DOE F 1325.8
(8-89)
EFG (07-90)

United States Government **Department of Energy**

memorandum

DATE: October 16, 1992

REPLY TO ATTN OF: EH-25

SUBJECT: Approval of the Final Environmental Impact Statement (FEIS) for the Washington Water Power/B.C. Hydro Transmission Interconnection Project (DOE/EIS-0141)

TO: James G. Randolph
Assistant Secretary
Office of Fossil Energy

The Office of Environment, Safety and Health (EH) has reviewed the subject EIS in accordance with our responsibilities under the Department of Energy Order 5440.1D regarding compliance with the National Environmental Policy Act (NEPA), as requested in your July 13, 1992, memorandum. On August 7 and 10, 1992, EH-25 and GC-11 staff, respectively, provided essential technical comments to FE to assist in revising the EIS. On August 18, 1992, the revised EIS was returned to EH. We note that written and oral comments provided on the Draft EIS, published in December, 1989, and on the Supplemental Draft EIS, distributed in February, 1992, have been adequately addressed in the FEIS. Therefore, based upon my staff's review and analysis and after consultation with the Office of General Counsel, I have determined that the FEIS is adequate for publication and distribution subject to incorporation of the comments noted on the attached marked-up copy of the EIS.

The Office of NEPA Oversight will continue to assist your office in filing the EIS with the U.S. Environmental Protection Agency and other distribution matters.

for Paul L. Ziemer, Ph.D.
Assistant Secretary
Environment, Safety and Health

Attachments

cc: James Johnson, FE-6
NEPA Compliance Officer

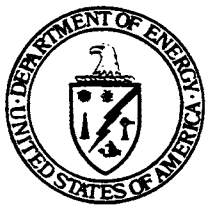
DOE/EIS-0141

FINAL ENVIRONMENTAL IMPACT STATEMENT

WASHINGTON WATER POWER

B.C. HYDRO

TRANSMISSION INTERCONNECTION PROJECT



U.S. DEPARTMENT OF ENERGY

Office of Fuels Programs

1992

DOE/EIS-0141

FINAL ENVIRONMENTAL IMPACT STATEMENT

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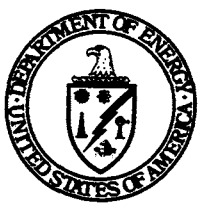


U.S. DEPARTMENT OF ENERGY

Office of Fuels Programs
Washington, DC 20585

1992

WASHINGTON WATER POWER/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT

Prepared by

U.S. DEPARTMENT OF ENERGY
OFFICE OF FUELS PROGRAMS
Washington, D.C.

October 1992

Assistant Secretary for Fossil Energy
James Randolph

COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT
WASHINGTON WATER POWER/B.C. HYDRO
TRANSMISSION INTERCONNECTION PROJECT

( ) DRAFT ( ) SUPPLEMENTAL DRAFT (X) FINAL

Lead Agency:	U.S. Department of Energy Assistant Secretary for Fossil Energy Washington, D.C.
Federal Cooperating Agency:	U.S. Forest Service Bureau of Indian Affairs
Counties That Could Be Directly Affected:	Pend Oreille, Spokane, Stevens, and Lincoln Counties, Washington

EIS contact where comments should be directed to:

Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., SW
Washington, D.C. 20585 (202) 586-5935

Date Draft EIS filed with EPA: January 16, 1990
Date Supplemental Draft EIS filed with EPA: February 21, 1992
Date Final EIS filed with EPA:

ABSTRACT

Washington Water Power (WWP) proposes to construct and operate an electric transmission line that would connect with the electrical system of the British Columbia Hydro and Power Authority (B.C. Hydro). The project would be composed of a double-circuit, 230-kilovolt (kV) transmission line from WWP's existing Beacon Substation located northeast of Spokane, Washington to the international border located northwest of Metaline Falls, Washington. The original Presidential permit application and associated proposed route presented in the draft environmental impact statement (DEIS) (December 1989) have been modified to terminate at the Beacon Substation, instead of WWP's initially proposed termination point at the planned Marshall Substation located southwest of Spokane. A supplemental draft EIS (Supplemental DEIS) was prepared and submitted for review to not only examine the new proposed 5.6 miles of route, but to also compare the new Proposed Route to the other alternatives previously analyzed in the DEIS. This final EIS (FEIS) assesses the environmental effects of the proposed transmission line through construction, operation, maintenance, and abandonment activities and addresses the impacts associated with the Proposed Action, Eastern Alternative, Western Alternative, Northern Crossover Alternative, Southern Crossover Alternative, and No Action Alternative. The FEIS also contains the comments received and the responses to these comments submitted on the DEIS and Supplemental DEIS.

Summary

Introduction 1.0

Proposed Action/Route and Alternatives Considered 2.0

Affected Environment 3.0

Environmental Consequences 4.0

Consultation and Coordination 5.0

SUMMARY

SUMMARY

Introduction. The Washington Water Power Company (WWP) and British Columbia Hydro and Power Authority (B.C. Hydro) are proposing to construct and operate a double-circuit 230,000 volt (230-kV) electrical transmission line linking the electrical systems of both utilities. The proposed action would entail the 230-kV transmission line traveling between Spokane and the United States-Canada border, tying into B.C. Hydro's system. Within the United States, the Department of Energy (DOE) requires a Presidential permit to construct the transmission line across the international boundary. WWP filed an application for a Presidential permit with DOE on October 15, 1987 (Docket No. PP-86).

WWP prepared an environmental report (ER) for the proposed Interconnection. This document was submitted to DOE in September 1988 and is currently available for review at selected libraries in the four-county project area and at WWP's corporate headquarters in Spokane. Since DOE has determined that the granting of a Presidential permit for the proposed Interconnection constitutes "a major federal action significantly affecting the quality of the human environment," an environmental impact statement (EIS), in compliance with the National Environmental Policy Act (NEPA) of 1969, is required to assess potential impacts. DOE is the federal lead agency responsible for the preparation of the WWP/B.C. Hydro Transmission Interconnection DOE/EIS-0141 and will issue the final decision on the proposed WWP/B.C. Hydro 230-kV Transmission Interconnection.

Prior to the preparation of the draft EIS (DEIS), public scoping meetings were held in Spokane, Colville, and Newport, Washington (in May 1988) to identify major issues and concerns that should be addressed in the EIS. Following the public and agency scoping meetings, an Implementation Plan was prepared, which summarized the proposed Interconnection, outlined issues to be addressed in the EIS, and discussed the subsequent procedures for the EIS preparation. This Implementation Plan is available from DOE.

DOE distributed approximately 650 copies of the DEIS in January 1990 to interested individuals and agencies, followed by public hearings held in Spokane, Newport, and Colville in February 1990. A total of 56 speakers presented comments at the public hearings, and DOE received 71 written comment letters during the 72-day public comment period. Substantive comments and responses associated with the DEIS are presented in Section 5.0 of this final EIS (FEIS).

On March 2, 1991, WWP formally notified the DOE that the company was amending its application for a Presidential permit for the construction of the WWP/B.C. Hydro Transmission Interconnection Project. This amendment would require modification of the DEIS that was prepared by DOE and submitted for public review in January 1990. The revised Proposed Route would now terminate at WWP's existing Beacon Substation located northeast of Spokane instead of WWP's originally proposed termination point at the planned Marshall Substation located southwest of Spokane. See Map 2-2, Sheet 5 for locations of these areas. As currently proposed, construction of the Marshall Substation would not be authorized as part of the Presidential permit action. The details of this amendment and the required route change to reach the Beacon Substation are presented in Section 2.1 of this report.

DOE prepared a supplemental draft environmental impact statement (Supplemental DEIS) that addressed the new proposed 5.6 miles of route between a point located along the originally proposed route directly south of the town of Mead in Spokane County to the existing Beacon Substation located in the eastern portion of Spokane. The Supplemental DEIS also compared the new Proposed Route (international boundary to Beacon Substation) to the other alternatives previously analyzed in the DEIS (December 1989), including the originally proposed international boundary to Marshall Substation route. That impact comparison is summarized in Section 4.0 of this FEIS.

DOE distributed approximately 500 copies of the Supplemental DEIS to individuals and agencies in February 1992. A 68-day public comment period allowed interested parties to submit comments on the contents of the Supplemental DEIS and the overall project. DOE received a total of 20 written comment letters during and following this comment period. Substantive comments and response to concerns identified for the Supplemental DEIS are presented in Section 5.0 of this FEIS.

Purpose and Need. WWP's primary purpose for the proposed interconnection would be to provide WWP's customers and other Northwest utilities with a future source of economical electricity. WWP claims that construction of a transmission interconnection would provide the company significant flexibility in meeting future demands. WWP has adopted a flexible resource construction/acquisition strategy to address uncertainties that the company believes are associated with load growth forecasts, in order to continue to reliably and economically supply electrical loads in the future. WWP predicts electricity supply and demand on a 20-year basis, according to estimated power generation capabilities and future customer loads. WWP predicts that under current conditions, forecasted deficits (where electricity demands exceed the available electricity) will begin in 1994. WWP anticipates these deficiencies to continue to increase through the year 2010, when the deficits are predicted by WWP to be approximately 202 megawatts (MW)

under average demands and 445 MW under peak demands. Consequently, WWP ownership of transmission facilities to the international boundary is presently foreseen by WWP as a means to ensure a long-term supply of reliable and economical electricity from B.C. Hydro.

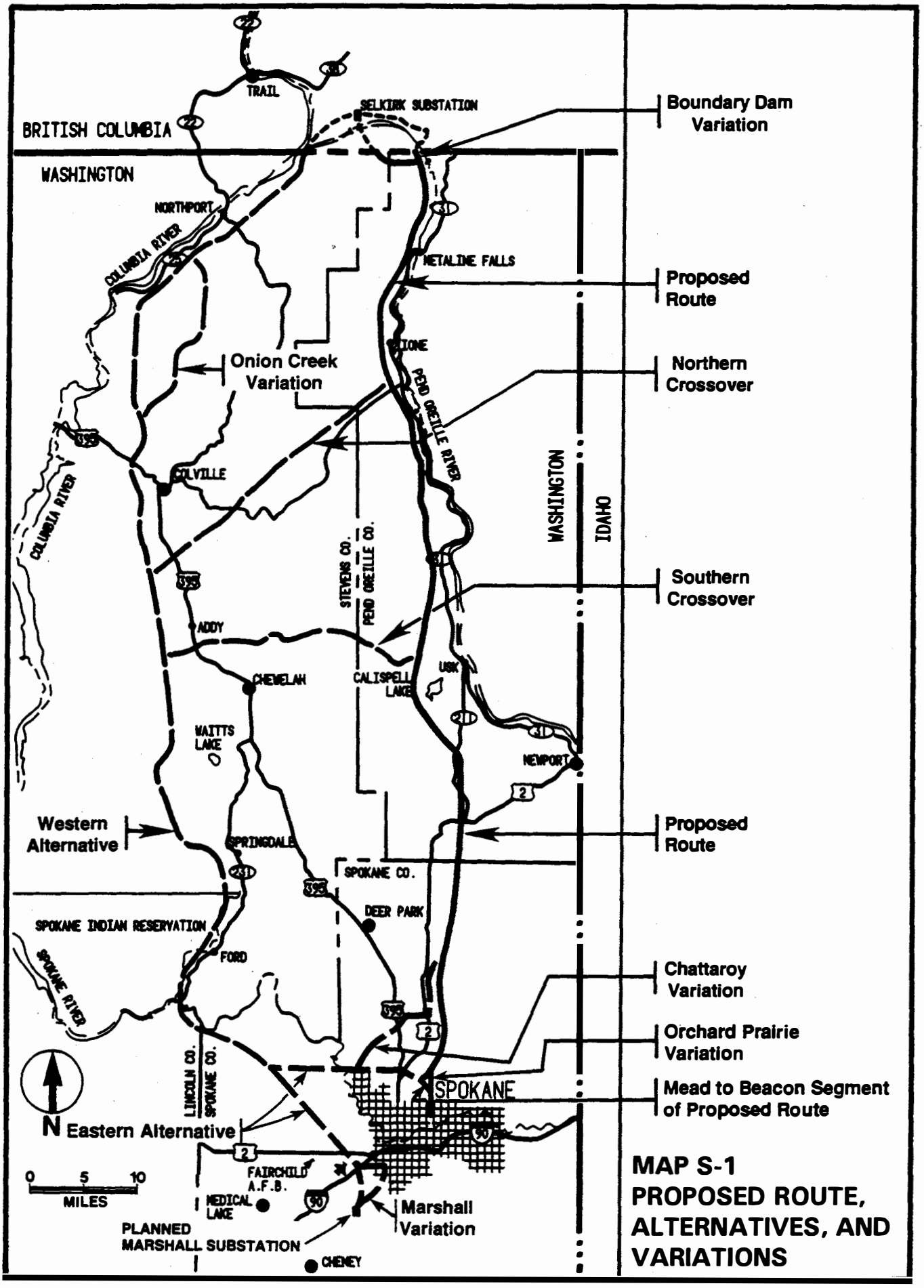
Proposed Route and Alternatives. A wide range of alternative locations for the proposed Interconnection have been considered in this EIS. The Proposed Route would consist of a new double-circuit 230-kV transmission line constructed between WWP's existing Beacon Substation and the United States-Canada international boundary (see Map S-1). The Proposed Route is 102.2 miles in length and crosses Stevens, Pend Oreille, and Spokane Counties. The Boundary Dam and Orchard Prairie Variations and the Eastern and Western Route Options are associated with this route. These project routes are described in detail in Section 2.1 of this FEIS.

The Eastern Alternative is the same route as that described for the Proposed Route, traveling from the United States-Canada boundary south to Mead. The Eastern Alternative then proceeds west, turning south at Four Mound Prairie, and terminates at the planned substation site near Marshall (see Map S-1). The Eastern Alternative is 127.9 miles in length and crosses Steven, Pend Oreille, and Spokane Counties. The Boundary Dam, Chattaroy, and Marshall Variations and the Eastern and Western Route Options are associated with this route, which are described in detail in Section 2.2.1 of this FEIS.

The Western Alternative originates at the international boundary and travels south, paralleling the Columbia River, within the Columbia and Colville River Valleys and terminates at the planned Marshall Substation (see Map S-1). The Western Alternative is 121.1 miles in length and crosses Stevens, Lincoln, and Spokane Counties. The Onion Creek and Marshall Variations are associated with the Western Alternative and are described in detail in Section 2.2.2 of this FEIS.

The Northern Crossover and Southern Crossover Alternatives are crossover routes from the Proposed Route to the Western Alternative (see Map S-1). Both of these alternatives cross Stevens, Pend Oreille, Lincoln, and Spokane Counties; terminate at the planned Marshall Substation; and are affiliated with the Boundary Dam and Marshall Variations. The lengths of the Northern and Southern Crossover Alternatives total 126.9 miles and 142.7 miles, respectively, and are described in Sections 2.2.3 and 2.2.4 of this FEIS.

Under the No Action Alternative, DOE would not issue a Presidential permit for the proposed Interconnection, and the transmission line would not be constructed. WWP would have to develop other sources of energy to meet increases in demand for electricity.


BRITISH COLUMBIA
WASHINGTON
TRAIL
SELKIRK SUBSTATION
NORTHPORT
COLUMBIA RIVER
METALINE FALLS
IONE
PEND OREILLE RIVER
COLVILLE
STEVENS CO.
PEND OREILLE CO.
WASHINGTON
IDAHO
ADDY
CHEWELAH
CALISPELL LAKE
USK
WAITTS LAKE
NEWPORT
SPRINGDALE
SPOKANE CO.
DEER PARK
SPOKANE INDIAN RESERVATION
FORD
SPOKANE RIVER
LINCOLN CO.
SPOKANE CO.
SPOKANE
FAIRCHILD A.F.B.
MEDICAL LAKE
PLANNED MARSHALL SUBSTATION
CHENEY
N
0 5 10
MILES
Boundary Dam Variation
Proposed Route
Onion Creek Variation
Northern Crossover
Southern Crossover
Western Alternative
Proposed Route
Chattaroy Variation
Orchard Prairie Variation
Mead to Beacon Segment of Proposed Route
Eastern Alternative
Marshall Variation
MAP S-1
PROPOSED ROUTE, ALTERNATIVES, AND VARIATIONS

Impacts and Mitigation. Section 2.7 presents a summary and comparison of the impacts associated with project alternatives, variations, and route options (see Tables 2-6 and 2-7). To minimize impacts to the extent practicable, WWP has developed a variety of environmental protection procedures that are presented in Table 2-5, and DOE has identified specific mitigation measures that are listed in Section 4.9 of this FEIS. Should the proposed Interconnection be permitted, WWP has committed to both the protection procedures and the mitigation measures. Therefore, these measures are considered part of the proposed Interconnection Project. Because of these procedures and measures, a majority of the environmental impacts associated with the proposed Interconnection would be minimized or eliminated.

The significant impacts that would remain, following the implementation of the mitigation measures presented in Section 4.9 (i.e., unavoidable adverse impacts) are discussed in Section 4.10 of this FEIS. For the Proposed Route, unavoidable adverse impacts would include the removal of 8.5 acres of forested wetlands and the removal of 7 residences. No unavoidable adverse impacts are associated with either the Boundary Dam or Orchard Prairie Variations or the segments of the Proposed Route replaced by these variations. Unavoidable adverse impacts associated with the Eastern Route Option would include the removal of 5.3 acres of forested wetlands and a total of 17 residences. The Western Route Option would result in unavoidable adverse impacts from the removal of 7.9 acres of forested wetlands and 34 residences. In comparison, unavoidable adverse impacts associated with the segment of the Proposed Route replaced by both of these route options would include the removal of 8.5 acres of forested wetlands and 7 residences.

For the Eastern Alternative, unavoidable adverse impacts would include the removal of 9.4 acres of forested wetlands, a total of 12 residences, and 2 major inhabited buildings. Neither the Boundary Dam Variation nor the segment of the Eastern Alternative that it would replace would result in unavoidable adverse impacts. The Chattaroy Variation would cross the Little Spokane River Natural Area, resulting in unavoidable adverse impacts from the removal 0.6 acre of forested wetlands, the increase in the potential for bald eagle collisions, the reduction in 0.6 mile of the recreation area naturalness, the violation of 0.6 mile of land use policies prohibiting transmission line ROWs, and long-term visual impacts for 0.4 mile of the variation. Unavoidable adverse impacts associated with the segment of the Eastern Alternative replaced by this variation would include the removal of 1 residence and 1 major inhabited building. Both the Marshall Variation and the segment of the Eastern Alternative replaced would affect two residences, resulting in unavoidable adverse impacts from each of these route segments. Unavoidable adverse impacts affiliated with the Eastern Route Option and the Western Route Option in

comparison to the segments of the Eastern Alternative replaced would be the same as those discussed for the Proposed Route.

Unavoidable adverse impacts for the Western Alternative would include the removal of 21.2 acres of forested wetlands; removal of 7 residences; removal of 1 major inhabited building; and significant, long-term visual impacts for 14.5 miles of this alternative route. No unavoidable adverse impacts would be associated with the Onion Creek Variation. However, the segment of the Western Alternative replaced would result in unavoidable adverse impacts from exceeding 5.9 miles of the visual quality objectives. The unavoidable adverse impacts affiliated with the Marshall Variation and the segment of the Western Alternative replaced would be the same as those described for the Eastern Alternative.

Use of the Northern Crossover Alternative would include the removal of 15.2 acres of forested wetland, the clearance of 9.1 acres of old growth forest, the removal of 8 residences, the removal of 1 major inhabited building, and the exceedence of applicable visual quality objectives for 1.8 miles of the route alternative, resulting in unavoidable adverse impacts to these resources. Unavoidable adverse impacts associated with the Boundary Dam and Marshall Variations and the segments of the Northern Crossover Alternative replaced would be the same as the impacts discussed when comparing these variations to the Proposed Route and Eastern Alternative.

Unavoidable adverse impacts for the Southern Crossover Alternative would include the removal of 9.1 acres of forested wetlands, the loss of 7.6 acres of old growth forest, the removal of 10 residences, and the removal of 1 major inhabited building. Unavoidable adverse impacts associated with the Boundary Dam and Marshall Variations and the segments of the Southern Crossover Alternative replaced would be the same as the impacts discussed when comparing these variations to the Proposed Route and Eastern Alternative.

Areas of Controversy. Based on the public review process for both the DEIS and the Supplemental DEIS, a few issues of controversy and concern were identified for the proposed Interconnection project. Potential health effects from electric and magnetic fields (EMF) associated with the proposed transmission line was the primary issue raised for the proposed project. Section 4.6 of this FEIS discusses the EMF issues, including the health issue under Section 4.6.5. Another area of controversy focused on overall project need. This issue is addressed in Section 1.2 of this FEIS, which correlates with Section 2.6 that addresses project alternatives. Finally, the third area of notable concern dealt with property values and landowner compensation for private lands; however, this issue is closely associated with the EMF question. Analysis of private property rights is addressed under Existing and Planned Land Uses and Socioeconomics and Community Resources for each of the project alternatives.

Agency Preferred Alternative. In accordance with the National Environmental Policy Act (NEPA) of 1969, federal agencies are required by the Council on Environmental Quality (40 CFR 1502.14) to identify their preferred alternative for a project in the FEIS prepared for the project. The preferred alternative is not a final agency decision; it is rather an indication of the agency's preliminary preference. The alternative identified below is the DOE's preferred alternative at the FEIS stage in the environmental review process. This preference may be changed, based on the agency and public comments that are received on this FEIS. DOE's final decision will be contained in a Record of Decision prepared for WWP's proposed interconnection. DOE's preference at that time will consider all information relevant to WWP's proposed action that has been received and reviewed. The DOE preferred alternative is the Applicant's Proposed Route.

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INTRODUCTION

1.0

1.0 INTRODUCTION

1.1 History and Background

The Washington Water Power Company (WWP), an investor-owned utility based in Spokane, Washington, and British Columbia Hydro and Power Authority (B.C. Hydro), a Crown Corporation of the British Columbia provincial government, propose to construct and operate a double-circuit 230,000 volt (230-kV) electrical transmission line linking the electrical systems of both utilities. A Memorandum of Understanding between Powerex, a subsidiary of B.C. Hydro, and WWP has been completed, providing the framework for the sale of electricity to WWP. The project is referred to as the WWP/B.C. Hydro 230-kV Transmission Interconnection, or proposed Interconnection. In early 1987, both WWP and B.C. Hydro agreed to pursue licensing with their respective regulatory authorities. In the United States, the construction, connection, operation, and maintenance of electric transmission facilities that cross the U.S. international border require the issuance of a Presidential permit by the Department of Energy (DOE) (see Section 1.3 for further discussion of the Presidential permit). Before the DOE issues a Presidential permit, it considers impacts that the project would have on the reliability of the United States electric power supply system, assesses the environmental impacts associated with the project, and obtains the concurrence of the Secretary of State and the Secretary of Defense. WWP filed an application for a Presidential permit for its proposed international interconnection on October 15, 1987.

The proposed Interconnection would consist of a double-circuit 230-kV transmission line located between Spokane and the United States-Canada border that would be constructed in a variety of right-of-way (ROW) configurations and would parallel existing transmission line ROWs through portions of the study area. The line is proposed to deliver up to 800 megawatts (MW) of power into the WWP system. DOE has determined that the proposed action to grant a Presidential permit for the proposed Interconnection would constitute a "major federal action significantly affecting the quality of the human environment." Consequently, DOE prepared a draft environmental impact statement (DEIS) on the complete project under the provisions of the National Environmental Policy Act (NEPA) of 1969. The preparation of an EIS is separate and apart from the Presidential permit process. Other permits will also be required by the U.S. Forest Service and the Bureau of Land Management for crossing National Forest and public land, respectively. DOE is the federal lead agency responsible for preparation of the EIS, and the Forest Service and the Bureau of Indian Affairs are formal cooperating agencies. Also, the Washington State Department of Ecology (WDE) and other Washington State agencies and

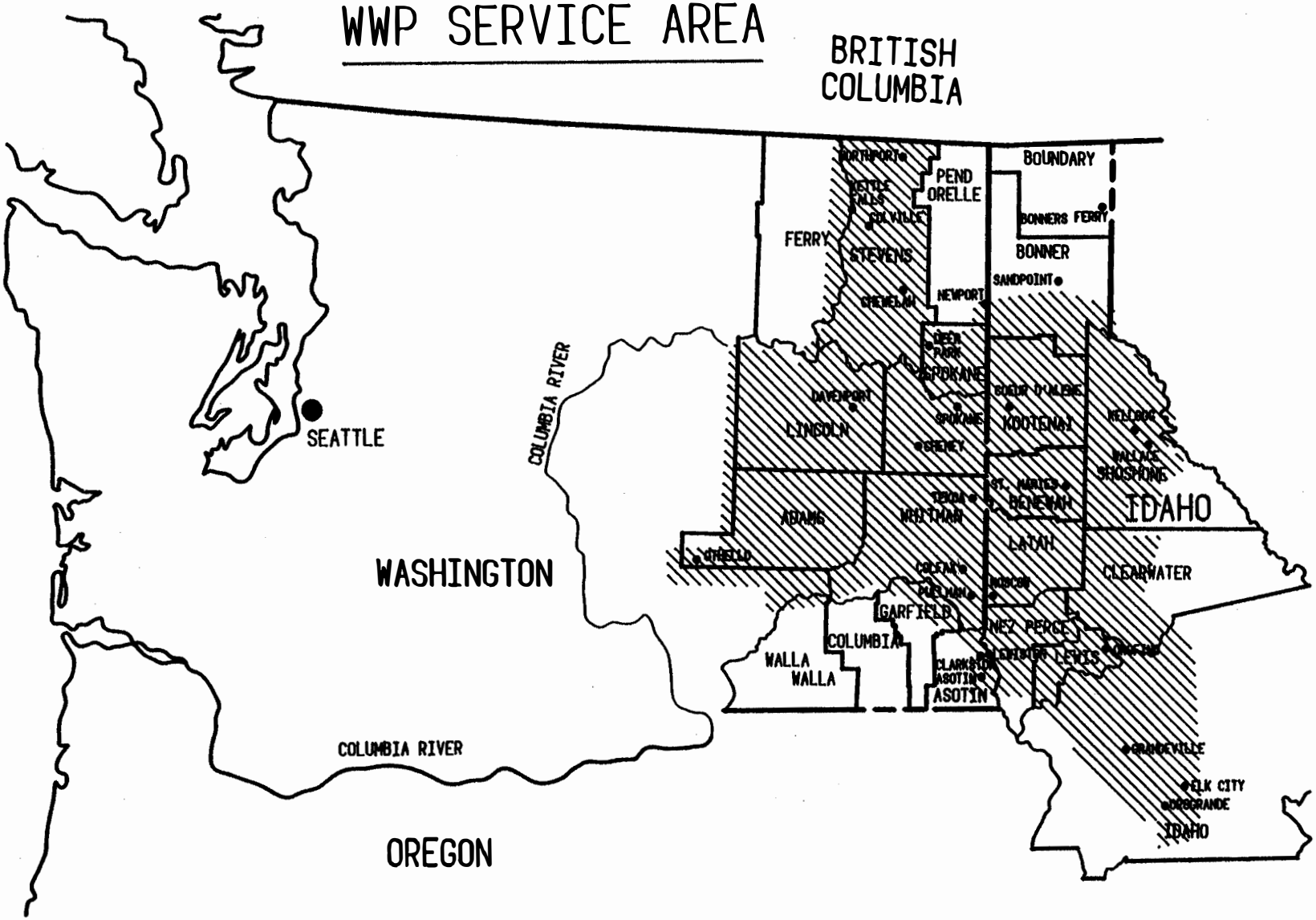
political subdivisions may decide to adopt the federal EIS, as provided in WAC 197-11-630 of the Washington State Environmental Policy Act (SEPA), for compliance with any state requirements.

As originally filed by WWP and as discussed in the DEIS, the proposed Interconnection was to total approximately 127.9 miles and was to terminate at the planned Marshall Substation, located southwest of Spokane. The DEIS addressed the environmental impacts associated with construction and operation of the transmission line, as well as those impacts associated with the construction and operation of the planned Marshall Substation. On March 2, 1991, WWP formally notified DOE that the company was amending its Presidential permit application by shortening the route by 25.7 miles in order to terminate the line at the existing Beacon Substation located northeast of Spokane, thus eliminating the need to construct the substation at Marshall, as part of the proposed Interconnection project. The details of this amendment and the required route change to reach the Beacon Substation are presented in Section 2.1. After reviewing WWP's amendment, DOE determined that it would be appropriate to prepare a supplemental DEIS. This document was made available to the public for review and comment on February 21, 1992.

1.1.1 WWP Overview

WWP is an investor-owned electric and natural gas utility based in Spokane, Washington with a 26,000 square-mile service territory in eastern Washington and northern Idaho (see Map 1-1). WWP was incorporated in 1889 and was entirely hydroelectric-based until 1971 when the Centralia coal-fired power plant in western Washington began operating. WWP currently meets its customer load and firm contract sales requirements with a diverse mixture of resources, including a substantial reliance on hydroelectric resources. Approximately 70 percent of WWP's customer energy requirements (1992 average of 1,130 MW) can be supplied by the company's hydroelectric generating units in a year with average streamflow. WWP-owned generation includes 946 MW of hydroelectric capacity, 407 MW of coal-fired capacity, 68 MW of combustion turbines, and 47 MW of wood-waste fueled capacity. In addition, WWP regulariy purchases and exchanges power with B.C. Hydro, Bonneville Power Administration (BPA), municipalities, public utility districts, and other investor-owned utilities. These purchase and exchange agreements are scheduled to expire at various times between 1988 and 2019, thereby reducing the availability of resources for WWP to meet projected customer electrical loads. Specifics on these agreements are outlined in WWP's environmental report (ER) submitted to DOE in September 1988 (WWP 1988).

WWP's transmission system consists primarily of 230-kV and 115-kV circuits, extending from Hot Springs, Montana west to the Columbia River in Washington, south to north-central Idaho, and north to Kettle Falls, Washington. Line-miles of WWP transmission lines are as follows:


WWP SERVICE AREA
BRITISH COLUMBIA
BOUNDARY
PEND ORELLE
BONNERS FERRY
BONNER
FERRY
STEVENS
SANDPOINT
NEWPORT
COLVILLE
SPOKANE
COEUR D'ALENE
KOOTENAI
SHELLEY
LINCOLN
DAVENPORT
SHOSHONE
BENEWAH
ADAMS
LATAH
CLEARWATER
GARFIELD
NEZ PERCE
COLUMBIA
WALLA WALLA
ASOTIN
IDAHO
SEATTLE
COLUMBIA RIVER
WASHINGTON
OREGON

MAP 1-1

230-kV	544 miles
115-kV	1,502 miles
60-kV	7 miles
	2,053 miles

In addition to these transmission facilities, WWP owns and operates 8,654 miles of distribution lines and approximately 200 substations. WWP also has partial ownership of the 500-kV Colstrip Transmission Line in eastern Montana.

The population within WWP's service territory totals about 700,000, with approximately 240,000 individual customers relying on WWP for their electrical services. Due to the availability of low-cost electricity during the 1950s, 1960s, and 1970s, many WWP residential customers installed electric heating systems. As a result, peak loads on WWP's system coincide with cold winter temperatures. WWP's all-time one-hour system peak load of 1,660 MW was established on February 2, 1989. Summer loads are relatively lower than winter loads, because of low use of electricity for air conditioning and irrigation purposes. Average loads in the summer generally range from 650 to 750 MW, with peak loads approaching 1,100 MW; average loads in the winter are usually from 900 to 1,200 MW, with peak loads typically up to 1,400 MW.

1.1.2 B.C. Hydro Overview

B.C. Hydro, a Crown Corporation of the British Columbia provincial government, was formed in the early 1960s by merging the British Columbia Electric Company and the British Columbia Power Commission. A number of other, smaller utilities have since become part of B.C. Hydro, which is currently responsible for the overall planning, generation, and supply of electricity for more than 90 percent of the 2.9 million people of British Columbia, Canada. B.C. Hydro has indicated a willingness to consider firm sales of electricity from existing B.C. Hydro generating facilities to WWP.

1.1.3 Utility Interconnection Overview

Interconnections between utilities are established for one or both of the following reasons:

- to take advantage of various opportunities for the sale and purchase of surplus power, as well as other types of arrangements (e.g., wheeling, flexible off-peak storage); and/or

- to improve the electrical reliability of one or both utilities' systems at a price lower than either utility would have to pay to provide a similar level of reliability on a "stand alone" basis.

If no direct interconnection exists between the two utilities, transmission service must be arranged with a third party who can provide a wheeling path for the transaction. In exchange for providing transmission service, the wheeling party receives compensation. Third parties are often unable or reluctant to provide long-term wheeling services to utilities lacking a direct interconnection, and will often impose restrictions on the wheeling arrangements.

1.2 Purpose and Need

The following discussion of the purpose and need for the proposed Interconnection has been extracted from WWP's ER and the company's 1991 Least Cost Plan, which is available to the public through WWP's Spokane office. Additional details on this topic can be obtained by referring to both documents, which are available for public review at WWP's corporate headquarters in Spokane. The purpose and need section in this EIS is written from WWP's perspective. DOE, in its role as Federal lead agency for the EIS, is charged with analyzing the environmental effects of the proposed Interconnection, but it does not have the responsibility of confirming or justifying the need for the project. However, the Washington Utilities and Transportation Commission and the Idaho Public Utilities Commission will review the purpose and need before the proposed Interconnection is included in WWP's resource acquisition plans.

1.2.1 Purpose of the Project

The primary purpose for the proposed Interconnection would be to provide a transmission path for peaking capacity and energy transfers between the B.C. Hydro system and the WWP system. WWP intends to help meet its customer needs with 20 percent to 40 percent of the proposed Interconnection's capacity. The remaining 60 to 80 percent would be sold to other Pacific Northwest utilities, implementing firm wheeling agreements. WWP is currently in the process of marketing this additional transmission capability to these other utilities. WWP believes the proposed Interconnection would allow it to take advantage of cost-effective peaking capacity and energy resource opportunities that are available in Canada. The hydroelectric nature of B.C. Hydro's resources results in the following additional benefits, which make an interconnection with B.C. to WWP and include:

- the availability of large amounts of less expensive secondary (non-firm) energy under most water conditions;

- the availability of excess peaking capacity to meet peak requirements for WWP and other utilities in the United States; and

- significant amounts of reservoir storage capacity for use during extended periods of drought conditions.

Because of the diversity of the Canadian hydroelectric resources available, WWP believes the proposed Interconnection would provide the Company with significant flexibility in meeting its future peaking capacity and energy requirements, by allowing transfers of up to 800 MW (1,000 MW with the addition of series capacitors) into the WWP system.

Currently, the transmission of peaking capacity and energy between British Columbia utilities and the Pacific Northwest utilities occurs over four BPA-owned transmission lines. Two of these transmission lines (500-kV) interconnect south of Vancouver, British Columbia, and two lines (230-kV) interconnect at Boundary Dam. These facilities are known collectively as the "Northern Intertie." The published transfer capability of the existing interconnections between Canada and the United States approaches 2,000 MW, depending on the time of year; however, B.C. Hydro and BPA are presently studying upgrading the capacity to 2,300 MW. Due to voltage stability restrictions within the B.C. Hydro system, transfer capability is reduced during the winter peak demand period. By 1996, these restrictions will produce periods where the British Columbia to United States transfer capability reduces to near zero, although the Northern Intertie has a 2,300 MW nonfirm rating. Without firm transfer capability, WWP believes that the Pacific Northwest will not be able to utilize firm capacity and energy supplies available in Canada to meet wintertime load requirements.

WWP feels that purchase of transmission service on existing lines between B.C. Hydro and WWP is not a viable alternative at this time for two reasons:

1. Due to the restrictions of the future system to transfer peaking capacity and energy, transmission service may not be available for purchase during the winter peak.

2. Only interruptible wheeling service is available over BPA's transmission system.

Interruptible wheeling service allows BPA to suspend power transmission at any time for BPA priority transactions or BPA power marketing strategies, and thereby precludes long-term firm power agreements between B.C. Hydro and WWP. In order to provide up to 1,000 MW of firm transfer capacity over existing Northern Intertie facilities, additional high voltage transmission lines in British Columbia and/or eastern Washington would be required. Current studies by WWP have identified no opportunity for low cost modifications to the existing transmission system that

would enable the level of firm transfers contemplated by the WWP/B.C. Hydro 230-kV interconnection. Consequently, WWP ownership of transmission facilities to the international boundary is presently foreseen by WWP as one way to ensure a long-term supply of reliable and economical electricity from B.C. Hydro.

The proposed Interconnection is one of several resource alternatives being considered by WWP to meet its customers' electrical needs beyond the mid-1990s. Purchases or exchanges with cogenerators and utilities other than B.C. Hydro, conservation, conversion of electric to natural gas appliances, and upgrades of existing hydropower developments are potential resource alternatives that are currently being evaluated by WWP (see Section 2.6). A strategy that calls for conservation and purchases of energy to meet future load growth has certain advantages to WWP over construction of large central generating stations due to: 1) minimization of WWP capital expenditures and 2) short lead times from project conception to implementation (e.g., about 2.5 years for the construction of a transmission line versus about 6 years for construction of a power plant). These advantages provide WWP with the flexibility to meet load growth with timely resource additions, thus avoiding surpluses (or deficits) that can often result from long lead times associated with generation construction programs.

1.2.2 Need for the Project

WWP's current philosophy is to meet future customer load growth at the least cost to the consumer, while minimizing the financial risk associated with resource acquisition. It is WWP's intent to develop low cost sources of power, thereby keeping rates to its customers as low as possible. Forecasting electric power need has been particularly difficult for WWP in the decade of the 1980s, due to the variability in the local economy and the reduced energy usage by WWP's customers. In order to provide new power resources to meet WWP customer load growth with a minimum of economic risk, WWP has adopted a resource acquisition strategy that stresses flexibility. WWP believes that a WWP-owned transmission interconnection with B.C. Hydro has the potential to meet its customer needs in a flexible, cost-effective manner.

WWP annually develops a long-term (20-year) forecast of average energy and peak loads. The results of this effort serve as the basis for most of the company's resource planning activity. Figure 1-1 shows WWP's 1991 forecast of high, low, and most likely load growth scenarios and the company's estimated long-term net resources (electricity supply). The "high" and "low" load growth scenarios are the maximum (2 percent) and minimum (1 percent) growth rates for loads forecasted by WWP. The "most likely" scenario (1.5 percent) is mid-way between the high and the low. WWP's anticipated annual electricity surplus or deficit is derived from Table 1-1 by subtracting total contract requirements on line 12 from the net resources found on line 38. Forecasted deficits, where electricity demands exceed the available electricity, under the "most

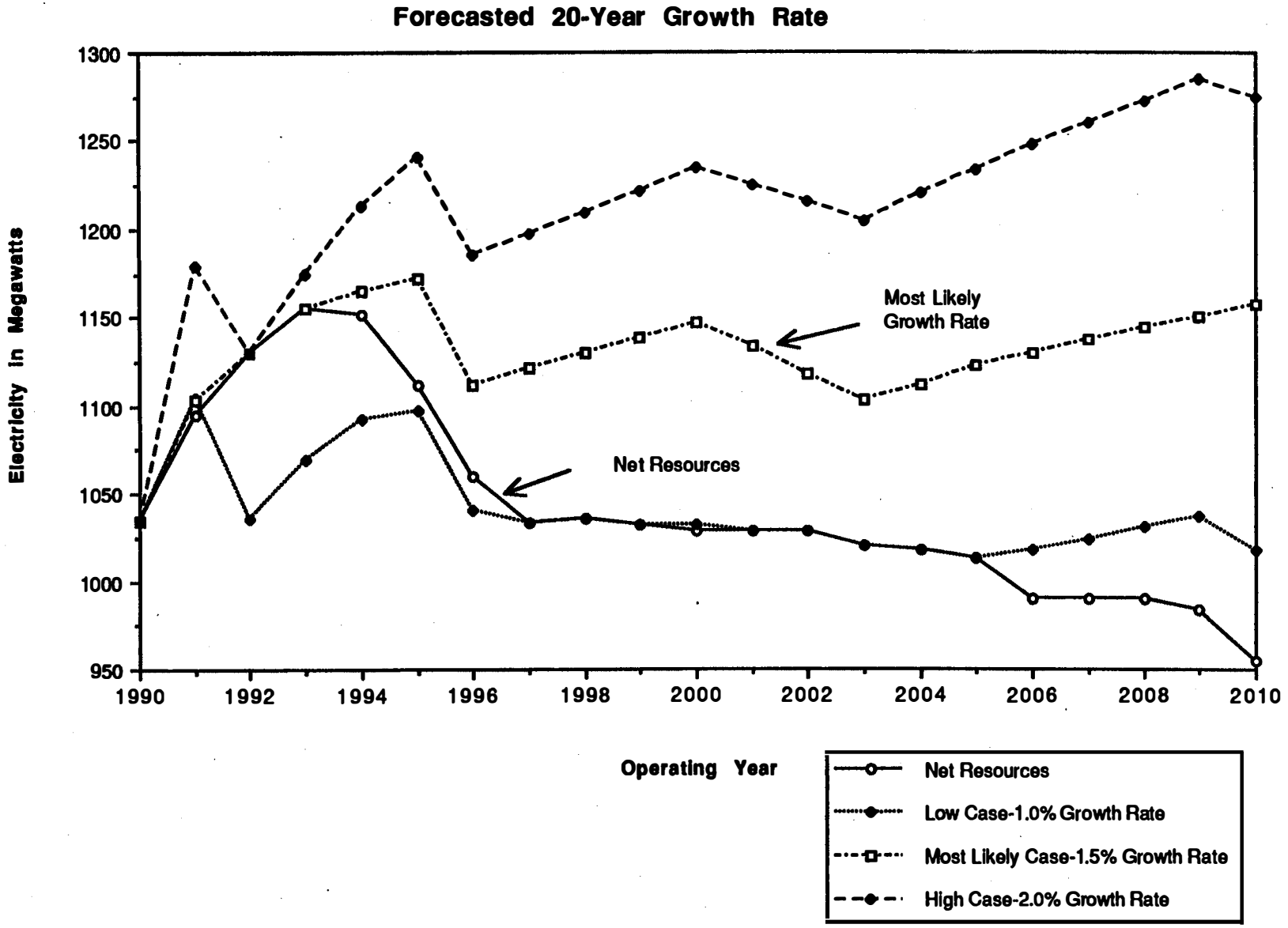


Figure 1-1. Forecasted 20-Year Requirements and Resources

TABLE 1-1

Washington Water Power Requirements and Resources

Figures are megawatts.	-1990-		-1991-		-1992-		-1993-		-1994-		-1995-		-1996-	
	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average
REQUIREMENTS														
1 System Firm Loads	1264	833	1530	879	1626	961	1684	986	1709	996	1728	1003	1746	1010
2 Puget #1	55	28	55	14	0	0	0	0	0	0	0	0	0	0
3 Puget #2	100	75	100	75	100	75	100	75	100	75	100	75	100	75
4 Seattle City Light	0	15	0	15	0	15	0	15	0	15	0	15	0	0
5 PG&E Exchange	0	0	0	25	0	25	0	25	0	25	0	25	0	25
6 PP&L Sandpoint	5	2	5	2	5	2	5	2	5	2	5	2	0	0
7 PP&L WIDCO	9	5	9	5	0	0	0	0	0	0	0	0	0	0
8 BPA-WNP #3	0	27	0	27	0	27	0	27	0	27	0	27	0	27
9 PP&L 1989	50	50	150	50	150	50	150	50	150	50	150	50	0	0
10 LADWP	0	0	0	11	0	0	0	0	0	0	0	0	0	0
11 Interruptible Load	0	0	0	0	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
12 TOTAL REQUIREMENTS	1483	1035	1849	1103	1856	1130	1914	1155	1939	1165	1958	1172	1821	1112
RESOURCES														
13 System Hydro	922	341	922	341	922	341	922	341	922	341	922	341	922	341
14 Contract Hydro	221	108	221	108	221	108	221	108	221	108	221	97	197	85
15 Canadian Entitlement Return	-14	-4	-13	-4	-12	-4	-11	-4	-9	-4	-8	-3	-7	-3
16 Restoration	0	4	0	4	0	4	0	4	0	4	0	4	0	4
17 Small Hydro	7	7	8	8	8	8	8	8	8	8	8	8	8	8
18 Monroe Street Upgrade	0	-3	-6	-5	-6	7	10	11	10	11	10	11	10	11
19 Total Hydro	1136	453	1132	452	1133	464	1150	468	1152	468	1153	458	1130	446
20 Cogeneration	10	9	10	9	75	64	75	64	75	61	71	60	71	60
21 Northeast Combustion Turbine	68	54	68	54	68	54	68	54	68	54	68	54	68	54
22 CSPE	49	16	49	16	45	15	40	14	36	14	32	13	28	13
23 PG&E Exchange	0	0	0	10	150	25	150	25	150	25	150	25	150	25
24 S Cal Edison	80	4	0	0	0	0	0	0	0	0	0	0	0	0
25 Grant Peaking	50	0	0	0	0	0	0	0	0	0	0	0	0	0
26 Entitlement & Supplemental Cap	26	0	26	0	24	0	21	0	19	0	17	0	14	0
27 BPA #39216	80	68	79	67	79	68	80	68	80	68	80	68	80	28
28 BPA-WNP #3	82	27	82	27	82	27	82	27	82	27	82	27	82	27
29 B C Hydro	0	22	100	11	0	0	0	0	0	0	0	0	0	0
30 Montana	0	0	0	36	0	36	0	36	0	27	0	0	0	0
31 Storage Arrangements	0	0	55	6	0	0	0	0	0	0	0	0	0	0
32 Short-Term Purchases	0	25	0	50	0	20	0	42	0	50	0	50	0	50
33 Thermal Centralia	192	163	192	163	192	163	192	163	192	163	192	163	192	163
34 Kettle Falls	47	40	47	40	47	40	47	40	47	40	47	40	47	40
35 Colstrip	210	154	210	154	210	154	210	154	210	154	210	154	210	154
36 TOTAL RESOURCES	2030	1035	2050	1095	2105	1130	2115	1155	2111	1151	2102	1112	2072	1060
37 Reserves	-216	0	-243	0	-253	0	-258	0	-261	0	-263	0	-265	0
38 NET RESOURCES	1814	1035	1807	1095	1852	1130	1857	1155	1850	1151	1839	1112	1807	1060
39 SURPLUS OR DEFICIT	331	0	-42	-8	-4	0	-57	0	-89	-14	-119	-60	-14	-52
LCP MODEL INPUTS:														
Net Contracts without N.E., Thermals or System Hydro		81		119		209		234		230		191		206
Net Resources		833		871		961		986		982		943		958

TABLE 1-1 (Continued)

	Figures are megawatts.	-1997- Peak	-1997- Average	-1998- Peak	-1998- Average	-1999- Peak	-1999- Average	-2000- Peak	-2000- Average	-2001- Peak	-2001- Average	-2002- Peak	-2002- Average	-2003- Peak	-2003- Average
	REQUIREMENTS														
1	System Firm Loads	1762	1017	1779	1023	1792	1031	1812	1040	1834	1051	1857	1061	1879	1071
2	Puget #1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Puget #2	100	75	100	75	100	75	100	75	67	50	33	25	0	0
4	Seattle City Light	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	PG&E Exchange	0	25	0	25	0	25	0	25	0	25	0	25	0	25
6	PP&L Sandpoint	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	PP&L WIDCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	BPA-WNP#3	0	29	0	32	0	32	0	32	0	32	0	32	0	32
9	PP&L 1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	LADWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Interruptible Load	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
12	TOTAL REQUIREMENTS	1837	1121	1854	1130	1867	1138	1887	1147	1876	1133	1865	1118	1854	1103
	RESOURCES														
13	System Hydro	922	341	922	341	922	341	922	341	922	341	922	341	922	341
14	Contract Hydro	197	85	197	85	197	85	197	85	197	85	197	85	197	85
15	Canadian Entitlement Return	-7	-3	-7	-2	-9	-3	-12	-4	-12	-4	-12	-4	-15	-5
16	Restoration	0	4	0	4	0	4	0	4	0	4	0	4	0	1
17	Small Hydro	8	8	8	8	8	8	8	8	8	8	8	8	8	8
18	Monroe Street Upgrade	10	11	10	11	10	11	10	11	10	11	10	11	10	11
19	Total Hydro	1130	446	1130	447	1128	446	1125	445	1125	445	1125	445	1122	441
20	Cogeneration	71	60	71	60	71	60	71	60	71	60	71	60	71	60
21	Northeast Combustion Turbine	68	54	68	54	68	54	68	54	68	54	68	54	68	54
22	CSPE	23	12	23	11	20	8	10	5	9	5	9	5	8	1
23	PG&E Exchange	150	25	150	25	150	25	150	25	150	25	150	25	150	25
24	S Cal Edison	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Grant Peaking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Entitlement & Supplemental Cap	12	0	11	0	10	0	5	0	4	0	4	0	4	0
27	BPA #39216	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	BPA-WNP #3	82	29	82	32	82	32	82	32	82	32	82	32	82	32
29	B C Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Montana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Storage Arrangements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Short-Term Purchases	0	50	0	50	0	50	0	50	0	50	0	50	0	50
33	Thermal Centralia	192	163	192	163	192	163	192	163	192	163	192	163	192	163
34	Kettle Falls	47	40	47	40	47	40	47	40	47	40	47	40	47	40
35	Colstrip	210	154	210	154	210	154	210	154	210	154	210	154	210	154
36	TOTAL RESOURCES	1985	1033	1984	1036	1978	1032	1960	1028	1958	1028	1958	1028	1954	1020
37	Reserves	-266	0	-268	0	-269	0	-271	0	-273	0	-276	0	-278	0
38	NET RESOURCES	1719	1033	1716	1036	1709	1032	1689	1028	1685	1028	1682	1028	1676	1020
39	SURPLUS OR DEFICIT	-118	-88	-138	-94	-158	-106	-198	-119	-191	-105	-183	-90	-178	-83
	LCP MODEL INPUTS:														
	Net Contracts without N.E., Thermals or System Hydro		177		177		173		169		194		219		236
	Net Resources		929		929		925		921		946		971		988

TABLE 1-1 (Continued)

Figures are megawatts.	-2004-		-2005-		-2006-		-2007-		-2008-		-2009-		-2010-	
	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average
REQUIREMENTS														
1 System Firm Loads	1900	1080	1920	1090	1940	1098	1955	1105	1970	1112	1984	1118	1997	1125
2 Puget #1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Puget #2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Seattle City Light	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 PG&E Exchange	0	25	0	25	0	25	0	25	0	25	0	25	0	25
6 PP&L Sandpoint	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 PP&L WIDCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 BPA-WNP#3	0	32	0	32	0	32	0	32	0	32	0	32	0	32
9 PP&L 1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 LADWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Interruptible Load	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
12 TOTAL REQUIREMENTS	1875	1112	1895	1122	1915	1130	1930	1137	1945	1144	1959	1150	1972	1157
RESOURCES														
13 System Hydro	922	341	922	341	922	341	922	341	922	341	922	341	922	341
14 Contract Hydro	197	85	197	80	142	56	142	56	142	56	142	50	67	21
15 Canadian Entitlement Return	-19	-5	-17	-5	-14	-4	-14	-4	-14	-4	-10	-4	-10	-4
16 Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 Small Hydro	8	8	8	8	8	8	8	8	8	8	8	8	8	8
18 Monroe Street Upgrade	10	11	10	11	10	11	10	11	10	11	10	11	10	11
19 Total Hydro	1118	440	1120	435	1068	412	1068	412	1068	412	1072	406	997	377
20 Cogeneration	71	60	71	60	71	60	71	60	71	60	71	60	71	60
21 Northeast Combustion Turbine	68	54	68	54	68	54	68	54	68	54	68	54	68	54
22 CSPE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 PG&E Exchange	150	25	150	25	150	25	150	25	150	25	150	25	150	25
24 S Cal Edison	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 Grant Peaking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 Entitlement & Supplemental Cap	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 BPA #39216	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28 BPA-WNP #3	82	32	82	32	82	32	82	32	82	32	82	32	82	32
29 B C Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 Montana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31 Storage Arrangements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 Short-Term Purchases	0	50	0	50	0	50	0	50	0	50	0	50	0	50
33 Thermal Centralia	192	163	192	163	192	163	192	163	192	163	192	163	192	163
34 Kettle Falls	47	40	47	40	47	40	47	40	47	40	47	40	47	40
35 Colstrip	210	154	210	154	210	154	210	154	210	154	210	154	210	154
36 TOTAL RESOURCES	1938	1018	1940	1013	1888	990	1888	990	1888	990	1892	984	1817	955
37 Reserves	-280	0	-282	0	-284	0	-286	0	-287	0	-288	0	-290	0
38 NET RESOURCES	1658	1018	1658	1013	1604	990	1602	990	1601	990	1604	984	1527	955
39 SURPLUS OR DEFICIT	-217	-94	-237	-109	-311	-140	-328	-147	-344	-154	-355	-166	-445	-202
LCP MODEL INPUTS:														
Net Contracts without N.F., Thermals or System Hydro		234		229		206		206		206		200		171
Net Resources		986		981		958		958		958		952		923

likely" load growth scenario, are predicted by WWP to begin in 1994 (see Figure 1-1). The timing of the forecasted deficits is a function of the actual rate of load growth experienced by WWP. A load growth rate in excess of the "most likely" scenario would hasten the onset of average and peak deficits; conversely, load growth rates lower than those assumed by WWP would delay those deficits.

WWP states that it would implement the proposed Interconnection as a regional resource. Although the proposed Interconnection would have the capability of delivering a maximum of 1,000 MW of power (thermal capacity) into the WWP electric system, WWP is initially planning to operate the project at transfer levels up to 800 MW (capacity without series capacitors). WWP claims this approach would provide the company with the opportunity to delay some of the initial project investments, such as a Series Capacitor Station, but still meet local and regional demands. WWP has conducted informal discussions with Northwest utilities regarding WWP's unused portion of the line, currently estimated at 60 to 80 percent. There is general interest in the remaining capacity, but formal negotiations have not yet begun; therefore, potential users or markets cannot be identified. Additional capacity available from the proposed Interconnection but not required by WWP could be sold or leased to other utilities. WWP would receive payment from these utilities to offset ownership costs of the line and compensate WWP for use of the Interconnection. The benefits to WWP and its customers of a firm purchase of energy and guaranteed capacity must be adequate to offset WWP's share of transmission construction and operating costs over the 50-year life of the project before WWP would commit to construct.

1.3 Permit Requirements

The major permits, licenses, and approvals that would be required for the construction and operation of the proposed Interconnection are listed in Table 1-2. The federal, state, and local agencies responsible for each action are identified in the table. As part of the process of receiving agency permit approvals, WWP must comply with various standard permit requirements. Since these standard procedures or requirements are mandatory, they have been considered to be in place during the impact analysis. In addition, other minor permits or authorizations may be required by responsible agencies, which are not listed on the summary table.

DOE, pursuant to Regulations Order G204-4, implements certain federal laws and issues Presidential permits for the construction, connection, operation, and maintenance of electric transmission facilities that cross the international border. Prior to constructing the proposed Interconnection across the international border, a Presidential permit (10 CFR Part 205.320-329) must be granted to WWP by DOE. The filing for a Presidential permit is required when: 1) a new facility is proposed to cross an international boundary or 2) an existing permitted facility is

Table 1-2

Permit Requirements

Agency	Nature of Action	Project Features
FEDERAL AGENCIES		
Department of Agriculture		
Forest Service	Issue special use permit, including antiquities permits, permits to excavate and remove archaeological resources on National Forest lands (if required), cultural resources clearance permit, and permit for removal of commercial wood products on National Forest lands.	Transmission line ROW, access roads, and staging areas (Proposed Route, Northern Crossover, and Southern Crossover Alternatives only).
	Issue ROW grant across National Forest lands.	Transmission line ROW and access roads (Proposed Route, Northern Crossover, and Southern Crossover Alternatives only).
Department of Energy		
Assistant Secretary for Fossil Energy	Issue Presidential permit.	Transmission line ROW, access roads, and areas (all alternatives).
Department of Interior		
Bureau of Indian Affairs	Consultation regarding construction within Indian Reservation boundaries.	Transmission line ROW and access roads (Western, Northern Crossover, and Southern Crossover Alternatives only).
Bureau of Land Management	Issue ROW grant across BLM lands.	Transmission line ROW and access roads (all alternatives).
	Issue temporary use permit.	Access roads and staging areas (all alternatives).

Table 1-2 (Continued)

Agency	Nature of Action	Project Features
Fish and Wildlife Service	Issue biological opinion on threatened or endangered species of fish, wildlife, or plants (Section 7 of the Endangered Species Act for all federal actions).	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
Department of Defense		
Army Corps of Engineers	Issue nationwide or individual permit(s) under Section 404 of the Clean Water Act for placement of dredged or fill material in waters of the U.S. or their adjacent wetlands.	River, stream, or wetland crossings for access roads (all alternatives).
	Issue permit(s) under Section 10 of the Rivers and Harbors Act for structures affecting navigable waters of the U.S.	Transmission line ROW (Eastern, Western, Northern Crossover, and Southern Crossover Alternatives only).
Department of Transportation		
Federal Aviation Administration	Determination of No Hazard (notice of proposed construction or alteration).	Transmission line (all alternatives).
Federal Highway Administration	Issue permit(s) to cross federal-aid highways.	Transmission line ROW (all alternatives).
SPOKANE TRIBE OF INDIANS		
Spokane Tribal Business Council	Issue permit(s) to cross Spokane Indian Reservation lands.	Transmission line ROW, access roads, and staging areas (Western, Northern Crossover, and Southern Crossover Alternatives only).

Table 1-2 (Continued)

Agency	Nature of Action	Project Features
STATE AGENCIES		
State of Washington		
Department of Ecology	Issue Water Quality Certification/Modification Permit for state water projects.	Transmission line ROW and access roads, where construction activities occur within water resources (all alternatives).
	Authority to substitute a state plan for local regulation of shorelines under a conditional use.	Transmission line ROW when crossing "shorelines of the state" (water areas, including reservoirs, and their associated wetlands).[1]
	Issue debris or slash burning permit.	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
Department of Natural Resources	Issue permit for construction on state-owned land.	Transmission line ROW, access roads, and staging areas (all alternatives).
	Approval of Forest Practice Application prior to timber removal on forest land.	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
	Approval of Slash Predisposal Plan prior to development.	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
Department of Transportation	Issue permit(s) to cross or traverse state highways.	Transmission line ROW (all alternatives).
	Transportation permit(s).	Construction materials transport (all alternatives).

Table 1-2 (Continued)

Agency	Nature of Action	Project Features
Department of Wildlife	Issue Hydraulic permit.	Access roads and anywhere construction activities occur within water resources (all alternatives).
	Issue biological opinion on state rare or endangered wildlife species.	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
Occupational Safety and Health Administration	Issue permit for occupational safety and health during construction, operation, and maintenance activities.	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
State Historic Preservation Office	Issue cultural resource clearance, required prior to construction under the National Historic Preservation Act.	Transmission line ROW, access roads, staging areas, and substation sites (all alternatives).
LOCAL AGENCIES		
Lincoln County	Issue conditional use permit for line location within Agricultural Zone and line size equal to or greater than 230-kV.	Transmission line ROW (Western, Northern Crossover, and Southern Crossover Alternatives only).
	Approval under the Shoreline Management Act and Guidelines.	Transmission line ROW, access roads, and staging areas, when crossing all "shorelines of the state" (all water areas, including reservoirs and their associated wetlands)[1] (Western, Northern Crossover, and Southern Crossover Alternatives only).
Pend Oreille County	Approval under the Shoreline Management Act and Guidelines.	Transmission line ROW, access roads, and staging areas, when crossing all "shorelines of the state" (all water areas including reservoirs, and their associated wetlands)[1] (Boundary Dam Variation only).

Table 1-2 (Continued)

Agency	Nature of Action	Project Features
Spokane County	Administrative approval under Spokane County Zoning Code.	Transmission line ROW, access roads, staging areas, and substation site (all alternatives).
	Approval for the design and location within the Airport Overlay Zone of airports. Height variance from the County Planning Director regarding height greater than permitted in the Airport Overlay Zone at Spokane International Airport.	Transmission line (Eastern, Western, Northern Crossover, and Southern Crossover Alternatives only).
	Approval under the Shoreline Management Act and Guidelines.	Transmission line ROW, access roads, and staging areas, when crossing all "shorelines of the state" (all water areas, including reservoirs, and their associated wetlands)[1] (Eastern Alternative only).
Stevens County	Approval under the Shoreline Management Act and Guidelines.	Transmission line ROW, access roads, and staging areas, when crossing all "shorelines of the state" (all water areas of the state, including reservoirs, and their associated wetlands)[1] (Western, Northern Crossover, and Southern Crossover Alternatives only).
City of Spokane	Approval under the Shoreline Management Act and Guidelines.	Transmission line ROW, access roads, and staging areas, when crossing water resources of statewide significance (Chattaroy Variation only).

[1] Shorelines do not include: (i) shorelines on segments of streams upstream of a point where the mean annual flow is 20 cubic feet per second or less and the wetlands associated with such upstream segments; and (ii) shorelines on lakes less than 20 acres in size and wetlands associated with such small lakes.

proposed to change ownership. In the event that an existing, permitted facility is proposed to be modified, an amendment may be required to that Presidential permit. For example, if WWP were to choose to increase maximum power delivery from 800 MW to 1,000 MW and construct a Series Capacitor Station, additional NEPA documentation and an amendment to the Presidential permit would be required.

DOE would also comply with those major federal and DOE environmental laws and regulations that apply to the proposed Interconnection. These include the Endangered Species Act, the Fish and Wildlife Coordination Act, DOE Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022), National Pollutant Discharge Elimination System regulations for Storm Water Discharge (40 CFR Parts 122, 123, and 124), the National Historic Preservation Act, the American Indian Religious Freedom Act, the Farmland Protection Policy Act and Impacts on Prime and Unique Farmlands (45 FR 59186), the Safe Drinking Water Act, and Health and Safety Impacts to Workers (DOE EH-25 memo of 6/10/88).

Export of electricity to Canada would be covered under Section 202(e) of the Federal Power Act of 1935 and would require a separate application for authority from DOE (previously from the Federal Power Commission). Such an application would require processing and approval separate from the Presidential permit. In determining whether or not to allow the export, the DOE must consider the impact of the proposed export on the operation of facilities under its jurisdiction; in this case, the WWP proposed Interconnection. WWP would apply for a permit to export power to Canada, if such exportation is ultimately determined to be appropriate, economical, and in the best interests of WWP and B.C. Hydro. It should be noted, however, that BPA and other federal and state agencies are exempted from the provisions of the Federal Power Act. Therefore, if BPA were to seek use of the WWP facilities to return Canadian entitlements DEIS_under the Columbia River Treaty, the DOE would not review BPA's ability to affect the export but would only consider the impact of the export on the operation of the WWP proposed transmission Interconnection.

The Proposed Route for the Interconnection would cross National Forest land managed by the U.S. Forest Service and a small amount of public land managed by the Bureau of Land Management (BLM). Federal right-of-way (ROW) grants issued for the proposed Interconnection would: 1) contain general mitigation measures, as well as a requirement that no construction occurs until a detailed Construction and Use (CU) Plan has been developed for Federal lands; 2) require that the CU Plan be submitted to a designated Federal authorized officer for approval; and 3) provide a Notice to Proceed for the project. The Forest Service would conduct an environmental and engineering review of the CU Plan. Site-specific mitigation measures would be developed during this review and would be included in the Notice to Proceed. The Federal

authorized officer would also inspect and monitor construction to assure compliance with the Notice to Proceed and all other stipulations. Minimally, the plan would include:

- the alignment of the transmission line, contract specifications, access road locations, cuts and fills, vegetation clearing for the ROW, and any other related activities;
- a reclamation plan, including a description of the clearing and maintenance procedures that would be used along the ROW;
- environmental protection plans to be implemented during construction, operation, and maintenance; and
- a fire plan, including responsibility descriptions for fire prevention and suppression, attack procedures, tools, equipment, and manpower.

1.4 Environmental Effects Abroad of Major Federal Actions

As discussed in Section 1.1, DOE is responsible for preparing an EIS for the proposed Interconnection. The analysis contained in this EIS will be restricted to those environmental impacts that would occur within the United States. The British Columbia portion of the proposed Interconnection would be subject to Canadian regulatory authority. Impacts that could occur in Canada will not be discussed for the reasons outlined below.

Executive Order 12114, entitled Environmental Effects Abroad of Major Federal Actions, was issued on July 4, 1979 (44 Fed. Reg. 1957). This Executive Order represents the exclusive and complete determination by the Executive Branch on the procedural and other actions to be taken by federal agencies to further the purposes of NEPA with respect to the environment outside the United States, its territories, and possessions. The major federal actions included under this Executive Order that would require the analysis of environmental effects outside of the United States fall into the following four categories:

1) those actions significantly affecting the environment of the global commons outside the jurisdiction of any nation;
2) those actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action;
3) those actions significantly affecting the environment of a foreign nation, which provide to that nation specified products or physical projects which would be prohibited or strictly regulated in the United States; and/or

4) those actions significantly affecting natural or ecological resources of global importance designated for protection under the Executive Order by the President.

For resources protected by international agreement binding on the United States, the Secretary of State may designate such resources for protection under this Executive Order. The Executive Order also designates a series of specific exceptions to its provisions, including actions not having a significant effect on the environment outside the United States as determined by the federal agency.

In making its determination whether an action will have a significant effect on the environment outside the United States, DOE may adopt all or part of existing environmental analyses. These analyses may be prepared by foreign countries or international organizations and may be adopted when DOE believes that these analyses are adequate in scope and content to make an independent determination.

In the present case, the major federal action is to grant (in whole or in part) or deny a Presidential permit for the construction, connection, operation, and maintenance of electric transmission facilities that will connect at the international boundary of the United States. The Applicant for the Presidential permit proposes to construct, connect, operate, and maintain a transmission line and related facilities completely within the United States. These activities do not fall under the jurisdiction of Executive Order 12114 because none of the four specified categories stated above is the subject of the proposed action. Therefore, the Executive Order does not apply, due to the following reasons:

- The proposed action does not have a significant adverse effect on the global commons outside the jurisdiction of any nation.

- The export of electric power to the United States by Canada is the reason the Applicant needs to construct the proposed facilities; thus, Canada is involved in the proposed action.

- The proposed action does not involve the export to Canada of any product or physical project.

- Neither the President nor the Secretary of State has designated any of the relevant natural or ecological resources to be subject to protection under the Executive Order.

Further, the British Columbia portion of the proposed Interconnection would be subject to approval and licensing by the National Energy Board (NEB) of Canada. It is expected that a

public hearing would be convened by the NEB to review the justification of the project and the acceptability of the selected route. The export of electrical energy over the transmission interconnection would require an Energy Removal Certificate from the provincial Ministry of Energy, Mines and Petroleum Resources. Resource agency comments would be requested through an Interministerial Referral Process in which each agency receives project information and route maps.

1.5 Environmental Review Process

The first step in the EIS process, regulated by NEPA and the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508), is to publish in the Federal Register a Notice of Intent (NOI) to prepare an EIS. The NOI for the proposed Interconnection was published on April 12, 1988 (Federal Register Vol. 53, No. 70) and subsequently sent to appropriate federal agencies and others for their comments.

Scoping is the next step in the environmental review process. The purpose of scoping is to determine the significant issues and concerns related to the proposed action and alternatives that should be addressed in the EIS. Public scoping meetings were held in Spokane, Colville, and Newport, Washington on May 3, 4, and 5, 1988, respectively. DOE representatives opened each meeting by explaining the meeting's purpose, the role of the federal government, and the EIS process. A WWP representative then gave a brief description of the proposed project and the project alternatives. The Eastern and Western Alternatives and the associated variations (see Section 2.0) were addressed at the scoping meetings; WWP had designated the Western Alternative as the Company's Proposed Route. An information handout was then distributed, and the remainder of each meeting was dedicated to speakers who presented verbal comments on the proposed project and the issues they would like to see addressed in the EIS. DOE requested that all additional written comments on the scope of the environmental analysis be received by May 27, 1988. A total of 50 participants made comments at the 3 scoping meetings. Subsequent to the meetings, 38 comment letters were submitted to DOE. These comments have been used in developing the topics included in this final EIS (FEIS) and were used by the staff in conducting the analysis of environmental impacts.

Following the public and agency scoping meetings, an Implementation Plan was prepared, which summarized the proposed Interconnection, outlined issues to be addressed in the EIS, and discussed the subsequent procedures for the EIS preparation. While all alternatives remained under consideration, WWP then designated the Eastern Alternative as its Proposed Route in mid-1988. Approximately 246 copies of the Implementation Plan were made available to the public in March 1989.

Approximately 650 copies of the DEIS were distributed by the DOE to interested agencies and members of the public beginning January 12, 1990. The public had the opportunity to attend public hearings in Spokane, Washington on January 31, 1990 and in Newport and Colville on February 1, 1990; and/or to submit formal written comments on the DEIS. A total of 56 speakers presented comments at the public hearings, and DOE received a total of 71 written comment letters during the 72-day public comment period. Substantive comments and responses are presented in Section 5.0 of this FEIS.

On March 2, 1991, WWP formally notified the DOE that the company was amending its application for a Presidential permit for the construction of the WWP/B.C. Hydro Transmission Interconnection Project. The revised Proposed Route would now terminate at WWP's existing Beacon Substation located northeast of Spokane instead of WWP's originally proposed termination point at the planned Marshall Substation located southwest of Spokane. As currently proposed, construction of the Marshall Substation would not be authorized as part of the Presidential permit action. After reviewing WWP's amendment, DOE determined that it would be appropriate to prepare a supplemental draft EIS (Supplemental DEIS), which was published February 1, 1992 addressing the new proposed 5.6 miles of route and comparing the new Proposed Route (international boundary to Beacon Substation) to the other alternatives previously analyzed in the DEIS, including the originally proposed international boundary to Marshall Substation route. The alternative routes, the associated variations, and route options are presented in Section 2.0 of this FEIS. During a 68-day public comment period on the Supplemental DEIS, DOE received 7 comment letters. Following the public comment period, DOE prepared this FEIS containing responses to comments on both the DEIS and the Supplemental DEIS.

PROPOSED ACTION/ROUTE AND ALTERNATIVES CONSIDERED

2.0

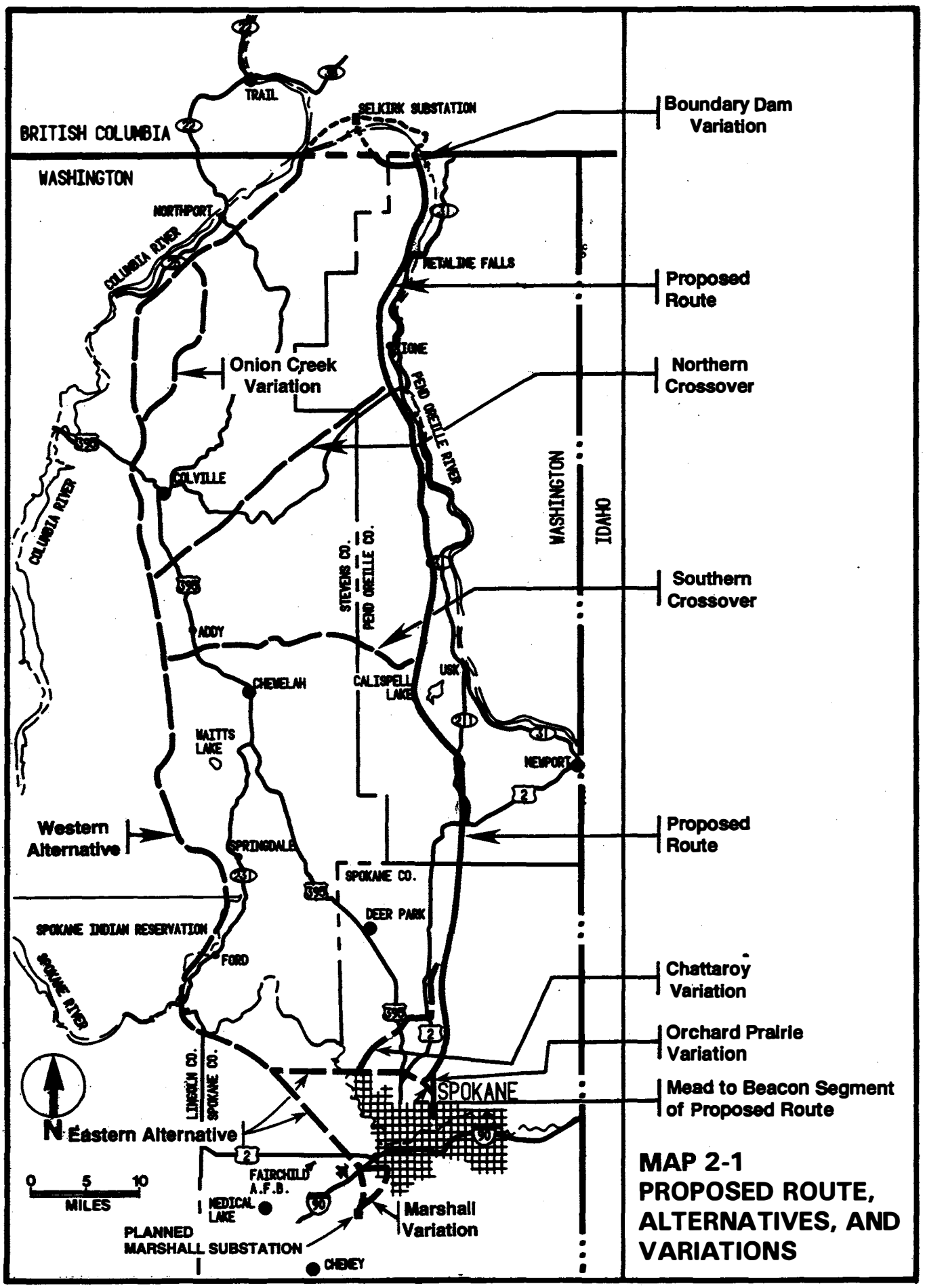
2.0 PROPOSED ACTION/ROUTE AND ALTERNATIVES CONSIDERED

The proposed Interconnection would consist of a new double-circuit, alternating current (AC), 230-kilovolt (kV) transmission line constructed between WWP's existing Beacon Substation and the United States-Canada international boundary. The B.C. Hydro portion of the transmission line (5.3 miles) would terminate at the existing Selkirk Substation. The station is located approximately 9.5 miles southeast of Trail, British Columbia, and about 4.1 miles from the international boundary. WWP would be responsible for its share of the costs and construction within the United States; B.C. Hydro would be responsible for the cost and construction of transmission and terminal facilities within Canada.

A wide range of alternative locations for the proposed Interconnection have been considered in this EIS. These alternatives have been arranged in a categorical manner to clearly present the alternatives to the public and to simplify the comparison of impacts among alternatives. The first category is alternative routes, which consist of five complete transmission line routes between the United States-Canada border and a terminating substation. All five alternative routes are compared to each other. The second category is composed of five variations, which are short, (from 1.0 to 18.3 miles in length) modified alignments along the alternative routes. Variations are compared against the segment of the alternative route that would be replaced. The third category is route options, which occur only along the existing BPA right-of-way (ROW) located on the eastern side of the study area and would apply only to the Proposed Route and the Eastern Alternative. A listing of the alternative routes, variations, and route options is presented below, and each is shown on Map 2-1 and described in detail in the following sections. Miles of each county crossed by these project routes are listed in Table 2-1.

- Alternative Routes
  - Proposed Route
  - Eastern Alternative
  - Western Alternative
  - Northern Crossover Alternative
  - Southern Crossover Alternative

- Variations
  - Boundary Dam Variation
  - Orchard Prairie Variation
  - Chattaroy Variation
  - Marshall Variation



MAP 2-1
PROPOSED ROUTE, ALTERNATIVES, AND VARIATIONS

Table 2-1

Counties Crossed by the Proposed and Alternative Routes, Variations, and Route Options for the WWP/B.C. Hydro Transmission Interconnection (Miles)

County	Proposed Route	Eastern Alternative	Western Alternative	Northern Crossover Alternative	Southern Crossover Alternative
Pend Oreille	71.8	71.8	--	29.0	57.3
Stevens	1.9	1.9	93.4	70.2	57.7
Spokane	28.5	54.2	25.7	25.7	25.7
Lincoln	--	--	2.0	2.0	2.0
Total Miles	102.2	127.9	121.1	126.9	142.7

County	Boundary Dam Variation	Segment of Proposed Route Replaced	Orchard Prairie Variation	Segment of Proposed Route Replaced	Eastern Route Option	Segment of Proposed Route Replaced	Western Route Option	Segment of Proposed Route Replaced	Chattaroy Variation	Segment of Eastern Alternative Replaced	Marshall Variation	Segment of Eastern Alternative Replaced	Union Creek Variation	Segment of Western Alternative Replaced
Pend Oreille	1.0	3.2	--	--	69.3	68.8	68.8	68.8	--	--	--	--	--	--
Stevens	--	1.9	--	--	21.7	23.7	21.7	23.7	--	--	--	--	18.3	17.2
Spokane	--	--	2.0	3.5	--	--	--	--	16.3	17.7	7.1	4.3	--	--
Lincoln	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Miles	1.0	5.1	2.0	3.5	91.0	92.5	90.5	92.5	16.3	17.7	7.1	4.3	18.3	17.2

- Onion Creek Variation

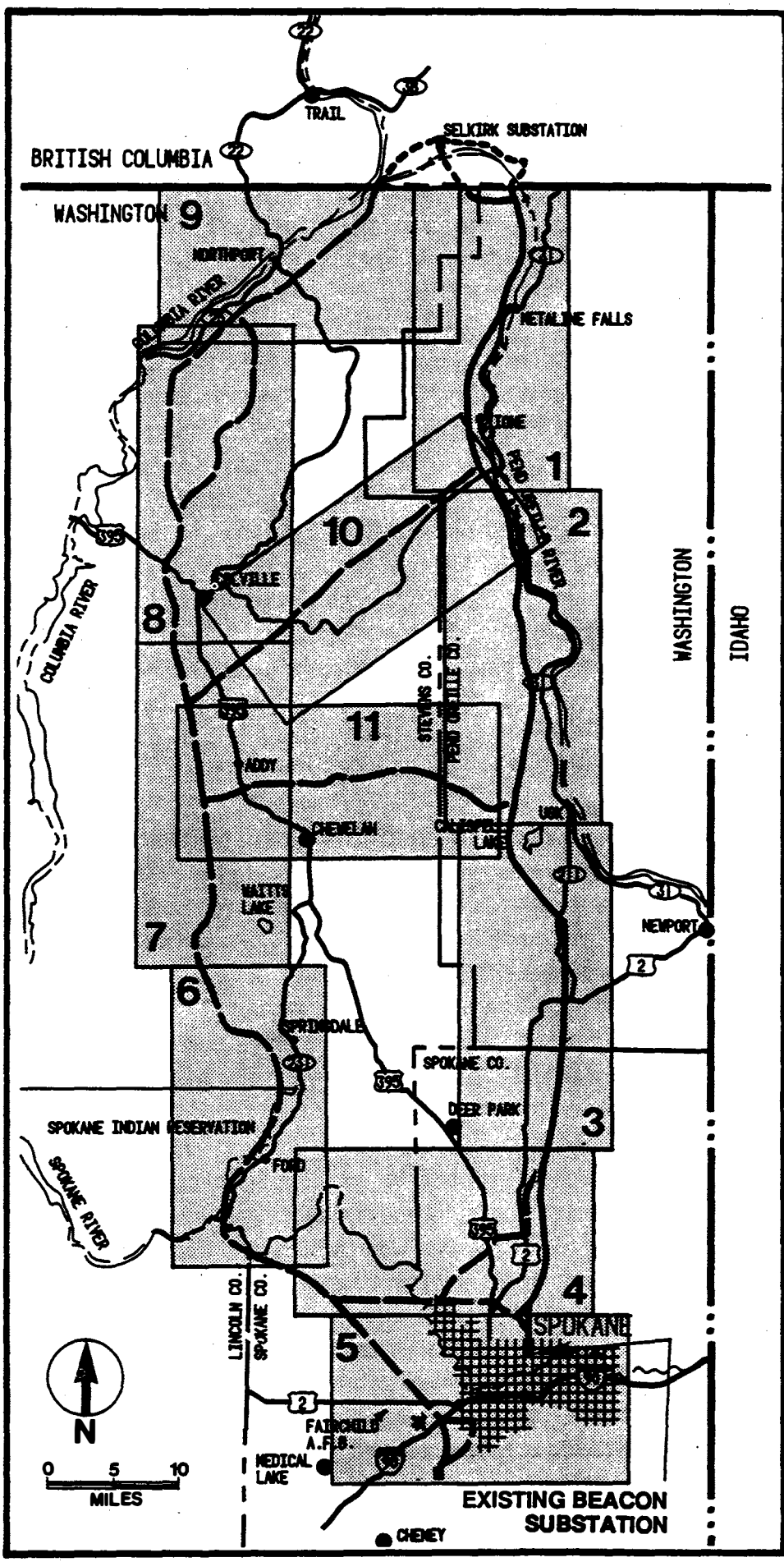
- Route Options
  - Eastern Route Option
  - Western Route Option

2.1 Description of the Proposed Route (Including the Boundary Dam and Orchard Prairie Variations and the Eastern and Western Route Options)

WWP's Proposed Route for the Interconnection (see Map 2-1, solid line) is currently the route that terminates at the existing Beacon Substation. The Proposed Route previously discussed in the DEIS is referred to in the Supplemental DEIS and FEIS as the Eastern Alternative, which would terminate at the planned Marshall Substation. WWP's Proposed Route is indicated on Map 2-1 and on the detailed location Map 2-2, Sheets 1 through 5, presented at the back of this document. The sheet index for Map 2-2 is shown on the following page.

The Proposed Route originates at the United States-Canada boundary in the northeastern corner of Stevens County (see Map 2-2, Sheet 1). The route proceeds east from the international boundary for 1.9 miles to the Pend Oreille County line and then east to a point directly west of Boundary Dam. The route then turns south, paralleling the Bonneville Power Administration (BPA) Bell-Boundary #1 and #2 230-kV circuits on the west side of the ROW to a point near Sacheen Lake where it crosses to the east side of the ROW. BPA currently maintains an undeveloped 125-foot ROW adjacent to and east of the existing transmission circuits between Metaline and Box Canyon Dam (see Map 2-2, Sheet 1). South of Box Canyon Dam to Chattaroy, the undeveloped ROW is located adjacent to and west of the BPA circuits (see Map 2-2, Sheets 1-4). The Proposed Route would parallel the undeveloped BPA corridor from Box Canyon Dam located north of Ione to the point where the route crosses over to the east side of the existing BPA ROW near Sacheen Lake (see Map 2-2, Sheets 1-3). The Proposed Route is approximately 102.2 miles in length between the international boundary crossing near Boundary Dam and the Beacon Substation.

WWP's preferred alternative for the southern terminus of the Proposed Route in the United States changed from the planned Marshall Substation site located southwest of Spokane (as described in the DEIS) to the existing Beacon Substation located northeast of Spokane. This amendment would eliminate 31.3 miles of the Proposed Route previously outlined in the DEIS between Mead and the planned Marshall Substation. The new route segment would add a total of 5.6 miles of transmission line from Mead to the Beacon Substation, resulting in an overall 25.7-mile decrease in line length for the Proposed Route (as described in the Supplemental DEIS). Map 2-3 depicts this route change for the new Mead to Beacon route segment. The segment originates at the



MAP 2-2
SHEET INDEX

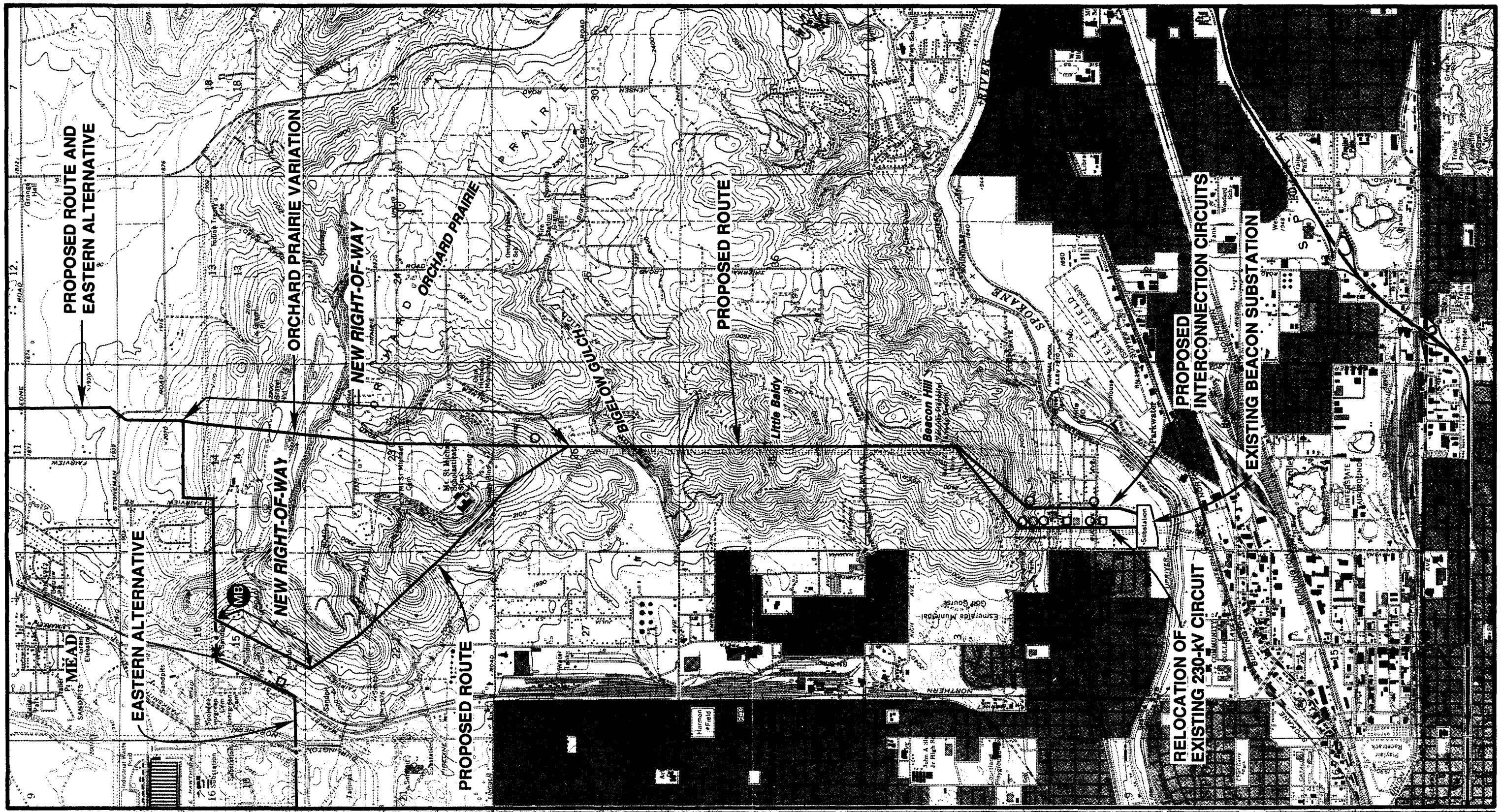
Note:
Sheets 1 through 11 are found at the back of this document.

junction point where the transmission line corridor would turn southwest from the four existing ROWs located south of Mead. The route segment would require approximately 0.5 mile of new ROW to WWP's existing ROWs that travel southeast. As shown in Map 2-3, the Proposed Route segment would then turn south, paralleling existing ROWs the remaining 5.1 miles to the Beacon Substation.

Variations associated with WWP's Proposed Route include the Boundary Dam and Orchard Prairie Variations. The Boundary Dam Variation is a short 1.0-mile segment, located in Pend Oreille County. This variation proceeds south from the international boundary, crossing the Pend Orellle River to rejoin the Proposed Route at Boundary Dam (see Map 2-2, Sheet 1). The Orchard Prairie Variation (see Map 2-3) would travel directly south from a point located southeast of Mead joining with the existing ROWs directly north of Bigelow Gulch. The Orchard Prairie Variation would require 2.0 miles of new transmission ROW. The corresponding segments of the Proposed Route and the Mead to Beacon route replaced by the Orchard Prairie Variation total approximately 3.5 miles in length, of which all but 0.5 mile would be located on existing transmission line ROWs. The total line length for the Proposed Route, using the Orchard Prairie Variation would be approximately 100.7 miles, compared to the total 102.2 miles of route, using the corresponding segment of the Mead to Beacon segment. Both the Mead to Beacon route segment and the Orchard Prairie Variation would cross privately-owned property.

WWP is also considering the opposite side (east or west as appropriate) of the existing BPA ROW as possible route options to the Proposed Route. The Eastern and Western Route Options involve following the east or west side of the existing BPA corridor, respectively, for the entire distance between Boundary Dam and a point located southeast of Mead near the Mead to Beacon route segment (See Map 2-2, Sheets 1-4). The two route options examine the differences in impacts between 100 percent east-side and west-side locations. The Eastern Route Option totals 91.0 miles in length and the Western Route Option travels 90.5 miles, as compared to the segment of the Proposed Route that these two route options would replace, which totals 92.5 miles.

Changing the project terminus from the planned Marshall Substation to the existing Beacon Substation would require reconfiguring three of the existing transmission lines at the Beacon Substation site. Currently, four 230-kV and three 115-kV WWP transmission circuits exit north from the Beacon Substation located on four wood pole H-frame structures and two steel lattice structures. Reconfiguration of the three eastemmost 230-kV circuits would require the following: 1) one 230-kV circuit would be removed from the existing steel lattice structure and reconstructed in a double-circuit configuration with an adjacent 115-kV transmission line; 2) the second 230-kV circuit would then be added to the adjacent single-circuit 230-kV line, resulting in a double-circuit line located on a steel lattice structure along the eastern edge of the ROW; and 3) the proposed



RESOURCE INFORMATION:

- ○ Residence less than 100 feet from edge of ROW
- □ Commercial or Major Industrial Building less than 100 feet from edge of ROW
- ✕ Gravel Pit

0 1000' 5000'

one mile

N

MB START OF MEAD TO BEACON ROUTE SEGMENT

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Mead to Beacon Route Segment of Proposed Route

MAP 2-3

double-circuit 230-kV Interconnection line would then be placed on the ROW made available from the proposed reconfigurations, occupying the westernmost steel lattice structure (see Figure 2-1).

The Beacon Substation has been a major transmission and distribution facility for WWP since 1945. The Beacon Substation facility is located directly east of Havana Street and due north of the Spokane River, in Spokane County (see Map 2-3). Beacon was developed on approximately 50 acres of land. The facilities that are proposed for the Interconnection project include only the new 230-kV line terminal positions, with no expansion of the current property boundary required. The 230-kV Interconnection would approach the substation from the north along the eastern side of the existing ROWs, terminating within the substation fenced area. During project operation, the Beacon Substation would not be manned. Electrical equipment can be remotely controlled from WWP's operations center. The proposed Interconnection would be incorporated into this current system.

The November 1997 completion date for the proposed Interconnection was chosen by WWP to provide electrical power resources to meet its customer needs in 1998 and beyond. The major project activities are scheduled by phases to provide WWP milestone dates for evaluating project status and determining whether to proceed with the next phase. Completion in 1997 would provide a transmission path for energy purchased to meet WWP's 1998 winter peaking period. Changes in projected electrical loads or other factors affecting the timing and feasibility of the proposed Interconnection could alter this schedule.

2.2 Alternatives Considered

Project alternatives consist of alternative transmission line routes and the applicable variations and route options. These are presented as a comparison to the new Proposed Action/Route. Alternative routes are described in detail, except when common with the Proposed Route. The Proposed Route and all alternatives are shown on Map 2-1; areas where the routes are common or different can be quickly determined from this map. The No Action Alternative is also described at the end of this section.

2.2.1 Description of the Eastern Alternative (Including the Boundary Dam, Chattaroy, and Marshall Variations and the Eastern and Western Route Options)

The Eastern Alternative for the proposed Interconnection (see Map 2-4) is the same route as that described for the Proposed Route from the United States-Canada boundary south to Mead (see Map 2-2, Sheets 1-5). At this point, the Eastern Alternative then proceeds west and aligns with

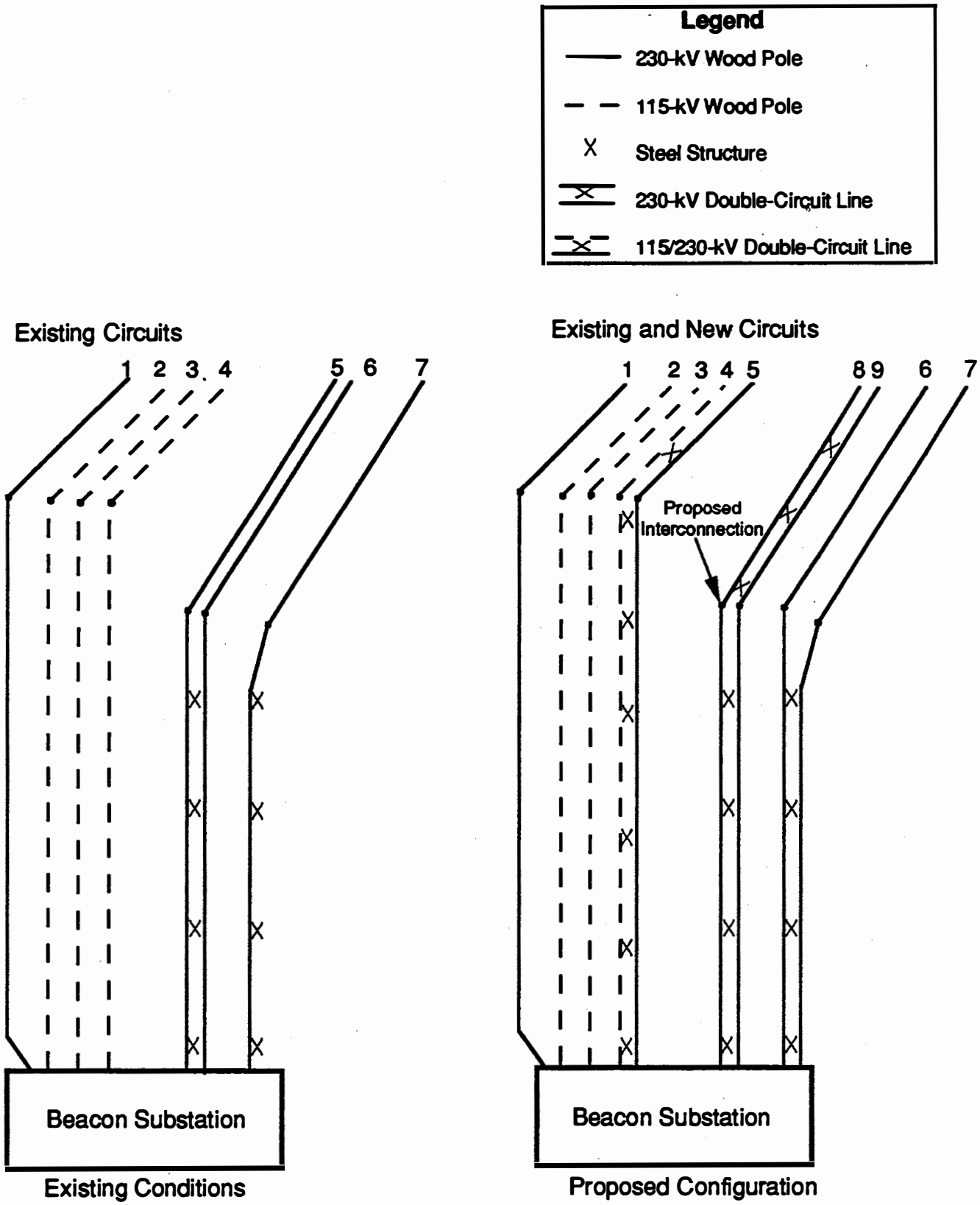
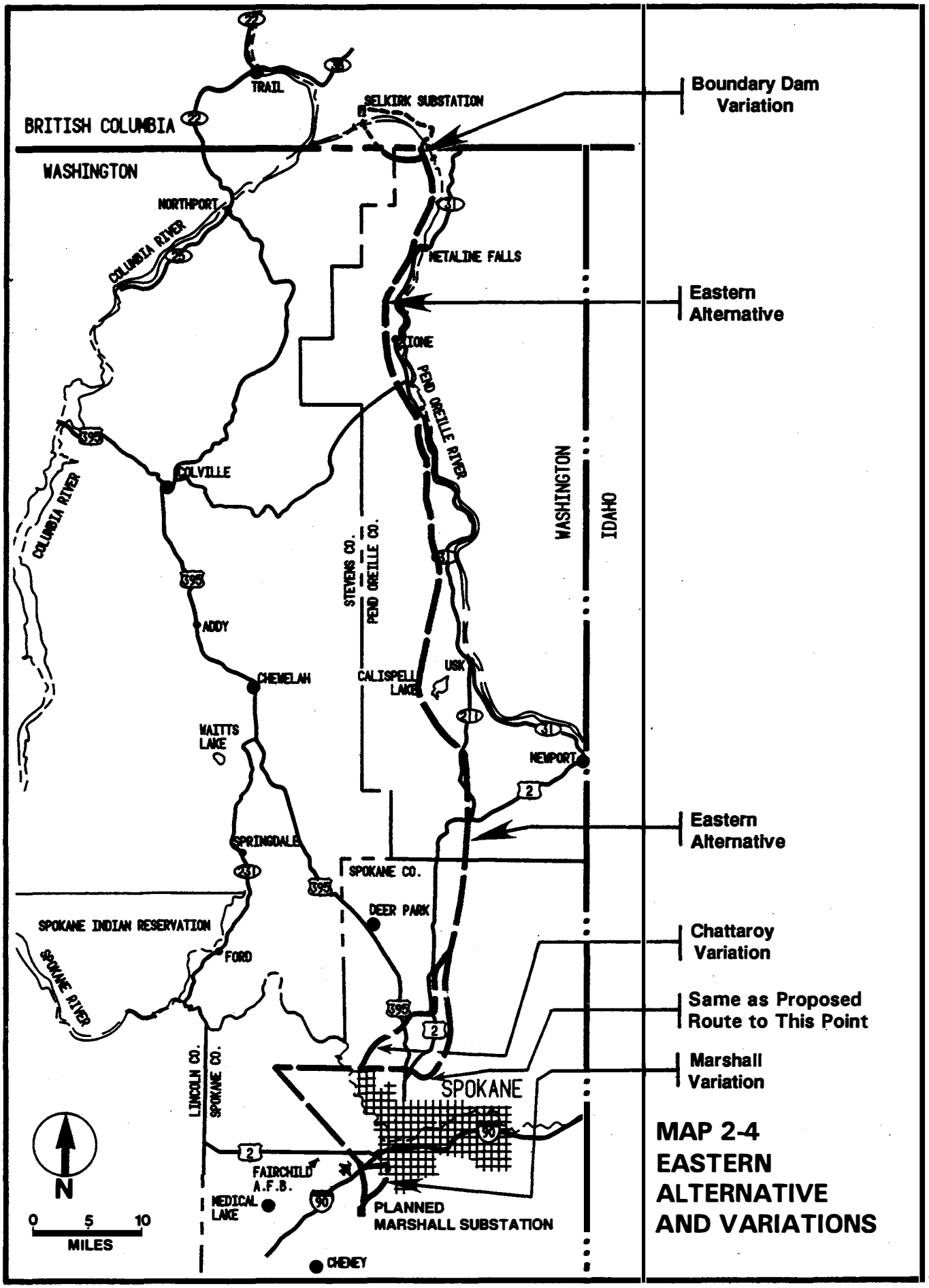


Figure 2-1. WWP Proposed Line Reconfigurations Near the Beacon Substation


BRITISH COLUMBIA
WASHINGTON
TRAIL
SELKIRK SUBSTATION
NORTHPORT
COLUMBIA RIVER
METALINE FALLS
IONE
PEND OREILLE RIVER
COLVILLE
COLUMBIA RIVER
STEVENS CO.
PEND OREILLE CO.
WASHINGTON
IDAHO
ADDY
CHEWELAH
CALISPELL LAKE
USK
WAITTS LAKE
NEWPORT
SPRINGDALE
SPOKANE CO.
DEER PARK
SPOKANE INDIAN RESERVATION
FORD
SPOKANE RIVER
LINCOLN CO.
SPOKANE CO.
SPOKANE
FAIRCHILD A.F.B.
MEDICAL LAKE
PLANNED MARSHALL SUBSTATION
CHENEY
N
0 5 10
MILES
Boundary Dam Variation
Eastern Alternative
Eastern Alternative
Chattaroy Variation
Same as Proposed Route to This Point
Marshall Variation
MAP 2-4
EASTERN ALTERNATIVE AND VARIATIONS

an existing WWP 115-kV ROW until it turns southeast at Four Mound Prairie, located approximately midway between Long Lake Dam and the Spokane International Airport (see Map 2-2, Sheet 5). The Eastern Alternative continues southeast along existing WWP 115-kV transmission facilities, passing directly east of the Spokane International Airport. Upon crossing Interstate-90, the Eastern Alternative turns south, parallels a short section of an existing WWP 115-kV transmission facility, and terminates at the proposed substation site near Marshall. The planned Marshall site would require substation construction, as discussed in the DEIS.

