adopted
27. Divert no more than 13.2 cfs from the East Fork into Lagoon Creek.	NMFS	Yes	$0	Adopted
28. Divert a constant amount of water through a bypass system regardless of power demand.	NMFS	Yes	$0	Adopted - Interpreted as discharging a constant flow from the powerhouse through a bypass system, turbine or combination of both.

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(J)	ANNUAL COST	CONCLUSION
29. Schedule maintenance that reduces water flow to meet ADF&G time restrictions. (Staff recommends adoption based on ADF&G's recommended time restrictions as presented at the April 26, 2000, meeting.)	NMFS	Yes	Indeterm-inate	Adopted.
30. For any unscheduled maintenance, report to the agencies the date, duration of reduction, cfs reduction, reason for occurrence, and measures for prevention of reoccurrence.	NMFS	Yes	Minimal	Adopted
31. Provide fail-safe and redundant backup provisions in project design and operation. The facilities shall have the capacity for indefinite flow continuation. (Staff recommends adoption based on agencies' clarification that this would apply only to powerhouse outages.)	Interior ADF&G	Yes	$0	Adopted.
32. Include remote monitoring and operation of all project components of project design and operations.	Interior	No - not a specific F&W measure	$0	Adopted under 10(a)
33. File, for Commission approval, a detailed plan for establishing an interest-bearing escrow account to mitigate for currently unforseen impacts on fish, wildlife, and water quality associated with construction and operation of the project.	Interior ADF&G	No - not a specific F&W measure	N/A	Not adopted - No evidence that AVEC could not fund environmental measures as required by the Commission.
34. Allow any interested party to petition the Commission to add new conditions or amend these conditions pursuant to FPA Section 10(j).	NMFS	No - not a specific F&W measure	Indeterm-inate	This is a legal question that would be addressed at the time of license issuance.

RECOMMENDATION	AGENCY	WITHIN SCOPE OF SECTION 10(j)	ANNUAL COST	CONCLUSION
35. Allow ADF&G representatives, with proper credentials, to have free and unrestricted access to, through, and across access routes leading to project lands, all project lands and all project works.	ADF&G	No-not a specific F&W measure	Minimal	Adopted under 10(a) - Advance notice required for safety and liability reasons
36. Ramp flows over a 3-hr period during scheduled shutdowns. (Staff recommends adoption based on NMFS modified recommendation of 2 in/hr.)	NMFS	Yes	Minimal	Adopted
37. Ramp flows at 2-in/hr during scheduled shutdowns.	ADF&G	Yes	Minimal	Adopted

IX. CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. Accordingly, federal and state agencies have filed 24 comprehensive plans for Alaska. Of these, we identified and reviewed four plans relevant to this project: Alaska Outdoor Recreation Plan (Alaska Department of Natural Resources 1981), American Waterfowl Management Plan (FWS 1986), the refuge Comprehensive Conservation Plan (CCP) (FWS 1987), and the refuge Fishery Management Plan. No conflicts were found with the Alaska Outdoor Recreation Plan, American Waterfowl Management Plan, or Fishery Management Plan.

The CCP serves as the master plan for providing broad policy guidance and establishing the long-term goals and objectives for FWS management of the refuge. Lands that are proposed for wilderness areas, including land that the proposed project would occupy, are designated as "minimal management" (letter from Paul Gates, Regional Environmental Officer, U.S. Department of the Interior, Anchorage, Alaska, February 22, 1996). Hydropower development was a significant issue at the time the plan was developed because of a proposed expansion to the Terror Lake Project (FERC No. 2743), also located on the proposed wilderness area. The plan allowed for an expansion

of the Terror Lake Project to the extent that it would be compatible with refuge purposes and consistent with refuge objectives, but prohibited any new hydro projects (FWS 1987).

The proposed Old Harbor Project is not consistent with the uses and purposes of the refuge allowed on lands designated for "minimal management." However, by implementing the environmental protection measures outlined in this EA, the small hydroelectric development proposed for the Old Harbor Project would be consistent with uses allowed under "moderate management." Changing the management designation from "minimal" to "moderate" would allow the construction and operation of a low-head dam and associated facilities, but lands designated "moderate management" usually allow activities which would not be consistent with authorized uses of refuge lands surrounding the project site. Therefore, the FWS has decided to amend the CCP to reclassify the lands within the proposed project site as "moderate management for the purpose of hydroelectric development." All other activities will be managed under guidance consistent with the "minimal management" designation of surrounding lands.

X. FINDING OF NO SIGNIFICANT IMPACT

We've prepared this environmental assessment for the project pursuant to the National Environmental Policy Act of 1969. Constructing the proposed project would have some unavoidable adverse impacts; some temporary, some permanent.

Temporary impacts would include short-term, localized erosion and sedimentation and increased traffic, noise, and dust, which would temporarily displace wildlife. Implementing the recommended ESCP, hazardous spill prevention, bear safety and eagle protection plans should mitigate these impacts to minor levels.

Permanent impacts would include the loss of about 16 acres of vegetation, and 1.3 acres of wetlands. These impacts are expected to be minor because sensitive habitats would be avoided and there is an abundance of similar habitat in the area. The additional flow diversion into Lagoon Creek could cause long-term temperature changes and/or erosion that could affect salmon and salmon habitat downstream of the powerhouse. With our recommended operational and biotic monitoring plans, however, these effects should be minimal. During emergency outages of the intake or penstock, some salmon could be stranded and redds dewatered downstream of the powerhouse. We recommend scheduling maintenance for the intake and penstock during times that would minimize any adverse effects on salmon and salmon habitat below the powerhouse. We also recommend continuing flows during all powerhouse outages, scheduled or unscheduled,

through AVEC's proposed turbine bypass system. Revegetation would not occur for about 4,400 feet along the penstock trail because of public ATV access. These effects would be minimized by our recommended recreation plan.

On the basis of this independent environmental analysis, issuing an original license for the project with our recommended environmental measures would not be a major federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement is not required.

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XII. LIST OF PREPARERS

Nan Allen -- EA Coordinator, Aquatic Resources, Socioeconomics (Fisheries Biologist; M.S., Biology)

James Fargo--Need for Power (Civil Engineer; M.S., Civil Engineering)

Gaylord W. Hoisington – Geology and Soil Resources, Recreation and Other Land Uses, Cultural Resources (Soil Conservationist; B.S., Recreation)

Sergiu Serban – Developmental Analysis (Civil Engineer; M.S., Civil Engineering)

David Turner -- Terrestrial Resources, Threatened and Endangered Species, (Wildlife Biologist; M.S. Wildlife Biology)

Appendix A

RESPONSE TO COMMENT LETTERS ON THE DRAFT ENVIRONMENTAL ASSESSMENT

ORIGINAL

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

February 29, 2000

David P. Boergers, Secretary
Federal Energy Regulatory Commission
888 First Street, N. E.
Washington, D.C. 20426

Comments:
Project No. 11690-001,
Alaska Old Harbor
Hydropower Project
Alaska Village Electric
Coop.

Dear Mr. Boergers:

This letter responds to the Draft Environmental Assessment (DEA) dated January 19, 2000, and a letter dated January 20, 2000, from the Federal Energy Regulatory Commission (FERC) to the National Marine Fisheries Service.

PROPOSED ACTION

The Old Harbor project, as described in the DEA, would consist of:

a. an 86-foot-long by 7-foot-high uncontrolled diversion structure, constructed with galvanized steel frames with Enki wood stop logs, at an elevation of 840 feet above mean sea level (FUSL);

b. an intake structure with a trash rack;

c. a 30-foot-long by 8-foot-high steel, wood and concrete desander box, with screens to catch suspended debris and a bypass gate for flushing the screens and accumulations of sand and gravel;

d. a 9,800-foot-long penstock made up of 3,200 feet of 20- to 18-inch-diameter high density polyethylene pipe and 6,600 feet of 16-inch-diameter steel pipe;

e. a bypass system, joining the penstock just upstream of the turbine, with a separate tailrace, parallel to the turbine tailrace, to direct water in the penstock, not needed for power generation to a submerged container to dissipate dissolved gases and moderate daily flow fluctuations;

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spawning and rearing success. NMFS does not oppose granting a license to Alaska Village Electric Cooperative, Inc. for this project, provided that the Commission incorporates the following Section 10(j) recommendations into the license.

SECTION 10(j) RECOMMENDATIONS

NMFS originally made 10(j) recommendations in a letter dated August 16, 1999. FERC responded to those recommendations in a letter dated January 20, 2000, and the Draft Environmental Assessment dated January 19, 2000. The following 10(j) recommendations have been altered from our original recommendations to respond to those documents.

Erosion Control and Revegetation Plan

Rationale: Erosion caused by construction and project operation can introduce sediment in the stream which can detrimentally impact incubating eggs and rearing fish.

Condition: A comprehensive erosion control and revegetation plan should be developed and submitted for review and comments at least 60 days before project implementation. The plan should include, but not be limited to, the following:

-Silt fences should be used to limit project footprint and eliminate sediment runoff to the stream.

-Procedures should include ways to limit erosion to bare ground such as covering with matting or mulch.

-Revegetation should be done on all impacted ground. Only native plant species should be used.

-Revegetation should be monitored. Vegetation should reach 50% of natural vegetation densities within one year.

-The plan should include monitoring, fixing any drainage or erosion problems and replanting if densities are not met.

-In-water work and stream crossings during construction must occur between May 15 and July 15. This will avoid adding sediment to the stream when eggs or juvenile fish are in the gravel or when adult salmon are spawning.

-Any stream bank damage should be repaired using biorehabilitation techniques that mimic native vegetation densities and species.

-Hire an environmental compliance monitor with the authority

NMFS 1: In Sections V.C.1, V.C.3, and VII, we discuss and recommend adoption of your recommended measures for erosion control and revegetation, except that we recommend native plant species be used to the greatest extent practical.

to cease construction and change orders in the field as deemed necessary. Agencies should jointly write the position description, including qualifications, duties and responsibilities.

Fuel and Hazardous Spill Plan

Rational: Hazardous material spills can result in short and long term detrimental impacts to the survival of anadromous fish.

Condition: A comprehensive fuel and hazardous spill plan should be developed to prevent any impacts associated with the handling of hazardous materials and operation of machinery during project construction and operation. The plan should be developed and submitted for review and comments at least 60 days before project implementation.

Monitoring Plan

In order to substantiate claims that the project will increase fisheries production in Lagoon Creek we recommend that the applicant develop a comprehensive monitoring plan. The plan should include, but not be limited to the following:

Stream Gaging

Rational: Accurate flow measurements are needed to assess effects upon water temperature, spawning area available, incubation of eggs, and erosion. All of these factors can affect stream health and fisheries production.

Condition: A stream gage should be operated for a minimum of five years just below the powerhouse. Discharge measurements must comply with standards established by the U.S. Geological Survey (USGS) and must record stage/flows at a frequency of no less than 15-minute intervals.

