

ENVIRONMENTAL ASSESSMENT

DIVISION OF ENVIRONMENTAL ANALYSIS, OFFICE OF HYDROPOWER LICENSING FEDERAL ENERGY REGULATORY COMMISSION

Dalles Dam North Fishway Hydroelectric Project
FERC No. 7076-002--Washington

November 16, 1987

I. APPLICATION

On April 26, 1985, the Northern Wasco County People's Utility District (applicant) filed an application for major license, less than 5 megawatts (MW), for the Dalles Dam North Fishway Hydroelectric Project. The application was supplemented on November 12, 1985, March 19, 1986, and April 16, 1987.

The proposed project would be built at the north end of the existing Dalles dam, operated by the Department of the Army, Portland District Corps of Engineers (Corps). The dam is located on the Columbia river, near the town of the Dalles, Oregon (figure 1). The proposed project would be located on the auxiliary water supply system (AWS) for the north fishway at the dam. The Dalles dam, an 8,700-foot-long structure, was completed in 1960 and impounds Lake Celilo, which has a surface area of 9,400 acres. The Corps operates the dam for flood control, navigation, power production, and fish passage. The proposed project would affect federal property administered by the Corps.

II. RESOURCE DEVELOPMENT

A. Purpose

The project would provide an estimated average of 25,250,000 kilowatthours (kwh) of electrical energy per year to the applicant.

B. Need for Power

According to the 1986-1987 Edition of the Electrical World Directory of Electric Utilities, the applicant's distribution system currently serves approximately 3,500 metered customers. At present, the applicant owns no generating capacity, and purchases power requirements from the Bonneville Power Administration (BPA) under a 10-year Requirements Customer Contract. In 1985, the

applicant purchased 204,005,568 kwh of electric energy from BPA. Ninety-six percent of this energy was resold to the applicant's metered customers. The applicant's summer peak demand in 1985 was 41.2 MW and the winter peak demand, for the same year, was 51.2 MW.

Under the Pacific Northwest Electric Power Planning and Conservation Act (PNEPPCA), BPA is required to meet the net firm power requirements of each requesting Pacific Northwest utility. Under the PNEPPCA, BPA is constrained from owning or constructing generating resources, but is required to purchase, on a long-term basis, the power-producing capabilities of resources sponsored by other entities, to the extent that such resources are required for BPA to meet its responsibilities. The PNEPPCA provides authority for BPA to restrict its power sales obligations, if it is unable to acquire sufficient resources to meet its responsibility. The BPA, aware of this escape provision in the PNEPPCA and aware of the unavoidable uncertainties in load forecasting as well as uncertainties in its ability to contract additional resources, has forewarned customers that, if available resources are not sufficient to meet contract obligations, BPA will implement contract curtailments, unless Requirements Customers are able to provide sufficient generating resources to cover the customers' load growth.

The number and complexity of events that affect the energy requirements of a specific geographic region over a 10 or 20-year period can produce serious errors in forecasting future requirements. As a result, the BPA, in the 1987 Resource Strategy report, gives the results of studies of several load-growth paths. If load-growth should follow the low-growth path, BPA predicts that neither the region nor BPA will need additional resources during the next 20 years. If regional loads grow at the high forecasted rate studied in the report, however, BPA will need additional resources in 1991, and the region will need additional resources in 1989. History has demonstrated that either of these extremes can become a reality.

Since the proposed project, if licensed, is expected to go on-line (into commercial operation) in the early 1990's, it is likely that the applicant may need the output of the proposed project to avoid the curtailment of its BPA contract.

Although project power is currently not needed to meet a resource deficit in the region or to meet BPA load responsibilities, the output would be useful in off-loading fossil-fueled units, thereby conserving nonrenewable primary energy resources and reducing atmospheric pollution.

The applicant states that it plans to continue the purchase of its total requirements from BPA and to sell the total output of the proposed project as long as BPA power is available, or until parallel buying and selling is not financially advantageous. At such a time as the project power is used to supply the applicant's customers, in-system dispatch ability would be advantageous to the applicant. The project power would also reduce the applicant's dependence on outside purchases, and would reduce concerns about future purchase prices and future availability.

C. Conservation and Load Management

Because the applicant is a municipal utility, section 10(a)(2)(c) of the Federal Power Act (Act), as amended by the Electric Consumers Protection Act of 1986 (ECPA), requires the Commission to address in writing the applicant's present and planned electricity consumption efficiency improvement programs, including its plans, performance, and capabilities for encouraging or assisting its customers to conserve electricity cost effectively, taking into account published policies restrictions and the requirements of relevant state regulatory authorities.

In response to the staff's request for information under section 10(a)(2)(c), the applicant submitted a report entitled, "Conservation and energy efficiency programs, as of December 31, 1986."

The present contract with BPA requires the applicant to comply with the BPA Residential Weatherization Program and to encourage the builders of new homes to follow construction practices that will qualify for certification as a "Super Good Cents Home," according to BPA standards and specifications. Under the residential weatherization program, as of December 31, 1986, the applicant has performed 2,146 residential energy audits and weatherized 1,081 homes. Under the Commercial and Residential Water Heater Wrap Program, the applicant, through counseling and public information programs, has persuaded a substantial fraction of its customers to wrap hot water tanks with thermal insulating material or wraps. The applicant has also been successful in promoting the conversion of street and area lighting to much more efficient, high-pressure sodium lights.

The staff believes that the applicant has made a good-faith effort to conserve electric energy and to comply with the objectives of section 10(a)(2)(c) of the Act.

III. PROPOSED PROJECT AND ALTERNATIVES

A. Proposed Project

1. Project Description

The proposed project would consist of the following: (1) a 210-foot-long, 20-foot-wide, rectangular concrete intake channel; (2) a 10-foot-diameter, 85-foot-long steel penstock; (3) a 64-foot-long by 35-foot-wide powerhouse, containing one generating unit with an installed capacity of 4,200 kW at a design head of 80 feet; and (4) a 3-mile-long, 12.5 kilovolt (kV) transmission line, connected to the applicant's existing Lambert substation.

The applicant would operate the proposed project using releases to the AWSR supplied to the north fish ladder by the Corps.

2. Applicant's Proposed Mitigative Measures

To protect water quality and to prevent adverse effects on the Corps' operation of the north fish ladder and of the associated AWSR, the applicant would confine construction activities affecting the AWSR to the normal scheduled shutdown period of the ladder and the AWSR, from December 1 through February 28. The applicant would replant vegetation disrupted by construction activity.