The Eastern Alternative is approximately 127.9 miles in length between the international boundary crossing near Boundary Dam and the planned Marshall Substation site. Three variations and two route options associated with this alternative include the Boundary Dam, Chattaroy, and Marshall Variations and the Eastern and Western Route Options. The route descriptions for the Boundary Dam Variation and the Eastern and Western Route Options would be the same as that described for the Proposed Route (see Map 2-2, Sheets 1-4). The miles of each county crossed by this alternative and its variations and route options are presented in Table 2-1.

The Chattaroy Variation (see Map 2-2, Sheet 4) departs from the Eastern Alternative south of Chattaroy, and crosses southwest to the abandoned Burlington Northern Railroad ROW adjacent to U.S. Highway 2. The variation follows the railroad ROW south to a point northwest of Colbert where it proceeds west on a distribution ROW to an existing Bell-Boundary line and then southwest to U.S. Highway 395. The 7.1-mile route continues southwest, crossing the Little Spokane River and Little Spokane River Natural Area before turning south to join the Eastern Alternative on an existing WWP transmission ROW. This variation totals 16.3 miles.

The Marshall Variation (see Map 2-2, Sheet 5) leaves the Eastern Alternative immediately south of I-90 and proceeds east, paralleling existing WWP 115-kV transmission facilities to an abandoned Union Pacific Railroad ROW. The 7.1-mile route follows the ROW southwest to the planned Marshall Substation site.

The terminal for the Eastern Alternative would be the planned 230/115-kV Marshall Substation located in southwest Spokane County (see Map 2-2, Sheet 5). If the Eastern Alternative is approved by the Department of Energy (DOE), the Marshall Substation would be authorized for construction; however, WWP is not currently requesting authorization for the Marshall Substation under the Presidential permit application (see Section 2.4).

2.2.2 Description of the Western Alternative (Including the Onion Creek and Marshall Variations)

The Western Alternative (see Map 2-5 and Map 2-2, Sheets 9, 8, 7, 6, 4, and 5, respectively, located at the back of this document) begins at the international boundary crossing near Waneta Customs and travels east of Franklin D. Roosevelt Lake (Columbia River), passing to the east of Northport. The route continues southwest and turns south through Swede's Pass, crossing the Colville River northwest of Colville. This alternative continues south through the easterly foothills of the Huckleberry Range, which is located west of the Colville River Valley (see Map 2-2, Sheet 8).

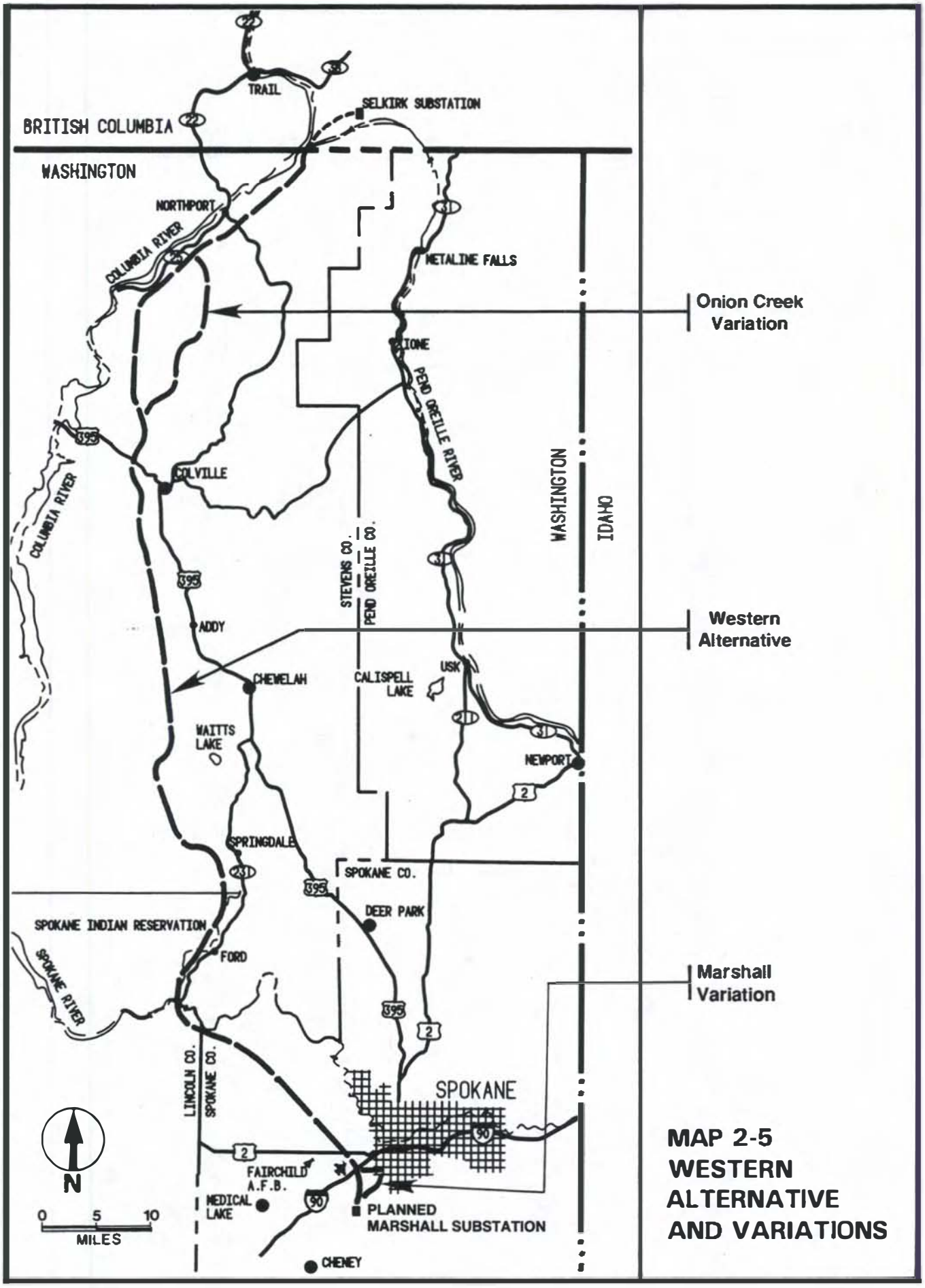
South of Springdale, the Western Alternative parallels the existing WWP Addy-Devils Gap 115-kV transmission line, and upon entering the Spokane Indian Reservation, turns southwest and crosses approximately 3.4 miles of the reservation land (see Map 2-2, Sheet 6). Passing west of Ford, the route again turns south and continues to parallel the existing transmission line to WWP's Long Lake Dam. The line then parallels existing WWP transmission facilities from Long Lake Dam southeast, passing by the east end of Spokane International Airport (see Map 2-2, Sheet 5). Upon crossing I-90, the Western Alternative turns south, parallels a short section of an existing WWP 115-kV transmission facility, and continues to the planned Marshall Substation site near Marshall. The Western Alternative is approximately 121.1 miles long between the international boundary crossing near Waneta Customs and the planned Marshall Substation site. Miles of each county crossed by this alternative and its variations are presented in Table 2-1.

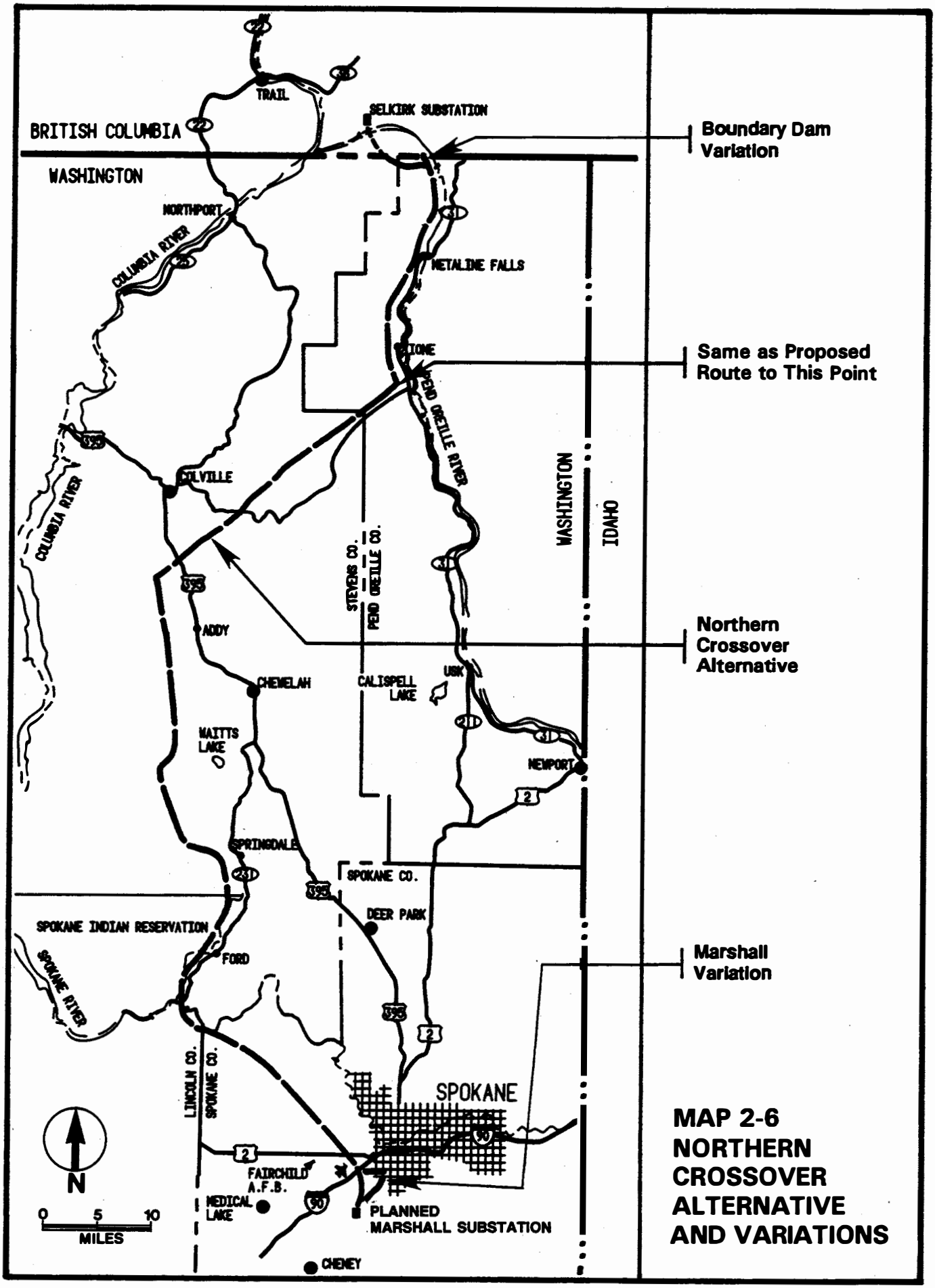
The Onion Creek Variation (see Map 2-2, Sheet 8) is a 18.3-mile segment that diverges from the Western Alternative along Lake Roosevelt at Onion Creek and proceeds south through the Onion Creek Valley and south-southwest through the West Fork of Onion Creek drainage. The variation turns south and follows Clugston Creek southwest to join the alternative south of Echo Lakes.

The Marshall Variation (see Map 2-2, Sheet 5) would also be applicable for the Western Alternative and is the same as that discussed under the Eastern Alternative in Section 2.2.1 of this FEIS.

2.2.3 Description of the Northern Crossover Alternative (Including the Boundary Dam and Marshall Variations)

The Northern Crossover Alternative (see Map 2-6 and Map 2-2, Sheets 1, 10, 7, 6, 4, and 5, respectively) is a crossover from the Proposed Route and Eastern Alternative to the Western Alternative. The crossover segment departs from the Proposed Route and the Eastern Alternative south of the town of Ione and proceeds southwest, north of the Tiger Highway (State


BRITISH COLUMBIA
WASHINGTON
TRAIL
SELKIRK SUBSTATION
NORTHPORT
COLUMBIA RIVER
METALINE FALLS
Onion Creek Variation
IONE
PEND OREILLE RIVER
COLVILLE
COLUMBIA RIVER
STEVENS CO.
PEND OREILLE CO.
WASHINGTON
IDAHO
ADDY
Western Alternative
CHEWELAH
CALISPELL LAKE
USK
WAITTS LAKE
NEWPORT
SPRINGDALE
SPOKANE CO.
DEER PARK
SPOKANE INDIAN RESERVATION
FORD
SPOKANE RIVER
Marshall Variation
LINCOLN CO.
SPOKANE CO.
SPOKANE
N
0 5 10
MILES
FAIRCHILD A.F.B.
MEDICAL LAKE
PLANNED MARSHALL SUBSTATION
CHENEY
MAP 2-5
WESTERN ALTERNATIVE AND VARIATIONS


BRITISH COLUMBIA
WASHINGTON
TRAIL
SELKIRK SUBSTATION
NORTHPORT
COLUMBIA RIVER
METALINE FALLS
BOUNDARY DAM
Boundary Dam Variation
Same as Proposed Route to This Point
PEND OREILLE RIVER
COLVILLE
COLUMBIA RIVER
STEVENS CO.
PEND OREILLE CO.
WASHINGTON
IDAHO
ADDY
Northern Crossover Alternative
CHEWELAH
CALISPELL LAKE
USK
WAITTS LAKE
NEWPORT
SPRINGDALE
SPOKANE CO.
DEER PARK
SPOKANE INDIAN RESERVATION
FORD
SPOKANE RIVER
Marshall Variation
LINCOLN CO.
SPOKANE CO.
SPOKANE
FAIRCHILD A.F.B.
MEDICAL LAKE
PLANNED MARSHALL SUBSTATION
CHENEY
N
0 5 10
MILES
MAP 2-6
NORTHERN CROSSOVER ALTERNATIVE AND VARIATIONS

Highway 20) and through Colville National Forest lands (see Map 2-2, Sheet 10). The route leaves National Forest lands prior to crossing the Tiger Highway east of Colville. The route then continues in a southwest direction south of Hatch Lake and Arden, joining the Western Alternative north of Stranger Creek (see Map 2-2, Sheet 7). This alternative would then proceed south to the planned Marshall Substation, as described for the Western Alternative (see Section 2.2.2). The length of the Northern Crossover Alternative totals approximately 126.9 miles.

The Boundary Dam and Marshall Variations for the Northern Crossover Alternative are the same as those routes described for the Proposed Route and Eastern Alternative, respectively. Refer to Map 2-2, Sheet 1 for the Boundary Dam Variation and Map 2-2, Sheet 5 for the Marshall Variation. Table 2-1 lists the miles of each county crossed by this alternative and its variations.

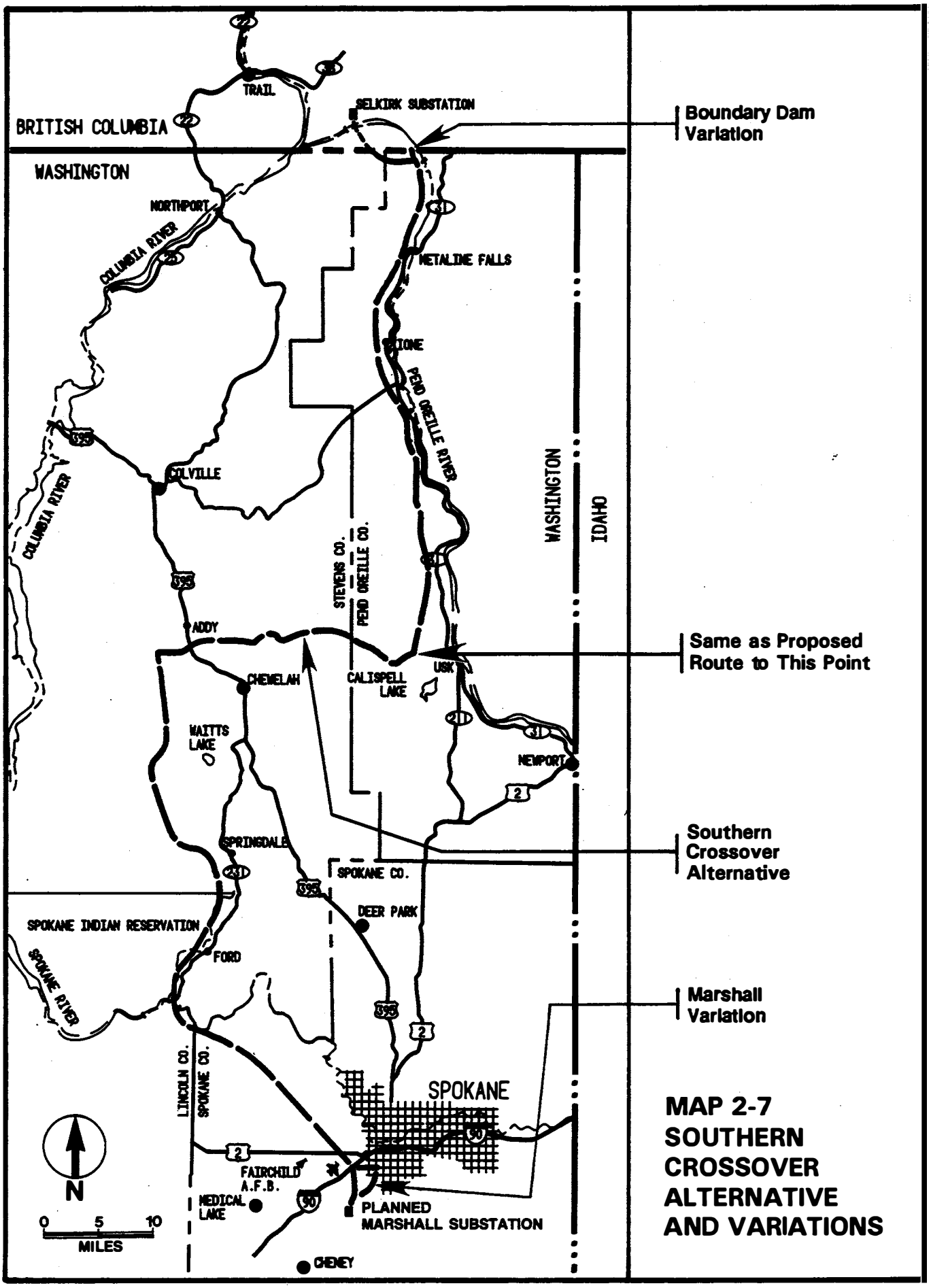
2.2.4 Description of the Southern Crossover Alternative (Including the Boundary Dam and Marshall Variations)

The Southern Crossover Alternative (see Map 2-7 and Map 2-2, Sheets 1, 2, 11, 7, 6, 4, and 5, respectively) is another crossover from the Proposed Route and Eastern Alternative to the Western Alternative. The crossover segment diverges west of Cusick, following the existing BPA Addy-Cusick 230-kV line (see Map 2-2, Sheet 11). This alternative proceeds west, crossing U.S. Highway 395 and the Colville River south of Addy. The route intersects with the Western Alternative south of Stranger Creek (see Map 2-2, Sheet 7) and continues south to the planned Marshall Substation, as described for the Western Alternative (see Section 2.2.2). The length of the Southern Crossover Alternative totals approximately 142.7 miles.

Both the Boundary Dam and Marshall Variations are applicable for the Southern Crossover Alternative and are the same as that described for the Proposed Route and Eastern Alternative, respectively. The Boundary Dam Variation is shown on Map 2-2, Sheet 1, and the Marshall Variation is shown on Map 2-2, Sheet 5. Table 2-1 lists the miles of each county crossed by this alternative and its variations.

2.2.5 Description of the No Action Alternative

Under the No Action Alternative, DOE would not issue a Presidential permit for the proposed Interconnection, and the proposed transmission line would not be constructed. WWP would be required to develop other sources of power to meet increases in demand for electricity. These alternative sources could include purchase or exchange of power with cogenerators and electric utilities, conservation, combustion turbines, or the construction of base load generation stations such as the coal-fired Creston Generating Station. The selection of other sources of energy


BRITISH COLUMBIA
WASHINGTON
TRAIL
SELKIRK SUBSTATION
Boundary Dam Variation
NORTHPORT
COLUMBIA RIVER
METALINE FALLS
IONE
PEND OREILLE RIVER
COLVILLE
COLUMBIA RIVER
STEVENS CO.
PEND OREILLE CO.
WASHINGTON
IDAHO
ADDY
Same as Proposed Route to This Point
CHEWELAH
CALISPELL LAKE
USK
WAITTS LAKE
NEWPORT
SPRINGDALE
Southern Crossover Alternative
SPOKANE CO.
DEER PARK
SPOKANE INDIAN RESERVATION
FORD
SPOKANE RIVER
Marshall Variation
LINCOLN CO.
SPOKANE CO.
SPOKANE
FAIRCHILD A.F.B.
MEDICAL LAKE
PLANNED MARSHALL SUBSTATION
CHENEY
N
0 5 10
MILES
MAP 2-7
SOUTHERN CROSSOVER ALTERNATIVE AND VARIATIONS

would be based on reliability and economic considerations and would likely include several of the sources mentioned above. Further discussion of energy supply alternatives can be found in Section 2.6.1 of this FEIS.

2.3 Transmission Facilities

2.3.1 Route Selection

WWP evaluated potential 230-kV transmission line routes between the international boundary and the Spokane area. This route evaluation is described in detail in WWP's environmental report (ER) and is summarized below. WWP submitted the ER to DOE in September 1988; this document is available for public review as described in Chapter 1.0. Specific objectives, a phased methodology, and an analysis of specific constraints and opportunities were used to identify and screen potential routes. From these potential routes, a Proposed Route, viable alternative routes, and route variations were selected. The objectives used to identify and screen potential routes included the following:

- Complying with requirements of federal, state, and local land managing and regulatory agencies ensured project safety and environmental protection.

- Minimizing contact with designated avoidance and exclusion areas limited significant environmental impacts and maintained cost effectiveness.

- Minimizing construction over agricultural croplands reduced the disruption of farming operations.

- Maximizing the use of existing transmission and distribution corridors, either by overbuilding or paralleling existing circuits, confined impacts to areas occupied by existing facilities.

- Minimizing routing in densely populated urban and suburban areas maximized routing flexibility and minimized ROW costs.

- Implementing the proper route evaluation and applying the appropriate mitigation techniques minimized environmental impacts.

- Minimizing overall line construction costs maintained a cost effective resource option for WWP and its customers.

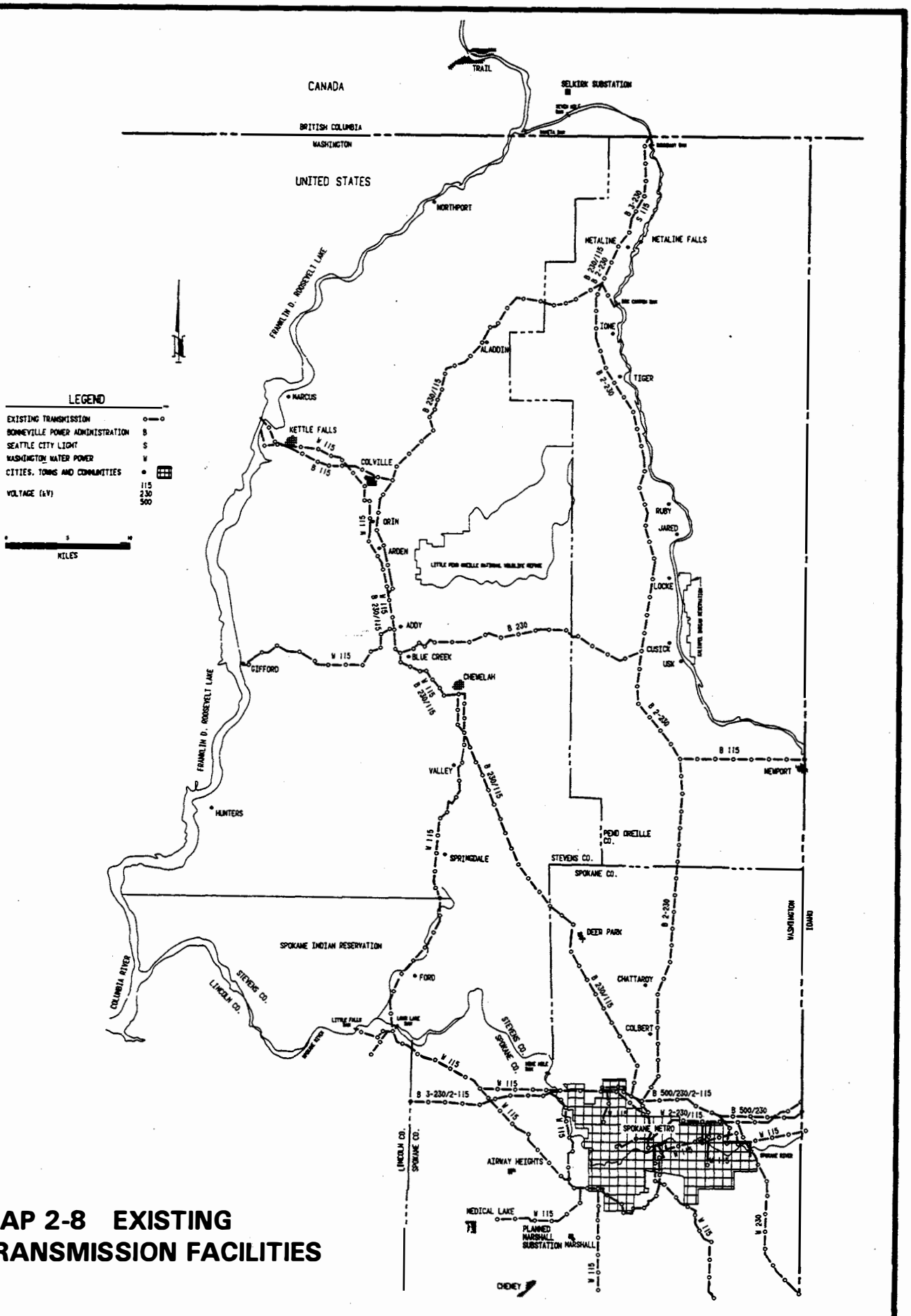
Two distinct routing options, encompassing the valleys formed by the Columbia and Colville Rivers and the Pend Oreille River Valley, were identified within the study area. Electrical transmission lines exist within the Colville and Pend Oreille Valleys and offer opportunities to maximize use of existing corridors for route location (see Map 2-8). Within the study area, avoidance and exclusion areas were defined and delineated. Avoidance areas generally do not preclude route location, but may limit route options, require substantial mitigation, increase construction costs, or create significant environmental or legal issues. Exclusion areas are likely to preclude construction due to legal problems and unacceptable environmental impacts.

Wherever possible, routes were identified which minimized contact with avoidance areas, bypassed exclusion areas, and utilized existing transmission corridors. A four-phased approach which evaluated environmental, engineering, and economic factors was developed to condense the multiple routing options within the established study area to a reasonable number of alternatives which were then systematically evaluated for preference and feasibility. A Route Evaluation Matrix was also created to compare routing alternatives and assess overall suitability. In addition to the matrix evaluation, various constraints and opportunities associated with each route were examined to further compare route feasibility. Route sections that appeared to pose significant construction constraints, cross extensive areas of agricultural cropland, impact known cultural resource sites, and/or affect critical fish and wildlife habitats were eliminated from review.

As part of the preparation of this EIS, WWP's proposed and alternative transmission routes were reviewed and evaluated for effects on various resources. In several locations, potential conflicts were identified and route modifications were developed for review by WWP. Map S-1 incorporates all reroutes that did not have engineering constraints. Where reroutes were not feasible, the potential conflicts were carried through impact analysis, and mitigation measures were developed as appropriate (see Chapter 4.0). In developing an agency preferred alternative (see Summary), DOE reviewed each alternative, including the proposed action, on its individual merits. The fact that WWP had designated a Proposed Route did not convey special status in the review and comparison process.

2.3.2 Right-of-Way Requirements

The proposed 230-kV transmission line would require 125 feet of ROW, 62.5 feet on each side of the centerline. The ROW width is wide enough to be consistent with any requirements by the State of Washington Electrical Construction Code and the National Electrical Safety Code (NESC) standards. The proposed ROW width would accommodate conductor blow-out (swinging of conductors under wind-loading conditions) and contain potential transmission line failure. Within the ROW, WWP would acquire an easement to locate, construct, operate, maintain, and rebuild the transmission facilities, as well as to restrict certain activities that may conflict with the



MAP 2-8 EXISTING TRANSMISSION FACILITIES

operation and maintenance of the line. Prohibited or restricted activities would include construction of buildings within the ROW and other activities within the ROW, where equipment heights exceed NESC standards for conductor clearance. Restrictions on open burning within the ROW would also be implemented due to the possibility of phase-to-phase or phase-to-ground flashovers.

The proposed placement of the transmission line parallel and adjacent to existing lines may reduce the required width of new ROW, since some overlap may occur. In addition, if the ROW alignment occurs along an existing line which is to be removed, the existing ROW would be maintained and possibly widened to accommodate the proposed line. Additional ROW width may be required to accommodate any changes in tower design.

Following final determination of the transmission line route, a WWP representative would contact property owners to discuss with the landowner the proposed location of the line and to obtain permission to conduct detailed surveys. WWP has made it a policy to work with the landowner to locate transmission facilities, access roads, and construction staging areas where the least impact might occur to the property. These siting decisions may involve locating structures to reduce effects on farming operations or to avoid areas designated for future development. A compromise can often be reached, concerning structure placement and facility alignment, that would meet the landowner concerns without adding significantly to project costs.

Following the ROW survey, a determination would be made of the transmission facilities location, and a WWP representative would estimate the market value of the property crossed by the proposed facilities. The landowner and representative would then meet to negotiate a ROW easement that would provide for compensation for line construction, operation, and maintenance. Compensation to owners of homes, businesses, or other structures that would need to be removed from the ROW would be determined in accordance with the Uniform Relocation Assistance and Land Acquisition Act of 1970. Easement payments would be paid prior to line construction. WWP does not plan to acquire ROW through land purchases. In the event that transmission line maintenance or repair activities disturbed or damaged adjacent property, compensation would be paid at the time of disturbance. WWP's practice has been to negotiate easements and do everything reasonably possible to acquire those easements without resorting to the right of eminent domain. WWP, as well as other public and semi-public agencies within the State of Washington, has the authority to implement the right of eminent domain that provides for the taking of private property for public purposes without the owner's consent, upon payment of just compensation for the right. Associated land ownership for the Proposed Route, project alternatives, and route options are presented on Tables 2-2 and 2-3.

Table 2-2

Land Ownership Along the Proposed Route and Project Alternatives for the WWP/B.C. Hydro Transmission Interconnection

Land Ownership (Miles)	Proposed Route	Eastern Alternative	Western Alternative	Northern Crossover Alternative	Southern Crossover Alternative
Federal					
Bureau of Land Management	0.1	0.1	0.7	0.8	0.8
Forest Service	21.2	21.2	0.0	27.5	31.1
Spokane Indian Reservation	0.0	0.0	3.4	3.4	3.4
State	2.2	3.4	14.1	8.6	6.8
Private	78.7	103.2	102.9	86.6	100.6
Total Miles	102.2	127.9	121.1	126.9	142.7

Table 2-3

Land Ownership Along the Route Variations and Route Options for the WWP/B.C. Hydro Transmission Interconnection

Land Ownership Miles	Boundary Dam Variation	Segment of Proposed Route Replaced	Orchard Prairie Variation	Segment of Proposed Route Replaced	Eastern Route Option	Segment of Proposed Route Replaced	Western Route Option	Segment of Proposed Route Replaced	Chattaroy Variation	Segment of Eastern Alternative Replaced	Marshall Variation	Segment of Eastern Alternative Replaced	Onion Creek Variation	Segment of Western Alternative Replaced
Federal														
Bureau of Land Management	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Forest Service	0.5	5.1	0.0	0.0	16.1	16.1	16.1	16.1	0.0	0.0	0.0	0.0	0.0	0.0
Spokane Indian Reservation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
State	0.0	0.0	0.0	0.0	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.9	2.3
Private	0.5	0.0	2.0	3.5	72.6	74.1	72.1	74.1	74.1	17.7	7.1	4.3	17.4	14.9
Total Miles	1.0	5.1	2.0	3.5	91.0	92.5	90.5	92.5	16.3	17.7	7.1	4.3	18.3	17.2

2.3.3 Structure Design

Table 2-4 lists the design features for the proposed Interconnection. The proposed structure design would be a double-circuit overhead line designed for 230-kV, 60-Hz operation. The conductors would consist of stranded aluminum wires around steel core cables (ACSR), with one or two conductors per phase. Minimum conductor size would be 1,590 KCM (1.5-inch diameter) and 795 KCM (1.1-inch diameter) for configurations with 1 and 2 conductors per phase, respectively. WWP is presently conducting detailed electrical and economic studies to determine the most cost effective conductor size and number of conductors per phase, based on estimates of installed cost, maintenance, and electrical losses.

The transmission line may use shield wires to intercept direct lightning strikes to the line. If required, the shield wires would be galvanized steel cable of approximately 0.375-inch in diameter. The tower and supporting structures would be designed to withstand ice and wind loading combinations specified by the NESC and the State of Washington Electrical Construction Code.

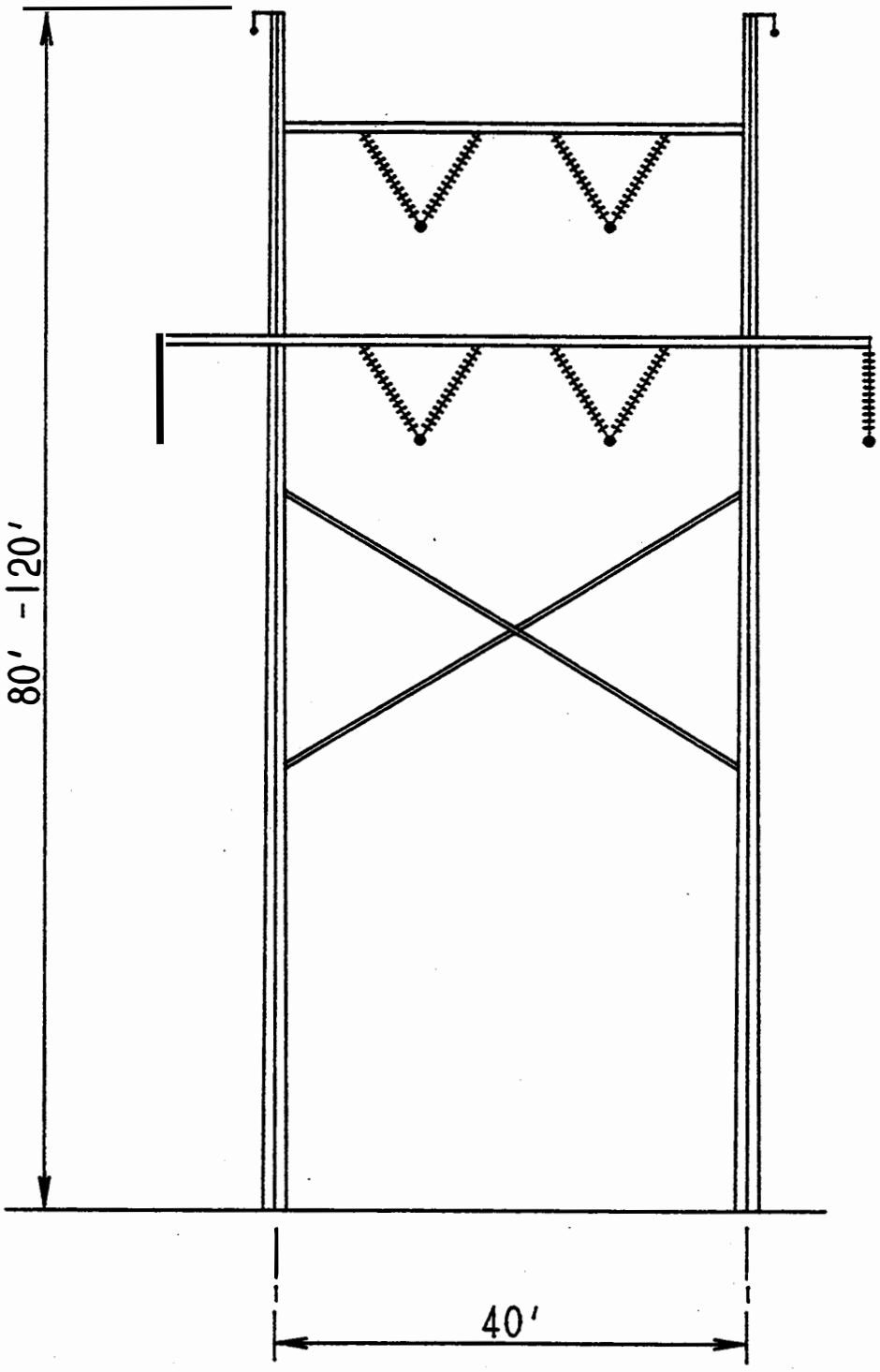
WWP would determine the type of supporting structures to be used on this transmission line, depending on safety, economic constraints, terrain, soil type, ROW constraints, aesthetic considerations, and other factors. The supporting structures would be designed to provide the constructor with flexibility in regard to methods of transportation, assembly, and erection and continue to meet or exceed standards stated in the NESC and the State of Washington Electrical Construction Code. The ability to adjust construction methods on a site-specific basis allows for cost-effective construction and tends to reduce ground disturbance. Based upon a general review, WWP is currently proposing supporting structures of a double-pole, weathering tubular steel H-frame design, 80 to 120 feet high. The proposed structure would use steel pole sections made of self-weathering steel plate, bent to form a multi-sided, pole-like shaft (see Figure 2-2). The finish of the self-weathering steel assumes a dull, rusty appearance.

The self-weathering steel structures were proposed due to the ability of the dull appearance of the structures to blend with their surroundings. An important property of self-weathering steel is that the oxidation process is self-arresting; the thin surface layer of oxidized steel protects the metal from further oxidation. Structure design and configuration may vary, however, depending on the requirements of specific structure locations. In areas of limited available ROW, for example, single-pole steel structures may be used (see Figure 2-3). In addition, the alternative route along the east end of the Spokane International Airport would require the use of single-circuit construction to meet height limitations specified by the Airport Overlay Zoning Requirements. It would be necessary to separate the two circuits into two parallel single-circuit lines of horizontal configuration. However, there are presently two 115-kV lines in this area. If

Table 2-4

Design Features of the Proposed WWP/B.C. Hydro Transmission Interconnection

Size - double-circuit 230,000 volts (230-kV)
Estimate maximum operating voltage - 240-kV
Maximum transfer capability - 1,000 megawatts (MW)
Transfer capacity as proposed - 800 MW
Transmission line structures - double-pole weathering tubular steel, 80 to 120 feet tall, 40 feet wide
Minimum conductor size - 1,590 KCM ACSR (one conductor per phase) or 795 KCM ACSR (two conductors per phase)
Lightning protection - Shield wires, galvanized steel cable 0.375-inch in diameter (if required)
Approximate equivalent phase spacing - 22 feet
Approximate phase to a ground spacing (short-circuit distance) - 6 feet 8 inches
Minimum line-to-ground clearance - 30 feet
Approximate distance from the outside conductor to the ROW edge - 32 feet
Average span length - 1,000 to 1,200 feet
Maximum span length - 2,000 feet
Approximate length - 102 miles in the United States
Right-of-way width - 125 feet
WWP terminal - Existing Beacon 230/115-kV Substation located northeast of Spokane
Estimated cost of WWP facilities - approximately $84.7 million



DOUBLE CIRCUIT
230 KV STEEL POLE STRUCTURE

FIGURE 2-2 PROPOSED STEEL POLE H-FRAME STRUCTURE

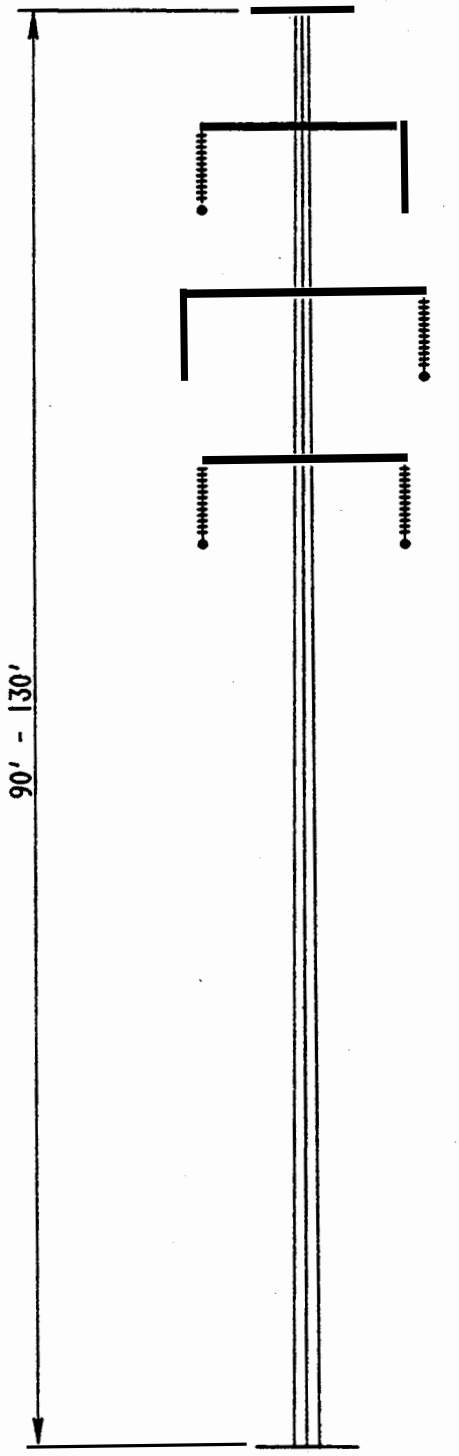


FIGURE 2-3 ALTERNATIVE SINGLE-SHAFT STEEL POLE STRUCTURE

necessary, one of these 115-kV lines could be replaced with one of the proposed 230-kV single-circuit lines, resulting in a net addition of one single-circuit 230-kV line in this section.

2.3.4 Construction

Transmission line construction typically includes ROW clearing, access road construction, structure foundation construction, structure assembly and erection, conductor and shield wire stringing and tensioning, and site restoration. Environmental protection procedures that would be implemented by WWP during construction are summarized in Table 2-5.

These procedures would be made conditions of the Presidential permit, in the event a permit for the proposed Interconnection is issued to WWP by DOE. Prior to the start of construction, aerial photography and ground survey work would be completed. Aerial and ground-survey methods are used to develop an exact centerline location. WWP would contact landowners to obtain ground survey permission prior to any on-site activities. Ground surveys are used to locate angle and control points along the centerline in relation to property boundaries and other available references. Following the final route alignment, a detailed survey of the centerline would be performed to allow refinements in profiles, structure locations, and clearing requirements. Prior to construction, final structure locations and other work areas would be outlined. The landowners would again be contacted regarding the anticipated date of construction initiation.

Construction of the United States portion of the proposed Interconnection would require a labor force of approximately 100 skilled and semi-skilled construction personnel. Workers would be hired from both in and out of state. Each construction phase at a particular structure site is completed by a crew of three to five workers, who are followed by the next phase crew. This construction method results in spreading construction activities over the length of the line, thus avoiding high concentrations of activity in any one area.

The proposed Interconnection would be routed to avoid large areas of steep or unstable slopes, to ensure the stability of the supporting structures, and to lessen erosion losses. Where slopes could not be avoided, they would be spanned by the line, where practicable, or the line would follow topographic contours. Access roads would also follow topographic contours, where possible, and main road grades generally would not exceed 20 percent for short pitches. During detailed line surveys and design, sensitive soils located along the route would be identified. Areas of sensitive soils on slopes of 20 to 30 percent would be delineated and treated as a high erosion hazard. If the standard erosion and sedimentation control measures outlined in Table 2-5 were insufficient in preventing erosion along these sensitive areas, additional treatment measures would be implemented or the areas would be avoided to the extent possible to ensure successful erosion control.

Table 2-5

Environmental Protection Procedures for Transmission Line Construction

1. The contractor shall comply with all applicable federal, state, and local environmental laws, orders, and regulations. Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural and ecological resources. To assist in this effort, the construction contract will address: (a) federal and state laws regarding antiquities, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
2. The contractor shall exercise care to preserve the natural landscape and shall conduct construction operations so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, approved construction roads, or excavation operations vegetation shall be preserved and shall be protected from damage by the contractor's construction operations and equipment.
3. Construction staging areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. On abandonment, all storage and construction materials and debris shall be removed from the site. The area shall be regraded as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate revegetation, provide for proper drainage, and prevent erosion.
4. Following construction activities and regrading of disturbed areas, WWP shall coordinate with the land manager, state and federal agencies, and the county noxious weed control board to implement a revegetation plan for areas disturbed during construction of the proposed transmission line and associated access roads. Plant species shall be chosen to stabilize the soil, prevent erosion, and minimize the invasion of noxious weeds. Because conditions would vary along the ROW, seed mixtures shall be mutually agreed upon by the parties involved, depending on the revegetation requirements. If required, wetland plant species and planting techniques shall be described in the wetlands mitigation plan. These procedures shall be initiated within the first growing season, following the completion of construction activities.
5. In order to aid in noxious weed prevention, the contractor shall implement a "clean vehicle policy" while entering and leaving construction areas. Measures involving the use of herbicides to control noxious weeds within disturbed areas are not preferred, but would be implemented in cooperation with the local noxious weed control board, if necessary.

6. Construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into streams, flowing or dry watercourses, lakes, and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

7. Excavated material or other construction materials shall not be stockpiled or deposited near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the actual water course itself.

8. Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses by construction of intercepting ditches, bypass channels, barriers, settling ponds, or by other approved means.

9. Water turnoff bars or small terraces shall be constructed across all ROW trails on hillsides to prevent water erosion and to facilitate revegetation on the trails.

10. Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, shall not be operated until corrective repairs or adjustments are made.

11. The contractor shall make all necessary provisions in conformance with safety requirements for maintaining the flow of public traffic and shall conduct construction operations so as to offer the least possible obstruction and inconvenience to public traffic.

12. WWP will apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objectives sharing the ROW, to the mutual satisfaction of the parties involved. WWP will install fence grounds on all fences that cross or are parallel to the proposed line.

13. When weather and ground conditions permit, the contractor shall obliterate all contractor-caused deep ruts that are hazardous to farming operations and to movement of equipment. Such ruts shall be leveled, filled, and graded or otherwise eliminated in an approved manner. In hay meadows, alfalfa fields, pastures, and cultivated productive lands, ruts, scars, or compacted soils shall be eliminated by loosening and leveling the soil by scarifying, harrowing, disking, or other approved methods. Damage to ditches, tile drains, terraces, roads, and other land features shall be corrected. At the end of each construction season and before final acceptance of the work in these agricultural areas, all ruts shall be removed, and all trails and areas that are hard-packed as a result of contractor operations shall be loosened and leveled. The land and facilities shall be restored as nearly as practicable to their original condition by implementing procedures to aid in revegetation and minimize noxious weeds.

Table 2-5 (Continued)

14.	On completion of the work, all work areas except access trails shall be scarified or left in a condition which will facilitate revegetation, provide for proper drainage, and prevent erosion. All destruction, scarring, damage, or defacing of the landscape resulting from the contractor's operations shall be repaired by the contractor.
15.	Construction roads not required for maintenance access shall be restored to the original contour and made impassable to vehicular traffic. The surfaces of such construction roads shall be scarified as needed to provide a condition which will facilitate revegetation, provide for proper drainage, and prevent erosion.
16.	WWP will not locate transmission structures or access roads within wetland or riparian areas during project construction and operation. Use of special construction and maintenance techniques will span wetland/riparian habitat, when possible.

The transmission line ROW would be cleared of trees to the extent necessary to facilitate line construction, maintenance, and conductor clearance. Where possible, tree removal would be 'feathered' at ROW edges to avoid sharp visual contrasts. Stumps, root systems, low-growing shrubs, and grasses would be left in place to stabilize the soil structure and decrease soil losses due to erosion. Where ground disturbance occurs, soils would be stabilized as soon as practicable; efforts to reclaim disturbed areas would be initiated within the first growing season following construction. Disposal of cleared vegetation would be as agreed to with the landowner or land manager. Local fire and air pollution regulations would be followed, if slash is burned. Trees may be left standing in ravines and other areas where they would not interfere with overhead activities. However, trees that are located outside the ROW and may damage the line if they fall would require removal. Owners of such trees would be compensated for their removal upon agreement between the landowner and WWP.

During project construction, WWP would avoid placing transmission structures or access roads within a wetland or riparian area, as required by the appropriate agencies. Special construction techniques would be used to span these areas, when possible, thereby avoiding disturbance of associated tree and shrub wetland/riparian vegetation. Crossing of wetlands classified as palustrine forested, however, may require removal of trees that exceed the maximum allowable height beneath the transmission line.

Existing roads would be used to the extent possible to access the ROW and structure sites, but may require improvements such as alignment modifications, grading, widening, and reinforcement in order to safely accomplish the work. New access roads may be required both within the ROW and from existing roads to the ROW; however, structure and access road locations would be determined during detailed engineering and are not known at this time. New roads would be constructed to the minimum standards required for safe line construction. Access road locations are usually determined by mutual agreement between the landowner or land manager, a WWP representative, and the constructor.

Access roads would be designed to ensure natural drainage and limit erosion. Water bars and other structures would be installed, as required, to control surface runoff. To prevent soil damage during wet soil conditions and heavy traffic, the road surface would be stabilized with gravel or rock, and vehicle traffic may be restricted. Construction activities would be temporarily halted during extremely wet periods, most often during late winter and early spring, if soil conditions in specific areas along the ROW become too wet to ensure the successful implementation of erosion and sedimentation control measures. Also, access roads would be routed, where possible, to use existing bridges to cross streams and to avoid close proximity to and/or paralleling of streams or wetlands. Where new access roads are required to cross

streams, the construction would comply with the Washington State Department of Wildlife (WDW) and the Washington State Department of Ecology (WDE) regulations pertaining to stream and water quality protection.

Access roads along cultivated areas where soils have been compacted during construction would be contoured, ripped, and revegetated as agreed upon with the landowner. Tower sites, temporary construction areas, pulling sites, and the transmission ROW would be reshaped to near natural contours and revegetated to stabilize the soil and reduce erosion, upon completion of construction activities. Revegetation procedures would be agreed upon between WWP, the land manager, and the local noxious weed control board. Seed mixtures would be chosen, depending on the type of area requiring reclamation. WWP would initiate these measures within the first growing season following ROW construction. By mutual agreement with the landowner, temporary access roads would be ripped, water-barred, and revegetated to reduce erosion. All fences would be restored following construction.

As a preventative measure to minimize the invasion of noxious weeds into areas disturbed for transmission line or access road construction, a clean vehicle policy would be implemented during construction activities. All vehicles would be inspected for weeds before entering and leaving the construction areas. In combination with the revegetation procedures, these measures would aid in weed prevention along the proposed Interconnection.

When extended dry periods occur during line construction, it can be expected that construction traffic over unpaved roads and road modification/construction would result in the production of varying amounts of fugitive dust. Where necessary, dust-control methods, such as watering, would be utilized. Also, fire prevention measures would be implemented as required by the landowner or land manager.

Foundation excavation for the supporting structures would involve large augers, backhoes, or excavators, depending on the type of foundation required. Foundation installation would involve the use of a small crane and earth compactors. Drilling and blasting may be required, if ground conditions warrant. Land owners would be notified in advance of any blasting.

The supporting structures would be designed to provide the constructor with flexibility in regard to methods of transportation, assembly, and erection. The ability to adjust construction methods on a site-specific basis would allow for cost-effective construction and would reduce ground disturbance in sensitive areas. Prior to erection, the supporting structure components may either be put together in assembly yards along the line and hauled to the structure site or hauled directly to the structure site and assembled there. The constructor may elect to assemble the structures onsite, either in a horizontal position on the ground or in an upright position,

depending upon the local topography. Structures would then be erected using a mobile crane. The use of helicopters in structure erection is usually limited to areas where access conditions preclude conventional ground erection methods. Such conditions might include steep sensitive slopes, extremely rough terrain, or wetland/ riparian areas. The helicopter would transport the assembled structure or structure section from a nearby assembly yard to the tower site, and place it on the previously-installed foundation or structure section.

All conductors and shield wires would be strung under tension to avoid ground contact and subsequent damage to the conductor. Tension stringing would be achieved by pulling a light lead line between towers, followed by pulling a heavy pulling cable through the same section. The pulling cable is then used to pull the conductor into position. A tensioner is required, with pulling hoists at the other end of the pull. A pull is usually between 15,000 and 20,000 feet in length. In the proximity of air strips and the Spokane International Airport, marker balls would be placed on the shield wires as required by Federal Aviation Administration (FAA) regulations.

WWP's total estimated construction costs are $84,734,500 based upon 102.2 miles of line construction. This includes the costs for the Beacon Substation termination, which is estimated to be $1,472,200. The estimated total cost also includes financing changes (Allowance for Funds Used During Construction).

2.3.5 Operation and Maintenance

Although permanent structures would not be allowed within the ROW, any land use activity that would not interfere with the operation or maintenance of the line (e.g., farming) could continue. Normal farming activities would be allowed, if reasonable care is taken to prevent contact or damage to transmission line structures from farm machinery.

During project operation, routine aerial or ground inspections would be conducted along the transmission line every 6 to 12 months to monitor the condition of the towers, insulators, and conductors. WWP has found that it has been more economical to conduct these inspections by air; although, ground surveys may be required under certain conditions. Maintenance may include repairing frayed lines and damaged conductors, inspecting and repairing steel towers, and replacing damaged insulators.

In areas determined to be environmentally sensitive (e.g., wetlands, unique habitats, deer winter range, high erosion, or fire hazard), access roads may be gated (or otherwise blocked) to minimize public use, in cooperation with the landowner or land manager. The U.S. Fish and Wildlife Service, Washington Department of Wildlife, and Forest Service would be contacted regarding such measures. Landowners and land managers (such as the Forest Service) would

retain keys to the applicable gates to assure their use of the access roads for authorized activities, such as fire protection. Access roads established during project construction would be used during maintenance activities.

These roads would avoid wetland or riparian areas, as described for project construction in Section 2.3.4. In the event that the transmission line is damaged and requires immediate repair, maintenance personnel would be dispatched to immediately repair the damage and replace any equipment. Storm damage is most common to transmission lines; however, WWP has experienced occasional acts of vandalism on its transmission system. WWP would take appropriate action to avoid damage or to make repairs, as required.

Closed access roads would be reopened only as needed for line maintenance or repair, or as deemed necessary by the landowner. Where an access road is constructed or reopened to transport equipment to the ROW for maintenance purposes, disturbed areas would be restored as agreed with the landowner or land manager. If crop damages result from the repair activities, WWP representatives would meet with the landowner or manager to arrange for compensation.

Throughout the life of the project, it may be necessary to periodically remove vegetation which has grown near the conductors. Mechanical cutting of this vegetation may be utilized where ground conditions are favorable and slash disposal may be accomplished by scattering, piling and burning, chipping, or burying. WWP implements preventative measures against noxious weeds and does not typically use chemical spraying techniques in its ROW management. In the event that herbicides would be required for the control of noxious weeds, WWP would coordinate these activities with the local noxious weed control board.

2.3.6 Abandonment

The proposed Interconnection is anticipated to have a 50-year project life. However, the transmission line would be continuously maintained and could, therefore, remain in service considerably longer than 50 years. WWP would analyze the project components and determine whether to rebuild or dismantle the 230-kV line. In the event WWP proceeded with line abandonment, the transmission structures would be removed, along with their foundations. The guard wires, conductors, insulators, and hardware would be dismantled and removed from the ROW. Mobile cranes, excavation equipment, and large trucks, as well as earthmoving equipment in a few of the steeper areas, would be required for efficient removal of the transmission line.

Following abandonment and removal of the transmission line, the natural contour in areas leveled for equipment required to dismantle the line would be reclaimed to its original condition.

Similarly, areas disturbed and stripped of vegetation during the dismantling process would be regraded and reseeded as described for ROW reclamation to prevent erosion and the invasion of noxious weeds. As discussed for project construction in Section 2.3.4 and project operation in Section 2.3.5, existing access roads would be used during project abandonment. Wetland and riparian areas would be avoided during the abandonment activities, as required by the appropriate federal and state agencies.

2.4 Substations

WWP evaluated one planned (Marshall) and four existing (Westside, Beacon, Bell, and Rathdrum) substations in the Spokane area as terminals for the proposed interconnection. WWP's amended Presidential permit application establishes WWP's existing Beacon Substation, rather than the planned Marshall Substation (as indicated in the DEIS), as the southern terminus of the proposed interconnection project. WWP identifies the following advantages of terminating the interconnection at the Beacon Substation: 1) reduced line length; 2) use of an existing substation (Beacon) rather than construction of a new substation (Marshall); 3) lower project costs; 4) reduced electrical system losses; and 5) increased flexibility for project staging, to better meet changing resource needs.

The Beacon Substation has been a major transmission and distribution facility for WWP since 1945. The Beacon Substation facility is located directly east of Havana Street and due north of the Spokane River, in Spokane County (see Map 2-3). Beacon was developed on approximately 50 acres of land. The facilities that are proposed for the interconnection project include only the new 230-kV line terminal positions, with no expansion of the current property boundary required. The 230-kV interconnection would approach the substation from the north along the eastern side of the existing ROWs, terminating within the substation fenced area. During project operation, the Beacon Substation would not be manned. Electrical equipment can be remotely controlled form WWP's operations center. The proposed interconnection would be incorporated into this current system.

The Marshall Substation would receive Presidential permit authorization only in the event that one of the alternative routes is approved by DOE. Facilities would include the line terminal positions, series capacitors (if located at Marshall), and shunt capacitors (if required). The property for the planned Marshall Substation is located immediately northwest of the community of Marshall in Spokane County (see Map 2-2, Sheet 5). In 1981 WWP purchased 351 acres of land for development of the station, with approximately 40 acres to be used for the substation and transmission line ROW. The land is predominantly wooded, with the substation development planned for the southwest portion of the property, which is nearest to an existing county roadway. The area of initial development would be 12 acres, with the proposed interconnection

230-kV lines approaching the site from the north and terminating on the west side of the planned substation.

2.4.1 Construction

The proposed Interconnection would terminate at the existing Beacon Substation. Any future transformation from 230-kV to a lower voltage (e.g., 115-kV) would not be directly associated with the proposed Interconnection. The phase shifting transformers for the WWP-B.C. Hydro Interconnection would be located in Canada at the Selkirk Substation. Construction at the existing Beacon Substation would consist of the following procedures:

- Site grading
- Foundation installation
- Equipment installation
- Cleanup

Construction would require grading and compaction equipment, concrete trucks, material-hauling vehicles, and mobile cranes.

2.4.2 Operation and Maintenance

The Beacon Substation would not be manned. Electric equipment would be remotely controlled from WWP's operations center. The equipment and facility layout would be designed to limit radio and television interference and audible noise. The facilities would be fenced, locked, and secured. Entry would be restricted to appropriate WWP personnel. Maintenance would include equipment testing and routine and emergency procedures. The area inside the fence would be maintained to prevent intrusions of any vegetation within the substation site, in cooperation with the county noxious week control board.

When transformers are installed at Beacon, hydrocarbon (mineral base) oils would be used as insulating fluids. Mineral oil is not regulated by state, federal, or local law. In rare instances of equipment failure or vandalism, oil may be released. It has been WWP's experience that only a portion of the oil in the tank is lost and the oil does not leave the fenced area. If a spill or leak were to occur, WWP's oil containment and cleanup plan would be followed. This plan is designed to meet or exceed all applicable federal, state, and local regulations.

2.4.3 Abandonment

The facilities associated with the proposed Interconnection at the Beacon Substation would be abandoned at the end of the project, if no longer needed. Methods for dismantling equipment and for equipment removal would depend on system requirements at the substation.

2.5 Interrelationships with Other Projects

Projects potentially interrelated with the proposed Interconnection were reviewed to determine if their impacts would interact in a cumulative manner with the proposed project. Only projects that are currently proposed with a reasonable likelihood of continuing during the same time frame as the proposed Interconnection and those that would compete for the same resources (e.g., temporary housing for construction workers) or have overlapping effects (e.g., clearing of forested areas) would be considered to be interrelated. Most of the projects reviewed would be completed prior to the start of construction of the proposed Interconnection in April 1995. Therefore, cumulative impacts from these projects would not be anticipated, and information on other projects that might be underway in 1995 is not readily available due to the planning lead time for such projects. Development in the Spokane area is expected to continue for the foreseeable future. However, the infrastructure present in the Spokane area (e.g., temporary housing) is sufficient to accommodate several construction projects. For these reasons, no specific interrelated projects that would have cumulative impacts have been identified.

2.6 Alternatives Considered but Eliminated from Detailed Analysis in the EIS

2.6.1 Energy Supply Alternatives

WWP states that it continuously evaluates various options to meet future electrical requirements, but currently believes that construction of a transmission line interconnection with Canada to enable a firm power purchase from B.C. Hydro is a potentially viable option to meet future demand. WWP presently relies upon a program of least cost planning to develop plans for meeting current and future energy needs. The methods are approved by the Washington Utilities and Transportation Commission (WUTC) and the Idaho Public Utilities Commission (IPUC), and the 20-year plan is updated every 2 years (see Section 1.2). Revisions incorporated into this plan include those from both the WUTC and IPUC staff and the public. The planning process is flexible to take into account a wide range of uncertainties. In addition to economics, other factors are reviewed and evaluated (e.g., environmental factors, reliability, dispatchability, contributions to peak, seasonal output, uncertainty, fuel mix, impact on local economy, capital requirements, rate stability, and daily-load matching capability). All of these factors are assessed in the development of an electrical resource plan for WWP. As described in WWP's most recent

Least Cost Plan (1991), which is available to the public through the company's Spokane office, WWP is actively investigating a variety of power alternatives. Currently, WWP states that its long-term strategy is to rely on five resource types to meet future loads. These resource types, which are listed in descending order of priority, include conservation, cogeneration or small hydro generation acquired under the federal Public Utility Regulatory Policy Act (PURPA) or through competitive bidding, hydro redevelopments, energy purchased from other utilities, and generation from a combined-cycle combustion turbine. The following options were evaluated by WWP for potentially meeting anticipated deficits. However, for reasons that encompass generation capacity, reliability, technical feasibility, and cost of energy to WWP's customers, some options were judged by WWP to be less desirable than the proposed Interconnection. Other options, such as conservation, are currently in place on WWP's system. In the event the Interconnection is not approved (see No Action Alternative in Section 2.2.5), WWP would likely pursue one or more of these alternatives.

2.6.1.1 Conservation

Conservation is the more efficient use of electricity and, therefore, is considered as a resource equivalent to one that generates electricity. This is based on the idea that one less megawatt (MW) of energy would need to be generated at a new power plant for each MW of electricity saved. WWP has pursued a number of conservation measures in the past and claims that it will continue to stress this option in its current development program. WWP views conservation as one of the most cost-effective resources available to the company. In assessing load management alternatives, WWP will compare the related cost to the cost of other alternatives including those associated with the proposed Interconnection. WWP claims that only the most cost-effective resources will be pursued in order to meet its future needs. Demand side conservation programs are estimated by WWP to save 235,700 cumulative MW-hours through 1986, which was the last year for which cumulative savings estimates have been compiled. WWP programs have been primarily energy efficiency (conservation) residential programs. WWP states that it is now staffing an Energy Management section in its Marketing Department to assess and develop programs to more fully utilize the demand side resource potentials within its service territory. WWP plans on evaluating energy efficiency programs for commercial and industrial customers as well as expanded programs for residential customers. The company also plans on assessing the feasibility and cost effectiveness of converting some residential electric space and water heat customers over to natural gas. Based upon its Least Cost Plan, WWP believes that it will begin implementing programs in 1991 for cost effective demand side measures which provide significant savings potential. Preliminary estimates by WWP of its program activity show annual savings of approximately 48 MW under average demands by the year 2000. This alternative could not meet WWP's projected energy shortfall of about 200 MW

in 2000 (see Section 1.2.2 and Table 1-1) or replace the capacity (up to 800 MW) of the proposed interconnection.

2.6.1.2 Cogeneration and Small Power Production

WWP has stated that the company is aware of the value of cogeneration and is currently pursuing this potential source of power within the company's service area. WWP has designated a manager in the Power Supply Department to investigate cogeneration alternatives on a full-time basis. WWP believes the potential appears to be good for cogeneration and small power production (CSPP) development by independent parties within its service area. Cogeneration is the production of electricity in conjunction with an industrial or manufacturing process, while small power production includes wind generation, small hydro facilities, and generation from waste and/or renewable energy sources (biomass). Biomass refers to cogeneration units that can be built at the fuel source, such as a lumber mill, utilizing wood or other waste products. They generally have minimal fuel, operation, and maintenance costs. Stand-alone biomass generation appears to be marginally cost-effective when compared with conventional generation, but costs are highly site-specific. Biomass generation in the Northwest appears to have potential as a feasible resource option, since the use of process steam by an adjacent mill would help defray operational costs. Biomass cogeneration facilities are also limited in the amount of electricity they can produce by the amount of waste wood (fuel) that is available. PURPA requires, subject to certain conditions, that utilities offer to purchase CSPP energy at just and reasonable rates that are no higher than the cost of alternative sources of electric energy. CSPP development can be valuable for several reasons. Resources can be added in smaller increments to more closely match load growth, thereby allowing WWP to meet future loads without taking unreasonable financial risks. CSPPs also have the benefit of short lead times between inception and commercial operation. Small scale technologies, however, do have disadvantages. Reliability is questionable in some of the resource additions. CSPPs are, for the most part, nondispatchable. This means that WWP does not have the contractual option to shut down those resources when it is economical to do so. Potential limitations also exist in WWP's system. In some cases, significant system upgrades would be required to handle the interconnection of CSPPs. Thus, CSPPs do not offer the reliability of supply or the economy of operation of the proposed interconnection.

2.6.1.3 Utility Purchases/Exchanges

In the past, WWP has had a large share of its winter load requirements furnished by contracts with other utilities. With the present surplus situation, additional sales have been used to achieve balance between loads and resources. Other opportunities include diversity exchanges with southwestern utilities. These exchanges are dependent upon gaining access to these utilities

over the Pacific Intertie, which is operated by BPA. WWP has completed negotiations with BPA for transmission access to implement a signed exchange contract with Pacific Gas and Electric Company that began in May 1991. WWP is looking at other options (including the proposed Interconnection) that will provide access to both potential markets and potential supplies of electricity. WWP maintains that this flexibility is needed so that purchase prices can be kept as low as possible. WWP is currently negotiating with B.C. Hydro for a long-term purchase of power to meet WWP's forecasted future needs. WWP believes that the cost of this power, when added to the cost of the proposed Interconnection, must be competitive with the cost of WWP's alternative power supplies in the Northwest, such as BPA. B.C. Hydro is aware that the cost of their power would have to be competitive with the cost of BPA's power. At this point, B.C. Hydro and WWP have not finalized an agreement defining the terms and conditions of a power purchase; therefore, no cost comparisons can be made. However, the long-term purchase of power from B.C. Hydro would be an integral part of the proposed interconnection project.

2.6.1.4 Combustion Turbines

Combustion turbines are versatile forms of power generation capable of burning conventional fuels such as natural gas and various grades of petroleum products. Combustion turbines can be installed for peaking duty (simple cycle) or for intermediate and base load duty (combined cycle). Typically, the units have been used only to meet peaking loads; however, natural gas-fired units may be attractive for cogeneration and firming of secondary hydropower during low water years. Combustion turbines using natural gas are attractive for a number of reasons: the units have short construction lead times, low capital costs, and are economical to construct in small sizes that more closely track load demand. They also have reasonable fuel efficiency and reliability, which results in low maintenance costs. Air emissions are minimized when using natural gas. Natural gas-fired combustion turbines are commercially available and are a well-demonstrated technology. The main concern in using combustion turbines as an energy resource is the uncertain future supply and cost of fuel. WWP operates the 68-MW Northeast Combustion facility in north Spokane. The site has space for an additional unit, plus space for an add-on boiler to convert the simple cycle units to combined cycle. However, combustion turbines are not economically competitive with the proposed Interconnection for providing up to 800 MW of firm power.

2.6.1.5 Conventional Coal Plants

WWP holds partial ownership in two operating coal-fired power plants (Centralia and Colstrip) and is currently maintaining the license for the proposed Creston Generating Station located in Lincoln County, Washington. The Creston site is licensed and available for the future construction of four 500-MW units. Land options, permits, and a Washington State Site

Certification Agreement are maintained by WWP in order to keep Creston available as a future resource option. In the WWP service area, the total cost to build and operate a coal plant is comparable to that of a similar-sized nuclear plant. Construction costs are not as high as those associated with a nuclear plant; however, fuel costs are higher, largely due to transportation requirements. In addition, coal plants built at the source of the fuel would require a large capital investment in transmission facilities to transmit the power to eastern Washington and northern Idaho. Coal-fired generating plants should continue to be an option for WWP resource additions; however, they are considered by WWP to be a low priority because of the long lead time for construction and the high capital cost. Ownership shares are available in existing coal plants at the present time that are considered surplus to the needs of the operating utilities. However, WWP estimates that those purchase options will not be present by the time additional energy supplies are needed by WWP in 1995. Thus, a coal-fired power plant is not viewed as a viable alternative to the proposed Interconnection.

2.6.1.6 Load Management

Load management programs are a part of the average energy and peak energy resource strategies of WWP and are helpful tools in shifting energy load from heavy on-peak to off-peak hours. Load management, beyond basic conservation programs, usually consists of three main areas. One area deals with filed rates, such as time-of-use rates. Another consists of arrangements made with commercial and industrial customers to shed load when needed. Usually, these arrangements are made feasible by financial benefits to the customer or by interruptible rates. The third area is direct control of a customer load by the utility, such as radio control of electric water heaters. As the need for peak energy increases in the future, WWP will evaluate load management further. However, load management cannot replace the capacity of the proposed Interconnection and is not predictable enough to supply future energy needs.

2.6.1.7 Hydro System Improvements

WWP has a large capital investment in existing plant facilities and is striving for maximum efficiency and potential from the existing generating units. WWP's preliminary estimate of its hydro system improvement potential is between 18 and 36 average MW. Generally, the increases reflect improved output due to turbine and generator replacement/rehabilitation. Some hydro projects are presently being evaluated for improvement potential, including plant and site modifications. Additional money is being budgeted by WWP to finalize the study phase and provide preliminary site evaluation. Once the studies are finalized, any hydro system improvements will be completed if they are shown to be cost effective. Again, hydro system improvements would not provide the amount of energy necessary to be considered an alternative to the proposed Interconnection.

2.6.1.8 Fluidized Bed

Fluidized bed combustion is in a period of refinement in the electrical generation industry. The fluidized bed concept involves a process in which crushed and ground combustible material (such as coal) is held in suspension with a cushion of air blown through a porous floor. The sulfur recovery is performed within the fluidized bed with the addition of limestone. This can eliminate the need for large, expensive scrubber systems downstream from the combustion area, as in conventional plants today. DOE, the manufacturing industry, and various trade groups have been the major contributors to fluidized bed research and development. Fluidized bed generation plants are currently constructed through 100-MW size. This allows for small-size plant installations to follow load growth. The small plants can be built in a shorter period of time compared to a large coal plant, allowing a utility to adjust for changes that occur over the years rather than being locked into one site for many years, as with a large generating facility. Because of its claimed versatility, excellent emissions control, and fuel utilization characteristics, fluidized bed generation could be a promising energy resource of the future. But, it is currently too small in plant size and too experimental in nature to be considered an alternative to the proposed Interconnection.

2.6.1.9 Energy Storage

WWP monitors information as it becomes available on all systems that have potential to be used to ease peak load conditions in its service area. Energy shifting devices that would shift peak loads to off-peak hours and off-peak energy to peak hours are continuously evaluated. These devices could ease peak energy deficiencies and will be evaluated as more information becomes available and operating experience is gained. They are not, however, currently an alternative to the proposed Interconnection.

2.6.1.10 Fuel Cells

A fuel cell is a device that converts the chemical energy of a fuel directly to usable energy in the form of electricity and heat without fuel combustion as an intermediate step. The fuel cell is 40 percent efficient producing electricity and 80 percent efficient operating in a cogeneration mode. Fuel cells generally show economic potential for commercial application such as in restaurants, apartment complexes, and possibly smaller-sized industrial operations. The fuel cell can operate on any hydrocarbon fuel; however, natural gas is currently the only economic fuel that meets the requirements of the fuel cell. The present cost of energy from a fuel cell is relatively high due to high capital cost. With mass production and technology improvements, the costs could decline, allowing the fuel cell to become a part of WWP's resource alternatives.

WWP continues to monitor development of fuel cells for future application, but at this time, fuel cells do not meet the stated purpose of the proposed Interconnection to develop low cost power.

2.6.1.11 Geothermal

Geothermal energy is currently being used economically world-wide and offers a large variety of applications. Unfortunately, there are no identified geothermal sites existing in the inland Northwest capable of supporting an electrical generating plant. The nearest identified sites to WWP's territory that are capable of supporting power generation are located in southern Idaho and southeast Oregon. Development of these sites would not be an economically viable alternative to the proposed Interconnection.

2.6.1.12 Hydro

WWP estimates that the additional hydroelectric potential for the Northwest region is approximately 3,000 average MW. However, only 324 average MW of this potential is ultimately developable due to environmental/social constraints, minimum instream flow requirements, economics, and friction/efficiency losses. Of the 324 MW, 194 average MW can be considered firm power. Estimates show that 50 to 80 percent of the developable hydroelectric power would be produced during only 4 months of the year (April through July). Because of the surplus energy available in the region during this 4-month period, the value of power produced from a run-of-river hydroelectric facility would be less than that of a comparable thermal facility that is capable of a uniform annual production. The small power potential and seasonal nature of additional hydroelectric development eliminate this as an alternative to the proposed Interconnection.

2.6.1.13 Nuclear

Although WWP has purchased electricity from nuclear generation in the past, the company is no longer considering future nuclear generation options. Nuclear power has lost the momentum it once had, due to long construction lead times, high construction costs, waste disposal concerns, regulatory constraints, and public opposition.

2.6.1.14 Solar

Currently, two solar power conversion systems are available to convert radiant energy from the sun into usable electrical power. One of these systems basically consists of a field of heliostats (more commonly known as mirrors) that reflect the sun's rays to a specified receiver for indirect conversion to electricity. The other system is a field of photovoltaic (solar cell) panels used to

absorb the sun's rays for direct conversion to electricity. Each of these conversion methods is a proven form of technology that is commercially available and in operation today, although the costs are high. In addition to the high cost of energy, no capacity credit can be given to solar generation due to its intermittent supply of electricity (i.e., day/night cycle and cloudy weather). Although WWP is assessing the potential for solar energy along with other energy alternatives, this alternative source of energy for the Northwest is not considered practical for the present and realistic for the near future because of the associated high cost of energy.

2.6.1.15 Wind

The process of converting power from the wind to useful energy has been technically feasible for many years. The first machines used wind to pump water and this basic concept is still being used to produce electricity. WWP conducted studies on the integration of wind electric generation into its generating system, but concluded that, while WWP's service territory does contain some areas with sufficient wind for the operation of large wind turbines, wind turbines were not economically viable at this time. Thus, wind energy does not meet the stated purpose of the proposed Interconnection to develop low cost power.

2.6.1.16 Fuel Substitution

In some industrial applications, there is a potential to substitute other fuels such as natural gas for electricity, which would reduce the demand for electricity. In other industrial applications, there is no substitute for electricity (e.g., electric motors). Fuel switching in the industrial sector (as well as in the residential and commercial sectors) is occurring and will continue as economics dictate. However, fuel substitution cannot replace the capacity of the proposed Interconnection.

2.6.2 Transmission System Alternatives

In addition to energy supply alternatives, WWP analyzed alternative electrical designs and the potential for upgrading existing transmission line interconnections. The upgrades, additions, and alternative transmission designs examined by WWP prior to adopting the proposed action are discussed below.

2.6.2.1 WWP 115-kV Sunset-Kettle Falls

WWP operates a single circuit 115-kV line between Sunset Substation in Spokane County and the Kettle Falls Generating Station near Colville in Stevens County (see Map 2-8). The facility interconnects Little Falls Dam and Long Lake Dam with the Spokane area and Stevens County

electrical loads. A number of 13-kV distribution substations are operated off of the line. Potential use of the 115-kV facility includes conversion to 230-kV and/or expansion of the existing ROW. WWP's considerations and findings in rejecting this alternative are discussed below:

- A 230-kV parallel or overbuild of the entire route is not practical, due to the extensive number of sharp angles in the existing alignment. Cost of such construction would be prohibitively expensive.

- Overbuild of the existing line to a triple circuit configuration would require removing the 115-kV circuit from service for possibly 2 years. Without the availability of adequate 115-kV alternate service, system reliability would be degraded.

- Triple-circuit construction over the distances being considered does not meet WWP's or the Western Systems Coordinating Council (WSCC) reliability standards.

- Removal of the 115-kV line and replacement with a doublecircuit 230-kV line would require conversion of the 115/13-kV substations to 230/13-kV. The conversion would be expensive and would reduce the transfer capability and reliability of the proposed Interconnection to unacceptable levels.

2.6.2.2 BPA Bell-Boundary 230-kV Circuits

BPA operates four circuits (three 230-kV and one 115-kV) between Boundary Dam in northern Pend Oreille County and Bell Substation in northeast Spokane (see Map 2-8). Bell-Boundary #1 and #2 are separate 230-kV circuits located within the same transmission corridor in Spokane and Pend Oreille Counties. Bell-Boundary #3 and #4 circuits are located in Pend Oreille, Stevens, and Spokane Counties; circuit #3 is operated at 230-kV, while circuit #4 is operated at 115-kV for service to local distribution loads.

Bell-Boundary #1 and #2. A possible alternative to construction of a new transmission line on new ROW is to convert the existing Bell-Boundary single-circuit lines to double-circuit construction. The existing circuits are not capable of carrying the additional 600 to 1,000 MW transfers proposed by WWP for the B.C. Hydro Interconnection; therefore, additional circuits would be required. Reconstruction would require a complete tear down of the existing circuits and erection of new structures, with temporary removal of the lines from service. The transmission system remaining in service during such reconstruction could have insufficient capacity to carry area power transfers, and would require reducing generation at Boundary Dam for as much as 2 years, while the 2 circuits were out of service. WWP does not consider this to be an acceptable trade-off to reducing ROW requirements. Termination of the two additional

circuits at Bell would also require significant upgrade to the WWP transmission system in the Spokane area (capacity additions and ROW expansion would be needed from Bell to the Beacon, Westside, and Marshall Substations) and potentially to other portions of the 230-kV transmission grid. In addition, termination at Bell does not meet the criteria of a WWP-owned (or private) transmission path.

Bell-Boundary #3 and #4. Bell-Boundary #3 and #4 circuits could be upgraded to a higher capacity with larger size conductors, increasing the transfer capability to approximately 600 MW (firm capacity proposed for the Interconnection). This is not considered an attractive alternative at this time for the following reasons:

- WWP requires costs and control equal to capacity ownership to provide an acceptable firm transmission path; however, BPA and WWP do not have such an agreement. Reconductoring the existing circuits and converting substations to 230/13-kV operation would be costly. In addition, a system having multiple intervening distribution substations is not attractive to WWP, since electrical reliability and maximum transfer capability are reduced.

- Should WWP and B.C. Hydro desire a firm transfer capacity of 600 to 1,000 MW, a second 230-kV circuit would be needed.

2.6.2.3 500-kV Transmission

A new 500-kV single-circuit facility with Bell as the Spokane area termination was considered as an option to the double-circuit 230-kV proposal. The 500-kV considerations are described below:

- Line construction costs per mile are equivalent.

- A double-circuit transmission line provides a more reliable transmission path than a single-circuit line. Two circuits reduce dependency on neighboring systems for transmission support during outage contingencies.

- Two circuits allow the transfer of firm power from B.C. Hydro to WWP; one circuit does not. Without a firm path, WWP would be required to rely upon neighboring systems to transfer power during the periods that the 500-kV interconnection was out of service.

- An uncompensated single-circuit 500-kV line transfers only 190 MW of a scheduled 1,000 MW between B.C. Hydro and WWP during heavy winter loading conditions. The remaining 810 MW flows on the existing B.C. Hydro-BPA 500-kV Interconnection as

inadvertent (loop) flow. This is unacceptable from the standpoint of impacts to both the BPA and B.C. Hydro systems.

- Integration of the B.C. Hydro interconnect into the Bell Substation, which already serves as the termination point for large blocks of existing federal and non-federal generation, would adversely affect WWP system security and reliability.

- Bell termination would require substantial upgrade of interconnections to the WWP system, as well as internal WWP modifications which would otherwise be unnecessary.

- Bell termination would require an ownership arrangement between WWP and BPA.

- System studies indicate that a double-circuit 230-kV line with 50 to 70 percent series compensation can meet the objective of increasing the British Columbia to Northwest transfer capability by approximately 1,000 MW.

- A 230-kV interconnection allows some flexibility in determining Spokane area terminals for the project. This flexibility is reduced when a 500-kV alternative is considered.

- WWP has 230-kV design and construction experience which favors 230-kV development when considering economic trade-offs with 500-kV.

- Environmental impacts associated with 500-kV transmission tend to be more difficult to mitigate than 230-kV. A 230-kV project can typically be constructed of double and single-pole tubular steel or wood structures, which are considered to have environmental advantages (e.g., less ground disturbance and more routing flexibility) over the lattice steel towers which are often required of 500-kV transmission lines.

- Line losses at 1,000 MW transfer levels are generally lower for one 500-kV circuit than for two 230-kV circuits.

The 230-kV alternative was selected by WWP because of reliability considerations, a direct connection to the WWP system, WWP ownership benefits, and potential for lower overall costs when considering transmission upgrade requirements and design/construction experience.

2.6.2.4 Underground Transmission

Undergrounding as an alternative for the proposed Interconnection would present concerns and serious drawbacks in the areas of cost, reliability, energy losses, and environmental consequences. Undergrounding of a double-circuit 230-kV transmission line would be considered only under special circumstances. The cost of installing such a line underground is 10 to 15 times that of an overhead line. The WWP transmission system has no underground 230-kV lines, but maintains a total of 6,500 feet of underground 115-kV line installed in downtown Spokane for a special application involving an indoor substation. Reliability is important for the proposed Interconnection because large load centers such as Spokane will rely on the transmitted power.

Reliability of a transmission line depends on the frequency of failure and the length of time it takes to identify, locate, and repair the problem. Although underground lines are not generally susceptible to weather related failures, they may be affected by digging operations, geologic changes ranging from erosion to earthquake, corrosion of the protective coating, and internal defects. Failures in overhead lines are relatively easy to detect and repair within a day or two. With underground lines, however, it may take days or weeks to identify, locate, and repair the failure.

Energy loss is an important consideration in the design of any transmission line, particularly one of the length of the proposed Interconnection. Operating the cooling, pressurization, monitoring, and control systems that may be required for an underground transmission system, but not for an overhead system, would increase the amount of energy used to operate the line. Undergrounding is, therefore, less desirable due to increased energy loss.

A double-circuit 230-kV underground transmission line would require an approximate 75-foot ROW clearance. A 6-foot-deep by 20-foot to 30-foot-wide trench would be excavated for cables placement. The cables would require a special thermal backfill to disperse heat generated by the cables and to protect the cables from rocks, chemicals, etc. in the soil. Small intermediary reservoir stations (requiring an enclosed yard 25 feet by 25 feet) could be required for low pressure, oil-filled cables. High-pressure, oil-filled, pipe-type cables utilizing forced cooling would require considerably larger areas.

Environmental problems with undergrounding are associated with trenching, burying the cable, increased access for monitoring purposes, land use, and esthetics. Burying the lines in trenches would eliminate the visual impacts of the overhead lines and supporting structures, but would not eliminate the need for a cleared ROW. The entire length and much of the width of the ROW would be disturbed by trenching, as opposed to primarily very localized structure site and access

road disturbance on overhead line ROWs. This results in greater impacts to environmental resources for the undergrounding alternative. The special backfill used to conduct heat away from the cables, and the heat itself, could also affect vegetation resources.

The material removed from the trench would need to be disposed of or broadcasted locally at the discretion of the landowner or land manager. Off-site disposal of the material would be expensive and difficult to obtain.

Water resources such as streams could be impacted by an underground system. Trenching through a streambed would result in substantial ground disturbance and sediment production. An overhead line would cause little or no ground disturbance at stream crossings, depending on tree removal requirements.

In the area of land use, the underground system has serious drawbacks due to the need for year-round access roads to the intermediate stations, and at least seasonal access of the line itself. Access roads of an overhead line can be allowed to revegetate, and are only reopened in the unlikely event of a line failure. In addition, alternative ROW uses, following the installation of an underground system, would be totally restricted. This would be necessary to minimize the possibility of damaging the cables and to maintain unobstructed access to expedite repair of the cable in case of a cable failure.

2.6.2.5 Superconducting Transmission

The recent development of materials which show superconducting characteristics at increasingly feasible temperatures may lead to many industrial and utility applications of superconductors in the future. However, much research must be done to develop the technology required for practical applications. Multi-year research projects designed to move toward the development of such technology are just beginning. WWP will continue to monitor this research and will consider utilizing superconductor technology at some point in the future, provided it can be shown to be a cost effective alternative. It is not anticipated, however, that such technology will be developed in a time frame necessary to be utilized on the proposed Interconnection.

2.6.3 Route Alternatives

2.6.3.1 Alternative Routes Terminating at the Beacon Substation

The reasonableness of terminating one of the alternative routes (Western, Northern Crossover, Southern Crossover) at the Beacon Substation was also investigated. Each of these alternative routes would cross the border near the Columbia River and follow segments of various

alternatives and the Proposed Route to Beacon. The Northern Crossover route would require backtracking (i.e., proceeding northeast before turning south), so it was dropped immediately. The Western and Southern Crossover alternatives were measured and compared with the Proposed Route. To terminate at Beacon, the Western Alternative would be 131.0 miles long, and the Southern Crossover would be 142.2 miles long, compared to 102.2 miles for the Proposed Route. This added line length and associated impacts (e.g., ROW clearance, access road construction, stream crossings) lead to the conclusion that alternative routes crossing the border at the Columbia River and terminating at the Beacon Substation were not reasonable alternatives to the Proposed Route, and they were dropped from further consideration.

2.6.3.2 Deer Park Crossover

A potential east-west route segment called the Deer Park Crossover was considered as an alternative route to reach the planned Marshall Substation. This segment would pass north of Deer Park and connect with the Western Alternative in the vicinity of Reflection Lake a few miles south of Springdale. The potential impacts along this route segment were examined, and it was rejected for detailed analysis for a number of reasons, which are presented below.

An analysis of 1:62,500 scale aerial photography revealed that the Deer Park Crossover would cross extensive areas of agricultural land, including an extensive area of important/prime farmland west of Deer Park. It would also necessarily affect numerous residences, especially if it were located on field edges (section lines or other land lines), as the residences tend to be concentrated along these areas. Not locating the transmission line along field edges or existing section line roads would greatly increase the disruption of agricultural activities in this area.

The Deer Park Crossover would also result in a somewhat greater level of visual impact than the Eastern Alternative. Approximately 20 miles of this crossover would be located on new ROW (not paralleling existing transmission lines), with a majority of this portion being visible from nearby residences. In comparison, 4 miles of the Eastern Alternative would be located on new ROW, thereby producing less of a visual impact. Considering its effect on existing land use and its greater visual impacts, the Deer Park Crossover appeared to offer no advantages over the alternative routes examined in detail and presented in this EIS.

2.7 Comparison of Environmental Impacts for the Proposed Route and Alternatives

Environmental impacts to resources associated with the proposed Interconnection project were compared between the Proposed Route terminating at WWP's existing Beacon Substation and the four project alternatives that would terminate at the planned Marshall Substation. The same assumptions were used for impact assessment of all project alternatives, variations, and route

options including a 125-foot transmission line ROW and use of specific construction practices along new and existing ROWs.

In comparing the five alternative routes, five route variations, and two route options, the impacts associated with the following resource areas were determined to be both similar and not significant: air quality, geology and soils, aquatic ecology, cultural resources, transportation, and noise. Significant impacts would potentially occur to wetlands, vegetation, wildlife, land use, visual resources, and socioeconomics. Tables 2-6 and 2-7 provide a summary comparison of concerns and impacts associated with the alternatives, route variations, and route options. Significant impacts are identified by an *. Impacts that would remain significant following mitigation are identified by two **. Section 4.0 of this EIS presents detailed discussions of significance criteria, impacts, applicable mitigation measures, and unavoidable adverse impacts.

Selection of the No Action Alternative would have no adverse impacts on the resources presented on the tables; however, the employment, income, and tax revenues that would result from implementation of the proposed project (i.e., beneficial impacts) would not occur.

Table 2-6

Summary of Concerns and Impacts for the WWP/B.C. Hydro Interconnection for the Proposed Route and Alternatives

	Proposed Route	Eastern Alternative	Western Alternative	Northern Crossover Alternative	Southern Crossover Alternative	No Action Alternative
General						
Total line length (miles)	102.2	127.9	121.1	126.9	142.7	0
Capital construction cost[1] ($ million)	84.7	106.5	101.0	105.7	118.6	0[2]
Geology and Soils						
Potential landslide areas crossed (number)	0	0	3	2	2	0
Gravel pits crossed (number)	0	1	1	0	0	0
Prime farmland crossed (miles)	12.8	17.2	12.2	11.7	13.6	0
Surface Water						
Streams crossed under County Master Plans and Shorelines of State (number)	3	4	5	3	4	0
Floodplains and Wetlands						
Structures in a floodplain (number)	1	1	4	3	2	0
Palustrine forested wetland removed (acres)	8.5**	9.4**	21.2**	15.2**	9.1**	0
Vegetation						
Forest land cleared (acres)	1,035	1,352	1,310	1,477	1,753	0
Loss of old growth forest (acres)	0	0	0	9.1**	7.6**	0
Sensitive plant locations potentially crossed (number)	7*	7*	0	5*	6*	0
Riparian/forested vegetation removed (acres)	8.5**	9.4**	21.2**	15.2**	9.1**	0

Table 2-6 (Continued)

	Proposed Route	Eastern Alternative	Western Alternative	Northern Crossover Alternative	Southern Crossover Alternative	No Action Alternative
Wildlife						
Communal bald eagle roost site (number)	0	1*	0	0	0	0
River crossings with potential for bald eagle collisions (number)	1*	2*	1*	1*	1*	0
Open water crossings with potential for significant bird collisions (number)	0	0	0	0	0	0
Loss of old growth forest (acres)	0	0	0	9.1**	7.6**	0
Priority deer winter areas crossed (number)	1*	1*	5*	3*	3*	0
Mountain goat kidding area crossed (number)	1*	1*	0	1*	1*	0
Existing and Planned Land Use						
Parallel to existing transmission line ROW (miles)	93.1	115	37.9	59.2	109.0	0
Agricultural land crossed (miles)	14.2	22.4	18.7	17.3	15.8	0
Agricultural land lost from cultivation (acres)	4.2	6.7	5.6	5.2	4.7	0
Developed/residential land crossed (miles)	0.8	1.7	1.0	1.0	1.0	0
Residence removed (number)	7**	12**	7**	8**	10**	0
Residence within 100 feet of ROW (number)	10	19	17	13	13	0
Major inhabited building removed (number)	0	2**	1**	1**	1**	0
Major inhabited building within 100 feet of ROW (number)	2	1	1	0	0	0
Major uninhabited building removed (number)	3	4	1	1	3	0
Major uninhabited building within ROW (number)	0	1	1	1	1	0
Naturalness of recreation area substantially reduced (miles)	0	0	0	0	0	0
Tribal Land Crossed (miles)	0	0	3.4	3.4	3.4	0
Land use policies prohibit transmission line ROWs (miles)	0	0	2.8	0	0	0
Designated tract/estate development areas crossed (miles)	0	0	0	0	0	0

Table 2-6 (Continued)

	Proposed Route	Eastern Alternative	Western Alternative	Northern Crossover Alternative	Southern Crossover Alternative	No Action Alternative
Visual Resources						
Visual quality objectives exceeded (miles)	0	0	14.5**	1.8**	0.1*	0
Socioeconomics						
Increase in property tax receipts (percentage)						
Pend Oreille	10.4[3]	10.4[3]	0	4.2	8.3[3]	0[4]
Stevens	<1.0	<1.0	8.2[3]	6.2[3]	5.1[3]	0[4]
Spokane	<1.0	<1.0	<1.0	<1.0	<1.0	0[4]
Lincoln	0	0	<1.0	<1.0	<1.0	0[4]
Loss of timber revenue ($ thousand)	352	460	445	502	596	0

[1]Capital construction cost assumes $814,700 per mile of transmission line for construction and ROW; and $1,472,200 for upgrading WWP's existing Beacon Substation or $2,367,000 for the planned Marshall Substation.

[2]The No Action Alternative would avoid direct construction costs; however, it would involve costs for acquiring electricity from other sources. These costs cannot be quantified as the other potential sources have not been identified by WWP.

*Potential significant impact that would be mitigated (see Section 4.9 of this EIS)

**Potential significant impact that could not be mitigated (i.e., unavoidable adverse impacts)

[3]This would be a significant beneficial impact.

[4]Significant beneficial impacts would not accrue under the No Action Alternative.