Temperature Monitoring

Rational: Stream temperatures recorded at the diversion site have been up to 10°F cooler than the waters in Lagoon Creek. The addition of cooler water to Lagoon Creek will lower water temperatures. Cooler water temperatures will increase incubation time for eggs and delay fry emergence. This "timing" change may affect migration and food availability for juvenile fish. Temperature monitoring will help to assess if the addition of Mountain Creek water appreciably changes water temperatures in different sections of Lagoon Creek and if additional mitigation or design features need to be implemented to maintain fisheries production.

NMFS 1: continued.

NMFS 2: In Section V.C.2 of the FEA we recommend the adoption of a fuel and hazardous spill prevention plan.

NMFS 3: In Sections V.C.2 and VII of the FEA, we discuss and recommend the adoption of plans to monitor streamflow, water temperatures, fisheries, including the use of index streams, and habitat and channel changes. We also recommend annual review meetings. Our recommendations incorporate the modifications as discussed at the Section 10(j) meeting held April 26, 2000.

Condition: Continuously recording temperature gages should be operated for one year prior to diverting water and up to five years during project operation. Gages should be placed:

a. At the diversion site on Mountain Creek,
b. Just above the powerhouse on Lagoon Creek
c. Below the powerhouse at the beginning of adequate spawning habitat,
d. Just above the confluence of Lagoon Creek and the Lake tributary on Lagoon Creek,
e. On the Lake tributary just above the confluence with Lagoon Creek,
f. Below the confluence of Lagoon Creek and the Lake tributary.

If average temperatures in Lagoon Creek are lowered more than 3 degrees F. and fish production has gone down, mitigation may be appropriate. Possible mitigation may include a pond constructed at the tailrace to raise water temperature before entering Lagoon Creek.

Fish Surveys

Rational: Juvenile and adult fish surveys are needed to ascertain impacts (positive or negative) of project operation on fisheries production and habitat use. Fish numbers may document increased spawning and rearing habitat utilized due to increased water flow in Lagoon Creek.

Spawning Surveys

Spawning surveys should be conducted for five years, once in July and twice per month during August, September, and October. Fish counts shall follow ADF&G protocols for standardization and indexing of peak foot survey counts. The survey should be split into three areas: 1) Lagoon Creek above the confluence with the Lake tributary, 2) the Lake tributary, 3) Lagoon Creek below the confluence with the Lake tributary. Live and dead fish should be counted and species identified.

Juvenile Surveys

Juvenile fish sampling should be conducted per ADFG timing recommendations using non-lethal methods. Results should be summarized in three segments as in the spawning surveys. Juvenile sampling would be done to quantify changes in juvenile fish numbers and habitat use, so standard sampling methodology, times, and locations should be used.

Index Streams

NMFS 3: continued.

the channel conditions, including salmon habitat. It should that monitoring erosion and channel changes is necessary.

The DEA also states that due to high flows in 1998, the measurements taken during 1996 do not represent present conditions and no longer be valid. NMFS agrees with these statements. In order to achieve objectives and meet concerns NMFS recommends:

In order to get present conditions, the survey should be performed before water is diverted into Lagoon Creek. The survey should be repeated during years three and five of project operation when flows are 13 cfs over flows occurring during pre-project cross section measuring.

A minimum of 12 cross sections be surveyed from the power house to the confluence of Lagoon Creek and Lake Creek; and a minimum of 12 cross sections be surveyed from the confluence down to salt water. This would be a total minimum number of 24 cross sections surveyed. Stream complexity and variability warrant this minimal number of cross sections to properly document wetted area, gather representative samples and document channel morphology changes. Photos should be taken at each cross section upstream, downstream and across stream from both streambanks. Stream flow should be recorded at the powerhouse gauge. An increase in the number of cross sections will not appreciably increase the cost of the survey and will give much greater reliability in the analysis. Perform the survey when flows are 13 cfs over flows occurring during pre-project cross section measuring. Calculate the increase in wetted area. Identify abnormal erosion or changes in channel morphology.

If cross sections show an increase in the width to depth ratio of more than 10% over pre-project levels, project design, operation, or mitigation should be altered. Obvious problem areas may occur that are not captured in survey summaries. These areas should be documented in the photo logs. If streambank mitigation is deemed appropriate, bioengineering methodology should be used. This will provide optimal fish habitat and long term stream health.

Yearly Review

Rational: Review of monitoring results will enable the applicant and agencies to work together to adjust the monitoring and interpret results.

NMFS 3: Continued.

Condition: A yearly monitoring review meeting should be done with the agencies. The monitoring results should be sent out at least 30 days prior to the meeting.

NMFS 3: Continued.

Escrow Account

Establish an interest bearing escrow account or other vehicle to mitigate unforseen impacts to fish, wildlife, or water quality impacts caused by construction, operation of the project during the license term, or decommissioning of the project. The funds in the account would be made available to a council made up of representatives from ADF&G, USFWS, NMFS and the licensee. The account would be used by the council to implement fish and wildlife mitigation. The principal and accumulated interest would remain in escrow for the term of the license, unless jointly determined by the council that the account may be closed and remaining funds be returned to the licensee.

The account would be readily available to mitigate unforseen impacts. This would help to alleviate concerns about impacts to state and federal conservation easements, and help to insure proper protection of fish and wildlife throughout the project life, even if ownership changes.

NMFS 4: We discuss an escrow account in Section V.C.2 of the FEA, but recommend against requiring AVEC to establish one.

Project Operation

Rational: Project operation will directly affect stream flow in Lagoon Creek. Stream flow is especially critical during spawning and incubation times. Reduction of flow during these times can seriously impact spawning and incubation success.

-No more than 13.2 cfs will be diverted from Mountain Creek into Lagoon Creek.

-The license should require that the project will divert a constant amount of water through a bypass system regardless of varying power demand. Bypass flows should be equal to power flows.

-Water reductions during low flows can kill eggs and strand juvenile fish. In order to avoid this, scheduled maintenance that reduces water flow should occur between May 15 and June 15 when flows are above 20.cfs. Shutdowns should be ramped over three hours to avoid stranding fish.

-Any emergency maintenance or breakdown that reduces water flow into Lagoon Creek will be reported to the agencies. Include the date, duration of reduction, cfs reduction, the reason for the occurrence, how to prevent the occurrence from happening again and any other pertinent information.

NMFS 5: In Section V.C.2. of the FEA, we discuss and recommend project operation measures consistent with your recommendations as modified during the April 26, 2000, meeting.

-The tailrace should be designed to prevent salmon from entering or attempting to enter the tailrace.

Amendment of License Articles

Any interested party may petition the Commission to add new conditions or to amend these terms and conditions as necessary to protect, mitigate and enhance fish, wildlife, and their habitat pursuant to Federal Power Act section 10(j).

National Marine Fisheries Service requests that any license issued in this proceeding incorporate the terms and conditions above, including a reservation of their authority to add new conditions or to amend these terms and conditions as necessary for the protection of the anadromous fish resources of Old Harbor.

If the above 10(j) recommendations cannot be met, NMFS requests a 10(j) meeting with the agencies to resolve differences. Thank you for the opportunity to comment. Please contact Daniel Vos of my staff at 907-271-5006 if you have any questions.

Sincerely,

Ronald J. Berg
For Steven Pennoyer
Administrator, Alaska Region

cc: ADFG, ADEC, ADGC, EPA, USFWS, COE - Anchorage

Alaska Village Electric Cooperative
Charles Y. Walls General Manager
Alaska Village Electric Cooperative, Inc.
4831 Eagle Street
Anchorage, AK 99503-7497

Daniel Hertrich
Polarconsult Alaska, Inc.
1503 West 33rd Avenue
Suite 310
Anchorage, AK 99503-3661

NMFS 5: continued.

NMFS 6: This is a legal issue which would be determined if a license is issued to AVEC.

NMFS 7: Commission staff conducted a meeting on April 26, 2000, in which NMFS participated.

TONY KNOWLES, GOVERNOR

ORIGINAL

DEPARTMENT OF FISH AND GAME

HABITAT AND RESTORATION DIVISION

March 3, 2000

Ms. Ann Miles, Chief
Licensing West Branch
Office of Hydropower Licensing
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington D.C. 20426

Dear Ms. Miles:

Re: OLD HARBOR HYDROPOWER PROJECT, FERC PROJECT NO. 11690-001, ALASKA - DRAFT ENVIRONMENTAL ASSESSMENT, ALASKA DEPARTMENT OF FISH AND GAME - 10j RECOMMENDATIONS

Thank you for providing the Alaska Department of Fish and Game (ADF&G) the opportunity to comment and respond to your January 20, 2000 letter regarding our Federal Power Act (FPA) § 10(j) final recommended terms and conditions for the Old Harbor Hydropower Project. The recommended terms and conditions are addressed in the January 19, 2000 National Environmental Policy Act draft environmental assessment (DEA) for the project. Your letter asks several questions: are the Federal Energy Regulatory Commission's (FERC/Commission) preliminary DEA mitigation measures acceptable to our agency; does ADF&G have additional evidence to support the department's August 20, 1999 recommendations; and do we have additional recommendations and supporting evidence? Following are responses to your January 20, 2000 letter including comments on the January 19, 2000 DEA.

1) Is our recommendation that Alaska Village Electric Cooperative, Inc. (AVEC) prepare a plan to determine any changes in channel morphology and salmon habitat acceptable to you?

Yes. The ADF&G will work with the National Marine Fisheries Service, the U.S. Fish and Wildlife Service and the applicant in designing such a plan. We suggest that width/depth measurements of a representative set of pools and riffles and their frequency be considered as a minimum requirement for the assessment of salmon habitat. In addition, a pre-project set of measurements must be accomplished so that a baseline can be established against which comparisons may be made.

3) Is our recommendation that AVEC install its proposed bypass system for flow continuation during all powerhouse outages acceptable to you?

Perhaps. Provided the efficiency and reliability of the proposed jet deflector system is capable of passing all of the water in the penstock (up to 13.0 cubic feet per second), at all times water is being diverted from the East Fork Mountain Creek, our concerns for streamflow in Lagoon Creek downstream of the

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ADF&G 1: In Section VII of the FEA, we recommend channel and habitat monitoring using the protocol developed by the USFS for national forests in Alaska, as discussed at the April 26, 2000, meeting with Commission staff and the resources agencies.

ADF&G 2: AVEC's proposed bypassed system and jet deflector were discussed at the Section 10(j) meeting held April 26, 2000, and we recommend measures to ensure flow continuation in Section VII of the FEA.

powerhouse should be met. We request that FERC or AVEC provide more details of the proposed system so that a more thorough evaluation can be made. Perhaps this information could be shared at a 10j meeting.

3) Is our recommendation that AVEC prepare a schedule for maintenance of the intake and penstock to minimize flow interruptions from intake and penstock outages acceptable to you?

Yes. We look forward to working with the applicant, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service in designing such a maintenance schedule. Such a schedule must be timed to coincide with natural Lagoon Creek surface water flows of sufficient magnitude that dewatering of the stream channel downstream of the powerhouse is prevented.

4) Are there any other measures that you'd agree to that would accomplish the objectives of your original recommendations?