To protect downstream migrant anadromous salmonids and to avoid affecting the operation of the AWSR in the event of an emergency shut-down of the proposed project, the applicant would provide fish screens and a downstream fish bypass system at the penstock intake. The fish screens would be designed for an approach velocity of 1.0 foot per second (fps). The applicant proposes to use an open-baffled flume fish bypass system if there is an agency-accepted design developed by the time of final project design. To prevent accumulation of debris on the fish screens, the applicant would install the screens at a shallow angle to the flow, and would hydraulically flush debris with high pressure hoses, actuated by predetermined head differentials. Temporary back-up screens would be provided to allow removal and cleaning of the main screen panels.

B. Alternatives to the Proposed Project

The alternative to the proposed action is denial of license. If the license is denied, the applicant would continue to purchase capacity and energy from BPA, as long as available.

No action would prohibit the applicant from constructing the proposed project. No action would involve no alterations to the existing environment and would preclude the applicant from producing electrical power at the site.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

Commission regulations require prospective applicants to consult with the appropriate resource agencies before filing an application for license. This consultation constitutes an initial step in compliance with the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, and other federal statutes. Prefiling consultation must be complete and must be documented in accordance with the Commission's regulations.

After the Commission accepts the application, concerned entities may submit formal comments during a public-notice period. In addition, organizations and individuals may petition to intervene and become a party to any subsequent proceedings. The Commission makes the comments provided by concerned entities part of the record, and the staff considers the comments during the review of the proposed project.

After the Commission issued a public notice of the proposed project on March 17, 1986, the following entities commented on the application.

<u>Commenting entity</u>	<u>Date of letter</u>
Department of the Army, Portland District Corps of Engineers	February 14, 1986
Washington Department of Fisheries	May 15, 1986
<u>Intervenor</u>	<u>Date of petition</u>
Washington Departments of Game and Fisheries	May 14, 1986
National Marine Fisheries Service	May 16, 1986
Confederated Tribes of the Warm Springs Reservation of Oregon and Columbia River Inter-Tribal Fish Commission	May 16, 1986
Confederated Tribes and Bands of the Yakima Indian Nation	May 16, 1986

B. Water Quality Certification

As required by Commission Order No. 464, the staff notified the Washington Department of Ecology (WDE) that for the proposed project, the certification requirements of section 401(a)(1) of the Clean Water Act (33 United States Code, section 1341(a)(1) (1982)) were waived. In a letter dated April 2, 1987, the WDE was given 30 days to file recommendations on water quality. Although the WDE provided recommendations in a letter dated June 2, 1987, this environmental assessment addresses these recommendations.

C. Pacific Northwest Electric Power Planning and Conservation Act

Under Section 4(h) of the PNEPPCA, the Northwest Power Planning Council (Council) developed the Columbia River Basin Fish and Wildlife Program (Program) to protect, mitigate, and enhance fish and wildlife resources associated with the development of hydroelectric projects. The Program contains a framework for assessing the impacts of new hydroelectric development on fish and wildlife resources and lists a number of general mitigative measures that should be implemented for any new development.

The program requires that fish and wildlife agencies, Indian tribes, and the Council be consulted during the study, design, construction, and operation of new hydroelectric projects. The Commission's regulations require applicants to initiate prefiling consultation with these entities and to give these entities the postfiling opportunity to review and to comment on the license application. The applicant has conducted this consultation process.

The Council states in the Program that authorization for new hydroelectric projects should include conditions of development that would mitigate the impacts of the project on fish and wildlife resources. The applicant proposes ways to mitigate adverse impacts. Moreover, where practical, the Commission has the authority to order alterations of project structures and operations, in order to take into account the Council's Program. Accordingly, the staff concludes that the proposed project does not conflict with the applicable provisions of the Council's Program.

V. ENVIRONMENTAL ANALYSIS

A. Proposed Project

The area of the proposed project is bounded on three sides by the north fish ladder and on the fourth side by the Dalles dam. The

Proposed project would be built within an area previously disturbed during construction of the Dalles dam; this area consists primarily of barren rock with little vegetative cover, which the applicant would replace after construction. The area receives little use by wildlife. Although the area is fenced, the Corps provides access to the fish passage facilities for public viewing. The views in the area are dominated by the Dalles dam and associated facilities. Because of these circumstances, the staff concludes that the proposed project would not affect soils and geology, vegetation, wildlife, recreation, or socioeconomic factors.

1. General Description of the Locals

The Dalles dam is situated on the Columbia River at river mile 191.5. The Deschutes River is a major tributary that enters the Columbia River, 12 miles upstream from the proposed project area. The climate of the Columbia River drainage, which is located in the belt of the prevailing westerlies, is characterized by wet, relatively mild winters, and warm, dry summers.

The Dalles dam is located in Klickitat County, Washington, and in Wasco County, Oregon. The major population center in the project area is the Dalles, Oregon, with a population of approximately 8,500. Tourism is an important regional industry; recreational activities include fishing, hunting, boating, camping, skiing, and hiking.

2. Water Resources

Affected Environment: The Dalles dam is 45.4 miles upstream from Bonneville dam and 24.1 miles downstream from John Day dam. The Columbia River drains approximately 260,000 square miles of the Pacific Northwest. Drainage areas include most of Washington, Oregon, and Idaho, and portions of Montana, Wyoming, Utah, Nevada, and British Columbia, Canada (Federal Energy Regulatory Commission, 1987). Flow in the Columbia River is regulated by an extensive series of dams and reservoirs. Flows in the river are characteristically greatest from mid-April through July, with annual peak flows usually occurring in June. In 1984, the maximum average monthly flow of 343,700 cubic feet per second (cfs) occurred in June, and the minimum flow of 115,800 cfs occurred in September (Northern Wasco County People's Utility District, 1985, supplemental information).

The Dalles dam impounds Lake Celilo. Lake Celilo is 24 miles long and has a surface area of 9,400 acres. Operation of the upstream John Day dam causes daily fluctuations in the reservoir of as much as 5 feet.