	Boundary Dam Variation	Segment of Proposed Route Replaced	Orchard Prairie Variation	Segment of Proposed Route Replaced	Eastern Route Option[2]	Segment of Proposed Route Replaced	Western Route Option[2]	Segment of Proposed Route Replaced	Chattanoy Variation	Segment of Eastern Alternative Replaced	Marshall Variation	Segment of Eastern Alternative Replaced	Onion Creek Variation	Segment of Western Alternative Replaced
General														
Total line length (miles)	1.0	5.1	2.0	3.5	91.0	92.5	90.5	92.5	16.3	17.7	7.1	4.3	18.3	17.2
Capital construction cost[1] ($ million)	0.81	4.2	1.6	2.9	74.1	75.4	73.7	75.4	13.3	14.4	5.8	3.5	14.9	14.0
Geology and Soils														
Potential landslide areas crossed (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gravel pits crossed (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prime farmland crossed (miles)	0.4	0	0.4	0	12.5	12.5	12.5	12.5	0.3	1.0	0.3	1.2	1.9	0.5
Surface Water														
Master Plan streams crossed (number)	1	0	0	0	3	3	3	3	1	0	0	0	1	1
Floodplains and Wetlands														
Structures in a floodplain (number)	0	0	0	0	1	1	1	1	0	0	0	0	0	0
Palustrine forested wetland removed (acres)	0	0	0	0	5.3**	8.5**	7.9**	8.5**	0.6**	0	0	0	0	0
Vegetation														
Forest land cleared (acres)	11	76	6	0	952	946	945	946	141	129	87	30	224	167
Loss of old growth forest (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sensitive plant locations potentially crossed (number)	0	0	0	0	7*	7*	7*	7*	0	0	0	0	0	0
Riparian/forested vegetation removed (acres)	0	0	0	0	5.3**	8.5**	7.9**	8.5**	0.6**	0	0	0	0	0
Wildlife														
Communal bald eagle roost site (number)	0	0	0	0	0	0	0	0	1*	0	0	0	0	0
River crossings with potential for bald eagle collisions (number)	1*	0	0	0	1*	1*	1*	1*	1**	0	0	0	0	0
Water crossings with potential for significant bird collisions (number)	0	0	0	0	1*	0	0	0	0	0	0	0	0	0
Loss of old growth forest (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Priority deer winter areas crossed (number)	0	0	0	0	1*	1*	1*	1*	0	0	0	0	2*	2*
Mountain goat kidding area crossed (number)	0	0	0	0	0	1*	1*	1*	0	0	0	0	0	0

Table 2-7. Summary of Concerns and Impacts for the WWP/B.C. Hydro Interconnection Variations and Route Options

	Boundary Dam Variation	Segment of Proposed Route Replaced	Orchard Prairie Variation	Segment of Proposed Route Replaced	Eastern Route Option[2]	Segment of Proposed Route Replaced	Western Route Option[2]	Segment of Proposed Route Replaced	Chattaroy Variation	Segment of Eastern Alternative Replaced	Marshall Variation	Segment of Eastern Alternative Replaced	Onion Creek Variation	Segment of Western Alternative Replaced
Existing and Planned Land Use														
Parallel to existing transmission line ROW (miles)	0	0	0	2.7	90.5	87.5	90.5	87.5	0	12.4	1.6	1.3	0	0
Agricultural land crossed (miles)	0	0	0.8	1.0	13.0	14.0	11.4	14.0	2.0	6.9	0.1	1.2	1.6	2.0
Agricultural land lost from cultivation (acres)	0	0	0.25	0.3	3.9	4.2	3.4	4.2	0.6	2.1	<0.1	0.4	0.5	0.6
Developed/residential land crossed (miles)	0.2	0	0	0	0	0	0	0	1.2	1.3	0.6	0.2	0	0
Residence removed (number)	0	0	0	0	17**	7**	34**	7**	0	1**	2**	2**	0	0
Residence within 100 feet of ROW (number)	0	0	1	0	12	4	25	4	2	3	12	3	2	2
Major inhabited building removed (number)	0	0	0	0	0	0	0	0	0	1**	0	0	0	0
Major inhabited building within 100 feet of ROW (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Major uninhabited building removed (number)	0	0	0	0	2	3	4	3	0	0	0	0	1	0
Major unhabited building within ROW (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naturalness of recreation area substantially reduced (miles)	0	0	0	0	0	0	0	0	0.6**	0	0	0	0	0
Tribal Land Crossed (miles)	0	0	0	0	0	0	0	0	0.6**	0	0	0	0	0
Land use policies prohibit transmission lines ROWs (miles)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Designated Tract/Estate development areas crossed (miles)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Visual Resources														
Visual quality objectives exceeded (miles)	0	0	0	0	0	0	0	0	0.4**	0	0	0	0	5.9**
Socioeconomics														
Increase in property tax receipts (percentage)														
Pend Oreille	<1.0	<1.0	0	0	10.4[2]	10.4[2]	10.4[2]	10.4[2]	0	0	0	0	0	0
Stevens	0	<1.0	0	0	<1.0	<1.0	<1.0	<1.0	0	0	0	0	<1.0	<1.0
Spokane	0	0	<1.0	<1.0	0	0	0	0	<1.0	<1.0	<1.0	<1.0	0	0
Lincoln	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loss of timber revenue ($ thousand)	4	26	2	0	324	322	321	322	48	44	30	10	76	57

[1]Assumes construction and ROW cost of $814,700 per mile of transmission line.

[2]This would be a significant beneficial impact.

*Potential significant impact that would be mitigated (see Section 4.9 of this EIS).

**Potential significant impact that could not be mitigated.

Table 2-7. (Continued)

AFFECTED ENVIRONMENT

3.0

3.0 AFFECTED ENVIRONMENT

3.1 Proposed Route

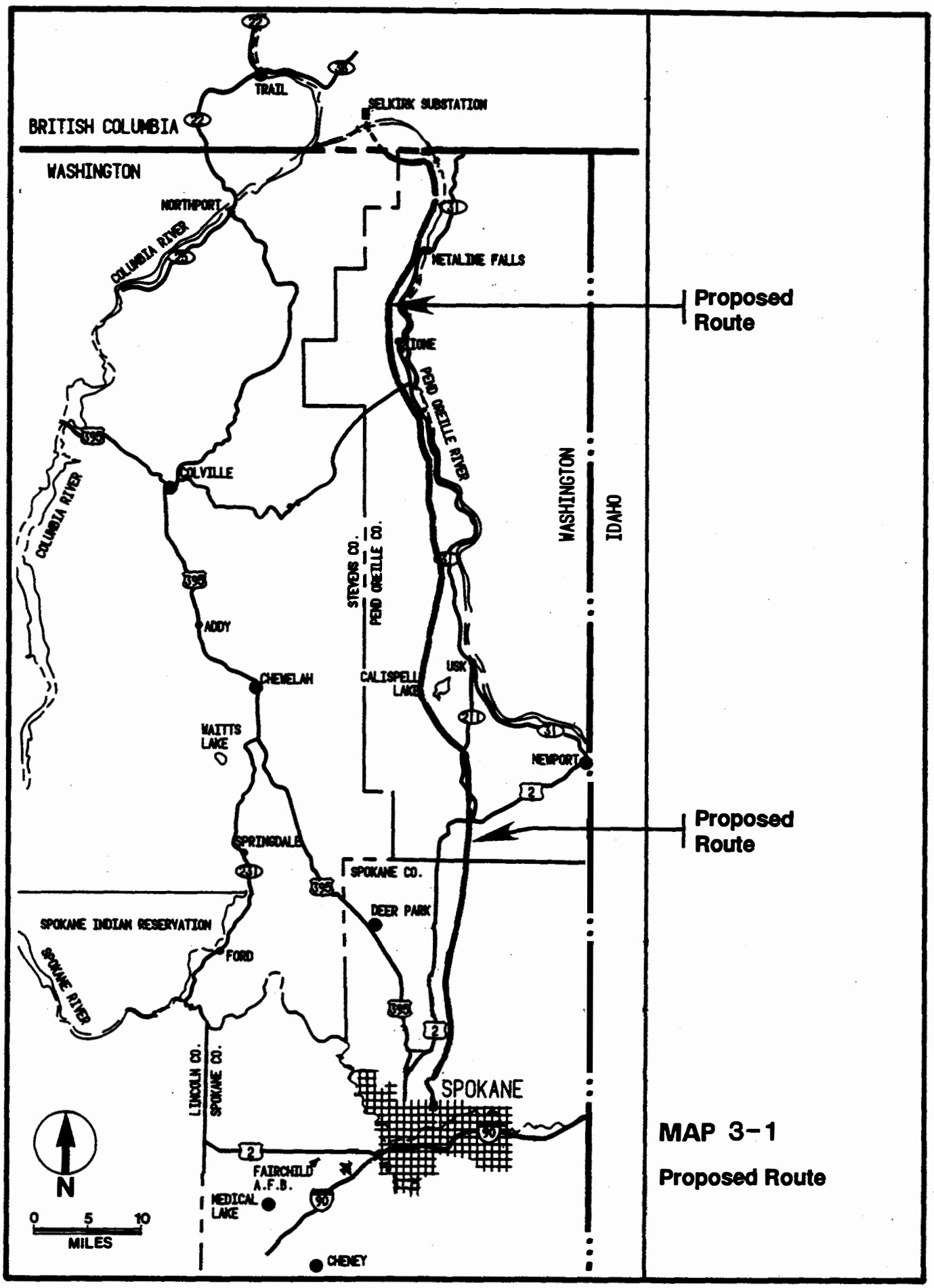
The Proposed Route extends from the international border, west of Boundary Dam, to the existing Beacon Substation, located northeast of Spokane (see Map 3-1). The route follows the west side of the existing Bonneville Power Administration (BPA) transmission line right-of-way (ROW) between Boundary Dam to a point southeast of Sacheen Lake (see Map 2-2, Sheets 1-5, at the back of this FEIS). The route then crosses the existing BPA circuits and follows the east side of the corridor to an area southeast of Mead. From Mead, the Proposed Route travels south to terminate at the existing Beacon Substation.

As discussed in Section 2.1, WWP is considering both sides of the existing BPA circuits as route options (see Map 2-2, Sheets 1-4). In addition, two smaller options located near Chattaroy and Mead (see Map 2-2, Sheet 4) indicate routing opportunities along existing ROWs, where the Proposed Route deviates to the east. For the majority of the resources examined in this EIS, the current environmental conditions along the Eastern Route Option and Western Route Option (parallel to the existing BPA corridor) and along these smaller route options near Chattaroy and Mead are the same as those described for the Proposed Route (e.g., air quality and socioeconomics). Only the environmental disciplines (e.g., land use) that differ from the Proposed Route are discussed in association with these project route options.

3.1.1 Air Quality

Air quality throughout the region is good. The predominant area that the proposed Interconnection would pass through is in attainment status, indicating that state and federal air quality standards are being maintained. The Spokane metropolitan area contains non-attainment areas for carbon monoxide (CO) and total suspended particulate (TSP). Therefore, a small portion of the Proposed Route from south of Mead to the Beacon Substation would pass through the Spokane metropolitan area particulate (PM-10) nonattainment area, indicating that the air quality standard for this class of particulates (10 microns or less in size) is not currently being met. Regional sources of air pollution include the following:

- industrial plants;
- wood fuel boilers;
- space heating with coal, oil, wood, and gas;
- unpaved and paved roads;


BRITISH COLUMBIA
WASHINGTON
TRAIL
SELKIRK SUBSTATION
NORTHPORT
COLUMBIA RIVER
METALINE FALLS
Proposed Route
IONE
PEND OREILLE RIVER
COLVILLE
COLUMBIA RIVER
STEVENS CO.
PEND OREILLE CO.
WASHINGTON
IDAHO
ADDY
CHEWELAH
CALISPELL LAKE
USK
WAITTS LAKE
NEWPORT
Proposed Route
SPRINGDALE
SPOKANE CO.
DEER PARK
SPOKANE INDIAN RESERVATION
FORD
SPOKANE RIVER
LINCOLN CO.
SPOKANE CO.
SPOKANE
FAIRCHILD A.F.B.
MEDICAL LAKE
CHENEY
N
0 5 10
MILES
MAP 3-1
Proposed Route

- internal fuel combustion emissions by automobiles;
- agricultural tilling;
- open and agricultural burning; and
- high winds on bare soil.

3.1.2 Geology and Soils

3.1.2.1 Geology

The Proposed Route traverses the Okanogan Highland Physiographic Province between the international boundary and the Beacon Substation. The southern portion of the route approaches the Spokane Plateau division of the Columbia Plateau Physiographic Province, which occurs south of the Spokane River.

The Okanogan Highlands are characterized by moderate slopes and broad, rounded summits. With the exception of the main river valleys, much of the province lies above 4,000 feet in elevation, with a few peaks attaining elevations of approximately 8,000 feet. The province is comprised of several upland areas separated by a series of north-south trending river valleys (Franklin and Dryness 1973). The bedrock geology of the Okanogan Highlands is complex and diverse. It is comprised of a variety of rock types, ranging in age from Precambrian to late Tertiary. The Columbia and Pend Oreille River Valleys (particularly near the Columbia Basin) were influenced in the later Tertiary period by eruptions of andesite and basalt lavas. Due to post-Miocene uplift and erosion, only a few basalt remnants occur north of the Spokane River (McKee 1972).

During the Pleistocene, virtually the entire province was covered repeatedly by glacial ice, approximately 5,000 feet thick. As a result of the glaciation, deposits of glacial drift are found surrounding the highest mountain peaks (i.e., Huckleberry and Calispell Ranges), forming "islands" of original geologic material above the previous ice level (Flint 1937). The glaciated landscape of the Okanogan Highlands exhibits a combination of erosional features, including polished and striated outcrops and rock-basin lakes, and depositional features, including end moraines, terraces formed along the shores of ice-marginal lakes, and carpets of outwash (Easterbrook and Rahm 1970).

The Proposed Route initially crosses sedimentary rocks exposed by thrust faults. It then traverses small areas of sandstones and shales south of Ione, granitic bedrock, metamorphosed sandstones and mudstones, and finally glacial debris near Beacon (Alt and Hyndman 1987).

Topography. The Proposed Route travels in a southeast direction from the Selkirk Substation, crossing mountainous terrain to the east of the Calispell Mountains. The route continues along the western slope above the Pend Oreille River Valley. The elevation fluctuates approximately 600 feet along this portion of the route within the hilly terrain. Southeast of Calispell Lake, the route descends into a small valley, rises approximately 700 feet over Grayback Mountain, and then descends 700 feet into Deer Valley. The route then crosses Deer Valley, traverses low hilly terrain, and rises west over Bare Mountain, with a 600 feet elevation change. The Proposed Route then descends 1,000 feet, prior to crossing the Little Spokane River, and descends into the Little Spokane River Valley. Before turning westward, directly north of Spokane, the route crosses nearly level terrain. The route segment from Mead to the Beacon Substation traverses several ridges, hills, and intermittent stream valleys of an upland area before crossing the sideslope of the western flank of Little Baldy. The route continues southward, rising approximately 500 feet to Beacon Hill located directly north of the Beacon Substation.

The Boundary Dam Variation crosses the Pend Oreille River and rises approximately 500 feet in elevation near the United States-Canada boundary. This variation connects with the Proposed Route at Boundary Dam. The Orchard Prairie Variation travels south over generally less diverse relief than the segment of the Proposed Route it would replace. The variation traverses an upland area over which it rises approximately 250 feet and terminates at its junction with the Proposed Route segment located directly north of Bigelow Gulch.

Geologic Hazards. The potential geologic hazards associated with the proposed Interconnection relate to landslide potential and seismic activity. No areas along the Proposed Route are listed by Radbruch-Hall et al. (1976) as potential landslide areas. Seismic potential along the transmission line route appears to be minimal. According to Algermission et al. (1982), a 90 percent probability exists that ground motion would be less than 4 percent of acceleration due to gravity once in 50 years in the southern portion of the project area, and ground motion would not exceed 9 percent in the northern portion.

Earthquakes are generally measured in terms of magnitude and intensity. Magnitude indicates the amount of energy released at the origin of the earthquake (epicenter), and is most commonly measured by the Richter Scale (Richter 1958). However, the magnitude measurement neglects to account for the geology of the area, which governs the extent of damage that would be caused by an earthquake, and is limited when assessing potential impact to the transmission line.

Intensity indicates the ground-shaking effect on an area. It is based on actual observations and subsequent damages and is a function of those features that determine the amount of damage. Intensity is measured on the modified Mercalli Scale (Wood and Neuman 1931) and is most

applicable for potential impact assessment. Intensity values on this scale range from I (least intensive) to XII (most intensive). The characteristic effects of these values are presented in Table 3-1. The modified Mercalli Scale represents ground motion intensity at any given location; whereas, the Richter Scale measures earthquake intensity at the epicenter. Earthquake activity recorded within 100 miles of the Proposed Route totals four events within the last 150 years. One event occurred within 30 miles of the Proposed Route at Colville, Washington on November 1, 1906 and registered V on the modified Mercalli Scale. A second event was recorded within 30 to 40 miles of the Proposed Route near Rathdrum, Idaho on March 11, 1918; this quake registered V. The third event was recorded approximately 60 miles from the route at Sandpoint, Idaho on November 1, 1942, registering VI. The fourth earthquake event occurred within 30 miles of the route on April 28, 1965 near Nordman, Idaho. This event also registered V on the Mercalli Scale (Stover 1982).

Mineral Resources. Northeastern Washington has witnessed a long and profitable mining history including gold, silver, and copper. Lead and zinc, however, currently lead Washington's metallic mineral production. These two metals occur together in sulfide minerals; the host rock is usually limestone (McKee 1972). The northern Pend Oreille Valley also boasts a major non-metallic mineral industry. The most notable is the Lehigh Portland Cement Company's plant located at Metaline Falls. Several areas of sand and/or gravel excavation occur proximate to the southern portion of the Proposed Route near Mead.

Specific areas along the Proposed Route were also identified for future mineral exploration and development from the Colville National Forest Land and Resource Management Plan (Forest Service 1987). These areas include:

- four miles of high minerals potential north of Metaline Falls;
- three miles of high minerals potential near Deer Mountain;
- two miles of moderate to high minerals potential in the vicinity of Blueslide; and
- four miles of high minerals potential west of Ruby Mountain.

3.1.2.2 Soils

This section describes the characteristics of the soil types encountered along the Proposed Route and highlights those characteristics that may affect the stability of the supporting structures, impact the natural environment, or affect agricultural production. The Pend Oreille County and Spokane County soil surveys were used as sources of information for soil type descriptions of those soils present along the Proposed Route within these two counties (SCS-In Press; SCS 1968).

Table 3-1

Earthquake Descriptions for the Modified Mercalli Scale and Richter Scale

Mercalli Intensity	Characteristic Effects
I	Detected only by sensitive instruments.
II	Felt only by a few at rest.
III	Felt indoors, like the vibrations of a truck.
IV	People awakened, objects rock, windows rattle.
V	Plaster falls, windows broken.
VI	Felt by all, objects fall, many frightened.
VII	Walls crack, plaster falls, waves on pond.
VIII	General alarm, buildings damaged, chimneys fall.
IX	Many buildings destroyed, underground pipes fail.
X	Only best buildings and structures survive.
XI	Few buildings survive, bridges destroyed.
XII	Total destruction, objects thrown into the air.

Richter Magnitude	Characteristic Effects	Comparison
1 - 3.9	Only observed instrumentally or felt only near the epicenter.	Mercalli intensity IV or less.
4 - 5.9	Surface fault movement is small or does not occur. Felt at distances of up to 20 to 30 miles from the epicenter; may cause damage in small area.	Can approach Mercalli intensity of VII.
6 - 7.9	Moderate to severe earthquake range. Fault rupture probable; landslides liquefaction, and ground failure triggered by shock waves.	Approximately VII to IX on the modified Mercalli Scale.
8 - 8+	Damage extends over a broad area, depending on magnitude and other factors.	Maximum Mercalli intensity ranges from VIII to XII.

Soils along the Proposed Route in Pend Oreille and Spokane Counties occur on mountains, foothills, river terraces, and in basins. A general description of all soil associations found along the Proposed Route is located in Appendix A. Soil associations consist of one or more major soil type and at least one minor soil type.

The soils along the Proposed Route formed mostly in glacial deposits: till, glaciofluivial outwash, and glaciolacustrine sediments. Some have formed in alluvial and organic deposits on floodplains, and some formed in shallow, weathered granitic materials (residuum) on mountain slopes. More recent deposits of loess and volcanic ash have accumulated over most of the glaciated and nonglaciated areas. Loess is fine grained material, dominantly of silt-sized particles, and deposited by wind. Loess originated from fine glacial material resulting from the post-glacial, xerothermic period, which was accompanied by strong westerly winds. Volcanic ash has accumulated from the eruptions of Mt. Mazama (Crater Lake Oregon) and Glacier Peak 12,000 years ago (SCS 1968), as well as the recent Mt. Saint Helens eruption. Volcanic ash is an important constituent of the upper part of soil profiles along the Proposed Route. Ash gives the soils a finer texture and enhances the available water capacity, although it has a low bulk density and generally a low level of fertility (SCS 1982).

Soils considered highly erodible or classified as prime farmland were considered significant for transmission line routing. The erosion factor "K" indicates the susceptibility of a soil to sheet and rill erosion by water. The "K" factor is one of the six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. "K" factor estimates are based primarily on percentage of silt, sand, organic matter, and on soil structure and permeability. Values of "K" range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water. A "K" factor of 0.40 or greater is generally indicative of high potential for soil erodibility; moderate erodibility values are between 0.20 and 0.39; and low erodibility "K" factors are less than 0.20 (SCS 1981).

In general, soils found along the Proposed Route in Pend Oreille County have moderate erosion potentials, although at least one soil component of three of the seven soil association map units have a high "K" factor value. The high soil organic matter content of Proposed Route soils tends to lower the "K" factor value although the high silt content of surficial loess and ash deposits tends to raise the "K" value. As a result, most "K" factor values are between 0.20 and 0.39 and are classified as moderate. Soils found along the Proposed Route in Spokane County have, in general, a high erodibility potential with five of seven soil association map units having at least one soil component with a high "K" factor value.

Areas designated as prime farmland are of particular concern to transmission line routing. Prime farmland is defined in the 1981 U.S. Department of Agriculture (USDA) Farmland Protection

Policy Act (Pub. L. 97-98) as land best suited for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses, although it may currently be used as cropland, pastureland, or rangeland. The location of prime farmland soils was taken from the detailed soil maps for Pend Oreille County (SCS-In Press) and from smaller scale Important Farmlands Map for Spokane County (SCS 1978). The Proposed Route crosses approximately 12.8 miles of prime farmland soils, which constitutes 13 percent of the total Proposed Route length of 102.2 miles.

Soils crossed by both the Boundary Dam and Orchard Prairie Variations have similar erosion hazard potentials as compared with segments of the Proposed Route replaced by these variations. Both the Boundary Dam and Orchard Prairie Variations each cross 0.4 mile of prime farmland soils, as compared to no prime farmland soils crossed by either of the Proposed Route segments replaced.

The small route option located along the existing BPA corridor immediately east of Chattaroy (see Map 2-2, Sheet 4) has similar erosion hazard potential as the segment of the Proposed Route replaced. However, the route option crosses 0.25 mile of prime farmland soils, as compared to 0.3 mile for the Proposed Route segment replaced. The small route option located east of Mead (see Map 2-2, Sheet 4) also has similar erosion hazard potential as the segment of the Proposed Route it would replace. The route option along the existing ROW would not cross any prime farmland soils; whereas, the segment of the Proposed Route replaced would intersect 0.3 mile of this soil type.

3.1.3 Surface Water

The proposed Interconnection study area lies within the Columbia River drainage basin and is comprised of five major sub-basins including the Columbia, Pend Oreille, Spokane, Little Spokane, and Colville Rivers. The Columbia River is the largest of these five, with a mean annual discharge of 100,100 cubic feet per second (cfs) at the international boundary (BLM 1987). Flows generally peak from mid-March through mid-June and are partially regulated by a network of water projects including hydroelectric, flood control, and irrigation. Many smaller, perennial streams flow into the larger systems and are of primary concern, since they are most frequently crossed by the proposed Interconnection.

The Shoreline Management Act of 1971 (Chp. 90.58 RCW) designates shorelines of the state to include all "shorelines" and "shorelines of state-wide significance." Shorelines include all streams that are not of state-wide significance and have an annual flow of 20 cfs or less and shorelines of lakes less than 20 acres in size. Shorelines of state-wide significance include streams with

mean annual flows of greater than 20 cfs and lakes greater than 20 acres in size. Associated wetlands are included with each designation.

The Washington State Forest Practices Board pursuant to Chapter 222 WAC has classified water bodies into five water categories. The Board classifies streams to determine their relative importance with respect to any development or land use, which could potentially impact the character of those waters. Type 1 waters include all waters inventoried as shorelines of the state. Type 2 waters are natural waters that are not classified as Type 1 water, have a high use, and are important from a water quality standpoint. Use of Type 2 waters include domestic water supplies, public recreation, and fish and wildlife uses. Type 3 waters have a moderate to slight use and are important from a water quality standpoint. The significance of Type 4 waters lies in their influence on water quality downstream in Types 1, 2, and 3 waters. Type 4 waters may be perennial or intermittent. Type 5 waters include all other waters in natural water courses, including streams with or without a well-defined channel, areas of perennial or intermittent seepage, ponds, and natural sinks. Because of the sensitivity and importance of Type 1 and Type 2 waters, only the water bodies classified as Type 1 or Type 2 were used in the EIS analysis and specific impact assessment.

The Proposed Route would cross a total of 70 streams, intersecting with 37 named and 24 unnamed streams (some multiple crossings) (see Table 3-2). Of these 70 water crossings, the Proposed Route would cross three water bodies classified as shorelines of the state and four Type 2 streams (see Table 3-2). One of these Type 2 streams is Cedar Creek, which provides the municipal water supply for the Town of Ione. The Proposed Route would cross Cedar Creek approximately 1.5 miles northwest of Ione. Table 3-3 outlines the summary comparisons of water resources crossed by the proposed Interconnection, including all project alternatives and variations.

The Boundary Dam Variation would cross the Pend Oreille River, which is classified as a shoreline of the state and a shoreline of state-wide significance and maintains a mean annual discharge of 27,250 cfs (BLM 1987). This individual crossing compares to two stream crossings along the segment of the Proposed Route replaced (see Table 3-4). The Orchard Prairie Variation would cross one unnamed intermittent stream. The segment of the Proposed Route replaced by this variation would cross a total of three unnamed intermittent streams (see Table 3-4). None of these streams are designated as Type 1 or Type 2 streams. No permanent surface water resources exist on the Beacon Substation property; however, the Spokane River flows approximately 800 feet to the south.

Table 3-2

Water Resources Crossed by the Proposed Route

Water Resource	Number of Crossings	Shoreline Management Act[1]	Shorelines of State-Wide Significance[2]	Type 1 and/or 2[2]
Russian Creek	1			
South Fork Russian Creek	1			
Pewee Creek	1			
Everett Creek	1			
Beaver Creek	1			
Flume Creek	1			
South Fork Flume Creek	1			
Linton Creek	1			
Sweet Creek	2			
Lunch Creek	1			
Lost Lake Creek	4			
Cedar Creek	1			2
Little Muddy Creek	1			
Big Muddy Creek	1			
Diamond Creek	1			
Renshaw Creek	1			
Lost Creek	1			
South Fork Lost Creek	1			
Ruby Creek	1			
Cusick Creek	2			
Tacoma Creek	1	X		1
South Fork Tacoma Creek	1			2
Trimble Creek	1			
East Fork Small Creek	1			
Small Creek	1			
South Fork Small Creek	1			
Winchester Creek	1			
Dorchester Creek	1			
South Fork Calispell Creek	2	X		1
Deer Creek	2			
Moon Creek	2			
Little Spokane River	2	X		1
Dry Creek	1			2
Deer Creek	1			2
Little Deep Creek	1			
Deadman Creek	1			
Bigelow Gulch	1			
Unnamed Streams	24			
TOTAL	70			

[1]Streams considered to be shorelines of the state pursuant to the Shoreline Management Act of 1971 (Chapter 90.58 RCW) and designated under County Shoreline Master Plans.

[2]Type 1 waters include all waters inventoried as shorelines of the state; Type 2 waters are natural waters not classified as Type 1, maintain high use, and are considered important for water quality.

[3]Source: WDNR 1978 to 1982.

Table 3-3

Summary Comparisons of Water Resources Crossed by Project Alternatives and Variations

Proposed Alternative or Route Variation	Water Resources Classified as Shorelines of the State[1]	Water Resources Classified as Shorelines of State-Wide Significance	Water Resources Classified as Type 2 Waters	Named Water Resources Crossed	Unnamed Water Resources Crossed	Total Number of Water Resource Crossings
Proposed Route	3	0	4	37	24	70
Eastern Alternative	4	1	4	40	24	74
Western Alternative	5	2	3	20	35	60
Northern Crossover Alternative	3	2	1	33	19	63
Southern Crossover Alternative	4	2	3	38	29	78
Boundary Dam Variation[2]	1	1	0	1	0	1
Orchard Prairie Variation[2]	0	0	0	0	1	1
Chattaroy Variation[2]	1	1	1	3	3	7
Marshall Variation[2]	0	0	0	0	1	1
Onion Creek Variation[2]	1	0	0	1	6	8

[1]This classification includes Type 1 waters.

[2]These transmission line segments include only the waterbodies crossed by the variations and do not include the remaining transmission line segments.

Table 3-4

Water Resources Crossed by the Interconnection Variations and the Route Segment Replaced

Variation	Water Resource	Number of Crossings	Shoreline Management Act[1]	Shorelines of State-Wide Significance[2]	Type 1 and/or 2[3]
Boundary Dam	Pend Oreille River	1	X	X	1
(Proposed Route Replaced)	Russian Creek	1			
	South Fork Russian Creek	1			
Orchard Prairie	Unnamed Streams	1			
(Proposed Route Replaced)	Unnamed Streams	3			
Chattaroy	Deer Creek	1			2
	Little Spokane River	2	X	X	1
	Dartford Creek	1			
	Unnamed Streams	3			
(Eastern Alternative Replaced)	Deer Creek	1			2
	Little Deep Creek	1			
	Deadman Creek	1			
Marshall	Unnamed Streams	1			
(Eastern Alternative Replaced)	Unnamed Pond	1			
Onion Creek	Onion Creek	2	X		1
	Unnamed Streams	6			
(Western Alternative Replaced)	Onion Creek	1	X		1
	Unnamed Streams	5			

[1]Streams considered to be shorelines of the state pursuant to the Shoreline Management Act of 1971 (Chapter 90.58 RCW) and designated under County Shoreline Master Plans.

[2]Type 1 waters include all waters inventoried as shorelines of the state; Type 2 waters are natural waters not classified as Type 1, maintain high use, and are considered important for water quality.

[3]Source: WDNR 1978 to 1982.

3.1.4 Floodplains and Wetlands

Floodplains. Floodplains are generally lowlands adjoining inland waters (usually flowing), which have a 1 percent chance of being inundated by flood in any given year. The base floodplain is defined as the 100-year (1 percent) floodplain (10 CFR 1022). Floodplains were identified using National Wetland Inventory Maps and high altitude aerial photography. It was assumed that areas showing wetland vegetation versus upland or timber vegetation would be the maximum physical extent of the floodplain.

Most of the streams crossed by the Proposed Route are small with poorly defined floodplains. Many occur in steep-sided drainages that do not develop broad floodplains. These small streams and associated floodplains crossed by the Proposed Route would be spanned by the transmission line, with no structures being located in the floodplain. Since the maximum span length for the proposed line would be approximately 2,000 feet, the only floodplain in which a structure might be located is the Little Spokane River (see Map 2-2, Sheet 3). This floodplain crossing is approximately 1,800 feet in length, and detailed engineering would be required to determine actual structure locations.

Wetlands. In general terms, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the plant types and animal communities present. The single feature that most wetlands share is soil or substrate that is at least periodically saturated with or covered by water (Cowardin et al. 1979). More specifically, the U.S. Army Corps of Engineers define wetlands as, "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil condition" (33 CFR 328.3[b]).

Based on U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory Maps (USFWS 1987), numerous relatively small wetlands are present within the project study area. The majority of these wetlands are classified as palustrine or riverine and are flooded on a seasonal basis, with both emergent and deciduous (i.e., scrub shrub and forest) vegetation present. As defined by the USFWS (1987), the Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, and emergent mosses or lichens. Typical vegetation species occupying palustrine areas include sedge, rush, cattail, bulrush, horsetail, willow, and grasses. Additional species commonly surrounding these habitats are cottonwood, elm, red maple, alder, birch, elderberry, rose, and snowberry.

The predominant wetlands present along or near the Proposed Route are concentrated in seven areas. Palustrine wetland areas occur directly south of Pewee Creek, east of the Proposed

Route; south of Lunch Creek, which occurs southwest of Metaline; at Tacoma Creek; near Deer Creek, which occurs south of Davis Lake; along Moon Creek, located southeast of Sacheen Lake; at the Little Spokane River; and within and directly north of Bigelow Gulch. Wetlands delineated on the National Wetlands Inventory Maps at Ruby Creek, Henry Brown Meadow, and at Small Creek located west of Cusick were examined during the field reconnaissance. These areas have been converted to hayfields and pasture and, therefore, are not included as wetland areas..

3.1.5 Aquatic Ecology

A variety of both perennial and intermittent water sources support the aquatic life that occurs within the project area. These water resources found throughout eastern Washington include lentic (non-flowing) systems that range from relatively shallow, eutrophic lakes in the southern portion of the study area to notably deeper oligo-mesotrophic lakes located more in the northern portion of the state. Lotic (flowing) systems include the large, slow-moving reservoirs, as well as the high gradient, cold-water streams. The Proposed Route predominantly crosses these flowing water sources, which typically flow from the larger water resource systems. The Proposed Route also crosses small, open water wetland areas; however, no large bodies of water would be crossed. A list of the water resources intersected by the Proposed Route is outlined in Table 3-2.

Table 3-5 contains the list of fish species potentially occurring in these water resources within the project area. Nongame fish species include a variety of suckers, dace, carp, shiners, and squawfish. Viable salmonid fisheries exist in many of these waters; however, no quantitative data are available. Trout species are most common of the game fish and compose the majority of the sport fishery. Game species include largemouth bass, cutthroat trout, eastern brook trout, rainbow trout, black crappie, and yellow perch (Forest Service 1988). The eastern brook trout is the dominant species found in the streams crossed by the Proposed Route. This species has outcompeted native species since its introduction into the area over 50 years ago.

Bull trout may be present in some of the water resources crossed and is a Washington Department of Wildlife (WDW) species of concern because of its limited distribution within the project area (Vail 1989). No federally or state-listed threatened or endangered fish species have been identified in any of the water resources crossed by the proposed Interconnection.

Table 3-5

Fish Species Potentially Occurring Within the Interconnection Project Area

Common Name	Scientific Name
White sturgeon	Acipenser transmontanus
Cutthroat trout	Salmo clarki
Brown trout	S. trutta
Brook trout	Salvelinus fontinalis
Lake trout	S. namaycush
Bull trout	S. confluentis
Sockeye salmon (kokanee)	Oncorhynchus nerka
Rainbow trout	O. mykiss
Mountain whitefish	Prosopium williamsoni
Sand roller	Percopsis transmontanus
Chiselmouth	Acrocheilus alutaceus
Peamouth	Mylocheilus caurinus
Northern squawfish	Ptychocheilus oregonensis
Redside shiner	Richardsonius balteatus
Longnose dace	Rhinichthys cataractae
Leopard dace	R. falcatus
Speckled dace	R. asculus
Largescale sucker	Catostomus macrocheilus
Longnose sucker	C. catostomus
Mountain sucker	C. platyrhynchus
Bridgelip sucker	C. columbianus
Channel catfish	Ictalurus punctatus
Brown bullhead	I. nebulosus
Pumpkinseed	Lepomis gibbosus
Bluegill	L. macrochirus
Green sunfish	L. cyanellus
White crappie	P. annularis
Black crappie	Pomoxis nigromaculatus
Largemouth bass	Micropterus salmoides
Smallmouth bass	M. dolomieui
Walleye	Stizostedion vitreum
Yellow perch	Perca flavescens
Shorthead sculpin	Cottus confusus
Piute sculpin	C. beldingi
Torrent sculpin	C. rhotheus
Slimy sculpin	C. cognatus
Prickly sculpin	C. asper
Mottled sculpin	C. bairdi
Carp	Cyprinus carpio
Lake chub	Couesius plumbeus
Tui chub	Gila bicolor
Tench	Tinca tinca

Historically, anadromous fish species inhabited the lower reaches of the Pend Oreille River (WDE 1987). No impacts to sensitive fish species are anticipated for the Boundary Dam Variation in relation to the Pend Oreille River.

3.1.6 Vegetation

The occurrence and distribution of vegetation in a geographic region is largely a function of both macro and microclimates, soil types, and local topography. A diverse mixture of these factors allows for equally diverse plant habitats and associations within the study area. Coastal species (e.g., western hemlock), northern species (e.g., Douglas fir), as well as species associated with drier conditions (e.g., ponderosa pine) all occur within the study area.

In their comprehensive study of forests in eastern Washington and northern Idaho, Daubenmire and Daubenmire (1968) classified forest vegetation in the region into the following four series: ponderosa pine (Pinus ponderosa), Douglas fir (Pseudotsuga menziesii), western hemlock (Tsuga heterophylla), and subalpine fir (Abies lasiocarpa). Each series is made up of numerous habitat types. For clarification purposes, the term "habitat type" refers to a physical environment that will support a particular climax plant association. These series generally follow a gradient of increasing moisture and decreasing temperature, ranging from the ponderosa pine series occupying a transitional zone between the bunchgrass prairie and the mountain forest zones, to the subalpine fir series occupying the uppermost sub-alpine/alpine zones (Daubenmire and Daubenmire 1968).

The vegetation communities (series) present along the proposed Interconnection routes are similar. In general, the northern three-fourths of the project vicinity is dominated by mixed coniferous forests. The southern portion of the study area contains a mosaic of ponderosa pine and grassland/pasture. The wetland areas and agricultural lands are generally concentrated along the major rivers and streams associated with the Pend Oreille and Colville River valleys. The USFWS National Wetlands Inventory Maps (1987) depicted numerous riparian areas, with many of these typically associated with wetlands, as discussed in Section 3.1.4. The total distances and relative distribution of these communities crossed along the alternative routes are presented in Section 4.1.6.

The vegetation along the Proposed Route is dominated by mixed coniferous forests, ponderosa pine, and grassland/pasture. The agricultural lands are predominantly located in southern Pend Oreille County and from Chattaroy south into Spokane. The majority of the mixed forests are included in the Douglas fir series dominated by Douglas-fir, western larch, lodgepole pine, and western white pine and the western hemlock series characterized by western hemlock, western red cedar, and grand fir. A dense understory dominated by shrubs (e.g., alder, wild rose, red

maple, serviceberry, snowberry) and ferns is typical of these forested areas on moderate to steep slopes.

The ponderosa pine communities range from dense stands with a shrubby understory to open stands containing a high percentage of grass species as ground cover. Common grasses include wheatgrass, needlegrass, and fescue on gentle to moderate slopes. The majority of this mixed vegetation type occurs along the Proposed Route in the southern portion of Pend Oreille County and Spokane County.

Based on the Washington Natural Heritage Program database, a total of 12 sensitive plant species are known to occur within the proposed Interconnection study area. Of these 12 species, 8 have been documented within 1 mile of the Proposed Route (see Table 3-6), for a total of 14 individual locations associated with this route (WDW 1988). None of these plant species have federal status; however, all are considered "sensitive" within the State of Washington.

Numerous relatively small wetlands are present along and adjacent to the Proposed Route. The locations and characteristics of these palustrine wetlands are discussed in Section 3.1.4.

3.1.7 Wildlife

3.1.7.1 Nongame Species

The vegetative community type often determines what wildlife species inhabit an area. Some species use a number of habitat types to fulfill basic requirements, whereas other species are largely restricted to a single habitat. The project area for the proposed Interconnection encompasses a wide variety of wildlife resources and habitats. Remote mountainous forests, composed primarily of mixed conifer species, exist predominantly in the northern portion of the study area; a mixture of grassland/pasture and ponderosa pine occurs within the southern portion of the project area. Riparian and wetland areas are primarily associated with major rivers and streams flowing through both the Pend Oreille and Colville River valleys.

A diversity of nongame wildlife species occurs along the Proposed Route. Amphibian species that occur along area water resources would include the northern long-toed salamander, northwestern boreal toad, and Pacific tree frog. Reptile species present would include the western painted turtle, western skink, valley garter snake, western yellow-bellied racer, Great Basin gopher snake, and the Northern Pacific rattlesnake (Burke 1976a).

Table 3-6

Sensitive Plant Species Located within 1 Mile of the Proposed Interconnection

Species	Status[1] Federal/State	Location	Distance From Route	Route[2] P	E	W	N	S
Blue-eyed grass (Sisyrinchium septentrionale)	--/SS	T40N, R43E, S34 (between Boundary Dam and Metaline Falls)	Crossed	X	X		X	X
		T34N, R39E, S32 (Marble Creek Valley)	0.5 mile west			X	X	
Bulb-bearing water-hemlock (Cicuta bulbifera)	--/SS	T40N, R43E, S27 (between Boundary Dam and Metaline Falls)	Crossed	X	X		X	X
		T36N, R42E, S2 (south of Tiger Meadows)	1.0 mile southeast				X	
		T35N, R41E, S4 (Little Pend Oreille National Wildlife Refuge north of Park Rapids)	0.5 mile southeast				X	
Buxbaum's sedge (Carex buxbaumii)	--/SS	T36N, R42E, S3 (south of Tiger Meadows)	0.5 mile southeast				X	
Creasted shield-fern (Dryopteris cristata)	--/SS	T31N, R44E, S7 (~3.5miles southwest of Dalkena)	Crossed	X	X			
Giant helleborine (Epipactis gigantea)	--/SS	T26N, R43E, S19 (north Spokane)	1.0 mile south		X			
Gray stickseed (Hackelia cinerea)	--/SS	T26N, R42E, S7 (Riverside State Park)	North of route		X			
Marsh muhly (Muhlenbergia glomerata)	--/SS	T40N, R43E, S34 (between Boundary Dam and Metaline Falls)	Crossed	X	X		X	X
Purple meadowrue (Thalictrum dasycarpum)	--/SS	T40N, R43E, S14 (two populations southeast of Boundary Dam)	0.75 mile east	X[a]	X		X	X
		T40N, R43E, S23 (southeast of Boundary Dam, east of Lead King Hills)	0.5 mile east	X	X		X	X
		T38N, R43E, S8 (Pend Oreille River between Metaline and Ione)	1.5 miles east	X	X		X	X
		T37N, R43E, S29	Crossed	X	X			X

Table 3-6 (Continued)

Species	Status[1] Federal/State	Location	Distance From Route	Route[2] P	E	W	N	S
Water (purple) avens (Geum rivale)	–/SS	T40N, R43E, S22 (Lead King Hills, south of Boundary Dam)	Crossed	X	X		X	X
Wood sage (Teucrium canadense ssp. viscidum)	–/SS	T36N, R39E, S31 (Colville Valley, northwest of Colville)	0.25 mile east			X		
Yellow mountain avens (Dryas drummondii)	–/SS	T40N, R43E, S23 (two populations southeast of Boundary Dam, east of Lead King Hills)	0.75 mile east	X	X		X	X
		T40N, R43E, S26 (east Lead King Hills)	0.75 mile east	X	X		X	X
		T40N, R43E, S35 (near Pend Oreille River, southeast of Boundary Dam)	0.75 mile east	X	X		X	X
Yellow sedge (Carex flava)	–/SS	T40N, R43E, S34 (between Boundary Dam and Metaline Falls)	Crossed	X	X		X	X

Source: WDW 1988.

[1]SS = Sensitive. Taxa with small populations or localized distributions within the State of Washington that are not presently state-listed as threatened or endangered, but whose populations and habitats would be jeopardized, if current land use practices continue.

[2]P = Proposed Route, E = Eastern Alternative, W = Western Alternative, N = Northern Crossover Alternative, S = Southern Crossover Alternative.

Bird species occur throughout the project area and are associated with three primary habitat types: 1) coniferous and deciduous forests, 2) open grasslands with interspersed pine, and 3) riparian and open water habitats. Common waterbird species include the western grebe, great blue heron, common merganser, and American coot. The common loon is an occasional migrant within the study area (Burke and Nisbet 1979; Zender 1989); large concentrations of waterbirds, including the tundra swan, utilize the Pend Oreille River and Calispell Lake near Usk (Zender 1990). Raptor species that occur within the study area include the golden eagle, osprey, northern harrier, Cooper's hawk, sharp-shinned hawk, great horned owl, and screech owl (Burke and Nisbet 1979). Osprey nesting is prevalent along the Pend Oreille River (Forest Service 1988; Hickman 1987); golden eagle nesting is widespread throughout the Colville National Forest (Forest Service 1988). Other common bird species include the northern flicker, cedar waxwing, western meadowlark, black-capped chickadee, white-breasted nuthatch, and western kingbird (Burke and Nisbet 1979).

Nongame mammals that commonly occur along the Proposed Route include the dusky shrew, big brown bat, red squirrel, northern flying squirrel, yellow pine chipmunk, and porcupine.

3.1.7.2 Game Species

A variety of game birds inhabit the project area. Upland game species include the blue grouse, ruffed grouse, Franklin's grouse, common snipe, Merriam's wild turkey, ring-necked pheasant, and mourning dove (Forest Service 1988; Burke and Nisbet 1979).

Numerous waterfowl species also occur throughout the project area, some of which include the Canada goose, mallard, pintail, green-winged teal, and northern shoveler (Burke and Nisbet 1979). These species are apt to be found on any open water bodies within the project area; however, significant waterfowl concentration areas exist along the Proposed Route, most notably Calispell Lake near Usk. The lake may contain thousands of migrant species during the spring period (Kaumheimer 1989; Zender 1989).

Abundant game mammal species occur along the Proposed Route. Important furbearers include the beaver, muskrat, mink, raccoon, river otter, marten, fisher, bobcat, lynx, coyote, and wolverine (Forest Service 1988; Burke 1976b). Wetland habitats associated with several of these species are diminishing within many areas of northeastern Washington (Forest Service 1988).

Although both white-tailed deer and mule deer inhabit the project area, primarily white-tailed deer occur along the Proposed Route. Mule deer populations have been recently declining in northeastern Washington (Forest Service 1988). Priority deer winter range is intersected by the Proposed Route and has been identified by the WDW, according to local occurrences, historic

use, slope aspect, and elevation (Zender 1989; Whalen 1989). Winter range provides thermal cover (e.g., dense coniferous stands) and available food resources (e.g., herbaceous and browse species) in sufficient amounts to attract individuals from a large geographic area during critical winter periods. Priority deer winter range occurs between the Cedar Creek and Little Muddy Creek drainages west of Ione, and important deer wintering areas are located immediately north of Calispell Lake (Whalen 1989). The Proposed Route also crosses the Little Spokane River Valley, which contains a healthy resident deer population but few areas of concentrated winter use.

Other big game mammals found along the Proposed Route include black bear, elk, moose, and mountain goat. Black bear, elk, and moose predominantly occur along the northern portion of the route along the Pend Oreille River (Hickman 1989; Zender 1989; Forest Service 1988). The resident mountain goat population was introduced to the project area and is currently estimated at 40 animals (Forest Service 1988). Mountain goats typically inhabit the Linton Mountain area immediately west of the proposed line near Metaline Falls. Individuals range from Lunch Creek north to Flume Creek, with several mountain goats using the abandoned gravel quarry area located adjacent to the project ROW (Burke 1990; Zender 1990).

3.1.7.3 Threatened or Endangered Species

A computerized data base search was requested from the WDW Nongame Data Systems for any sensitive wildlife species occurring within 2 miles of the Proposed Route and all project alternatives. The WDW (1988) reported three federally endangered species within the project area: the peregrine falcon, mountain caribou, and gray wolf. In addition, two federally threatened species were reported to occur, including: the bald eagle and grizzly bear (Hickman 1989; WDW 1988; Dunn 1987). In addition to these federally listed species, three federal candidate species and several state species of concern are found throughout the various habitats associated with the proposed project (see Table 3-7).

In addition to contacting the state WDW concerning sensitive species potentially found within the project area, the Forest Service and USFWS were also notified (Burke 1989; Haas 1989). In compliance with Section 7(a)(2) of the Endangered Species Act of 1973, a biological assessment was prepared for submittal to the USFWS and presented in the DEIS. The biological assessment analyzed the entire project area and originally addressed the bald eagle, grizzly bear, and mountain caribou. In response to requests from the USFWS during review of the DEIS, the gray wolf was added to the biological assessment. Therefore, the complete assessment for these four species is presented in Appendix B of this FEIS and is applicable to locations identified for the Proposed Route, project alternatives, route variations, and route options.

Table 3-7

Wildlife Species of Concern Potentially Occurring Within the Project Area

Common Name	Scientific Name	Status[1] Federal/State	Occurrence[2]	County[3]
BIRDS				
Red-necked grebe	Podiceps grisegena	--/C	B	ST,PO,SP
Great blue heron	Ardea herodias	--/C	B	ST,SP
Osprey	Pandion haliaetus	--/C	B	ST,PO,SP
Bald eagle	Haliaeetus leucocephalus	T/T	B,RSC,CR	ST,PO,SP
Peregrine falcon	Falco peregrinus	E/E	IO	ST,PO,SP
Northern goshawk	Accipter gentilis	--/C	B	PO
Golden eagle	Aquila chrysaetos	--/C	B	ST
Flammulated owl	Otus flammeolus	--/C	B,RI	ST,PO
Barred owl	Strix varia	--/C	B	ST,PO
Great gray owl	S. nebulosa	--/C	IO	ST
White-headed woodpecker	Picoides albolarvatus	--/C	B,RI	ST
Three-toed woodpecker	P. tridactylus	--/C	B,RI	PO
Black-backed woodpecker	P. arcticus	--/C	B,RI	ST,PO,SP
Western bluebird	Sialia mexicana	--/C	B	ST,SP
Grasshopper sparrow	Ammodramus savannarum	--/C	B	SP
MAMMALS				
Townsend's big-eared bat	Plecotus townsendii	C2/C		
Pallid bat	Antrozous pallidus	--/C	B,CR	SP
Red-tailed chipmunk	Tamias ruficaudus	--/C	IO	ST,PO
Wolverine	Gulo gulo	C2/C	IO	ST,PO
Gray wolf	Canis lupus	E/E	IO	ST,PO
Lynx	Lynx canadensis	C2/C	IO	ST,PO
Grizzly bear	Ursus arctos	T/T	IO	ST,PO
Mountain caribou	Rangifer tarandus caribou	E/E	IO	PO
INVERTEBRATES				
Compton tortoiseshell	Nymphalis vau-album	--/C	IO	PO,SP
Silver-bordered fritillary	Boloria selene	--/C	IO	PO,SP

Source: WDW 1988; USFWS 1987, 1990, and 1991.

Table 3-7 (Continued)

[1]E = Endangered: Federal. Species that are in danger of extinction throughout all or a significant portion of their ranges. State. A taxon in danger of becoming extinct or extirpated in Washington within the near future, if factors contributing to its decline continue. These are species whose populations are at critically low levels or whose habitats have been degraded or depleted to a significant degree.

T = Threatened: Federal. Species that are likely to become endangered within the foreseeable future through all or a significant portion of their ranges. State. A taxon likely to become endangered within the near future in Washington, if factors contributing to its population decline or habitat degradation or loss continue.

C2 = Federal Candidate Species - Category 2. Species that may be listed as federally threatened or endangered, but conclusive biological data to support these listings are not currently available.

C = Species of Concern within the State of Washington.

[2]IO = Individual Occurrence; B = Breeding; RI = Regular Individual Occurrence; RSC = Regular Small Concentrations (10 to 50 individuals); CR = Communal or Colonial Roosts.

[3]Counties where species may occur: ST = Stevens County; PO = Pend Oreille County; SP = Spokane County.

The bald eagle (Haliaeetus leucocephalus) is federally-listed as threatened within the State of Washington. Wintering bald eagles typically occur along the Pend Oreille and Little Spokane Rivers from mid-November to early May (Hickman 1987). Three active bald eagle nests occur within 2 miles of the Proposed Route; two of these active sites were occupied beginning in the spring of 1990 (Dunn 1987; Zender 1990). One new nest site is located along the eastern edge of the Pend Oreille River near Sand Creek; another new site occurs along the eastern edge of the river near Jared (Zender 1990; McAllister 1990). The third site was occupied in 1989 also near Jared along the western bank of the Pend Oreille River, but was not active in 1990 (Zender 1990). An additional bald eagle nest identified by Dunn (1987) within 2 miles of the line was located near Calispell Lake and used once by young birds; this nest site is no longer used (Zender 1989). Other active bald eagle nests occur in the vicinity of the Proposed Route (Zender 1990 and 1992; McAllister 1990); however, they are located over 2 miles from the proposed project ROW. The exact location of active bald eagle nests will not be revealed to ensure protection of the nest sites and their inhabitants.

The federally endangered peregrine falcon (Falco peregrinus) is present along the Pend Oreille River during migration (WDE 1987) and has been reported in the vicinity of the Colville National Forest during the fall migration for 3 periods within the past 10 years. However, no nesting is known to occur within the project area (Forest Service 1988). A peregrine release or hack site was initiated in Spokane during 1988 (Hickman 1989); the number of individuals may potentially increase, due to these reintroduction efforts.

The Selkirk Mountain caribou (Rangifer tarandus caribou) is federally-listed as endangered and is considered an ecotype of the more numerous woodland caribou. In 1984, the resident herd within Washington and Idaho numbered approximately 30 animals; mountain caribou from Canada have been introduced into this small herd. A total of 48 woodland caribou from Canadian herds were transplanted to augment the Selkirk Mountain herd in February and March of 1987 and 1988. Population estimates in 1989 ranged from 65 to 85 individuals (Rominger 1989; Hickman 1989). Historically, this species occupied much of the northern states near the Canadian border. Unlike deer, caribou require old growth forests, which produce the arboreal lichens consumed by the animals. This herd comprises the only population of caribou that regularly occurs in the conterminous United States (USFWS 1984).

According to the WDW data base (WDW 1988), the mountain caribou have been historically reported west of the Pend Oreille River and may occur in this area on rare occasions (Zender 1989). The mountain caribou critical habitat, however, occurs within the grizzly bear recovery area east of the Pend Oreille River. Specific locations for these individuals have not been made public for the protection of the few remaining animals (Owens 1988).

The federally threatened grizzly bear (Ursos arctos) is limited to 6 distinct ecosystems within the lower 48 states, 2 of which are located in Washington. These populations occur in the Selkirk Mountains and the northern Cascade Mountains. Each year grizzly observations are reported in these areas. The area east of the Pend Oreille River within the Selkirk Mountains contains designated grizzly bear recovery area. Evidence suggests that as many as 25 individuals may inhabit the Selkirk Mountains; although, this is difficult to estimate because the bears are highly mobile (WDW 1987). Following hibernation in mid-April, individuals will travel to lower elevations to graze on new vegetation, particularly along the river areas (Hickman 1987). Both confirmed and unconfirmed grizzly sightings have been reported by the WDW (WDW 1988; Bertram 1992) west of the Pend Oreille River. Map 2-2 shows the sightings located within 2 miles of the proposed line according to the map section, the year the sighting was reported, and whether the observation was confirmed or unconfirmed. Although the primary concentration of bears occurs near Boundary Dam, scattered individuals may be found throughout the northern portion of the project area.

Historically, the federally endangered Northern Rocky Mountain wolf, a subspecies of the gray wolf (Canis lupus), inhabited eastern Washington (Herman and Willard 1978) but had been considered eliminated from within this area since 1950 (Layser 1970; Nielsen 1978). However, both confirmed and unconfirmed gray wolf sightings have been reported in the project area within the last few decades, with evidence of wolf activity in the Colville National Forest and surrounding habitats in Pend Oreille and Stevens Counties (Bertram 1992; WDW 1988; Nielsen 1978; Layser 1970). Between 1973 and 1988, 24 sightings of gray wolves were reported within northeast Washington; most were accounts of lone animals (Forest Service 1988). These individuals are believed to be transient, since no pack activity has been recorded (Hickman 1989; Zender 1989; Kaumheimer 1989; WDW 1987). One confirmed sighting of a pair of gray wolves was reported within 2 miles of the Proposed Route on November 1, 1990 near Ione (Bertram 1992) (see Map 2-2, Sheet 1); the other sightings recorded within 2 miles of the proposed Interconnection have been unconfirmed individuals (see Map 2-2).

The wolverine (Gulo gulo) is a federal candidate species - Category 2 and occurs throughout the Colville National Forest, particularly within higher elevations and marshy areas. Wolverines are found predominantly in the northern portion of the study area and maintain a large range of travel (Zender 1989).

The lynx (Lynx canadensis), another federal candidate species - Category 2, occurs within the study area. These individuals are typically found in higher elevation areas dominated by lodgepole pine and spruce/subalpine fir forests in the northern portion of Pend Oreille and Stevens Counties (Forest Service 1988; Zender 1989).

The Townsend's big-eared bat (Plecotus townsendii) is the third federal candidate species - Category 2 present within the project area. This species inhabits open to forested areas, denning in caves, old mines, and buildings. Individuals were recorded within the Colville National Forest in 1988 (Forest Service 1988; Burke 1989).

3.1.8 Existing and Planned Land Use

3.1.8.1 Existing Land Use

Two field reconnaissance surveys of the land in the vicinity of the Proposed Route and its variations were performed. Through these site visits and interpretation of recent aerial photography, existing land use was mapped using the following classifications:

- recreational
- residential
- commercial
- institutional (e.g., schools, cemeteries)
- industrial
- extractive (e.g., surface mines and sand/gravel pits)
- agricultural (e.g., cultivation, pastureland, moving irrigation systems)
- airports/airstrips
- existing transmission lines

Timber harvest concerns are addressed elsewhere in this EIS. In addition, federal, state, and local agencies were contacted for information relative to the potential effects of the project on existing land use.

The locations of sensitive existing land uses were identified by using low-altitude aerial photography, flight clearance information, and recreational resource information. The aerial photographs delineated the position of the proposed Interconnection in relation to existing ROWs, transportation routes, and other land use types. Sensitive land uses were identified on the photographs and primarily included buildings, agricultural areas, and mineral extraction areas. The relationship of each of these resources along the proposed Interconnection was then examined. Flight clearance information was obtained for the Spokane International Airport, in accordance with Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace. Recreational land uses were derived from a variety of resources.

The primary overall existing land use patterns along the Proposed Route and its variations are as follows. Logging, mining, and dispersed and developed recreation are the predominant land

uses within the northern portion of the Proposed Route, as well as hydroelectric power generation located at Boundary Dam. A number of small communities occur along the Pend Oreille River that are dependent on recreation and industry. Agriculture and scattered rural residential development become progressively more common along the southern portion of the Proposed Route. In the Spokane vicinity, typical urban fringe development patterns dominate, containing primarily residential areas and industrial, extractive, commercial, institutional, and road, rail, and air transportation land uses. Recreational uses occur northwest of Spokane. Most of the Proposed Route parallels existing transmission lines.

The existing land use patterns along the Proposed Route are described below. The route is divided into six segments, proceeding from north to south, which can be identified on Map 2-1. The segments begin and end at intersection points in the network of alternative routes. Land use analysis was conducted for both sides of the existing ROW along these segments. The segments include:

- Border to Boundary Dam
- Boundary Dam to South of Ione
- South of Ione to West of Cusick
- West of Cusick to Northeast of Chattaroy
- Northeast of Chattaroy to Southeast of Mead
- Southeast of Mead to Beacon

Border to Boundary Dam. This short west to east segment of the Proposed Route is almost entirely undeveloped and is located on new ROW. A portion of the segment near the international boundary is located adjacent to old growth forest, as designated by the Forest Service Land and Resource Management Plan (Forest Service 1988). The area south of the route is designated by the Forest Service for semi-primitive, non-motorized recreation. Near the segment's east end and north of the route is Crawford State Park, containing Gardner Cave. At the eastern terminus of the segment are numerous power transmission facilities and a major substation.

Boundary Dam to South of Ione. This north-south route segment parallels two to four major transmission lines for its entire length. These, in turn, parallel the Pend Oreille River, which is located about 1 to 2 miles east of the corridor and along which occur recreational uses and occasional industrial facilities. The land along the existing transmission lines is almost entirely undeveloped, with only a few residences and small pastures. To the west of the northern half of this segment of the route is an area designated by the Forest Service for semi-primitive, non-motorized recreational use. East of the route, especially in the southern portion of this

segment, more extensive areas of agriculture occur, along with the Community of Ione. Several gravel pits and mines (often inactive) are scattered along the vicinity of the route.

South of Ione to West of Cusick. This north-south segment parallels two major existing transmission lines for its entire length and is otherwise similar to the previous segment, except that the number of residences and agricultural areas (mostly pasture) along this route segment increases. The segment parallels the Pend Oreille River, with its transportation corridor and increased density of residential and recreational developments, for approximately 7 miles near its north end. The lands to the west of this segment's north end are designated by the Forest Service for semi-primitive, non-motorized recreation use.

West of Cusick to Northeast of Chattaroy. This north-south segment parallels two major existing transmission lines for its entire length. It continues the progression towards a higher level of development in both residences and agriculture, observed in the previous two segments. The residences tend to be grouped in loose clusters, sometimes concentrated along the east-west roads (particularly along U.S. Route 2) that are crossed by the route. They are also accompanied by other types of development (e.g., cemetery, landing strip). Major mines are not evident this far south, but gravel pits do occur. This segment departs from and no longer parallels the Pend Oreille River Valley.

Northeast of Chattaroy to Southeast of Mead. The majority of this north-south segment parallels two major existing transmission lines. However, two short portions at either end of the segment are located on new ROW (i.e., the Chattaroy and Mead Route Options). The land is an approximately equal mix of agriculture and woodlands, with a relatively dense scatter of residences, increasing in density towards the south and acquiring the characteristics of the urban fringe at the southern end of the segment. A few of the residences are adjacent to the existing transmission line ROWs. A training college for clergy is located about the middle of the segment. The Colbert Landfill occurs near the northern end of the segment and is listed as an Environmental Protection Agency (EPA) Superfund Site, scheduled for cleanup. Cleanup procedures will include the use of extraction wells, which potentially could be sited within the project ROW (Thompson 1989).

Southeast of Mead to Beacon. All land along this segment is privately owned. The segment can be divided into several subsegments with respect to existing land use. The northernmost of these subsegments starts on the south side of a group of four existing transmission lines that travel west into a major industrial facility located southwest of Mead. The Mead to Beacon segment leaves the ROW of these existing lines and proceeds southwest on new ROW for a distance of approximately 0.5 mile, then intersects with another existing transmission line ROW.

In this short subsegment, the project passes along the edge of an area of industrial land use and crosses agricultural land and sparse woodlands.

The project next proceeds southeast for approximately 2 miles, using the ROW of two existing wood H-frame transmission lines. In order to accommodate the project without the need to acquire new ROW, the two existing lines (115-kV and 230-kV) would be removed and consolidated on new two-circuit structures similar to the project structures. The portion of the existing ROW thus vacated would accommodate the proposed Interconnection structures. Existing land uses in this area include scattered residences and an institutional use (the Mount St. Michael's Scholasticate). A few areas of pasture exist; however, most of the land is not intensively used and currently maintains a combination of grass, brush, and scattered trees.

From the southeast end of the previous subsegment, the Proposed Route travels south for over 2 miles, then southwest for about 0.5 mile, using a similar consolidation of existing lines that allows accommodation of the project without any widening of existing ROW. In most of this subsegment, the two single-circuit, wood H-frame transmission lines that would be rebuilt are paralleled by two other single-circuit, wood H-frame lines. At the north end of this subsegment, a truck farm with associated buildings and a few scattered residences occur. Elsewhere, there are no developed land uses; the existing lines pass through sparse to dense woodlands.

Finally, the route proceeds about 0.5 mile south to the Beacon Substation, again on existing ROW. Here there are six existing transmission line structures in two groups, separated by about 500 feet. To the west are four single-circuit, wood H-frame lines; to the east are two 230-kV steel lattice structures (one doubt-circuit and one single-circuit). The easternmost of these two structures has a vacant circuit; the westernmost steel structure would accommodate both circuits of the proposed Interconnection by moving its two existing circuits. One existing circuit would be transferred to the easternmost 230-kV structure to take advantage of the vacant circuit position. The other would be transferred to the easternmost of the four wood pole H-frame structures, reconstructing it as a double-circuit 115/230-kV line (see Figure 2-1). This subsegment of the route passes through sparse woodland with an area of scattered residences, then a mixed residential and agricultural/industrial area located immediately north of the substation.

Boundary Dam Variation. This is a very short segment running northeast to southwest. The segment crosses the Pend Oreille River a short distance downstream (north) of Boundary Dam. The area is traversed by two existing transmission lines (although the project does not parallel these) and is dominated by industrial-type land uses related to the power generation facilities located at Boundary Dam. Short portions of the segment cross undeveloped woodland. The segment of the Proposed Route replaced is longer than the variation (see Table 2-3), but

contains no sensitive land uses. The Crawford State Park and an area designated by the Forest Service for semi-primitive, nonmotorized recreation, however, occur adjacent to the segment replaced.

Orchard Prairie Variation. All land along this variation is privately owned. The variation is an alternative to the first two subsegments of the Mead to Beacon route described above. The variation starts by crossing four existing transmission lines and proceeding south (entirely on new ROW) to meet the Mead to Beacon route north of Bigelow Gulch. It is about 2.0 miles long and passes through an area characterized by scattered residences, agricultural land, and sparse to dense woodlands.

Route Options to the Proposed Route. The Proposed Route, as previously noted, follows first the west side and then the east side of the existing transmission lines between Boundary Dam and a point southeast of Mead (see Map 2-2, Sheets 1-5). The Eastern and Western Route Options follow the entire east and west sides, respectively, of the existing transmission line ROWs for the entire distance between Boundary Dam and southeast of Mead (see Map 2-2, Sheets 1-4). In addition, two segments of the Proposed Route near Chattaroy and Mead deviate from the existing ROWs and are located on new ROW. Whereas the Proposed Route would deviate from the existing transmission corridor at these locations (see Map 2-2, Sheet 4), the Eastern and Western Route Options continue to parallel the existing BPA circuits in these areas. The overall existing land use environment is identical to that of the Proposed Route, as described previously under the following segments: Boundary Dam to South of Ione, South of Ione to West of Cusick, West of Cusick to Northeast of Chattaroy, and Northeast of Chattaroy to Southeast of Mead.

3.1.8.2 Planned Land Use

The following section briefly outlines the relevant future land use plans and policies of the six agencies potentially concerned with the proposed Interconnection and its effects.

U.S. Forest Service. Large portions of the Colville National Forest would be crossed by the proposed Interconnection. The Proposed Land and Resource Management Plan for the Colville National Forest (Forest Service 1988) states, as a general policy regarding transmission lines, that designated (or existing) utility corridors will be used whenever possible for any future utility needs before new corridors are developed. As part of the Forest Service's Preferred Plan Alternative G, the Forest is divided into numerous management areas, arranged in 11 classes (Forest Service 1987). The Proposed Route and its variations would pass through five of these classes of management areas: 3, 5, 6, 7, and 8. The Forest Service's intentions regarding transmission lines in each of these classes is as follows:

- 3 - Emphasizes both developed and dispersed recreation in a mostly natural appearing environment, primarily along major roads. Encounters with other forest visitors may be frequent.

  - Utility corridors permitted.

- 5 - Emphasis is on timber management, while providing for protection and enhancement of the visual resource and allowing forage production and public use. Unmanaged tree stands will be converted to managed stands. A wide range of timber management practices will be used. Landscapes seen from selected travel routes and use areas will be managed to maintain or enhance their appearance. Dispersed recreation activities will occur.

  - Limit utility corridors to sites already developed for these purposes to the extent possible.

  - Proposed utility corridors will follow natural contours to the extent possible.

  - Visible power transmission towers will utilize colors to blend in with adjacent vegetative or rock land colors.

- 6 - Emphasizes management of white-tailed deer winter range while protecting and enhancing the visual resource. Vegetation will be managed to provide optimum habitat. Timber management will be used to maintain or develop needed forage and cover areas, and to stimulate or perpetuate vegetation needed for wildlife purposes. A variety of tree sizes and species will be maintained to provide visual diversity.

  - Utility corridor requirement, same as 5.

- 7 - Emphasis is on timber production while providing for forage production and public use. Unmanaged tree stands will be converted to managed stands. A wide variety of timber management practices will be used. Forage will be available for use by livestock and wildlife. Structural improvements, such as fences and water developments, may be constructed. Dispersed recreation activities will occur.

  - Utility corridors permitted.

- 8 - Emphasizes management of white-tailed deer winter range. Timber management will be used to maintain or develop needed forage and cover areas, and to stimulate or perpetuate vegetation needed for wildlife purposes.

  - Utility corridors may be constructed.

Bureau of Land Management. The proposed Interconnection would cross a few Bureau of Land Management (BLM) parcels that are scattered throughout portions of the study region. The BLM's Spokane Resource Management Plan states that all public (BLM) land will be available and open for utility corridor development, except at certain specially designated areas (none of which would be affected) (BLM 1985). The BLM has identified some potentiai utility corridors, but none of these is affected by the proposed Interconnection. The BLM encourages location of new facilities within existing corridors to the extent possible.

Pend Oreille County. Zoning in Pend Oreille County and a comprehensive plan are not currently used. The only significant land use controls relevant to transmission lines pertain to surface water, and are addressed in Section 3.1.3.

Spokane County/Spokane International Airport. The proposed Interconnection passes through Spokane County, which uses both a Comprehensive Plan Map and Zoning Maps. These two sources of information are not always In agreement on planned land use. Observations within the project area, however, suggest that the Comprehensive Plan Map appeared to more accurately reflect actual existing and ongoing land development patterns. For example, in an area east of Spokane International Airport where the Plan Map shows urban development and the Zoning Maps an Agricultural Zone District, the actual development pattern is relatively dense residential. Therefore, the Comprehensive Plan Map was used to assess the impacts of the project on future land use.

Portions of the network of project alternative routes would pass through the following Comprehensive Plan Map units:

- I - Industrial: Limited heavy commercial activities and all types of industrial activities are planned within this category.

- U - Urban: Intensive residential activity is projected within "Urban" areas. Offices, businesses, some retail/commercial services, and light industrial activities are appropriate within these areas. Residential density will range from approximately 1 unit per acre to 17 units per acre.

- S - Suburban: Suburban lands are planned for subdivisions with generous-sized lots, yet clustered residential development with smaller-sized lots and open spaces may become common. Housing densities are planned to be approximately 1 unit for every 0.5 acre to 1 unit for every 2.5 acres.

- SR - Semi-Rural: Typical land uses would include small-lot agriculture, open areas, and scattered housing. Residential density is planned to vary from 1 unit for every 2 acres to 1 unit for every 10 acres.

- R - Rural: Typical land uses might include large lot residential, agricultural pursuits, timber harvesting, public lands, and open spaces. Houses generally will be scattered among large acreages, while densities may occur as high as 1 house per 10 acres, but would most likely be more scattered.

- A - Agricultural: Typical uses anticipated are cultivation, grazing, timber production, and other activities normally associated with agriculture. Residential uses are planned to occur only as associated with income agricultural pursuits.

The County Zoning Code states that public utility transmission facilities are allowed in all zones provided:

- That the utility company shall secure the necessary property or ROW to assure the proper construction, continued maintenance, and general safety to the properties adjoining the public utility transmission facility.

- That all support structures for electrical transmission lines shall have their means of access located a minimum of 10 feet above the ground.

- That the facilities shall be compatible with the surrounding uses either by distance, landscaping, buffering or design, as determined by the Zoning Administrator.

- That the height of the structure above ground does not exceed 125 feet or the requirements of the Airport Overlay Zone, if it applies.

Northeast of Spokane International Airport, the proposed Interconnection would cross an area where a proposed new runway would generate height limitations, according to the Federal Aviation Regulations, Part 77 and also under the more restrictive Spokane County Airport Overlay Zone requirements.

City of Spokane. The Proposed Route passes through a short segment of the City of Spokane. The City of Spokane has a Land Use Plan (part of the Comprehensive Plan), with a Generalized Plan Map (Spokane City Plan Commission/City Planning Department 1983). The portion of the City that would be crossed by the Proposed Route is indicated as Low Density Residential. The plan does not address the compatibility of major transmission lines with each of the land use types. The Comprehensive Plan encompasses the Facilities Plan; however, this does not address transmission lines.

The City also has a Zoning Code and a relatively detailed Zoning Map (Spokane City Zoning Department 1986). The Comprehensive Plan and the zoning documents agree well with each other in the areas crossed by the network of potential project routes.

Two portions of the network of alternative routes would cross two zoning districts: R1 (One Family Residence), and RS (Residential Suburban).

- R1: The primary use in this zone is one family residential. Also permitted are uses incidental to residential occupancy, and certain institutional and public service uses.

- RS: This zone is intended primarily to provide land for the eventual transition of relatively undeveloped land to urban use. It allows temporary uses, such as agriculture and open space, until the land is needed for urban expansion. These lands are initially largely undeveloped, and are normally located on the urban fringe of the city. Subdivision and development within this urban reserve may be allowed, with the ultimate objective of such lands eventually becoming urban zones.

Utility facilities are listed as acceptable uses (by special permit) in these zones.

The Proposed Route. The Proposed Route extends from the Canadian border west of Boundary Dam to the existing Beacon Substation located northeast of Spokane, as described for existing land use in Section 3.1.8.1. The future land use plans and policies along the route are discussed below, separately for the six segments, as described for existing land use patterns in Section 3.1.8.1. These segments are outlined on Map 2-2.

Border to Boundary Dam. This short west to east segment of the Proposed Route is located on new ROW and passes through three Forest Service management areas, as indicated in the Draft Colville National Forest Plan (Forest Service 1987). The management areas crossed by this segment include:

- 8 - Deer Winter Range Management

- 7 - Timber Management
- 5 - Timber Management with Visual Resource Protection

This segment crosses Pend Oreille County, which has no published future land use policies or guidelines relative to transmission lines.

Boundary Dam to South of Ione. This north-south segment parallels an existing transmission line corridor. The majority of the segment is located on the Colville National Forest and crosses the following management areas:

- 5 - Timber Management with Visual Resource Protection
- 6 - Deer Winter Range Management with Visual Resource Protection
- 7 - Timber Management
- 8 - Deer Winter Range Management

This segment also crosses Pend Oreille County, which does not maintain published future land use policies or guidelines relative to transmission lines.

South of Ione to West of Cusick. This segment follows an existing transmission line corridor. Approximately one-third of the segment is located on the Colville National Forest and crosses the following management areas:

- 6 - Deer Winter Range Management with Visual Resource Protection
- 8 - Deer Winter Range Management
- 7 - Timber Management

This segment also crosses Pend Oreille County, which does not maintain published future land use policies or guidelines relative to transmission lines.

West of Cusick to Northeast of Chattaroy. This segment completely parallels an existing transmission line corridor. The southern portion of this segment is located in Spokane County and crosses an area shown as Rural in the County Comprehensive Plan.

Northeast of Chattaroy to Southeast of Mead. This segment of the Proposed Route follows an existing transmission line ROW. It is located entirely within Spokane County in areas shown in the Comprehensive Plan as (proceeding from north to south) Rural, Semi-Rural, and Suburban.

Southeast of Mead to Beacon. This route segment would be constructed partly on new ROW, but mainly on existing transmission line ROW. The segment is located primarily in Spokane County and for a short distance in the City of Spokane. The County portions of the route segment cross the Comprehensive Plan land classifications: Urban, Semi-Rural, Rural, and Industrial. Within the City of Spokane, the route segment passes through land zoned R2 - Residential Suburban.

Boundary Dam Variation. This short segment is located on new ROW. It crosses areas designated in the Colville National Forest Plan as:

- 3 - Developed and Dispersed Recreation along Major Roads
- 5 - Timber Management with Visual Resource Protection

The segment of the Proposed Route replaced by this variation crosses Forest Service Management Areas 8, 7, and 5.

Orchard Prairie Variation. The route variation would be located entirely on new ROW. It is located in Spokane County, crossing the Comprehensive Plan land classifications Semi-Rural and Rural. The segment of the Proposed Route replaced crosses Comprehensive Plan land classifications: Urban, Semi-Rural, Rural, and Industrial.

Route Options to the Proposed Route. The Proposed Route, as previously noted, follows first the west side and then the east side of the existing BPA circuits. The planned land use environment for the Eastern and Western Route Options (including the short route segments located near Chattaroy and Mead) is the same as that discussed in Section 3.1.8.1 for the Proposed Route.

3.1.9 Visual Resources

A study area for the inventory and analysis of visual resources for the proposed Interconnection was established and includes the seen-area, or area in view of the proposed line to a distance of 3 miles. Beyond 3 miles, the line visibility of the type of line proposed would appear as a minor element in the overall landscape. The study area is primarily composed of private lands, but a significant amount is federally owned and under the management of the U.S. Forest Service, Colville National Forest (see Map 2-2). There are also a few small tracts of BLM land. The National Forest lands have previously been inventoried for visual resources under the Forest Service's Visual Management System (VMS) process. Through this inventory process, visual management classifications and guidelines are established, which identify acceptable levels of

visual modification. The designations and management guidelines occurring within the study area are as follows:

- Retention: This visual quality objective provides for management activities that are not visually evident.

- Partial Retention: This objective provides for management activities that remain visually subordinate to the characteristic landscape.

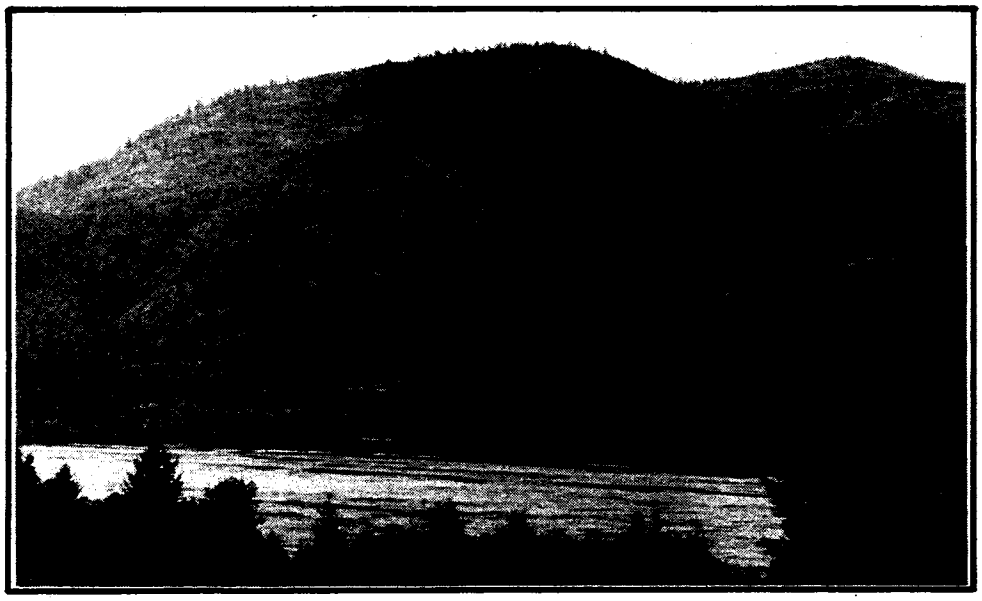
- Modification: Under this visual quality objective, management activities may visually dominate the original characteristic landscape. However, landform and vegetation modifications must borrow from the existing form, line, color, and texture of the surrounding landscape, and structures must remain subordinate.

The BLM maintains a similar program with similar designations; however, the BLM lands in the study area have not been inventoried for visual resources. On private lands, areas of similar landscape character were identified. The lands within each unit were then evaluated based on their quality and character, considering the condition of the landform, rockform, vegetation, and water. Special consideration was then given to the degree of naturalness of these lands. A final rating of High, Moderate, or Low landscape quality was then assigned to all units containing private land. Figure 3-1 shows typical examples of High, Moderate, and Low landscape quality in the study area.

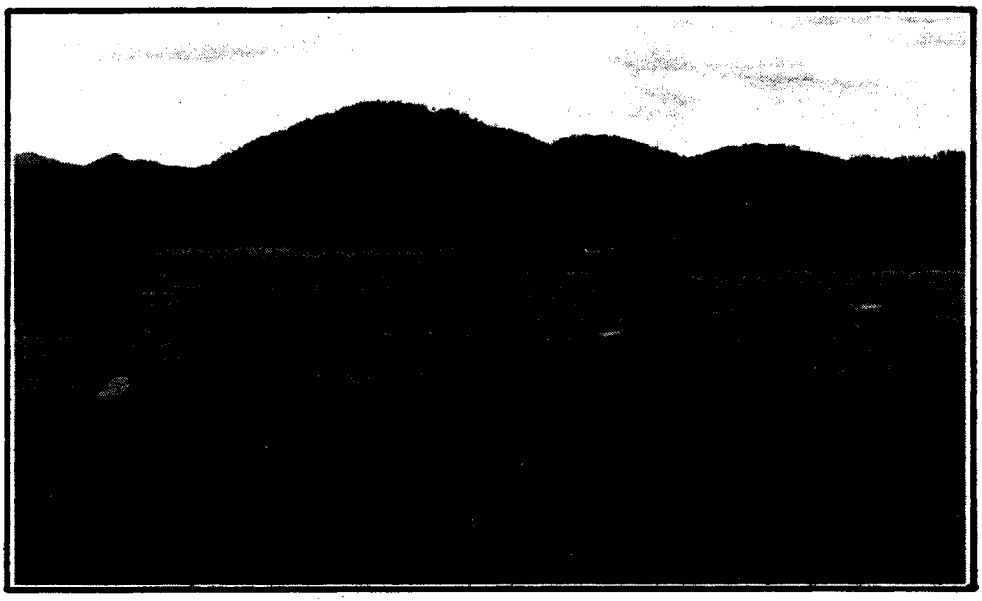
From north to south, the Proposed Route proceeds from a mountainous, scenic, natural-dominated landscape to a hilly, increasingly agrarian landscape where residential and other types of development are more evident. At the very southern end of the study area, the landscape becomes relatively open and flat, with a man-dominated urban and urban fringe character. Through this transition from natural to man-dominated, the study area can be divided into five relatively distinct visual areas. These are identified as follows:

- Border to Boundary Dam
- Boundary Dam to Ione
- Ione to Highway 2/Bare Mountain
- Highway 2/Bare Mountain to Mead
- Mead to Beacon

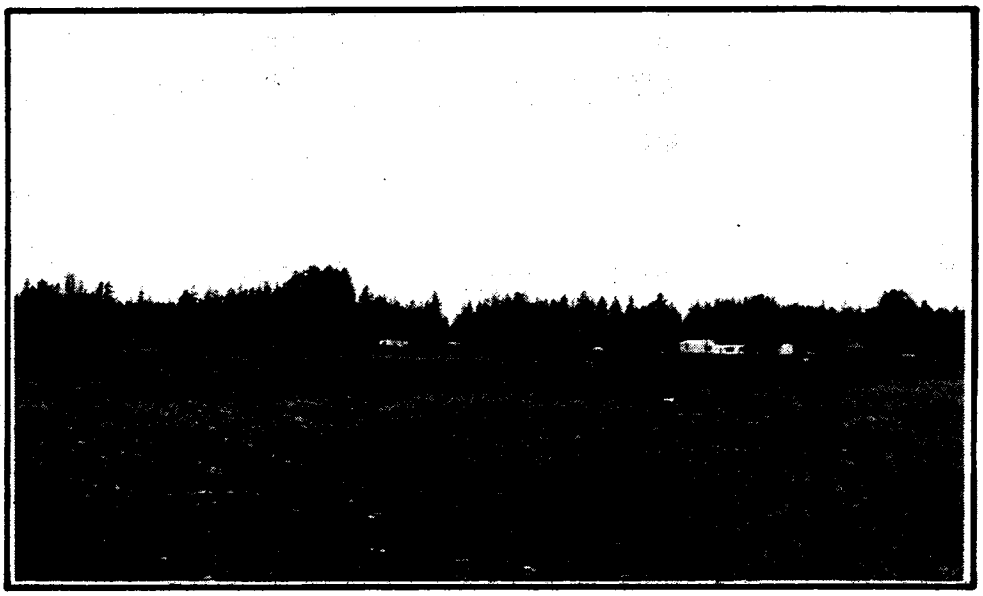
These areas are briefly described below.



HIGH
SCENIC QUALITY



MODERATE
SCENIC QUALITY



LOW
SCENIC QUALITY

FIGURE 3-1 EXAMPLES OF RELATIVE SCENIC QUALITY LEVELS IN THE STUDY AREA

Border to Boundary Dam. This is a mountainous area, remote and almost entirely natural except for evidence of past timber harvesting. The steep timber-covered mountain slopes, however, contain no outstanding scenic values, and the area has been designated with a Modification Visual Quality Objective (VQO) by the Forest Service. The only viewpoint in this area is from the Frisco-Standard Road.

Boundary Dam to Ione. This is a scenic setting dominated by the Pend Oreille River, which has cut a deep narrow valley through steep timber covered mountains. Man-made features include the Boundary Dam, the communities of Metaline Falls and Ione, and an existing transmission line corridor running south from Boundary Dam along the mountain slopes paralleling the Pend Oreille River located approximately 1 mile to the west. The Proposed Route is located parallel to this existing corridor. From Boundary Dam to approximately 4 miles north of Ione, this transmission corridor contains 3 lines of steel lattice towers. In some locations, the corridor also contains a smaller wood H-frame transmission line. From Deer Mountain, approximately 4 miles north of Ione, the corridor contains two steel lattice lines. The majority of this land is managed by the Forest Service as Modification and Partial Retention VQO; there are some areas of Retention, as well. Viewpoints include the Pend Oreille River, State Route 31, the communities of Metaline Falls and Ione, and some county and Forest Service roads.

Ione to Highway 2/Bare Mountain. In this area, the mountains become less dramatic and steep, and the Pend Oreille River Valley becomes wider, in places affording a broad cultivated terrace. This area remains in a generally scenic and natural-dominated condition. The Proposed Route follows the existing transmission line corridor through this segment, which continues to parallel the Pend Oreille River and contains two lines on steel lattice towers. Small, private recreation-oriented developments occur in this area, including Blueside, Davis Lake, and Sacheen Lake. The only town in this area is Cusick. Other viewpoints include State Routes 20 and 31 and U.S. Route 2; county and Forest Service roads; and scattered summer homes (primarily on private lands along the river or near the lakes).

Approximately half of this area is located on National Forest land. Visual quality designations in this area are about equally divided between Retention, Partial Retention, and Modification. The area in private ownership was classified as Moderate landscape quality.

Highway 2/Bare Mountain to Mead. This area can be characterized as rural agrarian mixed with a mosaic of low forested hills. Numerous farmhouses and small rural communities are present throughout. Viewpoints are widely scattered and include not only residences but numerous roads. Aside from the residences and community buildings, the only major structures are the two existing steel lattice transmission lines that are parallel to the Proposed Route in all

but two locations. These are relatively short segments occurring near Chattaroy and Mead. This area has been inventoried as being of Moderate landscape quality.

Mead to Beacon. This route segment diverges from four existing ROWs for approximately 0.5 mile, before joining the existing ROW containing two lines constructed on wood H-frame structures. These two lines would both be consolidated onto double-circuit structures and would share the existing ROW with the proposed Interconnection. This segment is located within an urban fringe setting of Spokane along the western edge of Orchard Prairie. The northern half of the route segment (approximately 2.5 miles to Bigelow Gulch) would cross a mixture of open grassland and cultivated fields over mostly moderate slopes rising to the undulating prairie. Viewpoints in this area consist of scattered to clustered residences and a number of roads. Moderately dense residential development occurs east and south of Mead, north of the Proposed Route. Another sensitive viewpoint, the Mount St. Michael's Scholasticate facility, is also located here along the top edge of the prairie and oriented to the southwest overlooking Spokane. Heavy industrial land uses dominate the landscape west of this area. Numerous transmission lines traverse the area, and for all but one section, the Mead to Beacon route would parallel these lines.

The area from Bigelow Gulch to 0.5 mile north of the existing Beacon Substation is characterized by low, forested hills with an irregular pattern of grassy and rocky clearings. This irregular vegetation pattern, however, is contrasted by linear cleared ROWs for transmission lines that traverse this area. Viewpoints include scattered to dense residential areas to the west on the urban edge of Spokane. Other viewpoints include two recreation areas directly west, the Esmeralda Municipal Golf Course and Minnehaha Park. Numerous road viewpoints also occur within the area.

The southernmost end of this segment is located within the urban area of Spokane and consists of moderately dense to dense residential development north and west of the Beacon Substation, while industrial land use occurs south and east. This general area lies on a low terrace adjacent to the Spokane River. Four existing parallel transmission lines (all on wood H-frame structures) cross this area from near Bigelow Gulch south (along or just below the hilltops) to the Beacon Substation, a distance of approximately 3 miles. Three additional transmission lines approach the Beacon Substation from the northeast. These three circuits enter the substation site on two steel lattice structures.

Both the northern and southern portions of this segment have been inventoried as being of moderate landscape quality, except for the urbanized area southeast of Mead and the urbanized area at the far south end, which are considered low landscape quality.

Boundary Dam Variation. The otherwise high scenic values of the short segment between the international border and Boundary Dam have been significantly altered by a series of buildings below the dam, roads, and other transmission lines. Approximately the southern half of this variation is located on National Forest land and identified as Retention VQO. Because of screening by trees, there is little public visibility of much of this area.

The segment of the Proposed Route replaced by this variation is located in a landscape that is more natural, but without any outstanding scenic values. It is, however, within the visual influences of the existing transmission lines, although not directly parallel to them. The segment is located entirely on National Forest land and largely classified as Modification VQO. Short sections are visible from a Forest Service road.

Orchard Prairie Variation. This variation would extend directly south from the Proposed Route over a portion of Orchard Prairie to Bigelow Gulch, where it joins the southern half of the proposed Mead to Beacon route segment. The Orchard Prairie Variation would not parallel any existing transmission line ROWs.

The Orchard Prairie area can be characterized as an undulating landscape of primarily open grassland and cultivated fields. Steeply sloped areas and drainages are generally moderately to densely forested. Viewpoints in the area consist of scattered to clustered rural residences and a limited network of roads. Another sensitive viewpoint would include the Mount St. Michael's Scholasticate facility located about 0.3 mile west. The Orchard Prairie area has been inventoried as being of moderate landscape quality. The segment of the Proposed Route replaced has been inventoried as low landscape quality in the area located southeast of Mead, transitioning to moderate landscape quality as the segment travels south toward Bigelow Gulch.

Route Options for the Proposed Route. Only minor differences exist for the visual conditions associated with the Eastern and Western Route Options located along the Proposed Route. Whereas the Proposed Route would deviate from the existing transmission corridor near Chattaroy and Mead for relatively short distances (see Map 2-2), the Eastern and Western Route Options continue to parallel the existing BPA circuits in these areas.

3.1.10 Cultural Resources

Archaeological and Historical Services at Eastern Washington University conducted a cultural resources evaluation of the routes being considered for the proposed Interconnection (Hudson et al. 1987; Hudson et al. 1988; Stevens and Galm 1991). Cultural resources information compiled during this review was derived from the site files housed at the Washington State Office of Archaeology and Historic Preservation (OAHP) in Olympia, and from published and

unpublished sources. The OAHP files include the records for the Colville National Forest and other federal agencies with land holdings in or adjacent to the proposed and alternative routes. While the focus of background research was a compilation of previously recorded prehistoric and historic sites and historic structures, the potential for occurrences of cultural resource sites was also evaluated for each routing alternative.

Cultural resources information within the four-county study area was reviewed for the background portion of this study. information compiled for each potential corridor included previously recorded sites and potential problem areas (i.e., areas with moderate-to-high sensitivity). A corridor width of 0.25 mile on either side of the approximate centerline was identified for this review and was used to define the study boundaries for each potential corridor. However, in those instances where sites were identified outside but close to the 0.5-mile-wide study corridor, they were included for consideration, since the perspective of this analysis was to develop a "worst-case" scenario for each routing alternative. Also, the inability to provide an exact centerline made it imperative that the review incorporate any site in proximity to a defined corridor. In actual practice, this did not add many sites to the sample compiled during this review. One exception to the 0.5-mile-wide study corridor occurred within the Spokane Indian Reservation where a 2-mile-wide corridor was evaluated.

There are 16 previously recorded sites within the 0.5-mile-wide study corridor along the Proposed Route, including historic properties in the town of Colbert, as well as along Peone Prairie. Peone Prairie, east of Mead, is reported to have been the location of an Upper Spokane Indian encampment and a small Hudson's Bay Company post. Remains of either could be eligible for the National Register of Historic Places (NRHP). Presently, Peone Prairie is the location of the William H. Stoneman home (1890) and the Anderson Rock barn (1907).

Other previously recorded sites along the Proposed Route include segments of the Calispell Trail, one clearing and dump, two homesteads, one railroad, two mining cabins, one mining camp, one mine drilling tower, the Lead King Mine, one barn, and one lumber flume. In addition, potential problem areas were identified along the Proposed Route, particularly along major drainages, in the vicinity of lakes and creeks, and where the proposed corridor crosses valleys, prairies, and meadows.

One recorded cultural resource site located along the route segment north of the Beacon Substation is the homestead allotment of Spokane Garry, an important leader of the Spokane Tribe during the 19th century. The homestead allotment occurs on Beacon Hill approximately 2.0 miles west of the ROW. Spokane Garry lived on and farmed his allotment claim from 1864 to 1873. It is doubtful that there are any historic remains on the property associated directly with Spokane Garry; however, the General Land Office Plat Map (dated 1874) shows numerous

claims in this area and indicates abundant historic activity. A second recorded site for this route segment is the Mount St. Michael Scholasticate complex and cemetery. These areas are located approximately 0.1 mile and 0.3 mile, respectively, from the route segment. The Mount St. Michael Scholasticate, built between 1914 and 1916, is likely eligible for nomination to the NRHP. The Mount St. Michael Cemetery located on the grounds contains approximately 400 graves.

No previously recorded sites occur along the Boundary Dam Variation; however, there is a high potential for prehistoric sites where this segment crosses the Pend Oreille River. There could also possibly be some unrecorded mining sites along this route variation.

Cultural sites that occur along the Orchard Prairie Variation include the second location of St. Michael's Mission and associated Cataldo Monument. The 1878 location of St. Michael's Mission occurs approximately 0.3 mile east of the proposed ROW. The Mission church was moved in 1968 to Fort George Wright College for restoration. Presently, the site consists of a cemetery that was associated with the church and a stone marker commemorating Father Cataldo, who established the original St. Michael's Mission in 1866. One unrecorded cultural site is located at a natural spring, which occurs within 0.1 mile of the variation ROW. This spring was reported to be the central location of an Indian Village previously associated with the 1878 location of St. Michael's Mission. The third site located along the Orchard Prairie Variation is the recorded Mount St. Michael Scholasticate complex and cemetery, which both occur approximately 0.3 mile west of the ROW. This site is previously discussed for the Proposed Route segment located north of the existing Beacon Substation.

3.1.11 Socioeconomics and Community Resources

3.1.11.1 Population

Table 3-8 shows the population characteristics for the four-county study area applicable to the proposed Interconnection. These characteristics would pertain to all of the project alternative routes, variations, and route options.

The Proposed Route, the Boundary Dam and Orchard Prairie Variations, and the Eastern and Western Route Options proceed south from the international border, across the extreme northeast corner of Stevens County, through Pend Oreille County, and into Spokane County to the existing Beacon Substation. The population density in these areas ranges from low-density rural in Stevens and Pend Oreille Counties to high-density urban in Spokane County, particularly in and around the City of Spokane (see Table 3-8).

Table 3-8

Study Area Population Characteristics

	1980	1987	1987 Percentage of Total (%)	Percent Change 1980-1987 (%)	Average Annual Growth Rate 1980-1987 (%)	1987 Population Density (People Per Square Mile)
Washington State (Total)	4,132,353	4,481,100	100.0	+8.4	+1.2	67.4
Unincorporated	2,008,258	2,274,181	50.8	+13.2	+1.8	N/A[1]
Incorporated	2,124,095	2,206,919	49.2	+3.9	+0.6	N/A
Lincoln County (Total)	9,604	9,700	100.0	+1.0	+0.2	4.2
Unincorporated	3,769	3,808	39.3	+1.0	+0.2	N/A
Incorporated	5,835	5,892	60.7	+1.0	+0.1	N/A
Pend Oreille County (Total)	8,580	8,900	100.0	+3.7	+0.5	6.4
Unincorporated	5,589	6,090	68.4	+9.0	+1.3	N/A
Incorporated	2,991	2,810	31.6	-6.1	-0.9	N/A
Cusick	246	217	2.4	-11.8	-1.7	1,808
Ione	594	570	6.4	-4.0	-0.6	864
Metaline	190	176	2.0	-7.4	-1.0	533
Metaline Falls	296	282	3.2	-4.7	-0.6	1,484
Newport	1,665	1,565	17.6	-6.0	-0.8	1,438
Spokane County (Total)	341,835	355,900	100.0	+4.1	+0.6	201.8
Unincorporated	152,164	165,132	46.4	+8.5	+1.2	N/A
Incorporated	189,671	190,768	53.6	+0.6	+0.1	N/A
Airway Heights	1,730	1,850	0.5	+6.9	+1.0	586
Cheney	7,630	7,640	2.1	+0.1	±0.0	2,899
Deer Park	2,140	2,385	0.7	+11.4	+1.6	352
Medical Lake	3,600	3,630	1.0	+0.8	+0.1	1,125
Spokane	171,300	172,100	48.4	+0.5	+0.1	3,016
Stevens County (Total)	28,979	30,200	100.0	+4.2	+0.6	12.2
Unincorporated	20,398	21,500	71.2	+5.4	+0.8	N/A
Incorporated	8,581	8,700	28.8	+1.4	+0.2	N/A
Chewelah	2,012	1,970	6.5	-2.1	-0.3	598
Colville	4,603	4,760	15.8	+3.4	+0.5	2,018
Kettle Falls	1,087	1,245	4.1	+14.5	+2.0	1,412
Marcus	174	159	0.5	-8.6	-1.2	748
Northport	424	342	1.1	-19.3	-2.7	1,438
Springdale	281	224	0.7	-20.3	-2.9	224

Source: State of Washington, Office of Financial Management 1987a and 1987b.

[1] N/A = Not Available.

Stevens County experienced moderate population growth between 1980 and 1987. The unincorporated areas, which represent approximately 71 percent of the total 1987 county population, experienced the majority of the population growth during this period. The incorporated cities and towns experienced vast population fluctuations between 1980 and 1987, from an increase of almost 15 percent in Kettle Falls to a decrease of 20 percent in Springdale (see Table 3-8).

Pend Oreille County, which has the lowest population density along the Proposed Route, experienced moderate population growth between 1980 and 1987. The unincorporated areas, which represent approximately 68 percent of the total county population in 1987, experienced the majority of the population growth during this period. In fact, all of the incorporated cities and towns in Pend Oreille County experienced a net reduction in population, ranging from a 12 percent decrease in Cusick to a 4 percent decrease in Ione (see Table 3-8).