Yes. Concerning sedimentation or disturbance of anadromous fish waters, the ADF&G, is the State of Alaska's principal manager of fish and wildlife resources and their habitats. ADF&G is mandated under state law to: "... manage, protect, maintain, improve, and extend the fish, game, and aquatic plant resources of the state in the interest of the economy and general well-being of the state ..." (AS 16.05.020). Among the ADF&G's various powers and duties are: "... to assist the United States Fish and Wildlife Service in the enforcement of federal laws and regulations pertaining to fish and game ..." (AS 16.05.050), and protect fish habitat (AS 16.05.840 and AS 16.05.870). Pursuant to AS 16.05.870 the ADF&G exerts jurisdiction over activities below the ordinary high water level of anadromous fish bearing waters.

For this reason any project-related operations that could affect the bed or banks of Lagoon Creek will require authorization from ADF&G. During pre-project scoping meetings the instream timing window for such activities as road construction, equipment fording, and outfall construction were discussed. Pink, chum, and coho salmon spawn in Lagoon Creek. Adult salmon spawning generally begins in mid July and extends through the fall. The eggs deposited in the streambed do not emerge as free swimming fish until late May or early June of the following year. Salmon eggs deposited in streambed gravel are extremely vulnerable to any type of disturbance and cannot withstand shock or pressure. In addition, sediment deposited on top of salmon spawning sites may suffocate and thereby kill eggs and alevin. For these reasons instream work in anadromous fish waters in the Kodiak area is generally prohibited in salmon spawning and rearing areas except between early June and mid July.

5) Is there any additional evidence to support your recommendations or to demonstrate why they are consistent with the FPA?

In addition to the measures discussed above, we believe that FERC should reconsider one other of the terms and conditions that ADF&G recommended.

Escrow Account: In the DEA (pages 52, 53, and 91) FERC makes a preliminary determination that the mitigation fund is not necessary because, in the event the project is adversely affecting resources, "the Commission may direct AVEC to modify project operations or facilities. Further, if during the term of a license documentation supporting additional measures is presented, the Commission could reopen the

ADF&G 2: continued

ADF&G 3: In Section V.C.2. of the FEA we recommend that instream construction activities occur between May 15 and July 15 in the East Fork and between early June and July 15 in Lagoon Creek.

license, and after notice and opportunity for hearing, require additional measures of AVEC. We have no reason to believe that AVEC would not be able to fund any future measures as may be required by the Commission. Therefore, we do not see a need for the account and do not recommend that AVEC establish an escrow account."

Our rationale for the trust fund is that funding should be readily available if there are unforeseen events that impact fish and wildlife resources as a result of the project that cannot be otherwise mitigated by changing project operations. Escrow mitigation accounts have precedent on FERC licenses. FERC required an escrow account for several Alaska projects, including Power Creek Hydroelectric Project (FERC No. 11243, Article 407) and Terror Lake (FERC No. 2743). In the Power Creek EA, FERC agreed with the resource agencies that "... establishing a fish and wildlife mitigation fund is necessary to mitigate for any unexpected impacts." The fund allows for a response when there is a need for mitigation, without concern for an applicant's immediate ability or willingness to pay for the response. The need for an escrow account has no bearing on an applicant's ability to fund mitigation and was not a factor in the decision by FERC to include mitigation escrow accounts in the Power Creek (FERC No. 11243, Article 407) and Terror Lake (FERC No. 2743) hydroelectric project licenses. We respectfully request you reconsider your preliminary decision to not provide for an escrow account for the Old Harbor project.

Thank you for the opportunity to respond to the mitigation measures recommended in the DEA and to provide our §10(j) recommendations. We request that the above §10(j) issues, including an escrow account, be addressed at a §10(j) meeting. We would not be available for such a meeting until after March 16, 2000. We suggest the meeting be held in Anchorage. If you have any questions regarding this letter or wish to set up a meeting with the department please contact me at 907-267-2333.

Sincerely,

C. Wayne Dolezal
Habitat Biologist
Region II

cc: Charles Walls, Alaska Village Electric Cooperative, Inc.
Brent Petrie, Alaska Village Electric Cooperative, Inc.
Daniel Hertrich, polarconsult alaska, inc.
Nan Allen, Federal Energy Regulatory Commission
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Lance Trasky, ADF&G/H&R
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Larry VanDeele, ADF&G/WC
Len Schwarz, ADF&G/SF
Gary Wheeler, U.S. Fish and Wildlife Service
Dan Voss, National Marine Fisheries Service
Jay Bellinger, Kodiak NWR

ADF&G 5: In Section V.C.2 of the FEA, we discuss escrow accounts and recommend that no account be required for the Old Harbor Project.

ADF&G 6: Commission staff conducted a Section 10(j) meeting at the ADF&G offices in Anchorage, Alaska on April 26, 2000.

ORIGINAL

polarconsult alaska, inc.

ENGINEERS - SURVEYORS - ENERGY CONSULTANTS

Project No. 11690-001
Old Harbor Project

April 7, 2000

DAVID BOERGER, SECRETARY
FEDERAL ENERGY REGULATORY COMMISSION
888 FIRST STREET NE
WASHINGTON, D.C. 20426

Subject: *COMMENTS*
FERC's DEA, FERC Project #11690-001, Old Harbor Project

AVEC requests that the allowable easement for the project be increased from the current 30' proposed width to a width of 60'. There are several reasons for requesting this change.

The original intention of the requested easement was based on the necessary width following construction. Construction related needs were not realized until after the initial application had been made and additional site visits had been conducted. This request for additional width in the easement is for the sake of improving the constructability of the project, improving safety during construction, lessening the potential for erosion during construction and operation, and decreasing the amount of post construction maintenance that will be required.

This additional room will allow for greater flexibility in making changes to the pipeline layout in the field. As an example, there may an area where a significant rock outcropping is present that will prevent digging and burial of the pipe without blasting. With extra room available the pipeline can be routed to avoid the obstacle. Another case where the route may need to be altered is on side slopes. Slight changes in the location of the pipeline may have significant effects as to the amount of bending and coning that is required. This is due to the fact that it is not possible to pick out every detail of the terrain through surveying.

Additional room is also necessary to have enough width to place pipe, run the track hoe, and get by the excavation and equipment with a sufficient distance to enhance worker safety and eliminate the worry of overstepping the easement boundary. It is very likely that if workers are confined to the narrow corridor of 30' they will be too close to the operation of the backhoe when trying to get around it. This could be a significant safety hazard that can be avoided by the additional width of a larger easement. Also, where pipe pieces are placed on a side hill, as occurs frequently along the coast, they have to be placed perpendicular to the route otherwise they will roll away. The pieces of pipe are 20' long and the width of the track hoe is about 10'. This would leave absolutely no room for maneuvering around the pipe. Pipe would have to be continuously moved to work around it without violating the easement. This increases significantly the amount of

April 7, 2000 Page 1 of 3

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polarconsult 1: **The 60-foot wide right-of-way is discussed in Section V.C.2 of the EA. We agree that greater flexibility of a wider right-of-way would benefit safety, penstock routing and vegetation.**

vegetation damage and erosion potential. AVEC wants to limit the amount of vegetation damage during construction and operation as much as possible.

Because of the wider width, there will be more freedom in deciding where to put the pipeline and the maintenance trail. This will ultimately translate into less maintenance because more locations will be available to select from to install the features of the project. Also by allowing more room for deciding where project features go, more durable ground and sites can be chosen. This will significantly improve the longevity of the access trail during the high volume of traffic that will occur during construction.

By implementing a 60' easement, actual vegetation damage area will remain essentially unchanged, if not decrease, from area quantities using a 30' width. This is because the width of trench excavation and of the access trail will remain the same. The DEA conservatively estimates that 16 acres of area will be disturbed. As stated in the DEA, that estimate is based on disturbing all of the area within the 30' width but that complete clearing may not be required in all areas. This is absolutely true – AVEC will minimize clearing so that revegetation quantities are minimized. Actual clearing amounts could be more accurately estimated by assuming a 10' width of clearing for trenching activities, another 8' width for construction of the access trail, complete clearing of the powerhouse and intake sites, and 20' of clearing for the transmission line/access road. Based on these values, actual area of clearing is estimated to be 8.5 acres. Even if the disturbed area doubled (based on doubling the easement width) it would still be about the same as the quantity of 16 acres that was the basis for analysis of the DEA.

In conclusion, by allowing extra room to work in, construction safety will improve, the potential for erosion and large cuts and fills will decrease, and there will be little or no change in the actual area disturbed.

polarconsult 1: continued.

Sincerely,

Daniel Hertrich, PE

Attachments:
Old Harbor Project Easement Description, Portions Located on Federal Lands
Proposed Easement Drawings

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cc (List of Participants):
Nan Allen
David Allen
Tony Azuyak
Robert Babaco
Jay Bellinger
Rick Berns
David Boerger
Secretary
Walt Boyle
John Bregar
Bret Christensen
Emil Christiansen
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Charles Walls
Gary Wheeler
John Williams
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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alaska Village Electric Cooperative — Project No. 11690-001

ORDER ISSUING ORIGINAL LICENSE
(Minor Project)
December 12, 2000

INTRODUCTION

On May 14, 1999, the Alaska Village Electric Cooperative (AVEC) filed, pursuant to Part I of the Federal Power Act (FPA), [1] an application for a minor license to construct, operate and maintain the 500-kilowatt (kW) Old Harbor Hydroelectric Project No. 11690 (Old Harbor Project). The project intake will divert streamflows from the East Fork of Mountain Creek to a powerhouse that discharges to Lagoon Creek, near the city of Old Harbor, on Kodiak Island, Alaska. The project facilities will occupy about 18 acres of the Kodiak National Wildlife Refuge (refuge), including lands owned in fee by the U.S. Department of the Interior (Interior). [2]

BACKGROUND

The Commission issued notice of the application on June 15, 1999, and extended the notice on August 19, 1999. Motions to intervene were filed by the National Marine Fisheries Service (NMFS) on August 16, 1999; Interior on August 17, 1999, and Alaska Department of Fish and Game (ADF&G) on August 19, 1999. Interior moved to intervene in opposition, but withdrew its motion to intervene on March 10, 2000.

The Commission staff (staff) issued a draft environmental assessment (draft EA) for the project on January 19, 2000. Comments on the draft EA were filed by ADF&G, AVEC, NMFS, and polarconsult alaska, inc., AVEC's consultant.

Their concerns were considered in preparing the final environmental assessment (final EA) for this project, which was issued on June 26, 2000, and is attached to and made part of this license order.

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[1] 16 U.S.C. §§ 791a-825r.

[2] Section 4(e) of the FPA, 16 U.S.C. §§ 797(e), requires the project to be licensed.

I have fully considered all comments received from interested agencies and individuals in determining whether, and under what conditions, to issue this license.

PROJECT DESCRIPTION

The proposed project will consist of an 86-foot-long, 7-foot-high uncontrolled diversion dam; a 30-foot-long, 8-foot-high de-sander box, a 9,800-foot-long conveyance; a powerhouse, with one 500-kW horizontal impulse turbine/generator; a 5,500-foot-long buried transmission line; a 5,500-foot-long access road; and related appurtenances. A detailed project description is contained in ordering paragraph B(2). The project will be operated as run-of-river.