The existing water quality of the Columbia River is generally good. The state of Washington classifies the water of the Columbia River at the Dalles dam as Class A, which is considered excellent (Washington Department of Ecology, 1982). The water quality of Class A meets or exceeds the requirements for all, or substantially all, uses, including domestic, industrial, and agricultural water supply, salmonid migration, rearing, spawning, and harvesting, wildlife habitat, recreation, and commerce and navigation.

Dissolved oxygen (DO) concentrations are generally high, and range between 73 and 136 percent of saturation (Corps of Engineers, 1981). Water temperatures vary seasonally. At the Dalles dam in 1984, for example, water temperature was 35 degrees Fahrenheit (°F) in January; water temperature increased to 71°F in August, and decreased to 39°F in December (Corps of Engineers, 1984b). Water clarity is generally greatest during the latter half of the year, when river flows decrease (Northern Wasco County People's Utility District, 1985).

Environmental Impacts and Recommendations:

Excavation of the area for the proposed powerhouse and construction of the intake channel could increase levels of turbidity and sedimentation in the immediate project area. The introduction of oil, paint, concrete, and other toxic substances during project construction and operation could result in fish kills in downstream areas and could interfere with upstream fish passage.

The WDE states that the licensee must obtain a "Water Quality Standards Modification" before starting work in the waterway, and must submit to WDE the plan of work for the portion of the project within the waterway, a copy of the Hydraulics Project Approval, and an explanation of how the state Environmental Protection Act has been addressed. To protect the water quality, the WDE recommends that the licensee do the following: (1) prepare an "oil spill prevention, containment, and counter-measure plan," which would include all oil-filled equipment associated with the proposed project; (2) prevent any petroleum products, paint, chemicals, or other harmful materials from entering the water; (3) dispose all construction debris on land; (4) minimize turbidity level increases resulting from work in the waterway; (5) allow for the complete drying of all lumber treated with creosote or other protective material before its use in or near the waterway; (6) cure concrete a minimum of 7 days before any contact with the water; (7) prevent the appearance of a visible petroleum product sheen associated with mobile equipment that enters the water; and (8) notify the WDE at least 5 days in advance of the start of dredging or other work in the waterway.

Construction of the proposed project could result in the degradation of water quality in the vicinity of the north fish ladder through the introduction of sediments and toxic substances. These impacts could, in turn, result in fish kills and could interfere with fish passage through the Dalles dam area. The applicant, however, has not yet developed a comprehensive plan to protect water quality during project construction and operation. Therefore, the licensee, after consultation with the appropriate state and federal agencies, should develop a comprehensive plan to control erosion and to minimize the quantity of sediment and other potential water pollutants resulting from project construction, spoil disposal activities, project operation, and maintenance. The plan should be filed for Commission approval before project construction begins.

Unavoidable Adverse Impacts: Construction-related activities would cause minor, short-term increases in turbidity in areas downstream from the proposed project.

3. Fishery Resources

Affected Environment: The fish community of the Columbia River in the vicinity of the Dalles dam is diverse and is composed of anadromous and resident species. Resident game fish include bluegill (*Lepomis macrochirus*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), yellow perch (*Perca flavescens*), and walleye (*Stizostedion vitreum*). Other resident species in the area are white sturgeon (*Acipenser transmontanus*), mountain whitefish (*Prosopium willamouhi*), northern squawfish (*Ptychocheilus oregonensis*), and prickly sculpin (*Cottus asper*).

The most valuable fish species that pass through the area are the endemic anadromous salmonids. These species include chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), sockeye salmon (*O. nerka*), and steelhead trout (*Salmo gairdneri*). Historically, the Columbia River supported significant runs of these species, before the mid-19th century. It has been estimated that between 7.5 and 8.9 million fish returned to the river each year to spawn (Pacific Northwest Utilities Conference Committee, 1987). As settlement of the area developed, however, run sizes decreased substantially because of fish harvest, habitat degradation, and the construction and operation of dams. Significant numbers of American shad (*Alosa sapidissima*) also occur within the Columbia River.

Counts of upstream migrant anadromous fishes at the Dalles dam have averaged 417,000 for the 28-year period from 1957 to 1984. Counts of chinook salmon, steelhead trout, sockeye salmon, and coho salmon

have averaged 220,178, 121,514, 53,267, and 13,030, respectively, during this period. In addition, 192 chum salmon (*O. keta*) and 63 pink salmon (*O. gorbuscha*) have been observed passing the Dalles dam, although few have been observed in recent years.

Chinook salmon is the most abundant species of salmon that passes through the Dalles dam area, and consists of three runs: spring (January 1 through June 3), summer (June 4 through August 3), and fall (August 4 through December 31). Periods of upstream migration for these runs occur virtually throughout the year. The annual run sizes at the Dalles dam between 1957 and 1984 for spring, summer, and fall chinook have averaged 66,912, 48,851, and 99,307, respectively. The 10-year average counts for chinook salmon runs for the period between 1975 and 1984 were 24, 42, and 9 percent less than the 28-year average counts. Both spring and summer chinook spawn in tributaries, whereas fall chinook spawn in the Columbia River mainstem, particularly in the Hanford Reach (Bell, 1984). Natural spawning populations of fall chinook have averaged 25,600 between 1978 and 1984; this run has responded well to efforts to stabilize flows at the existing Priest Rapids Dam Project (FERC No. 2114), and to measures at lower Columbia River projects to assist downstream migration (letter from William R. Wilkerson, Director, Department of Fisheries, Olympia, Washington, October 30, 1985).

Coho salmon adults migrate through the Dalles dam area from early July through November; peak migration occurs in September (Corps of Engineers, 1984b). An annual average of 13,030 coho salmon have been counted passing through the Dalles dam area between 1957 and 1984; the 10-year average (1975 to 1984) is 9,827. Coho salmon that pass the Dalles dam area spawn in tributaries to the mid- and upper-Columbia River (Bell, 1984).

Sockeye salmon adults, comprising early and late runs, migrate through the project area between May and October, with most fish passing through in June and July (Corps of Engineers, 1984b). The 28-year average count of sockeye salmon at the Dalles dam (1957 to 1984) is 63,267; the 10-year average (1975 to 1984) is 49,928. Substantial increases in the adult run size occurred in 1983 and 1984. The Columbia River sockeye salmon run is produced entirely of wild stocks, and efforts to supplement this run by artificial means have so far been unsuccessful (letter from Tim Weaver, Attorney for the Confederated Tribes and Bands of the Yakima Indian Nation, Yakima, Washington, May 16, 1986). Sockeye salmon spawn in tributaries upstream of lakes (Bell, 1984), principally using Columbia River tributaries upstream of Priest Rapids dam (Northern Wasco County People's Utility District, 1985b).