Spokane County experienced moderate population growth between 1980 and 1987. The 1987 population is nearly evenly split between unincorporated areas and incorporated cities and towns, with the incorporated percentage slightly higher as a result of the City of Spokane's population. The City of Spokane represents almost 50 percent of the total 1987 county population. However, the population in the unincorporated areas has been increasing at a much higher rate since 1980 than the incorporated areas, indicating a possible shift in overall population distribution within Spokane County (see Table 3-8).

3.1.11.2 Economic Base

The economic base of the study area for the Proposed Route, its variations, and associated route options is primarily derived from the services, manufacturing, government, and agricultural sectors. In particular, economic activity is focused on timber, mineral, and crop production.

The City of Spokane is considered the regional trade center for the Inland Northwest and provides services to residents of Washington, Idaho, and western Montana. Spokane County also has a fairly large manufacturing sector for machinery and equipment, as well as lumber products. Because of its variability as a central trade center, Spokane and Spokane County experience the least fluctuation in seasonal employment and economic stability in the study area and have shown steady employment growth.

Stevens and Pend Oreille Counties are more dependent on timber product manufacturing, trade, services, and government for their employment base. Tourism is of lesser importance economically speaking than the other sectors; however, tourism is a growing industry in northern Stevens County along Lake Roosevelt and in Pend Oreille County along the Pend Oreille River

Valley. Both counties have a higher unemployment rate than Spokane County. In 1987, Spokane County showed a 7.5 percent rate, Stevens County showed 11.6 percent, and Pend Oreille showed an 18 percent unemployment rate. Since 1984, Pend Oreille County has experienced declines in both employment and wages. Stevens County employment has remained steady with some growth from 1985 to 1987.

Although Lincoln County is not affected by the Proposed Route, it will be included here for formatting and comparison purposes. Lincoln County has a relatively small population and employment base. Much of the area is comprised of large wheat farms. Lincoln County has one of the highest per capita incomes of any of the counties in Washington State. Other important economic sectors include wholesale and retail trade and government. In 1987, local government employment represented over 50 percent of the total employment in the county. The unemployment rate at this time was 7.3 percent.

Table 3-9 shows 1987 employment and wages for the counties affected by the proposed Interconnection and alternatives. As shown in Table 3-10, labor force and unemployment rates fluctuate seasonally. Generally the summer and fall months show the lowest rates of unemployment, with higher unemployment in the first and fourth quarters of the year. Pend Oreille County has the highest rate of unemployment followed by Stevens County. This is due to the lack of diversity in the local economies and the dependency on the seasonal lumber industry.

Total personal income and per capita income are shown below:

Total Personal Income (Thousands)

County	1982	1983	1984	1985	1986
Lincoln	140.2	194.0	171.0	159.7	172.1
Stevens	260.4	286.8	299.5	308.6	323.9
Pend Oreille	64.7	70.8	82.5	80.9	86.8
Spokane	3,640.6	3,904.8	4,203.9	4,399.3	4,654.5

Per Capita Income

Lincoln	$14,496	$20,098	$17,604	$16,551	$18,242
Stevens	$ 8,597	$ 9,375	$ 9,644	$ 9,860	$10,246
Pend Oreille	$ 7,465	$ 8,160	$ 9,151	$ 8,929	$ 9,593
Spokane	$10,463	$11,200	$11,873	$12,333	$13,041

Source: Bureau of Economic Analysis 1988.

Table 3-9

Study Area Employment and Wages by Industry for the Proposed Interconnection (1987)

Industry	Stevens County				Pend Oreille County			
	Employment Number	Percent	Wages (Thousands)	Percent	Employment Number	Percent	Wages (Thousands)	Percent
Agriculture	22	<1.0	176	<1.0	NA[1]	NA	NA	NA
Mining	114	1.6	3,010	2.6	NA	NA	NA	NA
Construction	201	2.9	3,939	3.4	34	2.2	489	2.0
Manufacturing	1,898	27.3	48,007	40.9	297	19.0	6,974	28.2
T.U.C.[2]	209	3.0	5,395	4.6	24	1.5	590	2.4
Trade	1,290	18.5	11,783	10.0	231	14.8	2,147	8.7
FIRE[3]	159	2.3	2,581	2.2	32	2.0	451	1.8
Services	1,312	18.9	12,074	10.3	220	14.0	2,126	8.6
Government	1,754	25.2	30,412	25.9	704	45.0	11,475	46.3
TOTAL	6,959	100.0	117,377	100.0	1,566	98.5	24,771	96.2

Table 3-9 (Continued)

Industry	Spokane County Employment Number	Spokane County Percent	Spokane County Wages (Thousands)	Spokane County Percent	Lincoln County Employment Number	Lincoln County Percent	Lincoln County Wages (Thousands)	Lincoln County Percent
Agriculture	838	<1.0	7,176	<1.0	20	1.0	291	1.0
Mining	279	<1.0	8,298	<1.0	--	--	--	--
Construction	5,303	4.0	103,436	4.4	16	<1.0	169	<1.0
Manufacturing	18,093	13.6	402,139	17.3	33	1.6	376	1.4
T.U.C.[2]	6,149	4.6	145,030	6.2	57	2.8	1,786	6.4
Trade	38,239	28.7	519,651	22.3	583	29.1	7,289	26.3
FIRE[3]	8,620	6.5	189,564	8.2	90	4.5	1,400	5.0
Services	33,234	24.9	458,992	19.7	199	9.9	2,293	8.3
Government	22,467	16.9	491,421	21.1	1,003	50.1	14,144	51.0
TOTAL	133,224	100.0	2,325,708	100.0	2,001	100.0	27,748	100.0

Source: Washington State Employment Security Department 1987.

[1]NA = not available.

[2]Transportation, Public Utilities, and Communication.

[3]Finance, Insurance, and Real Estate.

Table 3-10

Study Area Labor Force and Unemployment by County

	Stevens	Pend Oreille	Spokane	Lincoln
March 1987				
Labor Force	11,190	3,050	163,900	4,170
Unemployment	1,870	740	14,100	370
Unemployment Rate (%)	16.7	24.3	8.6	8.9
June 1987				
Labor Force	11,870	3,190	167,400	4,620
Unemployment	1,200	500	11,800	260
Unemployment Rate (%)	10.1	15.7	7.0	5.6
September 1987				
Labor Force	11,470	3,060	165,700	4,150
Unemployment	960	650	10,600	230
Unemployment Rate (%)	8.4	14.4	6.4	5.5
December 1987				
Labor Force	11,450	3,020	168,500	4,020
Unemployment	1,300	520	12,900	340
Unemployment Rate (%)	11.4	17.2	7.1	8.5

Source: Washington State Employment Security Department 1988.

Spokane County clearly has the highest personal income in the area, followed by Stevens, Lincoln, and Pend Oreille Counties. Per capita income is dramatically higher in Lincoln County. Spokane County has a moderate per capita income. Both Pend Oreille and Stevens Counties show some of the lowest per capita incomes within the state.

3.1.11.3 Housing

The study area housing market varies among counties. Spokane County has the largest number of housing units in the study area (a total of 149,016 units available in 1987). During the period 1980 to 1987, total housing units increased by 8.2 percent in Spokane County. Single family housing represents 69 percent of all housing, multi-family 24 percent, and mobile homes 7 percent. All incorporated and unincorporated areas in the county showed growth in housing during this period.

Stevens County showed an increase in total housing units of 12.3 percent over the same period. Single-family housing represents 72 percent of total units, multi-family 9 percent, and mobile homes 18.7 percent. Most towns throughout Stevens County showed growth in their housing stock throughout the period 1980 to 1987, except Northport, which showed a 10.8 percent decline.

Pend Oreille County displayed overall growth of 12.4 percent countywide. However, a decrease in housing units of 2.6 percent in the incorporated areas and an increase of 18.3 percent in the unincorporated areas occurred within the county. The one incorporated town showing an increase in housing units was Cusick, with an increase of 4.9 percent from 1980 to 1987. Single-family houses represent 72 percent of the total housing stock, multi-family 9 percent, and mobile homes 17 percent. Table 3-11 shows housing characteristics for the study area, excluding Lincoln County for 1980 and 1987.

Rental housing appears to be relatively scarce in both Stevens and Pend Oreille Counties. However, rental rates are relatively low, with a two-bedroom apartment renting for approximately $250 to $300 per month. Spokane has a larger supply of rental housing with slightly higher rates.

In addition to permanent housing, temporary housing accommodations are found throughout the area of the proposed Interconnection and alternatives. According to the Washington State Standard County/City Profile, which lists the number of motels and available beds, a number of motel accommodations are located along the route. Motel and hotels are shown below for each county:

Table 3-11

Study Area Housing Characteristics

	1980				1987				
	Total Housing Units	Single Family	Multi-Family	Mobile Homes	Total Housing Units	Single Family	Multi-Family	Mobile Homes	Countywide Increase 1980-1987 Total (Percent)
Pend Oreille	4,688	3,567	437	684	5,267	3,804	470	993	12.4
Unincorporated	3,355	2,592	196	567	3,968	2,878	211	879	18.3
Incorporated	1,333	975	241	117	1,299	926	259	114	(2.6)
Cusick	103	86	9	8	108	84	11	13	4.9
Ione	237	168	23	46	229	163	18	48	(3.4)
Metaline	95	87	0	8	88	74	0	14	(7.4)
Metaline Falls	191	100	83	8	188	92	92	4	(1.6)
Newport	707	534	126	47	686	513	138	35	(3.0)
Stevens	12,550	9,450	1,159	1,941	14,090	10,187	1,273	2,630	12.3
Unincorporated	9,028	6,882	559	1,587	10,291	7,552	558	2,181	14.0
Incorporated	3,522	2,568	600	354	3,799	2,635	715	449	7.9
Chewelah	820	589	120	111	904	621	160	123	10.2
Colville	1,897	1,359	380	158	2,022	1,375	426	221	6.6
Kettle Falls	443	316	94	33	529	369	122	38	19.4
Marcus	62	55	3	4	64	49	2	13	3.2
Northport	186	166	3	17	166	150	5	11	(10.8)
Springdale	114	83	0	31	114	71	0	43	0
Spokane	137,673	97,953	32,431	7,289	149,016	102,746	36,261	10,009	8.2
Unincorporated	55,128	41,434	8,140	5,554	61,875	44,556	9,429	7,890	12.2
Incorporated	82,545	56,519	24,291	1,735	87,141	58,190	26,832	2,119	5.6
Airway Heights	762	300	184	278	918	337	189	392	20.5
Deer Park	871	604	160	107	1,023	686	183	154	17.5
Medical Lake	904	573	237	94	966	614	237	115	6.9
Spokane	76,041	52,581	22,430	1,030	80,170	54,252	24,737	1,181	5.4

Source: Office of Financial Management 1987a and 1987b.

County/City	Number of Motel/Hotels	Number of Beds
Pend Oreille	9	84
Ione	4	29
Newport	2	32
Stevens	7	190
Chewelah	2	35
Colville	2	99
Kettle Falls	3	56
Spokane	80	3,200+
Spokane	67	3,170
Deer Park	2	14

Source: Washington Department of Trade and Economic Development 1986.

Temporary accommodations appear to be adequate along the Proposed Route. However, rural areas in Pend Oreille County may require commuting time up to 1 hour.

The Colville National Forest has 22 developed campgrounds, 12 of which are administered as fee sites by the forest. These developed sites have a capacity to accommodate 5,954 persons at one time (Forest Service 1988). Ten additional developed campgrounds are administered by the National Park Service at the Coulee Dam National Recreation Area. The Washington State Department of Natural Resources operates four developed campgrounds close to the National Forest system lands. Some of these campgrounds would be available for recreational vehicle hook-ups during project construction.

3.1.11.4 Fiscal Conditions

The study area has shown relatively stable growth throughout the period 1987 through 1991. Lincoln County, however, has experienced declines in assessed value through the years, but has an overall growth rate of 1.5 percent. With completion of the Ponderay Newsprint Corporation plant, Pend Oreille County experienced a boost in assessed valuation and subsequent property tax collections. The other three counties are not expected to experience significant future increases in assessed valuation. Table 3-12 shows assessed value for the four counties potentially impacted by the proposed Interconnection or its alternatives.

Annual property tax receipts throughout the study area have increased at a faster rate than assessed valuation as seen from Table 3-13. Local property taxes represent 44 percent of general fund revenues in Pend Oreille County, 43 percent in Stevens County, 34 percent in Spokane County, and 30 percent in Lincoln County. Other sources of revenue include

Table 3-12

Assessed Valuation by County 1987 to 1991
(Thousands of Dollars)

	1987	1988	1989	1990	1991	Average Annual Increase (Percent) 1987-1991
Pend Oreille	253,681	263,262	392,359	592,736	592,771	26.0
Stevens	897,685	915,845	915,458	982,384	1,015,370	3.2
Spokane	9,308,592	9,416,592	9,533,261	9,892,447	10,149,253	2.2
Lincoln	477,533	487,857	503,850	506,814	505,801	1.5

Source: Orf 1988; Estep 1988 and 1992; Briton 1988; Brooks 1988; Friis 1988; Williams 1992; Briton 1992; Sweet 1992.

Table 3-13

Countywide Property Tax Receipts 1987 to 1991
(Thousands of Dollars)

	1987	1988	1989	1990	1991	Average Annual Increase (Percent) 1987 - 1991
Pend Oreille	3,260	3,085[1]	3,316	4,634	6,851	22.4
Stevens	9,212	9,687	9,549	9,711	11,271	5.4
Spokane[2]	134,800	144,010	148,438	161,726	177,650	8.0
Lincoln	6,543	6,255	7,145	7,212	7,246	2.8

Source: Verbrigge 1988; McCurdy 1988; Zamora 1988; Hine 1988; Brooks 1992; Erickson 1992; Lakin 1992; Lindbloom 1992.

[1]Through October 1988.

[2]Property Taxes Due.

inter-governmental state and federal sources, sales and use taxes, charges for services, and fines and fees.

Stevens and Spokane Counties both have adequate resources to provide services. However, there are not significant reserve funds available. Pend Orellle County has experienced declines in federal revenue sharing funds, as have all counties. Currently, the county is in search of additional revenue sources to help in providing existing levels of service within the county (Verbrigge 1988). The Lincoln County auditor considers Lincoln County to be in poor fiscal condition, due to the effects of the open space law and lack of county growth. Lincoln County has reduced services and staff, due to limited financial resources (Friis 1988).

The State of Washington is on a unitary system, which appraises utility property based on the value the property contributes to the company. Consequently, the appraisal value of a utilities property can go up or down, depending on whether the utility is experiencing a loss or profit company wide. This method of taxation is very complex and entails consideration of many appraisal approaches including cost, income, and market approach. In Washington, there is an equalization ratio for real and personal properties. Generally the ratio lowers the value of personal utility property. The state tries to assess utility property on par with other properties (Hoff 1988).

3.1.12 Transportation and Noise

Transportation. A network of state and federal highways are located within the study area. Secondary roads are numerous and generally well maintained by county governments and federal land managers. Three railroads also service the study area and connect the majority of the towns along the proposed and alternative routes, with Spokane being a major terminus for the Inland Northwest. Air traffic within the study area is mostly concentrated in the Spokane area, where the Spokane International Airport, Fairchild Air Force Base (FAB), and Felts Field are located. Twelve smaller airfields are located throughout the remainder of the study area.

Primary north-south highways along the Proposed Route include State Routes 31, 20, 211, and U.S. Route 2. South from the international boundary, State Route 31 serves Metaline Falls, Metaline, and Ione before turning into State Route 20 (at Tiger), which continues along the Pend Orellle River to Cusick, Usk, and east to Newport. State Route 211 connects Usk with U.S. Route 2; U.S. Route 2 connects Newport with Spokane. Traffic volume increases substantially closer to the Spokane metropolitan area. Northern State Routes 31, 20, and 211 receive an annual average daily traffic usage of between 0 to 1,999 vehicles, while the southern portions of U.S. Routes 2 and 395 (near Spokane) receive between 2,000 to 19,999 vehicles (Washington Department of Transportation [WDOT] 1987).

Small airfields located at Sullivan Lake, Riverbend, Newport, and Deer Park are not in close proximity to the Proposed Route. The Proposed Route is located within approximately 1.5 miles of small airfields near Ione and Mead, within 1 mile of a landing strip southeast of Sacheen Lake, and within 1 mile of Felts Field, which is located south of the Spokane River.

Noise. The existing noise environment in the vicinity of the Proposed Route is similar to many other rural and suburban areas. With few exceptions, existing ambient noise levels are typically low. Ambient noise levels increase near the more developed areas along the Proposed Route, including major highway corridors, airports, and urban areas, particularly the Spokane metropolitan area.

Ambient noise levels along the Proposed Route were not measured specifically for this project; however, reasonable estimates can be made (National Research Council 1977). Existing ambient noise levels are quite low in the rural sections of the Proposed Route. In the remote hilly areas, day-night average levels (L_{dn}) are estimated to be approximately 41 decibels A-weighted (dBA). In the agricultural areas and small communities, L_{dn} are estimated to be in the range of 44 to 51 dBA. In the Spokane metropolitan area, noise levels are dominated by transportation noise; primarily roadway traffic noise with some increases in levels near major rail lines and airports. In the Spokane area, L_{dn} are estimated to be in the range of 55 to 65 dBA. Actual existing ambient noise levels near the Proposed Route will be affected by existing major noise sources, local terrain features, and the location of sensitive noise receptors.

3.2 Eastern Alternative

3.2.1 Air Quality

Air quality along the Eastern Alternative would be the same as that described in Section 3.1.1 for the Proposed Route.

3.2.2 Geology and Soils

3.2.2.1 Geology

The Eastern Alternative traverses the Okanogan Highland Physiographic Province between the international boundary and the Spokane River. South of the Spokane River to the planned Marshall Substation, the route is located within the Spokane Plateau division of the Columbia Plateau Physiographic Province.

The characteristics of the Okanogan Highlands for the Eastern Alternative is the same as described for the Proposed Route in Section 3.1.2.1. South of the Spokane River, the Eastern Alternative travels within the Columbia Plateau Province. The Columbia Plateau is a broad, gently downwarped structural basin underlain by up to 10,000 feet of nearly horizontal basalt flows (McKee 1972). The basalt is generally covered by silt deposits, approximately 100 feet thick. Topography varies from very gently undulating to moderately hilly. Steep slopes are limited and restricted to isolated basaltic buttes or canyons; several coulees also exist to the south of the Spokane River.

As depicted for the Proposed Route, portions of the Eastern Alternative route crosses sedimentary rocks exposed by thrust faults, small areas of sandstones and shales, granitic bedrock, metamorphosed sandstones and mudstones, and glacial debris. From the Chattaroy area, the Eastern Alternative crosses glacial till, sand, and gravel along the Little Spokane River and ends on the basalt plateau (Alt and Hyndman 1987).

Topography. The Eastern Alternative crosses the same topography described for the Proposed Route in Section 3.1.2.1 from the international boundary to the Mead area. From the Mead area, the Eastern Alternative then rises approximately 500 feet in elevation north of Spokane onto the northwestern edge of Fivemile Prairie. It descends again to cross the Spokane river and rises 800 feet to the Four Mound Prairie. The route traverses this area, crossing Coulee Creek to Indian Prairie, and then descends 300 feet into the Deep Creek drainage. From the coulee, the alternative crosses undulating terrain to its terminus at the planned Marshall Substation.

The topography associated with the Boundary Dam Variation is the same as that described for the Proposed Route in Section 3.1.2.1. The Chattaroy Variation follows the east bank of the Little Spokane river on nearly level terrain to a point located northwest of Colbert. The route travels west, crossing the Little Spokane River, and turns southwest, ascending 400 feet in elevation to cross Lockhart Hill before descending to again cross the Little Spokane River. The variation then climbs 300 feet from the river drainage to connect with the Eastern Alternative directly west of Fivemile Prairie. The Marshall Variation continues east from the Eastern Alternative and turns south, descending 200 feet into the Marshall Creek drainage. This variation travels along the creek and ascends the adjacent slope to the planned Marshall Substation site.

The predominant geologic structure of the planned Marshall Substation site consists of glacial flood deposits of the Pleistocene epoch. The glacial flood deposits are composed of very poorly sorted gravels and occur predominantly as constructional bars within the channeled scablands of southwest Spokane County (Terra Corporation 1981). The proposed substation site is essentially level or gently sloping. The southern portion of the site is bisected by a ravine that is approximately 800 feet wide, 1,800 feet long, and 125 feet deep. In addition, the southeastern

property line lies along a steep sandy hillside about 100 to 150 feet high. Some rock outcroppings occur along the northwestern edge of the property. Two former sand and gravel mining pits are located on the southwestern portion of the property. Both abandoned mining sites are currently being recolonized by native vegetation (Terra Corporation 1981).

Geologic Hazards. No areas along the Eastern Alternative are identified as potential landslide areas (Radbruch-Hall et al. 1976). The seismic potential for the Eastern Alternative would be the same as discussed for the Proposed Route in Section 3.1.2.1.

Mineral Resources. Existing and future mineral development for the Eastern Alternative is generally the same as that discussed for the Proposed Route in (see Section 3.1.2.1), except that this alternative would cross one gravel pit located south of Mead (see Map 2-2, Sheet 4).

3.2.2.2 Soils

The Pend Oreille County and Spokane County Soil Surveys were used as sources for descriptions of the soil types that occur along the Eastern Alternative (SCS 1968; SCS in press). Soils associated with the Eastern Alternative are the same as those described for the Proposed Route in Section 3.1.2.1. Prime farmland crossed by this alternative totals approximately 17.2 miles, which constitutes 13.5 percent of the total 127.9-mile Eastern Alternative (SCS in press; SCS 1978).

Soils crossed by the Boundary Dam Variation would oe the same as those discussed for the Proposed Route (see Section 3.1.2.1). Soils crossed by the Chattaroy and Marshall Variations have similar erosion hazard potentials compared to the Eastern Alternative segments replaced. The Chattaroy Variation crosses 0.3 mile of prime farmland soils, as compared to 1.0 mile for the Eastern Alternative segment replaced. The Marshall Variation crosses 0.3 mile of prime farmland, compared to 1.2 miles for the segment of the Eastern Alternative replaced.

The predominant soil types that occur on the planned Marshall Substation site consist of well-drained, medium-textured soils underlain by sand, gravel, and cobblestones at a depth of about 20 inches. As much as 10 percent of some areas consist of basalt rock outcroppings. No prime farmland is associated with this planned site (Terra Corporation 1981).

3.2.3 Surface Water

Water resource characteristics for the Eastern Alternative would parallel those described for the Proposed Route in Section 3.1.3 of this EIS. The Eastern Alternative would cross 40 named and 24 unnamed streams (some multiple crossings), totaling 74 stream crossings for the entire route

variation (see Tables 3-3 and 3-14). The Eastern Alternative would cross four water resources classified as shorelines of the state, with one of these four water bodies being classified as shoreline of state-wide significance. This designation occurs along the Spokane River, which maintains a mean annual discharge of 7,949 cfs (BLM 1987). Four Type 2 streams would also be crossed by the Eastern Alternative (see Table 3-14). As discussed for the Proposed Route (see Section 3.1.3), Cedar Creek is a Type 2 stream that provides the municipal water supply for the Town of Ione. The Eastern Alternative would cross Cedar Creek approximately 1.5 miles northwest of Ione.

Water resources crossed by the Boundary Dam Variation would be the same as those discussed for the Proposed Route in Section 3.1.3 of this EIS. The Chattaroy Variation would cross three named and three unnamed streams, totaling seven crossings. The Little Spokane River is classified as a shoreline of the state and a shoreline of state-wide significance and maintains a mean annual discharge of 310 cfs (BLM 1987). The segment of the Eastern Alternative replaced by this variation would cross a total of three named streams (see Table 3-4). The Marshall Variation would cross one unnamed stream, whereas the segment of the Eastern Alternative replaced would cross one unnamed pond (see Table 3-4).

No natural surface water resources occur on the planned Marshall Substation site. A deeded easement exists along the northwestern border of the property and through a deep ravine, which bisects the central and southern portion of the property. The easement was granted to the federal government and consists of an open trench that originates at the sewage treatment plant for the Geiger Heights government housing project located approximately 1 mile north of the site. The drainage trench presumably acts as an overflow for the sewage ponds located about 0.25 mile north of the site, and as such may at times carry untreated or partly treated domestic sewage across the site.

3.2.4 Floodplains and Wetlands

Floodplains. Most of the streams and associated floodplains crossed by the Eastern Alternative would be the same as those described for the Proposed Route in Section 3.1.4. The majority of these floodplain areas would be spanned by the transmission line, with no structures being located in the floodplain. However, the floodplain associated with the Little Spokane River crossing for the Eastern Alternative is approximately 1,800 feet in length (see Map 2-2, Sheet 3). Detailed engineering would be required to determine actual structure locations, since the maximum span length for the proposed transmission line would be about 2,000 feet.

Table 3-14

Water Resources Crossed by the Eastern Alternative

Water Resource	Number of Crossings	Shoreline Management Act[1]	Shorelines of State-Wide Significance[2]	Type 1 and/or 2[3]
Russian Creek	1			
South Fork Russian Creek	1			
Pewee Creek	1			
Everett Creek	1			
Beaver Creek	1			
Flume Creek	1			
South Fork Flume Creek	1			
Linton Creek	1			
Sweet Creek	2			
Lunch Creek	1			
Lost Lake Creek	4			
Cedar Creek	1			2
Little Muddy Creek	1			
Big Muddy Creek	1			
Diamond Creek	1			
Renshaw Creek	1			
Lost Creek	1			
South Fork Lost Creek	1			
Ruby Creek	1			
Cusick Creek	2			
Tacoma Creek	1	X		1
South Fork Tacoma Creek	1			2
Trimble Creek	1			
East Fork Small Creek	1			
Small Creek	1			
South Fork Small Creek	1			
Winchester Creek	1			
Dorchester Creek	1			
South Fork Calispell Creek	2	X		1
Deer Creek	2			
Moon Creek	2			
Little Spokane River	2	X		1
Dry Creek	1			2
Deer Creek	1			2
Little Deep Creek	1			
Deadman Creek	1			
Spokane River	1	X	X	1
Deep Creek	1			
Coulee Creek	1			
Deep Creek	2			
Unnamed Streams	24			
TOTAL	74			

[1]Streams considered to be shorelines of the state pursuant to the Shoreline Management Act of 1971 (Chapter 90.58 RCW) and designated under County Shoreline Master Plans.
[2]Type 1 waters include all waters inventoried as shorelines of the state; Type 2 waters are natural waters not classified as Type 1, maintain high use, and are considered important for water quality.
[3]Source: WDNR 1978 to 1982.

The Chattaroy Variation would also cross the Little Spokane River (see Map 2-2, Sheet 4). However, the floodplain at this crossing is approximately 1,400 feet wide and would be spanned by the proposed line.

Wetlands. The majority of larger wetlands located along the Eastern Alternative are commonly found adjacent to streams and other water sources. The predominant wetlands present along or near the Eastern Alternative are concentrated in eight separate areas. Palustrine wetland areas associated with this route variation occur directly south of Pewee Creek, east of the route; south of Lunch Creek, located southwest of Metaline; at Tacoma Creek; near Deer Creek, which occurs south of Davis Lake; along Moon Creek, located southeast of Sacheen Lake; and at the Little Spokane River crossing. Numerous "kettles," small circular wetlands, are also present west and south of the Spokane River. These seasonally wet kettles are concentrated near the junction of the Eastern and Western Alternatives, near the Four Mound Prairie area, and in the vicinity of the Spokane International Airport.

Neither the Boundary Dam Variation nor the Marshall Variation cross wetland areas. However, the Chattaroy Variation is shown to cross wetland areas associated with the Little Spokane River.

3.2.5 Aquatic Ecology

Table 3-14 lists the water resources crossed by the Eastern Alternative. The aquatic resources and fish species parallel closely those listed for the Proposed Route in Section 3.1.5 and in Table 3-5. As indicated for the Proposed Route, bull trout may be present in some of the water resources crossed and is a WDW species of concern because of its limited distribution within the project area (Vail 1989). No federally or state-listed threatened or endangered fish species have been recorded in any of the water resources crossed by the Eastern Alternative.

3.2.6 Vegetation

The vegetation composition found along the Eastern Alternative is similar to that present along the Proposed Route with mixed forest, ponderosa pine, and grassland/pasture dominating the project area. As described for the Proposed Route, the Douglas fir and western hemlock series dominate the mixed coniferous forests that occur along the route from the Canadian border south to southern Pend Oreille and northern Spokane Counties. The vegetation transition to the mosaic of ponderosa pine, grassland/pasture, and agricultural lands occurs as the route travels south into the Spokane area, with an increase in open grassland and agricultural areas.

The locations and characteristics of the palustrine wetlands that occur along the Eastern Alternative are discussed in Section 3.2.4. The USFWS National Wetland Inventory Maps (1987) indicate that the majority of the wetlands are typically associated with riparian areas.

A total of 10 sensitive plant species have been recorded within 1 mile of the Eastern Alternative route (see Table 3-6), with approximately 16 individual locations (WDW 1988). None of these plant species have federal status; however, all are considered "sensitive" within the State of Washington.

The predominant vegetation type found at the planned Marshall Substation site is ponderosa pine and grassland communities. The majority of the site is covered by scattered stands of young scrub pines interspersed with open, grassy areas (Terra Corporation 1981). No riparian communities or sensitive plant species are associated with the planned Marshall Substation site.

3.2.7 Wildlife

3.2.7.1 Nongame Species

Habitat community types along the Eastern Alternative would parallel those described for the Proposed Route (see Section 3.1.7). The ponderosa pine and grassland habitat mosaic increases in frequency along the Eastern Alternative in the vicinity of the northern Spokane area south to the planned Marshall Substation site. Nongame wildlife species occurring along this project alternative would be the same as those listed in Section 3.1.7.1 for the Proposed Route.

The wildlife species likely to occupy the planned Marshall Substation site would consist of species associated with the ponderosa pine and grassland communities. Resident species would include the mountain chickadee, northern flicker, western meadowlark, yellow pine chipmunk, northern pocket gopher, red squirrel, porcupine, and coyote (Terra Corporation 1981). No game species or wildlife species of concern would be expected to occur near the planned substation site.

3.2.7.2 Game Species

Refer to Section 3.1.7.2 for a listing of the wildlife game species potentially occurring along the Eastern Alternative. A prominent waterfowl concentration area exists at Calispell Lake near Usk, which may contain thousands of migrant species during the spring period (Kaumheimer 1989; Zender 1989).

As indicated for the Proposed Route, both white-tailed deer and mule deer inhabit the project area; however, mule deer populations have been declining in northeastern Washington (Forest Service 1988). The Eastern Alternative crosses priority deer winter range between the Cedar Creek and Little Muddy Creek drainages located west of Ione and crosses important deer wintering areas that are located immediately north of Calispell Lake (Whalen 1989). The Eastern Alternative also crosses the Little Spokane River Valley, an area that contains a healthy resident deer population but few areas of concentrated winter use.

Other big game mammals listed in Section 3.1.7.2 for the Proposed Route would also apply to the Eastern Alternative, predominantly within the northern portion of the study area. The resident mountain goat population found in the Linton Mountain area near Metaline Falls use the abandoned gravel quarry that is located immediately west of the Eastern Alternative ROW.

3.2.7.3 Threatened or Endangered Species

The sensitive wildlife species discussed in Section 3.1.7.3 and presented in Table 3-7 for the Proposed Route may also be found along the Eastern Alternative within the appropriate habitat types. Wintering bald eagles typically occur along the Pend Oreille, Little Spokane, and Spokane Rivers from mid-November to early May (Hickman 1987). The Eastern Alternative crosses south of a likely communal roost site for bald eagles near Deep Creek and the Riverside State Park (Phamess 1990). The Chattaroy Variation may also cross near an active communal roost area along the north-facing slope in the Little Spokane River Natural Area, although this site has not been confirmed (Phamess 1990; Schulz 1990). On-going studies on these possible sites will determine the extent of bald eagle use. Three active bald eagle nest sites occur within 2 miles of the Eastern Alternative route, as discussed in Section 3.1.7.3 for the Proposed Route.

Peregrine falcons may also be present along the Pend Oreille River during migration (WDE 1985) and have been reported in the vicinity of the Colville National Forest during the fall migration. However, no peregrine nesting is known to occur in the project area (Forest Service 1988).

As discussed for the Proposed Route, the federally-endangered Selkirk Mountain caribou, Northern Rocky Mountain wolf, and grizzly bear may all be associated with the Eastern Alternative. The federal candidates wolverine, lynx, and Townsend's big-eared bat and the state protected osprey may also occur along portions of the proposed Eastern Alternative. Refer to Section 3.1.7.3 for additional detailed information on these species.

3.2.8 Existing and Planned Land Use

3.2.8.1 Existing Land Use

The inventory methodology used for the lands located along the Eastern Alternative is the same as that discussed for the Proposed Route and is outlined in Section 3.1.8.1. The existing land use patterns along this route alternative are described for each of the route segments. The first five route segments are in common with the Proposed Route and are discussed in Section 3.1.8.1. The remaining five route segments are described separately, proceeding from north to south. These segments can be identified on Map 2-2.

The segments include:

- Border to Boundary Dam
- Boundary Dam to South of Ione
- South of Ione to West of Cusick
- West of Cusick to Northeast of Chattaroy
- Northeast of Chattaroy to Southeast of Mead
- Southeast of Mead to North of Seven Mile
- North of Seven Mile to Four Mound Prairie
- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to North of Marshall
- Marshall Vicinity

Border to Southeast of Mead. The first portion of the Eastern Alternative consists of five segments that are common with the Proposed Route. The primary existing land uses along these segments are described in Section 3.1.8.1.

Southeast of Mead to North of Seven Mile. This short east-west segment parallels two to six existing transmission lines. In almost the entire segment the project is located on existing transmission line ROW. It crosses the northern edge of the Spokane urban area, with large areas of suburban-density residential development and occurrences of the commercial and institutional uses that are normally associated with such development levels. Whitworth College occurs near the center of the segment, and major industrial facilities are located near its eastern end. North of its western portion is the recently created Little Spokane River Natural Area. There are also extensive areas currently undeveloped (but not cultivated) along this segment.

North of Seven Mile to Four Mound Prairie. This east-west segment parallels two existing transmission lines for most of its length. It is located beyond the current Spokane urban fringe area, and its land uses consist of a thin scatter of farms and residences. A small cluster of farms and residences occur at the segment crossing of the Spokane River and State Highway 297. Immediately west of the river, a 1-mile portion of the route segment crosses Riverside State Park (which parallels 2 existing transmission line ROWs) (Washington State Parks and Recreation Commission 1988). The land along most of the segment however is undeveloped woodland.

Four Mound Prairie to East of Spokane International Airport. This northwest to southeast route segment parallels one or two existing transmission lines for its entire length. The development patterns along the segment vary from a sparse scatter of residences, with a few large farming operations at its northwest end; to a relatively dense scatter of residences, with extensive agriculture east of its central portion; to a mix of commercial, industrial, airport, expressway, and residential uses near its southeastern end, interspersed with undeveloped parcels. At a point opposite the end of one of the main runways of Spokane International Airport, the existing transmission lines (which the route parallels) complete a loop-shaped detour before returning to their original course. This is evidently to improve aircraft landing and takeoff clearance and to minimize obstructions in the zone in which aircraft accident potential is the highest. At this location, the route segment crosses an area subject to height limitations, according to the Federal Aviation Regulations - Part 77 and the more restrictive Spokane County Airport Overlay Zone requirements (Spokane Airport Board 1986 and 1987). These county zoning requirements also address the issue of the defined zones of increased aircraft accident potential at the ends of runways (Spokane County Planning Department 1987). Utility facilities are not prohibited from these zones.

East of Spokane International Airport to North of Marshall. In its northern third, this short north-south segment parallels an existing transmission line; elsewhere, it is located on new ROW. The northern two-thirds of the segment passes through land that contains a dense scatter of rural residential development, with some farming and patches of undeveloped woodland. This is the current southwestward limit of the Spokane urban fringe. To the west is the Community of Geiger Heights. The land along the southern third of this segment is primarily undeveloped woodland.

Boundary Dam Variation. The existing land use along the Boundary Dam Variation and the segment of the Eastern Alternative replaced by this variation would be the same as that discussed for the Proposed Route. See Section 3.1.8.1 for detailed information on these route segments.

Marshall Vicinity. This project segment is very short, but includes the area of the planned Marshall Substation. It is essentially undeveloped. The community of Marshall lies about 0.5 mile south of the planned substation site.

Chattaroy Variation. This northeast to southwest segment uses an abandoned railroad ROW (parallel to U.S. Route 2) for the majority of its northeast third. The remaining segment portions would require new ROW. All but the southwestern end of the segment crosses land that contains a relatively dense scatter of residences (many of which tend to be concentrated in loose clusters) and occasional farmed areas. One major existing transmission line crosses this area. The segment crosses one large agricultural area at its southwest end, including areas of lightly developed, sparsely wooded terrain. This undeveloped terrain includes the recently created Little Spokane River Natural Area, which is a joint state-county managed recreation/preservation area (Washington State Parks and Recreation Commission 1988). The route segment crosses the center of this natural area and parallels a portion of its edge. Near the northern end of the segment the variation crosses the Colbert Landfill, as described for the northeast of Chattaroy to southeast of Mead segment for the Proposed Route (see Section 3.1.8.1). The segments of the Eastern Alternative replaced differ in their existing land use character. While these segments do contain a dense scatter of residences, they also maintain suburban-density residential development, occasional commercial uses, institutional uses (including Whitworth College), a seminary, and a major industrial area. They also parallel existing transmission lines for a majority of their length.

Marshall Variation. This segment initially travels west to east, paralleling two existing transmission line ROWs; it turns north to south, occupying an abandoned railroad ROW; and then travels east to west along new ROW. The land uses along the variation's east to west portion include a dense scatter of residences set amongst areas of undeveloped woodland. its north to south portion follows a major transportation corridor containing two operating railroads, a highway, and (at the north end of this portion of the segment) an expressway. A scatter of residences also occurs along this transportation corridor. The segment's east to west portion crosses undeveloped woodland. The segment of the Eastern Alternative replaced is shorter than this variation (see Table 2-3), but relatively similar to it, in that it passes through a dense scatter of rural residential development and undeveloped woodland.

Planned Marshall Substation Site. Historically, the substation site has been used for both agricultural and industrial purposes. Portions of the site were used for the storage of explosives, for the mining of sand and gravel, and as open rangeland. Current land use consists of unused rangeland or vacated industrial usage. The zoning of the site is currently about 50 percent agricultural and 50 percent manufacturing. Land use in the surrounding area consists of open space/rangeland, sand and gravel mining, and large acreage residential tracts of 5 acres or

larger. Land use trends in the vicinity of the site seem to indicate increasing numbers of mining uses and land divisions for large acreage residential tracts (Terra Corporation 1981).

Route Options to the Eastern Alternative. The overall existing land use environment described for the Eastern and Western Route Options (including the short route segments located near Chattaroy and Mead) would be the same as that discussed for the Proposed Route. See Section 3.1.8.1 for additional information on these route options.

3.2.8.2 Planned Land Use

The inventory methodology used for the lands associated with the Eastern Alternative is identical to that used for the Proposed Route and is outlined in Section 3.1.8.2. The Eastern Alternative extends from the Canadian border west of Boundary Dam to the planned Marshall Substation site located southwest of Spokane. Descriptions of the future land use plans and policies for the five route segments in common with the Proposed Route are included in Section 3.1.8.2. The five additional segments located along this variation are presented separately, as described for existing land use patterns in Section 3.2.8.1. These segments are shown on Map 2-2, located at the back of this document.

Border to Southeast of Mead. The first portion of the Eastern Alternative consists of five segments that are common with the Proposed Route. The primary planned land uses along these segments are described in Section 3.1.8.2.

Southeast of Mead to North of Seven Mile. This segment follows an existing transmission line corridor, with the majority of it located on an existing vacant ROW; a small portion is located on new ROW. The segment occurs primarily within Spokane County, where the segment passes through or adjacent to the Comprehensive Plan land classifications; Industrial, Urban, and Suburban. A short portion of the western end of the segment travels along the City of Spokane boundary, within the city limits. The route crosses an area within the City of Spokane that is zoned R1 (One Family Residence); however, the line actually occupies an established and vacant transmission line ROW at this location.

North of Seven Mile to Four Mound Prairie. This entire segment parallels an established transmission line corridor that includes a vacant ROW located within that corridor. The segment passes adjacent to the City of Spokane (within the City limits) on land zoned R1 (One Family Residential). The route then passes through Spokane County where the planned land classification is initially Rural and then Agricultural.

Four Mound Prairie to East of Spokane International Airport. This entire segment follows an existing transmission line corridor. It is located entirely within Spokane County and crosses the Comprehensive Plan land classifications: Agricultural, Rural, Semi-Rural, and Industrial. This route segment passes the end of a proposed runway at Spokane International Airport. At this location, the segment is subject to height limits under the Federal Aviation Regulations, Part 77, and also under the more restrictive Spokane County Airport Overlay Zone Requirements (Spokane Airport Board 1986 and 1987).

East of Spokane International Airport to North of Marshall. The northwest half of this segment follows an existing transmission line corridor; the remainder is located on new ROW. The entire segment is within Spokane County and crosses the Comprehensive Plan land classifications: Industrial, Suburban, Rural, and Urban.

Marshall Vicinity. This entire short segment (which includes the planned Marshall Substation site) is located on new ROW. The segment occurs entirely within Spokane County and is indicated in the Comprehensive Plan as proposed for Rural future land use.

Boundary Dam Variation. The planned land use along this variation and the segment of the Eastern Alternative replaced would be the same as that described for the Proposed Route. See Section 3.1.8.2. for additional information on these route segments.

Chattaroy Variation. This segment occurs within an abandoned railroad ROW within its northeast third. The remaining segment is located along new ROW. The segment is entirely within Spokane County and crosses the Comprehensive Plan land classifications: Rural, Semi-Rural, and Urban.

The segments of the Eastern Alternative replaced by this variation are located almost entirely within existing transmission line corridors. These segments cross both Spokane County (where the Comprehensive Plan land classifications include: Rural, Semi-Rural, Suburban, Industrial, and Urban) and the City of Spokane (where zoning is R1 - One-family Residential).

Marshall Variation. This segment initially follows an existing transmission line corridor, is then located within an abandoned railroad ROW, and then occurs within new ROW. The segment is primarily located in Spokane County, crossing Comprehensive Plan land classes Semi-Rural and Rural. A portion of the segment, however, occurs within the City of Spokane with the zoning districts RI (One-family Residence) and RS (Residential Suburban).

The City of Spokane also has, as part of the Comprehensive Plan, a Bikeways Plan (Spokane City Plan Commission 1988). This indicates a priority (proposed) bikeway route, both within the City and extending beyond it, that coincides with a portion of the Marshall Variation.

The segment of the Eastern Alternative replaced parallels an existing transmission line corridor and is located within a new ROW. This segment occurs entirely within Spokane County, crossing land classes Industrial, Suburban, Rural, and Urban.

Route Options to the Eastern Alternative. The overall planned land use environment described for the Eastern and Western Route Options (including the short route segments located near Chattaroy and Mead) would be the same as those discussed for the Proposed Route. See Section 3.1.8.1 for additional land use information on these route options.

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3.2.9 Visual Resources

As with the Proposed Route, the northern portion of the Eastern Alternative is located in scenic, natural-dominated, mountainous country that transitions to a mix of lower mountains and broader agricultural valleys in the central portion of the study area and finally to relatively open, flat lands influences by the urban fringe of Spokane.

The baseline inventory of visual resources associated with the Eastern Alternative is the same as that discussed for the Proposed Route and is outlined in Section 3.1.9. The study area for this route alternative can be divided into six relatively distinct visual areas. The first four route segments are common with the Proposed Route and are discussed in Section 3.1.9. The remaining two route segments are described separately. These segments can be identified on Map 2-2 located at the back of this document. These route segments are as follows:

- Border to Boundary Dam
- Boundary Dam to Ione
- Ione to Highway 2/Bare Mountain
- Highway 2/Bare Mountain to Mead
- Mead to Fivemile Prairie
- Fivemile Prairie to Marshall

Border to Mead. The first portion of the Eastern Alternative consists of four segments that are common with the Proposed Route. The visual resources associated with these segments are described in Section 3.1.9.

Mead to Fivemile Prairie. This area is an entirely man-dominated urban and urban fringe setting. The southern and eastern portions are in an industrial setting, while the western portion is residential and institutional in character. A very large number of residential and highway viewpoints are present here. Numerous existing high voltage transmission lines are located in this area, parallel to the Proposed Route. This area has been inventoried as being of Moderate and Low landscape quality.

Fivemile Prairie to Marshall. This area is primarily flat terrain with a mosaic of scattered evergreen trees and large open areas of grassland with occasional cultivated fields. Residences are generally scattered throughout this area, but are relatively dense in some locations. The area is therefore generally man-dominated. The area in the vicinity of the Spokane River is an exception in that it is bounded by relatively high bluffs, has a higher concentration of tree cover, and is somewhat more insulated from development. It is also part of the Riverside State Park. The Coulee Creek and Deep Creek Valleys are similar, but lack such a dominant water feature. These three areas were identified as being of Moderate landscape quality, and the remainder was rated as being of Low landscape quality relative to other lands in the study area. Through the middle of this portion of the study area, at least one smaller wood H-frame transmission line is present; and in a portion of it, there are two smaller parallel wood H-frame lines. The Proposed Route would parallel these lines.

Boundary Dam Variation. The visual resources associated with this variation would be the same as that described for the Proposed Route in Section 3.1.9.

Chattaroy Variation. This variation is located in a somewhat hilly mosaic of agriculture and forest over most of its distance. Rural residences and farm buildings are located throughout this portion of the route, and visibility is generally high from relatively large numbers of viewpoints. The far southern portion crosses Lockhart Hill and would be prominently skylined from a large number of residences. It then drops down to the Little Spokane River and crosses the river in a natural and scenic area that is part of the Little Spokane River Natural Area, a joint County and State administered recreation area. The high scenic values of this area can be viewed from one of several locations including: the Rutter Parkway, built by the Works Project Administration from 1937 to 1938; biking trails; or the Little Spokane River itself. The only existing transmission lines in this area are located in the corridor that is paralleled by the Proposed Route. The majority of this area was rated as having Moderate landscape quality; the area adjacent to the Little Spokane River was rated as being of High landscape quality.The segment of the Proposed Route replaced is of both Moderate and Low landscape quality. The northern half of the segment is a mosaic of agriculture and forest, and the southern and western portions are a man-dominated industrial and residential setting. The Proposed Route would parallel numerous existing transmission line ROWs.

Marshall Variation. This area is located on the edge of the Spokane Metropolitan area and contains a relatively high concentration of scattered semi-rural residences in a forest and grassland mosaic setting. The northern portion of this variation is located in a relatively flat and open landscape and parallels two smaller existing transmission lines. It is rated as being of Low landscape quality. The eastern and southern portions are located in a relatively deep and narrow valley, which contains Marshall Creek. It also contains a greater concentration of trees, and is somewhat more insulated from the urban fringe development. A sufficient number of residences are present, however, to provide a high level of visibility of the area. There are no parallel transmission lines. A majority of this portion of the route is rated as Moderate landscape quality.

The segment of the Proposed Route replaced is in a flat mosaic of forest and grassland, with numerous semi-rural residences. Somewhat less than half the distance would parallel a smaller existing transmission line. The entire area is rated as Low landscape quality.

The planned Marshall Substation site is located in a relatively flat area of scattered pines on the outskirts of Spokane. Within the site vicinity, there are a variety of scattered residences, as well as inactive gravel pits. This area has been rated as Low landscape quality.

Route Options to the Eastern Alternative. The visual resources associated with the Eastern and Western Route Options would be the same as those described for the Proposed Route in Section 3.1.9.

3.2.10 Cultural Resources

The cultural resources evaluation performed for the Proposed Route would also apply to the Eastern Alternative (Hudson et al. 1987; Hudson et al. 1988; Stevens and Galm 1991). A total of 19 previously recorded cultural sites occur within the 0.5-mile-wide study corridor along the Eastern Alternative, including historic properties in the town of Colbert, as well as at Whitworth College and along Peone Prairie. Known historic properties in the Peone Prairie area include those listed for the Proposed Route in Section 3.1.10, in addition to Whitworth College, which includes at least two historic properties: Ballard Hall (ca. 1927) and McMillan Hall (pre-1915). One other previously recorded site located along the Eastern Alternative, includes the remains of the Deep Creek Colony.

Potential cultural sites associated with the Boundary Dam Variation are described in Section 3.1.10 for the Proposed Route.

No previously recorded sites exist along the Chattaroy Variation; however, the route crosses the Rutter Parkway, which was constructed by the Works Project Administration from 1937 to 1938.

This property may be eligible for the NRHP. Other potential problem areas identified along the Chattaroy Variation include the Chattaroy Cemetery and Cottonwood Road (1960s), which may be eligible for the NRHP. The Little Spokane River and Deer Creek have moderate to high prehistoric site potential, particularly in the vicinity of Buckeye. There is also the potential for visual impacts to historic properties north of Fivemile Prairie (see Map 2-2, Sheet 4).

Previously recorded sites along the Marshall Variation include flour mills and sawmills. Potential problem areas include historic features in the Marshall area and prehistoric site potential along Marshall Creek. There is also the potential for visual impacts affecting historic properties in the Spokane vicinity.

State records were reviewed for cultural resources located on the planned Marshall Substation site. No significant cultural resources are recorded, and analysis of archaeological probabilities indicates a very low potential for sites at the planned Marshall Substation. This assessment is based on the absence of significant natural resource conditions, which are commonly indicative of areas for historic and prehistoric human activities. Cultural resources on the site were limited to foundations of gun powder buildings, most of which were located in the ravine (Terra Corporation 1981).

3.2.11 Socioeconomics and Community Resources

3.2.11.1 Population

The population characteristics for the four-county study area, which would include the Eastern Alternative, its variations, and associated route options are shown in Table 3-8. The Eastern Alternative originates at the international border and proceeds across the northeast corner of Stevens County, through Pend Oreille County, and into Spokane County to the planned Marshall Substation. The population characteristics for these three counties crossed by the Eastern Alternative are described in detail in Section 3.1.11.1 for the Proposed Route.

3.2.11.2 Economic Base

The economic base for the Eastern Alternative and its variations is the same as that described for the Proposed Route. Review Tables 3-9 and 3-10 in Section 3.1.11.2 for additional information.

3.2.11.3 Housing

The housing characteristics associated with the counties crossed by the Eastern Alternative and its variations are the same as those described for the Proposed Route. Table 3-11 and Section 3.1.11.3 present this specific information pertaining to housing and accommodations availability.

3.2.11.4 Fiscal Conditions

The fiscal conditions associated with the Eastern Alternative and its variations are the same as those described for the Proposed Route. Review Tables 3-12 and 3-13 in Section 3.1.11.4 for additional information.

3.2.12 Transportation and Noise

Transportation. Existing transportation conditions associated with the Eastern Alternative parallel those described for the Proposed Route in Section 3.1.12. Primary north-south highways along the Eastern Alternative include State Routes 31, 20, 211, and U.S. Route 2. See Section 3.1.12 for detailed information regarding these highways, as discussed for the Proposed Route. U.S. Route 2 and Interstate 90 (I-90) are the primary east-west routes crossed by the Eastern Alternative. Both highways would be crossed where vehicle use is relatively heavy. Annual average daily traffic on U.S. Route 2 at the Eastern Alternative crossing is estimated between 10,000 to 19,999 vehicles, while traffic on I-90 is estimated to be between 20,000 to 39,999 vehicles (WDOT 1987).

Spokane International Airport is located approximately 1 mile southwest of the Eastern Alternative. The proposed Interconnection would parallel existing 115-kV transmission lines through this section and would be designed and routed to comply with Federal Aviation Administration (FAA) and Spokane County Airport Overlay Zoning regulations. Small airfields located at Sullivan Lake, Riverbend, Newport, Deer Park, and Felts Field are not in close proximity to the Eastern Alternative. This alternative is located within approximately 1.5 miles of small airfields near Ione and Mead and within 1 mile of a landing strip southeast of Sacheen Lake.

Access to the planned Marshall Substation site is by Grove Road, which is a paved two-lane county roadway. In addition, Andrus Road, which is a gravel-surfaced county road, bisects the property near the southern border. The Cheney-Marshall Road borders the southeast corner of the site. This is a paved, two-lane county roadway that is a main route connecting Cheney and Spokane. I-90, located approximately 3 miles north and U.S. Route 195, located about 4.5 miles

to the east, constitute the major highways to the site. Numerous smaller roads exist near the site, which are typically rural in character.

The small unincorporated community of Marshall lies directly south of the planned substation site. In past years, Marshall was a railroading center serving four intercontinental railroads. Today, the Burlington Northern and Union Pacific Railroads continue mainline tracks that pass through Marshall and border the planned substation site for the Eastern Alternative. Car loading capabilities also exist nearby (Terra Corporation 1981).

Noise. Please refer to Section 3.1.12 for a discussion of transmission line audible noise relative to the Eastern Alternative, its variations, and associated route options.

Noise sources in the planned Marshall Substation area include air traffic noise from the Spokane Airport, rail traffic on the Burlington Northern line bordering the site, gravel mining operations adjacent to the western boundary of the site, and road traffic on two sides of the property. No ambient noise data have been collected in the area; however, the number of relative high magnitude noise sources in the area indicates the probability that moderate-to-high ambient noise levels currently exist at the site (Terra Corporation 1981).

3.3 Western Alternative

3.3.1 Air Quality

Air quality along the Western Alternative would be the same as that described in Section 3.1.1 for the Proposed Route.

3.3.2 Geology and Soils

3.3.2.1 Geology

The Western Alternative crosses glacial till overlying mudstones and sandstones along the Columbia River Valley. From the Columbia River to northwest of Chewelah, the base rocks are of sedimentary origin. The route then traverses sandstones and mudstones, glaciofluvial valley deposits, and granite bedrock directly north of the Spokane River. This alternative then crosses basalts, with glacial debris deposited within the stream valleys (Alt and Hyndman 1987).

Topography. The Western Alternative follows the southern edge of the Columbia River Valley, remaining on fairly level terrain (see Map 2-2, Sheet 9). The route turns south near Swede Pass, rising approximately 1,000 feet before descending into Echo Valley. The alternative follows the west side of Echo Valley, crosses the Colville Valley, and ascends approximately 1,000 feet onto the west flank of the Huckleberry Mountain Range. The route proceeds southward, fluctuating as much as 800 feet in elevation, before descending into the Chamokane Creek Valley near Springdale. Within this valley, the route traverses both hilly and level terrain before crossing the Spokane River. South of the Spokane River the route ascends several hundred feet and travels to the southeast where it crosses undulating terrain to its terminus at the planned Marshall Substation.

The Onion Creek Variation leaves the Western Alternative in the Columbia River Valley and heads southeast along the east flank of the Onion Creek Valley (see Map 2-2, Sheet 9). The variation turns south and descends approximately 200 feet, crossing Onion Creek. The route then ascends 400 feet in elevation and turns southwest, climbing an additional 600 feet. The Onion Creek Variation crosses the East and South Forks of Bruce Creek, climbs 200 feet in elevation, and turns to the southwest. The route then follows the north slope of Clugston Creek before descending into Echo Valley and reconnecting with the Western Alternative.

The Marshall Variation is described for the Eastern Alternative in Section 3.2.2.1.

Geologic Hazards. The Western Alternative contains three areas of high landslide incidence with more than 15 percent of the area of underlying rock or earth material estimated to be involved in landsliding activities (Radbruch-Hall et al. 1976). These areas include the Columbia River Valley, an area directly north of the Spokane River, and the Spokane River crossing. Earthquake potential would be the same as that discussed for the Proposed Route (see Section 3.1.2.1).

Mineral Resources. Mining and mineral processing have been and remain important in the Colville area. Several mines surrounding Chewelah have produced lead, silver, copper, and gold between the late 1890s and the 1950s. Several mines have also produced magnesite (magnesium carbonate), such as the Alcoa Magnesium Plant near Addy. Chewelah maintains a large rock and marble quarrying industry and a source of silica sand. In northern Stevens County, Northport has undergone a transition from gold and silver mining to lead and zinc mining and smelting.

Areas exhibiting the potential for future minerals exploration may also occur along the Western Alternative. These have not been identified outside of the Colville National Forest (see Section 3.1.2.1).

3.3.2.2 Soils

The Stevens County, Lincoln County, and Spokane County Soil Surveys were used as sources for descriptions of the soil types present along the Western Alternative within these three counties (SCS 1982, 1981, and 1968).

Soils along the Western Alternative in Stevens County occur predominately on foothills and mountain sideslopes, although soils on the Colville Valley floor are crossed northwest of Colville. Mountain soils are moderately deep, well drained, and on nearly level to very steep slopes. These soils are forming in residuum from granite, with an admixture of loess and volcanic ash. Foothills soils are generally very deep, well drained, and on nearly level to very steep slopes. These soils are forming in mixed glacial till, with a mantle of loess and volcanic ash.

Soils in the Colville Valley floor are generally of the Colville-Peone-Narcisse soil association. These soils are very deep; well drained to poorly drained; and nearly level on bottomlands, floodplains, alluvial fans, lake perimeters, and in depressional areas. Soils found in the small portion of Lincoln County crossed by the Western Alternative are either steep soils on canyon slopes and plateaus or very deep, excessively drained sandy soils on river terraces. Soil descriptions for Spokane County have been previously discussed in Section 3.1.2.2.

Soils occurring along the Western Alternative in Stevens County have high erosion potential, with 9 of 10 soil association map units having at least 1 soil component with a high "K" factor value. Soils along the small portion of Lincoln County crossed by the Western Alternative have low to moderate "K" factor values, due to predominately sandy soils on nearly level river terraces. Soils in Spokane County have a high erosion potential.

The Western Alternative crosses approximately 12.2 miles of prime farmland soils, which constitutes 10.1 percent of the total route length of 121.1 miles.

Soils crossed by the Onion Creek Variation have similar high erosion hazard potentials compared to the segment of the Western Alternative replaced. The variation crosses 1.9 miles of prime farmland soils, as compared to 0.5 mile for the segment of the Western Alternative that would be replaced by this variation. The prime farmland soils associated with the Marshall Variation would be the same as those described for the Eastern Alternative in Section 3.2.2.2.

3.3.3 Surface Water

The Western Alternative would cross 20 named streams, 34 unnamed streams, and 1 unnamed pond, (some multiple crossings) totaling 60 water resource crossings (see Table 3-15). Five shorelines of the state would be crossed and of those five, two streams are classified as shorelines of state-wide significance. These include the Colville and Spokane Rivers, which maintain mean annual discharges of 308 cfs and 7,949 cfs, respectively (BLM 1987). In addition, three Type 2 streams would be crossed. Route comparisons are shown in Table 3-3.

The Onion Creek Variation would cross one named and six unnamed streams, totaling eight water resource crossings (see Table 3-4). One stream is classified as a shoreline of the state. The segment of the Western Alternative replaced by this variation would cross one named and five unnamed streams, totaling six stream crossings (see Table 3-4).

See Section 3.2.3 for surface water information associated with the Marshall Variation and the planned Marshall Substation site.

3.3.4 Floodplains and Wetlands

Floodplains. The only floodplain located along the Western Alternative and its variations that could not be easily spanned by the proposed line is the Colville River. This floodplain crossing is approximately 4,900 feet in length; therefore, structures would have to be located in the floodplain (see Map 2-2, Sheet 8).

Wetlands. The majority of the larger wetlands along the Western Alternative and its variations are commonly found adjacent to streams and rivers. Wetlands are present east of the route in Echo Valley, associated with Echo Lakes.

Palustrine emergent and forested wetlands are common along the Colville River and Mill Creek, northwest of Colville. Stensgar Creek (near the junction of the Western Alternative and the Southern Crossover Alternative) and Deer and Chamokane Creeks (west of Springdale) also contain wetlands. As described for the Eastern Alternative, "kettles" are common in the Four Mound Prairie area and in the vicinity of the Spokane International Airport.

3.3.5 Aquatic Ecology

Table 3-15 lists the water resources crossed by the Western Alternative. The aquatic resources are very similar along this alternative and its variations to those along the Proposed Route (see Table 3-5). Anadromous fish species have been eliminated from all the drainages of the

Table 3-15

Water Resources Crossed by the Western Alternative

Water Resource	Number of Crossings	Shoreline Management Act[1]	Shorelines of State-Wide Significance[2]	Type 1 and/or 2[3]
Matthews Creek	1			
Scriver Creek	1			
Deep Creek	1	X		1
Five Mile Creek	1			
Onion Creek	1	X		1
Colville River	1	X	X	1
Gold Creek	1			
Corbett Creek	1			
Haller Creek	1			2
Stranger Creek	1			
Stensgar Creek	1			
Dry Creek	1			
Service Creek	1			
Huckleberry Creek	1			
Cedar Creek	1			
Deer Creek	1			2
Chamokane Creek	6	X		1,2
Spokane River	1	X	X	1
Coulee Creek	1			
Deep Creek	1			
Unnamed Streams	34			
Unnamed Pond	1			
TOTAL	60			

[1]Streams considered to be shorelines of the state pursuant to the Shoreline Management Act of 1971 (Chapter 90.58 RCW) and designated under County Shoreline Master Plan.

[2]Type 1 waters include all waters inventoried as shorelines of the State; Type 2 waters are natural waters not classified as Type 1, maintain high use, and are considered important for water quality.

[3]Source: WDNR 1978 to 1982.

Columbia River upriver of the Grand Coulee Dam. Therefore, only resident game and nongame fish species occur within the water resources along the Western Alternative. A prominent brown trout fishery has developed on the Colvilie River, due to the ability of this species to withstand higher water temperatures associated with the annual low flows that the river experiences (Forest Service 1988; WDE 1973).

3.3.6 Vegetation

Vegetation composition along the Western Alternative and its variations is similar to that present along the Proposed Route with mixed forest, ponderosa pine, and grassland/pasture dominating the area. As described for the Proposed Route, the Douglas fir and western hemlock series dominate the mixed coniferous forests that occur along the route from the Canadian border south to the Springdale vicinity. The vegetation transition to the ponderosa pine series occurs as the route travels south into the Spokane area, with an increase in ponderosa pine.

A higher percentage of agricultural land is present along this route, with concentrations at Colville, Addy, and Ford in the Colvilie River Valley. The USFWS National Wetland Inventory Maps (1987) showed wetlands, typically associated with riparian areas, that are present along the route. These wetlands are concentrated in the Colvilie Valley and west of Spokane (see Section 3.3.4).

Two sensitive plant species populations (blue-eyed grass and wood sage) are known to occur near the Western Alternative in two separate locations (see Table 3-6).

3.3.7 Wildlife

3.3.7.1 Nongame Species

Habitat community types along the Western Alternative and its variations would parallel those found along the Proposed Route. Nongame wildlife species occurring on this alternative would be the same as those listed in Section 3.1.7.1. In addition, the Columbia and Colville Rivers exhibit a mixture of species associated with a variety of habitats. For instance, golden eagle nesting is prevalent along the Columbia River (Burke 1989) and three species of chickadee: chestnut-backed, mountain, and black-capped occur within the Colvilie River area (WDE 1973; Forest Service 1988). The Lewis' woodpecker has also been observed near Long Lake Dam and would be considered rare in the study area (Phamess 1992). Wildlife species associated with the Marshall Variation are outlined in Section 3.2.7 for the Eastern Alternative.

3.3.7.2 Game Species

Refer to Section 3.1.7.2 for a listing of the game species occurring along the Western Alternative and its variations. Waterfowl concentration areas occur within the Colville Valley, where birds show significant use of temporary wetland areas within the basin (Kaumheimer 1989).

The white-tailed deer populations along the Western Alternative are some of the highest deer densities within the state (Zender 1989; WDE 1973). The Western Alternative intersects with a priority mule deer wintering area near the northern boundary (Zender 1989; Whalen 1989). Mule deer are more numerous in higher elevations along this alternative than along the Proposed Route. Priority winter range for white-tailed deer is intersected by this alternative route in several locations. Priority winter range parallels the Columbia River from Island Rock to Marble. One of the largest winter concentration areas crossed by the line occurs in Echo Valley. Other priority areas exist within Marble Valley, northwest of Addy, and along Stensgar Creek near the community of Bluecreek (Whalen 1989).

The Onion Creek Variation crosses priority winter areas in the Island Rock vicinity and portions of the Echo Valley range. Mountain goat range would not be crossed by this route variation.

3.3.7.3 Threatened or Endangered Species

Although the sensitive wildlife species listed in Section 3.1.7.3 for the Proposed Route may occur along the Western Alternative, they would not likely be as prevalent along this route. Concentrations of nesting ospreys and wintering bald eagles occur along the Colville and Columbia Rivers; however, the majority of wintering eagles are primarily found along the Columbia River to the west and southwest of the route (Zender 1989; Dunn 1987). No communal roosting or nesting sites for bald eagles have been identified along the Western Alternative (Zender 1989; WDW 1988). A number of eagles forage below Long Lake Dam, where this alternative crosses the Spokane River (Phamess 1990).

The peregrine falcon may occur along the Columbia River and associated water resources during migration. However, no nesting is known to occur in the area associated with the Western Alternative (WDE 1985).

The mountain caribou is currently not reported along the Western Alternative; however, as the Selkirk population increases, movement of these individuals may be observed further west of the Pend Oreille River (WDW 1988; Hickman 1989). Confirmed and unconfirmed locations for the grizzly bear and gray wolf, respectively, have been recorded by the WDW (1988) and are shown

on Map 2-2. Individuals of both species would likely occur along the northern portion of the Western Alternative, as described for the Proposed Route.

3.3.8 Existing and Planned Land Use

3.3.8.1 Existing Land Use

The inventory methodology used for the lands located along the Western Alternative is the same as that discussed for the Proposed Route and is outlined in Section 3.1.8.1. The existing land use patterns along the route are described separately for eight route segments, proceeding from north to south. These segments can be identified on Map 2-2. The last three segments are common with the Eastern Alternative and are described in Section 3.2.8.1.

The segments are:

- Border to Island Rock
- Island Rock to Echo
- Echo to Southwest of Arden
- Southwest of Arden to Southwest of Bluecreek
- Southwest of Bluecreek to Four Mound Prairie
- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to North of Marshall
- Marshall Vicinity

Border to Island Rock. This segment runs northeast to southwest and is located on new ROW for its entire length. The majority of the route segment parallels Franklin D. Roosevelt Lake and the Columbia River (northeast of a point approximately 3 miles upstream of Northport), at distances varying from about 400 feet to 0.75 mile. The reservoir and river receive recreational use. Specific developed facilities include a marina at Northport and a few private boat docks. The Coulee Dam National Recreational Area does not extend upstream into this segment. The central portion of the route segment deviates from the river/reservoir, passing southeast of Silver Crown Mountain and the community of Northport. The valley also contains State Highways 25 and 251, as well as a lightly used railroad, but no major transmission line presently exists. The terrain along the route segment is primarily undeveloped woodland, but also contains residences and cultivated areas. One surface mine occurs in this area.

Island Rock to Echo. This segment of the Western Alternative is located on new ROW for its entire length and can be divided into two portions. The first part runs northeast to southwest and parallels the valley containing Franklin D. Roosevelt Lake at distances varying from 500 feet to over 0.75 mile from the reservoir shoreline. In this area, the reservoir is part of the Coulee Dam National Recreation Area, but no developed recreation facilities occur in this stretch. The existing land use characteristics in this segment portion are similar to those described in the previous Border to Island Rock segment. The second portion of the segment runs north to south, diverging from and no longer paralleling Franklin D. Roosevelt Lake. This portion traverses mostly undeveloped woodland, but contains a very sparse scatter of residences and agricultural areas. Near its southern end, however, this portion of the segment skirts the Echo Valley, an intensively farmed area.

Echo to Southwest of Arden. This north to south segment is located entirely on new ROW. It naturally falls into three divisions. The first of these is similar to the southwest portion of the previous segment, i.e., it skirts the edge of the agricultural Echo Valley, but most of the segment crosses undeveloped woodland containing scattered residences, farmed areas, and a gravel pit. The following segment portion crosses the heavily farmed Colville Valley, containing U.S. Route 395 and a relatively dense concentration of residences. The last segment division traverses an extensive area of undeveloped, wooded terrain intersected by six minor east-west roads. Both clustered and isolated residences occur along these roadways, in addition to occasional agricultural areas.

Southwest of Arden to Southwest of Bluecreek. This segment of the Western Alternative is located entirely on new ROW. It traverses terrain that is primarily undeveloped woodland, but also contains substantial agriculture areas with associated residences. Many of these areas are concentrated along east-west running roadways.

Southwest of Bluecreek to Four Mound Prairie. The northern half of this long north-south segment is located on new ROW. The southern half is located parallel to one or two existing transmission lines. The northern half of the segment crosses undeveloped, wooded terrain. As the segment proceeds south, residences and agricultural areas are more prevalent, but their density remains sparse down to where the route converges with the existing transmission line ROW and travels south. The southern half of the segment initially crosses sparsely wooded terrain, interspersed with agricultural areas and scattered residences, most of which are associated with relatively major roads. The Western Alternative route would cross 3.4 miles of the Spokane Indian Reservation along its eastern edge (see Map 2-2, Sheet 6), paralleling WWP's existing 115-kV transmission line through this area. The route segment then crosses the Spokane River, immediately downstream of the Long Lake Dam. In this area, hydroelectric power generation and power transmission are the dominant land uses, although small, loose

clusters of residences also occur. South of the river, the route segment turns southeast to Four Mound Prairie, paralleling two existing transmission lines. In this portion of the segment, the route traverses sparsely wooded, undeveloped terrain with a moderately dense scatter of residences and a few large agricultural areas.

Four Mound Prairie to Marshall Vicinity. The remainder of the Western Alternative route consists of three segments that are common with the Eastern Alternative. The primary existing land uses along these segments are described in Section 3.2.8.1.

Onion Creek Variation. This northeast to southwest segment is located entirely on new ROW. It parallels a moderately important road from less than 100 feet to over 2,000 feet for most of its length. The terrain crossed is primarily undeveloped woodland, with irregularly scattered residences and agricultural areas. At its southwest end, this segment crosses about a mile of agricultural land within the Echo Valley. Land uses along the segment of the Western Route replaced is relatively similar to the Onion Creek Variation, differing primarily in that the Western Alternative segment has proximity to the Coulee Dam National Recreation Area.

Marshall Variation. The Marshall Variation and its existing land uses are described in Section 3.2.8.1 for the Eastern Alternative.

3.3.8.2 Planned Land Use

The inventory methodology used for the lands located along the Western Alternative and its variations is identical to that used for the Proposed Route and is outlined in Section 3.1.8.2. Two additional agencies were contacted for the Western Alternative. Outlines of their future land use plans and policies are presented below.

Stevens County. The Western Alternative crosses portions of Stevens County. Stevens County maintains a Basic Policy Plan with a General Use Plan Map, but no zoning currently exists (Stevens County Office of Planning and Community Development 1982). The plan does not address major transmission lines. The plan divides the county into four land use classes, three of which (Resource Management I, Resource Management II, and Rural) would be crossed by various portions of the proposed Interconnection.

The County's policies/guidelines for these three land use classes are as follows:

- Resource Management I System: This system principally involves areas associated with the production and management of the County's natural resources on a sustained yield basis. Also normally included would be areas of excessive slope or elevation, important

or shallow aquifers, and the principal headwaters of the county's watershed systems. Recommended uses would include timber management, pasture and rangeland, non-intensive outdoor recreation, game and fish management, and general agriculture. Mining, quarrying, and resource-oriented industrial complexes would be allowable uses, where determined compatible with prevailing resource management practices and accompanied by appropriate conservation and reclamation programs.

- Resource Management II System: This system includes areas defined as incorporating soils of significant agricultural value, unique features, sensitive ecological associations, archaeological and historical sites, unique geologic features, and significant wildlife habitat areas. Also included are areas of flood proneness, high groundwater, seismic sensitivity, high potential hazards, or other conditions that limit or endanger development activities. Recommended uses would include those activities defined for a Resource Management I System, together with small farm estates, low density residential developments, and planned unit developments.

- Rural System: This system involves rural villages and communities, municipal fringe areas, and lands generally unsuitable for resource utilization. A principal objective in the Rural System would be the provision of development areas, which facilitate growth of established communities. Recommended uses would involve any use prescribed for Resource Management Classifications, residential development, and compatible industrial or commercial uses.

Stevens County also maintains the Generalized Land Use Map, documenting certain limited areas indicated as Residential/Recreational and Tract/Estate development areas.

Lincoln County. Lincoln County maintains a Zoning Ordinance and Map. A short segment common to the Western Alternative passes through the county, crossing the Open Space/Recreation and Agricultural Zoning Districts.

- The Agricultural Zoning District provides minimum standards for areas of general agricultural land use, including requirements for residential dwellings. Agriculture will be the primary use in the district, and all other uses will be placed to minimize their impact on the surrounding agricultural use. An absolute minimum lot size is not defined.

- The Recreational Zoning District provides and protects land for outdoor recreational and related residential uses. An absolute minimum lot size is not defined.

Transmission lines are conditionally approved uses in both these districts.

The future land use plans and policies along the route are described separately for eight route segments, proceeding from north to south. These segments are outlined for existing land use in Section 3.3.8.1 and can be identified on Map 2-2. The last three segments are common with the Eastern Alternative and are described in Section 3.2.8.2.

Border to Island Rock. This segment is located on new ROW for its entire length. It crosses Stevens County only and intersects land designated in the County Plan primarily as Rural, with some areas of Resource Management I and one small area of Resource Management II. The segment also crosses about 3 miles of land indicated by the county as a Tract/Estate development area.

Island Rock to Echo. This segment is located entirely on new row and within Stevens County. The County Plan Designation of the land along the segment is approximately equally divided into Rural, Resource Management I, and Resource Management II.

Echo to Southwest of Arden. This segment is very similar to the previous Island Rock to Echo segment, in that it is entirely located on new ROW and within Stevens County, and it crosses land divided similarly between the same three categories. A new airport is planned northwest of Colville about 1.1 miles east of this route segment (CH2M Hill 1988). The project would not approach the flight clearance zones of the proposed airport.

Southwest of Arden to Southwest of Bluecreek. This segment occurs entirely on new ROW. It is also located completely within Stevens County. The County Policy Plan land categories that it crosses are Rural and Resource Management II.

Southwest of Bluecreek to Four Mound Prairie. The northern half of this segment is located on new ROW. The remainder follows an existing transmission line corridor. The majority of the line (its northern three-quarters) is within Stevens County. This portion of the route segment crosses land that is designated in the County Policy Plan primarily as Rural, with substantial portions of Resource Management I. It also passes adjacent to an area designated by the county as a Tract/Estate development area. The route segment also crosses an isolated parcel of land managed by the BLM and 3.4 miles of the Spokane Indian Reservation. The crossing of the BLM parcel is located on new ROW; whereas, the crossing of the Spokane Indian Reservation parallels an existing line (see Map 2-2, Sheet 6). Proceeding south, a short portion of the segment is located in Lincoln County and, while following an existing transmission line corridor, crosses land zoned Agricultural and Recreation. The southernmost portion of the

segment follows and existing transmission line corridor within Spokane County on Comprehensive Plan land classes Rural and Agricultural.

Four Mound Prairie to Marshall Vicinity. The remainder of the Western Alternative route consists of three segments that are common with the Eastern Alternative. The primary future land use plans and policies along these segments are described in Section 3.2.8.2.

Onion Creek Variation. This segment is located entirely on new ROW within Stevens County. It crosses land that is an approximately equal mixture of Rural, Resource Management I, and Resource Management II in the County Policy Plan. It also crosses approximately 1 mile of BLM land along new ROW. The segment of the Western Alternative replaced is relatively similar to the Onion Creek Variation from the viewpoint of future land use plans and policies.

Marshall Variation. The future land use plans and policies associated with the Marshall Variation are presented in Section 3.2.8.2 for the Eastern Alternative.

3.3.9 Visual Resources

As with the Proposed Route, the northern portion of the Western Alternative is located in scenic, natural-dominated, mountainous country that transitions to a mix of lower mountains and broader agricultural valleys in the central portion of the study area and finally to relatively open, flat lands influenced by the urban fringe of Spokane. Unlike the Proposed Route, however, a majority of this alternative does not parallel an existing transmission line. Along the alternative's southern portion, near Springdale south to Long Lake, there is a single, wood pole H-frame transmission line; and from Long Lake to near Geiger Heights, there are two existing transmission lines. This alternative can be broken down into six segments of similar visual character. These include:

- Boundary to Swede Pass
- Swede Pass to Stensgar Creek
- Stensgar Creek to Deer Creek
- Deer Creek to Walkers Prairie
- Walkers Prairie to Four Mound Prairie
- Four Mound Prairie to Marshall

These are briefly described below.

Boundary to Swede Pass. This area includes the Columbia River Valley (Franklin D. Roosevelt Lake) and adjacent mountains. This is a highly scenic, natural-dominated setting. The Columbia River has been designated as a State Scenic River. The community of Northport is the largest man-introduced feature. Except for the widely separated farms on the narrow river terrace and a few old quarries, little evidence of man's activity occurs in this area. With the exception of the Coulee Dam National Recreation Area at the western portion of this unit, these lands are generally in private ownership and were given a rating of High landscape quality. Viewpoints include the community of Northport; the few residences; State Routes 25 and 251 and county roads; and Franklin D. Roosevelt Lake, including a portion of the National Recreation Area.

Swede Pass to Stensgar Creek (near the Community of Bluecreek). This portion of the Western Alternative skirts the edge of a series of agricultural valleys bounded by relatively high forested mountain slopes. A few small communities and one major town (Colville) occur in the valley areas. Overall, this alternative crosses an area of Moderate landscape quality. It is a pleasing mix of small-scale agricultural operations in well defined valleys, bounded by high mountains. There are occasional wood pole H-frame transmission lines crossing through this area, but none which parallel this alternative. Viewpoints include the towns, U.S. Route 395 and county roads, and the scattered farms and rural residences.

Stensgar Creek to Deer Creek. This is an area of relatively low forested mountains. Few roads or residences occur in this area, and because much of this land is in private ownership, it has virtually no recreation areas and few public viewpoints. Some BLM lands are located along this portion of the Western Alternative between Huckleberry and Cedar Creeks. Portions of the area show obvious evidence of past timber harvesting and mining activities. Overall, the area is of Moderate landscape quality. No existing transmission lines are located in this area.

Deer Creek to Walkers Prairie. This is an area of low forested foothills intermixed with small agricultural valleys. Springdale is the only community located in this area. Man-made features are primarily limited to scattered farm buildings. In addition, the southern 2 miles of the Western Alternative parallel a smaller existing wood pole H-frame transmission line. Viewpoints are limited to State Route 231, county roads, and rural residences. Overall, this area is a pleasing mix of low rolling forested hills and small agricultural valleys and is of Moderate landscape quality.

Walkers Prairie to Four Mound Prairie. This area is made up of relatively flat, broad valleys with a mixture of evergreen forest, large open grasslands, and cultivated fields. This area also includes a portion of Long Lake, but the lake itself has virtually no visual interaction with the project area due to topographic and vegetative screening. North of Long Lake, the Western Alternative would parallel a smaller (115-kV) wood pole H-frame transmission line; and southeast of Long Lake, it would parallel two smaller (115-kV) lines. Aside from the few scattered farms

and rural residences, there is little else besides the Long Lake Dam to indicate man's presence. Landscape quality for this area was rated as Moderate. Viewpoints include scattered residences, State Route 231, and county roads.

Four Mound Prairie to Marshall. The Four Mound Prairie area is an elevated, relatively flat open grassland landscape with areas of scattered evergreen trees. A few scattered farms, residences, and county roads provide the only viewpoints. The Western Alternative would parallel two smaller existing transmission lines through this area. Landscape quality is Low. The remainder of this unit is common to the Eastern Alternative and has been described in Section 3.2.9.

Onion Creek Variation. This area contains a variety of landscape conditions. From the north, it includes relatively steep and heavily forested mountain slopes that are generally not visible from roads or other public viewpoints, except for a single county road. In the upper middle portion, this variation would cross low forested hillsides, very close to numerous residential and highway viewpoints. Further south, it would cross Staghorn Mountain, a particularly prominent rocky ridge formation adjacent to the Clugston Creek-Onion Creek Road. The majority of the southern portion would cross moderately steep, forested mountains in intermittent view of a few residences and the Clugston Creek-Onion Creek Road. The very southern end of this variation would cross Echo Valley, a well defined agricultural valley bordered by relatively steep, forested hillsides. There are no existing transmission lines in this area, and aside from the few residences, little man-made influences. This area was given a rating of Moderate landscape quality. Approximately half of the portion of the segment of the Western Alternative replaced by this variation includes the Columbia River Valley, which has High landscape quality. Existing transmission lines do not occur along this route segment.

Marshall Variation. The visual resources associated with this variation and the route segment replaced is the same as those described for the Eastern Alternative in Section 3.2.9.

3.3.10 Cultural Resources

Previously recorded sites occur along the Western Alternative include one homestead, two prehistoric campsites, one tipi ring, talus pits, the Chamokane Mission, the remains of Deep Creek Colony, one prehistoric village, and the Long Lake Dam Pictographs. The Chamokane Mission is considered eligible for the NRHP (Hudson et al. 1988).

Potential areas of cultural resource concerns along the Western Alternative could include unrecorded mining sites; areas along major drainages, lakes, and creeks; trails and valley crossings; and visual impacts to potential historic sites and features (Hudson et al. 1988).

No previously recorded sites exist along the Onion Creek Variation. There is the potential for mining and homestead sites, particularly in the vicinity of Echo Valley, Clugston Creek, West Fork, and Onion Creek. The probability of prehistoric sites is relatively low overall, but the probability increases where the line crosses creek areas (Hudson et al. 1988).

Refer to Section 3.2.10 for cultural resources associated with the Marshall Variation. These would be the same as those described for the Eastern Alternative.

3.3.11 Socioeconomics and Community Resources

3.3.11.1 Population

Table 3-8 (see Section 3.1.11.1) shows the population characteristics for the four-county study area, which would include the Western Alternative, the Onion Creek Variation, and the Marshall Variation. The Western Alternative proceeds south from the international border through Stevens County, across the extreme northeast corner of Lincoln County, and into Spokane County terminating at the planned Marshall Substation. The Onion Creek Variation is located in Stevens County. The Marshall Variation is located in Spokane County. The population density along the Western Alternative ranges from low-density, rural in Stevens and Lincoln Counties to high-density, urban in Spokane County, particularly in and around the City of Spokane (see Table 3-8).

The population characteristics of Stevens County were described under the Proposed Route (see Section 3.1.11.1). The Western Alternative would be located in the unincorporated areas of Stevens County, which contain approximately 71 percent of the total 1987 county population. Incorporated cities and towns near the Western Alternative, which could provide a potential construction labor force and temporary housing opportunities, include Northport (1987 population 342), Marcus (1987 population 159), Kettle Falls (1987 population 1,245), Colville (1987 population 4,760), Chewelah (1987 population 1,970), and Springdale (1987 population 224). The town of Kettle Falls experienced a substantial increase in population between 1980 and 1987; whereas, Northport and Springdale experienced significant decreases during the same period (see Table 3-8).

The population of Lincoln County, including unincorporated areas and incorporated cities and towns, exhibited a fairly stable population level between 1980 and 1987. The population increase for all areas of the county between 1980 and 1987 was approximately 1 percent, with an average annual growth rate of less than 1 percent. Lincoln County has the lowest population density of the entire four-county study area (see Table 3-8).

The population characteristics of Spokane County would be the same as those described under the Proposed Route (see Section 3.1.11.1).

3.3.11.2 Economic Base

The economic base for the Western Alternative and its variations is similar to that described for the Proposed Route (see Section 3.1.11.2). The Western Alternative would be routed through parts of Stevens, Spokane, and Lincoln Counties. Pend Oreille County would not be affected by this alternative.

3.3.11.3 Housing

Housing for the Western Alternative and its variations would be similar to that described for the Proposed Route (see Section 3.1.11.3). The Western Alternative would be routed through parts of Stevens, Spokane, and Lincoln Counties. Housing availability is not discussed for Lincoln County, because it is assumed that most construction workers would locate in either Spokane or Stevens County, which are both in close proximity to the 2 miles of line that would be constructed within Lincoln County. Pend Oreille County would not be affected by this alternative.

3.3.11.4 Fiscal Conditions

The fiscal conditions analysis for the Western Alternative and its variations is similar to that described for the Proposed Route (see Section 3.1.11.4). The Western Alternative would be routed through parts of Stevens, Spokane, and Lincoln Counties. Pend Oreille County would not be affected by this alternative.

3.3.12 Transportation and Noise

Transportation. Major north-south highways along the Western Alternative and its variations include State Routes 25 and 231 and U.S. Route 395. South from the international boundary, State Route 25 parallels the Western Alternative for approximately 25 miles. Traffic on this section of highway is relatively light, with an average daily use of between 0 to 1,999 vehicles (WDOT 1987). The Western Alternative crosses U.S. Route 395 east of Colville and continues south along the Colville River, connecting Colville to Spokane. Annual average daily use on this section of highway is between 2,000 to 9,999 vehicles (WDOT 1987). State Route 231 follows the Chamokane Valley south to the Spokane River. Average annual daily use is between 0 to 1,999 vehicles (WDOT 1987).

Airfields for light aircraft located in Colville and Chewelah are not in close proximity to the Western Alternative. A new airport is planned northeast of Colville, approximately 1.5 miles to the east of the Western Alternative. The alignment of this alternative route took into account the proposed airport location to minimize any conflict with aircraft approach paths.

Noise. Please refer to Section 3.1.12 for a discussion of transmission line audible noise.

3.4 Northern Crossover Alternative

3.4.1 Air Quality

Air quality associated with the Northern Crossover Alternative and its variations would be the same as that described in Section 3.1.1 for the Proposed Route.

3.4.2 Geology and Soils

3.4.2.1 Geology

The Northern Crossover Alternative crosses granite rocks within the Calispell Mountain Range and sedimentary base rocks overlain by glacial debris near Ardon. This alternative proceeds from the Proposed Route at Diamond Creek, rising 1,400 feet in elevation. Between the Little Pend Oreille River drainage and near Hande Creek, the route reaches its highest elevation at approximately 4,100 feet. It then descends the west slope of the Calispell Mountain Range into the Colville Valley, crosses the valley, and ascends the east flank of the Huckleberry Mountain Range to connect with the Western Alternative at approximately 2,400 feet in elevation.

Landslide and earthquake potential for the Northern Crossover Alternative would be the same as that discussed for the Proposed Route and Western Alternative (see Sections 3.1.2.1 and 3.3.2.1, respectively).

Existing mineral resources occurring along the Northern Crossover Alternative would be the same as those discussed for the Proposed Route and Western Alternative (see Sections 3.1.2.1 and 3.3.2.1), with the exception of the Northport area. In addition, the Northern Crossover Alternative traverses approximately 12 miles of areas exhibiting moderate to high minerals potential in the Calispell Mountains.

Geological resources associated with the Boundary Dam and Marshall Variations are described in Sections 3.1.2.1 and 3.2.2.1, respectively, for the Proposed Route and Eastern Alternative.

3.4.2.2 Soils

The Northern Crossover Alternative crosses soils in all four counties previously described: Stevens, Pend Oreille, Lincoln, and Spokane. In Stevens County, the route crosses only a small portion of the Colville Valley floor south of Arden, although it does cross a significant distance of mountainous terrain northeast of Arden to the intersection with the Proposed Route near Tiger in Pend Oreille County. Soils along this crossover section are generally of the Aits-Newbell-Donavan soil association. These are very deep, well drained, nearly level to very steep soils formed in mixed glacial till with a mantle of volcanic ash and loess. The remainder of the Northern Crossover Alternative follows sections of the Proposed Route and Western Alternative (see Sections 3.1.2.2 and 3.3.2.2).

Soils found along the Northern Crossover Alternative have, in general, a high erodibility potential, with a majority of all soil association map units having high "K" factor values. The Northern Crossover Alternative crosses approximately 11.7 miles of prime farmland soils, which constitutes 9.2 percent of the total route length of 126.9 miles.

Soils associated with the Boundary Dam and Marshall Variations are the same as those described for the Proposed Route and Eastern Alternative in Sections 3.1.2.1 and 3.2.2.1, respectively.

3.4.3 Surface Water

The Northern Crossover Alternative would cross 33 named streams, 18 unnamed streams, and 1 unnamed pond, totaling 63 water resource crossings (see Table 3-16). The transmission line would cross three shorelines of the state and of those three crossings, two streams are classified as shorelines of state-wide significance. These include the Colville and Spokane Rivers, which maintain mean annual discharges of 308 cfs and 7,949 cfs, respectively (BLM 1987). In addition, one Type 2 water body would be crossed. Route comparisons for the proposed interconnection and the associated route variations are shown in Table 3-3.

See Sections 3.1.3 and 3.2.3 for surface water information relative to the Boundary Dam and Marshall Variations, respectively.

3.4.4 Floodplains and Wetlands

Floodplains. The only floodplain located along the Northern Crossover Alternative and its variations that could not be easily spanned by the proposed line is the Colville River. This

Table 3-16

Water Resources Crossed by the Northern Crossover Alternative

Water Resource	Number of Crossings	Shoreline Management Act[1]	Shorelines of State-Wide Significance[2]	Type 1 and/or 2[3]
South Fork Russian Creek	1			
Russian Creek	1			
Pewee Creek	1			
Everett Creek	1			
Beaver Creek	1			
Flume Creek	1			
South Fork Flume Creek	1			
Linton Creek	1			
Sweet Creek	2			
Lunch Creek	1			
Lost Lake Creek	4			
Cedar Creek	1			
Little Muddy Creek	1			
Big Muddy Creek	1			
Diamond Creek	1			
Lost Creek	1			
Patcher Creek	1			
Deer Creek	1			
Hande Creek	1			
Narcisse Creek	2			
Little Pend Oreille River	1			1
Colville River	1	X	X	1
Stranger Creek	1			
Stensgar Creek	1			
Dry Creek	1			
Service Creek	1			
Huckleberry Creek	1			
Cedar Creek	1			
Deer Creek	1			
Chamokane Creek	6	X		1,2
Spokane River	1	X	X	1
Coulee Creek	1			
Deep Creek	2			
Unnamed Streams	18			
Unnamed Pond	1			
TOTAL	63			

[1]Streams considered to be shorelines of the state pursuant to the Shoreline Management Act of 1971 (Chapter 90.58 RCW) and designated under County Shoreline Master Plans.

[2]Type 1 waters include all waters inventoried as shorelines of the state; Type 2 waters are natural waters not classified as Type 1, maintain high use, and are considered important for water quality.

[3]Source: WDNR 1978 to 1982.

floodplain crossing is approximately 4,300 feet in length; therefore, structures would have to be located in the floodplain (see Map 2-2, Sheet 7).

Wetlands. As described for the Proposed Route (see Section 3.1.4), wetlands are present near Pewee and Lunch Creeks. Palustrine emergent and deciduous (shrub and forested) vegetation occur along the Little Pend Oreille River and the Colville River crossed by the Northern Crossover Alternative segment. As discussed for the Western Alternative (see Section 3.3.4), wetlands are present near Stensgar Creek, Deer Creek, and Chamokane Creek. Numerous "kettles" are also common in the Four Mound Prairie area and in the vicinity of the Spokane International Airport, as discussed for the Eastern Alternative in Section 3.2.4.

3.4.5 Aquatic Ecology

The water resources crossed by the Northern Crossover Alternative are shown on Table 3-16. Aquatic species occurring along this alternative and its variations are the same as those previously described in Sections 3.1.5 and 3.3.5 for the Proposed Route and Western Alternative.

3.4.6 Vegetation

As previously described in Sections 3.1.6 and 3.3.6, mixed forests, ponderosa pine, and grassland/pasture dominate this alternative, which consists of the northern and southern components of the Proposed Route and Western Alternative, respectively. The crossover segment across the Calispell Range traverses the Douglas fir and western hemlock series, and may cross the subalpine fir series, associated with higher elevations. Species that commonly occur with this latter series include the subalpine fir, alpine fir, and Engelmann spruce. This segment crosses 0.6 mile of old growth forest, as designated by the Forest Service Land and Resource Management Plan (Forest Service 1988); in addition, eight sensitive plant species are known to occur along or near this route for a total of 15 locations (see Table 3-6). Vegetation associated with riparian/wetland areas crossed by this route is discussed in Section 3.4.4.

3.4.7 Wildlife

3.4.7.1 Nongame Species

The nongame species occurring along the Northern Crossover Alternative and its variations parallel those outlined in Section 3.1.7.1 for a portion of the Proposed Route from the international border to south of Ione and in Section 3.3.7.1 for portions of the Western Alternative from southwest of Arden to the planned Marshall Substation.

3.4.7.2 Game Species

Game species found along the Northern Crossover Alternative and its variations include those previously discussed for the Proposed Route and Western Alternative in Sections 3.1.7.2 and 3.3.7.2, respectively. This alternative would cross priority white-tailed deer wintering areas near Ione, Marble Valley, and Bluecreek, in addition to traveling adjacent to a deer concentration area located within the Little Pend Oreille National Wildlife Refuge near Arden. Other game species applicable to this alternative would be the same as those described for habitats associated with the Proposed Route from the international border to south of Ione and for the Western Alternative from southwest of Arden to the planned Marshall Substation.

3.4.7.3 Threatened or Endangered Species

Sensitive wildlife species associated with this alternative and its variations would be the same as those discussed for the Proposed Route and the Western Alternative in Sections 3.1.7.3 and 3.3.7.3, respectively. A bald eagle nesting site had previously been recorded for the northern crossover, east of Colville (Dunn 1987); however, this site is unconfirmed and probably does not exist (Zender 1989).

3.4.8 Existing and Planned Land Use

3.4.8.1 Existing Land Use

The inventory methodology used for the lands located along the Northern Crossover Alternative, the Boundary Dam Variation, and the Marshall Variation is outlined in Section 3.1.8.1. The initial portion of the Northern Crossover Alternative consists of two route segments that are in common with the Proposed Route. These include:

- Border to Boundary Dam
- Boundary Dam to South of Ione

The primary existing land uses along these segments are described in Section 3.1.8.1.

South of Ione to Southwest of Arden. This long northeast to southwest segment is located on new ROW for its entire length. The segment naturally divides itself into two portions for existing land use. One portion, covering two-thirds of the segment length, traverses undeveloped, wooded terrain. Part of this terrain is designated by the Forest Service and the Washington State Department of Natural Resources as the Little Pend Oreille Recreation Area. Several roads and two trails associated with this recreation area are crossed by the route. One

of the trails is designated for use by off-road vehicles (Little Pend Oreille Off-Road Vehicle Trail), the other for cross-country skiing. There is also a designated viewpoint (scenic overlook) in the area. Parts of the recreation area are subject to clearcut logging. About 0.5 mile to the southeast of the route segment are the main features of the recreation area, the Little Pend Oreille Lakes. Considerable residential and some commercial development is associated with these lakes. This segment also passes within 0.5 mile of the Little Twin Lakes Campground, located south of the route.

The land use character along the southwestern third of this segment changes to a mix of undeveloped woodland, agricultural areas, and scattered residences, which are mostly concentrated along a network of roads. Near its southwest end, the segment crosses the intensively farmed Colville Valley containing U.S. Route 395.

The remainder of the Northern Crossover Alternative route consists of five segments:

- Southwest of Arden to Southwest of Bluecreek
- Southwest of Bluecreek to Four Mound Prairie
- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to North of Marshall
- Marshall Vicinity

The first two segments are common with the Western Alternative and are described in Section 3.3.8.1. The last three segments are common with the Eastern Alternative and are described in Section 3.2.8.1.

The Boundary Dam Variation and Marshall Variation are presented in Sections 3.1.8.1 and 3.2.8.1, respectively. Existing land uses would be the same as described in these sections.

3.4.8.2 Planned Land Use

The inventory methodology used for the lands located along the Northern Crossover Alternative and its variations is outlined in Section 3.1.8.2. The initial portion of the Northern Crossover Alternative consists of two route segments that are common with the Proposed Route. The primary future land uses along these segments are described in Section 3.1.8.2.

South of Ione to Southwest of Arden. This segment occurs on new ROW for its entire length. A short northeast portion of the segment is located in Pend Oreille County. The remainder is within Stevens County on land designated in the County Policy Plan as Resource Management I (over 50 percent), Rural (most of the remainder), and Resource Management II (a small area). The segment also passes adjacent to an area designated by Stevens County as a Residential/Recreational development area.

The northeast half of the segment is within the Colville National Forest and crosses the following management areas:

- 6 - Deer Winter Range with Visual Resource Protection
- 1 - Special Wildlife Management
- 7 - Timber Management
- 3 - Recreation Along Major Roads
- 5 - Timber Management with Visual Resource Protection

These management areas are described in Section 3.1.8.2, with the exception of the Forest Service Class I Management Area (Special Wildlife Management). This area is described as follows:

- 1 - Habitat will be managed for barred owls in conjunction with pileated woodpeckers, and will maintain populations of low elevation timber dependent wildlife. Emphasis is on providing habitat to support the desired population levels. Vegetation will be managed to provide mature and overmature tree stands, having large live trees and dead trees.

    - Utility corridors may be permitted if other reasonable locations do not exist.

The remainder of the Northern Crossover Alternative route consists of five segments. The first two of these segments are common with the Western Alternative and are described in Section 3.3.8.2. The last three segments are common with the Eastern Alternative and are described in Section 3.2.8.2.

The planned land uses associated with the Boundary Dam Variation and Marshall Variation are described for the Proposed Route and Eastern Alternative in Sections 3.1.8.2 and 3.2.8.2, respectively.