APPLICANT'S PLANS AND CAPABILITIES

In accordance with Sections 10 and 15 of the FPA, [3] staff evaluated AVEC's proposal for these areas: (A) conservation efforts; (B) dam safety; and (C) need for power. I accept staff's conclusion in each of these areas.

A. Conservation Efforts

In accordance with Sections 10(a)(2)(C) of the FPA, staff evaluated AVEC's record as a licensee with respect to energy conservation efforts. AVEC has a record of encouraging its customers to conserve energy by distributing pamphlets and brochures informing consumers on appliance power consumption and bill-stuffing of conservation information. Its tariff specifically discourages the use of electric heat and, in order to reduce the peak demand for generating capacity, it imposes a systemwide demand charge of $45 per kW on monthly peak capacity demand for large commercial customers.

Staff found that AVEC is making a good faith effort to conserve electricity in compliance with the recommendations of the Alaska Public Utilities Commission.

B. Dam Safety

Our Regional Office classified the project as having a "low" hazard potential based on the following: (1) the diversion dam would be only 7 feet high and would have no storage; (2) the project would occupy undeveloped, forested land; (3) there are no

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[3] 16 U.S.C. §§ 803.

developed recreational facilities located near the project; and (4) failure of the penstock or diversion structure would not appear to pose a risk to life or property.

Because of the "low" hazard classification, the project would not be subject to Part 12, Subpart D, of the Commission's regulations.

C. Need for Power

Because the city of Old Harbor is isolated from major power producing centers, it currently relies on a small set of diesel generators and barged-in diesel fuel to supply its power needs. This reliance on diesel fuel causes high fuel costs, limits fuel supplies, and increases the risk of environmental harm from fuel spills. For these reasons, there is a need to provide a more economical, reliable, and cleaner source of power than the current system. Without this project, Old Harbor would continue to use diesel generation. With the project, the community's use of non-renewable fossil fuels, would lessen air emissions from burning diesel, and give the community the opportunity to lower the cost of electricity over time.

Staff found that there is a need for the power that will be generated by the Old Harbor Project.

WATER QUALITY CERTIFICATION

Under Section 401(a)(1) of the Clean Water Act, [4] the Commission may not issue a license for a hydroelectric project unless the state certifying agency has either issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year. [5] The Alaska Department of Environmental Conservation (ADEC) received AVEC's application for water quality certification on May 20, 1999. Because the ADEC did not act on the request within 1 year from the date of receipt, the water quality certification is deemed to be waived under section 4.38(f)(7)(ii) of the Commission's regulations.

COASTAL ZONE MANAGEMENT PROGRAM

[4] 33 U.S.C. § 1341(a)(1).

[5] Section 401(a)(1) requires an applicant for a federal license or permit to conduct any activity which may result in any discharge into navigable waters to obtain from the state in which the discharge originates certification that any such discharge will comply with applicable water quality standards.

Under Section 307 (c)(3)(A) of the Coastal Zone Management Act (CZMA), [6] the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program (which certification is included in the license application and, at the same time, is filed with the state), or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

By letter dated October 20, 2000, the Alaska Division of Governmental Coordination (ADGC) concurred that the Old Harbor Project, as proposed by AVEC, is consistent with Alaska's CZMA program, with 12 conditions which are requirements of the state. We are including in this license conditions that are consistent with ADGC's requirements to use best management practices during construction of the diversion weir (Article 401); comply with treatment specifications for wood used in weir and bridge construction (Article 401); isolate sites for bridge abutments and tailrace from flowing waters during construction (Article 401); stabilize and return to pre-project conditions any inadvertent bank cuts, slopes, fill, or other exposed earthwork (Article 401); monitor stream channel and fish habitat using specific methods (Article 402); prepare plans to monitor channel morphology and erosion (Article 402); monitor water temperature (Article 403); gage streamflows (Article 404); and restrict stream crossings by date (Article 405).

Staff did not recommend ADGC's condition that AVEC install a picket panel fish screen with 1-inch wide slot openings at the head of the tailrace and a 1-inch slotted picket weir at the mouth of the tailrace, because no preliminary design has been filed. Although staff did not recommend a screen that meets the specific CZMA criteria, Article 406 requires AVEC to design and implement a picket-panel fish screening system to prevent fish from entering the tailrace and reduce attraction to tailrace outflows.

Staff did not make specific recommendations to isolate all ground-disturbing activities within 25 feet of surface waters, leave riverbanks unaltered during stream crossings, or restrict stream crossings by type of slope, as required by ADGC, however, AVEC will be required to meet the Commission's requirements as specified by its Construction Quality Control Inspection Program (QCIP). [7] Further, Article 401 requires

[6] 16 U.S.C. § 1456(3)(A).

[7] The QCIP is found in Chapter 7 of the Commission's Engineering Guidelines for the Evaluation of Hydropower Project, available on the Commission's website. The Commission's website address is http://www.ferc.fed.us/hydro/hydro2.htm (please call

AVEC to consult with resource agencies to develop a final erosion and sediment control plan that would specify locations for final sediment control measures.

Although this license does not include certain specific CZMA criteria for the fish screen and ground-disturbing activities in the vicinity of surface waters, nothing in this license precludes AVEC from abiding by those CZMA conditions.

SECTION 4(e) FINDINGS AND CONDITIONS

Section 4(e) of the FPA [8] provides that the Commission can issue a license for a project located within any reservation only after it finds that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. Section 3(2) of the FPA [9] defines reservations as including lands and interests in lands owned by the United States, and withdrawn, reserved, or withheld from private appropriation and disposal under the public land laws.

The refuge was created by Executive Order No. 8857, on August 14, 1941, which established its purpose as the protection of habitat for the brown bear and other wildlife. Staff found that the licensing of the Old Harbor Project will not interfere or be inconsistent with the purposes for which the refuge was created or acquired. I concur with staff's finding.

SECTION 18 FISHWAY PRESCRIPTION

Section 18 of the FPA [10] provides that the Commission shall require the construction, maintenance and operation by a licensee of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate.

By letter filed September 13, 1999, Interior requested that its authority to prescribe the construction, operation, and maintenance of fishways at the Old Harbor Project be reserved. Article 407 of this license reserves the Commission's authority to require fishways that may be prescribed by Interior for the project in the future.

202-208-2222 for assistance).

[8] 16 U.S.C. § 797(e).

[9] 16 U.S.C. § 796(2).

[10] 16 U.S.C. § 811.

RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Section 10(j)(1) of the FPA [11] requires the Commission to include license conditions, based on recommendations of federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act, [12] for the protection of, mitigation of adverse impacts to, and enhancement of fish and wildlife. The U.S. Fish and Wildlife Service (FWS), NMFS, and ADF&G filed recommendations for license conditions that were considered in the Section 10(j) process in this proceeding. [13]

This license includes conditions based on the agencies' recommendations to prepare and implement an erosion and sediment control plan (Article 401); revegetate with native plant species (Article 401); prepare and implement a channel geomorphology and habitat monitoring plan (Article 402); prepare and implement a plan to monitor water temperature (Article 403); prepare and implement a plan to monitor streamflows (Article 404); restrict the dates for instream construction (Article 405); prepare and implement an adult fisheries monitoring plan (Article 408); prepare and implement a juvenile fisheries monitoring plan (Article 409); operate the project as run-of-river, with a maximum diversion of 13.2 cubic feet per second (cfs) and a constant discharge regardless of power demand (Article 410); report flow reductions (Article 410); provide flow continuation (Article 411); require ramping rates (Article 412); comply with restrictions on scheduled maintenance (Article 412); employ an environmental compliance monitor during construction (Article 413); prepare and implement a hazardous substance spill prevention and minimization plan (Article 414); and prepare and implement a bear safety plan (Article 415).

OTHER AGENCY RECOMMENDATIONS

NMFS, FWS, and ADF&G filed a number of recommendations that were not subject to Section 10(j)(1) of the FPA, and therefore, have been considered under Section 10(a)(1) of the FPA.

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[11] 16 U.S.C. § 803(j)(1).

[12] 16 U.S.C. § 661 et seq.

[13] NMFS Motion to Intervene filed August 10, 1999, and letter filed March 2, 2000; ADF&G letters filed August 26, 1999, and March 3, 2000; and FWS letter filed September 13, 1999.

Included in this license are conditions consistent with NMFS's, FWS's, and ADF&G's recommendations to hold annual meetings to review monitoring and stream-gaging results (Article 416) and 30-day consultation comment periods (Articles 401 through 406, Articles 413 through 415, and Articles 419 through 421). Also included are conditions recommended by NMFS: (1) to consider additional environmental measures if post-license monitoring shows that water is significantly colder at the intake than at the powerhouse and there has been a significant decline in fish production (Article 403); and (2) that interested parties may petition the Commission to add new conditions or to amend this license, as necessary pursuant to Section 10(j) of the FPA(Article 417). [14] Further, conditions are included consistent with FWS's and ADF&G's recommendations to: (1) send streamflow records to the agencies (Article 404); (2) follow guidelines for treated wood timbers or planks (Article 401); and allow agency representatives access to project works and lands (Article 418).

FWS and ADF&G recommended that if a new or modified course of action is proposed as a result of an annual review meeting (required by Article 416) or project operations result in unforeseen effects, additional reviews and meetings may be required. This license does not require this measure because any proposed courses of action not specified in this license, along with supporting evidence, must be filed with the Commission, for approval, before implementation.

FWS and ADF&G recommended that the annual review meetings include reviews of reports and compliance with all license stipulations. This license does not require this measure because the purpose of the annual meetings is to review license conditions incorporating measures to protect, mitigate, and enhance fish and wildlife resources. Therefore, other license requirements need not be reviewed.

FWS and ADF&G recommended that, if fish production is significantly reduced as a result of project operations, the license shall be reopened and the Commission will order the licensee to construct the necessary facilities or modify operations to release water at temperatures that do not impact fish production in Lagoon Creek. This recommendation was not adopted because the Commission upon its own motion or upon the recommendation of the resource agencies will determine whether the license would be reopened or AVEC is directed to modify project facilities or operations.

[14] Article 417 extends to NMFS the same consideration allowed other fish and wildlife agencies in standard license Article 11.

FWS and ADF&G recommended that project design and operations include remote monitoring and operation of all project components. This recommendation is consistent with AVEC's proposal on page 25, Exhibit E, of the application for license, and therefore, is part of the project as ordered by the Director.

FWS and ADF&G recommended that we require AVEC to establish an interest-bearing escrow account to fund mitigation for unforeseen environmental impacts. This license does not require AVEC to establish such an account because of the small size of the project, the amount of funding already acquired by AVEC, the number and range of resource protection measures established by the license, and AVEC's experience in operating and maintaining power plants. [15]

FWS and ADF&G recommended that, if the agencies determine that the temperatures during project operations vary from the range of measured pre-project temperatures and pose a potential negative effect on the spawning, incubation, and/or rearing of anadromous fishes, AVEC develop and implement a mitigation plan, approved by the fish and wildlife agencies. This license does not require this measure because the Commission would determine whether the results warranted additional measures after considering the recommendations of the resource agencies.