Steelhead trout runs are comprised of three races: an "A" group (earlier summer run), a "B" group (later summer run), and a winter run. The upstream passage seasons for the "A", "B", and winter runs are June to early August, August to October, and November to mid-June, respectively (Bell, 1984). The 28-year average count of steelhead trout passing through the Dalles dam area (1957 to 1984) is 124,927, which approximates the 10-year average for the period 1975 to 1984 of 125,228 (Corps of Engineers, 1984b). Steelhead trout spawn in Columbia River and Snake River drainages (Bell, 1984; Northern Wasco County People's Utility District, 1985b.)

The downstream migration of juvenile anadromous salmonids consists primarily of subyearling (less than 1 year of age) and yearling chinook salmon, coho salmon, sockeye salmon, and steelhead trout (Northern Wasco County People's Utility District, 1985b). The Northern Wasco County People's Utility District (1985a) states that the smallest of the juvenile migrants passing through the Dalles dam area probably are subyearling chinook salmon, which could include the spring, summer, and fall races, although subyearling fall chinook salmon are anticipated to be most abundant. Bell (1984) indicates that spring and summer chinook salmon juveniles typically migrate as yearlings, whereas fall chinook migrate as subyearlings. The juvenile downstream migration season for chinook, coho, and sockeye salmon and steelhead trout generally takes place from spring through fall (Bell, 1984), with variable peak movement periods occurring within this time frame, depending on species.

The Corps has operated upstream fish passage facilities at the Dalles dam since 1957. Upstream fish passage facilities consist of two fish ladders, one on the Oregon shore (east ladder) and the other near the Washington shore (north ladder). The east ladder passes upstream migrants collected at the south end of the spillway and across the downstream face of the powerhouse; the north ladder passes fish collected at the north end of the spillway. Approximately 90 percent of upstream fish passage is through the east ladder (Northern Wasco County People's Utility District, 1985a); the east ladder is next to the powerhouse containing 22 main generating units, so fewer fish are attracted to the north ladder. The north ladder, within which the proposed project would be constructed, operates between March 1 and November 30 of each year, and is shut down from December 1 through February 28. Exceptions to the scheduled shutdown period may occur when repairs are necessary to the east ladder (Corps of Engineers, 1984b). The north ladder currently operates with a flow of 70 cfs, and the AWS, during nonspill conditions at the dam, operates with a flow of 730 cfs; attraction water flows are increased to aid the attraction of upstream migrants during periods of spill.

Downstream fish passage facilities at the Dalles dam consist of an ice and trash sluiceway, which extends the length of the powerhouse (Northern Wasco County People's Utility District, 1985a). Downstream migrants are skimmed from the forebay and released in the tailrace, when the sluiceway gates are open.

Columbia River Basin Restoration Efforts

Various entities are making efforts to restore Columbia River anadromous fish runs. Foremost among these efforts is the Council's Program. The Program was adopted in 1982, with amendments added in 1984 and 1987. Under the 1987 Program, the Council has established an interim goal of doubling the current run size of adult fish, from approximately 2.5 million to 5 million (Northwest Power Planning Council, 1987). As part of a systemwide approach, potential fish production of each Columbia River subbasin will be evaluated to determine the relative potential contribution of each toward the interim goal. Efforts to achieve this goal will be directed to areas upstream of Bonneville dam and to the interaction of fish passage, harvest regulation, and habitat management. Numerous other programs are being implemented within the Columbia River Basin, including the Bureau of Reclamation's Yakima River Basin Enhancement Project, the Lower Snake River Compensation Plan, and the Hells Canyon Complex settlement (letters from S. Timothy Wapato, Executive Director, Columbia River Inter-Tribal Fish Commission, Portland, Oregon, May 16, 1986, and Tim Weaver, Attorney for the Confederated Tribes and Bands of the Yakima Indian Nation, Yakima, Washington, May 16, 1986).

Between August 1984 and March 1985, several state and federal fish and wildlife agencies and tribes conducted a study, entitled "Interim Categorization of Proposed Hydroelectric Projects in the Pacific Northwest Based on their Potential Impacts to Fish and Wildlife Resources." Agencies and tribes participating in the study were the Idaho Department of Fish and Game, the Montana Department of Fish, Wildlife, and Parks, the Oregon Department of Wildlife, the Washington Departments of Wildlife (WDW) and Fisheries (WDF), the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), and the Columbia River Inter-Tribal Fish Commission. In the study, the agencies place the proposed project under category II-B, a designation indicating that site-specific or cumulative impacts are not clearly determinable by the appropriate fish and wildlife agencies and tribes. The agencies and tribes would require additional information to reclassify this project into a category that would permit or preclude development. Specific information that is needed includes the adequacy of the design of the necessary

fish facilities, the effect of changes in the operating criteria of the AWS, and the size of juvenile fish at the project area (letter from Dale R. Evans, Division Chief, National Marine Fisheries Service, Portland, Oregon, October 30, 1985).

Environmental Impacts and Recommendations:

Turbidity and sedimentation

Increased levels of turbidity and sedimentation generated during project construction, particularly during the removal of an estimated 6,000 cubic yards of material, could disrupt the upstream migration of adult anadromous fishes. Although increased turbidity likely would be rapidly diluted by the Columbia River flows downstream, elevated turbidity levels in the immediate vicinity of the north ladder might interfere with upstream migrants locating the ladder entrance and might delay migration. In addition, the introduction of toxic substances during project construction could result in fish kills in the area of the fishway.

Although applicant has not developed a detailed erosion and sediment control plan for minimizing the impacts of construction on fish passage, the implementation of measures to protect water quality, addressed previously in section V.A.2., also would protect the fishery resources and would minimize impacts to upstream fish passage.

Operation of the Attraction Water Supply System and North Ladder

Depending on the construction schedule for the proposed project, construction activities could adversely affect the Corps' operation of the AWS. Interference with the operation of the AWS during project construction or operation would adversely affect upstream fish passage.