3.4.9 Visual Resources

The Northern Crossover Alternative is common with the Proposed Route from the international border to approximately 2 miles south of Ione. The visual conditions of this area have been described for the Proposed Route (see Section 3.1.9). From the point where the Northern Crossover Alternative departs from the Proposed Route to approximately 2 miles north of the crossing of State Route 20, the landscape is a forested foothills complex. Several Forest Service recreation roads and a Nordic ski trail penetrate this area. Otherwise, visibility is from short portions of State Route 20, and recreation areas and residences around the Little Pend Oreille Lakes. Timber harvesting activities are evident in portions of the area; otherwise, there is little indication of human activity. This portion of the Northern Crossover Alternative is located almost entirely on National Forest lands that have been designated a mixture of Retention, Partial Retention, and Modification VQO. The Retention areas are on lands adjacent to the Little Pend Oreille Lakes. The Modification designation is composed primarily of National Forest lands along the western portion of this route.

From approximately 2 miles north of the State Route 20 crossing to the point where the Northern Crossover Alternative intersects the Western Alternative, southwest of Arden, the landscape is a mixture of agricultural valleys and low forested hills. This area includes scattered to relatively dense residential development and the Community of Arden. Numerous roads cross through this area, affording a high degree of visibility to these lands. This area is entirely on private land and has been given a rating of Moderate landscape quality. No existing transmission lines are located in this area.

From a point southwest of Arden to Four Mound Prairie, the Northern Crossover Alternative is common with the Western Alternative and has been described in Section 3.3.9. The remainder of the Northern Crossover Alternative from Four Mound Prairie to the planned Marshall Substation is common with the Eastern Alternative and has been discussed in Section 3.2.9.

The visual resources associated with the Boundary Dam and Marshall Variations are presented in Sections 3.1.9 and 3.2.9, respectively.

3.4.10 Cultural Resources

Eighteen previously recorded sites are located along the Northern Crossover Alternative including two mining cabins, one mining camp, one mine drilling tower, the Lead King Mine, one tunnel with tailings, seven homesteads, one cabin, talus pits, one tipi ring, the Chamokane Mission, and the remains of Deep Creek Colony. The Chamokane Mission is considered eligible for the NRHP (Hudson et al. 1988).

Potential areas of historical importance along the Northern Crossover Alternative could include unrecorded mining sites, areas along major drainages and around lakes, trail and valley crossings, and visual impacts to potential historic sites and features (Hudson et al. 1988).

The cultural resources associated with the Boundary Dam and Marshall Variations are presented in Sections 3.1.10 and 3.2.10, respectively.

3.4.11 Socioeconomics and Community Resources

3.4.11.1 Population

Table 3-8 (see Section 3.1.11.1) shows the population characteristics of the four-county study area, which includes the Northern Crossover Alternative, the Boundary Dam Variation, and the Marshall Variation. The Northern Crossover Alternative is located in Pend Oreille, Stevens, Lincoln, and Spokane Counties. This alternative would follow portions of the Proposed Route, the Western Alternative, and the Eastern Alternative, except for the crossover between the towns of Tiger (Pend Oreille County) and Arden (Stevens County). The population characteristics of Pend Oreille, Stevens, Lincoln, and Spokane Counties were discussed under the Proposed Route and Western Alternative (see Sections 3.1.11.1 and 3.3.11.1), respectively, and are the same for the Northern Crossover Alternative.

3.4.11.2 Economic Base

The economic base for the Northern Crossover Alternative and its variations is similar to that described for the Proposed Route (see Section 3.1.11.2). The Northern Crossover Alternative would be routed through parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties.

3.4.11.3 Housing

Housing for the Northern Crossover Alternative and its variations would be similar to that described for the Proposed Route (see Section 3.1.11.3). The Northern Crossover Alternative would be routed through portions of Pend Oreille, Stevens, Spokane, and Lincoln Counties.

3.4.11.4 Fiscal Conditions

The fiscal conditions analysis for the Northern Crossover Alternative and its variations is similar to that described for the Proposed Route (see Section 3.1.11.4). The Northern Crossover Alternative would be routed through parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties.

3.4.12 Transportation and Noise

Transportation. The Northern Crossover Alternative and its variations follows portions of the Proposed Route, the Western Alternative and the Eastern Alternative, except for the crossover between the towns of Tiger (Pend Oreille County) and Arden (Stevens County). The transportation network for Pend Oreille County and Stevens County were discussed under the Proposed Route and Western Alternative (see Sections 3.1.12 and 3.3.12), respectively, and are the same for the Northern Crossover Alternative. The Northern Crossover Alternative segment between Tiger and Arden crosses State Route 20 east of Colville. Average daily traffic use is between 0 and 1,999 vehicles (WDOT 1987).

Noise. Please refer to Section 3.1.12 for a discussion of transmission line audible noise.

3.5 Southern Crossover Alternative

3.5.1 Air Quality

Air quality associated with the Southern Crossover Alternative and its variations would be the same as that described in Section 3.1.1 for the Proposed Route.

3.5.2 Geology and Soils

3.5.2.1 Geology

The Southern Crossover Alternative crosses metamorphosed sandstones and mudstones, which comprise the Chewelah Mountain area, and sedimentary rock to the northwest of Chewelah.

This alternative proceeds from 2,200 to 3,200 feet in elevation from the Proposed Route to the north slope above Winchester Creek. It then ascends to 4,600 feet along the divide between Winchester Creek and the South Fork of Chewelah Creek (see Map 2-2, Sheet 11). The route traverses rugged terrain along the slopes above the South Fork of Chewelah Creek as it descends toward the west. It drops 500 feet into the Bayley Creek Valley, climbs to additional rugged terrain, and subsequently descends into the Colville Valley. The route crosses the valley and climbs to 2,400 feet on the south slope of Riecker Mountain, before descending to connect with the Western Alternative at Stensgar Creek (see Map 2-2, Sheet 11).

The landslide and earthquake potential for the Southern Crossover Alternative would be the same as that discussed for the Proposed Route and Western Alternative (see Sections 3.1.2.1 and 3.3.2.1).

Existing mineral resources occurring along the Southern Crossover Alternative would be the same as those discussed for the Proposed Route and Western Alternative (see Sections 3.1.2.1 and 3.3.2.1), with the exception of the Northport and Colville areas. In addition, this alternative traverses approximately 2 miles of an area exhibiting low to moderate minerals potential in the Iron Mountains.

The Boundary Dam and Marshall Variations associated with the Southern Crossover Alternative and the route segments replaced are presented for the Proposed Route and Eastern Alternative in Sections 3.1.2.1 and 3.2.2.1, respectively.

3.5.2.2 Soils

The Southern Crossover Alternative crosses soils in all four counties previously described: Stevens, Pend Oreille, Lincoln, and Spokane. In Stevens and Pend Oreille Counties, the southern crossover segment crosses a more hilly terrain as compared to the segments for either the Proposed Route or Western Alternative. It also crosses a small portion of the Colville Valley floor directly north of Blue Creek. Soils along this crossover segment are the same as those described for the Northern Crossover Alternative segment.

Soils found along the Southern Crossover Alternative have, in general, a high erodibility potential, with a majority of all soil association map units having high "K" factor values. This alternative route crosses approximately 13.6 miles of prime farmland soils, which constitutes approximately 9.5 percent of the total route length of 142.7 miles.

Soils associated with the Boundary Dam and Marshall Variations are discussed in Sections 3.1.2.2 and 3.2.2.2, respectively.

3.5.3 Surface Water

The Southern Crossover Alternative would cross 38 named streams, 28 unnamed streams, and 1 unnamed pond, totaling 78 water resource crossings (see Table 3-17). The transmission line would cross four shorelines of the state, and of these four crossings, two streams are classified as a shorelines of state-wide significance. These include the Colville and Spokane Rivers, which maintain annual discharges of 308 cfs and 7,949 cfs, respectively (BLM 1987). In addition, three Type 2 water bodies would be crossed. Route comparisons for the proposed Interconnection and the associated route variations are shown in Table 3-3.

See Sections 3.1.3 and 3.2.3 for surface water information relative to the Boundary Dam and Marshall Variations, respectively.

Table 3-17

Water Resources Crossed by the Southern Crossover Alternative

Water Resource	Number of Crossings	Shoreline Management Act[1]	Shorelines of State-Wide Significance[2]	Type 1 and/or 2[3]
Russian Creek	1			
South Fork Russian Creek	1			
Pewee Creek	1			
Everett Creek	1			
Beaver Creek	1			
Flume Creek	1			
South Fork Flume Creek	1			
Linton Creek	1			
Sweet Creek	2			
Lunch Creek	1			
Lost Lake Creek	4			
Cedar Creek	1			
Little Muddy Creek	1			
Big Muddy Creek	1			
Diamond Creek	1			
Renshaw Creek	1			
Lost Creek	1			
South Fork Lost Creek	1			
Ruby Creek	1	X		1
Cusick Creek	2			
Tacoma Creek	1			
South Fork Tacoma Creek	1			
Trimble Creek	1			
East Fork Small Creek	1			
Small Creek	1			
Wilson Creek	1			
North Fork Chewelah Creek	1			2
Colville River	1	X	X	1
Stensgar Creek	2			
Dry Creek	1			
Service Creek	1			
Huckleberry Creek	1			
Cedar Creek	1			
Deer Creek	1			2
Chamokane Creek	6	X		1,2
Spokane River	1	X	X	1
Coulee Creek	1			
Deep Creek	1			
Unnamed Streams	28			
Unnamed Pond	1			
TOTAL	78			

[1]Streams considered to be shorelines of the state pursuant to the Shoreline Management Act of 1971 (Chapter 90.58 RCW) and designated under County Shoreline Master Plans.
[2]Type 1 waters include all waters inventoried as shorelines of the state; Type 2 waters are natural waters not classified as Type 1, maintain high use, and are considered important for water quality.
[3]Source: WDNR 1978 to 1982.

3.5.4 Floodplains and Wetlands

Floodplains. The only floodplain located along the Southern Crossover Alternative that could not be easily spanned by the proposed line is the Colville River. This floodplain crossing is approximately 2,400 feet in length; therefore, structures would have to be located in the floodplain.

Wetlands. Wetlands are present near Pewee, Lunch, and Tacoma Creeks along the portion of the Proposed Route (see Section 3.1.4). The alternative segment also crosses wetlands along the Colville River and Stensgar, Deer, and Chamokane Creeks along the portion of the Western Alternative (see Section 3.3.4). In addition, "kettles" are common at Four Mound Prairie and in the vicinity of the Spokane International Airport, as discussed for the Eastern Alternative in Section 3.2.4.

3.5.5 Aquatic Ecology

The water resources crossed by the Southern Crossover Alternative are shown on Table 3-17. Aquatic species occurring along this alternative are the same as those previously described in Sections 3.1.5 and 3.3.5 for the Proposed Route and Western Alternative.

3.5.6 Vegetation

The Southern Crossover Alternative continues farther south along the Pend Oreille Valley than the Northern Crossover Alternative before turning west across the Calispell Range. The vegetation communities crossed are the same as those described for the Northern Crossover Alternative (see Section 3.4.6). This segment crosses 0.5 mile of old growth forest (Forest Service 1988). In addition, seven sensitive plant species are present along the route for a total of 13 locations (see Table 3-6). Vegetation types associated with riparian/wetland areas crossed by this route are described in Section 3.5.4.

3.5.7 Wildlife

3.5.7.1 Nongame Species

The nongame species occurring along the Southern Crossover Alternative parallel those outlined in Section 3.1.7.1 for a portion of the Proposed Route from the international border to west of Cusick and in Section 3.3.7.1 for portions of the Western Alternative from southwest of Bluecreek to the planned Marshall Substation.

3.5.7.2 Game Species

Game species occurring along the Southern Crossover Alternative and its variations include those previously discussed in Sections 3.1.7.2 and 3.3.7.2 for the Proposed Route and Western Alternative, respectively. This alternative would cross priority white-tailed deer wintering areas near Ione, Marble Valley, and Bluecreek. Other game species applicable to this alternative would be the same as those described for habitats associated with the Proposed Route from the international border to west of Cusick and for the Western Alternative from southwest of Bluecreek to the planned Marshall Substation.

3.5.7.3 Threatened or Endangered Species

Sensitive wildlife species associated with this alternative would be the same as those discussed for the Proposed Route and the Western Alternative in Sections 3.1.7.3 and 3.3.7.3.

3.5.8 Existing and Planned Land Use

3.5.8.1 Existing Land Use

The inventory methodology used for the lands located along the Southern Crossover Alternative and its variations is outlined in Section 3.1.8.1. The initial portion of the Southern Crossover Alternative consists of three route segments that are common with the Proposed Route. These include:

- Border to Boundary Dam
- Boundary Dam to South of Ione
- South of Ione to West of Cusick

The primary existing land uses along these segments are described in Section 3.1.8.1.

West of Cusick to Southwest of Bluecreek. This east to west segment follows an existing transmission line ROW for all but a short portion of its length. The segment can be conveniently divided into three portions for existing land use. The first of these is a very short portion in which the basic existing land use pattern is a mix of undeveloped wooded areas, agriculture, and scattered residences. The next portion, extending almost to the segment halfway point, consists of undeveloped land that is, however, subject to intensive logging. The remaining portion of the segment traverses land that is primarily undeveloped, wooded terrain with a scattering of agricultural areas and residences mostly to the south of the route. The western portion of the segment crosses the more intensively farmed Colville Valley approximately 0.4 mile from the

community of Bluecreek. At this point, the existing transmission line ROW paralleled by this segment terminates, and the segment proceeds along new ROW.

The remainder of the Southern Crossover Alternative consists of four segments:

- Southwest of Bluecreek to Four Mound Prairie
- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to the North of Marshall
- Marshall Vicinity

The first segment is common with the Western Alternative and is described in Section 3.3.8.1. The last three of these segments are common with the Eastern Alternative and are described in Section 3.2.8.1.

Existing land uses associated with the Boundary Dam and Marshall Variations are presented in Sections 3.1.8.1 and 3.2.8.1, respectively.

3.5.8.2 Planned Land Use

The inventory methodology used for the lands located along the Southern Crossover Alternative and its variations is outlined in Section 3.1.8.2. The initial portion of the Southern Crossover Alternative consists of three route segments that are common with the Proposed Route. The primary future land uses along these segments are described in Section 3.1.8.2.

West of Cusick to Southwest of Bluecreek. This segment follows an existing transmission line corridor for all but the westernmost portion of its length, which is located on new ROW. A small eastern portion of the segment is within Pend Oreille County; the remainder is in Stevens County, crossing land designated in the County Policy Plan mainly as Resource Management I, with smaller but substantial areas of Rural and Resource Management II.

The eastern half of the segment is within the Colville National Forest and crosses the following management areas, which are described in Section 3.1.8.2:

- 5 - Timber Management with Visual Resource Protection
- 6 - Deer Winter Range Management with Visual Resource Protection
- 7 - Timber Management
- 1 - Special Wildlife Management
- 8 - Deer Winter Range Management

The remainder of the Southern Crossover Alternative consists of four segments. The first segment is common with the Western Alternative and is described in Section 3.3.8.2. The last three segments are common with the Eastern Alternative and are described in Section 3.2.8.2.

The planned land uses associated with the Boundary Dam and Marshall Variations are described in Sections 3.1.8.2 and 3.2.8.2, respectively.

3.5.9 Visual Resources

The Southern Crossover Alternative departs from the Proposed Route near Cusick. The initial 1 to 2 miles of the crossover is located in low forested foothills and is readily visible from highway and residential viewpoints in the valley below. This segment is located on private lands that have been rated as having Moderate landscape quality. This route would parallel one to two existing steel lattice transmission lines in this area.

From near Winchester Peak to near Burnt Valley, this alternative crosses relatively steep, forested, and mountainous land. Much of the portion between Winchester Peak and Goddards Peak has been heavily clear cut. This area is remote and visible only from a Forest Service recreation road. Forest Service visual quality designations are an even mixture of Partial Retention and Modification. A single steel lattice transmission line is located parallel to this alternative in this area.

From near Burnt Valley to the point of intersection with the Western Alternative near Bluecreek, the landscape is a mixture of small open valleys and forested foothills. Small farms and rural residences are scattered throughout this portion of the line, giving a relatively high degree of visibility to this area. In addition, several Forest Service recreation roads are located in the eastern portion of this area. Forest Service visual designations are about equally divided between Partial Retention and Modification. The private lands have been designated as Moderate landscape quality. All but about the last 3 miles of this segment near Stensgar Creek are parallel to an existing smaller wood pole H-frame transmission line. A parcel of BLM lands is located just above Stensgar Creek on Riecker Mountain.

From near Stensgar Creek to Four Mound Prairie, the Southern Crossover Alternative is common with the Western Alternative and has been described in Section 3.3.9. The portion from Four Mound Prairie to the planned Marshall Substation is common with the Eastern Alternative and has been described in Section 3.2.9.

The Boundary Dam and Marshall Variations are presented in Sections 3.1.9 and 3.2.9, respectively.

3.5.10 Cultural Resources

Twenty-nine previously recorded sites occur along the Southern Crossover Alternative including one prehistoric village, two mining cabins, one mining camp, one mine drilling tower, the Lead King Mine, one barn, one lumber flume, one railroad, ten homesteads, one clearing and dump, the Bisbee Meadows Burials, one sawmill, one cabin location, one hunting stand, talus pits, one tipi ring, the Chamokane Mission, the remains of Deep Creek Colony, and the Long Lake Dam Pictographs. The Chamokane Mission is considered eligible for the NRHP (Hudson et al. 1988).

Potential areas of historical importance along the Southern Crossover Alternative could include unrecorded mining sites, areas along major drainages and around lakes, trail and valley crossings, and visual impacts to potential historic sites and features (Hudson et al. 1988).

The Boundary Dam and Marshall Variations are presented in Sections 3.1.10 and 3.2.10, respectively.

3.5.11 Socioeconomics and Community Resources

3.5.11.1 Population

Table 3-8 (see Section 3.1.11.1) shows the population characteristics of the four-county study area, which includes the Southern Crossover Alternative, the Boundary Dam Variation, and the Marshall Variation. The Southern Crossover Alternative is located in Pend Oreille, Stevens, Lincoln, and Spokane Counties. This alternative would follow portions of the Proposed Route, the Western Alternative, and the Eastern Alternative, except for the crossover between Pend Oreille and Stevens Counties. The population characteristics of Pend Oreille, Stevens, Lincoln, and Spokane Counties were described under the Proposed Route and the Western Alternative (see Sections 3.1.11.1 and 3.3.11.1), respectively, and are the same for the Southern Crossover Alternative.

3.5.11.2 Economic Base

The economic base for the Southern Crossover Alternative and its variations is similar to that described for the Proposed Route (see Section 3.1.11.2). The Southern Crossover Alternative would be routed through parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties.

3.5.11.3 Housing

Housing for the Southern Crossover Alternative and its variations would be similar to that described for the Proposed Route (see Section 3.1.11.3). The Southern Crossover Alternative would be routed through parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties.

3.5.11.4 Fiscal Conditions

The fiscal conditions analysis for the Southern Crossover Alternative and its variations is similar to that described for the Proposed Route (see Section 3.1.11.4). The Southern Crossover Alternative would be routed through parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties.

3.5.12 Transportation and Noise

Transportation. The Southern Crossover Alternative and its variations would follow portions of the Proposed Route, the Western Alternative, and the Eastern Alternative, except for the crossover between Pend Oreille and Stevens Counties. The transportation network for Pend Oreille, Stevens, and Spokane Counties were discussed under the Proposed Route, the Western Alternative, and the Eastern Alternative (see Sections 3.1.12, 3.2.12, and 3.3.12), respectively, which are the same for the Southern Crossover Alternative. The Southern Crossover Alternative segment crosses U.S. Route 395 south of Addy in Stevens County.

Noise. Please refer to Section 3.1.12 for a discussion of transmission line audible noise.

3.6 No Action Alternative

Under the No Action Alternative, a Presidential permit for the proposed interconnection would not be granted, and the proposed transmission line would not be constructed. This allows comparison of impacts for an action against avoidance of those impacts for the No Action Alternative (see Section 2.7). The affected environment for the No Action Alternative (i.e., the area not disturbed) would be the same as described for each of the five proposed action alternatives.

ENVIRONMENTAL CONSEQUENCES

4.0

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4.0 presents a discussion of the environmental consequences that would result from implementation of the proposed Interconnection or its alternatives. In keeping with the directive of the National Environmental Policy Act (NEPA), this chapter focuses on impacts that are considered significant; criteria used to establish significance are stated at the beginning of each analysis. Where these criteria would be exceeded, impacts are deemed "significant." In many cases, anticipated impacts are compared to the significance criteria and found to be "not significant." The general approach followed throughout the chapter is to briefly describe the range of impacts that would occur and then provide a detailed discussion of those impacts that are considered significant. Where appropriate for the discipline under consideration, impacts are discussed for the construction, operation, maintenance, and abandonment phases of the project.

The EIS impact analysis in Chapter 4.0 is based on the project description presented in Chapter 2.0 and includes the implementation of the environmental protection procedures presented on Table 2-5. Thus, these impacts would be those remaining following implementation of WWP's proposed construction and maintenance procedures. Following this impact analysis, DOE developed additional mitigation measures where it was deemed necessary or appropriate. These measures are presented in Section 4.9.

4.1 Proposed Route

For the majority of the resources examined in this EIS, the impact assessment for the Eastern and Western Route Options (including the small route segments near Chattanoy and Mead), as compared to the other project alternatives, is the same (see Map 2-2, sheets 1-4 located at the back of this document). The environmental impacts that may differ between these route options are discussed in the appropriate resource sections only (e.g., land use, wildlife, etc.).

4.1.1 Air Quality

Impacts to air quality would be considered significant if:

- Emissions from construction vehicles and potential burning of slash from right-of-way (ROW) and access road clearing would violate state or federal air quality standards (source - National Ambient Air Quality Standards).

Construction. Air quality impacts from proposed construction activities would originate from carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM_{10}) and fugitive dust emissions from construction vehicles and potential burning of slash from ROW and access road clearing. Due to the temporary nature and small amount of vehicular emissions and potential burning of slash materials, violations of local air quality standards are not anticipated.

Operation and Maintenance. Operation and maintenance activities (as described in Section 2.3.5) would have no impact on air quality because vehicle emissions would be infrequent and minimal.

Abandonment. Abandonment would have no impact on air quality because emission sources would be similar to those during construction.

Significant Impact Summary. The proposed Interconnection would have no significant impacts on air quality because emissions from vehicular activity and potential burning of slash from ROW and access roads during the construction phase would be small enough and temporary so that violations of standards would not occur.

4.1.2 Geology and Soils

4.1.2.1 Geology

Impacts associated with geologic features would be considered significant if:

- Unique geologic features or outcrops are disturbed (source - EIS Team).
- Any geologic feature or condition that could cause collapse of transmission line structures is crossed (source - EIS Team).
- Construction of the transmission line precludes the continued operation of existing mineral extraction facilities (source - EIS Team).

Construction. The Proposed Route crosses a variety of geologic formations from the northern upland areas to the broad river valleys. The underlying soils and rock along the route should provide an adequate foundation for tower structures. Potential impacts to topographical features along the Proposed Route would be minimal. Surficial and underlying substrates would be disturbed during construction activities for tower placement and access road construction. Steep grades and other areas subject to erosion would be stabilized according to WWP's ROW restoration procedures (see Table 2-5). Although several areas of sand and/or gravel extraction

operations were identified in the vicinity of Mead, no significant disruptions to these operations from the Proposed Route would be anticipated. However, during route construction, moderate impacts to these operations may occur if construction machinery and other vehicles use roads common to those used by sand and gravel vehicles. No significant impacts to geological features would occur during transmission line construction.

Operation and Maintenance. No significant impacts to the transmission line would be expected from potential geologic hazards within the project area. As discussed in Section 3.1.2.1, seismic and landslide potential along the Proposed Route appears to be minimal. Operation of the proposed Interconnection has the potential to impact future mineral development along the transmission ROW. However, locating the proposed line along existing transmission corridors reduces the potential to preclude mineral development, since the existing BPA transmission lines have defined the land use in these areas.

Abandonment. No impacts would occur to geological resources following project abandonment. Appropriate reclamation procedures would be implemented and measures enforced to prevent increased erosion within the disturbed areas.

Significant Impact Summary. The Proposed Route and the associated Boundary Dam and Orchard Prairie Variations would have no significant impacts on geologic resources located along these project routes because of the reclamation procedures followed by WWP. In addition, geologic hazards and the potential for mineral development within the project ROW appear to be minimal for the Proposed Route.

4.1.2.2 Soils

Impacts to soils would be considered significant if:

- Highly erosive soils on moderate to steep slopes are disturbed and cannot be stabilized to predisturbance level of soil erosion within one growing season (source - EIS Team).

- Any soils classified as prime farmland or potentially prime farmland by the Soil Conservation Service (SCS) are disturbed and cannot be reclaimed to predisturbance conditions (source - EIS Team).

- Productivity is eliminated or severely reduced due to compaction caused by construction activities (source - EIS Team).

Construction. Soils with high erosion potential on moderate to steep slopes do occur along portions of the Proposed Route. Some increased wind and water erosion may occur in these areas. In order to minimize erosion and ensure the stability of the supporting tower structures, the transmission line would be routed to avoid large areas of steep or unstable slopes. Where steep slopes cannot be avoided, they would be spanned by the line, where possible, or the line would follow topographic contours. Possible land leveling on isolated steep slope areas may be required. Tower site areas would be reclaimed within the first growing season following construction, and any erosion losses should be considered a short-term construction-related impact.

Construction activities along the 125-foot ROW would include clearing of forested areas and heavy equipment movement. Stumps, root systems, low-growing vegetation, shrubs, and grasses would be left in place to stabilize soil structure and decrease soil losses due to erosion. Where ground disturbance does occur, the areas would be reclaimed as soon as practical; revegetation procedures would be implemented in the first growing season following construction (see Section 2.3).

Access roads would be designed to ensure natural drainage and limit erosion. The roads would follow topographic contours and avoid close proximity to or paralleling the streams or wetlands, where possible. Road grades would not exceed 20 percent for short pitches and water bars and other structures would be installed, as required, to control surface runoff (see Table 2-5). Vehicle traffic may be restricted during wet conditions or road surfaces may be stabilized with gravel or rock.

Approximately 12.8 miles of prime farmland soils would be crossed by the Proposed Route. These 194 acres are scattered throughout the length of the Proposed Route, including 2 to 3 miles located near the boundary between Pend Oreille and Spokane Counties and 3 to 5 miles crossed in Valley Prairie. Where possible, prime farmland soils would be spanned and not disturbed. Construction vehicles would circumvent these areas, if possible, and would be inspected upon entering and leaving the construction areas, as outlined in the project's clean equipment policy. Where cultivated areas are disturbed during construction activities, these areas would be reclaimed and reseeded by mutual agreement with the individual landowners. Local noxious weed control agencies would also be contacted regarding reclamation activities. Any soil compaction and resulting decline in crop productivity should be considered a short-term impact (see Table 2-5).

Erosion hazards and prime farmland concerns for the Boundary Dam and Orchard Prairie Variations are similar to those for the Proposed Route. Lengths of prime farmland soils crossed by these variations, as compared to segments of the Proposed Route replaced, were discussed

in Section 3.1.2.2. Each variation crosses 0.4 mile of prime farmland, as compared to none crossed by the segments of the Proposed Route replaced.

Operation and Maintenance. Following the ROW reclamation and revegetation procedures outlined in Table 2-5, typical transmission line operations would not result in significant impacts to soil types along the Proposed Route. Transmission line maintenance would include periodic ground travel along the line. Whenever possible, line maintenance would be conducted when minimum surface disturbance would occur (i.e., avoid wet periods). Therefore, no significant impacts are expected to occur as a result of these operation and maintenance activities.

Abandonment. The termination of the proposed Interconnection would result in transmission structure removal. Impacts would parallel those described during construction activities. WWP would use the appropriate measures to remove structures and implement site reclamation to ensure resource protection (see Table 2-5). No significant impacts to soil resources would occur from project abandonment.

Significant Impact Summary. The Proposed Route and the associated Boundary Dam and Orchard Prairie Variations would have no significant impacts on soil resources crossed by these project routes. Soil erosion losses or declines in crop productivity on prime farmland areas from soil compaction would be considered short-term construction impacts. Therefore, significant impacts would not occur as a result of transmission line operation, maintenance, or abandonment activities.

4.1.3 Surface Water

Impacts to surface water would be considered significant if:

- Sedimentation downstream of transmission line crossings or accidental contamination (e.g., oil or gasoline spills) affects surface water to the extent that water quality is in violation of state water quality criteria (source - Washington Water Quality Standards).

- The transmission line is inconsistent with the provisions of any county shoreline Master Plan (source - Washington Shoreline Management Act of 1971).

Construction. No significant impacts to surface water resources are expected within the project area from the Proposed Route. The majority of the water resources and sensitive riparian areas crossed would be spanned by the proposed transmission line. Both line and access road construction activities conducted near stream crossings would potentially cause an increase in siltation of the water resources. However, in areas directly crossed by the line, the environmental

protection procedures outlined in Table 2-5 and agreed upon by WWP would minimize potential impacts. Procedures to reduce the likelihood of accidental spillage of materials into natural watercourses are also discussed in Table 2-5; therefore, no impacts from these sources are expected.

The Proposed Route would cross three streams that are designated under county Shoreline Master Plans. The crossing of designated streams by an electric transmission line is permitted under these master plans. Impacts to designated streams would be minimized by selective clearing of vegetation at the crossing site and by restoring of disturbed areas following construction (see Table 2-5). Therefore, the proposed transmission line would be consistent with established Shoreline Master Plans and would not have significant impacts on the streams and environmental values these plans are designed to protect.

Table 3-4 presents the water resources crossed by the Boundary Dam and Orchard Prairie Variations and the segments of the Proposed Route replaced by these variations. These proposed crossings would be consistent with established management plans, and construction activities would be regulated under the protection procedures presented in Table 2-5. Therefore, no significant impacts are anticipated from project construction along these proposed variations.

No major construction would be required at the Beacon Substation. Therefore, impacts to surface water resources occurring near the existing substation site are not anticipated.

Operation and Maintenance. No impacts to surface water resources would occur during project operation. Line maintenance activities may require periodic ground inspections, resulting in potential impacts to streams when reopening access roads, crossing drainages, or removing vegetation. These impacts would not be significant, however, because WWP would implement the environmental protection measures presented in Section 2.3 (see also Table 2-5).

Abandonment. Abandonment of the proposed line would entail removal of the supporting structures and reclamation of disturbed areas. Potential impacts to surface water would result from these activities, as discussed for proposed line construction. As stated above, impacts would not be significant to these resources due to WWP's environmental protection procedures outlined in Table 2-5.

Significant Impact Summary. The Proposed Route, Boundary Dam Variation, and Orchard Prairie Variation would be consistent with established county and city Shoreline Master Plans; therefore, these routes would not significantly impact the resources protected under these plans. Increased sedimentation of streams crossed by the proposed transmission line or access roads would be minimized by the procedures implemented by WWP to protect sensitive resources (see

Table 2-5). Any stream siltation caused by the proposed project would be considered a short-term impact; therefore, implementation of the Proposed Route or these variations would not significantly impact surface water resources crossed by these project routes.

4.1.4 Floodplains and Wetlands

Impacts to floodplains and wetlands would be considered significant if:

- A flood event would cause damage to the transmission line structures, or the construction of the transmission line structures in a floodplain would increase the potential for flooding or violate applicable floodplain protection standards (source - DOE Compliance with Floodplain/Wetland Environmental Review Requirements; 10 CFR 1022).

- Construction resulted in the long-term loss of riparian or wetland vegetation (source - DOE Compliance with Floodplain/ Wetland Environmental Review Requirements; 10 CFR 1022).

Construction. No impacts to floodplains would be expected during the construction phase of the project, since surface disturbance would be restricted to the access road and tower sites, earth moving would be minimal, and excess soil from the foundations would not be disposed of within the floodplain area.

The Proposed Route crosses the seven major wetland areas discussed in Section 3.1.4. The following summary depicts the amount of wetland types affected by the Proposed Route, based on a 125-foot-wide ROW:

Miles of Palustrine Wetlands Crossed and (Acres) Affected

Emergent	Scrub-Shrub	Aquatic Bed	Forested
1.88 (28.5)	1.54 (23.3)	0.02 (0.3)	0.56 (8.5)

As stated in Table 2-5 in Section 2.3 of this FEIS for project construction, WWP would not locate transmission line structures or access roads within a wetland/riparian area, as required by the appropriate state and federal agencies. In the event wetland/riparian areas were crossed, special construction techniques would span wetland areas, when possible, thereby avoiding disturbance to low-lying wetland areas such as the emergent, scrub-shrub, and aquatic bed wetland types and the riparian zones associated with them. Significant impacts would not be anticipated for these specific areas.

Crossing of wetlands classified as palustrine, deciduous forested (PFO1C), however, may require removal of trees that exceed the maximum allowable height beneath the transmission line (see Section 2.3.4). Of the total 4 miles of wetlands that would be crossed by the line, 0.56 mile would cross forested areas. The 0.56 mile of forested wetlands are associated with 6 wetland crossings. These crossings are summarized below:

Associated Water Body	Feet (Acres) Affected	Associated Water Body	Feet (Acres) Affected
Ruby Creek	491 (1.4)	Deer Creek	491 (1.4)
Trimble Creek	242 (0.7)	Moon Creek	625 (1.8)
South Fork Calispell Creek	982 (2.8)	Unnamed Tributary to Otter Creek	122 (0.4)

Assuming that these sensitive areas could not be spanned by the line and complete canopy removal would be required within the 125-foot ROW, a total of 8.5 acres of forested wetlands would be replaced with scrub/shrub or emergent wetlands along the Proposed Route. Removal of these trees would constitute a long-term loss of forested wetland vegetation and would be considered a significant impact to this resource.

Neither the Boundary Dam and Orchard Prairie Variations nor the segments of the Proposed Route replaced by these variations would cross wetland areas. Therefore, no impacts to wetland resources would occur from the implementation of either of these variations or their respective route segments.

The Eastern Route Option associated with the Proposed Route would cross a total of 3.05 miles of palustrine wetland types, with 1.36 miles in emergent, 1.11 miles in scrub-shrub, 0.23 mile in aquatic body, and 0.35 mile in deciduous forested. Therefore, a total of 0.35 mile (5.3 acres) of forested wetlands would potentially be replaced with scrub/shrub or emergent wetlands for this route option. The segment of the Proposed Route replaced by the Eastern Route Option would cross a total of 3.86 miles of palustrine wetland types, with 1.86 miles in emergent, 1.42 miles in scrub-shrub, 0.02 mile in aquatic body, and 0.56 mile in deciduous forested. Therefore, 0.56 mile (8.5 acres) of forested wetlands would potentially be replaced with scrub/shrub or emergent wetlands for this route segment. The 8.5 acres of forested wetlands are delineated and summarized above for the Proposed Route. Removal of trees associated with the forested wetland areas would constitute a significant impact to this wetland type.

The Western Route Option associated with the Proposed Route would cross a total of 3.71 miles of palustrine wetland types, with 1.68 miles in emergent, 1.49 miles in scrub-shrub, 0.02 mile in aquatic body, and 0.52 mile in deciduous forested. Therefore, a total of 0.52 mile (7.9 acres) of forested wetlands would potentially be replaced with scrub/shrub or emergent wetlands for this route option. The segment of the Proposed Route replaced by the Western Route Option would be the same as that segment replaced by the Eastern Route Option, crossing a total of 3.86 miles of palustrine wetland types. Of these types, 1.86 miles would be in emergent, 1.42 miles in scrub-shrub, 0.02 mile in aquatic body, and 0.56 mile in deciduous forested. Therefore, 0.56 mile (8.5 acres) of forested wetlands would potentially be replaced with scrub/shrub or emergent wetlands for this route segment. The 8.5 acres of forested wetlands are delineated and summarized above for the Proposed Route. Removal of these trees associated with the forested wetland areas would constitute a significant impact to this wetland type.

Operation and Maintenance. Impacts to floodplains would be expected to occur only at the Little Spokane River crossing, the one floodplain area that could not be spanned. The need to place a structure in the floodplain cannot be determined until final, detailed engineering has been completed. However, since the floodplain is only about 1,800 feet wide at the crossing point, a maximum of one transmission structure would be located within the floodplain, if required. Surface disturbance associated with the construction of a structure and the physical presence of the structure during operation are not expected to alter the floodplain storage volume or cause a local increase in the flood stage. The final design for the transmission structure foundations would consider site-specific soil conditions, as well as elevation of the 100-year flood and potential debris loading of the structure during a flood. For these reasons, failure of the structure during a flood is not expected. Thus, no significant impacts to floodplains are anticipated.

No additional wetland impacts from project operation and maintenance activities would be expected from the proposed Interconnection. Forested wetlands that had been removed during project construction would be maintained as scrub/shrub or emergent wetlands. As stated in Section 2.3.5, access roads established during project construction would be used for line maintenance activities. Removal of wetland vegetation is addressed for project construction. During the life of the project, WWP would continue to cut trees growing beyond the maximum allowable height beneath the conductors; however, no additional vegetation would be removed during project operation.

Abandonment. No impacts to floodplains would be anticipated during the abandonment phase of the project. During the removal of the transmission structures and conductors for project abandonment, WWP would implement the same protection procedures outlined in Sections 2.3.4 and 2.3.6 and in Table 2-5. No additional access roads would be constructed for this activity,

and the trees removed within the wetland areas previously classified as deciduous palustrine forested would be allowed to return to their original condition. Reclamation procedures for these sensitive areas would follow those outlined in Table 2-5.

Significant Impact Summary. The Proposed Route would have no significant impacts on floodplains, since floods are not expected to damage the transmission line structure, the structure would not increase the potential for flooding, and the project is consistent with floodplain management objectives (see Section 4.1.3).

Neither the Proposed Route, its variations, nor route options would significantly impact wetlands classified as emergent, scrub-shrub, or aquatic bed that are crossed by these routes, due to the implementation of the environmental protection procedures outlined in Table 2-5. Potential long-term loss of approximately 8.5 acres of trees associated with 0.56 mile of forested wetlands crossed by the Proposed Route would result in significant impacts to this resource. Significant impacts would also be associated with the loss of 5.3 acres (0.35 mile crossed) and 7.9 acres (0.52 mile crossed) of forested wetlands from the Eastern and Western Route Options, respectively. As compared, the segments of the Proposed Route replaced by these route options would each affect 8.5 acres (0.56 mile crossed) of forested wetlands, also resulting in significant impacts.

Floodplain and Wetlands Statement of Findings. The final design for the transmission line structures located in the floodplain of the Little Spokane River (see Map 2-2, Sheet 3) would include foundation design that would consider site-specific soil conditions, as well as elevation of the 100-year floodplain and potential debris loading at each structure during flooding. Therefore, failure of a structure during a flood is not expected. No watercourses would be altered or relocated as a result of the project. No transmission line structures or access roads would be located within wetland/riparian areas as required by the appropriate state and federal agencies. Wetlands would be spanned, thereby avoiding disturbance to emergent, shrub-scrub, and aquatic bed wetland types and their associated riparian zones. Crossings of palustrine, deciduous forested wetlands may require removal of trees that exceed the maximum allowable height beneath the transmission line. A total of 8.5 acres of forested wetlands, associated with six wetland crossings, could be removed. No applicable state or local floodplain protection standards would be violated.

Public meetings were held on January 31 and February 1, 1990, and the public had the opportunity to comment on potential activities in floodplains and wetlands.

The floodplain and wetland assessment is contained within Sections 3.1.4 and 4.1.4 of this EIS, and this paragraph constitutes the floodplain/wetland statement of findings in accordance with

10 CFR 1022 and 10 CFR 1021 [DOE NEPA Implementing Procedures and Guidelines, specifically in 1021.313(c)]. No significant impacts to streams or floodplains are anticipated, and those forested wetlands where trees may be removed would be replaced with either emergent or shrub/scrub wetlands.

4.1.5 Aquatic Ecology

Impacts to aquatic resources would be considered significant if:

- Critical habitats (e.g., spawning and rearing areas) for federal or state sensitive or important recreational fish species would be affected by increased sedimentation, habitat removal or modification, or fuel spills during construction for a period exceeding 1 year, 1 life cycle, or the length of the reproductive season (source - EIS Team).

Construction. Aquatic resources crossed by the Proposed Route, its variations, and route options would be predominantly spanned by the transmission line, with minimal disturbance to the riparian area associated with many of the stream crossings (see Section 2.3.4 and Table 2-5). Access road construction could have a greater impact on these resources, depending on the stream crossing location, sensitivity of the species inhabiting the water resource, and the timing of the construction period. Potential impacts to aquatic species along the Proposed Route would include increased water temperatures and increased sedimentation, resulting in potential water quality degradation.

Removal of bank vegetation or cover surrounding water resources during construction activities may increase water temperatures. This impact could potentially increase productivity in colder streams. However, if excessive warming occurred, aquatic resources would degrade within that area. Transmission line or access road construction activities may also reduce bank stability, thereby increasing potential sedimentation of the aquatic habitats and consequently decreasing water quality. In some instances, construction may produce a beneficial impact along certain aquatic resources. The removal of conifer species along specific areas would allow the initial reestablishment of hardwoods and may improve beaver habitat. Beaver impoundments often improve fishery quality, as well as provide habitat for other wildlife species (Forest Service 1988).

No significant impacts to aquatic resources are anticipated from the Proposed Route, its variations, or route options. WWP would follow vegetation removal and soil stabilization guidelines along waterways and the environmental protection procedures outlined in Table 2-5. Transmission line access roads would be routed, where possible, to use existing bridges and avoid close proximity to streams and wetlands. In areas requiring access road construction directly across waterways, construction procedures would comply with the Washington State

Department of Wildlife (WDW) and the Washington State Department of Ecology (WDE) regulations pertaining to stream and water quality protection (see Section 2.3.4).

No federal or state-listed fish species have been identified in any of the water resources crossed by the proposed Interconnection. The bull trout is a WDW species of concern and may be present in some of the streams intersected by the project. This species is of limited distribution within the study area, however, and no detrimental impacts are anticipated for this species.

Operation and Maintenance. No impacts to aquatic resources are expected during project operation. Ground surveys for maintenance activities would produce minimal impacts on these resources along the route, since maintenance vehicles would use existing access roads, or protection measures would be implemented if closed access roads were reopened for line repair.

Abandonment. Potential impacts to aquatic resources from project abandonment and structure removal would parallel those discussed for construction activities. No significant impacts are anticipated from these procedures.

Significant Impact Summary. Sensitive aquatic organisms would not be impacted by the Proposed Route, its variations, or route options due to the implementation of appropriate environmental protection procedures during project construction, operation, and abandonment. These procedures would help prevent increased sedimentation, elevated water temperatures, or accidental fuel spills. In addition, WWP has committed to avoiding riparian and wetland areas during project construction and operation, when possible (see Section 2.3 and Table 2-5). Therefore, the Proposed Route, the route variations, and route options would have no significant impacts on aquatic resources.

4.1.6 Vegetation

Significance Criteria. Impacts to vegetation would be considered significant if:

- Any federal or state endangered, threatened, or sensitive plant species communities are adversely affected by disturbance from transmission line construction or maintenance (source - Endangered Species Act of 1973 and Washington Department of Natural Resources).

- Construction results in long-term loss of riparian or wetland vegetation (source - EIS Team and 10 CFR 1022) (Section 4.1.4 addresses these resources).

- Old growth forests are cleared during transmission line construction.

Construction. Construction activities within the 125-foot ROW include clearing of forested areas, possible leveling on isolated steep slope areas, and heavy equipment movement. Vegetation would be permanently removed (long-term impact) from the tower sites, along the forested areas cleared for the transmission line conductors, and for permanent access roads. Temporary disturbance (short-term impact) to vegetation would occur due to construction of temporary access roads and specific transmission line construction activities along the ROW.

Assuming a 125-foot ROW disturbance width, at most, 1,548 acres of vegetation would be affected along the 102.2 miles of Proposed Route (see Table 4-1). However, approximately 33 percent of the route (513 acres) is located in nonforested areas. Impacts in these nonforested areas would be limited to construction of tower foundations and access roads. In addition, clearing of forested areas would not occur within the steep canyon bottoms, where the transmission line would span above the trees. The majority of the total acres of vegetation affected would include the mixed forest type (824 acres), the grassland/pasture type (229 acres), ponderosa pine (202 acres), and cropland (124 acres). The maximum acreage of forested land, including the palustrine forested areas, that may be cleared along the Proposed Route would be 1,035 acres (see also Section 4.1.4).

As stated in Table 2-5 and Section 2.3.4 for project construction, WWP would avoid riparian areas, when possible, as required by the appropriate agencies. Potential impacts to riparian/ wetland vegetation are discussed in Section 4.1.4.

Potential timber volume removed would range from 8,900 to 16,200 board feet of sawtimber per acre, based on Forest Service estimates (Berube 1989). Volume estimates are based on 8,900 to 10,300 board feet for second growth stands and 13,700 to 16,200 for mature forest stands. This translates to a total timber volume removal, ranging from 9 million to 17 million board feet for the 1,035 acres of forested land along the Proposed Route. (The effects of the loss of future timber production are discussed in Section 4.1.11).

ROW clearing, access roads, and movement of heavy equipment throughout the ROW would result in increased potential soil erosion and spread of noxious weeds. The reseeding of these disturbed areas to reestablish ground cover would minimize erosion losses, particularly along steeper slopes, and would aid in weed prevention (see Table 2-5).

No old growth forests were observed during the ground and aerial reconnaissance surveys. Based on communications with the Colville National Forest (Zingmark 1989) and review of the Colville National Forest Land and Resource Plan (Forest Service 1988), one stand of old growth timber is present along the Proposed Route on Forest Service land. This area, mapped by the Forest Service, is located near the international border, north of Hooknose Ridge and near

Table 4-1

Vegetation Impact Summary for the Proposed Route and Alternatives for the WWP/B.C. Hydro Proposed Interconnection

Vegetation Type	Proposed Route Miles (Acres)	Eastern Alternative Miles (Acres)	Western Alternative Miles (Acres)	Northern Crossover Alternative Miles (Acres)	Southern Crossover Alternative Miles (Acres)
Mixed Forest	54.4 (824)	61.3 (929)	61.5 (931)	73.3 (1,110)	92.0 (1,394)
Ponderosa Pine	13.3 (202)[1]	27.3 (414)	23.6 (358)	23.2 (352)	23.1 (350)
Grassland/Pasture	15.1 (229)[2]	21.6 (326)	16.6 (252)	14.6 (221)	13.7 (207)
Riparian	3.3 (50)	0.1 (1.5)	0.1 (1.5)	0.2 (3)	0.2 (3)
Total Wetland Types	4.0 (61)	4.5 (68)	4.6 (70)	4.9 (75)	4.7 (71)
Cropland	8.2 (124)	11.3 (170)	13.6 (206)	8.4 (127)	7.1 (108)
Clearcut	2.9 (44)	>0.1 (2)	0.0	1.2 (18)	0.8 (12)
Developed/Residential	0.8 (12)	1.7 (26)	1.0 (15)	1.0 (15)	1.0 (15)
Open Water	0.2 (3)	0.1 (1.5)	0.1 (1.5)	0.1 (1.5)	0.1 (1.5)
TOTAL	102.2 (1,548)	127.9 (1,938)	121.1 (1,835)	126.9 (1,923)	142.7 (2,162)

[1]Where the proposed transmission line crosses ponderosa pine woodland areas within the existing WWP transmission line ROW (i.e., for line upgrade along the Mead to Beacon segment), no trees would be removed by line construction.

[2]Acres disturbed include 6 additional acres of grassland within the existing WWP ROW where it crosses the ponderosa pine vegetation type (i.e., along the Mead to Beacon segment).

Jubalee Creek (T40N, R42E, Sec 2 and 11). Based on Forest Service 1:250,000 scale maps, it appears that the Proposed Route is located directly east of this old growth forest and would not cross this area.

No federal or state threatened or endangered plant species are known to occur along or near the Proposed Route. As described on Table 3-6, 8 plant species, listed as sensitive within the State of Washington, are present at a total of 14 locations along the Proposed Route. The proposed ROW corridor may cross seven of these populations, based on Washington Natural Heritage Program (WNHP) data (WDW 1988). These sensitive plant locations are based on a mapping accuracy of not less than one section (640 acres), so exact population locations within the proposed ROW are not currently known. Project construction that would directly affect these sensitive species may significantly impact these local populations.

The projected acres and vegetation types affected along the proposed project variations are presented in Table 4-2. The Boundary Dam Variation would require 1.0 mile of new ROW, crossing 0.7 mile (11 acres) of mixed forest, 0.2 mile (3 acres) of developed/residential areas, and 0.1 mile (less than 1 acre) of open water. As compared, the segment of the Proposed Route replaced would require 5.1 miles of new ROW, crossing 5.0 miles (76 acres) of mixed forest, and 0.1 (less than 1 acre) of a clearcut area.

The Orchard Prairie Variation would require 2.0 miles of new ROW, as compared to the segment of the Propose Route replaced by this variation, which would require 0.5 mile of new ROW and be placed within 3.0 mile of WWP's existing ROWs. Table 4-2 lists the vegetation types affected by these variations and the corresponding segments of the Proposed Route replaced.

The Orchard Prairie Variation would cross a total of 0.4 mile of ponderosa pine forest, affecting approximately 6 acres of woodland. However, because a portion of the segment of the Proposed Route replaced by this variation between Mead to WWP's existing Beacon Substation would be located within WWP's existing ROWs, no trees would be removed within the ponderosa pine vegetation type to upgrade this portion of the line for the proposed Interconnection project. These existing ROWs that intersect with the forested areas are currently classified as grassland type. Therefore, the segment of the Proposed Route replaced would also cross 0.4 mile of the ponderosa pine vegetation type, but only affect an additional 6 acres of the grassland type. No additional forested areas would be removed for this route segment. These representative acreage numbers are shown in Table 4-2.

The Orchard Prairie Variation would cross 0.5 mile (8 acres) of cropland, as compared to 1.1 miles (17 acres) along the corresponding segment. The amount of grassland/pasture crossed is 1.1 miles (17 acres) for the variation and 2.0 miles (36 acres) for the corresponding

Table 4-2

Vegetation Impact Summary for the Route Variations and Route Options Associated with the Proposed Interconnection

Vegetation Type	Boundary Dam Variation	Segment of Proposed Route Replaced	Orchard Prairie Variation	Segment of Proposed Route Replaced	Chattaroy Variation	Segment of Eastern Alternative Replaced	Marshall Variation	Segment of Eastern Alternative Replaced	Onion Creek Variation	Segment of Western Alternative Replaced
Mixed Forest	0.7 (11)[1]	5.0 (76)	0	0	0	0	0	0	14.8 (224)	11.0 (167)
Ponderosa Pine	0	0	0.4 (6)	0.4 (0)[2]	9.3 (141)	8.5 (129)	5.7 (87)	2.0 (30)	0	0
Grassland/Pasture	0	0	1.1 (17)	2.0 (36)[3]	2.6 (39)	4.5 (68)	0.8 (12)	2.1 (32)	1.5 (23)	2.5 (38)
Riparian	0	0	0	0	<0.1 (1)	<0.1 (<1)	0	0	<0.1 (<1)	<0.1 (<1)
Total Wetland Types	0	0	0	0	0.3 (4)	<0.1 (<1)	0	0	0.4 (6)	0.5 (7)
Cropland	0	0	0.5 (8)	1.1 (17)	2.9 (44)	3.3 (50)	0	0	1.1 (17)	3.2 (49)
Clearcut	0	0.1 (>1)	0	0	0	0	0	0	0.5 (7)	0
Developed/Residential	0.2 (3)	0	0	0	1.2 (18)	1.3 (20)	0.6 (9)	0.2 (3)	0	0
Open Water	0.1 (>1)	0	0	0	0	0	0	0	0	0
TOTAL	1.0 (15)	5.1 (77)	2.0 (31)	3.5 (53)	16.3 (247)	17.7 (268)	7.1 (108)	4.3 (65)	18.3 (277)	17.2 (261)

[1]Data presented in miles (acres).

[2]Where the proposed transmission line crosses ponderosa pine woodland areas within the existing WWP transmission line ROW (i.e., for line upgrade), no trees would be removed for line construction.

[3]Acres disturbed include 6 additional acres of grassland within the existing WWP ROW (i.e., along the Mead to Beacon segment) where it crosses the ponderosa pine vegetation type.

route segment. Impact to vegetation resources crossed by either of these variations or route segments would not be considered significant.

The Eastern and Western Route Options to the Proposed Route would affect approximately 5.3 acres and 7.9 acres, respectively, of palustrine forested wetlands. By comparison, the segment of the Proposed Route replaced by these two options would impact 8.5 acres of forested wetlands. The long-term loss of riparian/wetland vegetation would result in a significant impact to this resource (see Section 4.1.4). Sensitive plant species potentially impacted by these two route options would be the same as those discussed for the Proposed Route, since exact population locations are currently unknown. As indicated in Table 3-6, the Proposed Route (in addition to the Eastern and Western Route Options) may cross seven of the sensitive plan populations, based on WNHP data (WDW 1988).

Operation and Maintenance. Following the ROW reclamation and revegetation procedures outlined in Table 2-5, the normal operations of the transmission line are not expected to result in significant impacts to vegetation resources. In general, any land use activity that does not interfere with the operation and maintenance of the line could continue (e.g., livestock grazing). To control livestock and public access, as necessary, gates would be constructed, maintained, and locked as appropriate (see Table 2-5).

Transmission line maintenance would include routine aerial and ground surveys. Whenever possible, ground patrols and repair activities would be conducted during times when minimum surface disturbance would occur (i.e., avoiding wet periods). Maintenance may include repairing frayed lines and damaged conductors, inspecting and repairing steel towers, and replacing damaged and broken insulators. Tall growing trees on the ROW would be cut on an as-needed basis in order to prevent flash-overs resulting in line outages and potential fires. Such ROW maintenance many not be required for up to 20 years following line construction. All low-growing species would be allowed to remain on the ROW, except concentrations of noxious weeds. The only effect on off-ROW vegetation would be that very tall trees would be cut to prevent them falling on the line. WWP would not use herbicides for vegetation control, unless required by the local noxious weed control board. No significant impacts to vegetation are expected to occur as a result of these maintenance activities.

Abandonment. During abandonment of the line, the transmission structures, static wires, conductors, insulators, and hardware would be dismantled and removed from the ROW. The environmental protection procedures outlined in Table 2-5 would be implemented during project abandonment to ensure resource protection during structure removal and site restoration. No significant impacts to vegetation would be anticipated during this project phase.

Significant Impact Summary. The potential removal of 8.5 acres of palustrine forested areas along the Proposed Route would result in long-term loss of riparian/wetland vegetation, producing a significant impact to this resource (see Section 4.1.4). The Proposed Route and both of the Eastern and Western Route Options could each potentially produce significant impacts on vegetation species listed as sensitive by the State of Washington in seven locations, during project construction. Significant impacts would also be associated with the loss of 5.3 acres (0.35 mile crossed) and 7.9 acres (0.52 mile crossed) of forested wetland habitat from the Eastern and Western Route Options, respectively. As compared, the segment of the Proposed Route replaced by these route options would affect 8.5 acres (0.56 mile crossed) of forested wetland habitat, also resulting in significant impacts. No old growth would be crossed, and the environmental protection measures discussed in Table 2-5 would be implemented for ROW revegetation and restoration; no additional significant impacts would be anticipated for other vegetation resources.

4.1.7 Wildlife

Impacts to wildlife would be considered significant if:

- Priority white-tailed deer and mule deer winter range is affected during construction or operation by disturbance or displacement of wintering animals, removal of thermal or snow intercept cover, or increased access and use of the ROW (source - Washington Wildlife and Game Fish Code).

- Loss of riparian habitat, old growth forest, or other unique communities affects key wildlife species (e.g., waterfowl, furbearers, raptors) (source - EIS Team and Washington Department of Wildlife).

- Effects from transmission line construction or operation, such as loss of individuals or long-term loss of habitat for federally listed species, results in a "may effect" decision under Section 7 of the Endangered Species Act (source - Endangered Species Act of 1973).

- The Washington Department of Wildlife determines that a state-listed species is in jeopardy from transmission line construction or operation activities (source - Washington Wildlife and Game Fish Code).

- Loss of or disturbance to bald eagle nesting or wintering sites and foraging areas due to project construction and operation, resulting in a "may affect" decision under

Section 7 of the Endangered Species Act (source - State Bald Eagle Protection Rules; Endangered Species Act of 1973).

- Location of the transmission line is in areas exhibiting prominent raptor or waterfowl use, resulting in an increase in the likelihood of collisions (source - EIS Team).

- Improved access within the project area promotes an increase in harassment or illegal killings of sensitive wildlife species (source - EIS Team).

Construction. Transmission line and access road construction would result in the displacement or mortality of small, less mobile wildlife species within the area of disturbance. Amphibians, reptiles, and small mammals would be more subject to mortality from construction activities than other wildlife species, but impacts to these groups would be minor on a regional basis. Many of these smaller species maintain a high reproductive potential and are common in surrounding habitats. Any population losses from these wildlife groups would likely be restored within one or two reproductive seasons.

Some species of ground-nesting birds, predominantly found within the ponderosa pine and grassland habitat mosaic, may experience disruption of nesting activities within the ROW during construction. However, individuals would be apt to use surrounding habitats and return to nesting areas located within the transmission line ROW, following the implementation of revegetation and reclamation procedures. Removal of snags during ROW construction would reduce habitat for numerous bird and mammal species. Certain danger trees would require removal for line safety; however, as discussed in Section 2.3.4, WWP would prevent any unnecessary removal of vegetation within the project ROW and along access roads. No impacts to waterbird species would be anticipated from line construction.

Riparian habitat provides ecological diversity for numerous wildlife species that inhabit these areas. Potential impacts from transmission line and access road construction would include increased disturbance to these ecosystems, increased sedimentation, and removal of forest canopy. The line would span the majority of these riparian areas located along the Proposed Route, thereby minimizing the amount of disturbance. As stated in Sections 4.1.3, 4.1.4, and 4.1.5 for surface water, floodplains/wetlands, and aquatic resources, WWP would implement environmental protection procedures (see Section 2.3.4) to prevent disturbance to riparian areas. Vegetation removal and related impacts are discussed in Section 4.1.4.

Because beaver habitat is diminishing within many areas of northeastern Washington (Forest Service 1988), the proposed line would span sensitive riparian/wetland areas and access road construction would be limited to minimize potential impacts (see Section 2.3.4 and Table 2-5).

No impacts to beaver impoundment areas would be anticipated from the proposed Interconnection. ROW clearance in specific areas may, in fact, increase forage items and improve beaver habitat as discussed for Aquatic Ecology (see Section 4.1.5).

The Proposed Route and the Eastern and Western Route Options cross one area designated as priority deer winter range near Ione and an area of important winter range near Calispell Lake (Whalen 1989). Construction activities that may disturb deer occupying the priority deer winter range (usually between December 1 and April 1) may significantly impact wintering deer populations. The quality and quantity of available food resources are limiting factors within priority deer winter ranges; however, additional herbaceous forage, resulting from a properly managed ROW, may have beneficial effects on wintering deer populations. The effects of line construction on available forage would depend on revegetation and reclamation efforts (see Section 2.3.4 and Table 2-5). Based on these environmental protection procedures agreed upon by WWP, no significant impacts are anticipated to available food resources for wintering deer. In addition, no significant impacts are expected from the removal of thermal or snow intercept cover for these wintering populations, due to the current amount of existing cover present in these specific areas.

The Proposed Route intersects with a portion of mountain goat range located directly west of Metaline Falls (Forest Service 1988). Typically, individuals inhabit the more mountainous areas located to the west of the ROW and would not be affected by the proposed Interconnection. However, several animals are regularly observed along an abandoned gravel quarry that occurs adjacent to the project ROW (Burke 1990; Zender 1990). Construction in this area during critical breeding periods would adversely impact breeding individuals and could affect the overall reproductive success of this local mountain goat population. Therefore, both the Proposed Route and the Western Route Option would potentially result in significant impacts to this species. No impacts would be anticipated for the Eastern Route Option, since line construction would occur east of the existing BPA ROWs and would not intersect with current mountain goat habitat. No impacts to other big game species would be expected from proposed construction activities.

ROW clearance would remove 1,035 acres of timbered area along the Proposed Route and would convert it to grass/shrub habitat for the life of the project. The Boundary Dam Variation would remove 11 acres of timbered area, compared to 76 acres removed by the segment of the Proposed Route replaced. The Orchard Prairie Variation would remove 6 acres of ponderosa pine, whereas the segment replaced would not. The Eastern and Western Route Options would remove 952 and 945 acres of timbered areas, respectively, as compared to 946 acres removed by the segment of the Proposed Route replaced. Timber removal for ROW construction could increase forage production for some wildlife species within the study area. The amount of

additional forage production, particularly for big game animals, would depend on plant species used in reclamation, habitat use, the number of acres removed, and relative reclamation success. No areas of old growth forest would be crossed by the Proposed Route.

Threatened or Endangered Species. Construction activities occurring adjacent to an active bald eagle, golden eagle, or osprey nest would likely limit individual production for that year. Construction disturbances to these raptor individuals at active nest sites would adversely impact breeding birds within 0.5 mile of the nest site. Three active bald eagle nesting sites are located along the Proposed Route near Sand Creek and Jared (WDW 1988; Zender 1990; McAllister 1990). Because these nests are located over 0.5 mile from the proposed ROW, significant impacts to breeding birds are not anticipated during project construction of the Proposed Route.

Impacts to the Selkirk Mountain caribou are not anticipated from the proposed Interconnection construction activities. Although caribou individuals have been reported along the western side of the Pend Oreille River and losses would significantly impact this herd, this limited population does not inhabit the area intersected by the Proposed Route.

Occasional sightings of both the grizzly bear and gray wolf are reported west of the Pend Oreille River. No impacts to these species would be anticipated from project construction.

The peregrine falcon and Townsend's big-eared bat would not be affected by the proposed Interconnection, due to their rare occurrence within the study area and specific habitat requirements. The lynx and wolverine occur in higher elevation habitats and maintain a large range of movement. No impacts are expected for these species. In addition, no impacts to other state species of concern are anticipated for the proposed Interconnection.

Significant impacts from project construction would not be likely for area wildlife species along the Boundary Dam or Orchard Prairie Variations or the Eastern Route Option. Table 4-2 outlines the acreage amounts of wildlife habitat removed by these route segments; Section 4.1.4 presents impacts associated with wetland/riparian areas.

Operation and Maintenance. Potential impacts to general wildlife species from project operation and maintenance activities would include periodic disturbances along the ROW for line repair and vegetation removal. No impacts to these resident species would be anticipated from these activities, since disturbances would be short-term and small in nature.

The Lead King Lakes located along the Proposed Route were investigated during the field reconnaissance. Transmission and distribution lines currently cross these riparian areas along

the western edge of the wetlands, and the Proposed Route or Western Route Option location to the west of these existing ROWs would not produce additional impacts to species using the wetland habitat. However, line placement to the east of the existing BPA circuits (i.e., Eastern Route Option) could significantly impact bird species within the wetlands. Use of the Eastern Route Option would place the conductors and overhead shield wires directly over the open water areas, thereby increasing the potential for bird collisions.

Impacts to both resident and migrant waterfowl, other waterbirds, and raptor species located along the Proposed Route could occur from mortality associated with collisions with transmission line conductors and static wires. Numerous bird species use the water resources located along the Proposed Route. Calispell Lake near Usk, the Pend Oreille River, and scattered riparian areas support a large number of birds, particularly during migration. Transmission line collision potential is dependent on many variables, such as habitat type, line orientation to flyways and foraging flight patterns, numbers of individuals, species' composition, visibility, potential disturbances or distractions, and line design (Beaulaurier et al. 1982; Meyer and Lee 1979; Anderson 1978). Species are especially susceptible to collisions with distribution and transmission lines when preoccupied by other factors (e.g., predators, foraging, courtship) (Beaulaurier et al. 1982). Raptor species may be susceptible to power line strikes when distracted. However, several physical and behavioral attributes of raptors, such as keen eyesight, slow flight speed, maneuverability in flight, and use of utility poles for nest and perch sites, decrease their susceptibility to collisions (Olendorff and Lehman 1988; Thompson 1978).

Previous studies on avian collisions with transmission lines have indicated that 80 to 93 percent of observed collisions occurred with the overhead shield wire (Beaulaurier et al. 1982; Faanes 1987). Approximately 87 percent of the individuals that collided with the lines flared to climb prior to the collision. In most instances, this involved flaring to clear the conductor wires and colliding with the shield wires (Faanes 1987; James and Haak 1979).

With the exception of the Eastern Route Option along the Lead King Lakes area, the potential for bird mortality associated with transmission line collisions during project operation of the proposed Interconnection would not be significant for a variety of factors. Stout and Cornwell (1976) have estimated that wire strikes comprise about 0.1 percent of total nonhunting mortality in waterfowl species. Hunting mortality, in comparison, may affect 20 to 30 percent of waterfowl populations (Willard et al. 1977). Although the potential for line collisions increases in poor visibility conditions (Thompson 1978), the Proposed Route placement adjacent to the existing ROW would increase the overall visibility of the line to bird species, thereby decreasing the collision potential. Therefore, due to line orientation with both bird concentration areas, such as Calispell Lake or the Pend Oreille River, and sensitive species' locations, no significant impacts

to resident or migratory bird species would be anticipated for the Proposed Route and the Western Route Option.

Transmission line and associated access road locations through priority deer winter range would increase the potential for disturbance to wintering populations. Other big game species (e.g., mountain goat, black bear, elk, moose) may also suffer from increased harassment, due to an increase in accessibility. Significant impacts to these species are not anticipated, however, due to the environmental protection procedures outlined in Section 2.3.5. In addition to removal of temporary access roads, WWP would install locked gates along permanent access roads into sensitive wintering areas to minimize public use. These measures would be in cooperation with the landowner, WDW, and the Forest Service.

Threatened or Endangered Species. During project operation, wintering bald eagles may be impacted where the Proposed Route, Eastern Route Option, and Western Route Option cross the Little Spokane River, and where the Boundary Dam Variation crosses the Pend Oreille River. Because wintering birds typically use the river corridors for daily movement and foraging, the potential for eagle collisions with the transmission line increases at these crossings. Bald eagle collisions for the proposed Interconnection would result in significant impacts to these individuals. No impacts to breeding eagles would be expected during project operation.

Electrocution of bald eagles during line operation is not typically considered a problem with transmission lines of this size. Most lines that electrocute raptors are smaller distribution lines that carry between 12 kilovolts (kV) and 69 kV, where the distance from a conductor to an electrical ground or to another conductor is often within the distance of a raptor's wingspan. Higher voltage transmission lines pose little electrocution hazard because the separation between the conductors is sufficient to prevent contact that would result in electrocution (Olendorff et al. 1981).

Table 2-4 lists the minimum distance between a conductor and a ground (short-circuit distance) to be about 6 feet 8 inches, this would be a vertical distance between the conductor and the structure crossarm. A bald eagle's wingspan ranges from approximately 6 feet 6 inches to 7 feet 6 inches. However, an eagle would ordinarily approach the structure in a horizontal flight pattern. The minimum horizontal short-circuit distance for the proposed line would be approximately 11 feet between a conductor and the structure, and estimated distance from conductor to conductor is about 22 feet (see Table 2-4). Therefore, no significant impacts to bald eagles from electrocution would be anticipated for this 230-kV transmission line.

Mountain caribou tend to use elevations at approximately 3,800 feet and above, and the potential impact to individuals would occur from increased snowmobile access into these higher elevations

(Hickman 1989). Significant impacts to this population from the Proposed Route would not be expected, because of the limited distribution of the population on the west side of the Pend Oreille River and the protection procedures outlined in Table 2-5 and in Section 2.3.5 to minimize access to the ROW and associated roads.

Potential impacts to the grizzly bear from project operation and maintenance would be from increased access to limited habitat areas, resulting in an increase in harassment. Protection measures would be implemented, as discussed above for big game animals, to reduce the likelihood of these effects to grizzly individuals (see Table 2-5 and Section 2.3.5).

No significant impacts to other federally listed wildlife species would occur from the proposed project operation and maintenance activities.

Abandonment. Potential impacts incurred during project abandonment and structure removal would parallel those discussed for construction. However, impacts would be minor, due to the limited amount of disturbance, no new areas would be cleared, and reclamation procedures would mitigate any impacts to area wildlife species.

Significant Impact Summary. Priority deer winter range may be significantly impacted by construction activities and increased access during project operation along the Proposed Route, both the Eastern and Western Route Options, and the route segment replaced. No significant impacts from removal of thermal or snow-intercept cover would occur. Impacts may be beneficial to big game species through the appropriate ROW reclamation, with a potential increase in forage production. Construction activities associated with the Proposed Route and the Western Route Option may result in significant impacts to the overall reproductive success of the mountain goat population inhabiting the Linton Mountain area, in the event that project construction occurred during the critical breeding period.

No old growth areas are directly crossed by the Proposed Route; impacts to riparian areas would be minimized by the environmental protection procedures outlined in Section 2.3 and are presented in detail in Section 4.1.4. Active bald eagle, golden eagle, or osprey nests may be adversely affected by construction activities within 0.5 mile of the nest site; however, the three active bald eagle nests do not occur within 0.5 mile. No additional federal or state-listed species would be significantly impacted by the Proposed Route.

Significant impacts are not anticipated from an increased potential in bird collisions with the transmission line (except as noted before). Line orientation to sensitive areas, species' locations, and marking of the line would minimize line strikes. However, line placement along the Eastern Route Option adjacent to the Lead King Lakes area may result in significant impacts to bird

species using the wetlands, due to a direct increase in collision potential. Line placement along the western side of the ROW (i.e., the Proposed Route and Western Route Option) would not result in significant impacts. Transmission line crossings of the Little Spokane River would increase the potential for line collisions by area bald eagles, potentially resulting in a significant impact to this species.

Increased harassment to wildlife species along the project ROW would not increase significantly; the environmental protection procedures discussed in Section 2.3.5 and presented in Table 2-5 would minimize the amount of disturbance to big game and sensitive wildlife species.

The Proposed Route and the Eastern and Western Route Options would cross the Little Spokane River; the Boundary Dam Variation would cross the Pend Oreille River. These proposed line crossings would increase the potential for bald eagle collisions at these locations. A biological assessment has been prepared for submittal to the USFWS for review of the bald eagle, grizzly bear, mountain caribou, and gray wolf in compliance with Section 7(a)(2) of the Endangered Species Act of 1973. This assessment is presented as Appendix B at the back of this FEIS.

4.1.8 Existing and Planned Land Use

Note that the impacts discussed in this section exclude purely visual impacts. Visual resource impacts are discussed separately in Section 4.1.9.

4.1.8.1 Existing Land Use

The following types and causes of potential land use impacts constitute a worst-case listing of the possible effects on existing land uses for the proposed Interconnection. Only potential adverse impacts are considered. The project may occasionally have slight beneficial impacts on a few of the existing land use evaluation factors, but these are neither substantial enough nor frequent enough for them to be considered in route comparison. Many of these potential effects would be completely or partially mitigated.

- ROW restrictions would require the removal or relocation of any building that would occur within the new ROW. In the case of residences and other occupied buildings, this would require the relocation of the occupants.

- ROW restrictions would limit future improvements/expansion (particularly the location of buildings) on existing residential, recreational, institutional, commercial, and industrial properties within the transmission line ROW.

- Noise, dust, increased traffic, excavated areas, and disturbed areas could affect adjacent residential, recreational, institutional, and commercial uses during the construction period.

- The creation of a new ROW for the project and new construction access roads in that ROW would have the potential to allow new or easier access by trail bikes and other off-road vehicles, with resulting potential for new or increased loss of privacy, disturbance, and vandalism.

- The presence of the proposed Interconnection could potentially affect some types of recreational or open space land use by affecting the naturalness of the setting. This could have the potential to reduce the use of such areas.

- The presence of structures in cultivated areas would impede the movement of agricultural equipment, making cultivation more inconvenient. Structures located in cultivated areas would also remove a small amount of land from production. On the average, it is estimated that about 2,000 square feet per structure, or 0.3 acre per mile, would be taken out of production when crossing cultivated land (University of Minnesota 1978).

- The presence of the proposed Interconnection in cultivated areas would limit the use of agricultural equipment higher than 20 feet below the conductor.

- The presence of the proposed Interconnection in areas irrigated by moving equipment could interfere with irrigation operations.

- The energized conductors of the proposed Interconnection could be a shock hazard to anyone handling long metallic irrigation pipes near them.

- Weeds growing in the area of uncultivated land at the structure bases of the proposed Interconnection would spread to adjacent cultivated areas.

- The presence of the proposed Interconnection in agricultural areas could restrict the aerial spraying of these areas.

- Construction and maintenance activities in cultivated areas would cause crop damage in some seasons.

- Construction and maintenance activities across cultivated land could cause soil compaction, resulting in lowered crop production.

- The presence of the proposed Interconnection across a surface mine or sand/gravel pit could restrict ongoing or future extraction of the resource around structure bases, and by limiting the height of equipment used under the conductors.

- The penetration of any element of the proposed Interconnection through the imaginary surfaces defining takeoff and landing clearance zones around airports and airstrips could present hazards to safety.

- Construction of the proposed Interconnection across major roads or active railroads could have the potential to delay traffic for short periods during a few construction operations.

- Because of the tendency to locate new transmission lines parallel to existing ones, sensitive land uses in the vicinity of the proposed Interconnection could have an increased probability of future impacts from future, as yet unidentified lines.

- There are various potential electromagnetic effects of the energized line that may be associated with existing and planned land uses. These are discussed in detail in Section 4.6 and summarized here:

  - Audible noise from energized conductors could affect adjacent residential and recreational land uses. Noise levels are discussed in Section 4.6, and predicted noise levels at the ROW edge are given.

  - In certain circumstances, the proposed Interconnection would have the potential to cause slight interference with television and radio reception close to the new ROW edge.

Impacts to existing and planned land use would be considered significant if:

- Current management plans or policies prohibit or strongly discourage transmission facilities or similar levels or kinds of development (source - EIS Team).

- Any residence or other major or inhabited building would have to be removed to comply with electrical safety codes restricting uses of the ROW (source - EIS Team).

- Property would be crossed in such a way that ongoing land use activities would not practically continue or would be substantially disrupted or limited (source - EIS Team).

- Any major building at a developed recreation site would have to be removed to comply with electrical safety codes restricting use of the ROW (source - EIS Team).

- The presence of the line would result in a substantial decrease in recreational land use (source - EIS Team).

- The presence of structures in cultivated fields would result in the loss of 100 acres from cultivation (source - EIS Team).

- The presence of structures would prevent the operation of an existing moving irrigation system (source - EIS Team).

- Mineral extraction or industrial operations would be substantially disrupted or limited (source - EIS Team).

- The presence of the line would prevent safe aircraft movement into or out of an established airport or airstrip (source - Federal Aviation Regulations, Part 77).

With all sensitive affected land use conditions encountered along the network of project routes, the short-term (construction-related) and long-term (life of the project) impacts were judged to fall into the same impact class (i.e., significant, moderate, or low). Therefore, short-term and long-term existing land use impacts are discussed together.

Project abandonment would require removal of structures from the study area, resulting in minor land use impacts. Structure removal would produce short-term, construction-related impacts; however, these would be outweighed by the beneficial impacts from the ensuing absence of the line.

For the purposes of route comparison, all impacts are assigned to one of three levels: Significant, Moderate, or Low. Route comparison is based primarily on significant Impacts and, to some extent, on moderate impacts. A discussion of low impacts is provided as background information. The tabulation of impact types that is consistent within the Existing Land Use Resource Category is shown in Table 4-3. For simplicity and clarity, environmental conditions that are clearly not subject to any land use impact from any portion of the network of potential project routes are omitted from this tabulation, even though they may exist within the study region.

Table 4-3

Significance Levels for Potentially Affected Existing Land Uses

Evaluation Factors	Post-Mitigation Short-Term/Long-Term Impact Levels			
	Significant	Moderate	Low	Very Low to None
Residence[1]:				
- Remove	X			
- <100 ft from ROW edge		X		
- 100 ft to <200 ft from ROW edge			X	
- 200 ft or greater from ROW edge				X
Major or Inhabited Institutional, Commercial, or Industrial Building[2]:				
- Remove	X			
- <100 ft from ROW edge		X		
- 100 ft to <200 ft from ROW edge			X	
- 200 ft or greater from ROW edge				X
Major Uninhabited Residential, Industrial, Agricultural, or Forestry Related Building:				
- Remove		X		
Minor Uninhabited Residential, Industrial, Agricultural, or Forestry Related Building[3]:				
- Remove			X	
Agriculture:				
- Operation of moving irrigation substantially disrupted		X		
- Operation of moving irrigation slightly disrupted			X	
- Greater than 100 acres removed[4] from cultivation	X			
- 10 to 100 acres removed from cultivation		X		
- Less than 10 acres removed from cultivation			X	

Table 4-3 (Continued)

Evaluation Factors	Post-Mitigation Short-Term/Long-Term Impact Levels			
	Significant	Moderate	Low	Very Low to None
Naturalness of Recreation Area or Cemetery Setting Diminished:				
- Substantially	X			
- Moderately		X		
- Slightly			X	
Mineral Extraction or Industrial Operation Disrupted or Limited:				
- Substantially	X			
- Moderately		X		
- Slightly			X	
Air Transportation:				
- Intrusion into FAA flight clearance zone of major airport	X			
- Minor intrusion into Spokane County flight clearance zone at Spokane International Airport		X		
- Substantial intrusion into flight clearance zone of minor airstrip	X			
- Minor or peripheral intrusion into flight clearance zone of minor airstrip		X		
Land Use Policies:				
- Transmission lines or similar levels or kinds of development prohibited or strongly discouraged	X			

[1]A residence may be a conventional permanent home, a seasonal home, or a mobile home.

[2]Industrial buildings were judged case-by-case. Isolated buildings, with good options for expansion in more than one direction, were considered subject to low impacts.

[3]May be a group of related buildings on one property.

[4]Cultivated areas include pasture (likely subject to mechanical mowing, etc.) but exclude rangeland.

The existing land use impacts along the Proposed Route are described below, using the same route designations described in Section 3.1.8.1. Impacts to agricultural land use, however, are related to the total amount of cultivated land that would be lost along the entire route, and are therefore, not evaluated (although they are quantified) separately for each segment. The segments and related impacts are shown on Map 2-2.

Border to Boundary Dam. No measurable impacts to existing land uses would occur along this segment. Crawford State Park (Gardner Cave), located over 1,000 feet from the proposed Interconnection, consists of heavily wooded terrain with few views in the project direction. The naturalness of its setting would not likely be affected to the point that use levels would be even slightly affected. The same is true of the Forest Service designated semi-primitive, nonmotorized recreation areas to the south of the route segment.

Boundary Dam to South of Ione (West Side of Existing Transmission Lines). One residence and one minor uninhabited building would be removed in this segment, resulting in significant and low impacts, respectively. About 6,600 feet of agricultural lands would be crossed. No measurable land use would be affected on the Forest Service designated semi-primitive, nonmotorized recreational land to the west of the segment. The project parallels the existing BPA transmission lines in this segment; therefore, the change in naturalness caused by the proposed Interconnection would be minor. The line would not affect the recreational uses along the Pend Oreille River, since they are located a considerable distance from the ROW to the east.

South of Ione to West of Cusick (West Side of Existing Transmission Lines). Two residences would be removed in this segment, which would result in significant impacts. Two major and two minor uninhabited buildings would require removal, which would produce moderate and low impacts, respectively. The ROW edge would be located 100 to 200 feet from two residences, with resulting low levels of impact. Approximately 6,900 feet of agricultural land would be crossed. No substantial effect would occur on the designated semi-primitive, nonmotorized recreational land along this segment, although the available Forest Service data map appears to show the ROW intersecting with this designated land. This impact conclusion is based on the fact that the proposed Interconnection would parallel two major existing transmission lines at this location. Therefore, the naturalness of these recreational uses would not be substantially changed by the proposed project. In addition, no substantial effect would occur on the recreational uses along the Pend Oreille River east of the route segment, for the same reason.

West of Cusick to Northeast of Chattaroy (West Side then East Side of Existing Transmission Lines). A total of three residences would require removal in this segment, with significant impacts resulting. One major uninhabited building would also require removal,

causing moderate impacts. Two residences would be within 100 feet of the ROW edge, resulting in moderate impacts; another three residences would be between 100 and 200 feet from the ROW, resulting in low impacts. Approximately 26,300 feet of agricultural land would be crossed by this segment. A minor landing strip occurs about 5,400 feet from this segment. The existing transmission lines paralleled by the project intrude into the edge of a 20:1 flight clearance zone defined from the airstrip's end. The proposed structures are estimated to be about 25 feet taller than the existing lines; therefore, this segment would increase the amount of intrusion. The apparently minor nature of the airstrip, the considerable distance from the ROW edge, and the intrusion being near the edge of the clearance zone all suggest that the project would not create a substantially increased hazard to the safe operation of this airstrip; the intrusion into this flight clearance zone was rated as a moderate impact.

Northeast of Chattaroy to Southeast of Mead (East Side of Existing Transmission Lines and Along New ROW). One residence and one minor uninhabited building would be removed in this segment, producing significant and low impacts, respectively. Two residences would be located within 100 feet of the ROW edge; an additional four residences would be between 100 and 200 feet from the ROW edge. These areas would be subject to moderate and low impacts, respectively. Approximately 34,100 feet of agricultural land would be crossed by this segment. A seminary is located adjacent to this segment along the opposite side of the existing BPA circuits. The smallest distance between any of its main inhabited buildings and the ROW edge would be substantially over 200 feet; therefore, no measurable adverse land use effects would occur at this location.

Southeast of Mead to Beacon. This route segment, where on new ROW, would cross about 900 feet of agricultural land, mostly pasture. Where rebuilt on ROW occupied by existing lines, the route would also cross cropland; but the effect here would be restricted to potential temporary disturbance during construction, probably more than offset by a smaller number of structures located in agricultural areas (because of the larger spans typical with steel structures).

Construction of this route segment would not require the removal of any buildings. However, a few residences and industrial buildings in the vicinity of the Beacon Substation would be affected by the action. Along the eastern edge of the ROW of the two existing lattice steel lines that run south into the eastern side of the substation, the action would add a new 230-kV circuit to the existing structures. This could potentially increase noise and other electromagnetic field and corona effects. A total of two residences are within 100 feet of the ROW edge of this location and are conservatively assumed to be subject to moderate impacts. Along the eastern edge of the group of existing H-frame lines that run south into the northwest corner of the substation, the segment of the Proposed Route would remove an existing 115-kV line and replace it with a larger two-circuit 115/230-kV line. This could also have the effect of increasing

noise, etc. A total of four residences and two major industrial buildings are within 100 feet of the ROW edge at this location and are similarly assumed to be subject to moderate impacts.

Total Impacts of Proposed Route. Seven residences would require removal from the construction of the Proposed Route, resulting in significant impacts. Three major uninhabited buildings and four minor uninhabited buildings would also require removal, with moderate and low impacts, respectively. Ten residences and two inhabited commercial buildings would occur within 100 feet of the ROW edge and subject to moderate impacts. A total of 9 residences located between 100 and 200 feet from the ROW edge would be subject to low impacts. Approximately 78,800 feet (14.2 miles) of agricultural land would be crossed, resulting in an estimated loss of 4.2 acres of cultivated land, resulting in a low level of impact to agriculture. The Proposed Route would intrude into the edge of a flight clearance zone at a minor airstrip, producing a moderate impact.

Boundary Dam Variation. This route segment crosses an area primarily used for electric utility-related industrial activities and passes within 100 feet of a major building. This building is not located in a congested area, and a variety of development options are apparent. Therefore, impacts to this building would be considered low. No other measurable land use impacts occur along this segment. The segment of the Proposed Route replaced creates no measurable impacts to existing land use. No impact differences exist between the Boundary Dam Variation and the segment of the Proposed Route that it replaces.

Orchard Prairie Variation. Along this segment, one residence would be within 100 feet of the ROW edge and therefore subject to moderate land use impacts. One additional residence would be between 100 feet and 200 feet of the ROW edge, resulting in low impacts. About 4,400 feet (0.8 mile) of agricultural land would be crossed, resulting in a loss of about 0.25 acre from cultivation.

The segment of the Proposed Route that would be replaced by the Orchard Prairie Variation would pass one residence at a distance of between 100 feet and 200 feet causing land use impacts at the low level. It would cross 5,100 feet (0.97 mile) of agricultural land and would take about 0.3 acre out of cultivation.

In summary, the Orchard Prairie Variation would have more impacts on residential land use and a slightly less effect on agriculture. It should be noted that the variation creates new ROW in a region that already contains a large number of existing transmission line corridors. This is a factor that should be given consideration in route comparison.

Western Route Option of the Proposed Route. The Proposed Route, as previously noted, follows first the west side and then the east side of the existing transmission lines between Boundary Dam and a point southeast of Mead, except for two short route segments located near Chattaroy and Mead. The Western Route Option follows the west side of the existing BPA ROW for the entire distance between Boundary Dam and the specific point located southeast of Mead (see Map 2-2, Sheet 4).

The summary of existing and planned land use concerns and impacts is presented in Tables 2-6 and 2-7 in Section 2.7 of this FEIS. These impacts are shown for the entire length of the proposed transmission line along the western perimeter of the ROW from Boundary Dam to southeast of Mead. This 90.5-mile Western Route Option is compared to the 92.5-mile segment of the Proposed Route replaced that travels between the same route points (see Map 2-2, Sheet 4).

This first portion of the Western Route Option consists of two segments that are common with the Proposed Route. These are:

- Boundary Dam to South of Ione
- South of Ione to West of Cusick

The impacts to existing land uses along these segments are described for the Proposed Route. The following route segments are not common with the Proposed Route and are, therefore, described in detail.

West of Cusick to Northeast of Chattaroy (West Side of Existing Transmission Lines). A total of nine residences would require removal in this segment, resulting in significant impacts. Two major uninhabited buildings and three minor uninhabited buildings would also be removed, creating moderate and low impacts, respectively. Five residences would occur within 100 feet of the ROW edge, causing moderate impacts; another five residences occur between 100 and 200 feet, resulting in low impacts. Approximately 23,000 feet of agricultural land would be crossed.

One recently expanded cemetery would be crossed for a distance of 300 feet. It is assumed that the parklike appearance, generally valued in a cemetery, could be compromised to some extent because of restrictions on tree planting in the ROW and the dominating presence of the transmission line structures. However, the proposed Interconnection parallels two existing transmission lines within this segment; therefore, the potential natural appearance of the cemetery would be slightly reduced. Impacts to this element would be considered low.

A minor county landing strip occurs near this segment, about 5,000 feet from the proposed ROW, measured along the extended airstrip centerline, and about 3,200 feet from the edge of the sloping, wedge-shaped flight clearance zone that is defined from the end of a runway. Assuming the usual 20:1 slope for the flight clearance zone of a minor airstrip, the clearance edge would be located approximately 160 feet higher than the airstrip itself, when directly above the project ROW. Moreover, the terrain at this point is also about 140 feet higher than the airstrip; therefore, the project would intrude into the flight clearance zone. However, two existing transmission lines, which the proposed Interconnection parallels, also occur in this segment. These are 230-kV single-circuit structures, with an estimated height approximately 25 feet lower than the proposed project towers. The project would then represent an additional intrusion of about 25 feet into the edge of the flight clearance zone of this airstrip. Given the considerable distance of the project from the airstrip, a moderate impact level is assumed.

Northeast of Chattaroy to Southeast of Mead (West Side of Existing Transmission Lines). A total of 22 residences would be removed in this segment, resulting in significant impacts. Five minor uninhabited buildings would also be removed, causing low impacts. Twenty residences would occur within 100 feet of the ROW edge; six others would occur between 100 and 200 feet from the ROW edge. These areas would be subject to moderate and low impacts, respectively. About 23,800 feet of agricultural land would be crossed. A seminary is adjacent to this segment. The smallest distance between any of its main inhabited buildings and the ROW edge would be greater than 200 feet; therefore, no measurable adverse effect would occur at this location.

Total Impacts of the Western Route Option for the Proposed Route. A total of 34 residences, 4 major uninhabited buildings, and 11 minor uninhabited buildings would require removal; causing significant, moderate, and low impacts, respectively. A total of 25 residences would occur within 100 feet of the ROW edge, and 13 would occur between 100 and 200 feet. These residences would be subject to moderate and low impacts, respectively. Approximately 60,300 feet (11.4 miles) of agricultural land would be crossed, causing the removal of 3.4 acres of land from cultivation. Low impacts would occur to one cemetery and moderate effects on air transportation at one airstrip.

The total impacts for the segment of the Proposed Route replaced by this Western Route Option are estimated from Boundary Dam to southeast of Mead (see Map 2-2, Sheet 4). Seven residences, three major uninhabited buildings, and four minor uninhabited buildings would be removed; causing significant, moderate, and low impacts, respectively. Four residences would occur within 100 feet of the ROW edge, and nine would occur between 100 and 200 feet. These residences would be subject to moderate and low impacts, respectively. About 73,900 feet (14 miles) of agricultural land would be crossed, causing the removal of 4.2 acres of land from cultivation. Moderate impacts on air transportation at one airstrip would occur within this area.

Considering only significant and moderate impacts, the Western Route Option would have substantially greater impacts on existing land use than what is exhibited along the segment of the Proposed Route replaced. This route option would require the removal of 27 additional residences (significant impact) and one additional major uninhabited building (moderate impact). This route option would also have 21 additional residences located within 100 feet of the ROW edge (moderate impact) than the segment of the Proposed Route.

Eastern Route Option of the Proposed Route. The summary of existing and planned land use impacts and concerns is presented in Tables 2-6 and 2-7 in Section 2.7 of this FEIS. These concerns apply to the entire length of this route option along the eastern edge of the ROW from Boundary Dam to southeast of Mead. The Eastern Route Option is also compared to the segment of the Proposed Route that it replaces.

The segments for the Eastern Route option are described in detail below.

Boundary Dam to South of Ione (East Side of Existing Transmission Lines). In this segment, one minor uninhabited building would be removed, causing low impacts. One residence would be located within 100 feet of the ROW, resulting in moderate impacts. About 3,500 feet of agricultural land would be crossed. There would be no impacts on the Forest Service designated semi-primitive, nonmotorized recreational land located west of the route segment because the project would parallel several major existing transmission lines and would, therefore, not measurably change the naturalness of the area. For the same reason, the project would not have any measurable effect on the recreational uses along the Pend Oreille River to the east.

South of Ione to West of Cusick (East Side of Existing Transmission Lines). Two residences, one major uninhabited building, and one minor uninhabited building would be removed in this segment, resulting in significant, moderate, and low impacts, respectively. Three residences would occur within 100 feet of the ROW edge, causing moderate impacts; and two additional residences would be within 100 and 200 feet from the ROW edge, resulting in low impacts. About 8,400 feet of agricultural land would be crossed. No measurable effect would occur on the naturalness of the Forest Service semi-primitive, nonmotorized recreational land near the northern end of the segment, even though the line crosses through a small portion of this land, because of the two existing transmission lines parallel to the project. The route segment would likewise have no measurable effect on the recreational uses of the Pend Oreille River, which is located adjacent to the east of the northern portion of the segment. The west side of the Pend Oreille River Valley in this area contains a highway and a railroad, as well as, the two major existing transmission lines mentioned above. The addition of the proposed Interconnection would not likely affect the naturalness of the setting of the recreation activities to the point that use levels would be measurably reduced.

West of Cusick to Northeast of Chattaroy (East Side of Existing Transmission Lines). In this route segment, two residences and one major uninhabited building would be removed, leading to significant and moderate impacts, respectively. One residence would occur within 100 feet of the ROW edge, causing moderate impacts; another residence would occur within 100 and 200 feet of the ROW edge, resulting in low impacts. About 25,700 feet of agricultural land would be crossed. A minor landing strip occurs about 5,400 feet from the project ROW, measured along an extension of the airstrip centerline. The existing transmission lines paralleled by the project intrude into the edge of a 20:1 flight clearance zone defined from the airstrip's end. The proposed structures are estimated to be about 25 feet taller than the existing lines; therefore, this segment would increase the amount of intrusion. The apparently minor nature of the airstrip, the considerable distance from the ROW edge, and the intrusion being near the edge of the clearance zone all suggest the project would not create a substantially increased hazard to the safe operation of this airstrip. The intrusion into this flight clearance zone was rated as a moderate impact.

Northeast of Chattaroy to Southeast of Mead (Remaining along the East Side of Existing Transmission Lines). Thirteen residences would be removed in this segment, causing significant impacts. Four minor uninhabited buildings would also be removed, causing low impacts. A total of 7 residences would occur within 100 feet of the ROW edge, and 8 would be located between 100 and 200 feet. These residences would be subject to moderate and low impacts, respectively. About 31,100 feet of agricultural land would be crossed.

Total Impacts of the Eastern Route Option for the Proposed Route. Seventeen residences would be removed over the total length of the Eastern Route Option, resulting in significant impacts. Two major and six minor uninhabited buildings would also be removed, causing moderate and low impacts, respectively. A total of 12 residences would be located within 100 feet of the ROW edge, and 11 residences would be within 100 to 200 feet, causing moderate and low impacts, respectively. About 68,700 feet (13 miles) of agricultural land would be crossed, causing the removal of 3.9 acres of land from cultivation. Moderate impacts would occur to air transportation at one airstrip.

The total impacts for the segment of the Proposed Route replaced by the Eastern Route Option are estimated from Boundary Dam to southeast of Mead. Seven residences, three major uninhabited buildings, and four minor uninhabited buildings would be removed; causing significant, moderate, and low impacts, respectively. Four residences would occur within 100 feet of the ROW edge, and nine would be located between 100 and 200 feet. These residences would be subject to moderate and low impacts, respectively. About 73,900 feet (14 miles) of agricultural land would be crossed, causing the removal of 4.2 acres of land from cultivation. Moderate impacts to air transportation would occur at one airstrip.

Considering only significant and moderate impacts, the Eastern Route Option would have substantially greater impacts on existing land use than what is exhibited along the segment of the Proposed Route replaced. This route option would require the removal of 10 additional residences (significant impact), and 8 additional residences would occur within 100 feet of the ROW edge (moderate impact).

Significant Impact Summary. The Proposed Route would remove a total of seven residences at various locations, resulting in significant impacts on existing land use. The Western Route Option, which follows the west side of the existing BPA ROW from Boundary Dam to Mead, would require the removal of 27 additional residences than the segment of the Proposed Route replaced. The Eastern Route Option, that follows the east side of the existing BPA circuits from Boundary Dam to Mead, would require the removal of 10 additional residences. As compared, the segment of the Proposed Route replaced by these route options would require the removal of 7 residences. No significant impacts are associated with either the Boundary Dam or Orchard Prairie Variations or the segments of the Proposed Route they would replace.

4.1.8.2 Planned Land Use

The following types and causes of potential impacts on planned land use are presented below.

- Planned development or resource use could be precluded within the project ROW, or could be restricted or limited adjacent to the ROW.

- The construction or presence of the transmission line could be incompatible with certain land use activity types and/or quality of experience desired in particular areas by governing jurisdictions and prescribed by their policies.

Impacts to planned land use would be considered significant if:

- A proposed use or expansion would be substantially disrupted or limited (source - EIS Team).

Where the proposed Interconnection would parallel an existing ROW, its effect on future land uses would tend to be less, since it would more likely be located along the predefined edges of future development proposals. The project's effect on planned land uses would, on average, tend to be inversely related to density, since the larger the lot size of the planned development, the greater the chances that a specific development could proceed unrestricted.

Impacts to planned land uses are presented as primarily operation-related impacts and would be considered long-term (for the life of the project), continuing through transmission line operation, maintenance, and abandonment.

Project abandonment would require removal of structures from the study area, resulting in minor land use impacts. Structure removal would produce short-term, construction-related impacts; however, these would be outweighed by the beneficial impacts from the ensuing absence of the line.

For the purposes of route comparison, all impacts are assigned to one of three levels: Significant, Moderate, or Low. Route comparison is based primarily on significant impacts and, to some extent, on moderate impacts. A discussion of low impacts is provided as background information. Table 4-4 outlines the potential impacts to planned land uses. For simplicity and clarity, environmental conditions (evaluation factors) that are clearly not subject to any land use impact from any portion of the network of potential routes are omitted from this tabulation, even though they may exist within the study region.

It is recognized that individual landowners may have plans to develop specific land parcels for residential or other uses, and these could be impacted by the project. However, there is no feasible way of identifying such individual proposals. An assessment of project impacts on future land use must rely on the relatively generalized published plans and policies of local planning agencies. This approach is adequate for route comparison.

The planned land use impacts along the Proposed Route are described below, using the same route designations described in Section 3.1.8.2.

Border to Boundary Dam. This segment of the Proposed Route would pass through about 0.6 mile of Forest Service Class 5 land (Timber Management with Visual Resource Protection) while located on new ROW. Siting new ROW through this unit is not consistent with Forest Service policy. Impacts to future land use plans and policies would be moderate.

Boundary Dam to South of Ione. This route segment, parallel to existing transmission lines, crosses about 1.5 miles of Forest Service Class 5 land (Timber Management with Visual Resource Protection) and 4.8 miles of Class 6 land (Deer Winter Range Management with Visual Resource Protection), causing low impacts in each case.

South of Ione to West of Cusick. In this segment, 2.6 miles of Forest Service Class 6 land are crossed, while parallel to existing transmission lines. The resulting impacts are low.