NMFS, FWS, and ADF&G recommended that AVEC be required to initiate consultation on all post-license plans at least 6 months before operations or ground-disturbing activities begin, depending on the plan. This license does not adopt this recommendation because plans vary in scope and length of time needed for preparation, consultation and filing.

OTHER ISSUES

A. Bald Eagles

AVEC proposes to minimize disturbances to nesting bald eagles in the project area during construction. Article 419 is included in this license to require AVEC to prepare and implement an eagle protection plan to minimize disturbances during construction.

[15] AVEC operates 47 power plants and has annual operating revenues of about $20 million (letter from Charles Y. Walls, President and CEO, AVEC, Anchorage, Alaska; October 25, 1999).

B. All Terrain Vehicles (ATV)

Constructing and maintaining the project will require an access trail from the powerhouse to the intake. This trail, unless blocked, could allow ATV access to the intake, resulting in the potential for disturbances to wildlife, destruction of sensitive alpine vegetation, soil compaction, rutting and erosion of stream banks, and long-term scars on the land. Article 420 requires AVEC to prepare and implement an ATV access control plan for the intake access trail.

C. Recreation Resources

Constructing a maintenance road to the powerhouse will improve an existing trail used by ATV's and could attract additional ATV use. Article 421 requires AVEC to prepare and implement a recreation plan to allow ATV access to the improved trail, while protecting the area from improper use.

D. Cultural Resources

No archeological or historic sites eligible for inclusion in the National Register of Historic Places have been identified at the proposed project site. If, however, archeological or historic sites are discovered during project construction, maintenance or operation, Article 422 requires preparation of a cultural resources management plan in consultation with the Alaska State Historic Preservation Officer.

E. Use and Occupancy of Project Lands and Waters

Requiring a licensee to obtain prior Commission approval for every use or occupancy of project land would be unduly burdensome. Article 423 allows AVEC to grant permission, without prior Commission approval, for the use and occupancy of project lands for such minor activities as landscape plantings. Such uses must be consistent with the purpose of protecting and enhancing the scenic, recreational, and environmental values of the project.

F. Start and Completion of Construction

Section 13 of the FPA [16] mandates that licensees begin construction within two years of the date of the license and complete construction within the time period

[16] 16 U.S.C. § 806.

established by the license. Article 301 requires AVEC to start project construction within two years of the issuance date of this license and to complete construction within five years of the issuance date of the license.

G. Review of Final Plans and Specifications

AVEC filed preliminary plans and a supporting design report with the license application. AVEC or its engineering consultants will develop detailed drawings and specifications after this license is issued. To ensure that AVEC's final plans are consistent with the project design authorized by this license, Article 302 requires AVEC to provide the Commission and its regional director with final contract drawings and specifications--together with a supporting design report consistent with the Commission's engineering guidelines--at least sixty days before the start of project construction.

H. Review of Contractor-Designed Cofferdams and Deep Excavations

Construction contractors selected by licensees may determine that certain cofferdams or deep excavations not included in the licensee's final plans are needed at a project site. To ensure that such temporary facilities or measures are consistent with project plans and drawings, Article 303 requires AVEC to (1) review and approve contractor-designed cofferdams and deep excavations, and (2) provide copies of the approved cofferdam construction drawings and specifications to both the Commission and its regional director.

I. Clearing and Disposing of Temporary Structures and Materials

Clearing lands for construction and maintenance may result in temporary facilities, brush, refuse, or other material which requires disposal. Article 203 requires AVEC to follow appropriate federal, state, and local statutes and regulations when clearing and disposing of unnecessary materials.

J. Administrative Conditions

The Commission collects annual charges from licensees for the administration of the FPA and the use of federal lands. Article 201 provides for the collection of such funds.

Article 202 requires AVEC to file copies of all approved project drawings on microfilm.

Article 304 requires AVEC to file revised drawings of project features as-built.

Article 305 requires AVEC to reimburse the owner of a storage reservoir or other headwater improvement project that directly benefits the licensee's project. The benefits will be assessed in accordance with Subpart B of the Commission's regulations.

STATE AND FEDERAL COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA [17] requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. [18] Under Section 10(a)(2)(A), federal and state agencies filed 22 comprehensive plans that address various resources in Alaska. Of these, staff identified and reviewed four comprehensive plans that are relevant to the project. [19] No conflicts were found. [20]

COMPREHENSIVE DEVELOPMENT

In determining whether a proposed project will be best adapted to a comprehensive plan for developing a waterway for beneficial public purposes, pursuant

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[17] 16 U.S.C. § 803(a)(2)(A).

[18] 18 C.F.R. § 2.19 (1997), see Comprehensive Plans.

[19] The plans are the Alaska Outdoor Recreation Plan: 1991-1985, Alaska Department of Natural Resources, Division of Parks, 1981, Juneau, Alaska; North American Waterfowl Management Plan, U.S. Fish and Wildlife Service and Canadian Wildlife Service, 1986, Twin Cities, Minnesota; Kodiak National Wildlife Refuge Comprehensive Conservation Plan, U.S. Fish and Wildlife Service, 1987, Anchorage, Alaska; and Kodiak National Wildlife Refuge Fishery Management Plan, Region 7, August 1990, Kodiak, Alaska.

[20] The refuge's Comprehensive Conservation Plan (CCP) specifically prohibits hydropower development on lands designated for "minimal management," as the project site within the refuge is currently designated. The final EA, prepared jointly by FWS and Commission staffs, states that FWS will amend the CCP and reclassify the lands within the proposed project site as "moderate management for the purpose of hydroelectric development." The inclusion of our recommended environmental measures, and the FWS's amended CCP plan, will remove any project-related conflict with the CCP plan.

to Section 10(a)(1) of the FPA,[21] the Commission considers a number of public interest factors, including the economic benefits of project power.

Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division, [22] the Commission uses an analysis that compares the current cost of the project's power and the likely alternative power without forecasting future potential inflation, escalation, or deflation beyond the license issuance date. The basic purpose of the Commission's economic analysis is to provide a general estimate of the potential power benefits and the costs of a project, and reasonable alternatives to project power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

Based on current economic conditions, and assuming the project is financed at an interest rate of 5 percent, the project as proposed by AVEC would generate 664,000 kWh and cost about $183,000 (276 mills/kWh) annually. The current annual value of the project's power would be about $174,800 (263 mills/kWh). The project as proposed by AVEC would cost $8,200 (13.0 mills/kWh) more than the alternative. I base this value on the cost of alternative power, which for Old Harbor is diesel generation. However, if the project were not built, the city of Old Harbor will need to replace its diesel generators, so the alternative power value for the project includes the cost of such replacement.

I find the project, as licensed, will generate 664,000 kWh at an annual cost of about $192,330 (290.0 mills/kWh). The value of the project's power would be about $174,800 (263 mills/kWh), annually. As licensed, the project would cost $17,530 (27.0 mills/kWh) more than the alternative. However, as explained in Mead, project economics is only one of the many public interest factors that are considered in determining whether or not to issue a license. Developing the project may be desirable for other reasons; for example, to diversify the mix of energy sources in the area, to promote construction-related jobs in the area, and to provide a fixed-cost source of power and reduce contract needs. AVEC would need to decide whether or not to proceed with project development.

In analyzing public interest factors, the Commission takes into account that hydroelectric projects offer unique operational benefits to the electric utility system

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[21] 16 U.S.C. § 803(a)(1).

[22] 72 FERC ¶ 61,027 (1995).

(ancillary benefits). These benefits include their value as almost instantaneous load-following response to dampen voltage and frequency instability on the transmission system, system-power-factor-correction through condensing operations, and a source of power available to help in quickly putting fossil-fuel based generating stations back on line following a major utility system or regional blackout.

Ancillary benefits are now mostly priced at rates that recover only the cost of providing the electric service at issue, which don't resemble the prices that would occur in competitive markets. As competitive markets for ancillary benefits begin to develop, the ability of hydro projects to provide ancillary services to the system will increase the benefits of the projects.

Electricity generated from renewable water power resources is beneficial because it offsets the use of fossil-fueled generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution and greenhouse effects. By producing hydroelectricity, the Old Harbor Project will displace the need for diesel fuel generation, thereby avoiding some power plant emissions and creating an environmental benefit. Consequently, the operation of the project will likely reduce annual carbon emissions in the region. The amount of greenhouse gases emissions that are avoided depends on the type of power displaced, which is region-specific.

Sections 4(e) and 10(a)(1) of the FPA, 16 U.S.C. 797(e) and 803(a)(1), require the Commission, in acting on applications for license, to give equal consideration to the power and development purposes and to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to license this project, and the terms and conditions included herein, reflect such consideration. Based on the record in this proceeding, we conclude that the Old Harbor Project, with the conditions attached to this license, does not conflict with any planned or authorized development and is best adapted to comprehensive development of the waterway for beneficial public uses.

LICENSE TERM

Section 6 of the FPA [23] states that licenses under Part I of the FPA shall be issued for a period not to exceed 50 years. The Commission's policy establishes 30-year terms for those projects that propose little or no redevelopment, new construction, new capacity, or enhancement; 40-year terms for those projects that propose a moderate amount of redevelopment, new construction, new capacity or enhancement; and 50-year terms for those projects that propose extensive redevelopment, new construction, new capacity or enhancement. Because the Old Harbor Project involves an original license with substantial new construction, the license is issued for a period of 50 years.

SUMMARY OF FINDINGS

The EA contains background information, analysis of effects, support for related license articles, and the basis for a finding of no significant impact on the environment. The design of this project is consistent with the engineering standards governing dam safety. The project would be safe if operated and maintained in accordance with the requirements of this license.

Based upon a review of the agency and public comments filed on the project, and the staff's independent analysis pursuant to Sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, I conclude that issuing a license for the Old Harbor Project, with the required environmental measures and other special license conditions, will be best adapted to the comprehensive development of Mountain and Lagoon Creeks for beneficial public uses.

The Director orders:

(A) This license is issued to the Alaska Village Electric Cooperative (licensee), for a period of 50 years, effective the first day of the month in which this order is issued, to construct, operate, and maintain the Old Harbor Project. This license is subject to the terms and conditions of the FPA, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the FPA.

(B) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, enclosed by the project boundary shown by Exhibit G, filed May 14, 1999 (pages G-1 and G-2 of the license application):

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[23] 16 U.S.C. § 799.

Exhibit G Drawing	FERC No.	Description
Sheet G-1	11690-1	Project Map
Sheet G-2	11690-2	Legal Description of Lands Occupied by the Project and the Required Access Routes

(2) Project works consisting of: (a) an 86-foot-long by 7-foot-high uncontrolled diversion dam, constructed with galvanized steel frames with Ekki wood stop logs, at elevation of 840 feet above mean sea level; (b) an intake structure with a trash rack; (c) a 30-foot-long by 8-foot-wide by 6-foot-high steel, wood and concrete de-sander box, with screens to catch suspended debris and a bypass gate for flushing the screens and accumulations of sand and gravel; (d) a 9,800-foot-long penstock made up of 3,200 feet of 20- to 18-inch-diameter high density polyethylene pipe and 6,600 feet of 16-inch-diameter steel pipe; (e) a bypass system, joining the penstock just upstream of the turbine, with a separate tailrace, parallel to the turbine tailrace, to direct water in the penstock not needed for power generation to a submerged container to dissipate dissolved gases and moderate daily flow fluctuations; (f) a 625-square-foot metal powerhouse on concrete footing and slab, with one 500-kW impulse turbine; (g) a deflector plate system to provide flow continuation; (h) a 5,500-foot-long buried transmission line; (i) a 5,500-foot-long access road; and (j) related appurtenances.