Several state and federal agencies and tribes have expressed concern about the proposed project's effects on the operation of the AWS and of the north ladder. The WDW and the WDF state that construction and operation of the proposed project could affect the efficient operation of the north ladder. One of the primary concerns of the NMF is to ensure that use of the AWS for project generation does not impair optimum operation of the north ladder. The NMF states that variance from criteria established by the fishery agencies and the tribes for operating the existing fishway could reduce attraction flows at the ladder entrances, thereby reducing the efficiency of adult fish passage. Specifically, the NMF states that operation of the proposed project must be

considered secondary to the purpose of fishery resource protection at the north ladder, which includes operation of the AWS to provide optimum adult fish passage conditions at all times; the NMF says that the project must operate within the constraints of these purposes and must not impair or alter these purposes. In addition, the NMF states that the proposed project must be designed, built, and operated in a manner that provides sufficient flexibility to modify operation of AWS to improve adult fish passage conditions. The Confederated Tribes of the Warm Springs Reservation of Oregon and the Columbia River Inter-Tribal Fish Commission (Tribes) state that while the applicant has acknowledged that the provision of flows must take priority over project operation, the applicant has not developed adequate information regarding guarantees of flows to the AWS during construction and during emergency or malfunction situations. In addition, the Tribes say that project design must include the flexibility to alter project operations when needed, to improve adult fish passage through modified operation of the AWS.

The applicant acknowledges that the primary constraint on the proposed project is that the project must not degrade the operation of the existing north ladder and the AWS. As to the scheduling of project construction, the applicant acknowledges that any construction work that affects fish passage must be conducted from December to February, during the maintenance shutdown period for the north fish ladder. The applicant says that preparatory work that would not affect the existing system, such as move-in, surface preparation, and excavation of the penstock passage, penstock headworks, and intake water passage, could be conducted during the operational period for the ladder. The applicant would limit preparatory efforts to work that would not affect ladder operation. With regard to project operation, the applicant states that turbine and bypass flows would be controlled to match the existing discharge characteristics of the Rainier gate, that regulates the AWS flows; consequently, the applicant does not anticipate any discernable changes in operation of the existing AWS. In addition, the applicant states that project design includes the flexibility to accommodate changes in AWS operating criteria.

Continued operation of the north ladder and the AWS, as regulated by the Corps, is essential to efficient upstream passage of adult anadromous fishes. Despite the greater number of migrants that use the east ladder (approximately 90 percent), the north ladder contributes substantially to upstream passage. Further, the north ladder becomes increasingly important when the east ladder is shut down for maintenance or repairs. Any interference with operation of the north ladder and the AWS that would be caused by construction,

operation, or maintenance of the proposed project would pose an unacceptable risk to successful upstream fish passage. A critical consideration would be ensuring that construction activities would not preclude operation of the AWS if maintenance or emergency shutdown of the east ladder required operation of the north ladder during the construction period. To ensure that upstream fish passage is fully protected and that the Corps' operation of the north ladder and AWS is maintained, the licensee should coordinate construction activities and project operation with the Corps. Further, the licensee should reach an agreement with the Corps concerning operation of the proposed project which may include future alterations of flows to the AWS available for project operation.

Downstream Fish Passage

Downstream-migrating juvenile anadromous fishes that enter the AWS would be subject to entrapment if fish screens are not provided at the project intake or to impingement if fish screens are not properly designed and operated. An improperly designed bypass system would subject downstream migrants to injury or to delays in downstream passage.

A major concern of the Corps, the state and federal fish and wildlife agencies, the Tribes, and the Confederated Tribes and Bands of the Yakima Indian Nation (Yakimas) is the proper design, operation, and maintenance of the intake fish screens and downstream bypass system. The Corps states that the project intake must be adequately screened to protect downstream migrants, and that all bypassed fish must be moved to a safe place in the tailrace. Specifically, the Corps states that the vertical velocity component through the fish screen should not exceed 1.0 fps. With regard to the downstream fish bypass, the Corps notes that the passage of debris through the bypass system will be hazardous to downstream migrants.

The WDM and the WDF state that the intake channel must be properly designed and screened to meet approach velocities consistent with the size of the juvenile fish present. The WDF specifically recommends that the licensee should design the intake fish screens with an approach velocity of 0.7 fps; if the licensee wishes to conduct studies to demonstrate that a greater approach velocity would protect downstream migrants, the WDF would adjust its approach velocity requirements accordingly (letter from William R. Wilkerson, Director, Washington Department of Fisheries, Olympia, Washington, April 8, 1985). The WDF also cites the need for back-up screens when fish screens are raised for cleaning. With regard to the

design of the downstream migrant bypass, both the WDM and the WDF express their preference for an open-baffled flume bypass for juveniles, as opposed to a closed system that could cause maintenance problems and fish injury or mortality (letters from Claude Stoddard, Regional Habitat Program Manager, Washington Department of Game, Vancouver, Washington, October 30, 1985, and William R. Wilkerson, Director, Washington Department of Fisheries, Olympia, Washington, December 3, 1984).

A primary concern of the NMFS is that downstream migrating juvenile fish attracted to the project intake not be injured or killed. The NMFS recommends that the intake fish screens be designed to provide an approach velocity of 1.0 fps, that a post-construction evaluation be conducted, and that project operation be modified to alleviate any significant fishery problems (letter from Dale R. Evans, Division Chief, National Marine Fisheries Service, Portland, Oregon, October 30, 1985). In addition to the need for intake fish screens, the NMFS states that an effective juvenile bypass is necessary. The NMFS currently recommends an open-baffled flume bypass system, but says that further consultation with the fishery agencies is needed before final design (letter from Dale R. Evans, Division Chief, National Marine Fisheries Service, Portland, Oregon, October 30, 1985).

The NMFS states that it reserves the right to prescribe any necessary upstream and downstream fish facilities, pursuant to section 18 of the Act, 4/ which must be designed and operated to comply with the NMFS' screening and passage criteria. These measures include, but are not limited to, the following: (1) consultation during additional preliminary engineering; (2) fishery agency and tribal approval of conceptual design prior to initiation of final design; (3) fishery agency and tribal review and approval of final design drawings at 50, 95, and 100 percent of completion; (4) fishery agency and tribal inspection during construction and at the completion of construction prior to watering up; (5) operating the fish facilities year-round, except for agency- and tribal-

4/ Section 18 of the Act provides: "The Commission shall require the construction, maintenance, and operation by a licensee at its own expense of . . . such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce."

approved maintenance shutdowns; (6) provisions for dewatering the entire screen for regular inspection and maintenance, including a regular inspection, repair, and maintenance schedule; (7) provisions for routine access for inspection during project operation; and (8) implementation of a postconstruction evaluation of fish protection facilities, including the implementation of any necessary modifications to project facilities or operation. The staff was informed that a fishway prescription by the NMFS would not prescribe measures beyond those already discussed during the consultation process (personal communication, Brian Brown, Fishery Biologist, Environmental and Technical Services Division, National Marine Fisheries Service, Portland, Oregon, October 20, 1987).