Table 4-4

Significance Levels for Potentially Affected Planned Land Uses

Evaluation Factors	Post-Mitigation Short-Term/Long-Term Impact Levels			
	Significant	Moderate	Low	Very Low to None
U.S. Forest Service				
- Units 5 & 6, Timber or Wildlife Management w/Visual Resource Protection; Not Parallel to Existing Transmission Line(s)		X		
- Units 5 or 6; Parallel to Existing Transmission Line(s)			X	
- Units 3, 7 & 8; Utility Corridors Permitted				X
Bureau of Land Management				
- BLM Land; Not Parallel to Existing Transmission Line(s)			X	
- BLM Land; Parallel to Existing Transmission Line(s)				X
Pend Oreille County				X
Spokane County/Spokane International Airport				
- Comprehensive Map Units; Not Parallel to Existing Transmission Line(s)				
• Industrial				X
• Urban		X		
• Suburban		X		
• Semi-Rural		X		
• Rural			X	
• Agricultural			X	
- Comprehensive Plan Map Unit; Parallel to Existing Transmission Line(s)				
• Industrial				X
• Urban			X	
• Suburban			X	
• Semi-Rural			X	
• Rural				X
• Agricultural				X

Table 4-4 (Continued)

Evaluation Factors	Post-Mitigation Short-Term/Long-Term Impact Levels			
	Significant	Moderate	Low	Very Low to None
- Intrusion into Federal Flight Clearance Zone for Proposed Runway	X			
- Intrusion into County Flight Clearance Zone for Proposed Runway		X		
Stevens County				
- Tract/Estate or Residential/ Recreational Development Area; Not Parallel to Existing Transmission Line(s)		X		
- Tract/Estate or Residential/ Recreational Development Area; Parallel to Existing Transmission Line(s)			X	
- Land Use Plan Map Unit; Rural, Not Parallel to Existing Transmission Line(s)			X	
- Land Use Plan Map Unit; Rural, Parallel to Existing Transmission Line(s)				X
- Land Use Plan Map Unit: Resource Management I				X
- Land Use Plan Map Unit: Resource Management II				X
Lincoln County				
- Recreation; Not Parallel to Existing Transmission Line(s)			X	
- Recreation; Parallel to Existing Transmission Line(s)				X
- Agricultural				X
City of Spokane				
- R1 - One Family Residential or RS - Residential Suburban; Not Parallel to Existing Transmission Line(s)		X		

Table 4-4 (Continued)

Evaluation Factors	Post-Mitigation Short-Term/Long-Term Impact Levels			
	Significant	Moderate	Low	Very Low to None
- R1 or RS; Parallel to Existing Transmission Line(s)			X	
- Bikeway, Not Parallel to Existing Transmission Line(s)			X	
- Bikeway, Parallel to Existing Transmission Line(s)				X

West of Cusick to Northeast of Chattaroy. There would be no measurable impacts to future land uses in this segment.

Northeast of Chattaroy to Southeast of Mead. About 4.0 miles of this segment (located on new ROW) would pass through an area proposed in the Spokane County Comprehensive Plan for development to the level defined as Rural. This would result in low impacts.

Southeast of Mead to Beacon. Those portions (the majority) of this route segment that would be located on existing transmission line ROW would not have any effect in planned land use. The 0.5 mile of the route segment that would be located on new ROW has the potential to cause impacts to planned land uses. About 0.1 mile of this portion of the route segment would cross land planned for future rural use. Impacts here would be low. The remaining 0.4 mile would cross future industrial land where impacts would be moderate.

Total Impacts of Proposed Route. National Forest land planned for Timber Management with Visual Resource Protection (Class 5) would be impacted by this route; 0.6 mile at the moderate level and 1.5 miles at the low level. About 7.4 miles of land designated by the Forest Service for Wildlife Management with Visual Resource Protection (Class 6) would be subject to low level impacts. About 0.4 mile of land planned for Industrial use would be impacted at the moderate level. Land proposed in the County Comprehensive Plan for future development at the Rural level would be subject to low impacts for 4.1 miles.

Boundary Dam Variation. About 0.3 mile of this segment (located on new ROW) crosses the Forest Service's Class 5 land (Timber Management with Visual Resource Protection). This results in moderate impacts. The segment of the Proposed Route replaced crosses 0.6 mile of Forest Service Class 5 land, also producing moderate impacts.

The Boundary Dam Variation would have less impact on future land use than the corresponding portion of the Proposed Route. The variation would result in approximately 0.3 mile of moderate impacts, as compared to 0.6 mile of moderate impacts for the segment of the Proposed Route it would replace.

Orchard Prairie Variation. The entire 2.0 miles of this route variation would be located on new ROW and therefore, have the potential to cause impacts to planned land uses. A total of 1.1 miles would cross land planned for rural use with resulting low impacts; 0.9 mile would cross future semi-rural land and impacts would also be considered low.

The corresponding segment of the Proposed Route replaced by the variation would cross primarily land planned for rural and semi-rural uses, with resulting low impacts. About 0.4 mile

of moderate impact would be caused, however, where industrial use is planned and the route would be located on new ROW.

In summary, the Orchard Prairie Variation and the segment of the route replaced are approximately equal in their impacts on planned land use. The variation would have larger quantities of low impacts and the route segment would have smaller quantities of moderate impacts.

Western Route Option of the Proposed Route. The Western Route Option's impacts on future land use are identical to those discussed previously for the following segments of the Proposed Route: Boundary Dam to South of Ione, South of Ione to West of Cusick, and West of Cusick to Northeast of Chattaroy. Within two portions of the Northeast of Chattaroy to Southeast of Mead segment, however, this route option is located some distance from the Proposed Route, and therefore has different future land use impacts (see Map 2-2, Sheet 4). The Western Route Option, while paralleling existing transmission lines, would pass through approximately 3.8 miles of an area proposed in the Spokane County Comprehensive Plan for Suburban density development. This would result in low impacts. The corresponding portions of the Proposed Route, located on new ROW, would pass through an area proposed for development to the level defined as Rural. This would also result in low impacts. Thus, the Western Route Option would produce slightly fewer impacts on future land use (0.2 mile of low impacts) than the corresponding segment of the Proposed Route.

Eastern Route Option of the Proposed Route. The Eastern Route Option's impacts on future land use are identical to those discussed previously for the following segments of the Proposed Route: Boundary Dam to South of Ione, South of Ione to West of Cusick, and West of Cusick to Northeast of Chattaroy. Within portions of the Northeast of Chattaroy to Southeast of Mead segment, however, this route option produces 0.2 mile fewer low impacts than the corresponding portions of the Proposed Route.

Significant Impact Summary. Neither the Proposed Route, its variations, nor associated route options would produce significant impacts on planned land uses.

4.1.9 Visual Resources

Impacts to visual resources would be considered significant if:

- The visual contrast of the proposed transmission line on National Forest lands exceeds the established Visual Quality Objectives (VQO) for those lands. On all other lands, visual impacts would be considered significant if the visual contrast of the proposed

transmission line causes it to dominate a scenic, natural, or primarily natural landscape as seen from sensitive viewpoints (source - Forest Service VQO and EIS Team).

Table 4-5 outlines the process used to assess visual resource impacts. As this table indicates, there were three basic steps involved in the assessment of impacts. The first is an identification of the degree to which the existing landform and vegetation would be physically modified by the proposed project, and how the new structures would fit into the existing built environment. For this analysis, detailed criteria were developed to rank the levels of expected modification. For example, areas with slopes over 30 percent, without existing access or other modifications, would be rated as an area having an expected high level of physical contrast to the landform due to the degree of road building required during construction.

The second step in the process was to determine the degree to which this physical contrast would be seen by viewers at sensitive locations. Sensitive locations included all residences, highways, and recreation areas, including recreation-oriented roads and trails. Again, detailed criteria were developed to identify the level at which the physical modifications would be seen. These criteria included consideration of conditions, such as distance, duration, screening, type of viewer, backdrop, etc. A comparison of the degree of physical contrast with the level of visibility of that contrast determined the overall level of visual contrast.

The level of visual contrast was then compared against the existing landscape values to determine the level of visual impact. These existing landscape values were determined either through original inventory for this EIS (in the case of private lands) or through the existing VQO established by the Forest Service for their lands (see Section 3.1.9). Landscape values of the few BLM parcels were identified through discussions with the local BLM Area Manager.

Impacts on National Forest lands were judged to be significant, if construction or operation of the proposed transmission line exceeded the established Existing Visual Condition. If the predicted level of visual contrast would be fully at but not exceeding the level of the Existing Visual Condition, the level of impact was judged to be moderate. If the level of visual contrast was judged to be clearly below the Existing Visual Condition, impacts were judged to be low to none. As indicated in the existing visual environment discussion (see Section 3.1.9), corresponding levels of landscape quality were established for private lands, and similar criteria to those described above for Forest Service lands (utilizing dominance considerations) were used for private lands. In this case, if the visual contrast of the proposed transmission line would cause the line to dominate a scenic, natural, or primarily natural landscape (as seen from sensitive viewpoints), the impact would be significant. If the line would be seen as a dominant element in landscapes of lesser quality, it would result in a moderate level of impact. It would also result in a moderate level of impact if it were a readily evident, but subordinate, level of

Table 4-5

Visual Impact Assessment Process

Landscape Condition of: • Landform • Vegetation • Built Environment	+	Proposed Project Construction and Operation Plans	=	Type and Extent of Physical Contrast (or on-site change)
Physical Contrast	+	Visibility from Sensitive Viewpoints Consideration of: • Distance • Duration • Type of Viewer • Backdrop • Etc.	=	Expected Degree of Visual Contrast (or visible change)
Expected Degree of Visual Contrast	+	Existing Landscape Values (Based on inventory or existing agency designations, e.g., Existing Visual Conditions for Forest Service lands)	=	Visual Impact • Significant • Moderate • Low to None

change in a scenic, natural, or natural-dominated landscape. Based on discussions with the local BLM Area Manager, dominance was used as the basis to assess impacts on BLM lands as well.

Impacts of construction and operation/maintenance range from significant to low, depending upon the particular alternative and the lands it crosses. In all cases, however, the impacts of disturbance at the time of abandonment would be low to none, well offset by the removal of the towers, resulting in a net benefit or positive impact. Because this is true of all alternatives, the impacts of abandonment will not be discussed in the separate alternative discussions to follow.

In general, short-term construction impacts would result from landform and vegetation modifications (e.g., clearing, blading, grading). Long-term operation and maintenance impacts would result from continued vegetative modifications (ROW maintenance) and the presence of the structures. Landform modifications would be regraded and reclaimed following construction, and would be inconsequential thereafter. With few exceptions, and unless otherwise stated, the short-term impacts identified would occur in locations which would also have long-term impacts. In other words, there are very few places where a short-term construction impact would occur in a location that would not also result in long-term operation impacts. In order to avoid redundancy, the short and long-term impacts will therefore be discussed together in the following sections.

For ease of discussion, the visual impacts expected along the Proposed Route is addressed in the same five segments that were identified in the discussion of existing conditions (see Section 3.1.9). These segments have somewhat distinct landscape conditions and generally have similar types and levels of impacts.

Border to Boundary Dam. This is a somewhat remote, forested, mountainous landscape visible only from the Frisco-Standard Road. The majority of this area has been designated as Modification VQO by the Forest Service, but an area near the eastern end of this link has been designated as Retention VQO. Various short segments of the proposed Interconnection would be visible from the county road in the Modification VQO area. None would be visible in the Retention VQO area. Because no existing transmission lines occur in this area and visibility would be high, this segment of the Proposed Route would result in 1.9 miles of moderate long-term impact. Due to past logging in the area, only about half this distance would also result in moderate short-term impacts.

Boundary Dam to Ione. This segment of the Proposed Route parallels an existing transmission line corridor (two to four existing lines). This occurs in a forested, mountainous setting with much of it crossing National Forest lands. These lands have been designated primarily as

Modification VQO, but there are also a few small areas of Partial Retention and some Retention lands located directly south of Boundary Dam. The portion not located on National Forest land has been identified as being of moderate landscape quality. Viewpoints include Forest Service recreation roads and a county road. Because of the existing transmission lines and associated timber modifications, long-term impacts would be low, except for the segment crossing of Retention VQO lands south of Boundary Dam. This crossing would result in 1.3 miles of moderate long-term impacts.

The second area of impact would occur near Linton Mountain on private lands, as a result of landform modifications from crossing a very steep mountain side slope. This would result in 1.2 miles of moderate short-term impacts. Altogether, this segment would result in 2.5 miles of moderate visual impact.

Ione to Highway 2/Bare Mountain. This is an area primarily of forested foothills, with a few small agricultural valleys. The proposed Interconnection would parallel two existing transmission lines through this area. Because of the presence of the existing corridor, the addition and operation of the Proposed Route would result in low impacts in terms of structures and vegetative clearing. However, a few areas exist, in which slopes in excess of 30 percent would be crossed. These areas are principally near Tiger Slough, Calispell Lake, and Bare Mountain. These areas are on private lands identified as having moderate landscape quality. Viewpoints in each case include roads and a few scattered rural residences. These areas would result in 2.7 miles of moderate short-term impacts. In addition, a portion of this segment would cross approximately 4.3 miles of National Forest lands identified as Retention VQO. These lands are located between Lost Creek and Blueside and are visible from numerous residences, the Pend Oreille River, and intermittent portions of Highway 31. Along portions of this segment, a buffer of timber would be left between the existing transmission line corridor and the proposed line. This would help to screen views, but such narrow strips of timber are often subject to blow-down of larger trees. These effects would result in 4.3 miles of short and long-term moderate impacts within the National Forest. Altogether, this segment of the Proposed Route would result in 7.0 miles of moderate impact.

Highway 2/Bare Mountain to Mead. This is an area of low wooded foothills intermingled with flat agricultural valleys. The Proposed Route would parallel two existing transmission lines through most of this area. In two locations, however, the line would depart onto new ROW and subsequently return to parallel the existing lines. The first deviation is located directly south of Deer Creek near Chattaroy. Here the Proposed Route would cross the forested, relatively steep side slopes of Orchard Bluff. The transmission line would be highly visible in this elevated location from a number of scattered rural residences and portions of nearby highways. This would result in approximately 2.1 miles of moderate short-term and long-term visual impacts.

The second deviation occurs east of Mead in the Peone Prairie. This crosses a gently rolling, open area. Little if any short-term construction impacts would result; however, the towers on a new alignment would result in approximately 1.5 miles of moderate long-term visual impact as seen from residences in the area. A visual simulation of the proposed transmission line, looking northwest from Stoneman Road 1.5 miles southeast of Mead, is shown on Figure 4-1.

In each of these cases, the distances of the Proposed Route from the existing transmission corridor are relatively small (approximately 0.5 mile for the Chattaroy area and 1.25 miles for the Mead area). As a result, the proposed line would be neither near enough to the existing lines to consolidate the impacts or far enough away to reduce them. The result to many residential viewers would be a more chaotic-appearing landscape. Overall, this line segment would result in 3.6 miles of moderate long-term visual impact.

Mead to Beacon. This segment of the Proposed Route would replace and parallel existing transmission lines for all but 0.5 mile of the total distance of 5.6 miles. Visual impacts of this route would be low in terms of structures and vegetative clearing due to the presence of the existing transmission line corridors. Two exceptions to this are moderate impacts that would result where the route deviates from existing transmission lines and in several locations where slopes near and over 30 percent are crossed. The portion of new alignment occurs south of Mead where the new route segment departs from the existing east/west corridor of four transmission lines in a southwest direction for approximately 0.5 mile before returning to an existing corridor (see Map 2-3). Viewpoints in this area include numerous roads and scattered residences. This departure represents a moderate short and long-term visual impact of approximately 0.5 mile.

Steep slopes in this area include three prominent hills in the vicinity of Gerlach Road (one is located southeast of Mount St. Michael's Scholasticate), the south slope of Bigelow Gulch, and two small areas located near the toe of Beacon Hill at the southern end of the segment. In general, viewpoints for each case are scattered residences and roads. For the northern three steep slope locations, Mount St. Michael's Scholasticate would also be considered a sensitive viewpoint. In addition, general viewer sensitivity may increase in this northern area, as the Mead to Beacon segment would replace the two existing lines with significantly taller structures that would be more prominently skylined along this upper edge of Orchard Prairie to views below and on the prairie. These steep sloped areas combined would result in approximately 0.7 mile of moderate short and long-term impacts. Together with the 0.5 mile on a new alignment, this segment would result in 1.2 miles of moderate visual impact.

Total Impacts of the Proposed Route. The Proposed Route would result in a total of 16.2 miles of moderate short and long-term visual impacts. No significant visual impacts would

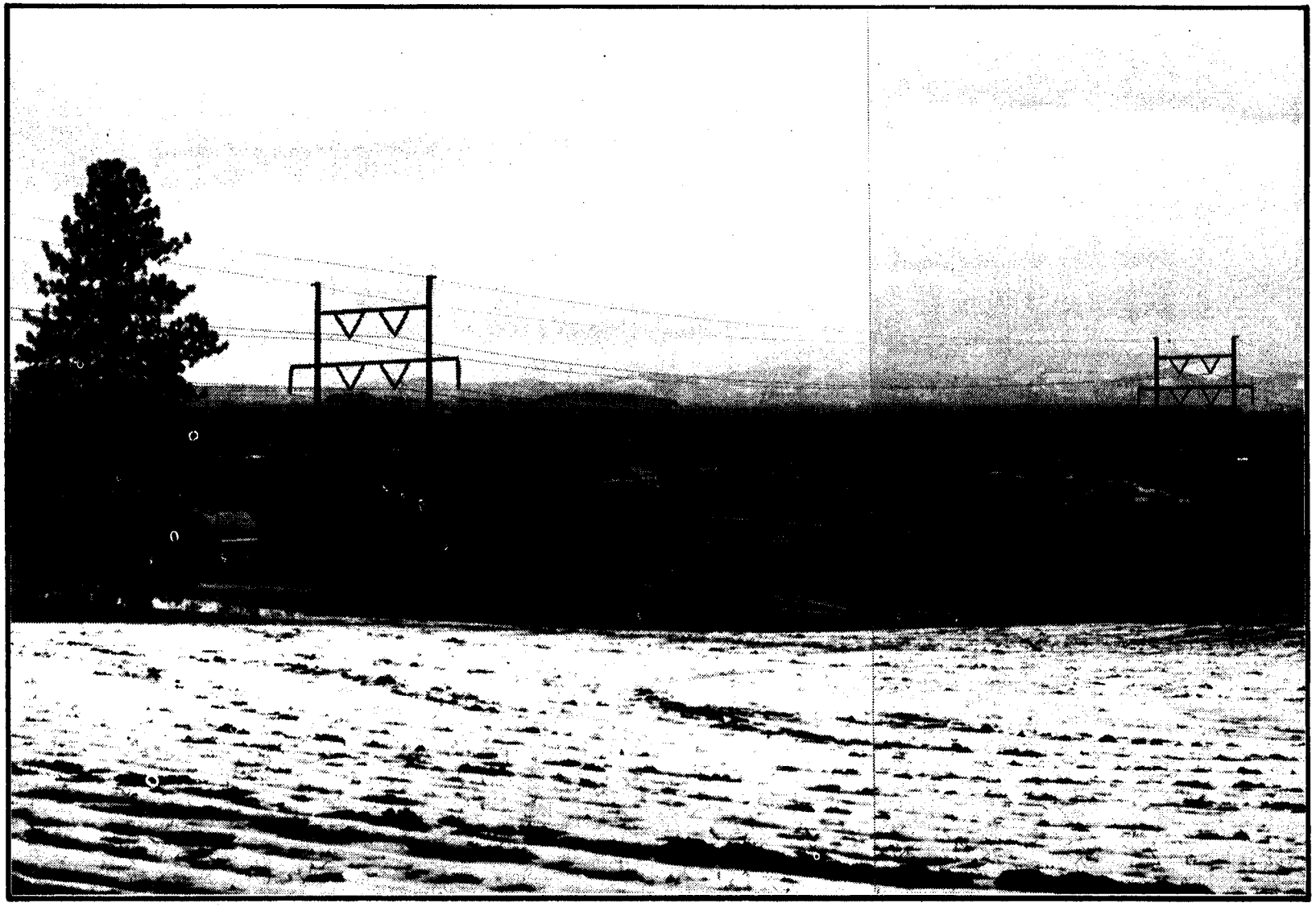


FIGURE 4-1 VISUAL SIMULATION: VIEW TO NORTH FROM STONEMAN ROAD, 1.5 MILES SOUTHEAST OF MEAD

be associated with this route, due largely to the influence of the large number of existing, parallel transmission lines.

Boundary Dam Variation. This variation would generally parallel existing transmission lines across the Pend Oreille River directly north of Boundary Dam. Approximately half this area is managed by the Forest Service and has been designated as Retention VQO. This area is adjacent to Boundary Dam. The remainder has been identified as having moderate to high landscape quality. Visibility to this portion of the line is from a county road. Visual contrasts would be low overall, due to the presence of existing lines, but would result in 0.3 mile of moderate short and long-term impacts, as a result of crossing the Forest Service Retention VQO area. By comparison, the segment of the Proposed Route replaced would result in 1.9 miles of moderate long-term impact.

Orchard Prairie Variation. The Orchard Prairie Variation departs from the Proposed Route and continues south over the prairie for 2.0 miles before joining the Proposed Route directly north of Bigelow Gulch. This variation would require construction of a new transmission line where none currently exists. Within this area of moderate landscape quality, the new alignment would result in 2.0 miles of moderate impact. By comparison, the portion of the Proposed Route replaced would result in only 1.0 mile of moderate visual impacts (of which approximately 0.5 mile would be located on new ROW).

The Orchard Prairie Variation would result in a reduction of 1.5 miles of transmission line to be constructed in comparison to the portion of the Proposed Route segment replaced by this variation. However, this variation would add 2.0 miles of new visual disturbance in an area where no existing transmission lines currently occur. This new corridor, combined with the numerous existing corridors in the general area, would further increase discord to residents and other viewers in the area.

Western Route Option of the Proposed Route. The Western Route Option is common with the Proposed Route from Boundary Dam to a point approximately 3 miles north of the crossing where the Proposed Route crosses to the east side of the existing transmission lines. Visual impacts, however, are identical down to near Chattaroy. While the Proposed Route would deviate from the existing transmission line corridor near Chattaroy and again near Mead, the Western Route Option would parallel the existing lines entirely through this area. Due to the presence of the existing transmission lines, some existing vegetative modifications, and lack of steep slopes, the Western Route Option would result in low to none impacts in this area. The Western Route Option would have 3.6 miles less of moderate long and short-term impacts than the segment of the Proposed Route.

Eastern Route Option of the Proposed Route. The Eastern Route Option would be close to the Proposed Route, in terms of the location and level of impacts between the International border to near Chattaroy. In this portion of the route, the level of impacts would differ in three areas. These consist of locations where the Proposed Route would be located on steep hillsides, resulting in moderate short-term (landform) impacts. However, the Eastern Route Option traverses more gentle terrain, eliminating impacts in these areas. The general locations of these three areas are near Linton Mountain, Tiger Slough, and South Fork Creek. From near Chattaroy to Mead, the Eastern Route Option would parallel the existing transmission corridor, while the Proposed Route would be located on new ROW in two locations. As a result of the existing transmission lines, some vegetative clearing, and the relatively gentle lands crossed, the Eastern Route Option would result in only low impacts in this area. The Eastern Route Option would result in 5.9 miles less of moderate long and short-term visual impacts than the segment of the Proposed Route.

Significant Impact Summary. The Proposed Route, the Boundary Dam and Orchard Prairie Variations, and the Eastern and Western Route Options would not result in the generation of significant visual impacts. This is because of the large number of existing transmission lines paralleled by the proposed project and the relatively low landscape quality and VQO designations in other areas.

4.1.10 Cultural Resources

Significance Criteria. Impacts to cultural resources would be considered significant if:

- Construction activities cause an adverse, non-mitigable effect to a historic or prehistoric site eligible for or listed in the National Register of Historic Places (NRHP) (source - 36 CFR 60 and Protection of Historic Properties; 36 CFR 800).

- Construction activities disturb sites of cultural or religious significance to contemporary Native Americans (source - American Indian Religious Freedom Act).

- Accelerated erosion or increased public access result in indirect or secondary impacts to National Register-eligible sites (source - EIS Team).

- Construction of high-profile facilities such as transmission line towers create visual impacts to sites listed in or eligible for the National Register, particularly historic sites whose original settings are seriously compromised (source - EIS Team).

Construction. Potential impacts to cultural resources may be caused by construction of the transmission line, particularly from access road disturbances. Most potential impacts would be direct (e.g., the result of construction activities), with some possible indirect impacts (e.g., vandalism to historic sites). Most potential impacts would be avoidable (Hudson et al. 1988).

The cultural resources survey of the transmission line proposed and alternative routes did not identify resources that would alter the location of the routes under consideration. Where appropriate, field surveys would be conducted prior to construction in any areas known to have cultural significance (WWP 1988). The purpose of these surveys would be to explore any potential sites or problem areas that may occur in the ROW and to investigate any additional, as yet unidentified, cultural resources that may be present. All applicable state and federal procedural requirements and permit restrictions would be complied with.

Operation and Maintenance. Indirect impacts to significant cultural resources could occur during the projected operating life of the project. Such impacts would tend to occur outside of the construction ROW. The principal threats to cultural resources are created by improved access to all sections of the line and the increased exposure of sites to both transmission line company personnel and the general public. Impact under these circumstances may be subtle and very slow to occur, as in repeated surface collecting of artifacts by non-professionals. Nonetheless, these impacts may have the long-term effect of irreversibly compromising a site's physical integrity, and thereby diminishing cultural and historic values.

Abandonment. Abandonment activities are similar to those associated with construction, in the sense that they involve surface and subsurface disturbance (e.g., dismantling and removal of equipment, surface regrading, revegetation). However, all activities should take place in areas previously disturbed during transmission line construction, and it is unlikely that previously undisturbed cultural sites would be subjected to significant direct impacts.

Significant Impact Summary. The Proposed Route would have no significant impacts on cultural resources because most potential impacts would be avoidable (Hudson et al. 1988) through judicious route selection, compliance with all applicable state and federal procedural requirements and permit restrictions, and completion of field surveys prior to construction, where appropriate (see Section 4.9).

4.1.11 Socioeconomics and Community Resources

Significance Criteria. Impacts to socioeconomics and community resources would be considered significant if:

- Project-related population increases result in housing or public service demands which could not be met by existing or currently planned facilities (source - EIS Team).

- Rental and temporary housing is inadequate, causing construction workers to commute further than 150 miles per day (source - EIS Team).

- Long-term employment increases more than 5 percent for any county (source - EIS Team).

- Changes in the tax base for any county or city is greater than 5 percent (source - EIS Team).

4.1.11.1 Construction

Population. Study area population changes due to construction of the proposed Interconnection are expected to be minimal, of short duration, and not significant. Construction would require approximately 2.5 years to complete. The peak work force would be 100 personnel, but could be less depending on the scheduling of activities. Most of the workforce are expected to be residents of the Spokane metropolitan area or nearby communities, along with a limited number of out-of-region workers. An insignificant amount of secondary population growth is expected because of the low number of out-of-region workers.

Economic Base. Approximately 100 skilled and semi-skilled workers would construct the 230-kV transmission line over a period of 2.5 years. Workers would be hired from both in and out of the state depending upon who is selected as the contractor (Carter 1988). Approximately 20 crews of 5 workers each would proceed through each construction phase of the 102.2-mile line. Each crew at a particular structure site would be followed by the next phase crew. This construction method would result in spreading construction activities over the length of the line, thus avoiding high concentrations of activity in any one area.

The 100-person workforce would have a minimal impact on employment within the study area. Assuming all 100 employees were hired from within Pend Oreille County, the increase in total employment in the county would be less than 5 percent. If all 100 workers were hired from within the four-county study area, the overall impact on employment would be less than 1 percent. In addition, due to the short duration of the construction phase, the long-term impact on employment and income would be minimal.

Housing. The housing supply in the study area of the proposed Interconnection currently has a moderate supply of temporary housing and recreational vehicle camping sites. More

permanent rental housing throughout the study area is fairly limited, especially in Pend Oreille County, where construction activity on the Ponderay Newsprint plant has occupied most available rental housing. Approximately 75 percent of non-local transmission line workers typically bring their personal trailers or mobile homes (Carter 1988). The remaining 25 percent non-local workers occupy motels or rent apartments in the area. Assuming 75 percent of the workforce would be non-local, 58 out of 75 employees would bring housing accommodations to the job, resulting in only 19 employees requiring temporary housing. It is likely that as the crews move along the line they would stay in motel accommodations or camping sites in close proximity to the section of line on which they are working. In Pend Oreille County, approximately 84 rooms are available, according to the Economic Development Council. Ione has an estimated 29 rooms and Newport 32 rooms. In addition, the Colville National Forest has a number of campgrounds and camping sites available throughout the forest area. These are described further in Section 3.1.11.3.

The immediate area surrounding the northern section of the proposed Interconnection may not have adequate temporary housing to provide for the entire workforce. This lack of temporary housing could require longer commutes to Colville and Newport. However, the daily commute would not likely exceed 150 miles; therefore, it would not be considered a significant impact.

Fiscal Conditions. The fiscal impacts related to the proposed Interconnection during the construction of the transmission line would correspond to local spending by the construction workforce. Total project construction costs for the facilities including labor and materials is estimated at $84.7 million. Construction and ROW cost per mile is estimated at $814,700 (see Table 2-6). Impacts to the local communities within the transmission line area can be described as income producing. The income effects of the workforce would likely be more evident than possible impacts on public services. Income would be generated in basically three areas: income generated by the contractor for materials purchased in the local economy such as fuel, parts, and repair services; income generated by the construction workforce and WWP staff in the form of lodging, food, retail sales, and gasoline; and wages paid to the construction workforce and WWP staff.

Property Values. During the scoping process for the proposed Interconnection, local residents expressed concern about the impact of transmission lines on land values and saleability of property near the line. In order to address this issue, a review of the literature addressing these concerns was undertaken. Unfortunately, recent studies dealing with electric transmission line effects on land values are scarce. The primary sources of information came from literature reviews, which included: 1) a review completed for BPA by Mountain West Research, Inc. in 1982 entitled, "Electric Transmission Line Effects on Land Values: A Critical Review of the Literature"; 2) seven statistical empirical studies completed between 1976 and 1989 completed

by The Real Estate Counseling Group of Connecticut for a conference held in Portland, Oregon, October 1989 entitled, "Transmission Lines and Residential Neighborhoods: Issues in Siting and Environmental Planning"; and 3) a study completed in September 1989 by Kinnard, Mitchell, and Webb, "The Impact of High Voltage Overhead Transmission Lines on the Value of Undeveloped Land."

The first review analyzed 27 key studies conducted between 1959 and 1981. Twelve of the studies concluded that transmission lines had no effect or no significant effect on land values; ten studies were deemed inconclusive or contradictory; and five studies concluded that transmission lines did have adverse effects on land values.

The second literature review showed mixed results among the studies. Four of the studies concluded that transmission lines and towers had negligible effects on residential property, farmland, and undeveloped land prices (Brown 1976; Kinnard et al. 1984; Kinnard and Mitchell 1988; Kinnard et al. 1989a). However, Boyer et al. (1978) suggested that properties adjacent to or crossed by a transmission line maintained average prices that were 16 to 29 percent lower than those of similar sized parcels located further from the ROW or transmission structures. Another study suggested that selling prices for undeveloped residential land along a transmission ROW were up to 10 percent lower than those associated with properties not located along a corridor (Kinnard et al. 1988). Colwell (1989) concluded that the selling prices of developed residential properties were higher as the distance from the transmission corridor increased. The final study reviewed (Kinnard et al. 1989b) concluded that the market value of undeveloped land in two rural towns in Orange County, New York, was not perceptibly impacted by overhead transmission lines.

The methodologies, sample size, and level of detail incorporated in all of the studies reviewed were so variable that the research limited comparability, leaving many of the key relationships in question and the exact nature of transmission lines effects on land values unclear.

The review pointed out that assessment and prediction of effects on land value requires explicit statement and understanding of factors actually causing the effects. These factors relate to restrictions on land use and control, effects on the productivity of land, perceived health and safety effects, distance from the line, and visual effects. It is, therefore, concluded that the effects of electric transmission lines on land values can vary dramatically, depending on the relationship of the land and the transmission line to these factors. Consequently, each property should be evaluated and considered individually.

Recently, concerns about health and safety have created a perception of risk associated with electric and magnetic fields from electric transmission lines. These health concerns are covered

in Section 4.6.5. Despite the scientific conclusions regarding these risks, there remains a skepticism associated with transmission line proximity, which may contribute to a reduction in property values.

Conversations with land appraisers suggest that impacts on property values may be dependent on market conditions (Moore 1988). In a weak market the impact may be greater because buyers can be more selective; whereas, in a strong market there may be no diminution of value based on sales statistics because the demand is greater.

The Spokane County Assessor suggests that assessed land values may be adjusted down if land use is affected; if not, no devaluation generally occurs. No assessment devaluation from transmission line proximity to residential property has been observed by this office within Spokane County (Briton 1988).

In conclusion, property values may or may not be negatively affected depending upon the factors described above.

4.1.11.2 Operation and Maintenance

Population. No permanent workforce would be established as a result of the proposed Interconnection; consequently, there would be no population changes during project operation and maintenance.

Economic Base. Operation and maintenance of the proposed Interconnection would be conducted by WWP. Additions to its staff are not anticipated. Effects on regional employment and income are expected to be minimal during the operation and maintenance phase.

Expansion of the tax base would probably have the greatest impact to the local economy. These tax estimates are found in the fiscal conditions section of this analysis. The proceeds derived from the taxing of transmission lines shall be allocated to each county in which the transmission lines are located. Distribution of revenues is in accordance with the percentage of line lengths within each county.

Some agricultural and timber lands would be removed from production. No effects on dairies, dairy cows, or milk production are anticipated as discussed in Section 4.6.3.4. There may be potential effects on honey bees and production, but these impacts can be mitigated (see Section 4.6.3.4). The estimates of timber production removed are shown in the fiscal conditions section. Neither recreation nor tourist activities would be affected by transmission line construction or operation.

Housing. The proposed Interconnection, its variations, and associated route options would have no impact on housing during the operations and maintenance phase of the project.

Fiscal Conditions. The fiscal impacts related to the proposed Interconnection would primarily correspond to the expansion of the tax base derived from the miles of transmission line constructed in each county and the upgrading of WWP's existing Beacon Substation in Spokane County. Table 4-6 shows the estimated capital cost of the line for each county, number of miles of line, and estimated property tax revenues based on an average of $13.50 per $1,000 assessed valuation. The tax revenues are estimated for only the first year of operation, due to the difficulty associated with the State of Washington appraisal process. The tax projections are estimates and may not reflect actual property tax revenues collected, due to variations in the appraisal process in each county.

The value of agricultural lands removed from production would be minimal as compared to tax receipts generated by the transmission line. Total acreage removed from production would total only 4.2 acres (see Section 4.1.8).

Timber production would be impacted to a greater extent than agriculture. Based on the assumption that there would be 8,900 board feet of timber per acre, timber value per acre would be $340. Total impacts for the Proposed Route would be $352,000. Table 4-7 shows potential timber values in the transmission line ROW for the Proposed Route, the four alternatives, the five variations, and two route options. A private landowner would receive a one-time compensation for timber removal on his property at the current market rates, in addition to the easement compensation agreed upon with WWP. An established timber business would have two options for compensation. Either WWP would purchase the property directly from the business for the land's fair market value (see Section 2.3.4) or the landowner would retain title to the land, but the easement amount would equal that of the value of the land (i.e., the fair market value).

Property Values. Refer to the construction phase of the proposed Interconnection for the discussion on property values (see Section 4.1.11.1).

4.1.11.3 Abandonment

Study area population changes due to abandonment of the proposed Interconnection are expected to be similar to the construction-related impacts. Abandonment impacts are expected to be minimal, of short duration, and not significant.

Abandonment of the proposed Interconnection and its variations would decrease the tax bases of those counties through which it passes. At the time of line abandonment, tax receipts in each

Table 4-6

Property Tax Estimates by County for First Year of Operation (Thousands of Dollars)

	Pend Oreille	Stevens	Spokane	Lincoln
Proposed Route				
Miles per county	71.9	1.9	28.4	
Line capital cost[1]	$58,577	$1,548	$23,137	
Beacon Substation capital cost			$1,472	
Estimated property tax[2]	$712	$19	$299	
Percent increase in property tax receipts	10.4%	0.2%	0.2%	
Eastern Alternative				
Miles per county	71.9	1.9	54.1	
Line capital cost[1]	$58,577	$1,548	$44,075	
Marshall Substation capital cost			$2,367	
Estimated property tax[2]	$712	$19	$564	
Percent increase in property tax receipts	10.4%	0.2%	0.3%	
Western Alternative				
Miles per county		93.4	25.7	2.0
Line capital cost[1]		$76,093	$20,938	$1,629
Marshall Substation capital cost			$2,367	
Estimated property tax[2]		$925	$283	$20
Percent increase in property tax receipts		8.2%	0.2%	0.3%
Northern Crossover Alternative				
Miles per county	29.0	70.2	25.7	2.0
Line capital cost[1]	$23,626	$57,192	$20,938	$1,629
Marshall Substation capital cost			$2,367	
Estimated property tax[2]	$287	$695	$283	$20
Percent increase in property tax receipts	4.2%	6.2%	0.2%	0.3%

Table 4-6 (Continued)

	Pend Oreille	Stevens	Spokane	Lincoln
Southern Crossover Alternative				
Miles per county	57.3	57.7	25.7	2.0
Line capital cost[1]	$46,682	$47,008	$20,938	$1,629
Marshall Substation capital cost			$2,367	
Estimated property tax[2]	$567	$571	$283	$20
Percent increase in property tax receipts	8.3%	5.1%	0.2%	0.3%
Boundary Dam Variation Compared to Segment of Proposed Route Replaced				
Miles per county	<2.2>[3]	<1.9>		
Line capital cost[1]	<$1,792>	<$1,548>		
Estimated property tax[2]	<$22>	<$19>		
Orchard Prairie Variation Compared to Segment of Proposed Route Replaced				
Miles per county			<1.5>	
Line capital cost[1]			<$1,222>	
Estimated property tax[2]			<$15>	
Chatteroy Variation Compared to Segment of Eastern Alternative Replaced				
Miles per county			<1.4>	
Line capital cost[1]			<$1,141>	
Estimated property tax[2]			<$14>	
Marshall Variation Compared to Segment of Eastern Alternative Replaced				
Miles per county			2.8	
Line capital cost[1]			$2,281	
Estimated property tax[2]			$28	
Onion Creek Variation Compared to Segment of Western Alternative Replaced				
Miles per county		1.1		
Line capital cost[1]		$896		
Estimated property tax[2]		$11		

[1]Line capital costs are estimated using $814,700 per mile of transmission line, which includes Allowance for Funds Used During Construction.
[2]Property taxes are estimated using an equalization ratio of 90 percent on capital costs times $13.50 per $1,000 assessed valuation.
[3]"< >" represents a decrease when compared to segment replaced.

Table 4-7

Potential Timber Production in Transmission Line ROW
(Thousands of Dollars)

	Acres of Timber	Timber Value $340/ac[1]
Proposed Route	1,035	$352
Eastern Alternative	1,352	460
Western Alternative	1,310	445
Northern Crossover Alternative	1,477	502
Southern Crossover Alternative	1,753	596
Boundary Dam Variation	11	4
Segment of Proposed Route Replaced	76	26
Orchard Prairie Variation	6	2
Segment of Proposed Route Replaced	0	0
Eastern Route Option	952	324
Segment of Proposed Route Replaced	946	322
Western Route Option	945	321
Segment of Proposed Route Replaced	946	322
Chattaroy Variation	141	48
Segment of Eastern Alternative Replaced	129	44
Marshall Variation	87	30
Segment of Eastern Alternative Replaced	30	10
Onion Creek Variation	224	76
Segment of Western Alternative Replaced	167	57

[1]Colville National Forest estimates based on 8,900 board feet/acre tractor ground timber value $340/acre for second growth stands.

county would be reduced from the line's in-service date due to depreciation. Counties that would be affected include Pend Oreille, Stevens, and Spokane. Some agricultural and timber lands may be returned to production. The proposed Interconnection and its variations would have no impact on housing during abandonment of the project.

If actual removal of the conductors, wires, cables, and structures occurred at abandonment, values of affected properties would possibly increase, depending upon the type of property and its location.

4.1.11.4 Significant Impact Summary

The Proposed Route and its variations would have no significant impacts on population, economic base, or housing throughout the project life. The fiscal conditions of Pend Oreille County would be significantly benefitted by increases to the tax base and subsequent property tax receipts throughout the life of the project.

The impacts on property values can only be determined from a parcel-by-parcel analysis. Depending on the variables discussed in Section 4.1.11.1, impacts to property values from the proposed Interconnection may range from significant to negligible. The impacts associated with timber production are assumed to be not significant due to compensation for timber harvested in ROW acquisition.

4.1.12 Transportation and Noise

Significance Criteria. Impacts to transportation and noise would be considered significant if:

- Construction of the line results in traffic delays greater than 15 minutes for surface transportation routes (source - EIS Team).

- The transmission line conflicts with the operation of any airport or landing strip (sources - Federal Aviation Administration (FAA) regulations and existing state and local zoning ordinances).

- Estimated, long-term, audible noise emissions would exceed 50 dBA at the edge of the transmission line ROW (source - EIS Team).

Construction. Significant impacts on transportation are not expected as a consequence of the construction of the proposed Interconnection. Surface transportation on certain routes could

potentially be delayed, for short periods of time (less than 15 minutes), where construction-related activities might interfere with local traffic. This should be mitigable through judicious choice of routes and prior consultation with highway officials.

A small, county landing strip occurs south of Cusick where the Proposed Route crosses from the west to the east side of the existing BPA ROWs. The edge of the landing strip is located about 5,000 feet from the corridor and about 3,200 feet from the edge of the flight clearance zone that is defined from the end of the a minor airstrip, the project would intrude slightly into this zone (see Section 4.1.8.1 for Existing Land Use). However, two transmission lines are currently located along this area that the proposed project would parallel. The proposed Interconnection line would intrude approximately 25 feet into the edge of the flight clearance zone of this airstrip, over the other two transmission corridors. Given the distance of the project ROW from the county airstrip, a moderate impact level is assumed.

The operation of typical construction equipment would cause localized, temporary noise levels that could be annoying to individuals, depending upon distance, weather, topography, individual sensitivities, and other factors. Noise levels at a distance of 50 feet range from 70 to 90 decibels A-weighted (dBA) for various types of internal combustion powered equipment, and up to 106 dBA for impact tools and equipment (BLM 1983). Impact equipment is typically used very infrequently and for short periods of time during construction, primarily in the establishment of tower foundations. Contribution to hearing impairment begins at 70 dBA, a noise level that is equivalent to freeway traffic at 50 feet, while sustained noise levels of 90 dBA can cause hearing damage (BLM 1983).

Intermittent construction noise above 90 dBA (equivalent to the noise of a heavy truck 50 feet away) can be expected on an infrequent basis near the few residential and commercial areas along the ROW. Noise levels inside residences near the construction area would be much lower, as outside walls of houses would typically reduce high-frequency noise levels by 20 to 25 dBA (BLM 1983). Overall, construction noise would be intermittent and of short duration on a daily basis, while construction equipment would probably remain in a given location for only a short time. Noise from construction activities may also be audible as background noise at distances of 1 mile or more from the ROW. Blasting could occur but is not anticipated as a normal transmission line construction activity.

Operation and Maintenance. Significant impacts on transportation are not expected as a result of the operation and maintenance of the proposed Interconnection.

Transmission lines may create some long-term noise effects through operation and maintenance. Use of helicopters for patrolling the transmission line might cause some intermittent, short-term noise for nearby residents, but this would occur infrequently and is not considered significant.

Audible noise is noise that can be perceived by the human ear. Audible noise from a 230-kV transmission line generally has 2 components, a hum at a frequency of 120 cycles per second (120 Hz) and a random crackling or hissing sound. The sound level near the transmission line depends on the electric field strength at the conductor surface, the size and number of conductors, and the weather (Bonneville Power Authority [BPA] 1977). The magnitude of transmission line audible noise is closely associated with weather conditions. During fair weather, audible noise levels are normally very low and are rarely of concern. Audible noise increases during and after rain, due to water droplets on the conductor. During the rain, much of the transmission line audible noise is masked by the rain storm itself.

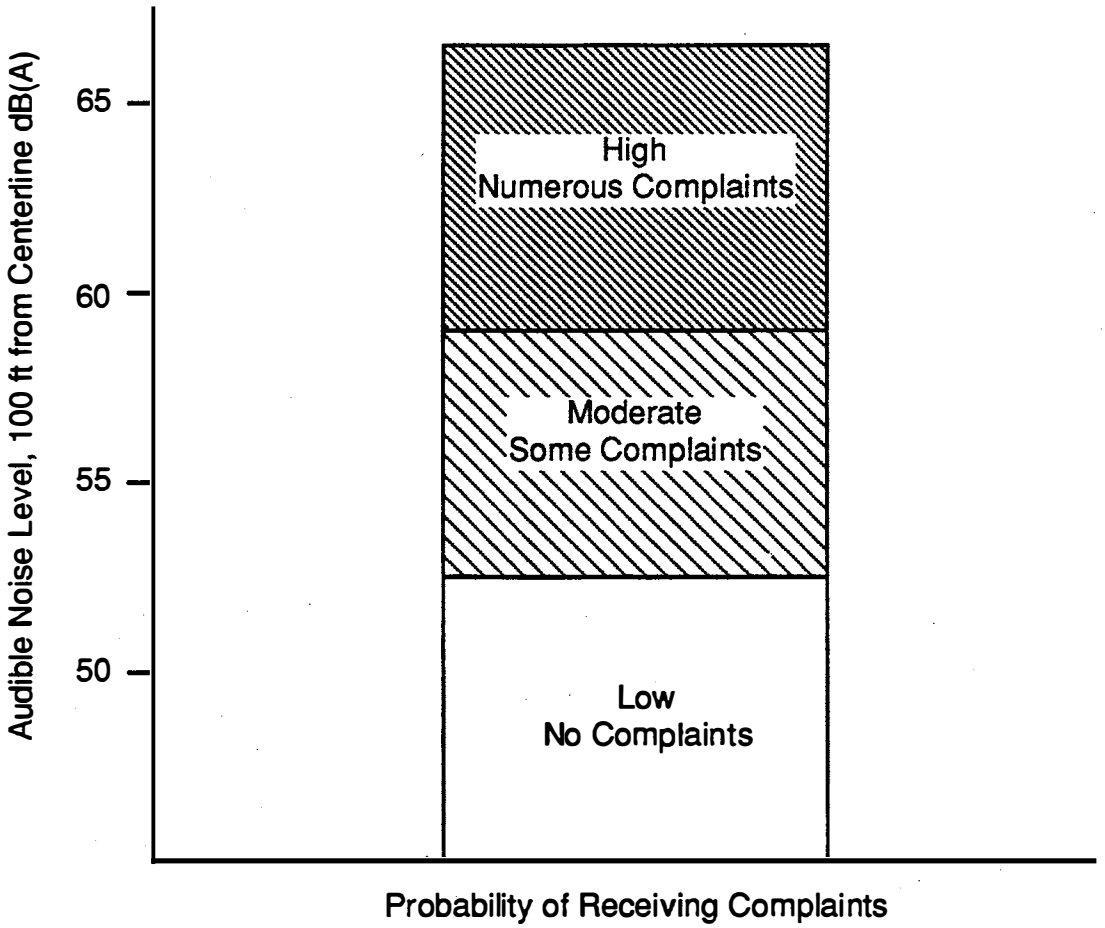
Audible noise levels of the proposed Interconnection (at the edge of the ROW) are not expected to exceed 36 dBA during rainy periods (see Section 4.6.2.2). Based on a general guideline for categorizing transmission line audible noise annoyance (see Figure 4-2), the proposed project should cause little or no audible noise annoyance (Perry 1972).

Abandonment. Transportation impacts as a result of abandonment of the proposed Interconnection are expected to be similar to the construction-related impacts. Impacts are not expected to be significant.

Noise impacts as a result of abandonment of the proposed Interconnection are expected to be similar to construction-related impacts. Impacts are expected to be of short duration and not significant.

Significant Impact Summary. The Proposed Route would have no significant impacts on transportation because traffic would be delayed for only short periods of time during construction (less than 15 minutes). In addition, the slight intrusion into the edge of the flight zone for the county landing strip would be considered as moderate impact, given the distance of the project ROW from the county airstrip and the presence of the two existing transmission lines that the Proposed Route would parallel.

The Proposed Route would have no significant noise impacts because construction-related noise would only be for a short period of time in a given location; and long-term, audible noise levels during transmission line operation are not expected to exceed 36 dBA at the edge of the ROW.



Source: Perry 1972

Figure 4-2 Probability of Complaints Relative to Audible Noise

4.2 Eastern Alternative

4.2.1 Air Quality

Potential air quality impacts for the Eastern Alternative would be the same as described for the Proposed Route (see Section 4.1.1). The Eastern Alternative would have no significant impacts on air quality resources.

4.2.2 Geology and Soils

4.2.2.1 Geology

Construction. The Eastern Alternative crosses a variety of geologic formations from the northern upland areas to the broad river valleys. The underlying materials along the route should provide an adequate foundation for tower structures. Potential impacts to topographical features along the Eastern Alternative would be minimal. Surficial and underlying substrates would be disturbed during construction activities for tower placement and access road construction. Steep grades and other areas subject to erosion would be stabilized according to WWP's ROW restoration procedures (see Table 2-5).

A sand/gravel extraction area located south of Mead (see Map 2-2, Sheet 4) would be crossed by the Eastern Alternative for a total distance of 700 feet. The potential disruption to this operation is anticipated to be a moderate impact. No significant impacts to geological features would occur during transmission line construction.

The generally level topography of the planned Marshall Substation site would require only moderate grading to prepare the substation foundation, in the event this site were developed. Drainage to the ravine on the east side of the property may be altered slightly by drainage and erosion control features surrounding the facility foundations. Any alteration in either the drainage or recharge area would not be significant.

Operation and Maintenance. Potential impacts from project operation of the Eastern Alternative would be the same as described for the Proposed Route (see Section 4.1.2). No significant impacts to the transmission line would be expected from potential geologic hazards; seismic and landslide potential along the Eastern Alternative appears to be minimal. Operation of the proposed Interconnection has the potential to impact future mineral development along the transmission ROW. However, locating the proposed line along existing transmission line corridors reduces the potential to preclude mineral development, since the existing transmission

ROWs have defined land use in these areas. The Eastern Alternative would have no significant impacts on geologic or mineral resources.

The gravelly soils of the planned Marshall Substation site are valuable sand and gravel sources. Approximately 12 acres of a potential gravel surface mine area would be removed from production for the life of the project, in the event this site were developed. However, the loss of this mining potential is not significant, due to the remaining mining opportunities within the area and the inactive status of the sand and gravel operation located onsite.

Abandonment. No impacts would occur to geological resources following project abandonment. Appropriate reclamation procedures would be implemented and measures enforced to prevent increased erosion within the disturbed areas.

Significant Impact Summary. The Eastern Alternative and the associated Boundary Dam, Chattaroy, and Marshall Variations would have no significant impacts on geologic resources crossed by these project routes or at the planned Marshall Substation site because of reclamation procedures followed by WWP (see Section 2.3). In addition, seismic hazards and the potential for mineral development within the project ROW appear to be minimal for the Eastern Alternative. Crossing one active sand/gravel extraction area would be of moderate impact.

4.2.2.2 Soils

Construction. Potential impacts to soils along a majority of the Eastern Alternative would be the same as those described for the Proposed Route. Construction procedures developed to minimize erosional hazards are also the same as those discussed in Section 4.1.2.2 and in Table 2-5.

Approximately 17.2 miles of prime farmland soils would be crossed by the Eastern Alternative. These 261 acres are scattered throughout the length of this alternative route, including 2 to 3 miles located near the boundary between Pend Oreille and Spokane Counties, 3 to 5 miles crossed in Valley Prairie, and 2 to 3 miles located in the Four Mound Prairie area. Where possible, prime farmland soils would be spanned and not disturbed. Reclamation procedures, noxious weed control, and avoidance of agricultural areas are the same as described for the Proposed Route in Section 4.1.2.2.

Erosion and prime farmland concerns for the Boundary Dam, Chattaroy, and Marshall Variations parallel those discussed in Section 4.1.2.2 for the Proposed Route. Erosion hazards are typically equal for these areas. The Chattaroy Variation and Marshall Variation cross approximately

0.7 mile and 0.9 mile less of prime farmland, respectively, than the segments of the Eastern Alternative replaced by these route variations. No impacts to soils would be anticipated from the potential development of the planned Marshall Substation.

Operation and Maintenance. Following the ROW reclamation and revegetation procedures outlined in Table 2-5, typical transmission line operations would not result in significant impacts to soil types along the Eastern Alternative or at the planned Marshall Substation site. Transmission line maintenance would include periodic ground travel along the line. Whenever possible, line maintenance would be conducted when minimum surface disturbance would occur (i.e., avoid wet periods). Therefore, no significant impacts are expected to occur as a result of these operation and maintenance activities.

Abandonment. The termination of the proposed Interconnection would result in transmission structure removal. Impacts would parallel those described during construction activities. WWP would use the appropriate measures to remove structures and implement site reclamation to ensure resource protection (see Table 2-5). No significant impacts to soil resources would occur from project abandonment.

Significant Impact Summary. The Eastern Alternative and the associated Boundary Dam, Chattaroy, and Marshall Variations would have no significant impacts on soil resources crossed by these project routes. Soil erosion losses or declines in crop productivity on prime farmland areas from soil compaction would be considered short-term construction impacts. Therefore, significant impacts would not occur as a result of transmission line operation, maintenance, or abandonment activities.

4.2.3 Surface Water

Construction. Potential impacts to water resources along a majority of the Eastern Alternative would be the same as those described for the Proposed Route (see Section 4.1.3). No significant impacts to surface water resources are expected within the project area from implementation of the Eastern Alternative. The majority of the water resources and sensitive riparian areas crossed would be spanned by the proposed transmission line. Both line and access road construction activities conducted near stream crossings would potentially result in an increase in siltation of the water resources. However, in areas directly crossed by the line, the environmental protection procedures outlined in Table 2-5 and agreed upon by WWP would minimize potential impacts. Procedures to reduce the likelihood of accidental spills of materials into natural watercourses are also discussed in Table 2-5; therefore, no impacts from these sources are anticipated.

The Eastern Alternative would cross four streams that are designated under county Shoreline Master Plans. The crossing of designated streams by an electric transmission line is permitted under these master plans. Impacts to designated streams would be minimized by selective clearing of vegetation at the crossing site and by restoring of disturbed areas following construction (see Table 2-5). Therefore, the proposed transmission line would be consistent with established Shoreline Master Plans and would not have significant impacts on the streams and environmental values these plans are designed to protect.

Table 3-4 presents the water resources crossed by the Boundary Dam, Chattaroy, and Marshall Variations and the segments of the Eastern Alternative replaced by these variations. These proposed crossings would be consistent with established management plans, and construction activities would be regulated under the protection procedures presented in Table 2-5. Therefore, no significant impacts are anticipated from project construction along these proposed variations.

No permanent surface water resources exist on the planned Marshall Substation property. The small ravine located along the eastern edge of the property apparently provides overflow drainage for untreated or partially treated domestic sewage originating from sewage ponds to the north of the property. In the event that the planned Marshall Substation would be constructed, no impacts to the area hydrology would not be anticipated, due to the abundance of porous, gravel soils for recharge in the area.

Operation and Maintenance. No impacts to surface water resources would occur during project operation. Line maintenance activities may require periodic ground inspections, resulting in potential impacts to streams when reopening access roads, crossing drainages, or removing vegetation. These impacts would not be significant, however, because WWP would implement the environmental protection measures presented in Section 2.3, Table 2-5 of this EIS.

The operation of the planned Marshall Substation would cause no impacts on the area surface water resources. The majority of the facility construction site would be finished with gravel surfaces allowing rapid surface drainage to subsurface porous native soils. All runoff from the substation would be controlled and channeled away from the ravine and toward the highway drainage located along the western boundary of the property.

Abandonment. Abandonment of the proposed line would entail removal of the supporting structures and reclamation of disturbed areas. Potential impacts to surface water would result from these activities, as discussed for proposed line construction. As stated above, impacts would not be significant to these resources due to WWP's environmental protection procedures outlined in Table 2-5.

Significant Impact Summary. The Eastern Alternative and the Boundary Dam, Chattaroy, and Marshall Variations would be consistent with the established county and city Shoreline Master Plans; therefore, these routes would not significantly impact the resources protected under these plans. Increased sedimentation of streams crossed by the proposed transmission line or access roads would be minimized by the procedures implemented by WWP to protect sensitive resources (see Table 2-5). Any stream siltation caused by the proposed project would be considered a short-term impact; therefore, implementation of the Eastern Alternative or these variations would not significantly impact surface water resources crossed by these project routes.

4.2.4 Floodplains and Wetlands

Construction. No impacts to floodplains would be anticipated during the construction phase of the proposed project, since surface disturbance would be restricted to the access road and tower sites, earth moving would be minimal, and excess soil from the tower foundations would not be disposed of within the floodplain area.

The Eastern Alternative crosses the eight predominant wetland areas discussed in Section 3.2.4; six of these are in common with the Proposed Route. The following summary depicts the amount of wetland types affected by the Eastern Alternative, based on a 125-foot-wide ROW:

Miles of Palustrine Wetlands Crossed and (Acres) Affected

Emergent	Scrub-Shrub	Aquatic Bed	Forested
2.4 (36.4)	1.43 (21.7)	0.04 (0.6)	0.62 (9.4)

As stated in Table 2-5 in Section 2.3 of this EIS for project construction, WPP would not located transmission line structures or associated access roads within a wetland/riparian area, as required by the appropriate state and federal agencies. In the event wetland/riparian areas were crossed, special construction techniques would span wetland areas, when possible, thereby avoiding disturbance to low-lying wetland areas such as the emergent, scrub-shrub, and aquatic bed wetland types and the riparian zones associated with them. Significant impacts would not be anticipated for these specific areas.

Crossing of wetlands classified as palustrine forested, however, may require removal of trees that exceed the maximum allowable height beneath the transmission line (see Section 2.3.4). Of the total 4.5 miles of wetlands that would be crossed by the line, 0.62 mile would cross forested areas. Assuming that these sensitive areas could not be spanned by the line and complete canopy removal would be required within the 125-foot ROW, approximately 9.4 acres of forested

wetlands would be removed along the Eastern Alternative. Removal of these trees would constitute a long-term loss of wetland vegetation and would be considered a significant impact to this resource.

Neither the Boundary Dam and Marshall Variations nor the segments of the Eastern Alternative replaced by these variations would cross wetland areas. Therefore, no impacts to wetland resources would occur from the implementation of either of these variations or their respective route segments.

The Chattaroy Variation would cross a total of 0.34 mile of palustrine wetland types, with 0.2 mile in emergent, 0.1 mile in scrub-shrub, and 0.04 mile in forested. Therefore, 0.04 mile (0.6 acre) of forested wetland would potentially be removed for this route variation. No forested areas would be associated with the less than 0.1 mile of wetlands crossed for the segment of the Eastern Alternative replaced by this variation.

Operation and Maintenance. Impacts to floodplains would be expected to occur only at the Little Spokane River crossing, the one floodplain area that could not be spanned. The need to place a structure in the floodplain cannot be determined until final, detailed engineering has been completed. However, since the floodplain is about 1,800 feet wide at the crossing point, a maximum of one transmission structure would be located within the floodplain, if required. Surface disturbance associated with the construction of a structure and the physical presence of the structure during operation are not expected to alter the floodplain storage volume or cause a local increase in the flood stage. The final design for the transmission structure foundations would consider site-specific soil conditions, as well as elevation of the 100-year flood and potential debris loading of the structure during a flood. For these reasons, failure of the structure during a flood is not expected. Thus, no significant impacts to floodplains are anticipated.

No additional wetland impacts from project operation and maintenance activities would be expected from the proposed Interconnection. As stated in Section 2.3.5 of this EIS, access roads established during project construction would be used for line maintenance activities. Removal of wetland vegetation is addressed for project construction. During the life of the project, WWP would continue to cut trees growing beyond the maximum allowable height beneath the conductors; however, no additional vegetation would be removed during project operation.

Abandonment. No impacts to floodplains would be anticipated during the abandonment phase of the project. During the removal of the transmission structures and conductors for project abandonment, WWP would implement the same protection procedures outlined in Sections 2.3.4 and 2.3.6 and in Table 2-5. No additional access roads would be constructed for this activity,

and the trees removed within the wetland areas previously classified as palustrine forested would be allowed to return to their original condition. Reclamation procedures for these sensitive areas would follow those outlined in Table 2-5.

Significant Impact Summary. The Eastern Alternative would have no significant impacts on floodplains since floods are not expected to damage the transmission line structure, the structure would not increase the potential for flooding, and the project is consistent with floodplain management objectives (see Section 4.2.3).

Neither the Eastern Alternative, its variations, nor route options would significantly impact wetlands classified as emergent, scrub-shrub, or aquatic bed that are crossed by these project routes, due to the implementation of the environmental protection procedures outlined in Table 2-5. Potential long-term loss of approximately 9.4 acres of trees associated with 0.62 mile of forested wetlands crossed by the Eastern Alternative would result in significant impacts to this resource. The Chattaroy Variation would significantly affect forested wetlands by removing 0.6 acre (0.04 mile crossed) of this wetland type, but the segment of the Eastern Alternative replaced would not. Significant impacts would also be associated with the loss of 5.3 acres (0.35 mile crossed) and 7.9 acres (0.52 mile crossed) of forested wetlands from the Eastern and Western Route Options, respectively. As compared, the segments of the Eastern Alternative replaced by these route options would each affect 8.5 acres (0.56 mile crossed) of forested wetlands, also resulting in significant impacts.

4.2.5 Aquatic Ecology

Potential impacts to aquatic resources from construction, operation, maintenance, and abandonment activities along the Eastern Alternative, its associated variations, and route options would be the same as those discussed for the Proposed Route (see Section 4.1.5). No significant impacts to these resources would occur for the Eastern Alternative.

4.2.6 Vegetation

Construction, operation, maintenance, and abandonment impacts to vegetation would parallel those described for the Proposed Route (see Section 4.1.6). Approximately 1,938 acres of vegetation would be affected along the 127.9 miles of the Eastern Alternative. About 69 percent of the route (1,343 acres) would traverse the mixed forest and ponderosa pine vegetation types (see Table 4-1), in addition to the 9.5 acres of forested areas associated with wetlands (see Section 4.2.4). Approximately 326 acres of grassland/pasture and 170 acres of cropland would be affected. Potential impacts to vegetation associated with riparian/wetland areas crossed by this route are discussed in Section 4.2.4. Of the total 4.5 miles of wetland types crossed, the

Eastern Alternative would potentially affect 0.62 mile (9.4 acres) of palustrine forested wetlands, resulting in significant impacts to this resource.

Based on the Forest Service timber volume estimates (Berube 1989), an estimated 12 million to 22 million board feet of sawtimber would be cleared along the Eastern Alternative, assuming that all forested areas along the route were cleared.

As indicated for the Proposed Route, one stand of old growth timber is present along the Eastern Alternative on Forest Service land. This area is located near the international border, north of Hooknose Ridge and near Jubalee Creek (T40N, R42E, Sec 2 and 11). Based on the Forest Service 1:250,000 scale maps, it appears that the Eastern Alternative is located directly east of this old growth forest and would not cross this area.

No federal or state listed plant species are known to occur along or near the Eastern Alternative. As shown on Table 3-6, 10 state sensitive plant species have been recorded within 1 mile of the route, with approximately 16 individual locations (WDW 1988). The Eastern Alternative may cross seven of these populations, based on WNHP data (WDW 1988). Because these sensitive plant locations are based on a mapping accuracy of not less than one section (640 acres), the exact population locations within the proposed ROW are not currently known. Project construction that would directly affect these sensitive species may significantly impact these local populations.

The projected acres and vegetation types affected by the Boundary Dam, Chattaroy, and Marshall Variations are presented in Table 4-2. Vegetation impacts associated with the Boundary Dam Variation and the segment of the Eastern Alternative it would replace would be the same as those discussed for the Proposed Route.

The predominant vegetation type occurring along the Chattaroy Variation is ponderosa pine (141 acres), with areas of grassland/pasture (39 acres), cropland (44 acres), and developed areas (18 acres) interspersed throughout. The segment of the Eastern Alternative replaced by this variation is similar in that the route segment would intersect with ponderosa pine (129 acres), grassland/pasture (68 acres), cropland (50 acres), and developed areas (20 acres). The Chattaroy Variation would remove 0.6 acre of palustrine forested wetlands, resulting in significant impacts to this resource. The segment of the Eastern Alternative replaced would not affect forested wetland areas.

The Marshall Variation would affect approximately 87 acres of ponderosa pine and 12 acres grassland/pasture types. In comparison, the segment of the Eastern Alternative replaced would affect 30 acres of ponderosa pine and 32 acres of grassland/pasture types. Neither the Marshall Variation nor the segment of the route replaced would impact sensitive wetland areas.

The Eastern and Western Route Options that were presented for the Proposed Route in Section 4.1.6 would also apply to the Eastern Alternative. Approximately 5.3 acres and 7.9 acres of palustrine forested wetlands would be impacted by the Eastern and Western Route Options, respectively. By comparison, the segment of the Eastern Alternative replaced by these two options would impact 8.5 acres of forested wetlands. The long-term loss of riparian/wetland vegetation would result in a significant impact to this resource (see Section 4.2.4).

No sensitive plant species have been identified for the Boundary Dam, Chattaroy, or Marshall Variations. Sensitive plant species potentially impacted by the Eastern and Western Route Options would be the same as those discussed for the Proposed Route (see Section 4.1.6). Because the exact population locations for these species are currently unknown, the seven populations potentially crossed by both the Proposed Route and the Eastern Alternative may also be affected by these two routing options.

Approximately 12 acres of ponderosa pine and grassland communities would be removed from the planned Marshall Substation site for the life of the project, in the event this route were built. No significant impacts to these habitat types or the plants associated with them would be expected from substation construction. Not only are these two communities common in adjacent areas, the site has also been partially developed from past land use practices. No sensitive plant species would be affected by substation construction.

Significant Impact Summary. The potential removal of 9.4 acres of palustrine forested areas along the Eastern Alternative, 0.6 acre along the Chattaroy Variation, 5.3 acres along the Eastern Route Option, and 8.5 acres along the Western Route Option would result in long-term loss of riparian/wetland vegetation, producing a significant impact to this resource (see Section 4.2.4). As compared, the segments of the Eastern Alternative replaced by both route options would each affect 8.5 acres (0.56 mile crossed) of forested wetlands, also resulting in significant impacts. The Eastern Alternative, Eastern Route Option, and Western Route Option may also potentially each cross seven sensitive plant populations, resulting in significant impacts to plant species listed as state sensitive from project construction. No old growth timber would be crossed, and the environmental protection measures discussed in Table 2-5 would be implemented for ROW revegetation and restoration. No additional significant impacts would be anticipated for other vegetation resources.

4.2.7 Wildlife

Overall construction, operation, maintenance, and abandonment impacts to area wildlife species and their associated habitats would parallel those discussed for the Proposed Route (see Section 4.1.7). The Eastern Alternative would cross one area designated as priority deer winter

range near Ione and an area of important winter range near Calispell Lake (Whalen 1989). Construction activities that may disturb deer occupying the priority deer winter range (typically between December 1 and April 1) may significantly impact winter deer populations.

The Eastern Alternative would also cross an area used by mountain goats directly west of Metaline Falls (Forest Service 1988; Burke 1990; Zender 1990). As indicated for the Proposed Route, line construction occurring in this area during critical breeding periods may adversely impact breeding individuals, potentially affecting the overall reproductive success of this local mountain goat population. These impacts would also apply to the Western Route Option.

The Eastern Alternative would remove a total of 1,352 acres of timbered area, converting this habitat type to a grass/shrub community for the life of the project (see Table 4-1). The Boundary Dam Variation would remove 11 acres of timbered area, compared to 76 acres removed by the segment of the Eastern Alternative replaced. The Chattaroy Variation would remove 141 acres of timber, whereas the segment replaced would affect a total of 129 acres. The Marshall Variation would remove 87 acres of timbered land, compared to 30 acres removed by the segment of the Eastern Alternative replaced by this variation. The Eastern and Western Route Options would remove 952 and 945 acres of timbered area, respectively, as compared to the 946 acres removed by the segment of the Eastern Alternative. The planned Marshall Substation site would remove approximately 12 acres of potential habitat. No impacts to wildlife resources are expected for this site.

Crossing the Lead King Lakes located along the Eastern Alternative or the Western Route Option would not result in significant impacts to waterfowl from bird strikes during project operation. However, use of the Eastern Route Option would place the conductors and overhead shield wires directly over the open water areas, thereby increasing the potential for bird collisions. With the exception of the route option along Lead King Lakes, the potential for bird mortality associated with transmission line collisions during project operation would not be significant for the Eastern Alternative route or the Western Route Option.

Other operational impacts to area wildlife species from the Eastern Alternative would be the same as those discussed for the Proposed Route in Section 4.1.7.

Threatened or Endangered Species. Two communal bald eagle roost sites have not been confirmed along the Eastern Alternative near Deep Creek and the Riverside State Park and along the north-facing slope in the Little Spokane River Natural Area for the Chattaroy Variation (Pharness 1990; Schulz 1990), but are considered likely sites. Construction activities that would either remove important roosting habitat or disturb concentrations of roosting eagles would affect wintering birds. As discussed for the Proposed Route, the three active bald eagle nests located

within 2 miles of the Eastern Alternative near Sand Creek and Jared are located over 0.5 mile from the proposed ROW. Therefore, significant impacts to breeding birds are not anticipated during project construction. Possible impacts to other sensitive wildlife species potentially occurring along the Eastern Alternative would be the same as those discussed for the Proposed Route.

Table 4-2 outlines the acreage amounts of wildlife habitat removed by each of the Eastern Alternative route variations and route options. Significant impacts from project construction would not be likely for area wildlife species along the Boundary Dam or Marshall Variations. The proposed crossing of the Little Spokane River Natural Area along the Chattaroy Variation, however, would be of significant impact to wildlife resources and associated habitats within this unique environment, in addition to potentially affecting a communal roost site for wintering bald eagles. The Eastern and Western Route Options cross the priority deer winter range located near Ione, and the Western Route Option crosses a portion of important mountain goat range.

During project operation, wintering bald eagles may be impacted where the Eastern Alternative crosses the Little Spokane and Spokane Rivers; the Boundary Dam Variation crosses the Pend Oreille River; the Chattaroy Variation crosses the Little Spokane River within the Natural Area; and the Eastern and Western Route Options cross the Little Spokane River (associated with the Eastern Alternative route). It is anticipated that the Spokane River crossing for the Eastern Alternative and the Little Spokane River crossing for the Chattaroy Variation would present greater hazards to bald eagles from potential line strikes, particularly if communal roost sites occur nearby along Deep Creek and within the Little Spokane River Natural Area. Bald eagle collisions would result in significant impacts to these individual birds. No impacts to breeding eagles would be expected during project operation.

No significant impacts to other sensitive wildlife species would be anticipated from the proposed project operation and maintenance activities.

Significant Impact Summary. The Eastern Alternative would cross one priority deer winter range, potentially resulting in significant impacts during project construction. Construction activities associated with the Eastern Alternative may lead to significant impacts to the overall reproductive success of the mountain goat population near Linton Mountain, if project construction occurred during the critical breeding period.

No old growth areas would be crossed by this project alternative, and impacts to riparian/wetland areas are outlined in Section 4.2.4. A communal roost site for wintering bald eagles may be significantly impacted during project construction near Deep Creek and the Riverside State Park. The three active bald eagle nest sites do not occur within 0.5 mile of the

proposed ROW; no significant impacts are anticipated for these active sites. Transmission line crossings of the Little Spokane and the Spokane Rivers would increase the potential for line strikes by local bald eagles, potentially resulting in a significant impact to this species.

The Boundary Dam Variation would cross the Pend Oreille River, increasing the potential for bald eagle collisions at this location. Use of the Chattaroy Variation crossing the Little Spokane River Natural Area would also increase the potential for eagle line strikes, resulting in significant impacts to this species. Disturbance of the communal roost area potentially located along the north-facing slope in the Little Spokane River Natural Area would result in significant impacts to wintering eagles.

Both the Eastern and Western Route Options would cross one priority deer winter area. Only the Western Route Option would potentially impact the mountain goat kidding area. Crossing the Little Spokane River by both of these route options would also increase the potential for line strikes by local bald eagles. Significant impacts are not expected from an increased potential in general bird collisions with the transmission line from either the Eastern Alternative or the Western Route Option. However, line placement along the Eastern Route Option adjacent to the Lead King Lakes area would result in significant impacts to bird species using the wetlands, due to a direct increase in the collision potential.

4.2.8 Existing and Planned Land Use

4.2.8.1 Existing Land Use

The impact assessment methodology used for the existing land use along the Eastern Alternative was identical to that used for the Proposed Route (see Section 4.1.8.1). The existing land use impacts along the Eastern Alternative are described below, using the same route designations described in Section 3.2.8.1. However, impacts to agricultural land use are related to the total amount of cultivated land lost from production, and are, therefore, not evaluated (although they are quantified) separately for each segment. These route segments and the associated impacts are depicted on Map 2-2.

Border to Southeast of Mead. The first portion of the Eastern Alternative consists of five segments that are common with the Proposed Route. The primary existing land use impacts potentially occurring along these segments are described in Section 4.1.8.1.

Southeast of Mead to North of Seven Mile. Approximately 2,300 feet of agricultural land would be crossed by this segment. A sand/gravel extraction area would be crossed for a total distance of 700 feet. It is estimated that disruption to the operation would result in a moderate impact.

Whitworth College campus is located south of this segment. its nearest existing buildings are located over 300 feet south of the ROW edge. Two existing 115-kV, double-pole transmission lines currently occupy this ROW. As part of the project action, these two lines would be removed and rebuilt on new double-circuit, single-pole structures located about 25 feet north of the ROW edge. The structures for the proposed Interconnection would occupy the remainder of the existing ROW beyond the 115-kV line. Therefore, no substantial, adverse land use effects would occur to Whitworth College from this project.

One major industrial-type building is located partially within the new ROW, and would have to be removed, with resulting moderate land use impacts. One associated residence is located within 100 feet of the ROW edge and would also be subject to moderate land use impacts.

The ROW would pass along the edge of the Little Spokane River Natural Area for a distance of about 1 mile. The line would be located outside the boundary of the natural area and in a location where a minimum of six parallel transmission lines exist. In this area, the naturalness of the recreation area would not be measurably changed by the project, and therefore no impact would occur.

North of Seven Mile to Four Mound Prairie. Construction of this segment would require the removal of one residence, with a resulting significant impact. One barn would also require removal, causing a moderate impact. Three residences would be located within 100 feet of the ROW edge, and would be subject to moderate impacts. About 3,400 feet of agricultural land would be crossed. Immediately west of the Spokane River, the segment would pass through approximately 5,700 feet of the Riverside State Park, while paralleling two existing and relatively small transmission lines. The naturalness of the park could be moderately diminished in this area; impacts would therefore be considered moderate. A short distance further west, the proposed Interconnection would pass along the edge of another unit of Riverside State Park. In this instance, however, the project would be separated from the park by two existing transmission lines; therefore, no measurable adverse effects would be likely for the park.

Four Mound Prairie to East of Spokane International Airport. In this segment, the removal of two residences and one major industrial building would be required, with consequent significant impacts. The removal of a new, major uninhabited building within the proposed ROW and two minor uninhabited buildings would result in moderate and low impacts, respectively. A total of 8 residences would be located within 100 feet of the ROW edge; another 7 residences occur between 100 and 200 feet from the ROW edge. These areas would be subject to moderate and low impacts, respectively. Approximately 32,300 feet of agricultural land would be crossed. The proposed Interconnection would pass beneath the approach surface to one of the main runways at Spokane International Airport, while paralleling existing transmission lines

approximately 43 feet high. At this point, the proposed Interconnection would utilize two separate single-circuit, short span, low profile structures approximately 55 feet high. The minimum clearance between the terrain and the Federal Runway Flight Clearance Zones is estimated to be 88 feet (in most cases, it is 100 feet or greater). Therefore, the project would be within the safety criteria established by FAA Regulations, Part 77, Objects Affecting Navigable Airspace. The minimum clearance between the terrain and Spokane County's Airport Overlay Zone along the project ROW is estimated to be approximately 48 feet. In a few other locations, the minimum clearance is approximately 50 to 60 feet, and in most potential structure locations, clearance flight is over 60 feet. Therefore, the project could potentially protrude into the clearance zone up to 7 feet. The project would therefore require a height variance from the Spokane County Planning Director. Considering the relatively small amount the transmission line structures would protrude above the county clearance surfaces and the fact that the standard Federal Clearance Zones are not violated, the project's potential impacts to air transportation at this location are considered moderate.

East of Spokane International Airport to North of Marshall. Two residences would require removal along this segment, resulting in significant impacts. Two minor uninhabited buildings would also require removal, with consequent low impact levels. Three residences would occur within 100 feet of the ROW edge; three others would be located between 100 and 200 feet. These areas would be subject to moderate and low impacts, respectively. About 6,300 feet of agricultural land would be crossed.

Marshall Vicinity. No measurable impacts on existing land use would occur along this segment.

Total Impacts of Eastern Alternative. A total of 12 residences and 2 major industrial buildings would be removed, causing significant impacts. Four major uninhabited buildings would also require removal, with one of these being a new building located within the proposed ROW, which would result in moderate impacts. Eight minor uninhabited buildings would require removal, causing low impacts. One major inhabited commercial building and 19 residences would occur within 100 feet of the ROW edge and would be subject to moderate impacts. An additional 19 residences would be located between 100 and 200 feet from the ROW edge, resulting in low impacts. Approximately 118,200 feet (22.4 miles) of agricultural land would be crossed, resulting in an estimated loss of 6.7 acres of cultivated land. This loss would result in a low level of impact to these agriculture activities. The Eastern Alternative would intrude into the edge of a flight clearance zone at a minor airstrip located near Sacheen Lake. While this alternative would not affect the FAA flight clearance zones at the Spokane International Airport, it would intrude slightly into Spokane County's more restrictive flight clearance zone at the major northeast-southwest runway located there. At both of these locations, the Eastern Alternative would produce moderate impacts. The route would cross about 700 feet of a sand/gravel extraction

area, resulting in moderate impacts to the operation. West of the Spokane River, the route would cross approximately 1 mile of Riverside State Park, while parallelling two existing transmission lines. The resulting impacts would be considered moderate.

Boundary Dam Variation. Impacts to existing land use that are associated with this variation and the segment of the Eastern Alternative replaced would be the same as those presented for the Proposed Route in Section 4.1.8.1.

Chattaroy Variation. In this segment, two residences would occur within 100 feet of the ROW edge and subject to moderate impacts; nine residences would be located between 100 and 200 feet from the ROW edge, resulting in low impacts. About 10,700 feet (2.03 miles) of agricultural land would be crossed, resulting in a loss of 0.6 acre of cultivation. This variation would directly intersect the Little Spokane River Natural Area and substantially affect the naturalness of the setting; resulting in a significant impact. The natural area was created to preserve (among other values) scenic quality and semi-primitive recreational values and to provide the opportunity to view nature in an uncontrolled form. The project would clearly conflict with the purposes for which this natural area was created. This variation also passes along the natural area edge for a distance of approximately 3,000 feet, crossing undeveloped land. This portion of the route would produce a moderate adverse effect on the natural area.

The segment of the Eastern Alternative replaced would remove one residence, causing significant impacts. It would also require the removal of one major industrial building and one minor uninhabited building, resulting in significant and low impacts, respectively. Three residences would occur within 100 feet of the ROW edge, causing moderate impacts; four other residences would be located between 100 and 200 feet of the ROW edge, resulting in low impacts. Approximately 36,400 feet (6.89 miles) of agricultural land would be crossed, removing about 2.1 acres of land from cultivation. A sand/gravel extraction area would be crossed with consequent moderate impacts.

The Chattaroy Variation contains fewer significant and moderate impacts than the corresponding portion of the Eastern Alternative regarding effects to residences, other buildings, and mineral extraction activities. However, the variation would result in severe and significant impacts on recreation and ecological resources. The segment of the Eastern Alternative replaced has no such impacts.

Marshall Variation. Two residences would require removal in this segment, resulting in significant impacts. Twelve residences would occur within 100 feet of the ROW edge; three would occur between 100 and 200 feet of the ROW edge. These areas would be subject to

moderate and low impacts, respectively. About 600 feet (0.1 mile) of agricultural land would be crossed; resulting in 0.03 acre of land taken out of cultivation.

Two residences and two minor uninhabited buildings would be removed within the segment of the Eastern Alternative replaced, leading to significant and low impacts, respectively. Three other residences would occur within 100 feet of the ROW edge and would be subject to moderate impacts. Three residences would occur between 100 and 200 feet from the ROW edge and would experience low impacts. About 6,300 feet (1.2 miles) of agricultural land would be crossed, resulting in the loss of 0.4 acre of cultivated land.

Considering significant and moderate impacts, the Marshall Variation contains nine additional residences within 100 feet of the ROW edge, than the segment of the Eastern Alternative replaced. These are considered moderate impacts.

Planned Marshall Substation Site. Approximately 12 acres of existing land use would be removed for the life of the project for the planned Marshall Substation site. However, no adverse impacts would occur to existing land uses of the substation site, as a result of the proposed Interconnection.

Route Options to the Eastern Alternative. The overall existing land use impacts described for the Eastern and Western Route Options would be the same as those discussed for the Proposed Route. See Section 4.1.8.1 for additional information on these route options.

Significant Impact Summary. The Eastern Alternative would remove a total of 12 residences and 2 major inhabited buildings, resulting in significant impacts to existing land use. Use of the Western Route Option that follows the west side of the existing BPA ROW from Boundary Dam to Mead, would require the removal of 27 additional residences than the individual segment of the Eastern Alternative replaced. The Eastern Route Option, that follows the east side of the existing BPA circuits from Boundary Dam to Mead, would require the removal of 10 additional residences, as compared to the individual segment of the Eastern Alternative replaced.

No significant impacts are associated with the Boundary Dam Variation or the segment it would replace. The Chattaroy Variation would not require the removal of a residence or a major industrial building, unlike the segment of the Eastern Alternative replaced, which would remove one of each. However, this variation would impose extreme significant impacts on the recreational land use at the Little Spokane River Natural Area for 0.6 mile. In addition, this area's land use policies prohibit transmission ROWs (see Table 2-7). The Marshall Variation and the segment of the Eastern Alternative replaced would each require the removal of two residences.

4.2.8.2 Planned Land Use

The impact assessment methodology used for the Eastern Alternative was identical to that used for the planned land use along the Proposed Route (see Section 4.1.8.2). The planned land use impacts along the Eastern Alternative are described below, using the same route designations described in Section 3.2.8.2.

Border to Southeast of Mead. The first portion of the Eastern Alternative consists of five segments that are common with the Proposed Route. The primary planned land use impacts potentially occurring along these segments are described in Section 4.1.8.2. The five additional segments located along this variation are presented separately. These segments are shown on Map 2-2, located at the back of this document.

Southeast of Mead to North of Seven Mile. About 0.3 mile of this segment (located on new ROW) crosses undeveloped land that is proposed for Industrial use in the Spokane County Comprehensive Plan. In this portion of the segment, impacts to future land use would be moderate.

Another 0.4 mile of the segment (while paralleling existing transmission lines) crosses planned Industrial land, resulting in low impacts. The remainder of the segment is located on pre-established vacant transmission line ROW and has no measurable impacts on future land use.

North of Seven Mile to Four Mound Prairie. The entire segment would be constructed on existing vacant transmission line ROW and would, therefore, cause no impacts to future land use.

Four Mound Prairie to East of Spokane International Airport. This segment passes through land with several classifications in the Spokane County Comprehensive Plan. The entire segment parallels existing transmission lines, however, and only while crossing 2.1 miles of planned Industrial land would the route create impacts. These impacts would be considered low.

The segment also passes approximately 1.8 miles from the end of a proposed new runway at Spokane International Airport. The approximate minimum vertical clearance between ground level along this portion of the route segment and the flight clearance zone is estimated to be over 230 feet. At this location, where Spokane County's Airport Overlay Zone flight clearance requirements are applied, the minimum clearance between ground and flight zone above is estimated to be approximately 132 feet. Therefore, the proposed Interconnection would have no impacts on future/planned air transportation at Spokane International Airport.

East of Spokane International Airport to North of Marshall. The northern portion of this segment parallels an existing transmission line. Along this area, the route crosses 0.8 mile of land planned by Spokane County for future Industrial and Suburban use, causing low impacts.

While located on new ROW, the segment also crosses 2.1 miles of land planned for Urban development, causing moderate impacts; and 0.6 mile of land designated by Spokane County for future development in the Rural category, causing low impacts.

Marshall Vicinity. This segment is not related to any existing ROW. It is located on land planned by Spokane County for future development as Rural, causing low impacts over an estimated distance of 0.5 mile.

Total Impacts of Eastern Alternative. National Forest land planned for Timber Management with Visual Resource Protection (Class 5) would be impacted by this alternative route; 0.6 mile resulting in moderate impacts and 1.5 miles causing low level impacts. Approximately 7.4 miles of land designated by the Forest Service for Wildlife with Visual Resource Protection (Class 6) would be subject to low level impacts. In Spokane County, the proposed Interconnection crossing 2.1 miles of land planned for future Urban use would result in moderate impacts. About 0.3 mile of land planned for future Industrial use would be impacted at the moderate level, and an additional 3.3 miles would be impacted at the low impact level. Land proposed in the County Comprehensive Plan for future development at the Rural level would be subject to low impacts for a total of 5.1 miles.

Boundary Dam Variation. Impacts to planned land use that are associated with this variation and the segment of the Eastern Alternative replaced would be the same as those presented for the Proposed Route in Section 4.1.8.2.

Chattaroy Variation. This variation is located entirely along new ROW. The route crosses about 0.5 mile of land designated in the Spokane County Comprehensive Plan for future Urban land use, with consequent moderate impacts. It crosses 2.9 miles of land planned for Semi-Rural future use, causing low impacts. Finally, the route crosses a total of 6.5 miles of land designated by Spokane County for use at the Rural level of development. This would cause low impacts.

The segment of the Eastern Alternative replaced crosses 0.3 mile of future Industrial land, causing moderate impacts. The segment also crosses 0.4 mile of Industrial land and 4.0 miles of land planned for Rural development, resulting in low impacts.

The Chattaroy Variation would have a greater effect on future land use than the corresponding portion of the Eastern Alternative. The variation would moderately impact an extra 0.2 mile and create a low impact on an extra 5.0 miles of line, as compared to the alternative.

Marshall Variation. This segment (while on new ROW) crosses 1.0 mile of land designated by Spokane County for Rural use, resulting in low impacts. A portion of the segment (0.9 mile) is also located within the City of Spokane where it crosses land zoned for Single Family Residential and Suburban Residential uses, while paralleling an existing transmission line. This causes low level impacts. The segment of the Eastern Alternative replaced creates 3.5 miles of low impacts, because of crossing various of Spokane County's planned land uses.

The Marshall Variation would create 1.6 miles fewer low level impacts on future land uses than the portion of the Eastern Alternative it would replace.

Planned Marshall Substation Site. Approximately 12 acres of future land use would be removed for the life of the project for the planned Marshall Substation. However, no adverse impacts would occur to future land uses of the substation site, as a result of the proposed Interconnection.

Route Options to the Eastern Alternative. The overall impacts to planned land uses described for the Eastern and Western Route Options would be the same as those discussed for the Proposed Route. See Section 4.1.8.2 for additional land use information on these route options.

Significant Impact Summary. Neither the Eastern Alternative, its variations, nor associated route options would produce significant impacts on planned land uses.

4.2.9 Visual Resources

The visual impact assessment process for the Eastern Alternative is the same as that presented for the Proposed Route in Section 4.1.9. For ease of discussion, the visual impacts expected along the Proposed Route are addressed in the same five segments that were identified in the discussion of existing conditions (see Section 3.2.9). These segments have somewhat distinct landscape conditions and generally have similar types and levels of impacts.

Border to Mead. The first portion of the Eastern Alternative consists of four segments that are common with the Proposed Route. The visual resources impact analyses associated with these segments are described in Section 4.1.9.

Mead to Fivemile Prairie. This is an urban-dominated landscape (industrial to the east and residential to the west). Through this area, the Eastern Alternative would parallel three or more existing transmission lines. Despite the large number of sensitive viewers, the existing setting is so influenced by existing transmission lines and ROW clearing that the addition of the proposed Interconnection would result in low visual contrast and, as a result, low visual impacts.

One area of exception is a segment of approximately 0.25 mile in length located immediately north of Whitworth College. Currently, the existing 115-kV transmission lines are largely set back in a relatively dense grove of ponderosa pines and are visible only from the athletic fields and not from the central campus. The Eastern Alternative would require double circuiting the 115-kV lines, increasing their height, and adding the new lines, which will provide visibility to the upper portions of the towers. This degree of visual contrast would result in a moderate level of visual impact over this distance.

Fivemile Prairie to Marshall. This portion of the Eastern Alternative would parallel a minimum of one existing transmission line, except for approximately 2.5 miles located directly north of the Marshall Substation. Landscape quality is relatively low overall, except for the crossings of the Spokane River (Long Lake), Coulee Creek, and Deep Creek. These areas were rated as having moderate landscape quality. Because of its proximity to Spokane, this entire route would be seen from numerous residences and roads. Little contrast is expected from vegetation, due to the sparse nature of trees and the existing clearings along the present transmission lines. Structure contrast is reduced everywhere, except for the portion mentioned near Marshall Substation, because of the presence of an existing transmission line. Landforms crossed are relatively flat, except for the bluffs near the Spokane River, Coulee Creek, and Deep Creek. Because of this and their moderate landscape quality, these areas would result in moderate short-term impacts. In addition, these areas would result in moderate long-term impacts because of the added structures crossing these areas of moderate landscape quality.

From the standpoint of the number of viewers affected within Riverside State Park, the three generally north-south gravel roads will be most affected. However, somewhat more sensitive viewpoints include hiking and other dispersed recreation viewpoints. The proposed line will have somewhat greater visibility than the two existing 115-kV transmission lines due to its increased height. Despite the scattered ponderosa pines that will effectively limit views in most areas, there will be some increased visibility. Finally, the 2.5 miles near Marshall Substation would result in moderate long-term impacts, despite the low landscape quality, due to the absence of an existing transmission line in this area. Overall, this segment would result in 6.8 miles of moderate visual impact.

Total Impacts of the Eastern Alternative. The Eastern Alternative would result in 22.1 miles of moderate short and long-term visual impacts. No significant visual impacts would be associated with this alternative route, due primarily to the influence of the large number of existing, parallel transmission line ROWs.

Boundary Dam Variation. Impacts to visual resources that are associated with this variation and the segment of the Eastern Alternative replaced would be the same as those presented for the Proposed Route in Section 4.1.9.

Chattaroy Variation. The Chattaroy Variation deviates from the Eastern Alternative near Chattaroy and rejoins the route near Fivemile Prairie. None of this portion is parallel to an existing transmission line ROW. Viewpoints in this area include numerous scattered residences and roads. The landscape is of moderate landscape quality, except for the land located in the vicinity of the Little Spokane River, which has high landscape quality. Because of the relatively high landscape quality, the number of sensitive viewpoints, and the lack of existing transmission lines, much of this portion of the variation (13.5 miles) would result in moderate long-term visual impacts as a result of the introduction of the proposed Interconnection. In addition, the crossing of the Little Spokane River would result in 0.4 mile of significant long-term impacts. By comparison, the portion of the Eastern Alternative replaced would result in only 4.0 miles of moderate visual impacts.

Marshall Variation. This variation departs from the Eastern Alternative near the Spokane International Airport and remains on a new alignment to the Marshall Substation site. It first passes through an area of low landscape quality and then an area of moderate landscape quality (the Marshall Creek Drainage). In addition, the majority of the low landscape quality area contains an existing transmission line. As a result, visual impacts in this area are low. However, the remainder of the segment has no existing transmission line and would result in moderate long-term visual impacts, due to the presence of the proposed transmission structures. This portion of the Marshall Creek Variation would result in 5.3 miles of moderate impact, while the segment of the Eastern Alternative replaced would result in 2.5 miles of moderate visual impact.

Planned Marshall Substation Site. The site of the planned Marshall Substation is heavily screened from sensitive viewpoints by existing conifer woodland. Provided that a buffer of these trees is left intact, the Marshall Substation would not be seen from sensitive viewpoints and would result in low visual impacts.

Route Options to the Eastern Alternative. The overall impacts to visual resources described for the Eastern and Western Route Options would be the same as those discussed for the Proposed Route (see Section 4.1.9).

Significant Impact Summary. The Eastern Alternative, the Boundary Dam and Marshall Variations, and the Eastern and Western Route Options would not result in the generation of significant visual impacts. This is predominantly because of the large number of existing transmission lines paralleled by the proposed project and the relatively low landscape quality and VQO designations in other areas. The Chattaroy Variation, however, would result in 0.4 mile of significant impact at the crossing of the Little Spokane River, due to the high landscape quality, the sensitive recreation viewpoint, and the lack of existing transmission lines (i.e., a nature-dominated landscape).

4.2.10 Cultural Resources

Cultural resource impacts along the Eastern Alternative would be the same as those described for the Proposed Route (see Section 4.1.10). Potential impacts should be avoidable (Hudson et al. 1988) through judicious route selection; compliance with all applicable state and federal procedural requirements and permit restrictions; and completion of field surveys prior to construction, where appropriate (see Section 4.9). In addition, no significant cultural resources are known to exist on the planned Marshall Substation site.

4.2.11 Socioeconomics and Community Resources

4.2.11.1 Construction

Population. Population impacts along the Eastern Alternative, its variations, and route options would be the same as described for the Proposed Route (see Section 4.1.11.1). The Eastern Alternative would have no significant impacts on population because of the short duration of construction, the limited number of out-or-region workers, and no permanent workforce would be required.

Economic Base. The economic base impacts resulting from the Eastern Alternative, variations, and route options would be similar to those described for the Proposed Route (see Section 4.1.11.1). No significant impacts to economic conditions would be anticipated from construction of this alternative.

Housing. No significant housing impacts are expected from the Eastern Alternative, variations, or route options. See Section 4.1.11.1 for the Proposed Route for detailed information on anticipated housing availability during project construction.

Fiscal Conditions. Potential impacts to fiscal conditions relative to the construction phase would be similar to those described for the Proposed Route in Section 4.1.11.1.

Property Values. Refer to the discussion on project construction and the anticipated effects on property values for the Proposed Route (see Section 4.1.11.1).

4.2.11.2 Operation and Maintenance

Population. No permanent workforce would be established as a result of the proposed Interconnection; consequently, no population changes would be expected during project operation and maintenance.

Economic Base. There are no anticipated changes in the economic base for the Eastern Alternative during the operation and maintenance phase, other than an increase to the Stevens, Pend Oreille, and Spokane County tax bases from property tax proceeds. Property tax receipts would increase due to transmission line construction. Some agricultural and timber lands would be removed from production, as discussed below.

Housing. The Eastern Alternative, its variations, and associated route options would have no impact on housing during the operation and maintenance phase of the project.

Fiscal Conditions. The fiscal conditions for the Eastern Alternative are similar to those described for the Proposed Route (see Section 4.1.11.2). Table 4-6 shows the tax estimates and percent increase in property tax receipts for the affected counties, based on an average of $13.50 per $1,000 assessed valuation. The value of agricultural lands removed from production would be minimal as compared to tax receipts generated by the transmission line. Total acreage removed from production would total only 6.7 acres (see Section 4.2.8). Table 4-7 presents the potential timber production value loss totaling $460,000 for the Eastern Alternative. The Boundary Dam Variation would result in approximately $4,000 loss in estimated timber production, compared to $26,000 for the segment of the Eastern Alternative replaced. The Chattaroy Variation would result in $48,000 loss, compared to $44,000 for the segment replaced. The Marshall Variation would result in $30,000 loss in estimated production, compared to approximately $10,000 loss for the segment of the Eastern Alternative replaced. Private property owners would be compensated at current market rates; established timber operations would receive two options for the land's fair market value, as described in Section 4.1.11.2.

Property Values. Refer to the construction phase of the Proposed Route for the discussion on property values (see Section 4.1.11.1).

4.2.11.3 Abandonment

Abandonment of the Eastern Alternative would decrease tax bases in counties crossed by the route. At the time of line abandonment, tax receipts in each county would be reduced from the line's in-service date due to depreciation. Counties that would be affected include Stevens, Pend Oreille, and Spokane. Some agricultural and timber lands may be returned to production. The Eastern Alternative would have no impact on housing during abandonment of the project. Property values would be affected similar to that described for the Proposed Route.

4.2.11.4 Significant Impact Summary

Increases to the tax base and subsequent property tax receipts throughout the life of the project would significantly benefit the fiscal conditions in Pend Oreille County.

4.2.12 Transportation and Noise

Construction. Transportation and noise impacts along the Eastern Alternative during project construction would be the same as described for the Proposed Route (see Section 4.1.12). The Eastern Alternative would have no significant impacts on transportation and noise because traffic would be delayed for only short periods of time during line construction (less than 15 minutes); the slight flight zone intrusion would be considered a moderate impact, based on the existing configurations; and construction-related noise would only be for a short period of time in a given location.

The construction of the planned Marshall Substation represents additional noise sources at the site. Temporary increases in noise levels would occur, as a result of construction activities. However, anticipated construction noise levels would be expected to be well below levels currently experienced in the immediate area, originating at several gravel mining facilities.

Operation and Maintenance. Impacts to transportation and noise during project operation and maintenance along the Eastern Alternative would be the same as described in Section 4.1.12 for the Proposed Route. While routes for the proposed Interconnection were selected to avoid air traffic conflicts, special, low-profile structure configurations would be required in the vicinity of the Spokane International Airport to fulfill Spokane Airport Overlay Zone requirements (WWP 1988). Therefore, no significant impacts to transportation or noise are expected since low-profile structure configurations would be used in the vicinity of the Spokane International Airport and long-term, audible noise levels during line operation are not expected to exceed 36 dBA at the edge of the ROW (see Section 4.1.12).

The operation of the planned Marshall Substation would represent a long-term noise source. The sound emissions from the substation would be dependent upon equipment configuration and would be directional in nature. The noise impacts expected from the planned Marshall Substation would not be significant. The primary receptors (i.e., residents of Marshall) are located over 1,000 feet from the site. The planned substation site is moderately forested, and the potential noise would be buffered by the trees located to the east and south of the property. The open exposure of the site would be to the west facing Grove Road and the current gravel mining operations along the west side of the road. No sensitive receptors occur in the direction of this exposed side.