The project works generally described above are more specifically described on page 12 of Exhibit A and page 25, paragraph 3 of Exhibit E, both filed on May 14, 1999. The project works are also shown in Exhibit F (pages F-1 through F-10) of the license application, filed May 14, 1999:

Exhibit F Drawing	FERC No.	Description
Sheets F-1 through F-7	11690-1 through 11690-7	Project Plan
Sheet F-8	11690-8	Intake, Truss Bridge, and Pipeline Details
Sheet F-9	11690-9	Powerhouse Site Plan, Bridge, and Access Trail Details
Sheet F-10	11690-10	Powerhouse Details

(3) All of the structures, fixtures, equipment, or facilities used to operate or maintain the project, all portable property that may be employed in connection with the project, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) Those sections of Exhibits A, E, and F described above are approved and made part of the license. Exhibit G is approved only insofar as it shows the general project location.

(D) The following sections of the FPA are waived and excluded from the license for this minor project:

4(b), except the second sentence; 4(e), insofar as it relates to approval of plans by the Chief of Engineers and the Secretary of the Army; 6, insofar as it relates to public notice and to the acceptance and expression in the license of terms and conditions of the FPA that are waived here; 10(c), insofar as it relates to depreciation reserves; 10(d); 10(f); 14, except insofar as the power of condemnation is reserved; 15; 16; 19; 20; and 22.

(E) This license is subject to the articles set forth in Form L-17 (October 1975), entitled *"Terms and Conditions of License for Unconstructed Minor Project Affecting Lands of the United States,"* and the following additional articles.

Article 201. The licensee shall pay the United States an annual charge, effective as of the date of start of construction, for the purpose of:

(1) Reimbursing the United States for the cost of administration of Part I of the Act. The authorized installed capacity for that purpose is 500 kilowatts. Under the regulations currently in effect, projects with authorized installed capacity of less than or equal to 1,500 kilowatts will not be assessed an annual administration charge.

(2) Recompensing the United States for the use, occupancy and enjoyment of 13 acres of its lands [other than for transmission line right-of-way].

(3) Recompensing the United States for the use, occupancy and enjoyment of 5 acres of its lands for transmission line right-of-way.

Article 202. Within 45 days of the issuance of the license, the licensee shall file three original sets of aperture cards of the approved drawings. The drawings must be

reproduced on silver or gelatin 35 mm microfilm. All microfilm must be mounted on type D (3¼" x 7-3/8") aperture cards.

Prior to microfilming, the FERC Drawing Number (11690-1 through 11690-10) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number must be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (e.g., F-1, G-1, etc.), Drawing Title, and date of issuance of this license must be typed on the upper left corner of each aperture card.

Two sets of aperture cards should be filed with the Secretary of the Commission, ATTN: OEP/Division of Hydropower Administration and Compliance and one set with the Commission's Portland Regional Office.

Article 203. The licensee shall clear and keep clear to an adequate width all lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which result from construction, maintenance, operation, or alteration of the project works. All clearing of lands and disposal of unnecessary material shall be done with due diligence to the satisfaction of the authorized representative of the Commission and in accordance with appropriate federal, state, and local statutes and regulations.

Article 301. The licensee shall commence construction of the project works within 2 years from the issuance date of the license and shall complete construction of the project within 5 years from the issuance date of the license.

Article 302. Before starting construction, the licensee shall review and approve the design of contractor-designed cofferdams and deep excavations, and shall make sure that construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of the cofferdam, the licensee shall submit one copy to the Commission's Regional Director and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, Division of Dam Safety and Inspections), of the approved cofferdam construction drawings and specifications and the letters of approval.

Article 303. The licensee shall, at least 60 days prior to the start of construction, submit one copy to the Commission's Regional Director and two copies to the Commission (one of these shall be a courtesy copy to the Director, Division of Dam Safety and Inspections), of the final contract drawings and specifications along with an accompanying supporting design report for pertinent features of the project, such as

water retention structures, powerhouse or equivalent, and water conveyance structures. The Commission may require changes in the plans and specifications to assure a safe and adequate project. If the licensee plans substantial changes to location, size, type, or purpose of the water retention structures, powerhouse or equivalent, or water conveyance structures, the plans and specifications must be accompanied by revised Exhibit F and G drawings, as necessary.

Article 304. Within 90 days after finishing construction, the licensee shall submit, for Commission approval, eight copies of the revised Exhibits A, F, and G describing the project as built. The licensee shall submit six copies to the Commission, one copy to the Commission's Regional Director, and one to the Director, Office of Energy Projects.

Article 305. If the licensee's project was directly benefitted by the construction work of another licensee, a permittee, or the United States of a storage reservoir or other headwater improvement, the licensee shall reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed. The benefits will be assessed in accordance with Subpart B of the Commission's regulations.

Article 401. At least six months before the start of land-disturbing, land-clearing, or construction activities, the licensee shall file, for Commission approval, and with the Portland Regional Director as part of the plans and specifications required by Article 303, a final erosion and sediment control plan (ESCP) incorporating and building upon the measures described in the Draft Environmental Assessment filed on May 14, 1999, as part of the license application, with the following modifications:

(1) the final ESCP shall be based on site-specific conditions and shall include (a) descriptions of actual geological, soil and groundwater site conditions relative to project features, (b) detailed descriptions of final preventive measures, (c) detailed descriptions, design drawings, and topographic locations of final control measures, including rip-rap placement, stream set back distances, and stabilization of spoil material and temporary construction access trails, and (d) a specific implementation schedule;

(2) the final ESCP shall include a revegetation plan that includes a complete prescription for revegetating all disturbed areas including: (a) locations of treatment areas, (b) plant species and methods to be used, (c) planting densities, (d) fertilizer formulations, (e) seed test results, (f) application rates, and (g) a specific implementation schedule and details for monitoring and maintenance programs; native plant species should be used to the greatest extent possible;

(3) the final revegetation plan shall include a monitoring plan that, at a minimum, (a) establishes a goal of achieving 50 percent of natural vegetation densities within 1 year of planting, (b) describes monitoring methods, (c) describes measures that would be followed if desired goals are not achieved, and (d) includes an implementation schedule that establishes a monitoring period of at least 3 years following planting; and

(4) the final ESCP shall include stipulations that all construction contractors will not use in wetland or on other water bodies lumber treated with preservatives containing creosote or pentacholorophenol or other surface applied preservatives.

The licensee shall prepare the final ESCP after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Alaska Department of Natural Resources, and Alaska Department of Fish and Game. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

A courtesy copy of the plan shall be filed with the Commission's Portland Regional Office. The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 402. At least six months before the start of any land-clearing or land-disturbing activities, the licensee shall file, for Commission approval, a plan to monitor channel geomorphology and fish habitat upstream and downstream of the confluence of Lake Fork and Lagoon Creek during project years 0, 3, and 5.

The plan shall incorporate the protocols and methods found in R-10 Amendment 2090-98-1 to the U.S. Forest Service's FSH 2090 - Aquatic Ecosystem Management Handbook, using tier 2 survey measures, except that tier 3 would be used for riparian vegetation and undercut banks.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and

Game. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

A courtesy copy of the plan shall be filed with the Commission's Portland Regional Office. The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

If the results of the monitoring indicate that changes in project structures or operations, including alternative flows, are necessary to protect aquatic resources, the Commission may direct the licensee to modify project structures or operations.

Article 403. At least six months before the start of any land-clearing or land-disturbing activities, the licensee shall file with the Commission, for approval, a plan to monitor intergravel water temperature for 1 year prior to the start of project construction and up to 5 years after the start of project operations.

The plan shall include intergravel water temperature monitoring at the following six locations: (1) the diversion site; (2) a short distance upstream of the powerhouse on Lagoon Creek; (3) Lagoon Creek downstream from the powerhouse at the upstream reach of adequate spawning habitat; (4) Lagoon Creek a short distance upstream of the confluence of Lagoon Creek and the Lake Fork; (5) the Lake Fork a short distance upstream of its confluence with Lagoon Creek; and (6) Lagoon Creek downstream of the confluence of Lagoon Creek and the Lake Fork.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

A courtesy copy of the plan shall be filed with the Commission's Portland Regional Office. The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

If the results of the monitoring indicate that changes in project structures or operations, including alternative flows, are necessary to protect aquatic resources, the Commission may direct the licensee to modify project structures or operations. The Commission may consider requiring the construction of a pond at the tailrace to raise water temperature before entering Lagoon Creek.

Article 404. At least six months before the start of any land-disturbing and land-clearing activities, the licensee shall file, for Commission approval, a plan necessary to continuously monitor compliance with the run-of-river operations and flow releases required in Article 410, flow continuation required in Article 411, and ramping rates required in Article 412.

The plan shall further include; but need not be limited to: (1) the method of collecting and recording the data; (2) a schedule for installing monitoring equipment; (3) the proposed location, design, and calibration of the monitoring equipment; (4) a provision for providing discharge data, including any rating curve or other regression relationship used to calculate discharge, to the ADF&G Statewide and Instream Flow Coordinators and Hydrologist annually, and whenever a shift in the rating curve is observed, whichever occurs first; (5) a provision to summarize and submit data monthly to the ADF&G Statewide and Instream Flow Coordinators and Hydrologist for the first year of operation and annually thereafter; and (6) a provision to submit any recorded data, including regression relationships, to other consulted agencies within 30 days of receiving an agency's request.

The plan shall further include the installation, operation, and maintenance of a streamgage in Lagoon Creek, immediately downstream of the powerhouse, for up to 5 years, depending on results, to collect flow data at 15-minute intervals for assessing any project effects on erosion (Article 402), water temperature (Article 403), spawning runs (Article 408), and incubation of eggs (Article 408); and to monitor compliance with the flow diversion restriction (Article 410).

The licensee shall prepare the plan in consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and U.S. Geological Survey. The licensee shall include with the plan documentation of

consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

A courtesy copy of the plan shall be filed with the Commission's Regional Office. The Commission reserves the right to require changes to the plan. Project operation shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 405. At least six months before the start of any land-clearing or land-disturbing activities, to protect salmonid spawning and incubation from sedimentation effects, the licensee shall file, for Commission approval, a construction plan and schedule that includes provisions to conduct all in-water construction activities in: (1) the East Fork of Mountain Creek between May 15 and July 15; and (2) Lagoon Creek between early June, after coho salmon emergence, and July 15.

The plan shall include, but need not be limited to: (1) identification of all construction, land-disturbing, and land-clearing activities; (2) a detailed description of the licensee's planned construction methods to complete all in-river construction activities; and (3) a specific implementation schedule.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 406. At least six months before the start of project operation, the licensee shall file, for Commission approval, detailed design drawings of a picket panel fish screening system to reduce attraction flows at the tailrace and prevent fish from entering the tailrace, together with a schedule to construct/install the facilities before any operation of the project occurs.