Although the FWS did not comment in response to the public notice for the proposed project, it did comment during the pre-application consultation period. Specifically, the FWS recommends that if data show that fish shorter than 60 mm in length are not normally present in the project area, then a 1.0 fps approach velocity would be acceptable; if, however, fish smaller than 60 mm are present in significant numbers, then the maximum approach velocity cannot exceed 0.5 fps (letter from Russel D. Peterson, Field Supervisor, U.S. Fish and Wildlife Service, Department of the Interior, Portland, Oregon, January 23, 1985). In addition, the FWS states that considering the maintenance and evaluation problems associated with a closed bypass, the initial design plans should provide for an open-flume bypass.

Both the Tribes and the Yakimas believe that the existing and potential production of the anadromous fishery resources in the Columbia River must be fully protected from adverse effects associated with the proposed project. The Yakimas state that downstream migrating juvenile fish attracted to the intake flow must not be injured or killed and that the applicant should provide plans for and should study open-flume bypass methods. The Tribes state that the applicant has estimated project-related impacts to the fishery resources, based on the numbers of juvenile migrants that have passed through the project area in recent years, but points out that current numbers are much reduced. The Tribes say that increased numbers of fall chinook subyearling migrants will be released from the Lyons Ferry hatchery complex on the Snake River, and that significant measures are being taken to build mid-Columbia River summer chinook salmon runs, some of which would be expected to be less than 60 mm in length as downstream migrants. The Tribes note that the applicant has agreed to conduct a sampling study to

determine the occurrence and number of downstream migrants using the AWS, and state that a decision to license the proposed project should be delayed until the study is completed. In addition, the Tribes are concerned about debris accumulation, which would alter uniform flow through the fish screens.

As stated previously, the applicant proposes to install fish screens across the project intake to prevent turbine mortality of juvenile downstream migrants. The screens would be designed to maintain an approach velocity of 1.0 fps, and would include back-up screens, which would be installed when the main screens are raised for cleaning. Debris accumulation on the screens would be minimized by the shallow angle of the screen face, and the applicant would hydraulically flush debris from the screens with high pressure hoses. The applicant also proposes to install an open-baffled flume, if there is an agency-accepted design developed by the time of final project design.

The applicant believes that an approach velocity of 1.0 fps complies with the NMFS design criteria, which is intended to protect fish longer than 60 mm. In support of its belief that few fish less than 60 mm in length would occur in the project area, the applicant provides data on downstream migrants from John Day dam and from the Deschutes River. The applicant estimates that between 1980 and 1984, 115 subyearling chinook salmon less than 60 mm in length that passed John Day dam would have passed through the north ladder's AWS. Assuming a 4-percent fish screen mortality rate and a 5-percent return rate of adults from chinook salmon less than 60 mm long, adult losses would not have exceeded one fish per year. For subyearling chinook originating from the Deschutes River, the applicant estimates equivalent returning adult losses resulting from the proposed project as two adult fish (based on 1979 data) and one fish (based on 1977 data).

At the request of the Commission, the applicant collected fish samples at the AWS in 1986 to determine the species composition and length distribution of downstream migrants. Since the applicant collected few fish, however, the fishery agencies questioned the data's validity, saying that anticipated low-flow conditions in 1987 would likely produce similar results; as a result, the applicant conducted no further sampling. Although the 1986 data may not accurately characterize the downstream fish passage through the AWS, 29 percent of captured fish were chinook salmon less than 60 mm long.

Based on data from the applicant, it appears that significant numbers of subyearling chinook salmon less than 60 mm long would not occur at the AMS. Consequently, compliance with the agencies' 1.0 fps approach velocity criterion probably would protect downstream migrants that pass through the AMS. The applicant's estimation of the number and length of fish that pass through the system is not based on comprehensive, site-specific data, however. Further, the applicant's calculations do not consider anticipated increases in anadromous fish runs resulting from various enhancement measures being undertaken throughout the Columbia River Basin. Achieving the Program's interim goal of doubling the current adult run size to 5 million fish would increase the numbers of downstream migrants that pass through the Dalles dam area.

As the majority of juvenile salmonids produced in the Columbia River Basin must pass through the Dalles dam area, the staff believes that the licensee should design intake fish screens with an approach velocity of 0.5 fps. This approach velocity would protect downstream migrants both longer and shorter than 60 mm in length. Although significant numbers of juveniles less than 60 mm in length currently may not pass through the project area, enhancement efforts may increase the number of this size fish in the future. In addition, unusual, high-flow events, which may have been responsible for the relatively large proportion of juvenile fall chinook salmon less than 60 mm long recovered in the applicant's sampling in 1986 by prematurely flushing subyearling salmon from the Hanford reach (personal communication, Kevin Bauersfeld, Fish Biologist, Washington Department of Fisheries, Tumwater, Washington, October 2, 1987) may be expected in the future. Therefore, the licensee, after consultation with the Corps, the Council, the state and federal fish and wildlife agencies, the Tribes, and the Yakimas, should develop and submit for Commission approval functional design drawings of intake fish screens and a maintenance and operating plan.

In addition, the licensee, after consultation with the Corps, the Council, appropriate state and federal fish and wildlife agencies, the Tribes, and the Yakimas, should develop functional design drawings of a downstream fish migrant bypass facility including an operation and maintenance plan. Further consultation and the availability of results of studies of downstream bypass designs at Little Goose dam and at Lower Granite dam would allow the licensee to develop an appropriate bypass design to safely and efficiently pass downstream migrants. Important considerations in any bypass design include debris removal, which would be facilitated by an open-flume design, and the location of the bypass exit. Releasing downstream migrants in slack water areas would subject them to predation and could delay their downstream migration.