Abandonment. Transportation and noise impacts associated with the Eastern Alternative are not expected to be significant, as described for the Proposed Route in Section 4.1.12.

Significant Impact Summary. The Eastern Alternative would have no significant impacts on transportation because traffic would be delayed for only short periods of time during construction (less than 15 minutes).

The Eastern Alternative would have no significant noise impacts since construction related noise would only be for a short period of time in a given location; and long-term, audible noise levels during transmission line operation are not expected to exceed 36 dBA at the edge of the ROW.

4.3 Western Alternative

4.3.1 Air Quality

Potential air quality impacts for the Western Alternative and its variations would be the same as described for the Proposed Route (see Section 4.1.1). The Western Alternative would have no significant impacts on air quality resources.

4.3.2 Geology and Soils

4.3.2.1 Geology

Construction. The Western Alternative crosses a variety of geologic formations from the northern upland areas to the broad river valleys, as discussed in Section 3.3.2.1. The underlying materials along the route should provide an adequate foundation for tower structures. Potential impacts to topographical features along the Western Alternative would be minimal. Surficial and underlying substrates would be disturbed during construction activities for tower placement and

access road construction. Steep grades and other areas subject to erosion would be stabilized according to WWP's ROW restoration procedures (see Table 2-5).

An active sand/gravel extraction area located north of Colville would be crossed for a total distance of 300 feet. It is estimated that disruption to the operation would be of moderate impact (see Map 2-2, Sheet 8). No significant impacts to geological features would occur during transmission line construction.

Operation and Maintenance. Seismic potential along the Western Alternative appears to be minimal. Potential landslide hazards may occur during project operation within the Columbia River Valley, at the Spokane River Crossing, and north of the Spokane River (see Section 3.3.2.1), due to the moderate incidence and susceptibility to landsliding in steep mountainous areas, where slopes are potentially undercut, or if excavations occur in susceptible material. No significant impacts to the transmission line would be expected from potential geologic hazards within the project area because of structure sighting procedures implemented by WWP for potentially sensitive areas. Operation of the proposed Interconnection has the potential to impact future mineral development along the Western Alternative; this impact would not be anticipated to be significant.

Abandonment. No impacts would occur to geological resources following project abandonment. Appropriate reclamation procedures would be implemented to prevent increased erosion within the disturbed areas.

Significant Impact Summary. The Western Alternative and the associated Onion Creek and Marshall Variations would have no significant impacts on geologic resources located along these project routes because of reclamation procedures followed by WWP (see Section 2.3). In addition, seismic hazards and potential mineral developments appear to be minimal for the project area. Potential landslide areas would be avoided by proposed line construction.

4.3.2.2 Soils

Construction. Soils with high erosion potential on moderate to steep slopes occur along greater lengths of the Western Alternative, as compared to the Proposed Route. However, impacts due to erosion losses during construction activities should be considered short-term and would not be significant, due to the implementation of the environmental protection measures presented in Section 2.3.4.

Approximately 12.2 miles of prime farmland soils would be crossed by the Western Alternative. These 185 acres are scattered throughout the length of the Western Alternative and are located

in two areas that potentially may be avoided. These areas include the Echo Valley area and the Chamokane Valley area. It is estimated that 2 to 3 miles of prime farmland are crossed in each of these sections. Similar avoidance and protection measures would be employed along the Western Alternative as stated for the Proposed Route. These impacts should be considered short-term construction-related impacts.

Erosion and prime farmland concerns are similar for the Onion Creek and Marshall Variations as compared to the segments of the Western Alternative replaced by these route variations. The Onion Creek Variation crosses about 1.4 miles more of prime farmland soils, as compared to the segment of the Western Alternative replaced. The prime farmland soils associated with the Marshall Variation are described in Section 4.2.2.2 for the Eastern Alternative.

Operation and Maintenance. Following ROW reclamation and revegetation, typical transmission line operations are not expected to result in significant impacts to soil types along the Western Alternative or its variations. Transmission line maintenance would include periodic ground travel along the ROW. Whenever possible, line maintenance would be conducted when minimum surface disturbance would occur (i.e., avoid wet periods). Therefore, no significant impacts are expected to occur as a result of these operation and maintenance activities.

Abandonment. The termination of the proposed Interconnection would result in transmission structure removal. Impacts would parallel those described during construction activities. WWP would use the appropriate measures to remove structures and implement site reclamation to ensure resource protection (see Table 2-5). No significant impacts to soil resources would be anticipated from project abandonment.

Significant Impact Summary. The Western Alternative and the associated Onion Creek and Marshall Variations would have no significant impacts on soils crossed by these project routes. Soil erosion losses or declines in crop productivity on prime farmland areas from soil compaction would be considered short-term construction impacts. No significant impacts are expected to occur as a result of transmission line operation, maintenance, or abandonment activities.

4.3.3 Surface Water

Construction. No significant impacts to surface water resources are expected within the project area from the Western Alternative or its variations. The majority of the water resources and sensitive riparian areas crossed would be spanned by the proposed transmission line. Both line and access road construction activities conducted near stream crossings would potentially cause an increase in siltation of the water resources. However, in areas directly crossed by the line, the environmental protection procedures outlined in Table 2-5 would minimize potential impacts.

Procedures to reduce the likelihood of accidental spillage of materials into natural watercourses are also discussed in Table 2-5; therefore, no impacts from these sources are expected.

The Western Alternative would cross five streams that are designated under county Shoreline Master Plans. The crossing of designated streams by an electric transmission line is permitted under these master plans. Impacts to designated streams would be minimized by selective clearing of vegetation at the crossing site and by restoration of disturbed areas following construction (see Table 2-5). Therefore, the proposed transmission line would be consistent with established Shoreline Master Plans and would not have significant impacts on the streams and environmental values these plans are designed to protect.

Table 3-4 presents the water resources crossed by the Onion Creek and Marshall Variations and the segments of the Western Alternative replaced by these variations. These proposed crossings would be consistent with established management plans, and construction activities would be regulated under the protection procedures presented in Table 2-5. Therefore, no significant impacts are anticipated from project construction along these proposed variations.

Operation and Maintenance. No impacts to surface water resources would occur during project operation. Line maintenance activities may require periodic ground inspections, resulting in potential impacts to streams when reopening access roads, crossing drainages, or removing vegetation. These impacts would not be significant, however, because WWP would implement the environmental protection measures presented in Section 2.3, Table 2-5 of this EIS.

Abandonment. Abandonment of the proposed line would entail removal of the supporting structures and reclamation of disturbed areas. Potential impacts to surface water would result from these activities, as discussed for proposed line construction. As stated above, impacts would not be significant to these resources due to WWP's environmental protection procedures outlined in Table 2-5.

Significant Impact Summary. The Western Alternative and the Onion Creek and Marshall Variations would be consistent with established county Shoreline Master Plans; therefore, these routes would not significantly impact the resources protected under these plans. Increased sedimentation of streams crossed by the proposed transmission line or access roads would be minimized by the procedures implemented by WWP to protect sensitive resources (see Table 2-5). Any stream siltation caused by the proposed project would be considered a short-term impact; therefore, implementation of the Western Alternative or its variations would not significantly impact surface water resources crossed by these project routes.

4.3.4 Floodplains and Wetlands

Construction. No impacts to floodplains would be expected during the construction phase of the project, since surface disturbance would be restricted to the access road and tower sites, earth moving would be minimal, and excess soil from the foundations would not be disposed of within the floodplain area.

The Western Alternative crosses the eight major wetland areas discussed in Section 3.3.4; two of these are in common with the Eastern Alternative. The following summary depicts the amount of wetland types affected by the Western Alternative, based on a 125-foot-wide ROW.

Miles of Palustrine Wetlands Crossed and (Acres) Affected

Emergent	Scrub-Shrub	Aquatic Bed	Forested
2.0 (30.3)	1.2 (18.2)	0.02 (0.3)	1.4 (21.2)

As stated in Table 2-5 in Section 2.3 for project construction, WWP would not locate transmission line structures or access roads within a wetland/riparian area, as required by the appropriate agencies. In the event wetland/riparian areas were crossed, special construction techniques would span wetland areas, when possible, thereby avoiding disturbance to low-lying wetland areas, such as the emergent, scrub-shrub, and aquatic bed wetland types and the riparian zones associated with them. Significant impacts would not be anticipated for these specific areas.

Crossing of wetlands classified as palustrine forested, however, may require removal of trees that exceed the maximum allowable height beneath the transmission line (see Section 2.3.4). Of the total 4.62 miles of wetlands that would be crossed by the line, 1.4 miles would cross forested areas. Assuming that these sensitive areas could not be spanned by the line and complete canopy removal would be required within the 125-foot ROW, approximately 21.2 acres of forested wetlands would be removed along the Western Alternative. Removal of these trees would constitute a long-term loss of wetland vegetation and would be considered a significant impact to this resource.

Of the 0.4 mile of palustrine wetland crossed along the Onion Creek Variation, 0.2 mile would be emergent and 0.2 mile would be scrub-shrub wetland types. No forested wetlands would be crossed; therefore, no significant impacts to this resource for this variation would be expected. The segment of the Western Alternative replaced would cross a total of 0.5 mile of wetland, containing 0.4 mile of emergent and 0.1 mile of scrub-shrub vegetation.

Potential construction impacts to wetland areas associated with the Marshall Variation and the segment replaced by this variation would be the same as those described for the Eastern Alternative. This discussion is presented in Section 4.2.4.

Operation and Maintenance. Impacts to floodplains would be expected to occur only at the Colville River crossing, the only floodplain that could not be spanned. The number of structures to be placed in the floodplain cannot be determined until final, detailed engineering has been completed. However, since the floodplain is about 4,900 feet wide at the crossing point, approximately four transmission structures would be located within the floodplain. This would include one large dead-end or heavy angle structure. Surface disturbance associated with the construction of the structures and the physical presence of the structures during operation are not expected to alter the floodplain storage volume or cause a local increase in the flood stage. The final design for the transmission structure foundations would consider site-specific soil conditions, as well as elevation of the 100-year flood and potential debris loading of the structure during a flood. For these reasons, failure of the structure during a flood is not expected. Thus, no significant impacts to floodplains are anticipated.

No additional wetland impacts from project operation and maintenance activities would be expected from the proposed Interconnection. As stated in Section 2.3.5, access roads established during project construction would be used for line maintenance activities. Removal of wetland vegetation is addressed for project construction. During the life of the project, WWP would continue to cut trees growing beyond the maximum allowable height beneath the conductors; however, no additional vegetation would be removed during project operation.

Abandonment. No impacts to floodplains would be anticipated during the abandonment phase of the project. During the removal of the transmission structures and conductors from project abandonment, WWP would implement the same protection procedures outlined in Sections 2.3.4 and 2.3.6 and in Table 2-5. No additional access roads would be constructed for this activity, and the trees removed within the wetland areas previously classified as palustrine forested would be allowed to return to their original condition. Reclamation procedures for these sensitive areas would follow those outlined in Table 2-5.

Significant Impact Summary. The Western Alternative and its variations would have no significant impacts on floodplains because floods are not expected to damage transmission line structures located within a floodplain, the structures would not increase the potential for flooding, and the project is consistent with floodplain management objectives (see Section 4.3.3).

Neither the Western Alternative, the Onion Creek Variation, nor the Marshall Variation would produce significant impacts to wetlands classified as emergent, scrub-shrub, or aquatic bed that

are crossed by the route, due to the implementation of the environmental protection procedures outlined in Table 2-5. Potential long-term loss of approximately 21.2 acres of trees associated with 1.4 miles of forested wetlands crossed by the Western Alternative would result in significant impacts to this sensitive resource.

4.3.5 Aquatic Ecology

Potential impacts to aquatic resources from construction, operation, maintenance, and abandonment activities along the Western Alternative and its variations would be the same as those discussed for the Proposed Route (see Section 4.1.5). It has been documented that during periods of deteriorating water quality within the Colville River, nongame fish species often out-compete resident game species (WDE 1973). The water quality in the Colville River would not be further degraded by the proposed Interconnection, and no significant impacts to the Colville River brown trout fishery or other aquatic resources would occur from implementation of the Western Alternative, Onion Creek Variation, or Marshall Variation.

4.3.6 Vegetation

Construction, operation, maintenance, and abandonment impacts to vegetation would be similar to those described for the Proposed Route (see Section 4.1.6). Approximately 1,835 acres of vegetation would be affected along 121.1 miles of the Western Alternative. Approximately 70 percent of the route (1,289 acres) would traverse the mixed forest and ponderosa pine vegetation types (see Table 4-1), in addition to the 21.2 acres of forested areas associated with wetlands. Based on the Forest Service timber volume estimates (Berube 1989), an estimated 11.7 million to 21 million board feet of sawtimber would be cleared, assuming that all forested areas along the route would be cleared. Approximately 252 acres of grassland/pasture and 206 acres of cropland would be affected. Potential impacts to vegetation associated with riparian/wetland areas crossed by this route are discussed in Section 4.3.4. Of the total 4.6 miles of riparian/wetland types crossed, the Western Alternative would potentially affect 1.4 miles (21.2 acres) of palustrine forested wetlands, resulting in significant impacts to this resource. No old growth forested areas or any federal or state-listed plant species are known to occur within the proposed Western Alternative ROW. Two state sensitive species (blue-eyed grass and wood sage) occur 0.5 to 0.25 mile from the route, respectively (see Table 3-6).

The majority of the vegetation along the Onion Creek Variation is the mixed forest type (see Table 4-2). No forested wetlands appear to occur along this variation. The vegetation resources associated with the Marshall Variation are described in Section 4.2.6 for the Eastern Alternative.

Significant Impact Summary. No areas of old growth forest would be crossed by the Western Alternative or its variations and no federal or state-listed plant species would be affected. Approximately 21.2 acres of palustrine forested wetlands would potentially be affected by line construction of the Western Alternative, resulting in the long-term loss of riparian or wetland vegetation. This loss would be considered significant for this sensitive resource.

4.3.7 Wildlife

Potential construction, operation, maintenance, and abandonment impacts to area wildlife species and their associated habitats would be similar to those discussed for the Proposed Route (see Section 4.1.7). The Western Alternative would potentially remove 1,310 acres of forested area, converting it to a grass/shrub habitat (see Table 4-1). This alternative crosses a total of five priority deer concentration areas. These wintering areas are large throughout the route and maintain a high number of individuals (see Section 3.3.7).

Construction of the Onion Creek Variation would remove approximately 224 acres of forested area. The segment of the Western Alternative replaced would remove 167 acres of forested area. Both the variation and the segment of the Western Alternative replaced would each intersect two deer concentration areas. Refer to Section 4.2.7 for additional information on wildlife resources associated with the Marshall Variation.

Threatened or Endangered Species. Potential impacts to sensitive wildlife species would be similar to those discussed for the Proposed Route. Disturbance to wintering bald eagle roost sites potentially located along the Columbia and Colville Rivers during line construction would affect wintering birds. Potential impacts to foraging eagles below Long Lake Dam would be limited to an increase in line collisions. No impacts to these birds would be expected from project construction, since individuals would return to the area to forage following completion of construction and no communal roost sites have been reported at this crossing.

Significant Impact Summary. A total of five priority deer winter ranges would be crossed by the Western Alternative, potentially resulting in significant impacts. The line would also cross the Spokane River below Long Lake Dam, increasing the potential for line strikes by bald eagles foraging along the river. No old growth would be crossed by this route or its variations, and impacts to riparian/wetland areas are outlined in Section 4.3.4. Both the Onion Creek Variation and the segment of the Western Alternative replaced would affect two priority deer areas, potentially resulting in significant impacts.

4.3.8 Existing and Planned Land Use

4.3.8.1 Existing Land Use

The impact assessment methodology used for the existing land use along the Western Alternative was identical to that used for the Proposed Route (see Section 4.1.8.1). The existing land use impacts along the Western Alternative are described below, using the same route designations described in Section 3.3.8.1. However, impacts to agricultural land use are related to the total amount of cultivated land lost from production, and are, therefore, not evaluated (although they are quantified) separately for each segment. These segments and related impacts are shown on Map 2-2.

Border to Island Rock. In this segment of the Western Alternative, four residences would be located between 100 and 200 feet from the ROW edge and would be subject to low impacts. One major industrial building would be less than 100 feet from the ROW edge. However, this building is isolated and appears to have relatively unrestricted opportunities for expansion. Therefore, the project would not likely affect the site's potential for development. Impacts would therefore be low. About 9,200 feet of agricultural land would be crossed. The operation of one moving irrigation system would be slightly disrupted, causing low impacts. The naturalness of the setting of the recreational uses along the Columbia River and Franklin D. Roosevelt Lake would not be substantially affected. The valley containing this river/reservoir also accommodates a highway and railroad; therefore, the addition of the project in this area would have little effect on the naturalness of the river/reservoir area.

Island Rock to Echo. Two residences would occur within 100 feet of the ROW edge in this segment, subject to moderate impacts. Three residences located between 100 and 200 feet from the ROW edge would be subject to low impacts. About 10,500 feet of agricultural land would be crossed. As discussed for the Border to Island Rock segment, no measurable effect would occur on the recreational use of Franklin D. Roosevelt Lake/Columbia River. This segment would also not affect the recreational uses at Williams Lake, located more than 0.5 mile to the west.

Echo to Southwest of Arden. Two residences would be located within 100 feet of the ROW edge, in this segment, and five would occur between 100 and 200 feet from the ROW edge. These areas would be subject to moderate and low impacts, respectively. The route segment would cross 8,200 feet of agricultural land. One active sand/gravel pit would be crossed over a distance of about 300 feet, resulting in a moderate impact to the facility. A picnic area is located about 1,200 feet from the proposed line, west of Arden. The project would have no effects on the use of this picnic area.

Southwest of Arden to Southwest of Bluecreek. In this segment, one residence would be located between 100 and 200 feet from the ROW edge, experiencing low impact. About 9,000 feet of agricultural land would be crossed. Formerly, a small rural school (Sunnyside School) was located adjacent to the ROW in this segment. According to Stevens County personnel, this school is no longer active.

Southwest of Bluecreek to Four Mound Prairie. This segment would require the removal of three residences and one minor uninhabited building, causing significant and low impacts, respectively. Two residences would be located within 100 feet of the ROW edge and five would be between 100 and 200 feet from the ROW edge, resulting in moderate and low impacts, respectively. About 23,400 feet of agricultural land would be crossed. One industrial operation would be affected where the route segment would cross the edge of an apparently active tailings pond for a distance of 1,600 feet, causing low impacts.

Significant impacts to the Spokane Tribe of Indians would be limited to the removal of two residences located on the west side of the Western Alternative (see Map 2-2, Sheet G). The Tribe would be compensated for these removals, and there would be no other impacts to other tribal rights and interests, such as treaty rights, hunting and fishing rights, or sacred sites. WWP has informed DOE that it representatives first met with the Spokane Tribal Business Council regarding the proposed interconnection on August 31, 1987; the potential for a route paralleling the existing WWP 115-kV line along the eastern boundary of the Reservation was discussed. (Please refer to Table 1-2 for the permit requirement to cross Spokane Indian Reservation lands). No comments were received from the Tribal Business Council on either the Draft EIS or SDEIS. The proposed licensing/construction schedule was described along with upcoming public information meetings scheduled in September 1987. Following the WWP public information meetings and the DOE scoping meetings for the EIS, the preferred route was designed in Pend Oreille County leaving the route in Stevens County and across the Reservation boundaries as an alternative. Since the route on the Reservation was only an alternative, further contact was not made with the Tribal Council to discuss acquiring ROWs. The Spokane Tribe has been included on the DOE mailing list for the EIS, and the Bureau of Indian Affairs (BIA), is also a formal cooperating agency for the preparation of this EIS.

No comments were received from the Tribal Business Council on either the Draft EIS or SDEIS.

Four Mound Prairie to Marshall Vicinity. The remainder of the Western Alternative route consists of three segments that are common with the Eastern Alternative. These are:

- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to North of Marshall

- Marshall Vicinity

The existing land use impacts along these segments are described in Section 4.2.8.1.

Total Impacts of Western Alternative. A total of seven residences and one major industrial building would require removal, causing significant impacts. One major uninhabited building and five minor uninhabited buildings would also require removal, causing moderate and low impacts, respectively. Seventeen residences and one major industrial building would be located within 100 feet of the ROW edge, resulting in moderate impacts. A total of 28 residences would occur between 100 and 200 feet from the ROW edge, creating low impacts. Approximately 98,900 feet (18.7 miles) of agricultural land would be crossed, causing the removal of 5.6 acres of land from cultivation. This would constitute a low level impact on agricultural activities. The operation of a moving irrigation system would be slightly obstructed, causing low impacts. An active sand/gravel pit would be crossed, creating moderate impacts to the extraction operation. The edge of an active industrial tailings pond would be crossed, causing low impacts. The project would not affect the FAA flight clearance zone at Spokane International Airport, but would intrude slightly into Spokane County's more restrictive flight clearance zone at the same location. These would be considered moderate impacts.

Onion Creek Variation. In this segment, one major uninhabited building would require removal, causing moderate impacts. Two residences would occur within 100 feet of the ROW edge and another two would be located between 100 and 200 feet from the ROW edge. These residences would be subject to moderate and low impacts, respectively. About 8,400 feet (1.6 miles) of agricultural land would be crossed, causing 0.5 acre of cultivated land to be removed from production. The segment of the Western Alternative replaced would pass within 100 feet of two residences, causing moderate impacts, and between 100 and 200 feet from three other residences, resulting in low impacts. The segment would cross 10,500 feet (2.0 miles) of agricultural land, removing 0.6 acre from cultivation. Considering significant and moderate impacts, the Onion Creek Variation would affect one additional major uninhabited building (moderate impact).

The existing land use impacts associated with the Marshall Variation and the segment of the Western Alternative replaced would be the same as those described for the Eastern Alternative in Section 4.2.8.1.

Significant Impact Summary. The Western Alternative would require the removal of seven residences and one major inhabited building, resulting in significant impacts to existing land uses. The Onion Creek Variation and the route segment replaced would cause no significant impacts to existing land uses. Both the Marshall Variation and the segment replaced would each

require the removal of two residences, which would result in significant impacts to existing land uses for both route segments.

4.3.8.2 Planned Land Use

The impact assessment methodology used for the Western Alternative was identical to that used for the planned land use along the Proposed Route (see Section 4.1.8.2). The planned land use impacts along the Western Alternative are described below, using the same route designations described in Section 3.3.8.2. These segments and related impacts are shown on Map 2-2.

Border to Island Rock. This segment of the Western Alternative is located along new ROW and crosses about 2.8 miles of land designated for Tract/Estate development by Stevens County, causing moderate impacts. The segment also crosses about 9.5 miles of land planned as future Rural development by the county, resulting in low impacts.

Island Rock to Echo. This segment crosses about 3.4 miles of land designated in the Stevens County Plan as future Rural development. Since the route here is located on new ROW, it would cause low impacts.

Echo to Southwest of Arden. About 5.4 miles of this segment is located along on new ROW and crosses Stevens County's designated Rural land. This would cause low impacts.

Southwest of Arden to Southwest of Bluecreek. This segment is located on new ROW and crosses about 4.6 miles of land designated by Stevens County's future Rural development, causing low level impacts.

Southwest of Bluecreek to Four Mound Prairie. This route segment crosses 0.8 mile of new ROW on Bureau of Land Management (BLM) public land. The segment would not conflict with planned land use or designated policy, resulting in low impacts. No impacts to future land uses would occur along the 3.4 miles of Spokane Indian Reservation land, since the proposed transmission line would parallel existing ROWs through this area. The segment also crosses about 8.8 miles of land designated for Rural development by Stevens County. This land would be subject to low impacts.

Four Mound Prairie to Marshall. The remainder of the Western Alternative route consists of three segments that are common with the Eastern Alternative. The planned land use impacts along these segments are described in Section 4.2.8.2.

Total Impacts of Western Alternative. The entire route crosses 0.8 mile of BLM land, resulting in low impacts. In Stevens County, it crosses 2.8 miles of proposed Tract/Estate development, causing moderate impacts and 31.7 miles of land designated for Rural development, resulting in low impacts. In Spokane County, the route crosses land planned for Urban, Industrial, Suburban, and Rural levels of development for a total of 5.6 miles, where it would cause low impacts.

Onion Creek Variation. This variation is located entirely along new ROW. It crosses about 1.1 miles of BLM land, with no apparent conflict, resulting in low impacts. It also crosses about 7.6 miles of land designated in the Stevens County Plan for Rural development. This land would also be subject to low impacts. The segment of the Western Alternative replaced would cause about 3.4 miles of low level impacts to land designated by Stevens County's for Rural development. The Onion Creek Variation would have 5.3 more miles of low level impact on planned land use than the corresponding portion of the Western Alternative.

Marshall Variation. The effects on planned land uses associated with the Marshall Variation and the segment of the Western Alternative replaced would be the same as those described for the Eastern Alternative in Section 4.2.8.2.

Significant Impact Summary. Neither the Western Alternative, the Onion Creek Variation, nor the Marshall Variation would have significant impacts on planned land uses.

4.3.9 Visual Resources

The visual impact assessment process for the Western Alternative is the same as that presented for the Proposed Route in Section 4.1.9. For ease of discussion, the visual impacts expected along the Western Alternative is addressed in the same six segments that were identified in the discussion of existing conditions (see Section 3.3.9). These areas have somewhat distinct landscape conditions, and have generally similar types and levels of impacts.

Boundary to Swede Pass. This route would parallel the Columbia River in a scenic and natural-dominated landscape. There are large numbers of viewers on Highways 25 and 251, which closely parallel the proposed ROW. In addition, the proposed line would be visible from scattered residences and the Columbia River (Franklin D. Roosevelt Lake), including the Coulee Dam National Recreation Area. No existing transmission lines occur in this area. Visual impacts would be relatively high, with 14.5 miles of significant long and short-term impacts and 3.2 miles of moderate impacts. Only where visibility is reduced, due to distance or screening, would impact levels drop to moderate or low.

Swede Pass to Stensgar Creek. This segment would follow the west edge of Echo Valley down to Highway 395 then cross the foothills directly west of the Colville Valley. These valleys are relatively intensely farmed. As a result, most of this segment would be visible from a combination of scattered rural residences and highways (primarily Highway 395 and the Williams Lake Road). Only six relatively short segments would be screened from view and result in no visual impacts. The remainder (27.8 miles) would result in moderate long-term impacts, as a result of the structures in this agricultural valley-foothills landscape. Short-term impacts would be few, resulting in a few areas of vegetative modification and a single area of landform modification directly north of Stensgar Creek on Dunn Mountain.

Stensgar Creek to Deer Creek. This segment would cross a mountainous, forested landscape and is less visible to sensitive viewpoints. Moderate long-term impacts would affect 6.8 miles of this portion of the route. Some short-term moderate impacts would also result from vegetative modifications in a few areas. The timber over much of this area has been heavily logged, which would reduce the vegetative modifications. The impacts along this segment, both short and long term, would be concentrated largely in the first 4 to 5 miles south of Stensgar Creek, due to visibility from the Bluecreek West Road, the Addy Gifford Road, and a few scattered rural residences in the Stensgar Creek and Dry Creek drainages. The remainder of the impacts result from visibility of relatively short segments from a few residences near the Huckleberry Creek, Cedar Creek, and Deer Creek drainages. There is a 0.5 to 0.75-mile section of BLM land crossed by this segment between Huckleberry and Cedar Creeks. However, it is not visible from any sensitive viewpoint.

Deer Creek to Walkers Prairie. This area is a mosaic of farmland and low forested foothills. Viewpoints are primarily limited to scattered rural residences. A portion of the route on Craney Hill would also be visible from Highway 231. Approximately the southern 2 miles of this segment would parallel a smaller existing wood H-frame transmission line. The majority of this segment (7 miles) would result in moderate long-term impacts, as a result of the introduction of the project structures; it would also result in moderate short-term impacts, as a result of tree clearing.

Walkers Prairie to Four Mound Prairie. This route would pass through a relatively flat, forest-grassland/agricultural mosaic, paralleling one smaller existing H-frame transmission line from Walkers Prairie to the Long Lake Dam and two smaller existing transmission lines from this point south. Most of the route in this area is open to view from either scattered rural residences or Highway 231 and county roads. As a result, 12.4 miles would result in long-term moderate visual impacts. Only a short portion would result in moderate short-term impacts, due to crossing the steep escarpment south of Long Lake.

Four Mound Prairie to Marshall. Four Mound Prairie is an open grassland/agricultural landscape of generally low landscape quality, containing two smaller existing transmission lines. A number of scattered rural residences occur in this area which would be in view of the line. Visual impacts would be low throughout. The remainder of this segment is common to the Eastern Alternative and has been discussed in Section 4.2.9. Overall, this segment would result in 5.2 miles of moderate long-term impact.

Total Impacts of the Western Alternative. Overall, the Western Alternative would result in 62.4 miles of moderate long-term impacts and 14.5 miles of significant long-term impacts. There would also be numerous scattered areas of short-term impacts, resulting from tree clearing, and four relatively small areas where landform modifications would be moderate, as well.

Onion Creek Variation. The Onion Creek Variation would cross through a forested, mountainous, and mountain valley landscape with numerous scattered rural residences. There are currently no existing transmission lines in the area, and it has been identified as having a moderate level of landscape quality. The proposed transmission line would have relatively high visibility from many of the scattered residences, as well as intermittent visibility from the Clugston-Onion Creek Road. As a result, the transmission line along this variation would result in 13.5 miles of moderate long-term visual impacts. Approximately half this distance would also result in moderate short-term impacts, resulting from tree clearing along the ROW.

By comparison, the segment of the Western Alternative replaced would result in 7.9 miles of moderate long-term impacts and 5.9 miles of significant impacts. The reason for this difference is that a greater portion of the Western Alternative segment would pass through areas of high landscape quality, in addition to residential and highway viewpoints, which would be visible from the Coulee Dam National Recreation Area.

The visual resource impacts for the Marshall Variation and the segment replaced are presented in Section 4.2.9 for the Eastern Alternative.

Significant Impact Summary. The Western Alternative would result in 14.5 miles of significant long-term visual impacts, due to high visibility from various types of sensitive viewpoints in a scenic, natural-dominated setting without similar modifications. The Onion Creek Variation would cause no significant long-term visual impacts, as compared to the 5.9 miles of significant impacts along the segment of the Western Alternative replaced. Neither the Marshall Variation nor the segment replaced would result in significant impacts to visual resources.

4.3.10 Cultural Resources

Cultural resource impacts along the Western Alternative would be the same as described for the Proposed Route (see Section 4.1.10). Potential impacts should be avoidable (Hudson et al. 1988) through judicious route selection; compliance with all applicable state and federal procedural requirements and permit restrictions; and completion of field surveys prior to construction, where appropriate (see Section 4.9).

4.3.11 Socioeconomics and Community Resources

4.3.11.1 Construction

Population. Population impacts along the Western Alternative would be the same as described for the Proposed Route (see Section 4.1.11.1). The Western Alternative and its variations would have no significant impacts on population because of the short duration of construction, the limited number of out-of-region workers, and no permanent workforce would be required.

Economic Base. The economic base impacts resulting from the Western Alternative would be similar to those described for the Proposed Route (see Section 4.1.11.1). However, Pend Oreille County would not be impacted by this alternative. The route would run through parts of Stevens, Spokane, and Lincoln Counties and cover 121.1 miles. No significant impacts to economic conditions would be anticipated from construction of this alternative or its variations.

Housing. No significant housing impacts are expected. Adequate temporary housing exists in Stevens and Spokane County to accommodate all workers requiring housing, as illustrated in Sections 3.1.11.3 and 4.1.11.1.

Fiscal Conditions. The fiscal impacts related to the construction phase would be similar to those described for the Proposed Route (see Section 4.1.11.1).

Property Values. Refer to the construction phase of the Proposed Route for a discussion on property values (see Section 4.1.11.1).

4.3.11.2 Operation and Maintenance

Population. No permanent workforce would be established as a result of the proposed Interconnection; therefore, there would be no population changes during project operation and maintenance.

Economic Base. There are no anticipated changes in the economic base for the Western Alternative during the operation and maintenance phase, other than an increase to the Stevens, Spokane, and Lincoln County tax bases from property tax proceeds. Property tax receipts would increase due to transmission line construction. Some agricultural and timber lands would be removed from production, as discussed below.

Housing. The Western Alternative and its variations would have no impacts on housing during the operations and maintenance phase of the project.

Fiscal Conditions. The fiscal conditions for this alternative are similar to those described for the Proposed Route (see Section 4.1.11.2). Table 4-6 shows the tax estimates and percent increase in property tax receipts for the affected counties. The value of agricultural lands removed from production would be minimal as compared to tax receipts generated by the transmission line. Total acreage removed from production would be only 5.6 acres (see Section 4.3.8). Table 4-7 shows a potential timber production value loss of $445,000 for the Western Alternative. The Onion Creek Variation would result in approximately $76,000 loss in estimated timber production, compared to $57,000 for the segment of the Western Alternative replaced. The Marshall Variation would result in $30,000 loss in estimated production, compared to approximately $10,000 loss for the Western Alternative segment replaced. Private property owners would be compensated at current market rates; established timber operations would receive two options for the land's fair market value, as described in Section 4.1.11.2.

Property Values. Refer to the construction phase of the Proposed Route for the discussion on property values (see Section 4.1.11.1).

4.3.11.3 Abandonment

Abandonment of the Western Alternative would decrease tax bases in counties crossed by the route. At the time of line abandonment, tax receipts in each county would be reduced from the line's in-service date due to depreciation. Counties that would be affected include Stevens, Spokane, and Lincoln. Some agricultural and timber lands may be returned to production. The Western Alternative would have no impact on housing during abandonment of the project. Property values would be affected similar to that described for the Proposed Route (see Section 4.1.11.3).

4.3.11.4 Significant Impact Summary

Increases to the tax base and subsequent property tax receipts throughout the life of the project would significantly benefit the fiscal conditions in Stevens County.

4.3.12 Transportation and Noise

Transportation and noise impacts along the Western Alternative would be the same as those described for the Proposed Route (see Section 4.1.12). The Western Alternative and its variations would have no significant impacts on transportation and noise because traffic would be delayed for only short periods of time during construction (less than 15 minutes); low profile structure configurations would be used in the vicinity of the Spokane International Airport; construction-related noise would only be for a short time in a given location; and long-term, audible noise levels during line operation are not expected to exceed 36 dBA at the edge of the ROW.

4.4 Northern Crossover Alternative

4.4.1 Air Quality

Potential air quality impacts associated with the Northern Crossover Alternative and its variations would be the same as described for the Proposed Route (see Section 4.1.1). The Northern Crossover Alternative would have no significant impacts on air quality resources.

4.4.2 Geology and Soils

4.4.2.1 Geology

Construction. The Northern Crossover Alternative crosses a variety of geologic formations from the northern upland areas to the broad river valleys, as discussed in Section 3.4.2.1. The underlying materials along the route should provide an adequate foundation for tower structures. Potential impacts to topographical features along the Northern Crossover Alternative would be minimal. Surficial and underlying substrates would be disturbed during construction activities for tower placement and access road construction. Steep grades and other areas subject to erosion would be stabilized according to WWP's ROW restoration procedures (see Table 2-5). No significant impacts to geological features would occur during transmission line construction.

Operation and Maintenance. Seismic potential along the Northern Crossover Alternative appears to be minimal. Potential landslide hazards may occur during project operation at the

Spokane River crossing and north of the Spokane River (see Section 3.3.2.1), due to the moderate incidence and susceptibility to landsliding in steep mountainous areas, where slopes are potentially undercut, or if excavations occur in susceptible material. No significant impacts to the transmission line would be expected from potential geologic hazards within the project area, however, because of structure sighting procedures implemented by WWP for potentially sensitive areas. Operation of the proposed Interconnection has the potential to impact future mineral development along this alternative.

Abandonment. No impacts would occur to geological resources following project abandonment. Appropriate reclamation procedures would be implemented to prevent increased erosion within the disturbed areas.

Significant Impact Summary. The Northern Crossover Alternative and its variations would have no significant impacts on geologic resources located along these project routes because of reclamation procedures followed by WWP (see Section 2.3 and Table 2-5). In addition, seismic hazards and potential mineral development appear to be minimal for the project area. Potential landslide areas would be avoided by proposed line construction.

4.4.2.2 Soils

Construction. Soils with high erosion potential on moderate to steep slopes occur along greater lengths of the Northern Crossover Alternative than compared to the Southern Crossover Alternative or comparable segments of either the Proposed Route or Western Alternative. This is due to a greater amount of mountainous terrain along the Northern Crossover Alternative segment. However, impacts due to erosion losses during construction activities should be considered short-term and would not be significant, due to the implementation of the environmental protection measures presented in Section 2.3.4.

Approximately 11.7 miles of prime farmland soils would be crossed by this alternative. These 177 acres are scattered throughout the length of the Northern Crossover Alternative. About 1 mile of the Colville Valley floor is crossed directly south of Arden. This area contains prime farmland soils. Areas of prime farmland soils along common segments of the Proposed Route and Western Alternative have been previously described in Sections 4.1.2.2 and 4.3.2.2. Similar avoidance and mitigation measures would be employed along the Northern Crossover Alternative, as stated for the other routes, and potential impacts should be considered short-term construction related impacts and would not be significant.

The Boundary Dam and Marshall Variations are presented in Sections 4.1.2.2 and 4.2.2.2, respectively. Construction impacts associated with these variations would be the same as those described for the Proposed Route and Eastern Alternative.

Operation and Maintenance. Following ROW reclamation and revegetation, typical transmission line operations are not expected to result in significant impacts to soil types along the Northern Crossover Alternative or its variations. Transmission line maintenance would include periodic ground travel along the ROW. Whenever possible, line maintenance would be conducted when minimum surface disturbance would occur (i.e., avoid wet periods). Therefore, no significant impacts are expected to occur as a result of these operation and maintenance activities.

Abandonment. The termination of the proposed Interconnection would result in transmission structure removal. Impacts would parallel those described during construction activities. Appropriate measures would be used by WWP to remove structures and implement site reclamation to ensure resource protection (see Table 2-5). No significant impacts to soil resources would be anticipated from project abandonment.

Significant Impact Summary. The Northern Crossover Alternative and the associated Boundary Dam and Marshall Variations would have no significant impacts on soils crossed by these routes. Soil erosion losses or declines in crop productivity on prime farmland areas from soil compaction would be considered short-term construction impacts. No significant impacts would occur as a result of transmission line operation, maintenance, or abandonment activities.

4.4.3 Surface Water

Construction. No significant impacts to surface water resources are expected within the project area from the Northern Crossover Alternative or its variations. The majority of the water resources and sensitive riparian areas crossed would be spanned by the proposed transmission line. Both line and access road construction activities conducted near stream crossings would potentially cause an increase in siltation of the water resources. However, in areas directly crossed by the line, the environmental protection procedures outlined in Table 2-5 would minimize potential impacts. Procedures to reduce the likelihood of accidental spillage of materials into natural water courses are also discussed in Table 2-5; therefore, no impacts from these sources are expected.

The Northern Crossover Alternative would cross three streams that are designated under county Shoreline Master Plans. The crossing of designated streams by an electric transmission line is permitted under these master plans. Impacts to designated streams would be minimized by selective clearing of vegetation at the crossing site and by restoration of disturbed areas

following construction (see Table 2-5). Therefore, the proposed transmission line would be consistent with established Shoreline Master Plans and would not have significant impacts on the streams and environmental values these plans are designed to protect.

Table 3-4 presents the water resources crossed by the Boundary Dam and Marshall Variations and the segments of the Northern Crossover Alternative replaced by these variations. These proposed crossings would be consistent with established management plans, and construction activities would be regulated under the protection procedures presented in Table 2-5. Therefore, no significant impacts are anticipated from project construction along these proposed variations.

Operation and Maintenance. No impacts to surface water resources would occur during project operation. Line maintenance activities may require periodic ground inspections, resulting in potential impacts to streams when reopening access roads, crossing drainages, or removing vegetation. These impacts would not be significant, however, because WWP would implement the environmental protection measures presented in Section 2.3, Table 2-5 of this EIS.

Abandonment. Abandonment of the proposed line would entail removal of the supporting structures and reclamation of disturbed areas. Potential impacts to surface water would result from these activities, as discussed for proposed line construction. As stated above, impacts would not be significant to these resources due to WWP's environmental protection procedures outlined in Table 2-5.

Significant Impact Summary. The Northern Crossover Alternative and the Boundary Dam and Marshall Variations would be consistent with established county Shoreline Master Plans; therefore, these routes would not significantly impact the resources protected under these plans. Increased sedimentation of streams crossed by the proposed transmission line or access roads would be minimized by the procedures implemented by WWP to protect sensitive resources (see Table 2-5). Any stream siltation caused by the proposed project would be considered a short-term impact; therefore, implementation of the Northern Crossover Alternative or its variations would not significantly impact surface water resources crossed by these project routes.

4.4.4 Floodplains and Wetlands

Construction. No impacts to floodplains would be expected during the construction phase of the project, since surface disturbance would be restricted to the access road and tower sites, earth moving would be minimal, and excess soil from the foundations would not be disposed of within the floodplain area.

The Northern Crossover Alternative crosses the nine major wetland areas discussed in Section 3.4.4; two of these are common with the Proposed Route, three are common with the Western Alternative, and two are common with the Eastern Alternative. The following summary depicts the amount of wetland types affected by the Northern Crossover Alternative, based on a 125-foot-wide ROW:

Miles of Palustrine Wetlands Crossed and (Acres) Affected

Emergent	Scrub-Shrub	Aquatic Bed	Forested
2.2 (33.3)	1.7 (25.8)	0.02 (0.3)	1.0 (15.2)

As stated in Table 2-5 in Section 2.3.4 for project construction, WWP would not locate transmission line structures or access roads within a wetland/riparian area, as required by the appropriate agencies. In the event wetland/riparian areas were crossed, special construction techniques would span wetland areas, when possible, thereby avoiding disturbance to low-lying wetland areas, such as the emergent, scrub-shrub, and aquatic bed wetland types and the riparian zones associated with them. Significant impacts would not be anticipated for these specific areas.

Crossing of wetlands classified as palustrine forested, however, may require removal of trees that exceed the maximum allowable height beneath the transmission line (see Section 2.3.4). Of the total 4.92 miles of wetlands that would be crossed by the line, 1.0 mile would cross forested areas. Assuming that these sensitive areas could not be spanned by the line and complete canopy removal would be required within the 125-foot ROW, approximately 15.2 acres of forested wetland would be removed along the Northern Crossover Alternative. Removal of these trees would constitute a long-term loss of wetland vegetation and would be considered a significant impact to this resource.

Potential construction impacts to wetlands areas associated with the Boundary Dam and Marshall Variations are described in Sections 4.1.4 and 4.2.4, respectively.

Operation and Maintenance. Impacts to floodplains would be expected to occur only at the Colville River crossing, the only floodplain that could not be spanned. The number of structures to be placed in the floodplain cannot be determined until final, detailed engineering has been completed. However, since the floodplain is about 4,300 feet wide at the crossing point, approximately three transmission structures would be located within the floodplain. Surface disturbance associated with the construction of the structures and the physical presence of the structures during operation are not expected to alter the floodplain storage volume or cause a

local increase in the flood stage. The final design for the transmission structure foundations would consider site-specific soil conditions, as well as elevation of the 100-year flood and potential debris loading of the structure during a flood. For these reasons, failure of the structure during a flood is not expected. Thus, no significant impacts to floodplains are anticipated.

No additional wetland impacts from project operation and maintenance activities would be anticipated from the proposed Interconnection. As stated in Section 2.3.5, access roads established during project construction would be used for line maintenance activities. Removal of wetland vegetation is addressed for project construction. During the life of the project, WWP would continue to cut trees growing beyond the maximum allowable height beneath the conductors; however, no additional vegetation would be removed during project operation.

Abandonment. No impacts to floodplains would be anticipated during the abandonment phase of the project. During the removal of the transmission structures and conductors from project abandonment, WWP would implement the same protection procedures outlined in Sections 2.3.4 and 2.3.6 and in Table 2-5. No additional access roads would be constructed for this activity, and the trees removed within the wetland areas previously classified as palustrine forested would be allowed to retum to their original condition. Reclamation procedures for these sensitive areas would follow those outlined in Table 2-5.

Significant Impact Summary. The Northern Crossover Alternative and its variations would cause no significant impacts on floodplains because floods are not expected to damage transmission line structures located within the floodplain, the structures would not increase the potential for flooding, and the project is consistent with floodplain management objectives (see Section 4.4.3).

Neither the Northern Crossover Alternative, the Boundary Dam Variation, nor the Marshall Variation would produce significant impacts to wetlands classified as emergent, scrub-shrub, or aquatic bed that are crossed by the route, due to the implementation of the environmental protection procedures outlined in Table 2-5. Potential long-term loss of approximately 15.2 acres of trees associated with 1.0 mile of forested wetlands crossed by the Northern Crossover Alternative would result in significant impacts to this sensitive resource.

4.4.5 Aquatic Ecology

Potential impacts to aquatic resources from construction, operation, maintenance, and abandonment activities along the Northern Crossover Alternative and its alternatives would be the same as those discussed for the Proposed Route and the Western Alternative (see Sections 4.1.5 and 4.3.5). No significant impacts to these resources would occur for the Northern Crossover Alternative.

4.4.6 Vegetation

Construction, operation, maintenance, and abandonment impacts would be similar to those described for the Proposed Route (see Section 4.1.6). Approximately 1,923 acres of vegetation would be affected along the 126.9 miles of the Northern Crossover Alternative. Approximately 76 percent of the route (1,462 acres) would cross the mixed forest and ponderosa pine vegetation types (see Table 4-1), in addition to the 15.2 acres of forested wetlands. Based on the Forest Service timber volume estimates (Berube 1989), an estimated 13 million to 24 million board feet of sawtimber would be cleared, assuming that all forested areas along the route would be cleared. Approximately 221 acres of grassland/pasture and 127 acres of cropland would be affected. Potential impacts to vegetation associated with riparian/wetland areas crossed by this route are discussed in Section 4.4.4. The Northern Crossover Alternative would potentially remove 1.0 mile (15.2 acres) of forested wetlands, resulting in significant impact.

The Northern Crossover Alternative would cross 0.6 mile of old growth forest (see Section 3.4.8.2). ROW clearance during construction would remove 9.1 acres of old growth timber, resulting in significant impacts to this vegetation type. No federal or state threatened or endangered plant species are known to occur near the route. Eight state-sensitive plant species are present, however, at 15 locations along the route (see Table 3-9). Five populations of these species would potentially be crossed by the corridor.

Potential impacts to vegetation resources associated with the Boundary Dam and Marshall Variations are described in Sections 4.1.6 and 4.2.6, respectively.

Significant Impact Summary. The Northern Crossover Alternative may significantly impact five populations of state-sensitive plant species potentially crossed by the route. The 15.2 acres of forested wetlands that may be removed from project construction would result in long-term loss of riparian or wetland vegetation. This loss would be considered a significant impact. Significant impacts would also result from the clearance of 9.1 acres of old growth forest for this alternative.

4.4.7 Wildlife

Potential construction, operation, maintenance, and abandonment impacts to area wildlife species and their associated habitats would be similar to those discussed for the Proposed Route (see Section 4.1.7). Construction of the Northern Crossover Alternative would potentially remove 1,477 acres of forested area (see Table 4-1) and 9.1 acres of old growth timber (see Section 4.4.6). Loss of old growth forest would significantly affect those wildlife species dependent upon this habitat type. The Northern Crossover Alternative crosses a portion of mountain goat range, travels adjacent to Lead King Lakes, intersects three priority deer

concentration areas, and travels adjacent to one winter range located within the Little Pend Oreille National Wildlife Refuge. No impacts to the wildlife refuge would occur. Refer to Sections 4.1.7 and 4.2.7 for additional information on wildlife resources associated with the Boundary Dam and Marshall Variations, respectively.

Threatened or Endangered Species. Potential impacts to sensitive wildlife species would be the same as those discussed for the common areas of the Proposed Route and Western Alternative. This would include an increase in potential line strikes for bald eagles below Long Lake Dam at the Spokane River crossing.

Significant Impact Summary. A total of three priority deer winter ranges would be crossed by this alternative, potentially resulting in significant impact. Construction in the Linton Mountain area may significantly impact the resident mountain goat population during the critical breeding period. The line would also cross the Spokane River below Long Lake Dam, increasing the potential for line strikes by bald eagles foraging along the river. Approximately 9.1 acres of old growth timber would be removed by route construction, producing significant impacts to the wildlife species dependent on the habitat type. Impacts to riparian/wetland areas are outlined in Sections 4.1.4 and 4.3.4. This alternative would also travel adjacent to the Lead King Lakes area and would produce significant impacts to wildlife species associated with the wetlands, if the Eastern Route Option is implemented.

The Boundary Dam Variation would cross one river with a potential for bald eagle collisions, as compared to the route segment replaced, which would avoid a water crossing.

4.4.8 Existing and Planned Land Use

4.4.8.1 Existing Land Use

The impact assessment methodology used for existing land use along the Northern Crossover Alternative was identical to that used for the Proposed Route (see Section 4.1.8.1). The existing land use impacts along the Northern Crossover Alternative are described below, using the same route designations described in Section 3.4.8.1. These segments and related impacts are shown on Map 2-2.

The first portion of the Northern Crossover Alternative consists of two segments that are common with the Proposed Route. These are:

- Border to Boundary Dam
- Boundary Dam to South of Ione

The existing land use impacts along these segments are described in Section 4.1.8.1.

South of Ione to Southwest of Arden. In this segment, four residences occur between 100 and 200 feet from the ROW edge and are subject to low impacts. About 13,800 feet of agricultural land would be crossed. The route segment crosses twice a designated cross-country ski trail, which is part of the Little Pend Oreille Recreation Area. It is considered likely that the attractiveness of this trail for non-local skiers would be somewhat reduced, resulting in a moderate impact. The segment also passes close to a designated viewpoint in the same recreation area. However, several clear-cut logging areas are also in the vicinity of this viewpoint, and it is likely that the naturalness of the area and the use of the photo viewpoint would only be slightly affected by the project. This would result in low impact. No recreation impacts are expected along the Little Pend Oreille Off-road Vehicle Trail or at the Little Twin Lakes Campground.

Southwest of Arden to Marshall. The remainder of the Northern Crossover Alternative route consists of five segments:

- Southwest of Arden to Southwest of Bluecreek
- Southwest of Bluecreek to Four Mound Prairie
- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to North of Marshall
- Marshall Vicinity

The first two segments are common with the Western Alternative. Their existing land use impacts are described in Section 4.3.8.1. The last three of these segments are common with the Eastern Alternative, and their existing land use impacts are described in Section 4.2.8.1.

Total Impacts of Northern Crossover Alternative. Eight residences and one major inhabited building would be removed by this alternative, causing significant impacts. One major uninhabited building and six minor uninhabited buildings would also require removal, resulting in moderate and low impacts, respectively. A total of 13 residences would occur within 100 feet of the ROW edge, resulting in moderate impacts. Twenty residences would be located between 100 and 200 feet of the ROW edge, and would sustain low impacts. A designated cross-country ski trail would be crossed twice by the route and subject to moderate land use impacts. A designated viewpoint would be located near to the route. The impacts to this recreational feature would be low. The route would cross the edge of an active industrial tailings pond, causing low level impacts. About 91,400 feet (17.3 miles) of agricultural land would be crossed, resulting in the removal of 5.2 acres of land from cultivation. This impact would be considered to be low. The project would not affect the FAA flight clearance zone at Spokane International Airport, but

would intrude slightly into Spokane County's more restrictive flight clearance zone at the same location. This would cause moderate impacts.

Boundary Dam and Marshall Variations. The existing land use impacts associated with the Boundary Dam and Marshall Variations are discussed in Sections 4.1.8.1 and 4.2.8.1, respectively.

Significant Impact Summary. The Northern Crossover Alternative would require the removal of eight residences and one major inhabited building, resulting in significant impacts to existing land use. Both the Marshall Variation and the route segment replaced would each require the removal of two residences, which would also result in significant impacts to existing land uses.

4.4.8.2 Planned Land Use

The impact assessment methodology used for the Northern Crossover Alternative was identical to that used for the planned land use along the Proposed Route (see Section 4.1.8.2). The planned land use impacts along the route are the same as the route designations outlined in Section 4.4.8.1 for existing land use. These areas are shown on Map 2-2.

The first portion of the Northern Crossover Alternative consists of two segments that are common with the Proposed Route. The planned land use impacts along these segments are described in Section 4.1.8.2.

South of Ione to Southwest of Arden. This segment is located entirely on new ROW. About 0.6 mile of National Forest land planned for Special Wildlife Management (Forest Service Class I land) would be crossed. Forest Service policy permits new utility corridors in this land class, only if alternative locations do not exist. Since alternatives do exist, impacts are considered moderate. The segment also crosses about 0.6 mile of Class 6 (Deer Winter Range with Visual Resource Protection) and about 2.0 miles of Class 5 (Timber Management with Visual Resource Protection). A new utility ROW would conflict with Forest Service policy in these classes; therefore, impacts to future land use plans and policies are considered moderate. In Stevens County, the route segment crosses about 9.3 miles of land planned for Rural development. This land would be subject to low level impacts.

Southwest of Arden to Marshall. The remainder of the Northern Crossover Alternative route consists of five segments. The first two segments are common with the Western Alternative. Their planned land use impacts are described in Section 4.3.8.2. The last three segments are common with the Eastern Alternative, and their planned land use impacts are described in Section 4.2.8.2.

Total Impacts of Northern Crossover Alternative. The route crosses 0.6 mile of Forest Service Land Management Class 1 and 2.6 miles of Class 5. This siting would be contrary to Forest Service policy for future land use, resulting in moderate impacts. The alternative also crosses Forest Service Land Management Class 6 for 0.6 mile, causing moderate impacts. It crosses Classes 5 and 6 for 1.5 and 4.8 miles, respectively. These lands would be subject to low level impacts. The route crosses an isolated parcel of BLM land for 0.8 mile. Impacts here would be low. In Stevens County, the route crosses 22.7 miles of land planned for Rural development, causing low level impacts. In Spokane County, the route crosses a total of 5.5 miles of land planned for Urban, Industrial, Suburban, and Rural development. Impacts to these lands would be low.

Boundary Dam and Marshall Variations. The effects on planned land uses associated with these variations and the route segments replaced are discussed for the Proposed Route and the Eastern Alternative in Sections 4.1.8.2 and 4.2.8.2, respectively.

Significant Impact Summary. No significant impacts to planned land uses would occur from the Northern Crossover Alternative, the Boundary Dam Variation, or the Marshall Variation.

4.4.9 Visual Resources

The visual impact assessment process for the Northern Crossover Alternative is the same as that presented for the Proposed Route in Section 4.1.9. The Northern Crossover Alternative is common with the Proposed Route from the International border to approximately 2 miles south of Ione. The visual impacts of this area have been described for the Proposed Route (see Section 4.1.9). From the point of departure with the Proposed Route, the Northern Crossover Alternative would first pass through a somewhat remote, forested mountainous landscape, much of which is under the management of the Forest Service. This area is a mixture of Retention, Partial Retention, and Modification VQO designations. Segments of the proposed Interconnection would be visible from a combination of recreation roads, a nordic ski trail, Highway 20, and portions of the Pend Oreille Lakes. No existing transmission line occurs in this area. As a result, much of this area would result in either significant or moderate long-term visual impacts.

From approximately 2 miles north of Highway 20, the Northern Crossover Alternative would be in continual visibility from a combination of roads and residences. Near Highway 20, these residences are scattered rural homes; but further south, the line would be visible from a large concentration of homes at the Community of Arden. This area was rated as being of moderate landscape quality, and visual impacts would be moderate and long-term throughout this area. Some moderate short-term impacts would result as well, particularly in the area of Castle Rock

and The Butte, due to landform modifications. The remainder of the Northern Crossover Alternative would be common to the Western Alternative and is presented in Section 4.3.9.

In the portion that is unique to the Northern Crossover Alternative, this route would result in 15.4 miles of moderate long and short-term impacts and 1.8 miles of significant long-term visual impacts. Overall, the Northern Crossover Alternative would result in 58 miles of long and short-term moderate visual impacts and 1.8 miles of significant visual impact.

The visual resources associated with the Boundary Dam and Marshall Variations and the route segments replaced are discussed for the Proposed Route and Eastern Alternative in Sections 4.1.9 and 4.2.9, respectively.

Significant Impact Summary. The Northern Crossover Alternative would result in 1.8 miles of significant long-term impacts near the Pend Oreille Lakes, due to high visibility of the line in areas of Retention and Partial Retention VQO without similar modifications.

4.4.10 Cultural Resources

Cultural resource impacts along the Northern Crossover Alternative would be the same as described for the Proposed Route (see Section 4.1.10). Potential impacts should be avoidable (Hudson et al. 1988) through judicious route selection; compliance with all applicable state and federal procedural requirements and permit restrictions; and completion of field surveys prior to construction, where appropriate (see Section 4.9).

4.4.11 Socioeconomics and Community Resources

4.4.11.1 Construction

Population. Population impacts along the Northern Crossover Alternative would be the same as described for the Proposed Route (see Section 4.1.11.1). The Northern Crossover Alternative and its variations would have no significant impacts on population because of the short duration of construction, the limited number of out-of-region workers, and no permanent workforce would be required.

Economic Base. The economic base impacts resulting from the Northern Crossover Alternative would be similar to those described for the Proposed Route (see Section 4.1.11.1). The route would traverse parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties and cover 126.9 miles. No significant impacts to economic conditions would be anticipated from construction of this alternative or its variations.

Housing. The housing impacts resulting from the Northern Crossover Alternative would be similar to those described for the Proposed Route (see Section 4.1.11.1). No significant housing impacts are expected.

Fiscal Conditions. The fiscal impacts related to the construction phase would be similar to those described for the Proposed Route (see Section 4.1.11.1).

Property Values. Refer to the construction phase of the Proposed Route for a discussion of property values (see Section 4.1.11.1).

4.4.11.2 Operation and Maintenance

Population. No permanent work force could be established as a result of the proposed Interconnection; therefore, there would be no population changes during project operation and maintenance.

Economic Base. There are no anticipated changes in the economic base for the Northern Crossover Alternative during the operation and maintenance phase, other than an increase to the Pend Oreille, Stevens, Spokane, and Lincoln County tax bases from property tax proceeds. Property tax receipts would increase due to transmission line construction. Some agricultural and timber lands would be removed from production, as discussed below.

Housing. The Northern Crossover Alternative and its variations would have no impacts on housing during the operations and maintenance phase of the project.

Fiscal Conditions. The fiscal conditions for this alternative are similar to those described for the Proposed Route (see Section 4.1.11.2). Table 4-6 shows the tax estimates and percent increase in property tax receipts for the affected counties. The value of agricultural lands removed from production would be minimal as compared to tax receipts generated by the transmission line. Total acreage removed from production would be only 5.2 acres (see Section 4.4.8). Table 4-7 shows a potential timber production value loss of $502,000. Private property owners would be compensated at current market rates; established timber operations would receive the land's fair market value, as described in Section 4.1.11.2.

Property Values. Refer to the construction phase of the Proposed Route for the discussion on property values (see Section 4.1.11.1).

4.4.11.3 Abandonment

Abandonment of the Northern Crossover Alternative would decrease the tax bases in counties crossed by the route. At the time of line abandonment, tax receipts in each county would be reduced from the line's in-service date due to depreciation. Counties that would be affected include Pend Oreille, Stevens, Spokane, and Lincoln. Some agricultural and timber lands may be returned to production. The Northern Crossover Alternative would have no impact on housing during abandonment of the project. Property values would be affected similar to that described for the Proposed Route (see Section 4.1.11.3).

4.4.11.4 Significant Impact Summary

Increases to the tax base and subsequent property tax receipts would significantly benefit the fiscal conditions of Stevens County throughout the life of the project.

4.4.12 Transportation and Noise

Transportation and noise impacts along the Northern Crossover Alternative would be the same as those described for the Proposed Route (see Section 4.1.12). The Northern Crossover Alternative and its variations would have no significant impacts on transportation and noise because traffic would be delayed for only short periods of time during construction (less than 15 minutes); low profile structure configurations would be used in the vicinity of Spokane International Airport; construction-related noise would only be for a short time in a given location; and long-term, audible noise levels during line operation are not expected to exceed 36 dBA at the edge of the ROW.

4.5 Southern Crossover Alternative

4.5.1 Air Quality

Potential air quality impacts associated with the Southern Crossover Alternative and its variations would be the same as described for the Proposed Route (see Section 4.1.1). The Southern Crossover Alternative would have no significant impacts on air quality resources.

4.5.2 Geology and Soils

4.5.2.1 Geology

Construction. The Southern Crossover Alternative crosses a variety of geologic formations from the northern upland areas to the broad river valleys, as discussed in Section 3.5.2.1. The underlying materials along the route should provide an adequate foundation for tower structures. Potential impacts to topographical features along the Southern Crossover Alternative would be minimal. Surficial and underlying substrates would be disturbed during construction activities for tower placement and access road construction. Steep grades and other areas subject to erosion would be stabilized according to WWP's ROW restoration procedures (see Table 2-5). No significant impacts to geological features would occur during transmission line construction.

Operation and Maintenance. Seismic potential along the Southern Crossover Alternative appears to be minimal. Potential landslide hazards may occur during project operation at the Spokane River Crossing and north of the Spokane River (see Section 3.3.2.1), due to the moderate incidence and susceptibility to landsliding in steep mountainous areas, where slopes are potentially undercut, or if excavations occur in susceptible material. No significant impacts to the transmission line would be expected from potential geologic hazards within the project area, however, because of structure sighting procedures implemented by WWP for potentially sensitive areas. Operation of the proposed Interconnection has the potential to impact future mineral development along the transmission ROW.

Abandonment. No impacts would occur to geological resources following project abandonment. Appropriate reclamation procedures would be implemented to prevent increased erosion within the disturbed areas.

Significant Impact Summary. The Southern Crossover Alternative and its variations would have no significant impacts on geologic resources located along the route because of reclamation procedures followed by WWP (see Section 2.3 and Table 2-5). In addition, seismic hazards and potential mineral development appear to be minimal for the project area. Potential landslide areas would be avoided by proposed line construction.

4.5.2.2 Soils

Construction. Soils with high erosion potential on moderate to steep slopes do occur along the Southern Crossover Alternative. However, impacts due to erosion losses during construction activities should be considered short-term and would not be significant, due to the implementation of the environmental protection measures presented in Section 2.3.4.

Approximately 13.6 miles of prime farmland soils would be crossed by the Southern Crossover Alternative. These 206 acres are scattered throughout the length of the route and have been previously described for common segments with the Proposed Route and Western Alternative in Sections 4.1.2.2 and 4.3.2.2. A small portion of prime farmland along the Colville Valley floor is crossed directly north of Bluecreek. Similar avoidance and mitigation measures would be employed along the Southern Crossover Alternative, as stated for the Proposed Route, and potential impacts should be considered short-term construction related impacts.

The Boundary Dam and Marshall Variations are presented in Sections 4.1.2.2 and 4.2.2.2, respectively. Construction impacts associated with these variations would be the same as those described for the Proposed Route and Eastern Alternative.

Operation and Maintenance. Following ROW reclamation and revegetation, typical transmission line operations are not expected to result in significant impacts to soil types along the Southern Crossover Alternative or its variations. Transmission line maintenance would include periodic ground travel along the ROW. Whenever possible, line maintenance would be conducted when minimum surface disturbance would occur (i.e., avoid wet periods). Therefore, no significant impacts are expected to occur as a result of these operation and maintenance activities.

Abandonment. The termination of the proposed Interconnection would result in transmission structure removal. Impacts would parallel those described during construction activities. Appropriate measures would be used by WWP to remove structures and implement site reclamation to ensure resource protection (see Table 2-5). No significant impacts to soil resources would be anticipated from project abandonment.

Significant Impact Summary. The Southern Crossover Alternative and the associated Boundary Dam and Marshall Variations would have no significant impacts on soils crossed by these routes. Soil erosion losses or declines in crop productivity on prime farmland areas from soil compaction would be considered short-term construction impacts. No significant impacts would occur as a result of transmission line operation, maintenance, or abandonment activities.

4.5.3 Surface Water

Construction. No significant impacts to surface water resources are expected within the project area from the Southern Crossover Alternative or its variations. The majority of the water resources and sensitive riparian areas crossed would be spanned by the proposed transmission line. Both line and access road construction activities conducted near stream crossings would potentially cause an increase in siltation of the water resources. However, in areas directly crossed by the line, the environmental protection procedures outlined in Table 2-5 would

minimize potential impacts. Procedures to reduce the likelihood of accidental spillage of materials into natural water courses are also discussed in Table 2-5; therefore, no impacts from these sources are expected.

The Southern Crossover Alternative would cross four streams that are designated under county Shoreline Master Plans. The crossing of designated streams by an electric transmission line is permitted under these master plans. Impacts to designated streams would be minimized by selective clearing of vegetation at the crossing site and by restoration of disturbed areas following construction (see Table 2-5). Therefore, the proposed transmission line would be consistent with established Shoreline Master Plans and would not have significant impacts on the streams and environmental values these plans are designed to protect.

Table 3-4 presents the water resources crossed by the Boundary Dam and Marshall Variations and the segments of the Southern Crossover Alternative replaced by these variations. These proposed crossings would be consistent with established management plans, and construction activities would be regulated under the protection procedures presented in Table 2-5. Therefore, no significant impacts are anticipated from project construction along these proposed variations.

Operation and Maintenance. No impacts to surface water resources would occur during project operation. Line maintenance activities may require periodic ground inspections, resulting in potential impacts to streams when reopening access roads, crossing drainages, or removing vegetation. These impacts would not be significant, however, because WWP would implement the environmental protection measures presented in Section 2.3 and Table 2-5 of this EIS.

Abandonment. Abandonment of the proposed line would entail removal of the supporting structures and reclamation of disturbed areas. Potential impacts to surface water would result from these activities, as discussed for proposed line construction. As stated above, impacts would not be significant to these resources due to WWP's environmental protection procedures outlined in Table 2-5.

Significant Impact Summary. The Southern Crossover Alternative and the Boundary Dam and Marshall Variations would be consistent with established county and city Shoreline Master Plans; therefore, these routes would not significantly impact the resources protected under these plans. Increased sedimentation of streams crossed by the proposed transmission line or access roads would be minimized by the procedures implemented by WWP to protect sensitive resources (see Table 2-5). Any stream siltation caused by the proposed project would be considered a short-term impact; therefore, implementation of the Southern Crossover Alternative or its variations would not significantly impact surface water resources crossed by these project routes.

4.5.4 Floodplains and Wetlands

Construction. No impacts to floodplains would be expected during the construction phase of the project, since surface disturbance would be restricted to the access road and tower sites, earth moving be minimal, and excess soil from the foundations would not be disposed of within the floodplain area.

The Southern Crossover Alternative crosses the nine major wetland areas discussed in Section 3.5.4; three of these are common with the Proposed Route, four are common with the Western Alternative, and two are common with the Eastern Alternative. The following summary depicts the amount of wetland types crossed by the Southern Crossover Alternative, based on a 125-foot-wide ROW.

Miles of Palustrine Wetlands Crossed and (Acres) Affected

Emergent	Scrub-Shrub	Aquatic Bed	Forested
2.2 (33.3)	1.9 (28.8)	0.02 (0.3)	0.6 (9.1)

As stated in Table 2-5 in Section 2.3.4 for project construction, WWP would not locate transmission line structures or access roads within a wetland/riparian area, as required by the appropriate agencies. In the event wetland/riparian areas were crossed, special construction techniques would span wetland areas, when possible, thereby avoiding disturbance to low-lying wetland areas, such as the emergent, scrub-shrub, and aquatic bed wetland types and the riparian zones associated with them. Significant impacts would not be anticipated for these specific areas.

Crossing of wetlands classified as palustrine forested, however, may require removal of trees that exceed the maximum allowable height beneath the transmission line (see Section 2.3.4). Of the total 4.72 miles of wetlands that would be crossed by the line, 0.6 mile would cross forested areas. Assuming that these sensitive areas could not be spanned by the line and complete canopy removal would be required within the 125-foot ROW, approximately 9.1 acres of forested wetland would be removed along the Southern Crossover Alternative. Removal of these trees would constitute a long-term loss of wetland vegetation and would be considered a significant impact to this resource.

Potential construction impacts to wetland areas associated with the Boundary Dam and Marshall Variations are described in Sections 4.1.4 and 4.2.4, respectively.

Operation and Maintenance. Impacts to floodplains would be expected to occur only at the Colville River crossing, the only floodplain that could not be spanned. The number of structures to be placed in the floodplain cannot be determined until final, detailed engineering has been completed. However, since the floodplain is about 2,400 feet wide at the crossing point, approximately two transmission structures at most would be located within the floodplain. Surface disturbance associated with the construction of the structures and the physical presence of the structures during operation are not expected to alter the floodplain storage volume or cause a local increase in the flood stage. The final design for the transmission structure foundations would consider site-specific soil conditions, as well as elevation of the 100-year flood and potential debris loading of the structure during a flood. For these reasons, failure of the structure during a flood is not expected. Thus, no significant impacts to floodplains are anticipated.

No additional wetland impacts from project operation and maintenance activities would be anticipated from the proposed Interconnection. As stated in Section 2.3.5, access roads established during project construction would be used for line maintenance activities. Removal of wetland vegetation is addressed for project construction. During the life of the project, WWP would continue to cut trees growing beyond the maximum allowable height beneath the conductors; however, no additional vegetation would be removed during project operation.

Abandonment. No impacts to floodplains would be anticipated during the abandonment phase of the project. During the removal of the transmission structures and conductors from project abandonment, WWP would implement the same protection procedures outlined in Sections 2.3.4 and 2.3.6 and in Table 2-5. No additional access roads would be constructed for this activity, and the trees removed within the wetland areas previously classified as palustrine forested would be allowed to return to their original condition. Reclamation procedures for these sensitive areas would follow those outlined in Table 2-5.

Significant Impact Summary. The Southern Crossover Alternative and its variations would have no significant impacts on floodplains because floods are not expected to damage transmission line structures located within the floodplain, the structure would not increase the potential for flooding, and the project is consistent with floodplain management objectives (see Section 4.5.3).

Neither the Southern Crossover Alternative, the Boundary Dam Variation, nor the Marshall Variation would produce significant impacts to wetlands classified as emergent, scrub-shrub, or aquatic bed that are crossed by the route, due to the implementation of the environmental protection procedures outlined in Table 2-5. Potential long-term loss of approximately 9.1 acres of trees associated with 0.6 mile of forested wetlands crossed by the Southern Crossover Alternative would result in significant impacts to this sensitive resource.

4.5.5 Aquatic Ecology

Potential impacts to aquatic resources from construction, operation, maintenance, and abandonment activities along the Southern Crossover Alternative and its variations would be the same as those discussed for the Proposed Route and the Western Alternative (see Sections 4.1.5 and 4.3.5). No significant impacts to these resources would occur for the Southern Crossover Alternative.

4.5.6 Vegetation

Construction, operation, maintenance, and abandonment impacts would be similar to those described for the Proposed Route (see Section 4.1.6). Approximately 2,162 acres of vegetation would be affected along the 142.7 miles of the Southern Crossover Alternative. Approximately 81 percent of the route (1,744 acres) would cross the mixed forest and ponderosa pine vegetation types (see Table 4-1), in addition to the 9.1 acres associated with forested wetlands. Based on the Forest Service timber volume estimates (Berube 1989), an estimated 15.6 million to 28 million board feet of sawtimber would be cleared, assuming that all forested areas along the route would be cleared. Approximately 207 acres of grassland/pasture and 108 acres of cropland would be affected. Potential impacts to vegetation associated with riparian/wetland areas crossed by this route are discussed in Section 4.5.4. The Southern Crossover Alternative would potentially remove 0.6 mile (9.1 acres) of forested wetland areas, significantly impacting this resource.

The Southern Crossover Alternative would cross 0.5 mile of old growth forest (see Section 3.5.8.2). ROW clearance during construction would remove 7.6 acres of old growth timber, resulting in significant impacts to this vegetation type. No federal or state threatened or endangered plant species are known to occur near the route. However, 7 state-sensitive plant species are potentially present at 13 locations along the route (see Table 3-9). Six populations of these species would potentially be crossed by the alternative corridor.

Potential impacts to vegetation resources associated with the Boundary Dam and Marshall Variations are described in Sections 4.1.6 and 4.2.6, respectively.

Significant Impact Summary. The Southern Crossover Alternative would have no significant impacts on federally-listed plant species. However, the route may significantly impact six populations of state-sensitive plant species potentially crossed by the route. The 9.1 acres of forested wetlands that may be removed by project construction would be considered significant. Significant impacts would also result from the clearance of 7.6 acres of old growth forest.

4.5.7 Wildlife

Potential construction, operation, maintenance, and abandonment impacts to area wildlife species and their associated habitats would be similar to those discussed for the Proposed Route. Construction of the Southern Crossover Alternative would potentially remove 1,753 acres of forested area (see Table 4-1) and 7.6 acres of old growth timber (see Section 4.4.6). Loss of old growth forest would significantly affect those wildlife species dependent on this habitat type. The Southern Crossover Alternative crosses a portion of mountain goat range, is adjacent to the Lead King Lakes area, and intersects a total of three priority deer concentration areas. The wildlife resources associated with the Boundary Dam and Marshall Variations are described in Sections 4.1.7 and 4.2.7, respectively.

Threatened or Endangered Species. Potential impacts to sensitive wildlife species would be the same as those discussed for the common areas of the Proposed Route and Western Alternative. This would include an increase in the potential for line strikes by bald eagles below Long Lake Dam at the Spokane River crossing.

Significant Impact Summary. A total of three priority deer winter ranges would be crossed by this alternative, potentially resulting in significant impacts. Construction in the Linton Mountain area may significantly impact the resident mountain goat population during the critical breeding period. The line would also cross the Spokane River below Long Lake Dam, increasing the potential for line strikes by bald eagles foraging along the river. Approximately 7.6 acres of old growth timber would be removed by route construction, producing significant impacts to the wildlife species dependent on the habitat type. Impacts to riparian/wetland areas are outlined in Sections 4.1.4 and 4.3.4. This alternative would also travel adjacent to the Lead King Lakes area and would produce significant impacts to wildlife species associated with the wetlands, if the Eastern Route Option is implemented.

The Boundary Dam Variation would cross one river with a potential for bald eagle collision, as compared to the route segment replaced, which would avoid a water crossing

4.5.8 Existing and Planned Land Use

4.5.8.1 Existing Land Use

The impact assessment methodology used for existing land use along the Southern Crossover Alternative was identical to that used for the Proposed Route (see Section 4.1.8.1). The existing land use impacts along the Southern Crossover Alternative are described below, using the same

route designations described in Section 3.5.8.1. These segments and related impacts are shown on Map 2-2.

The first portion of the Southern Crossover Alternative consists of three segments that are common with the Proposed Route. These include:

- Border to Boundary Dam
- Boundary Dam to South of Ione
- South of Ione to West of Cusick

The existing land use impacts along these segments are described in Section 4.1.8.1.

West of Cusick to Southwest of Bluecreek. Two residences would be located between 100 and 200 feet of the ROW edge and subject to low impacts. About 7,700 feet of agricultural land would be crossed. The project would slightly reduce the naturalness at two areas of dispersed stream-related recreation on National Forest land near the segment, resulting in low impacts. The project parallels an existing transmission line at this location, preventing a greater change in the naturalness of the setting.

Southwest of Bluecreek to Marshall. The remainder of the Southern Crossover Alternative route consists of four segments:

- Southwest of Bluecreek to Four Mound Prairie
- Four Mound Prairie to East of Spokane International Airport
- East of Spokane International Airport to North of Marshall
- Marshall Vicinity

The first segment is common with the Western Alternative. its existing land use impacts are described in Section 4.3.8.1. The last three segments are common with the Eastern Alternative, and their existing land use impacts are described in Section 4.2.8.1.

Total Impacts of Southern Crossover Alternative. Ten residences and one major inhabited building would be removed by this route, causing significant impacts. Three major uninhabited buildings and eight minor uninhabited buildings would also be removed, resulting in moderate and low impacts, respectively. A total of 13 residences would occur within 100 feet of the ROW edge and subject to moderate impacts. Nineteen residences would be located between 100 and 200 feet from the ROW edge, and would receive low level impacts. About 83,200 feet (15.8 miles) of agricultural land would be crossed, resulting in the removal of 4.7 acres of land from cultivation. This would be a low level of impact. Two areas of dispersed recreation on

National Forest land would be subject to low impacts from this route, as would an active industrial tailings pond whose edge would be crossed. The project would not affect the FAA flight clearance zones at Spokane International Airport, but would intrude slightly into Spokane County's more restrictive flight clearance zone at this location. This is assigned a moderate impacts.

The existing land use impacts associated with the Boundary Dam and Marshall Variations are discussed in Sections 4.1.8.1 and 4.2.8.1, respectively.

Significant Impact Summary. The Southern Crossover Alternative would require the removal of 10 residences and one major inhabited building, resulting in significant impacts to existing land use. Both the Marshall Variation and the route segment replaced would each require the removal of two residences, which would result in significant impacts to existing land uses.

4.5.8.2 Planned Land Use

The impact assessment methodology used for the Southern Crossover Alternative was identical to that used for planned land use along the Proposed Route (see Section 4.1.8.2). The planned land use impacts along the route are the same as the route designations outlined in Section 4.5.8.1 for existing land use. These areas are shown on Map 2-2.

The first portion of the Southern Crossover Alternative consists of three segments that are common with the Proposed Route. The planned land use impacts along these segments are described in Section 4.1.8.2.

West of Cusick to Southwest of Bluecreek. This segment crosses about 0.5 mile of Forest Service Land Management Class 1 (Special Wildlife Management). This siting is contrary to Forest Service policy for future land use and would cause moderate impacts. The segment also crosses Forest Service Classes 5 and 6 (Timber Management and Deer Winter Range with Visual Resource Protection), while paralleling an existing transmission line for a total of 1.8 miles. Impacts would be considered low. The segment crosses about 2.6 miles of Stevens County's designated Rural development land (while on new ROW), causing low level impacts.

Southwest of Bluecreek to Marshall. The remainder of the Southern Crossover Alternative route consists of four segments. The first segment is common with the Western Alternative. Its future land use impacts are described in Section 4.3.8.2. The last three of these segments are common with the Eastern Alternative, and their future land use impacts are described in Section 4.2.8.2.

Total Impacts of Southern Crossover Alternative. The route crosses Forest Service Classes 1 and 5 land for about 0.5 mile and 0.6 mile, respectively. The impacts at these locations would be moderate. The route also crosses lands of Classes 5 and 6 for about 10.7 miles, causing low level impacts. It affects an isolated parcel of BLM land over a distance of about 0.8 mile. This would result in low impacts.

In Stevens County, the route would cross about 11.4 miles of land planned for Rural development. Impacts here would be low. In Spokane County, the route would cross lands planned for Urban, Industrial, Suburban, and Rural uses. These lands would be subject to low impacts over a distance of 6.1 miles.

Boundary Dam and Marshall Variations. The effects on planned land uses associated with these variations and the route segments replaced are discussed for the Proposed Route and the Eastern Alternative in Sections 4.1.8.2 and 4.2.8.2, respectively.

Significant Impact Summary. The Southern Crossover Alternative and its variations would have no significant impacts on planned land use.

4.5.9 Visual Resources

The visual impact assessment process for the Southern Crossover Alternative is the same as that presented for the Proposed Route in Section 4.1.9. The Southern Crossover Alternative is common with the Proposed Route from the border to the area near Cusick. The visual impacts of this area have been described for the Proposed Route (see Section 4.1.9). For approximately the first 2 miles of the crossover segment, the line would be visible from a combination of rural residences and roads. The route would parallel a smaller existing wood H-frame transmission line through this area of forested foothills and mountains. Due to the moderate landscape quality and high visibility, this portion of the route would result in moderate long-term impacts.

Between this area and Burnt Valley, the route would cross Forest Service lands designated as Partial Retention and Modification VQO. Visibility is limited to a Forest Service recreation road, except in Burnt Valley where a few scattered residences are located with a view of the proposed line. Portions of this area would result in moderate long-term impacts. From Burnt Valley to the Colville Valley, the route is largely on private lands, with a few areas of Forest Service lands designated as Modification and Partial Retention VQO. This area is seen largely from scattered rural residences. Where visibility is high, visual impacts would be moderate and long-term, with a few areas of short-term landform modifications.

From the Colville Valley near Bluecreek to its intersection with the Western Alternative, the Southern Crossover Alternative would not parallel an existing line. Here, visibility is from a combination of rural residences, Highway 395, and county roads. A portion of this segment would cross a corner of BLM lands located near the angle point on Riecker Mountain. The angle tower would be skylined and prominently visible from Highway 395. Based on the analysis process used for private lands, this would result in a moderate long-term impact. However, based on discussions with the BLM Area Manager, his assessment is that BLM would consider this an occurrence of significant impact. The remainder of this area would result in moderate short and long-term visual impacts.

From this point south, the Southern Crossover Alternative is common to the Western Alternative and has been discussed in Section 4.3.9. The portion of this alternative, which is unique, would result in 17.3 miles of moderate long and short-term visual impacts, and 0.1 mile of significant long-term impacts. Overall, the Southern Crossover Alternative would result in 56.7 miles of moderate long and short-term visual impacts and 0.1 mile of significant long-term impact.

The Boundary Dam and Marshall Variations are discussed in Sections 4.1.9 and 4.2.9, respectively.

Significant Impact Summary. The Southern Crossover Alternative would result in 0.1 mile of significant long-term visual impacts, due to the skylined visibility of a tower on BLM land as seen from Highway 395.

4.5.10 Cultural Resources

Cultural resource impacts along the Southern Crossover Alternative would be the same as described for the Proposed Route (see Section 4.1.10). Potential impacts should be avoidable (Hudson et al. 1988) through judicious route selection; compliance with all applicable state and federal procedural requirements and permit restrictions; and completion of field surveys prior to construction, where appropriate (see Section 4.9).

4.5.11 Socioeconomics and Community Resources

4.5.11.1 Construction

Population. Population impacts along the Southern Crossover Alternative would be the same as described for the Proposed Route (see Section 4.1.11.1). The Southern Crossover Alternative and its variations would have no significant impacts on population because of the short duration

of construction, the limited number of out-of-region workers, and no permanent workforce would be required.

Economic Base. The economic base impacts resulting from the Southern Crossover Alternative would be similar to those described for the Proposed Route (see Section 4.1.11.1). The route would traverse parts of Pend Oreille, Stevens, Spokane, and Lincoln Counties and cover 142.7 miles. No significant impacts to economic conditions would be anticipated from construction of this alternative or its variations.

Housing. The housing impacts resulting from the Southern Crossover Alternative would be similar to those described for the Proposed Route (see Section 4.1.11.1). No significant housing impacts are expected.

Fiscal Conditions. The fiscal impacts related to the construction phase would be similar to those described for the Proposed Route (see Section 4.1.11.1).

Property Values. Refer to the construction phase of the Proposed Route for a discussion on property values (see Section 4.1.11.1).

4.5.11.2 Operation and Maintenance

Population. No permanent work force would be established as a result of the proposed Interconnection; therefore, there would be no populations changes during project operation and maintenance.

Economic Base. There are no anticipated changes in the economic base for the Southern Crossover Alternative during the operation and maintenance phase, other than an increase to the Pend Oreille, Stevens, Spokane, and Lincoln County tax bases from property tax proceeds. Property tax receipts would increase due to transmission line construction. Some agricultural and timber lands would be removed from production, as discussed below.

Housing. The Southern Crossover Alternative and its variations would have no impacts on housing during the operations and maintenance phase of the project.

Fiscal Conditions. The fiscal conditions for this alternative are similar to those described for the Proposed Route (see Section 4.1.11.2). Table 4-6 shows the tax estimates and percent increase in property tax receipts for the affected counties. The value of agricultural lands removed from production would be minimal as compared to tax receipts generated by the transmission line. Total acreage removed from production would be only 4.7 acres (see Section 4.5.8). Table 4-7

shows a potential timber production value loss of $596,000. Private property owners would be compensated at current market rates; established timber operations would receive two options for the land's fair market value, as described in Section 4.1.11.2.

Property Values. Refer to the construction phase of the Proposed Route for the discussion on property values (see Section 4.1.11.1).

4.5.11.3 Abandonment

Abandonment of the Southern Crossover Alternative would decrease the tax bases in counties crossed by the route. At the time of line abandonment, tax receipts in each county would be reduced from the line's in-service date due to depreciation. Counties that would be affected include Pend Oreille, Stevens, Spokane, and Lincoln. Some agricultural and timber lands may be returned to production. The Southern Crossover Alternative would have no impact on housing during abandonment of the project. Property values would be affected similar to that described for the Proposed Route (see Section 4.1.11.3).

4.5.11.4 Significant Impact Summary

Increases to the tax base and subsequent property tax receipts from the project would significantly benefit the fiscal conditions in Pend Oreille and Stevens Counties throughout the life of the project.

4.5.12 Transportation and Noise

Transportation and noise impacts along the Southern Crossover Alternative would be the same as those described for the Proposed Route (see Section 4.1.12). The Southern Crossover Alternative and its variations would have no significant impacts on transportation and noise because traffic would be delayed for only short periods of time during construction (less than 15 minutes); low profile structure configurations would be used in the vicinity of Spokane International Airport; construction-related noise would only be for a short time in a given location; and long-term, audible noise levels during line operation are not expected to exceed 36 dBA at the edge of the ROW.

4.6 Electric and Magnetic Field Effects

4.6.1 Introduction

Due to the interest raised during public scoping for the proposed Interconnection and at public hearings and in public comment letters on the DEIS, the specific references for potential electric and magnetic field (EMF) effects used in this discussion are presented in Section 4.6.6. This reference section is not intended to present every scientific and popular press article published on the subject. Rather, it presents the major publications that form the core of our understanding of EMF phenomena. Those scientific panels and governmental agencies that have evaluated the EMF question (see Section 4.6.5) have reviewed and considered virtually all publications, studies, evidence, points of view, and opinions on the issue. This section attempts to summarize the reviews that have taken place and the conclusions that have been reached to date.

The proposed Interconnection would be a double-circuit 230-kV transmission line. The line would be constructed in a variety of ROW configurations, paralleling existing transmission lines through portions of the study area. Transmission lines in the 230-kV voltage classification were first built in the 1920s, and today a variety of 230-kV lines are in service within the United States. Table 4-8 summarizes the circuit-miles of electric transmission lines of different voltage classifications currently in service.

4.6.2 Corona

4.6.2.1 Definition and Description

One of the electrical phenomena associated with all energized devices, including high voltage transmission lines, is corona. This is the physical manifestation of energy loss and can transform energy into very small amounts of light, sound, radio noise, chemical reaction, and heat. Because power loss is uneconomical, corona has been studied since the early part of this century. Consequently, it is well understood by engineers, and steps to minimize corona are major factors in line design. Corona can be controlled through design practices, and it is usually not a problem for transmission lines rated at 230-kV and lower.

Corona is caused by the voltage gradient (electrical pressure) at the surface of a conductor. When the stress is great enough, it can exceed the insulating capability of the surrounding air, and some electrons can be forced off the wire, something like a garden hose leaking at weak points because the pressure is too high. The electrons can then collide with air molecules up to a fraction of an inch away. The air molecules become ionized (positively or negatively

Table 4-8

Transmission Line Circuit Miles in Service In the United States

Voltage Classification	Circuit Miles in Service
115 - 161 kV	188,901
230 kV	68,996
345 kV	46,159
500 kV	23,042
765 kV	2,428
TOTAL	329,526

Sources: (1, 2).

charged). Ionized air molecules may then join other ionized oxygen atoms to form ozone, which in turn can produce nitrogen oxide; or the air molecules may re-stabilize by capturing an electron and returning to an uncharged state. This return to the normal condition releases energy in the form of light and electromagnetic radiation (radio noise).

There are many variables that contribute to the presence and degree of corona: line voltage, number and diameter of conductors, nicks and scratches on the conductor surface, and weather, to name a few. Foul weather affects the insulating properties of the surrounding air and also leaves water droplets on the line which serve to concentrate electrical stress and make it easier for corona activity to occur. In the same way, scratches and defects on the conductor surface and even the sharper curvature of a smaller cable can lead to corona. Corona does not only occur on powerlines, it can happen anywhere electricity is used, such as in appliances and electrical machinery, or in nature.

Saint Elmo's fire is the best known example of natural corona. It is caused by the electric charge between overhead clouds and the earth acting through the mast of a sailing ship. It usually happens at a period of high electrical activity, such as during a thunderstorm. Natural corona can occur on airplanes where friction between the moving plane and air molecules can build up a static charge. It can occur naturally in, for example, mountain tops near clouds, dust storms, tornadoes, and around the tops of erupting volcanoes.

When corona occurs on transmission lines it is usually on high voltage lines of 345-kV and above, and then mostly during foul weather. The effects are local and are a nuisance rather than a serious problem or a hazard. For example, although radio noise in the AM range can be generated by corona discharge, it is usually of such small intensity that it should not be a significant problem outside of the ROW. The same is true of television interference and audible noise. These topics will be dealt with in later sections.

Power loss due to corona is an important factor in transmission line design. However, corona on lines below 345-kV has generally not been a major problem with proper design. Corona can be minimized by using larger diameter or multiple conductors, but at the cost of more and heavier conductor material. It is economically and physically impractical to design totally corona-free power lines, but experience and research have produced design techniques that can reduce corona and its effects to low levels.

The engineering design of the proposed Interconnection would produce very low conductor surface gradients of about 10 to 11 kV per centimeter (cm) due to the relatively low 230-kV line voltage and use of relatively large diameter and bundled conductors. The corona performance of the Interconnection would be as good as, or better than other lines in this voltage

classification (references 3, 4, 5, 6). It should be expected that the proposed Interconnection would have little or no corona activity under most operating conditions, and some corona activity during foul weather conditions.

4.6.2.2 Audible Noise

During corona activity, electric transmission lines (mainly 345-kV and above) generate a small amount of sound energy. This audible noise from the line can barely be heard in fair weather conditions on the higher voltage lines (345-kV and above) and usually not at all on lines of 230-kV. During foul weather, water drops collect on the conductor and increase corona activity so that a crackling or humming sound may be heard near the line. This noise is caused by small electrical discharges from the water drops.

The sound is not hazardous and does not indicate an abnormal operating condition on the line. Rather, the sound is due to corona on the line. The audible noise would disappear when the conductors become dry. Background noise caused by falling rain usually "masks" or covers audible noise; but in certain conditions, noise may be detectable near the ROW during a period of rain or fog.

Audible noise decreases with distance away from the line. Noise levels on most 230-kV lines have not been a problem, and audible noise is almost never reported for lines of this voltage. Table 4-9 compares some common noise levels with calculated values for the proposed Interconnection.

Sound is physically measured in decibels (dB), but the human ear detects different loudness levels at different pitches (frequencies). Therefore, an adjusted "A" scale has been developed, and noise (unwanted sound) is almost always measured in dBA. Because the decibel scale is logarithmic, a difference of 20 dB indicates a factor of 10 in perceived loudness. In other words, an automobile horn at 3 feet (about 110 dBA) is 10 times as loud as the inside of a New York subway train (90 dBA), which in turn is 10 times as loud as average street corner traffic (70 dBA), etc.

The audible noise levels at the proposed Interconnection ROW edge that are reported in Table 4-9 would be far below 52 dBA, an audible noise level reported by the Electric Power Research Institute as causing "no complaints" (6), and also well below the similar noise level below which the EPA believes no effects on public health and welfare will occur (7). Residences adjacent to the ROW would be exposed to these low levels. Schools are at least 1,200 feet from the ROW edge, so transmission line noise would not be noticeable.

Table 4-9

Common Noise Levels

Environmental Condition	dBA (Decibels)	Responses
Carrier Deck Jet Operation	140	Painfully Loud
Discotheque	120	Max. Vocal Effect
Alarm Clock	80	Annoying
Air Conditioner at 20 feet	60	Intrusive
Typical Office	50	Quiet
Library	40	
Soft Whisper	30	Very Quiet
Proposed Interconnection Foul Weather (ROW edge)	27-36	
Broadcast Studio	20	Just Audible
Proposed Interconnection Fair Weather (ROW edge)	4-11	

4.6.2.3 Radio and Television Interference

Although overhead transmission lines generally do not interfere with normal radio or television reception, there are two potential sources of interference from transmission lines - corona and gap discharges. Corona may affect AM radios, while gap discharge can affect television, as well as radio reception.

As described in Section 4.6.2.1, corona activity would be minimized due to proper design and is therefore unlikely to be a source of interference. However, if one stands under a 345-kV or larger line in a rain storm with an AM radio, they will most probably detect static interference from the transmission line. This level of static interference is lower on 230-kV lines. Corona generated interference decreases with distance, and beyond the ROW edge it decreases to very low values. For the proposed 230-kV line design, the calculated radio noise level at the ROW edge for fair weather is about 27 to 33 dBmv/m (decibels above a 1mv/m reference value). This level would meet the Federal Communications Commission guidelines for satisfactory service (6). The design of the 230-kV line is such that TV interference levels will be low (lower than on many previous 230-kV lines where TV interference has not been a problem).

Gap discharges are a very different problem. They are due to electrical discharges between broken or poorly fitting hardware (i.e., insulators, clamps, brackets). Hardware is designed and installed to be problem-free, but gunshot damage, wind motion, corrosion damage, etc., sometimes can create a gap discharge condition. When this condition develops, intermittent gaps at connection points between hardware items allow small electrical discharges to occur across the gaps. This phenomenon is not limited to transmission lines and can often be found on low voltage distribution lines. The discharges act as small "transmitters" at frequencies that may be received on some radio and TV receivers. Gap discharge sources would be located and repaired by trained WWP personnel.

The severity of any interference depends upon the strength and quality of the transmitted radio or TV signal, the quality of the radio or TV set and antenna system, and the distance between the set and interference source. It is often the case that radio and TV sets are influenced more by interference sources in the home itself than by transmission lines because of the proximity of these sources. The large majority of interference complaints are found to be attributable to sources other than transmission lines, e.g., poor signal, poor antenna, heating pad, door bell, sewing machine, freezer, ignition system, aquarium thermostat, appliances, fluorescent lights, etc. (8).

The frequency content of corona discharge interference does fall within the range of AM radio receivers, but the interference intensity also decreases with distance so that it should normally

not be noticeable beyond the ROW edge. Of course, this also depends on the signal strength of the station. An automobile passing under some transmission lines in foul weather may pick up interference (static) on an AM radio while beneath the line. (Sometimes this also occurs in fair weather, but it is due to gap discharge on poorly fitting or damaged hardware.) The upper limit or frequency range affected by the corona phenomenon is normally too low to influence FM receivers or CB radios.

Typical transmission line engineering practice is to design all transmission lines to be as free from corona and other sources of interference as possible. Radio interference complaints would be recorded and investigated when necessary by WWP, and corrective measures taken as required. WWP has a formal procedure for evaluating and responding to interference complaints, and this procedure would be implemented for any complaints received on the proposed Interconnection.

4.6.2.4 Ozone

Ozone (O_3) is another possible by-product of the higher voltage transmission lines that has raised some concern. As mentioned before, charged air molecules can combine with each other. Ozone can be formed this way, by combining three oxygen atoms. It is a paradox that the 15-mile high ozone layer shields life from ultraviolet radiation, and yet ozone can be harmful to life upon contact due to its powerful oxidizing effect. The concern has been that transmission lines can potentially produce a harmful amount of ozone. Research has revealed that ozone has not been a problem, even for very large lines up to 765-kV. The amounts of ozone generated are extremely small compared to naturally occurring background levels.

Ozone generation by electricity is very inefficient; commercial generators can only convert about 4 to 8 percent of their electrical input to ozone. Generation by transmission lines is even more inefficient because lines are designed to minimize energy loss and corona activity. There are several other manmade sources of ozone: welding operations, high voltage spectrographic equipment, copying machines, and even air fresheners. By far the largest ozone problem is caused by the action of sunlight on industrial and automobile pollution.

The quantity of ozone produced by the largest 765-kV transmission line can be almost impossible to measure because it is so small. As far as health is concerned, the important parameter is concentration. Concentration is determined by the amount of mixing between the newly formed ozone and the air surrounding the conductor. It is a function of the amount of ozone being generated, local weather conditions, wind speed and direction, local air turbulence, and the natural ozone decay rate.

Estimating ozone concentration is a complex problem but it can be handled adequately by modern air pollution models. Ozone concentration is usually measured in terms of parts of ozone per billion parts of air (ppb). Ambient ozone is ozone that is already in the air from other sources, such as dispersion from the natural ozone layer, automobile emissions reacting with sunlight, and electrical storms. Ambient ozone may also be depleted by dispersion back to the upper atmosphere, spontaneous decay, and contact with oxidizable materials. Ambient ozone levels in rural areas are typically around 10 to 30 ppb at night and may peak during the day at around 100 ppb. In urban areas, concentrations greater than 100 ppb are common. Cities like Los Angeles may peak at 500 ppb. The National Ambient Air Quality Standard for Oxidants (of which ozone is usually 90 to 95 percent) is 120 ppb, not to be exceeded as a peak concentration on more than one day a year. The worst high-voltage power line, under rare circumstances, will still only contribute a very small percentage to the total ambient ozone concentrations.

One important factor is an evaluation of the ozone level increase that could be expected in the vicinity of a transmission line. A theoretical "worst case" would be provided by the following conditions: heavy rains, light winds blowing exactly parallel to the line, and 10 or more continuous hours of these conditions. Close to the proposed Interconnection, calculated ozone levels would be about 0.09 ppb. Concentrations below about 1.0 ppb are impossible to measure with even the most sensitive instrumentation.

Nitrogen oxides can also be generated by transmission lines but on a much smaller scale than ozone, and therefore the problem is even less significant. Therefore, both ozone and nitrogen oxide are not a problem with 230-kV transmission lines, because levels are so small as to be undetectable.