The licensee shall prepare the drawings and schedule after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game. The licensee shall include with the drawings documentation of consultation, copies of comments and recommendations on the drawings and schedule after they have been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the licensee's facilities. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the drawings and schedule with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

A courtesy copy of the plan shall be filed with the Commission's Portland Regional Office. The Commission reserves the right to require changes to the proposed facilities and schedule. Project operation shall not begin until the licensee is notified by the Commission that the filing is approved. Upon Commission approval, the licensee shall implement the proposal, including any changes required by the Commission.

Article 407. Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of Interior under Section 18 of the Federal Power Act.

Article 408. At least six months before the start of any land-disturbing or land-clearing activities, the licensee shall file, for Commission approval, a plan to monitor adult salmon spawning to enumerate runs of spawning coho, pink, and chum salmon. The plan shall provide for surveys conducted:

(1) during each of seven survey periods, which are: (A) July 16-31; (B) August 1-15; (C) August 16-31; (D) September 1-15; (E) September 16-30; (F) October 1-15; and (G) October 16-30;

(2) at least 7 to 10 days apart;

(3) using Alaska Department of Fish & Game (ADF&G) protocols for standardization and indexing of peak foot survey counts;

(4) counting live and dead fish; and

(5) with results documented by stream segment according to the following three areas: (A) Lagoon Creek upstream of the confluence with the Lake Fork of Lagoon Creek; (B) Lake Fork upstream of its confluence with Lagoon Creek; and (C) Lagoon Creek downstream of the confluence with Lake Fork all the way to the ocean.

The licensee shall prepare an annual monitoring report that includes the results of aerial surveys for two nearby streams conducted by ADF&G's commercial fisheries staff in the same year. Aerial surveys of nearby streams shall be used only as a gross indicator of trend in recruitment, and not as a sole basis for determining any project effects on fisheries.

The licensee shall continue monitoring adult spawning runs for at least 5 years after the project begins power production, and if different project operations are implemented that modify the flow regime, monitoring shall be conducted for at least 5 years after the new operations are implemented.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and ADF&G. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

The results of the monitoring shall be filed annually with the Commission and provided to the NMFS, FWS, ADF&G Statewide and Instream Flow Coordinators and Hydrologist, and ADF&G Division of Habitat and Restoration Office in Anchorage,

Alaska. If the results of the monitoring indicate that changes in project structures or operations, including alternative flows, are necessary to protect aquatic resources, the Commission may direct the licensee to modify project structures or operations.

Article 409. At least six months before the start of any land-disturbing or land-clearing activities, the licensee shall file, for Commission approval, a plan to monitor juvenile fisheries in Lagoon Creek. The plan shall be designed to quantify changes in juvenile fish numbers and identify any increases in rearing habitat made available by the project. The plan shall provide for: (1) counting fish by species; (2) recording fork length; (3) using non-lethal capture and releasing the fish unharmed at their point of capture; (4) using standardized methods, times, and locations; and documenting results by stream segment according to the following three areas: (A) Lagoon Creek upstream of the confluence with the Lake Fork of Lagoon Creek; (B) Lake Fork upstream of its confluence with Lagoon Creek; and (C) Lagoon Creek downstream of the confluence with Lake Fork all the way to the ocean.

The licensee shall continue monitoring juvenile fish for at least 5 years after the project begins power production, and if different project operations are implemented that modify the flow regime, monitoring shall be conducted for at least 5 years after the new operations are implemented.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and Alaska Department of Fish and Game (ADF&G). The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

The results of the monitoring shall be filed annually with the Commission and provided to the NMFS, FWS, ADF&G Statewide and Instream Flow Coordinators and Hydrologist, and ADF&G Division of Habitat and Restoration Office in Anchorage,

Alaska. If the results of the monitoring indicate that changes in project structures or operations, including alternative flows, are necessary to protect aquatic resources, the Commission may direct the licensee to modify project structures or operations.

Article 410. The licensee shall operate the project as run-of-river for the protection of aquatic resources below the tailrace. Flow diversions from the East Fork of Mountain Creek shall not exceed 13.2 cubic feet per second (cfs). The licensee shall release from the powerhouse into Lagoon Creek a continuous minimum flow of 13 cfs, or the inflow at the intake, whichever is less, regardless of power demand, for the protection of fisheries in Lagoon Creek downstream of the powerhouse.

The run-of-river operation and/or the flow requirement may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon agreement between the licensee and the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and Alaska Department of Fish and Game (ADF&G). If the flow is so modified, the licensee shall notify the Commission, NMFS, FWS, and ADF&G as soon as possible, but no later than 10 days after each such incident. Flow reductions reported as a result of emergency maintenance or breakdowns shall include the date, duration, volume of flow reduction in cfs, reason for occurrence, method to prevent any future occurrence, and any other pertinent information.

Article 411. The licensee shall design and operate the project to ensure continuation of the minimum flow required by Article 410 during all powerhouse outages not scheduled in accordance with Article 412. Design features for flow continuation shall include AVEC's proposed turbine bypass system and turbine unit jet deflector, and shall be filed with the project plans and specifications to be filed under Article 303.

The licensee shall notify the Commission, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game of any non-compliance events as soon as possible, but no later than 10 days after each such incident. Flow reductions reported as a result of unscheduled outages shall include the date, duration, volume of flow reduction in cfs, reason for occurrence, method to prevent any future occurrence, and any other pertinent information.

Article 412. The licensee shall, for the protection of fisheries in Lagoon Creek: (1) conduct spring maintenance between May 15 and July 15, when flows in Lagoon Creek at the powerhouse are 10 cfs or greater; (2) conduct fall maintenance between mid-October and November 30, when flows in Lagoon Creek at the powerhouse are 10

cfs or greater; (3) limit maintenance periods to less than 8 hours in any given day; (4) ramp project discharge at a rate of 2 inches per hour when shutting down for scheduled maintenance; (5) not dewater the penstock during routine maintenance; and (6) consult with National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game prior to conducting routine maintenance during other times.

Article 413. At least six months before the start of any land-clearing or land-disturbing activities, the licensee shall file with the Commission for approval, a compliance monitoring plan to ensure that project construction adheres to the erosion and sediment control plan (Article 401) and hazardous substances spill prevention plan (Article 414). The compliance monitoring plan shall be developed in coordination with the Commission's Construction Quality Control Inspection Program.

The plan shall include: (1) provisions to employ a qualified environmental compliance monitor to be on-site during construction with authority to: (a) ensure strict compliance with the conditions of this license, (b) cease work and change orders in the field, as deemed necessary, and (c) make pertinent and necessary field notes on monitoring compliance by the licensee; (2) the position description of the compliance monitor, including qualifications, duties, and responsibilities; (3) provisions to hold a meeting between the licensee and National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and Alaska Department of Fish and Game (ADF&G) once annually for each year of compliance monitoring to: (a) review and evaluate the results of all compliance monitoring activities and reports, (b) make necessary adjustments of compliance monitoring to meet resources needs, and (c) decide on continuation of compliance monitoring.

The licensee shall prepare the plan after consultation with the NMFS, FWS, and ADF&G. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

A courtesy copy of the plan shall be filed with the Commission's Portland Regional Office. The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the

Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 414. At least six months before the start of any land-clearing or land-disturbing activities, the licensee shall file for Commission approval, a fuel and hazardous substances spills plan to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operation.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 415. At least six months before the start of any land-disturbing or land-clearing activities, the licensee shall file with the Commission for approval, a bear safety plan to minimize possible conflicts between bears and humans in the project area during project construction and operation.

The plan, at a minimum, shall include: (1) instructions for operating practices when in bear country that minimize possible conflict; (2) instructions to minimize encounters and avoid areas often used by bears, if possible; (3) instructions for keeping construction sites and refuse areas clean; (4) instructions for installing bear-proof garbage receptacles and other measures during construction periods to prevent bears from obtaining food or garbage during construction periods; and (5) procedures to deal with problem bears.

The licensee shall prepare the plan after consultation with the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the

agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 416. The licensee shall consult with the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and Alaska Department of Fish and Game (ADF&G) annually at least 60 days preceding the anniversary date of the license, or other date mutually agreed upon with the agencies, to determine if a meeting is necessary to review the results of the geomorphology and habitat monitoring required by Article 402, water temperature monitoring required by Article 403, streamflow data collection required by Article 404, and fisheries monitoring required by Articles 408 and 409. The licensee shall coordinate and conduct the annual review meeting if requested by one of the consulted agencies.

The purpose of these meetings is to determine any course of action to be recommended based on the results of the monitoring, including the need for continued monitoring. Following the meeting, the licensee shall prepare and send draft minutes of the meeting to the meeting participants, allowing 14 days for comments. Final meeting minutes shall be prepared and distributed to the participants within 60 days of the meeting. A plan and schedule for completing any recommended courses of action must be filed, along with documentation supporting the need for the action, for Commission approval, at least 90 days before the scheduled implementation of the course of action. The licensee shall prepare the plan and schedule after consultation with the NMFS, FWS, and ADF&G.

The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 417. The licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the
Commission upon the recommendation of the Secretary of Commerce, after notice and opportunity for hearing.

Article 418. The licensee shall provide representatives of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game, who show proper credentials, free and unrestricted access to, through, and across the project lands and project works, in the performance of their official duties, after appropriate advance notification is made.

Article 419. At least 90 days before the start of any land-disturbing or land-clearing activities, the licensee shall file with the Commission for approval, a bald eagle protection plan to minimize disturbance to nesting eagles during project construction.

The plan, at a minimum, shall include: (1) the methods and timing of pre-construction surveys for nesting eagles, (2) specific actions that would be implemented to avoid disturbance to nesting eagles, including but not limited to, the timing of construction activities and helicopter use and paths to minimize eagle disturbance, (3) provisions for forwarding survey results to the U.S. Fish and Wildlife Service (FWS) and Alaska Department of Fish and Game (ADF&G) to initiating construction, and (4) provisions for further consultation with FWS and ADF&G if active eagle nests are located near project facilities.

The licensee shall prepare the plan after consultation with the FWS and ADF&G. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 420. At least six months before the start of any land-disturbing or land-clearing activities, the licensee shall file, for Commission approval, and with the Portland Regional Director as part of the plans and specifications required by Article 303, a final All Terrain Vehicle (ATV) access control plan to minimize unauthorized public use and access on refuge lands during project construction, maintenance, and operation.

The final plan, at a minimum, shall include: (1) detailed descriptions, including final design drawings and specifications, of the locations and types of access control (gates, boulders, etc) that would be implemented, (2) construction methods to be employed, (3) methods and schedule for monitoring the effectiveness of the measures through the license period, and (4) measures that would be taken if access restrictions prove to be ineffective.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 421. At least six months before the start of any land-disturbing or land-clearing activities, the licensee shall file, for Commission approval, and with the Portland Regional Director as part of the plans and specifications required by Article 303, a plan that would allow for recreational All Terrain Vehicle (ATV) use on the access road to the powerhouse. The plan shall include detailed descriptions of methods and measures to protect the area from improper use.