To ensure that the intake fish screens and downstream migrant bypass facilities are fully protective of juvenile anadromous fishes, the licensee, after consultation with the Corps, the state and federal fish and wildlife agencies, the Tribes, and the Yakimas, should develop and implement a plan to monitor the effectiveness of these facilities. The licensee should include in the plan provisions for rapidly altering project operation, if needed to protect downstream migrants, for example, by reducing flow diversions for project operation or shutting down the project. The licensee also should file an implementation schedule, a schedule for filing the results with the Commission and with the consulted agencies, the Tribes, and the Yakimas, and recommendations for changes in project facilities or project operation based on monitoring results. In addition, the licensee should permit personnel from the consulted entities, upon showing proper credentials, to inspect the fish screens, the downstream fish bypass facilities, related project records, and other fish and wildlife protective measures, upon showing proper credentials.

Unavoidable Adverse Impacts: Construction activities would cause short-term increases in turbidity that could affect upstream fish passage on a short-term basis. Although some minor levels of injury or mortality of downstream migrant salmonid juveniles might result from contact with the project's intake fish screens and bypass facility, provisions for monitoring the effectiveness of these facilities in protecting the fishery resources, including provisions for rapidly altering project operation, would reduce unavoidable impacts to minor levels.

4. Threatened and Endangered Species

Affected Environment: The bald eagle (*Haliaeetus leucocephalus*) and the peregrine falcon (*Falco peregrinus*) are the only federally listed threatened or endangered species that may occur within or near the project area (personal communication, Diana Hwang, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Department of the Interior, Portland, Oregon, November 5, 1987). Peregrine falcons occur as seasonal migrants and may overwinter in the Columbia River area; however, no nesting sites have been reported in the project area. Bald eagles may occur in the area during the wintering season from about October 31 through March 31, but no sightings at the Dalles dam have been reported (personal communication, Diana Hwang, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Department of the Interior, Portland, Oregon, November 5, 1987).

Environmental Impacts and Recommendations: The proposed project would not affect either the food supply or roosting sites and day perches of the bald eagle. Although the bald eagle consumes birds, waterfowl, and fish (Federal Energy Regulatory Commission, 1987), because of the limited habitat value of the project area, the proposed project would not affect waterfowl populations or habitat for other bird prey species. Similarly, the food source of the peregrine falcon, which consists of avian prey, would be unaffected. Given the recommended mitigative measures discussed previously in section V.A.3. for the fishery resources, there would be no impacts to the bald eagle's fish food supply. As the project area has been previously disturbed and provides no reported roosting or perching sites, the proposed project would not affect roosting sites and day perches.

The applicant has not decided whether the 12.5-KV transmission line from the powerhouse to the Dalles bridge would be above ground or underground. As the transmission line is within the 4 to 69-KV range that poses the greatest threat of electrocution of raptors, including bald eagles and peregrine falcons, the licensee should develop a transmission line design plan to prevent raptor electrocutions associated with the transmission line, should the final project design include the provision of an above-ground transmission line. This plan should be prepared in accordance with guidelines in the 1981 publication, "Suggested Practices for Raptor Protection on Power Lines," Raptor Research Report No. 4, published by the Raptor Research Foundation, Inc.

Unavoidable Adverse Impacts: None.

5. Cultural Resources

Affected Environment: No properties have been identified in the project area as listed on or eligible for listing on the National Register of Historic Places (letter from Robert G. Whittam, State Archaeologist, Office of Archeology and Historic Preservation, Olympia, Washington, December 12, 1983).

Environmental Impacts and Recommendations: Land-clearing and land-disturbing activities could adversely affect archaeological and historic properties not previously identified in the project area. Therefore, if the licensee encounters such properties during the development of project works or related facilities, the licensee should stop land-clearing and land-disturbing activities in the vicinity of the properties and should consult with the State

Historic Preservation Officer (SHPO) about the eligibility of the properties and about any measures needed to avoid or to mitigate effects on the properties. In addition, before beginning land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license, the licensee should consult with the SHPO about the need to conduct an archaeological or historical survey and the need for avoidance or mitigative measures. In these instances, 60 days before starting such land-clearing or land-disturbing activities, the licensee should file a plan and a schedule for conducting the appropriate studies, along with a copy of the SHPO's written comments concerning the plan and the schedule. The licensee should not start land-clearing or land-disturbing activities, other than those specifically authorized in this license, or resume such activities in the vicinity of an archaeological or historic property discovered during construction, until informed that the requirements discussed above have been fulfilled.

Unavoidable Adverse Impacts: None.

6. Cumulative Impacts

The WPF, MDW, and the Tribes state that there must be an evaluation of the cumulative effects caused by the presence and operation of the proposed Dalles Dam North Fishway Hydroelectric Project and of other projects in the Columbia River Basin.

The Council estimates that in the basin, long-term, cumulative adverse impacts associated with hydropower development, irrigation, fishing, logging, mining, grazing, urbanization, and pollution, have caused the loss of 7 of 14 million salmon and steelhead annually (Federal Energy Regulatory Commission, 1987). The Council attributes the loss of 5 to 11 million anadromous fish to the development and operation of the 136 hydropower projects in the basin, and states that the majority of these losses are associated with mainstem Columbia River dams (Federal Energy Regulatory Commission, 1987).

The BPA, the Bureau of Reclamation, the Corps, the WFS, the Forest Service, the states of Oregon, Washington, and Idaho, and numerous Indian tribes in the Columbia River Basin are spending millions of dollars annually to restore the anadromous fishery resource. Any increase in the production of salmon and steelhead above the Dalles dam will have to pass by the Dalles dam, both as juveniles and as adults, and could be subject to the impacts of the Dalles Dam North Fishway Hydroelectric Project. As a result, the proposed project could affect (1) the fishery resources of the Salmon River Basin of

Idaho; (2) the fishery improvements of the Bureau of Reclamation's Yakima River Basin Enhancement Project; (3) fishery improvements associated with the Lower Snake River Compensation Plan and the Idaho Power Company Hells Canyon Complex settlement; (4) the efforts of the Grant County Public Utility District under the mid-Columbia settlement agreement; (5) the hatchery program of the Douglas County Public Utility District at Wells dam; (6) the fishway improvements at Tumwater and Dryden dams; and (7) additional fisheries mitigation programs of the Program. Thus, the construction and operation of the Dalles Dam North Fishway Hydroelectric Project could contribute to cumulative adverse impacts on the existing fishery resources of the Columbia River Basin and to future improvements in production resulting from the myriad fishery mitigative programs in the basin.