The licensee shall prepare the plan after consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, city of Old Harbor, Old Harbor Native Corporation, and Kodiak Island Borough. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 422. Before starting any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in this license, including recreation developments at the project, the licensee shall consult with the State Historic Preservation Officer (SHPO).

If the licensee discovers previously unidentified archeological or historic properties during the course of constructing or developing project works or other facilities at the project, the licensee shall stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the SHPO.

In either instance, the licensee shall file, for Commission approval, a site-specific cultural resource management plan prepared by a qualified cultural resource specialist after consultation with the SHPO. The plan shall include the following items: (1) a description of each discovered property indicating whether it is listed on or eligible to be listed on the National Register of Historic Places; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for mitigating effects and conducting additional studies.

The licensee shall file the plan, for Commission approval, together with the written comments of the SHPO documenting consultation and adequacy of the plan; and take the necessary steps to protect the discovered archeological or historic sites from further impact until notified by the Commission that all of these requirements have been satisfied.

The Commission may require a cultural resources survey and changes to the cultural resources management plan based on the filings. The licensee shall not begin any land-disturbing or land-clearing activities, other than those specifically authorized in this license, or resume such activities in the vicinity of a property discovered during construction, until informed by the Commission that the requirements of this article have been fulfilled.

Article 423. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and water for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control

erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline.

To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

If no conveyance was made during the prior calendar year, the licensee shall so inform the Commission and the Regional Director in writing no later than January 31 of each year.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved exhibit R or

approved report on recreational resources of an exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year.

At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked exhibit G or K map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved exhibit R or approved report on recreational resources of an exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to insure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised exhibit G or K drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

(E) The licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to the Commission filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This Order is final unless a request for rehearing is filed within 30 days of the date of its issuance, as provided in Section 313(a) of the FPA. The filing of a request for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this Order, except as specifically ordered by the Commission. The licensee's failure to file a request for rehearing shall constitute acceptance of this Order.

Daniel M. Adamson

Daniel M. Adamson
Director
Office of Energy Projects

Form L-17
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR UNCONSTRUCTED MINOR PROJECT AFFECTING LANDS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project works shall be constructed in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Upon the completion of the project, or at such other time as the Commission may direct, the Licensee shall submit to the Commission for approval revised exhibits insofar as necessary to show any divergence from or variations in the project area and project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the exhibits approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the Licensee necessitated or justified variation in or divergence from the approved exhibits. Such revised exhibits shall, if and when approved by the Commission, be made a part of the license under the provisions of Article 2 hereof.

Article 4. The construction, operation, and maintenance of the project and any work incidental to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Energy Regulatory Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of the project and for any subsequent alterations to the project. Construction of the project works or any features or alteration thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties

shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 7. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 8. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power

and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 9. The operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Commission may prescribe for the purposes hereinbefore mentioned.

Article 10. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 11. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 12. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 13. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 14. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon the request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 15. The Licensee shall consult with the appropriate State and Federal agencies and, within one year of the date of issuance of this license, shall submit for Commission approval a plan for clearing the reservoir area. Further, the Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. Upon approval of the clearing plan all clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statues and regulations.

Article 16. Timber on lands of the United State cut, used, or destroyed in the construction and maintenance of the project works, or in the clearing of said lands, shall be paid for, and the resulting slash and debris disposed of, in accordance with the requirements of the agency of the United States having jurisdiction over said lands. Payment for merchantable timber shall be at current stumpage rates, and payment for young growth timber below merchantable size shall be at current damage appraisal values. However, the agency of the United States having jurisdiction may sell or dispose of the merchantable timber to others than the Licensee: Provided, That timber so sold or disposed of shall be cut and removed from the area prior to, or without undue interference with, clearing operations of the Licensee and in coordination with the Licensee's project construction schedules. Such sale or disposal to others shall not relieve the Licensee of responsibility for the clearing and disposal of all slash and debris from project lands.

Article 17. The Licensee shall do everything reasonably within its power, and shall require its employees, contractors, and employees of contractors to do everything reasonably within their power, both independently and upon the request of officers of the agency concerned, to prevent, to make advance preparations for suppression of, and to suppress fires on the lands to be occupied or used under the license. The Licensee shall be liable for and shall pay the costs incurred by the United States in suppressing fires caused from the construction, operation, or maintenance of the project works or of the works appurtenant or accessory thereto under the license.

Article 18. The Licensee shall interpose no objection to, and shall in no way prevent, the use by the agency of the United States having jurisdiction over the lands of the United States affected, or by persons or corporations occupying lands of the United States under permit, of water for fire suppression from any stream, conduit, or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license, or the use by said parties of water for sanitary and domestic purposes from any stream, conduit, or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license.

Article 19. The Licensee shall be liable for injury to, or destruction of, any buildings, bridges, roads, trails, lands, or other property of the United States, occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Arrangements to meet such liability, either by compensation for such injury or destruction, or by reconstruction or repair of damaged property, or otherwise, shall be made with the appropriate department or agency of the United States.

Article 20. The Licensee shall allow any agency of the United States, without charge, to construct or permit to be constructed on, through, and across those project lands which are lands of the United States such conduits, chutes, ditches, railroads, roads, trails, telephone and power lines, and other routes or means of transportation and communication as are not inconsistent with the enjoyment of said lands by the Licensee for the purposes of the license. This license shall not be construed as conferring upon the Licensee any right of use, occupancy, or enjoyment of the lands of the United States other than for the construction, operation, and maintenance of the project as stated in the license.

Article 21. In the construction and maintenance of the project, the location and standards of roads and trails on lands of the United States and other uses of lands of the United States, including the location and condition of quarries, borrow pits, and spoil disposal areas, shall be subject to the approval of the department or agency of the United States having supervision over the lands involved.

Article 22. The Licensee shall make provision, or shall bear the reasonable cost, as determined by the agency of the United States affected, of making provision for avoiding inductive interference between any project transmission line or other project facility constructed, operated, or maintained under the license, and any radio installation, telephone line, or other communication facility installed or constructed before or after construction of such project transmission line or other project facility and owned, operated, or used by such agency of the United States in administering the lands under its jurisdiction.

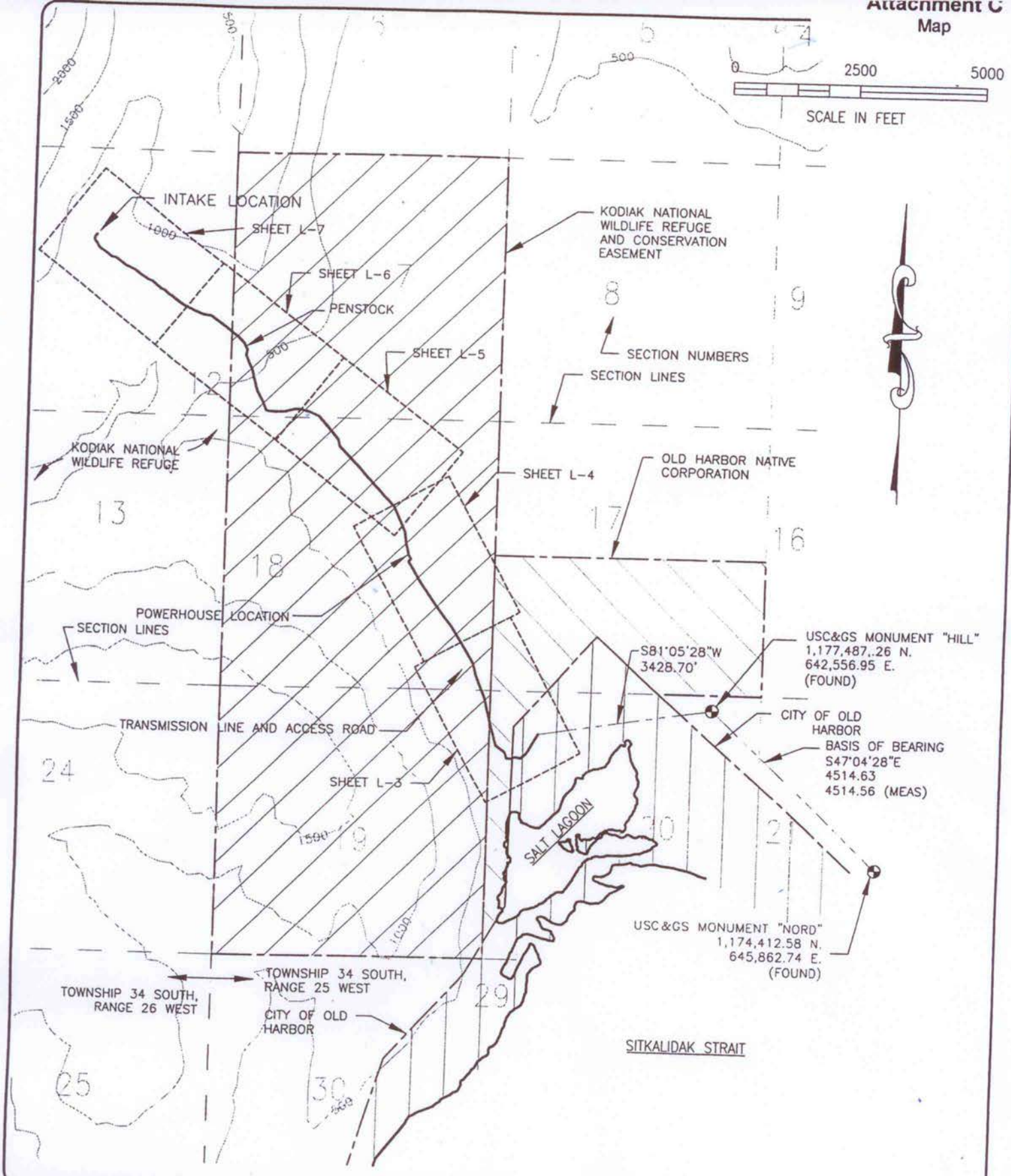
Article 23. The Licensee shall make use of the Commission's guidelines and other recognized guidelines for treatment of transmission line rights-of-way, and shall clear such portions of transmission line rights-of-way across lands of the United States as are designated by the officer of the United States in charge of the lands; shall keep the areas so designated clear of new growth, all refuse, and inflammable material to the satisfaction of such officer; shall trim all branches of trees in contact with or liable to contact the transmission lines; shall cut and remove all dead or leaning trees which might fall in contact with the transmission lines; and shall take such other precautions against fire as may be required by such officer. No fires for the burning of waste material shall be set except with the prior written consent of the officer of the United States in charge of the lands as to time and place.

Article 24. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply

with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 25. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 26. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.



DATE: 3/24/00
DESIGNED: DH
DRAWN: DH
CHECKED:
SCALE: AS NOTED
FILE: HOLDNHC1-3

PROJECT
ALASKA VILLAGE ELECTRIC COOPERATIVE INC. – OLD HARBOR HYDROELECTRIC PROJECT

polarconsult alaska, inc.
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DRAWING
PROPOSED EASEMENT DRAWINGS
PROJECT OVERVIEW

SHEET
L-2
OF 9