The staff believes that it would be contradictory to allow further development in the Columbia River Basin, if that development would negate the potential for success of these fishery improvement projects. Thus, the staff recommends that mitigative measures outlined in sections V.A.2, and 3, be included as conditions of any license issued for the project, and that the licensee be required to demonstrate, through postlicense monitoring, that the project would not contribute to cumulative adverse impacts on existing and future fishery resources in the Columbia River Basin.

B. Alternative of No Action

Implementing the no-action alternative would not alter the existing physical or biological components of the area, but would preclude the use of renewable water resources of the AWS to generate electricity.

C. Recommended Alternative

The proposed project is the preferred alternative because electricity would be generated from a renewable resource, thus lessening the use of existing fossil-fueled, steam-electric plants, and because the environmental effects that would result from constructing and operating the project would not be major and would be adequately mitigated.

VI. FINDING OF NO SIGNIFICANT IMPACT

Construction of the proposed project would result in minor, short-term increases in turbidity levels in the Columbia River downstream from the north ladder. Operation of the project would result in the injury or mortality of some downstream migrating salmonid juveniles,

but recommended mitigative measures would reduce these losses to minor levels.

The project would not affect any federally listed threatened or endangered species nor any sites or structures listed on or eligible for listing on the National Register of Historic Places.

This environmental assessment was prepared in accordance with the National Environmental Policy Act of 1969. On the basis of the record and of the staff's independent environmental analysis, issuance of a license for the Dalles Dam North Fishway Hydroelectric Project would not constitute a major federal action significantly affecting the quality of the human environment.

LITERATURE CITED

Bell, M.C. 1984. Fisheries handbook of engineering requirements and biological criteria. Department of the Army, North Pacific Division Corps of Engineers, Portland, Oregon.

Corps of Engineers. 1981. Final environmental impact statement, navigation development, Bonneville Lock and Dam. Department of the Army, Portland District Corps of Engineers, Washington, D.C.

1984a. Supplement to Corps of Engineers memorandum no. 25, analysis of technical and environmental issues. Department of the Army, Portland District Corps of Engineers, Portland, Oregon. January 30, 1984.

1984b. Annual fish passage report, Columbia and Snake Rivers, for salmon, steelhead, and shad. Department of the Army, North Pacific Division, Corps of Engineers, Portland, Oregon.

Federal Energy Regulatory Commission. 1987. Draft environmental impact statement for the Rock Island Project, FERC No. 943, Washington. Washington, D.C.

Northern Wasco County People's Utility District. 1985a.

Application for major license, Dalles Dam North Fishway Hydroelectric Project, FERC No. 7076-000, filed April 26, 1985. The Dalles, Oregon.

1985b. Supplement to the application for major license, Dalles Dam North Fishway Hydroelectric Project, FERC No. 7076-000, filed November 12, 1985. The Dalles, Oregon.

Northwest Power Planning Council. 1987. Seventh annual report of the Pacific Northwest Electric Power and Conservation Planning Council. Portland, Oregon. 36 pp.

Pacific Northwest Utilities Conference Committee. 1987. PNUECC and fish: a primer. Portland, Oregon.

Washington Department of Ecology. 1982. Water quality standards for waters of the state of Washington. Chapter 173-2101 WAC. Olympia, Washington.

VIII. LIST OF PREPARERS

Robert Kraka, EA Coordinator--Water and Fishery Resources (Fishery Biologist; M.S., Fisheries Sciences).

Alan D. Mitchell--Threatened and Endangered Species (Wildlife Biologist; M.S., Wildlife and Fisheries Sciences).

Edwin Slater--Cultural Resources (Archaeologist; Ph.D., Anthropology).

John Mitchell--EA Editor (Writer-editor; B.S., Social Science).

Kenneth B. Fearon--Need for Power and Alternatives (Civil Engineer; BCE).

SAFETY AND DESIGN ASSESSMENT DALLAS DAM NORTH FISHWAY HYDROELECTRIC PROJECT

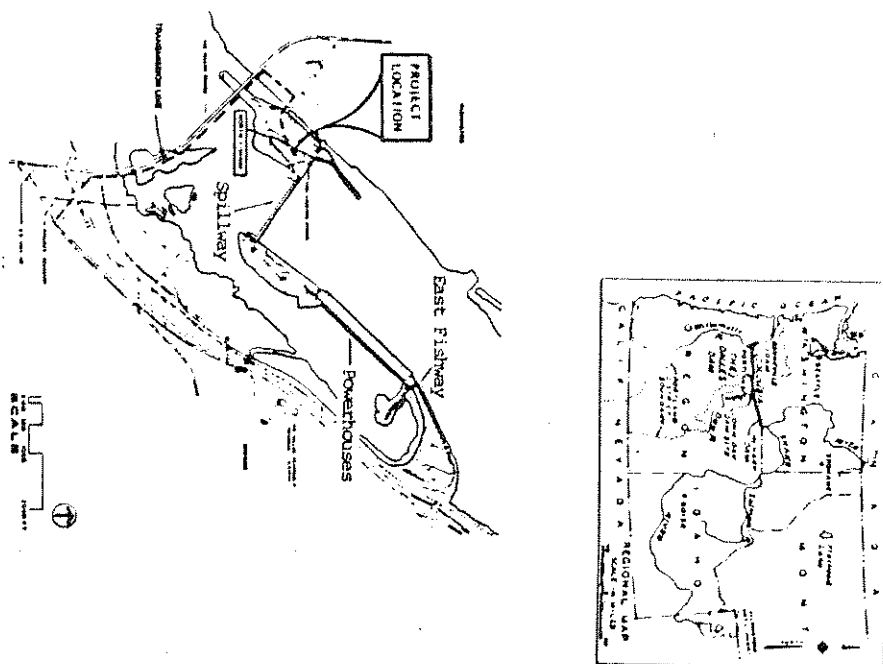


Figure 1. Project location for the proposed Dallas Dam North Fishway Hydroelectric Project, FERC No. 7076, Washington (Source: the staff, as modified from the Department of the Army, Portland and Walla Walla Districts, Corps of Engineers, 1984, and from Northern Wasco County People's Utility District, 1985, application, exhibit G).