4.6.3 Electric Fields

4.6.3.1 Definition and Description

Electric fields arise from the voltage (electrical pressure) on an object. Any object with an electric charge on it has a voltage (or electric potential) at its surface, caused by the accumulation of more electrons on that surface as compared to another object or surface. The voltage effect is not limited to the surface but exists in the space surrounding the object. The change in this voltage over a distance is known as the electric field. The units describing an electric field are volts per meter (V/m) or kilovolts per meter (kV/m). A field measured in volts per meter expresses the difference in electrical potential or voltage between two points that are one meter apart. The electric field becomes stronger near a charged object and decreases rapidly with distance away from the object.

Electric fields are a very common phenomenon. Static electric (or DC) fields can result from taking off a sweater or walking across a carpet. Body voltages have been measured as high as 16,000 volts due to walking on a carpet (9). The earth creates a natural static field in fair weather of about 150 V/m (0.15 kV/m) at ground level due to the 300 to 400,000 volt potential between the ionosphere and the earth (10, 11). This means that a 6-foot tall person would have a static potential of about 275 volts between the top of the head and the bottom of the feet.

The normal fair weather potential gradient of the earth varies from month to month, reaching a maximum of about 20 percent above normal in January, when the earth is closest to the sun, and falling to about 20 percent below normal by July, when the earth is farthest from the sun. Much stronger static electric potentials can exist underneath clouds, where the electric potential with respect to earth can reach 10 to 100 million volts. Natural static electric fields under clouds and in dust storms can reach static field levels as high as 3 to 10 kV/m (11, 12).

Almost all household appliances and other devices that operate on electricity create electric fields. The electric field is due to the voltage on the appliance and the field decreases rapidly with distance away from the device. The field due to point source household appliances generally attenuates more rapidly with distance than fields from line sources, such as power lines. Appliances need not be operated to create an electric field, but just plugged into an electrical outlet. Typical values measured 12 inches away from some common appliances (13) are shown in Table 4-10.

Sometimes, a person holding a fluorescent light tube directly underneath a transmission line (on a dark night) can demonstrate the presence of an electric field when the tube glows dimly. However, this same phenomenon will occur near many television sets, near an automobile ignition system, and near some CB radios. This phenomenon is unlikely for lines below 345-kV due to their lower electric field levels.

Electric field values were calculated both for existing lines on transmission corridors to be paralleled by the proposed Interconnection and for the completed Interconnection project under a number of different ROW configurations. A total of five configurations are presented in Figure 4-3 and depict the most representative alignment proposed for the Interconnection and its alternative routes. The results of these calculated electric field values are discussed below and presented graphically in Figures 4-4 through 4-8. Currently, existing transmission lines occupying corridors proposed for the Interconnection are producing electric fields ranging from a high of roughly 2.2 kV/m directly under the center conductor at midspan to about 0.8 kV/m at the edge of existing ROWs. These are maximum calculated values, and some lines are currently producing lower fields depending on line configuration and voltage ratings.

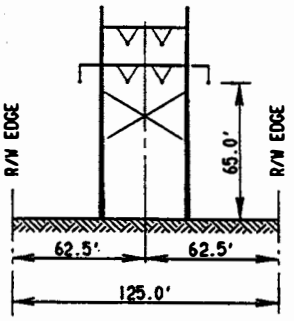
Table 4-10

Typical Electric Field Values for Household Appliances (at 12 Inches)

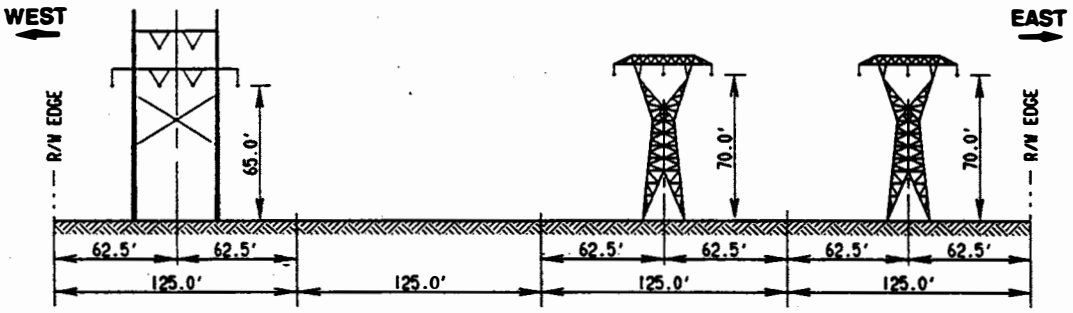
Appliance	Electric Field (kV/m)
Electric Blanket	0.25[1]
Broiler	0.03
Stereo	0.09
Refrigerator	0.06
Iron	0.06
Hand Mixer	0.05
Phonograph	0.04
Coffee Pot	0.03

[1]1-10 kV/m in the region adjacent to the blanket wires (14).

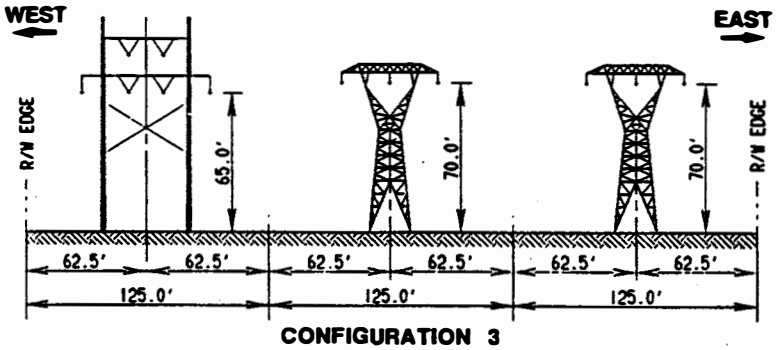
FIGURE 4-3 TRANSMISSION LINE CONFIGURATIONS USED IN CALCULATED ELECTRIC AND MAGNETIC FIELD PROFILES



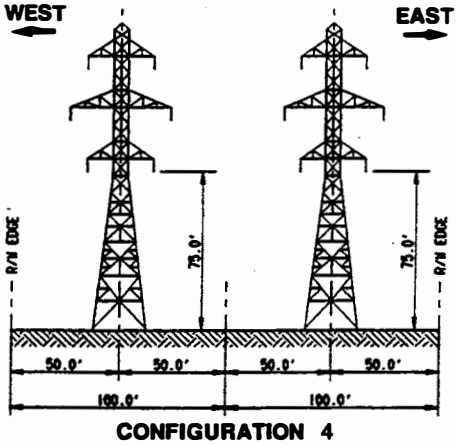
CONFIGURATION 1
Proposed 230-kV Interconnection



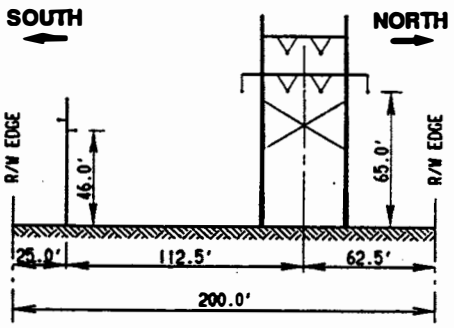
CONFIGURATION 2
Proposed Interconnection Adjacent to Vacant and Existing BPA ROWs



CONFIGURATION 3
Proposed Interconnection Adjacent to Existing BPA ROWs



CONFIGURATION 4
Beacon Substation Alignment



CONFIGURATION 5
Proposed Interconnection Adjacent to WWP 115-kV ROW

ELECTRIC FIELD LATERAL PROFILE FOR THE PROPOSED INTERCONNECTION

Configuration #1

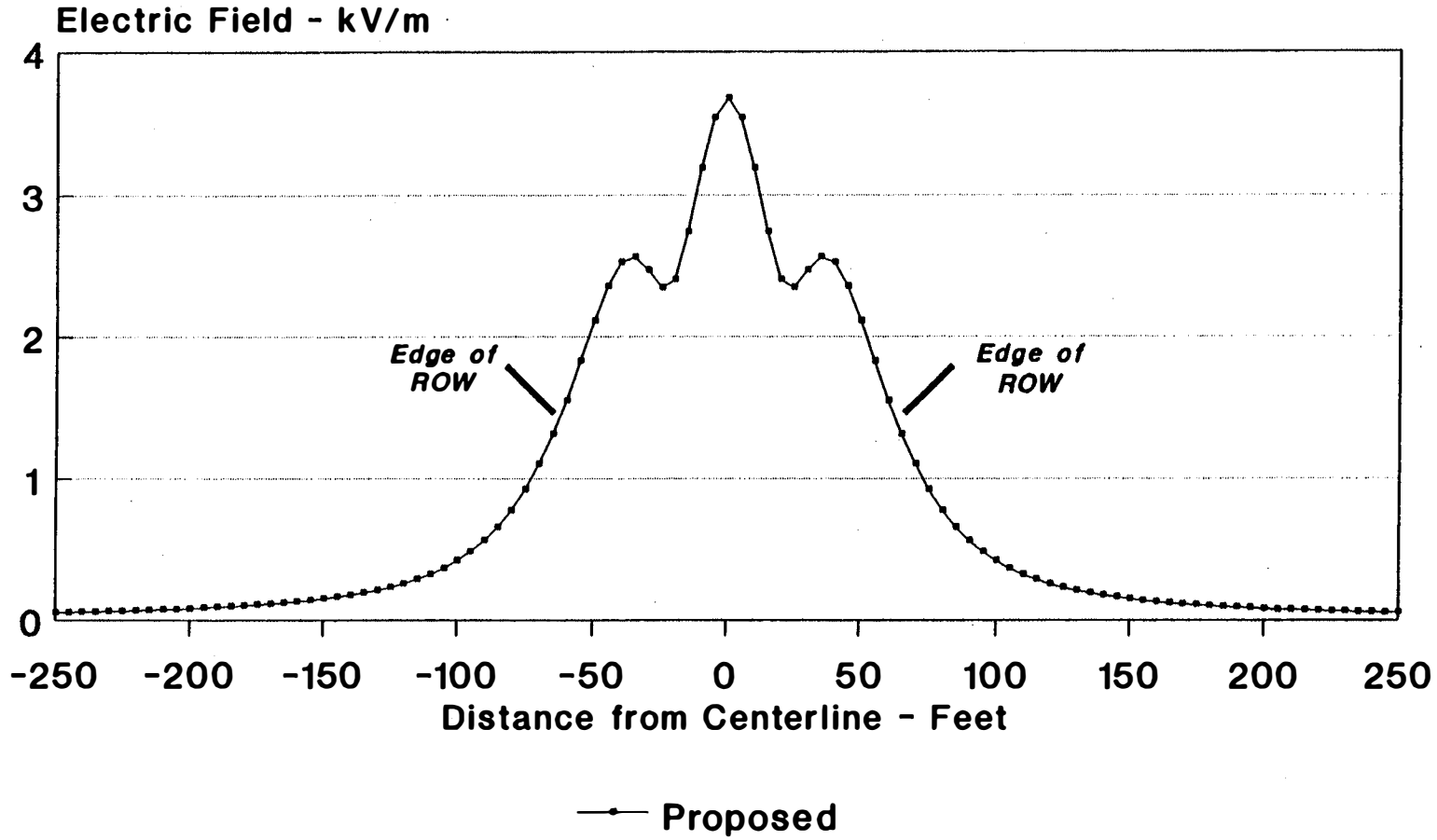


FIGURE 4-4

Electric Field Lateral Profiles
Configuration #2

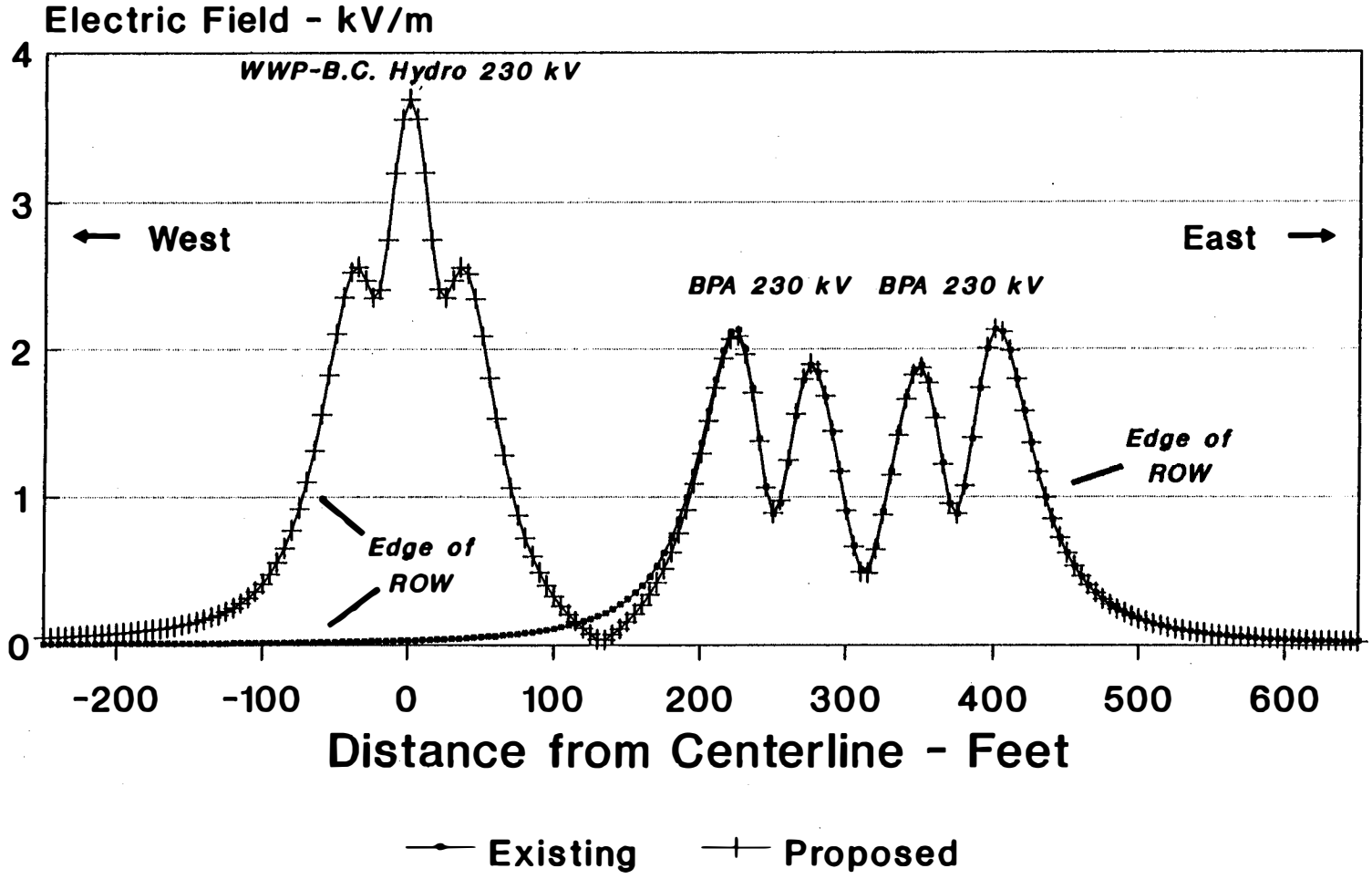


FIGURE 4-5

Electric Field Lateral Profiles
Configuration #3

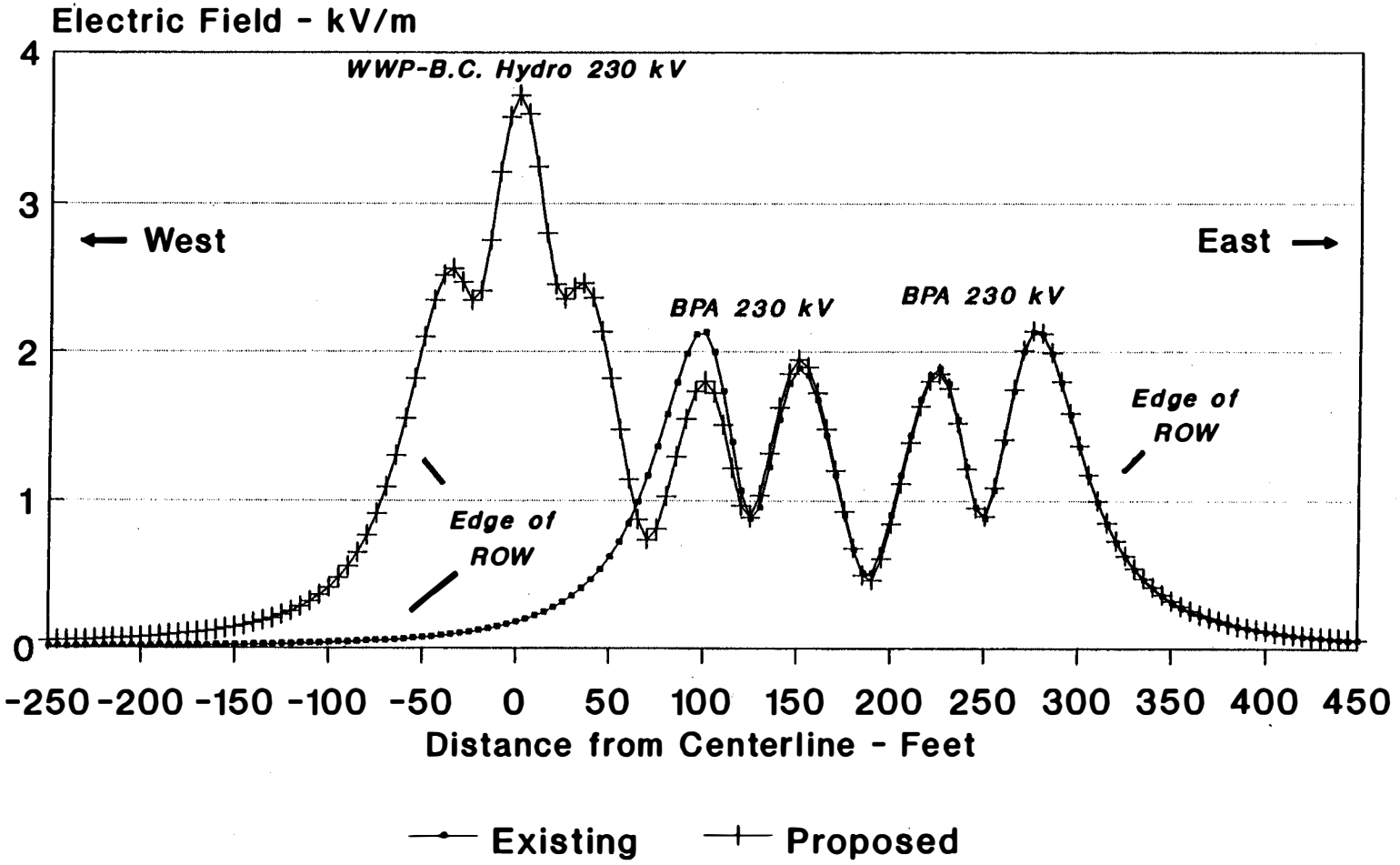


FIGURE 4-6

Electric Field Lateral Profiles
Configuration #4

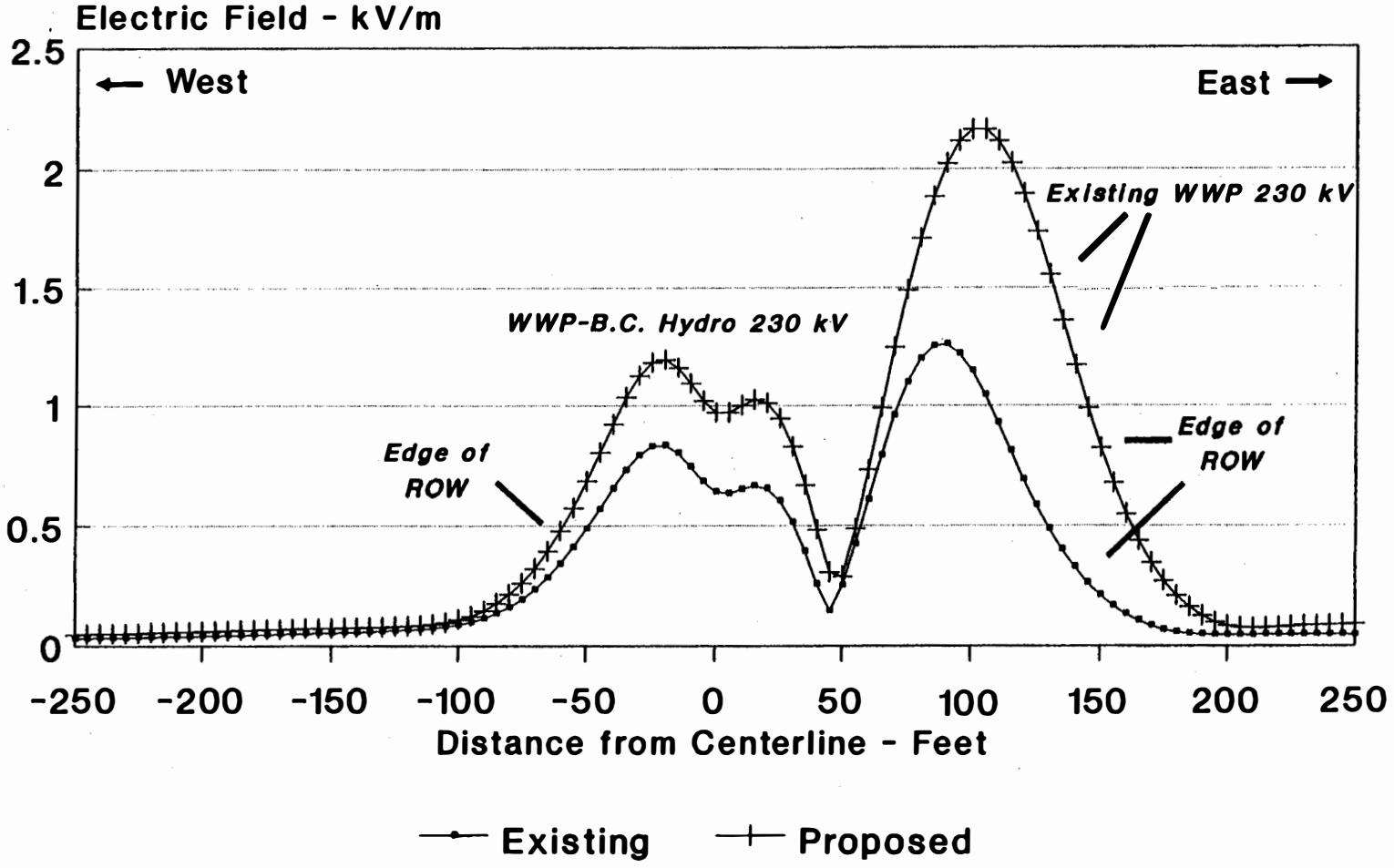


FIGURE 4-7

Electric Field Lateral Profiles
Configuration #5

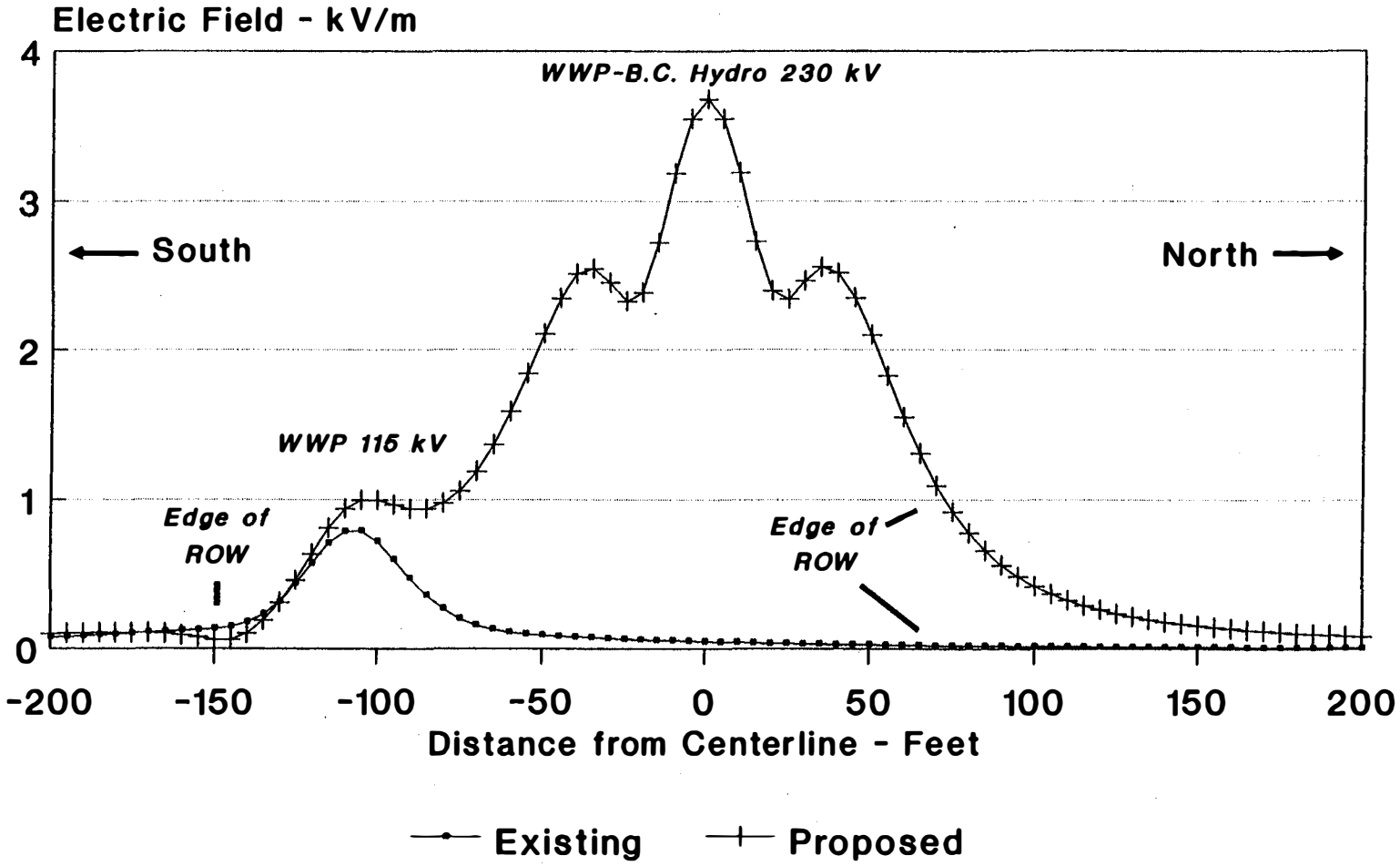


FIGURE 4-8

Field values calculated for the proposed Interconnection would vary from a high of approximately 3.7 kV/m directly under the center conductor at midspan to about 1.4 kV/m at the ROW edge adjacent to the Interconnection line. On ROWs where the proposed Interconnection would be the only line in service, the 1.4 kV/m field would be expected at both ROW edges. Where existing lines are in service, electric field values at ROW edges adjacent to existing lines would be expected to be lower than 1.4 kV/m.

Edge of ROW fields associated with the proposed Interconnection are slightly higher than those associated with the existing BPA 230-kV lines, primarily because of a difference in line configuration; two circuits on a common structure for the proposed Interconnection versus two circuits on separate center lines for the existing BPA transmission lines. Regardless, both existing and proposed electric field values occur within a relatively small area of the ROW (about 5 percent of the total area) near midspan, (i.e., near the location where the conductors sag closest to the ground). Additional attenuation of fields would be realized as distance from the ROW edge is increased. Most states, including Washington, have not established maximum electric field levels within the ROW or at the ROW edge, nor have federal standards been established. If the lines were constructed with underground cables, no electric fields caused directly by the transmission lines would be detected at ground level. Other impacts associated with placing transmission lines underground are discussed in Section 2.6.2.4.

4.6.3.2 Cardiac Pacemakers

One electric field concern for high voltage transmission lines has been the possibility of interference with cardiac pacemakers. However, pacemaker interference from the proposed Interconnection would be an improbable event. The electric fields at the ROW edge associated with the proposed Interconnection are below levels that are reported as capable of affecting pacemaker operation (about 2-9 kV/m) and would therefore pose no hazards for pacemaker wearers (15, 16).

There are two general types of pacemakers: asynchronous and synchronous. The asynchronous pacemaker pulses at a predetermined rate. It is practically immune to interference since it has no sensing circuitry and is not exceptionally complex. The synchronous pacemaker only pulses when its sensing circuitry determines pacing is necessary. Interference may result from a transmission line electric field causing a spurious signal on the pacemaker's sensing circuitry. However, when these pacemakers detect a spurious signal, such as a 60 Hz signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation.

Prolonged asynchronous pacing is not considered a problem; some pacemakers are designed to operate that way. A common procedure when testing implanted synchronous pacemakers

for battery strength, etc., is to put the pacemaker into the asychronous mode. So, while transmission line electric fields could interfere with the normal operation of some pacemakers, the result of the interference would be of short duration and not considered harmful.

4.6.3.3 Electric Field Induction

Electric fields can induce a charge on nearby objects and cause a small electrical current to flow. For a grounded person (standing in wet grass), this current will be about 16 millionths of an ampere (0.000016 amps) for each kV/m of electric field strength. For the proposed Interconnection, the maximum induced current at the peak value of electric field would be about 0.00006 ampere. To put this in perspective, most household appliances have a small amount of electricity that can leak through the appliance insulation and flow into the body of the operator (this is called leakage current). This leakage current can increase as the insulation ages in appliances. The maximum amount of leakage current for portable household appliances allowed by the American National Standards Institute (ANSI) is 0.0005 amperes, and for fixed or built in appliances, the allowable increases to 0.00075 amperes (17). In other words, it would take a transmission line electric field of about 32 kV/m (much higher than that generated by the proposed Interconnection) to induce a current in the body of a person greater than that allowed by household appliance safety standards.

The median threshold of perception (i.e., that humans can start to detect) for electric fields is about 7 kV/m and for electric currents is about 0.001 amperes (6). The electric field values for the proposed Interconnection are below these perception threshold levels.

Electric charge induction on objects adjacent to the proposed Interconnection would be minimized by grounding practices, where necessary. Most objects are routinely grounded during construction; however, this practice has usually not been necessary for 230-kV transmission lines. Charges usually do not develop on buildings since they are generally grounded through plumbing, electric service connections, metal Sheeting, or frame. Most fences very near to a line will normally have little or no noticeable charges induced since fences are often grounded by metal posts, as well as by contact with vegetation (plant tissue in its normal, healthy green state is composed of nearly 85 percent water, indicating it to be quite a good electrical conductor). WWP would evaluate grounding requirements on a site-specific basis and implement corrective measures where necessary to ensure public safety. In general, induced voltages on fences and structures would be reduced to very low levels by grounding at intervals. For very long fences parallel to the transmission line, the electrical continuity would be broken where necessary.

Vehicles do not usually build up noticeable electric charges in the vicinity of transmission lines because most modern tires contain carbon black, a substance used in their manufacture that

makes the tire able to conduct electric charges to ground. However, as a general safety measure, most utilities recommend that no refueling of vehicles be done within the ROW of 345-kV and larger transmission lines. Many typical farming operations such as discing or plowing automatically ground farm equipment to earth.

Metal irrigation systems near transmission lines pose a potential shock hazard. Caution must be exercised when handling lengths of metallic pipe near any type of overhead conductors. The pipe should be kept in a horizontal position to avoid approaching or contacting the conductors. Most irrigation equipment is naturally grounded due to contact with soil and induced charge effects can be minimized by providing contact with the earth.

Another area of possible concern is the proper functioning of electronic equipment used in modern farming machinery when operated closely parallel to or crossing underneath high voltage power lines. This has apparently not been a problem due to shielding of the electronics and the fact that equipment manufacturers understand the nature of the environment where the equipment is operated (i.e., sometimes near powerlines).

4.6.3.4 Effects on Vegetation and Livestock

Electric field levels associated with the proposed Interconnection would not have an adverse effect on crops, gardens, or natural vegetation beneath the line due to low electric field values (18). No adverse effects have been revealed on livestock or wildlife, with the possible exception of honeybees. There have been reported effects in hive weight gains and honey production. Effects are most evident in electric fields of 7 to 12 kV/m, a value much larger than the fields under the proposed Interconnection's 230-kV lines. Depending on hive height, some effects were reported in the 2-4 kV/m range. This could be solved by shielding the hives with a wire mesh or moving them off the ROW. These effects were attributable to shocks the bees received within the hive, rather than to any subtle effects of the electric fields (19, 20). Electric fields at all locations off the ROW are below the levels reported to affect bees.

There are no indications that exposures to the electric fields beneath operating transmission lines affect livestock behavior or productivity. However, both AC and DC currents can cause definite behavioral responses in dairy and beef cattle. For this reason metal water and feed troughs, like all conducting objects under the proposed line, would be grounded to eliminate the possibility of nuisance shocks. Microshocks to animals from so-called "stray" or neutral-to-earth voltages have given rise to problems of animal health and production (41). Voltages between a grounded-neutral system and true earth can produce low level current shocks in and around barns. These shocks can affect livestock, particularly dairy cows, which can apparently perceive a voltage as low as 0.75 to 1 V across parts of the body. The results of these low level shocks

can be a significant loss in production. Neutral-to-earth voltages have been observed from both on-farm and off-farm sources. The sources are generally related to current flow in the primary distribution and farmstead neutral systems and not to field induction from transmission lines. Similarly, the mitigation of neutral-to-earth voltages involves modifications to the primary neutral system, the farmstead neutral system, the farmstead electrical load, or the conducting surfaces in the affected area (41). Mitigation is done on a case-by-case basis. The effects of "stray" voltages are considered an electrical distribution system problem and not a transmission line problem.

4.6.4 Magnetic Fields

4.6.4.1 Definition and Description

An electric current flowing in any conductor (e.g., electric equipment, household appliance, power line) creates a magnetic field. The most common magnetic field unit of measurement is the Gauss (or mG = 0.001 Gauss), which is a measure of the magnetic flux density (intensity of magnetic field attraction per unit area). As a reference, the earth has a natural static magnetic field of about 0.56 Gauss (560 mG) near the route of the proposed Interconnection.

The magnetic field near electric transmission lines is relatively low in comparison with measurements near many household appliances and other equipment. The magnetic field near a point source, such as an appliance, decreases rapidly with distance away from the device. The magnetic field also decreases with distance away from linear sources, such as powerlines, but not as rapidly as with appliances. Since the magnetic field is caused by the flow of an electric current, a device must be turned on to create a magnetic field.

The magnetic field of a large number of typical household appliances was measured by IITRI in 1985 for the U.S. Navy (21) and by Enertech Consultants in 1989 for EPRI (22). Typical values are given on Table 4-11 in units of milliGauss (mG) or thousandths of a Gauss.

Magnetic field values were also calculated both for existing lines on transmission corridors to be paralleled by the proposed Interconnection and for the completed Interconnection project under a number of different ROW configurations (see Figure 4-3). The line current loadings used to make these calculations were supplied by WWP and are presented in Table 4-12. The results are discussed below and presented as lateral profiles of the magnetic field in Figures 4-9 through 4-13.

Currently, existing transmission lines occupying corridors proposed for the Interconnection are producing magnetic fields under normal line loading, ranging from a high of approximately

Table 4-11

Magnetic Field From Household Appliances

Appliance	Magnetic Field - milliGauss (1 mG = 0.001 G) 12 Inches Away	Maximum
Electric Range	3-30	100-1,200
Electric Oven	2-5	10-50
Garbage Disposal	10-20	850-1,250
Refrigerator	0.3-3	4-15
Clothes Washer	2-30	10-400
Clothes Dryer	1-3	3-80
Coffee Maker	0.8-1	15-250
Toaster	0.6-8	70-150
Crock Pot	0.8-1	15-80
Iron	1-3	90-300
Can Opener	35-250	10,000-20,000
Mixer	6-100	500-7,000
Blender, Popper, Processor	6-20	250-1,050
Vacuum Cleaner	20-200	2,000-8,000
Portable Heater	1-40	100-1,100
Fans/Blowers	0.4-40	20-300
Hair Dryer	1-70	60-20,000
Electric Shaver	1-100	150-15,000
Color TV	9-20	150-500
Fluorescent Fixture	2-40	140-2,000
Fluorescent Desk Lamp	6-20	400-3,500
Circular Saws	10-250	2,000-10,000
Electric Drill	25-35	4,000-8,000

Source: (22).

Table 4-12

Transmission Line Loadings Used for Magnetic Field Calculations

ROW Configuration	Circuit Configuration	Normal Load (Amps)	Emergency Load (Amps)
Proposed Interconnection	Double Circuit 230-kV	1,000	1,250
Proposed Interconnection	Double Circuit 230-kV	1,000	1,250
adjacent to existing	Single Circuit 230-kV	500	900
BPA 230-kV lines	Single Circuit 230-kV	500	900
Proposed Interconnection	Double Circuit 230-kV	1,000	1,250
adjacent to existing	Single Circuit 115-kV	100	250
WWP 115-kV line			

MAGNETIC FIELD LATERAL PROFILE FOR THE PROPOSED INTERCONNECTION

Configuration #1

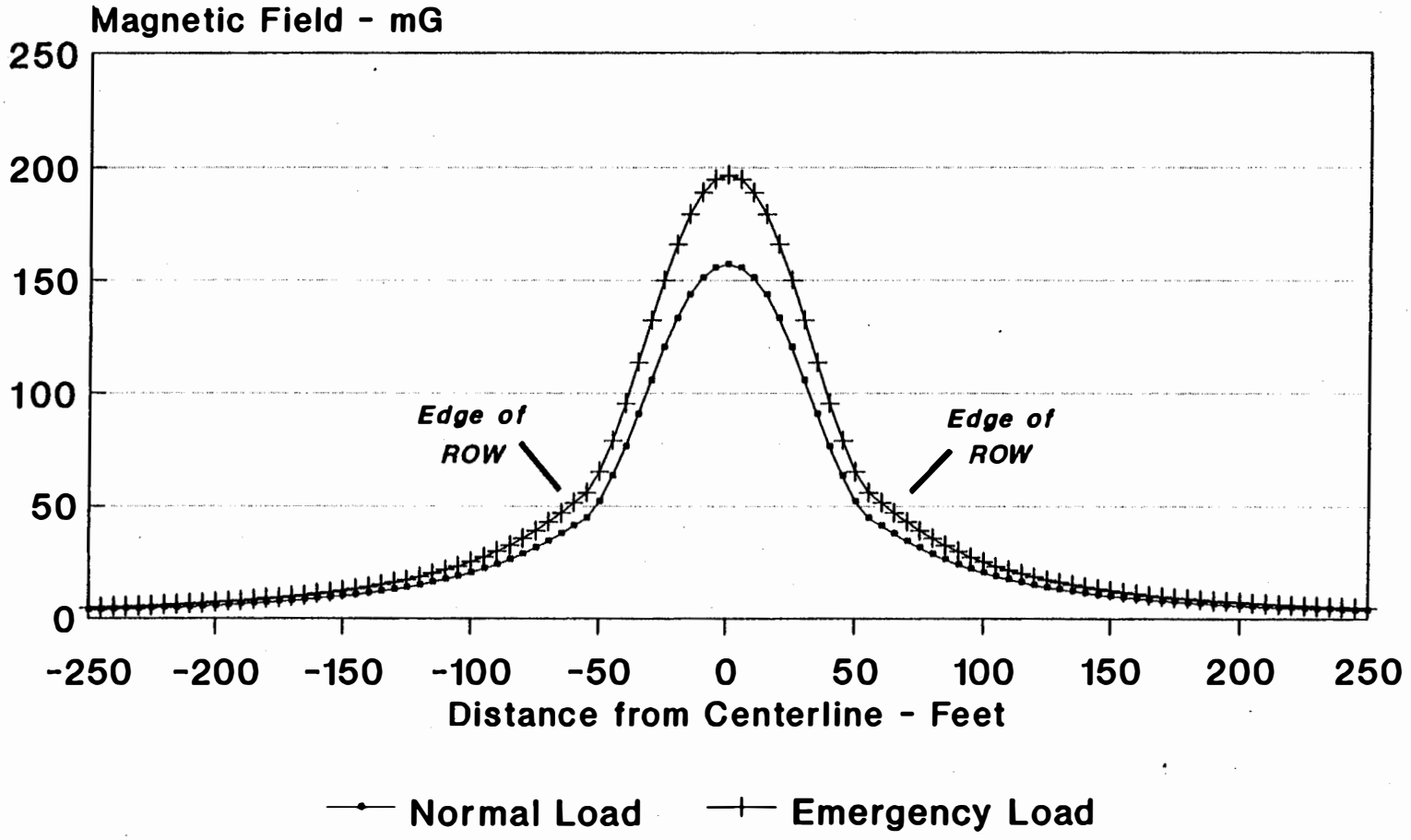


FIGURE 4-9

Magnetic Field Lateral Profiles
Configuration #2

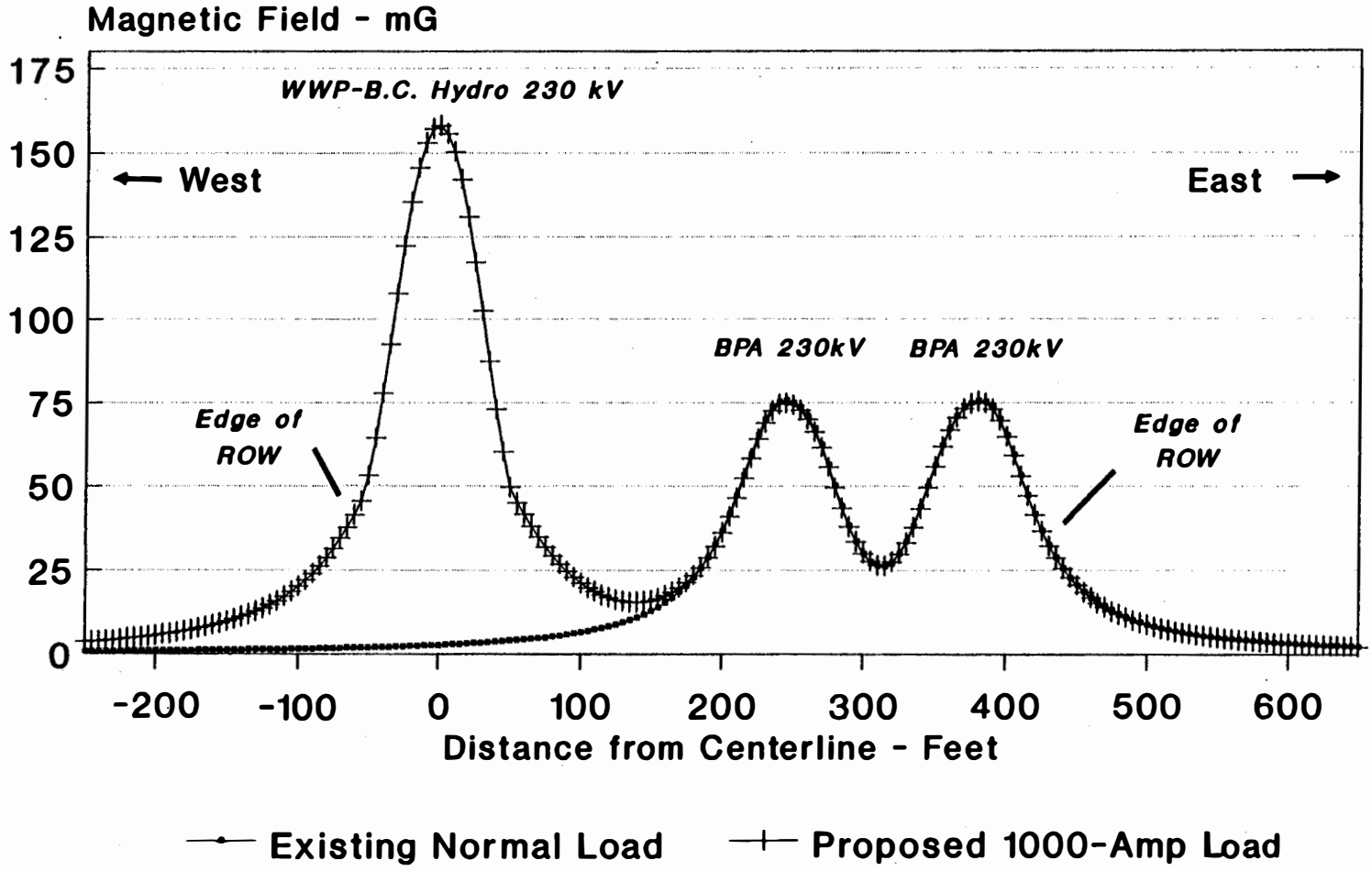


FIGURE 4-10

Magnetic Field Lateral Profiles
Configuration #3

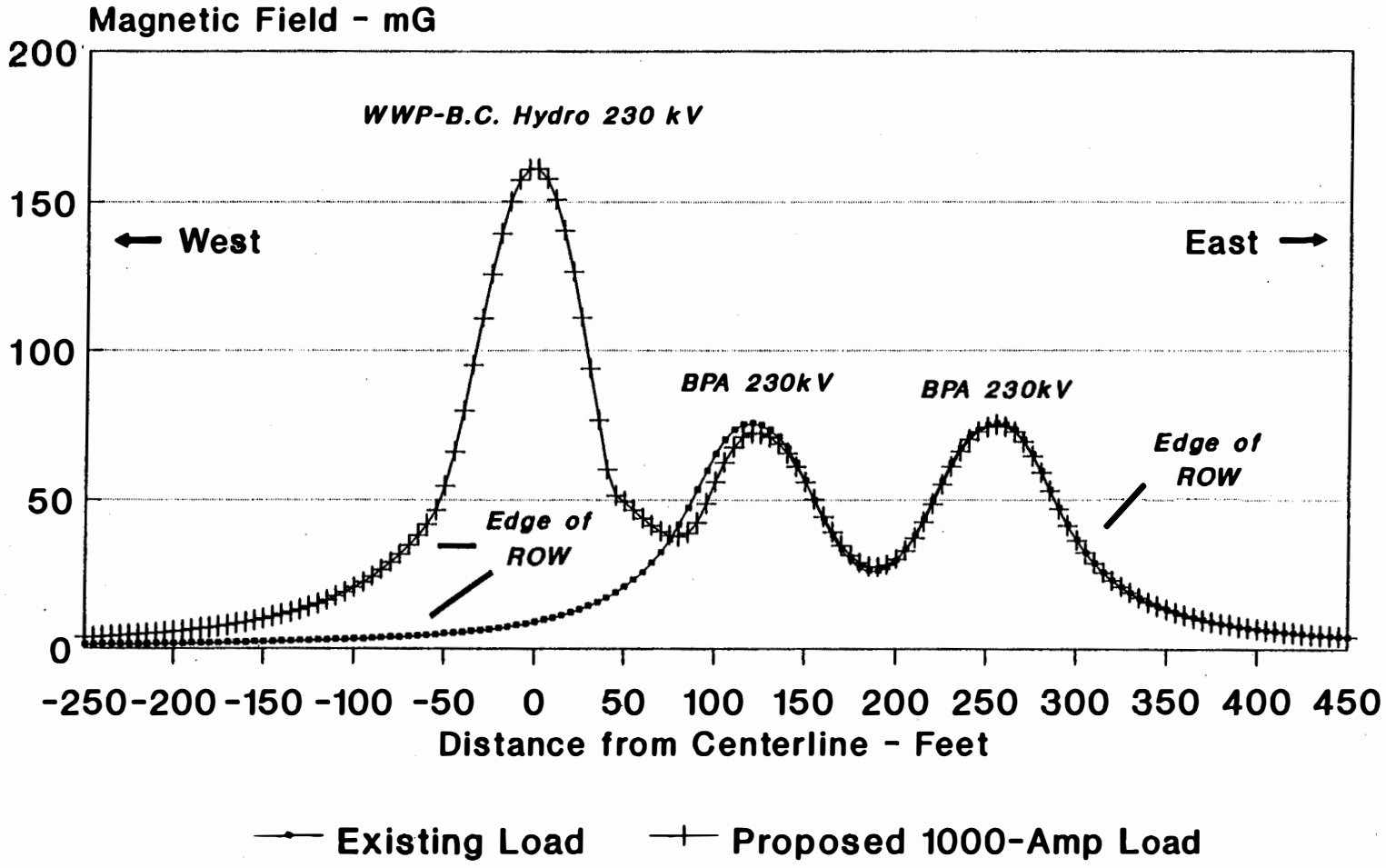


FIGURE 4-11

Magnetic Field Lateral Profiles
Configuration #4

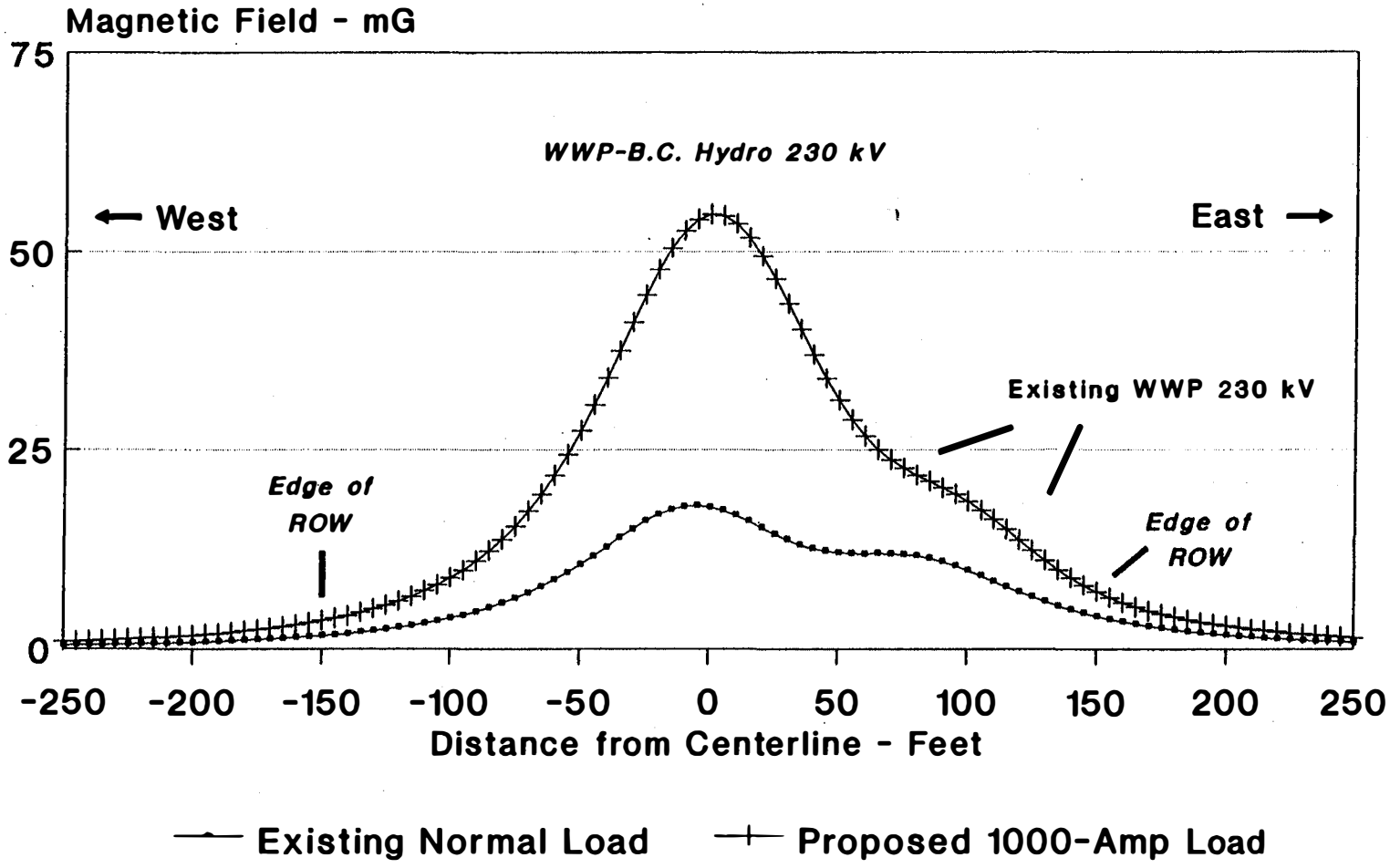


FIGURE 4-12

Magnetic Field Lateral Profiles
Configuration #5

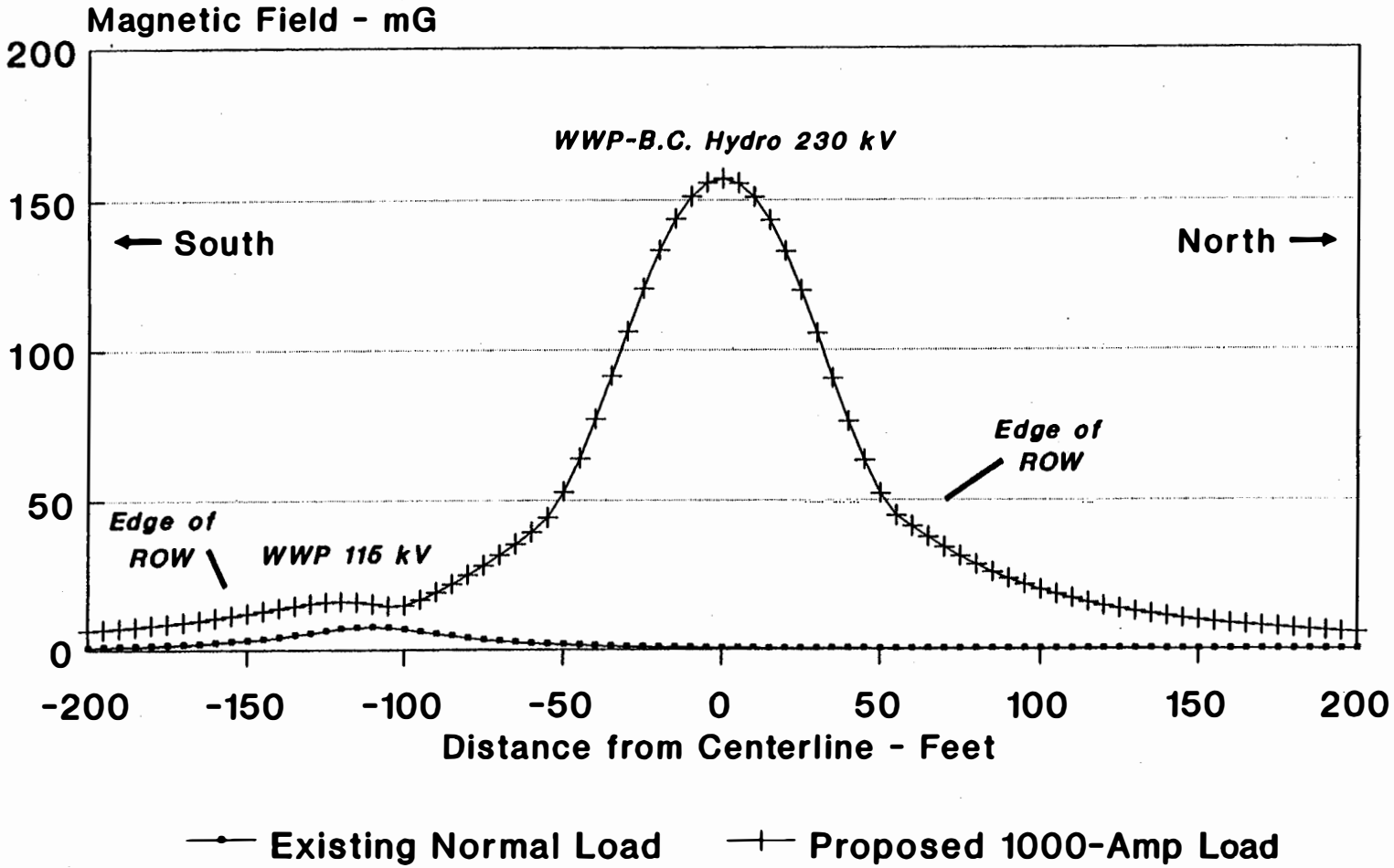


FIGURE 4-13

75 mG directly under the conductors near midspan to about 25 mG at the ROW edge. These are maximum calculated values, and some existing lines are currently producing lower fields depending on variables such as line current loading and configuration.

Maximum field values calculated for the proposed Interconnection under normal line loading would vary from a high of approximately 150 to 160 mG directly under the conductors near midspan to between 40 mG and 50 mG at the ROW edge adjacent to the Interconnection line. On ROWs where the proposed Interconnection would be the only line in service, a field of approximately 40 mG would be expected at both ROW edges. Where existing lines are in service, magnetic field values at ROW edges adjacent to existing lines would be expected to be lower than 40 mG, and in most cases would approximate current fields. In all cases, additional attenuation of fields would be realized as distance from the ROW edge is increased.

Edge of ROW fields associated with the proposed Interconnection are higher than those associated with the existing BPA 230-kV lines, primarily because of a difference in line configuration; two circuits on a common structure for the proposed Interconnection versus two circuits on separate center lines for the existing BPA transmission lines, and higher current (amps) (see Table 4-12). Most states, including Washington, have not established maximum electric field levels within the ROW or at the ROW edge, nor have federal standards been established.

For unusual situations, the proposed 230-kV line could operate under an emergency loading that would temporarily increase magnetic field values at the ROW edge to about 50 mG, depending on line configuration and location. Under emergency conditions, the maximum value on the ROW, under the conductors near midspan, would then be about 200 mG. For transmission lines, these conditions are usually rare and of short duration. If the lines were constructed with underground cables, the magnetic field strength at the edge of the ROW would be greatly reduced, as compared to the overhead lines at the same location. This reduction would be due primarily to the greater proximity of the three phases of the underground circuits, which causes the magnetic fields from the phases to cancel each other more effectively. Other impacts associated with placing transmission lines underground are discussed in Section 2.6.2.4.

4.6.5 The Health Issue

Much research has been conducted in response to questions that have been raised over the past two decades as to whether exposure to electric and magnetic fields in the extremely-low-frequency (ELF) range (less than 300 Hz) may produce adverse health effects. Particular interest has been expressed in electromagnetic fields of power frequency, which are 60 Hz in North America and 50 Hz in Europe. During this period, research has addressed a wide

range of possible adverse biological and health effects (e.g. physiological changes in laboratory mice and incidence of disease in human populations) that are relevant to assessing whether exposure to electric and magnetic fields presents a health risk to the general population or to specific occupational groups.

From 1977 to 1990, eight highly qualified independent scientific panels and agencies evaluated the relevant scientific literature to consider whether exposure to electric and magnetic fields, at or near power frequencies, is associated with effects on human health. Each group reviewed both the laboratory and epidemiologic studies available. Summaries of these major reviews are presented below. A discussion of potential health risks posed by EMF exposure based on an assessment of the information that is available as of February 1991 is presented in the subsequent section. As was stated in the introduction to this section on EMF effects (Section 4.6.1), the following discussions do not specifically reference every publication on EMF health issues. However, the independent panel and agency reviewers and DOE have considered the available evidence as well as differing (and sometimes contradictory) interpretations of the health implications of the evidence in reaching the conclusions that are presented.

4.6.5.1 Independent Panel and Agency Reviews of the Electric and Magnetic Field Health Issue

Since the mid-1970s, several independent panels of scientists have been convened in this country and abroad to review the health and scientific literature on electric and magnetic fields, and to offer evaluations regarding potential adverse health effects of such fields. The specific issues that prompted the formation of these panels varied and included concerns about AC transmission lines, an ELF naval communication system, and the generic question of exposure to ELF electric and magnetic fields regardless of the source. None of the panels has had an adversarial interest in the outcome of its deliberations, and each panel has been multidisciplinary, composed of individuals from the biological, physical, and health sciences. In each case, the purpose was to provide technical support and input to a public organization or agency faced with the problem of determining whether field exposures create unacceptable risks to human health, safety, and welfare. In several cases, the panels considered the issues related to cancer, while in others they did not.

These panel and agency proceedings are briefly reviewed below.

AC Transmission: The Florida Commission. In 1983, the Florida legislature gave the Florida Department of Environmental Regulation (DER) the authority to promulgate rules that could limit electric and magnetic field levels from overhead transmission lines. The DER established the

Florida Electric and Magnetic Fields Science Advisory Commission, a group of six qualified scientific experts, to conduct an independent assessment of the biological and health literature relevant to questions of potential human risks from exposure to 60-Hz electric and magnetic fields produced by AC transmission lines. In addition, the Commission was charged with recommending regulatory guidelines, if deemed necessary. The Florida Commission opted not to evaluate the question of carcinogenesis, perhaps reflecting a tacit assumption about the quality of the available data.

The Florida Commission released its report (23) in March 1985, and specifically did not recommend regulatory control of electric or magnetic fields in its conclusion:

> "The Commission unanimously believes that the scientific evidence now available supports the conclusion that it is unlikely that human exposures to 60-Hz electric and magnetic fields from high voltage transmission lines can lead to public health problems. Although the commission believes that such problems are unlikely, but (sic) ambiguities in the currently available scientific knowledge preclude the conclusion that there is no chance that a public health problem exists. Thus, the Commission believes that:
>
> - From time to time the State should monitor new developments in this area. However, once an initial decision has been made in Florida that public health problems are unlikely, reopening the area for further consideration would not be justified unless a significant new body of experimental evidence becomes available."

As a result of the Commission's findings, the DER adopted an approach to consider decisions on new transmission projects on an individual case basis. Thus, in August 1985, when faced with a certification decision for Florida Power Corporation's (FPC) proposed 500-kV Lake Tarpon-Kathleen transmission line, the DER specified the condition of a 190-foot wide ROW along the line's route. This decision took into account uncertainties about health effects, the potential anxiety of abutters, and the fact that 190 feet is a normal ROW width for 500-kV lines within the state. In January 1986, a Florida hearing examiner rejected DER's requirement for this condition, stating that no evidence of adverse health effects was presented, and the DER's preference was "not contained in a DER existing or proposed rule and no standard for magnetic fields or other evidence of known adverse health effects from magnetic fields was offered during the course of this proceeding." Shortly thereafter, in March 1986, the Florida Siting Board, which consists of the Governor and his cabinet denied FPC's bid for certification of the line, not on the basis of health effects per se, but because the DER had not promulgated rules limiting field strength.

At this point, the DER embarked on an effort to comply with the Siting Boards requirement for a field standard, and appointed a scientific advisory panel from within the state to consider the state-of-the-science and recommend standards that would protect the public health. By September 1987, the panel had prepared its recommendations. Ironically, shortly after the panel's recommendations were available, the First District Court of Appeal for the State of Florida overturned the Siting Board's order to deny certification for the Lake Tarpon-Kathleen line. Apparently, the DER's policy of proceeding on an individual case basis was appropriate. However, by this time the initiative for setting a standard in Florida has gathered sufficient momentum, and the Florida Environmental Regulation Commission, empowered to set standards, considered the scientific panel's recommendations.

On March 1, 1989, the Commission filed standards for regulating the strength of electric and magnetic fields produced by utility transmission and distribution lines and equipment. Thus, the State of Florida became the first governmental authority in the world to set standards for both types of fields (42). Existing lines will be allowed to operate as they are currently installed. New lines must meet the following standards:

- **For 230-kV Lines or Smaller.** 8 kV/m maximum electric field within the ROW, 2 kV/m maximum electric field at the edge of the ROW, and 150 mG maximum magnetic field at the edge of the ROW.

- **For 500-kV Lines.** 10 kV/m maximum electric field within the ROW, 2 kV/m maximum electric field at the edge of the ROW, and 200 mG maximum magnetic field at the edge of the ROW.

- **For Double Circuit 500-kV Lines.** Electric field standards the same as for single circuit 500-kV lines and 250 mG maximum magnetic field at the edge of the ROW.

It is important to note, that although Florida has promulgated edge-of-ROW magnetic field standards, these standards are not based directly on any known health risk information, but rather are designed so that future transmission lines will not produce edge-of-ROW fields higher than any lines in operation at the time of enactment. The Florida regulations, therefore, assure the maintenance of the status quo while further research into possible EMF health effects is ongoing.

Member utilities of the Florida Electric Power Coordinating Group, which accounts for about 99 percent of the state's transmission lines, have said that the rules are achievable and have not planned to challenge them (42). The field strengths for the proposed Interconnection would be below all of the Florida standards.

The World Health Organization (WHO) Evaluations of ELF Electric Fields (24) and Magnetic Fields (25). Under a United Nations mandate, the WHO Environmental Health Criteria Program was initiated in 1973 to assess the effects of environmental chemicals and physical factors and to issue criteria documents. WHO issued a health criteria document in 1984 concemed primarily with ELF electric fields, and in 1987 issued a document focused only on ELF magnetic fields. Unlike the other panel reviews discussed here, the WHO documents did not apply to a specific source or kind of exposure, but rather dealt with the effects of electric and magnetic fields from a generic standpoint.

The 1984 document on electric fields concluded:

> "Adverse human health effects from exposure to ELF electric field levels normally encountered in the environment or the workplace have not been established," (Page 88)
>
> and
>
> "Whilst it would be prudent in the present state of scientific knowledge not to make unqualified statements about the safety of intermittent exposure to electric fields, there is no need to limit access to regions where the field strength is below about 10 kV/m. Even at this field strength, some individuals may experience uncomfortable secondary phenomena such as spark discharge, shocks, or stimulation of the tactile sense." (Page 2)

The 1984 WHO document briefly considered the epidemiologic literature on cancer then available, concluding:

> "The epidemiological studies suggesting a relationship between childhood or adult cancer and residence in houses at various distances from high current flow due to external electrical wiring configurations, can only be considered as preliminary because of the many criticisms that have been leveled at the studies." (Page 87)

The principal evaluations of the 1987 WHO document (Criterion #69) on non-carcinogenic effects of magnetic fields were expressed in terms of the levels of magnetically-induced currents that may be associated with adverse effects. The current density quantity, "1 mA/m2" that appears in the excerpt that follows corresponds to a 60-Hz magnetic field exposure level of about 3 Gauss (3,000 mG), which is about 60 to 70 times greater than the maximum field that would be encountered at the edge of the proposed Interconnection's ROW, during normal loading, and about 20 times greater than during emergency loading conditions. The WHO report states:

"It can be assumed that a current density of less than 1 mA/m2, induced by an external magnetic field should not produce adverse neurological or behavioral effects, since naturally flowing currents in the brain are of the same order of magnitude," (Page 121)

and

"For human exposure to time-varying magnetic fields, it seems reasonable to assume that a health risk assessment can be made on the basis of significant perturbations of biological functions caused by electric currents induced by the fields. Available data suggest that, when current densities less than 10 mA/m2 [equivalent to about 30 G at 60 Hz] are induced in tissues and extracellular fluids, the induction of adverse health effects is unlikely. However, the possibility of some perturbing effects occurring following long-term exposure cannot be excluded." (Page 126)

The 1987 WHO document considered the epidemiologic literature, which included several studies published since 1984, and acknowledged the existence of both negative and positive reports. With reference to the positive reports, the WHO document offered the following opinion:

"These associations cannot be satisfactorily explained by the available theoretical basis for carcinogenesis by ELF electromagnetic fields. The preliminary nature of the epidemiological evidence, and the relatively small increment in reported incidence, suggest that, although these epidemiological data cannot be dismissed, there must be considerable further study before they can be accepted." (Page 22)

The ELF Communication System: National Academy of Sciences (NAS) (26) and American Institute of Biological Sciences (AIBS) (27). The U.S. Navy has twice commissioned reviews of the biological and health science literature pertinent to the fields produced by its proposed ELF antenna system, formerly known as Project Sanguine and then as Project Seafarer. The antenna system is designed for land-based communication with the United States submarine fleet, and operates at 76 ± 4 Hz. In 1977, an NAS Committee (26) produced a report, and in 1985 the AIBS (27) reviewed the literature published since 1977. In the interval between the two reviews, the antenna was redesigned (for engineering reasons) from its original underground configuration to an overhead design; it is now called Project ELF.

Although the antennas transmit at 76 ± 4 Hz, the 1977 and 1985 assessments both considered studies performed at other ELF frequencies, including 60 Hz, as highly relevant to their objectives. This follows from the fact that the physical mechanisms of electric and magnetic field interactions that induce electric currents and fields within exposed subjects appear to be similar over the ELF range (less than 300 Hz). The research performed at 60 Hz to investigate AC

transmission line environments served in many instances as significant source material for both the NAS and AIBS panel judgments concerning the ELF antennas' fields. It is appropriate, therefore, to consider the two expert evaluations of the Navy antenna system as highly relevant to the health questions concerning 60-Hz AC transmission. Neither the NAS nor AIBS reviews explicitly considered issues concerned with cancer. The NAS review was published prior to more recent studies on cancer, which are discussed on the following pages (for Wertheimer-Leeper and Savitz). The AIBS decision not to consider questions of carcinogenesis may have reflected the inadequacy of the data-base on cancer that existed at the time their review was conducted.

The NAS concluded in 1977:

> "A number of concerns raised over the years that Seafarer ELF fields might constitute a source of dangerous--even catastrophic--environmental contamination have been raised and found invalid and unwarranted. The Committees' considered opinion is that such fields will not cause a significant and adverse biologic disturbance, except in the event of electric shock, which is of serious concern. In fact, apart from the possible result of electric shock, the Committee cannot identify with certainty any specific biologic effects that will definitely result from exposure to the proposed Seafarer fields."

In the preface to the 1985 report, the AIBS Project Director, Donald R. Beem, Ph.D., concluded as follows:

> "The AIBS Committee members are in agreement with the conclusions of the 1977 Academy report, and based on their finding in this study, the Committee believes that it is still unlikely that exposure of living systems to ELF electric and magnetic fields in the range of those associated with the Navy's ELF Communications System can lead to adverse public health effects or to adverse effects on plants or animals. However, because of certain ambiguities in the scientific literature, the Committee recommends that the Navy continue to monitor the literature and respond appropriately to any significant new information."

The New York State Power Lines Project (28). The New York State Power Lines Project (PLP) consisted of 17 separate biological and health investigations concerned with the electric and magnetic fields that transmission lines produce. The PLP was conducted under a 1978 order from the New York Public Service Commission to the utilities within the state to support a $5 million electric and magnetic field biological effects research program. The order resulted from public hearings concerning the health and safety aspects of two proposed 765-kV AC transmission lines. An independent Scientific Advisory Panel developed the research program and monitored and reviewed the studies.

The PLP was initiated in 1982, and the research projects included in the program were chosen specifically to address high priority scientific questions regarding the electrical environment produced by 765-kV transmission lines. Following a careful consideration of the scientific literature, this broadly-based program supported research projects in the following areas: reproduction and development; cancer, including both laboratory studies and two epidemiologic studies (one of childhood cancer and the other of adult cancer); cell biology; and neurobiology and behavior. In almost every laboratory study, the experiments used electric and magnetic fields at least as large in strength as those found in a 765-kV ROW, which generally exceed those found in association with lower transmission voltages. Also, the exposure time that the animals, tissues, or cells tested received were very long in duration (chronic exposures). Typically, people spend relatively little time within ROWs, and the cumulative exposures in the laboratory far exceeded those that people typically receive (29).

The PLP studies showed that electric and magnetic fields do not affect genetic material, which indicates that magnetic fields would not cause cancer through mechanisms related to genetic or chromosomal mutation. Also, in multi-generational experiments using rodents (i.e., successive generations of animals mated and reared throughout the exposure period), electric and magnetic field exposure produced no effects on reproduction, fertility, litter size, fetal mortality, or generation time. Although several of the PLP studies reported biochemical changes, as well as effects on cell function and whole animal behavior, neither the investigators nor the Scientific Advisory Panel concluded that these observations were indicative of an adverse effect of field exposure on public health.

The major concern of the panel was with the results of the epidemiologic study of childhood cancer conducted by Savitz in Denver (30), which reported a possible association between electric utility wiring configurations and cancer, and thus suggested a magnetic field effect (31). This study was intended as a replication of a study published by Wertheimer and Leeper (32). The latter had presented data that described an association between the incidence of childhood cancer (including leukemia) and the type of utility wiring normally found outside homes (these are almost entirely distribution rather than transmission lines). The outdoor wires were coded according to their apparent current- carrying-capacity and distance from the home. The wiring configuration for each home was assigned as a surrogate for the magnetic field strength predicted for each home; however, actual in-home measures were not conducted. The implication that Wertheimer and Leeper drew from their data was that the size of the magnetic field produced by the utility wiring was associated with disease rate.

Unlike the Wertheimer and Leeper study, however, the Savitz study included measurements of magnetic fields inside the homes of the study subjects. When measured magnetic fields were used as the index of exposure, the associations with disease were weak to nonexistent, and

none was statistically significant. Savitz did find, however, that magnetic field strength in the home was weakly correlated with wiring configuration, and disease was slightly but statistically significantly associated with utility wiring configuration.

Study results are often expressed in terms of the probability of observing the results if they were due to random chance. A commonly used convention is that, when this probability (or p-value) is less than 5 percent (often written $p<0.05$), the observed findings are "statistically significant." If a study reports a p-value of 0.05, this means that 5 times out of a hundred a result at least as large as that reported would have occurred solely due to random chance. The selection of 5 percent as a cutoff value for significance is arbitrary, and some investigators select 1 percent as a more stringent criterion for significance. In this discussion, the reader should assume that the term "significance" refers to the 5 percent value.

It is very important for the reader to understand that a "statistically significant association" as shown in the Savitz study does not prove causation. The Scientific Advisory Panel was careful to point out that a causal relationship between magnetic fields and cancer had not been demonstrated, and that causality was only a hypothesis. The basis for this opinion was: 1) we still have only one well-designed [positive] study [the Savitz study], 2) there are unresolved questions in the Savitz study, and 3) there is no basic mechanism known to explain a causal relationship.

The other epidemiologic study in the PLP examined the relationship between both wire codes and measured magnetic fields with adult leukemia in the Seattle, Washington area (33, 34). In this study, neither wiring codes nor measured magnetic fields were found to be associated with the incidence of leukemia. Other epidemiologic studies have been conducted in community settings and the results have been mixed; some have failed to detect an association between proximity to magnetic field sources and cancer (35, 36, 37, 38), while others have reported positive associations (39, 40).

The results of the PLP showed that, under carefully controlled laboratory conditions, field strengths characteristic of 765-kV AC transmission lines do not produce effects on the general health or vitality of exposed subjects, or produce cellular effects indicative of transformation to a cancerous state; the effects that were observed failed to suggest that field exposures from transmission lines were associated with adverse effects on health. Neither of the two epidemiology studies produced data linking measured magnetic fields with cancer, but one produced an association with an exposure surrogate, namely wiring codes.

In July 1987, the Public Service Commission (PSC) of the State of New York appointed a Power Lines Project Evaluation Task Force to evaluate the Scientific Advisory Panel's final report and

develop recommendations for the PSC to consider. The Task Force in its report to the PSC (issued in January 1988) stated:

> "Although biological effects were noted in the research, the research findings themselves do not readily translate into concrete regulatory recommendations for establishing a magnetic field standard because the research revealed no evidence that magnetic fields pose a health hazard" (p. 28, NYS Public Service Commission, 1988).

Nonetheless, it recommended actions that would be in the public interest. Included among the recommendations was that the utilities should survey all fields associated with power delivery in the state and consider means to reduce field levels. Another was that "the Chairman and Commissioners should encourage the National Association of Regulatory Utility Commissioners to establish a committee to spearhead a joint state research effort similar to the New York State Power Lines Project."

The Task Force also recommended an interim magnetic field standard according to the philosophy that, "an interim magnetic field standard should ensure that magnetic fields at the edge of future transmission line rights-of-way are no greater than the fields typical of the many existing 345-kV lines operating through the state." The Task Force further stated, "If a magnetic field limit is adopted, it should be made clear that magnetic fields have not been shown to be hazardous and that the purpose of the limit is to ensure that exposures to magnetic fields in future transmission line designs would be no greater than those which society has implicitly accepted for the 345-kV lines operating for many years throughout New York State."

In February, 1988, the PSC approved the Task Force report and recommendations. Following the completion of a state-wide survey of 345-kV lines, the PSC proposed an edge of ROW magnetic field limit of 200 mG, winter normal conductor rating, for future transmission facilities over 1 mile long operating at 125-kV or above, or over 10 miles long operating at 100 to 125-kV.

The Office of Technology Assessment (OTA) Report (43). A background paper on "The Biological Effects of Power Frequency Electric and Magnetic Fields" was prepared in 1989 by a group from Carnegie Mellon University for the U.S. Congress (43). The OTA report discusses the present information on the health effects of extremely-low-frequency electric and magnetic fields. It also describes various research programs in progress and provides information on regulatory activity, including existing and proposed field exposure standards.

The Carnegie Mellon group prepared the OTA report as a compendium of the available science rather than a critical review. At its conclusion, the OTA report considers various approaches to deal with the issue of electric and magnetic fields. It does point out that there are no firm policy

statements it can make because the science is not complete enough to support them. To say any more would go beyond science and involve judgments and values. Nevertheless, it does present a general framework to think about the available approaches for regulators. The three general policy options are: 1) Do Nothing, 2) Prudent Avoidance, and 3) Aggressive Regulation.

The OTA report seems to direct the reader toward the prudent avoidance option. Prudent avoidance is taking modest steps to limit or reduce exposure that can be done with small investments of money and effort. Examples given of prudent avoidance include: 1) modest engineering design changes that reduce field levels and 2) actions that make exposure comparable, such as making field levels from new transmission lines similar to those levels for existing lines. The report does not recommend doing anything drastic or expensive until research provides a clearer picture of whether there is any risk and, if there is, how big it is. It also gives examples of excessive steps that, in the opinion of the authors, go beyond prudence and are at least foolishly expensive, at the worst, signs of serious paranoia.

The U.S. Environmental Protection Agency (EPA) Report (44). In December 1990, the EPA released a Review Draft Report entitled "Evaluation of the Potential Carcinogenicity of Electromagnetic Fields." The report, dated October 1990, reviews and evaluates the available literature on the potential carcinogenicity of electromagnetic fields including extremely low frequency magnetic fields such as those produced by power lines. Though widely reported and quoted in both the print and electronic media, EPA has issued this report as a preliminary draft only, and cautions against citation, quotation, or characterization of the report as formal agency policy. Since this is the second draft of this document to contain substantially the same information and public familiarity with its issuance and findings is relatively high, the report is briefly summarized below. The reader is cautioned, however, that this is a Draft report, issued for comment.

The EPA report reviewed available literature pertaining to human epidemiologic studies relating to carcinogenesis, chronic exposure animal studies, and in vitro studies. The purpose of the document was to "evaluate the likelihood that exposure to nonionizing electromagnetic radiation poses a risk or is a risk factor for the development of cancer in humans."

With respect to human epidemiologic studies, the EPA found that the strongest link between exposure to 60 Hz magnetic fields and human cancer comes from childhood cancer studies. In examining seven case-control studies of childhood cancer, EPA found consistent, modest elevations of cancer risk for leukemia, cancer of the central nervous system, and lymphoma in children whose exposure to magnetic fields has been estimated by the types of wires near their homes (wiring codes) or where magnetic field measurements indicated fields of 2 mG or higher. However, measured dose response relationships were found to be contradictory and could not

be substantiated. Particularly, EPA cites studies by Wertheimer and Leeper (32) and Savitz (30), as presenting the fewest difficulties with respect to bias, confounding, or other methodological problems. These studies estimate a potential 1.5 to threefold increase in cancer risk from elevated magnetic field exposure as defined by wiring codes.

Studies of residential adult exposure to magnetic fields, EPA concludes, provide somewhat mixed evidence of a risk of leukemia, and can neither be reliably used to assert or deny a possible association. One adult cancer study, however, does support an association between wiring codes and central nervous system cancer and lymphoma. Additionally, EPA found weak evidence of an association between leukemia and cancer of the central nervous system and employment in certain jobs characterized by high potential magnetic field exposure. EPA did caution, however, that misclassification of job function or other biases appears to be a distinct possibility in occupational studies.

EPA further stated that while no lifetime animal carcinogen studies of extremely low frequency electric and magnetic fields have been reported in the literature, evidence from a large number of biological test systems shows that such fields induce biological effects that are consistent with several possible mechanisms of carcinogenesis. However, none of these processes has been experimentally linked to tumors in either animals or humans, and the methods by which electric or magnetic fields may cause these events are not known. Additionally, the report points out:

> Most of the effects have been observed at field strengths that are many times higher than the ambient fields which are the putative cause of the childhood cancers in residential situations; as a consequence, many of the candidate mechanisms may not be really involved in the response to low environmental fields.

In summary, the EPA concluded:

> With our current understanding, we can identify 60-Hz magnetic fields from power lines and perhaps other sources in the home as a possible, but not proven, cause of cancer in humans. The absence of key information... makes it difficult to make quantitative estimates of risk. Such quantitative estimates are necessary before judgment about the degree of safety or hazard of a given exposure can be made. This situation indicates the need to continue to evaluate the information from ongoing studies and to further evaluate the mechanisms of carcinogenic action and the characteristics of exposure that lead to these effects.

4.6.5.2 Current Assessment of Potential Health Risks

In assessing whether exposure to electric and magnetic fields, whether from transmission lines or other sources, poses a human health risk, it is first necessary to demonstrate that such exposure results in biological effects to cells, tissues, organs, or organisms. Next it is necessary to demonstrate that any established biological effects translate into health effects, i.e., an increase in disease or a decrease in well being. Finally, it is necessary to demonstrate the frequency with which health effects occur, or the health risk.

Highlights of Current Research. During the last dozen years, extensive experimental work on the interaction between electric and magnetic fields and biological systems has been carried out. During this period, DOE established a research program to investigate possible health hazards. The funding level for this program was approximately $3 million in 1990, $3.5 million in 1991, and is estimated to approach $5 million in 1992. The Electric Power Research Institute (EPRI) has also maintained a similar program, vastly accelerated in recent years. Research spans the entire spectrum from humans, primates, and rodents to tissues, cells, and DNA. After the early screening studies, many of which were negative, effects have now been identified for a considerable number of systems.

It must be noted that many of the observed effects are not very robust. Moreover, most studies have not been extensively replicated. In part, this may be due to the fact that appropriate exposure parameters have not yet been fully identified.

In human research, male volunteers were exposed for 6 hours to mixed electric and magnetic fields which they could perceive (46). Of some 50 blood, urine, physiological, and psychological variables investigated, only 3 showed significant changes due to the fields: 1) changes in certain brain waves; 2) a slowing of motor responses; and 3) in particular, a slight slowing of heart rate (3 out of 70 beats per minute). These effects were consistent. However, they were present only at 9 kV/m and 0.2 g and not at fields above and below these values. There appears to be a "window" effect quite unlike the usual dose/effect relationship. Moreover, when fields were intermittent (on-off 4 times per minute), the effect becomes stronger. Both of these features had previously appeared in cellular work.

Melatonin is an important hormone produced in the pineal gland that regulates the thyroid gland, adrenal gland, and reproductive organs. Reduction of melatonin production is strongly correlated with breast cancer in rats, as well as human females. Exposure of rats to electric fields for 3 weeks has resulted in depression of daily melatonin production by some 50 percent (46). Continuing experiments have shown that this effect can be elicited with fields ranging from

3.5 kV/m to 120 kV/m. Currently, effects of mixed electric and magnetic fields are being explored. Preliminary results show that intermittent magnetic fields yield stronger effects (46).

Cellular work has shown varied responses to exposure such as irregular firing of neurons and reduced killing capacity of white blood cells (thus reducing effectiveness of the immune system). It has become clear, largely through DOE work, that the cellular basis of many bio-effects seems to be a disturbance of the flux of biologically important ions through the cell membrane. These ions, particularly calcium, serve as messengers telling cells how to respond to external stimuli. If was found, for example, that exposure causes changes in the intra-cellular hormones, omithine-decarboxylase and parathyroid, which are similar to changes caused by known cancer promoters (46).

Although extensive experimentation has revealed no direct effect of electric and magnetic fields on DNA, recent results reveal a more subtle effect. DNA transcription and translation into messenger RNA is apparently affected by exposure. Put simply, this means that DNA is not affected directly, but the way DNA works may be changed by fields (46).

All these effects are biological effects; currently they cannot be characterized as health effects. They do, however, present cause for future concern.

Dose and Effect. Most toxic agents found in the environment have a fairly simple dose/effect relationship. Basically, this relationship is linear, at least for small doses; twice the dose gives twice the effect. Often there is some saturation, when further increases in dose do not increase the effect.

The situation for bio-electromagnetic effects is completely different. Both human and cellular work indicate the existence of intensity "windows." An effect only seems to occur within a certain range of the parameter. Certain phenomena, in fact, appear to be restricted to narrow resonance-like bands. Non-linearity also seems to be characteristic of the frequency dependence. Furthermore, intermittency emerges as an important factor. The magnitude of the field may not be as important as fluctuations in exposure. Finally, other factors such as timing and even the local geo-magnetic field seem to play a role as well. In other words, the possible existence of intensity windows argue that more may not be worse when considering bio-effects from electric and magnetic fields. If may be some time before researchers are able to understand why certain distinct exposure ranges, resonant (or pulsing) characteristics, or exposure durations provide an observable effect, while others, even though greater in intensity, do not.

While extremely interesting from a scientific point of view, this situation makes any evaluation of "exposure" quite difficult. An extensive program of exposure measurement is not warranted at this time, since the parameters to be measured are not yet known. Finding the dose/effect relationship for biological effects must be the prime scientific objective. Once such a relationship is found, one will be in a much better position to look for possible health effects, either through epidemiology or through animal experiments.

Epidemiology. Since human experimentation involving toxic agents is usually not possible, epidemiology (the study of the occurrence and distribution of disease) can offer a useful alternative. There have been some 40 epidemiological studies on potential health hazards of electric and magnetic fields. Roughly half of these studies are residential and half are occupational. Twenty studies are ongoing.

Epidemiological studies look for statistical correlations between the occurrence of disease and other factors. When a significant correlation is identified, the health risk is described in terms of a risk factor. A risk factor of 2 indicates that a disease occurs twice as often in a study population (or group of people) exposed to a certain factor as compared to a control population which is not exposed to the factor being considered.

In general, risk factors for residential studies of electric and magnetic fields are in the vicinity of 2, while occupational studies yield higher risk factors (e.g., 8). However, in many cases, studies showing statistically significant correlation with exposure are matched by other studies which do not. Also, the diseases involved are fortunately rare and the total number of cases is orders of magnitude smaller than those involved in accepted correlations such as lung cancer and smoking.

Among the most often quoted studies, the Savitz study (30) investigated cases of childhood leukemia in Denver. Disease incidence was associated with wiring codes, but generally not with measured magnetic field strengths. However, Savitz found that houses with fields of about 3mG have a slightly higher, though statistically insignificant, correlation with the disease than those with only 1mG. While the study itself was carefully conducted, certain facts have to be kept in mind: 1) the risk factor involved in only 2, 2) the total number of cases was about 135, and 3) there was no correlation to adult leukemia. While the study indicates potential effects, it is certainly not proof that leukemia is caused by power line fields. After the release of his study in 1987, Savitz, in an open memorandum to "persons concerned about reports of electromagnetic fields and childhood cancer," addressed the inquiries he had received concerning the study's results. He stated: "It should be kept in mind that we have not proven that magnetic fields cause cancer. Subsequent research will indicate whether we are on the right track or whether our results are in error."

Results released in 1990 from studies of telephone linemen conducted at Johns Hopkins University by researcher Genevieve Matanowski have shown elevated risks of leukemia, brain cancer, and male breast cancer (47, 48). In one study, Matanowski found that the association between leukemia and EMF exposure was strongest in workers, such as cable splicers and central office technicians who were exposed to higher peak EMF doses than other workers. Although Matanowski's work lends support to the theory of an EMF - cancer link in occupationally exposed populations, it does not prove a cause and effect relationship, and Matanowski continues to emphasize the need to identify the precise mechanisms by which EMF could influence human cells.

Finally, results of a study examining childhood leukemia risk from EMF exposure were published in the November 1, 1991 issue of the American journal of Epidemiology (45). The study, conducted by John M. Peters, M.D. et al. of the University of Southern California, examined 232 cases of childhood leukemia which occurred in children ages 10 and younger between 1980 and 1987 in Los Angeles. Researchers interviewed parents of leukemia victims by telephone, measured electric and magnetic fields in their homes, conducted like examinations of a control group of 232 children who did not have leukemia, and evaluated power lines outside the children's homes using wiring codes similar to previous studies (45).

The preliminary findings are complex and somewhat contradictory and include:

- no association between measured electric fields and leukemia;
- a weak, statistically insignificant, correlation between magnetic field measurements in the children's bedroom and leukemia;
- a statistically significant correlation between wiring codes and leukemia; and
- a statistically significant association between the use of appliances (hair dryers and black and white televisions) and leukemia.

The Peters findings, though generally consistent with earlier studies such as the Savitz work, continued to present further research needs. Particularly of interest are the reasons why wiring configuration is again observed to correlate better with leukemia risk than measured exposure. The question of an apparent appliance use correlation with leukemia also bears further examination.

Epidemiology studies are easier for the general public to understand than work on cellular biology. However, such studies also lend themselves to facile (and misleading) interpretations. It is sometimes difficult for the public to remember that statistical associations that may be shown in an epidemiology study do not prove causation. Therefore, these studies are particularly prone to lead to alarmist reports in the press and to general confusion. Actually, a wide variety of causes lead to risk factors of approximately 2, without arousing any notable public concern. Secondary smoking and bottle feeding infants are among such causes.

Biology - Health - Risk. A decade ago, a substantial number of scientists may have doubted whether electric and magnetic fields could interact with biological mechanisms. Today, the existence of "biological effects" is accepted by a majority of scientists. However, such biological effects do not necessarily imply that there are "health effects." Experiments are made under carefully controlled laboratory conditions, which may have little relevance to realistic exposure environments. For example, small amounts of light can essentially negate the effects of the melatonin experiment. Furthermore, body mechanisms are able to take care of most other biological perturbations. Proof of health effects will need extensive and costly animal experimentation. Until there is better understanding of the dose/effect relation, such work will not be conclusive.

While biological effects can be considered as established, health effects of electric and magnetic fields must be considered as unproven. Only if there are health effects, will the question of risk become relevant. Because of the apparent nature of the dose/effect relationship, one might conclude that the special exposure conditions which result in effects might be comparatively rare. On the other hand, because electricity is virtually ubiquitous, one could say that even very small health effects will result in major risks.

There are several arguments against pursuing vigorous programs of regulation and mitigation. It is not known whether, and to what degree, there really are health effects. More importantly, one does not know what to mitigate against. In a usual toxicological situation, one could simply conclude that any reduction in field strength would be commendable. But because of possible "window effects," as discussed above, it is possible that more exposure may not necessarily be worse than less, and reduction of field levels may actually be counter-productive. If it turns out that only certain frequencies are biologically active, then it may be much more important to decrease contributions of that specific component rather than lowering field strengths in general.

Other Points of View. Although the consensus opinion of the majority of researchers (including DOE), regarding the existence of a link between magnetic and electric field exposure and health effects, continues to center on the need for further research, there are well known and credible epidemiologists who have taken the position that adequate evidence does indeed exist by which

to conclude the presence of a cause and effect relationship. Perhaps most prominent among these researchers is Dr. Nancy Wertheimer, whose early work with Dr. Ed Leeper in 1979 (32) is often referenced as the beginning of the current credible research into possible EMF health effects. Since that time, Wertheimer and Leeper have published several other studies examining possible relationships between electrical wiring and adult cancers and possible effects of electric blankets on fetal development (49, 50, 51). In all of these studies, Wertheimer and Leeper have observed a consistent correlation between high EMF exposure situations, often represented by surrogates such as wiring codes or electric blanket use, and negative health effects such as cancer or fetal loss. Wertheimer and Leeper's work has also attempted to control for confounding variables such as age, neighborhood, or socioeconomic levels in the case of the adult cancer studies and thermal effects in the case of electric blanket users. In both cases, the authors feel that their results are able to isolate electric and magnetic fields as the likely causal mechanism for the observed health effects.

In the area of occupational exposures, in addition to the work of G. M. Matanowski referenced above, Dr. Sam Milham, Jr. has published several studies (52, 53, 54, 55, 56) between 1982 and 1988. Dr. Milham examined mortality from leukemia and non-Hodgkin's lymphomas in workers involved in "electrical" occupations (including electricians, power station operators, and aluminum workers) and amateur radio operators who are exposed to electric and magnetic fields as a result of their hobby. Dr. Milham has consistently concluded that elevated risks, as represented by significant excess deaths correlate positively with elevated occupational exposures.

Conclusions. It is becoming apparent that biological effects of electric and magnetic fields occur with frequencies between 15 and 150 Hz. However, health effects cannot be considered as proven, and it is not clear whether biological effects can lead to health effects. If health effects exist, epidemiology indicates that they are likely to be small.

There is, however, much room for research to improve our understanding of this complex area. And indeed, research to investigate or replicate previous studies involving electric and magnetic field exposure is continuing. There are nearly 50 studies on biological effects currently being funded in the United States; 18 of these studies are being funded by DOE. The work involves more epidemiologic investigation and basic laboratory work. DOE is currently conducting research on the effects of electric and magnetic fields on humans, baboons, small mammals (melatonin, stress, circadian rhythms), cell membranes, and cell and tissue physiology. Future studies will investigate the effects of mixed electric and magnetic fields, long-term effects on cell growth, and cell membrane interactions with electric and magnetic fields. Powerline epidemiological studies are continuing in the United States, as well as in Sweden and Great Britain. The National Cancer Institute is considering a large-scale childhood cancer study in the United States to investigate several environmental factors, including exposure to EMF. EPRI has

also recently begun studies of cancer among electrical workers. Unlike previous studies, this research will include actual measurement of occupational EMF exposures. A large study of Canadian and French workers on high-voltage facilities is also just beginning. The approximate 1992 budget for the programs in the United States is approaching $11 million.

In conclusion, study results do not currently indicated a cause for alarm. Because of our limited knowledge of the exposure parameters involved and the non-linearity of the dose/effect relationship, there is currently no scientific basis for regulatory action. For the same reason, an extensive program of mitigation is not warranted at this time.

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4.7 Worker Health and Safety

The proposed Interconnection would be constructed by a contractor who would be selected by WWP. This contractor would be required by law to comply with all applicable federal and state worker health and safety regulations (see Table 1-2). Regardless of the regulations that are in place, the safety policies of the contractor, and the case of the workers, construction is an inherently dangerous activity. The possibility of equipment accidents and falls from structures would be minimized but could not be eliminated. Construction of transmission lines does not typically involve exposure to hazardous chemicals. Dust generated by ROW clearing and heavy equipment movement would not exceed air quality standards, and thus would not pose a health hazard.

Once constructed, the transmission line would be operated and maintained by WWP employees. Hazards posed by the proposed line are very similar to those posed by other lines in WWP's system. Linemen must be trained to WWP's standards before working on high voltage transmission lines, and all work must be conducted according to WWP procedures, which meet or exceed federal and state health and safety requirements. These procedures are designed to protect workers from hazards such as falls or electrocution, but these types of accidents are still a possibility when working on any transmission line. Potential health effects of electric and magnetic field (EMF) exposure are discussed in Section 4.6.5. Herbicides would only be used for the control of noxious weeds (see Section 2.3.5). The most appropriate herbicide would be selected through coordination with the local noxious weed control board; it would be applied to a relatively small area along the ROW; and workers would be thoroughly trained in the safe handling and application of the herbicide being used. Appropriate protective clothing and respirators would be used.

Health and safety concerns for the general public are limited. EMF exposure is discussed in Section 4.6.5. Herbicide exposure would be much less than for maintenance workers discussed above. As mentioned in Section 4.6.3.3 electrocution could be a hazard. The line would be designed to meet all National Electric Safety Code standards for minimum ground clearance. However, care must still be taken when operating any large equipment or moving irrigation pipe around any power line. Electrocution hazards are in fact much greater around small distribution lines than they are around large transmission lines. Farmers along the southern half of the proposed route should be aware of potential hazards. The proposed line will also be marked according to FAA standards to minimize aircraft collision hazards.

4.8 Cumulative Impacts

As discussed in Section 2.5, no specific projects were identified that would interrelate with the proposed Interconnection, so that their impacts would interact in a cumulative manner. Therefore, no cumulative impacts resulting from the proposed Interconnection and other reasonably foreseeable projects are anticipated.

Residential development is expected to continue along the proposed route, particularly along the Pend Oreville River to the north and in the area between Chatteroy and Mead. Development may take the form of single residences or new subdivisions; however, it is not possible to predict the development activity in 1995 when the proposed Interconnection would be constructed. Residential development would convert existing land uses such as timber production, graying, farming, or wildlife habitat to another use. This would be cumulative with the impacts of the proposed Interconnection in some cases and not in others. Residential development and transmission line construction would both require the removal of trees and restrict their regrowth. In other vegetation types, however, the existing vegetation (e.g. shrubs, grasses, crops) would be allowed to return following construction of the transmission line. The cumulative impacts of tree removal are expected to be widely scattered along the Proposed Route and not significant on a local or regional basis.

BPA currently has an unused ROW from approximately Boundary Dam to the Mead area that would be paralleled by the Proposed Route. It is not known if or when BPA would construct a transmission line along the ROW. Utilization of this ROW by BPA would result in cumulative impacts with the proposed Interconnection. These impacts would be to the same resources as discussed for the proposed Interconnection (e.g. vegetation disruption or removal, stream crossings, restriction of development on the ROW); however, none are expected to be significant or unacceptable. Since the BPA ROW follows the existing transmission line corridor (as does the Proposed Route), and in some locations would be between the proposed Interconnection and the existing transmission lines, no previously undisturbed areas would be affected.

Cumulative impacts to vegetation, wildlife, and water resources; timber production and agricultural activities; and visual resources and recreation would be minimized. Existing access roads could be utilized, further minimizing cumulative impacts. Thus while some cumulative impacts would occur from the construction of both the proposed Interconnection and a future BPA transmission line, WWP's proposed route would minimize those impacts.

4.9 Additional Mitigation Measures

WWP has committed to a number of environmental protection measures that are presented in Table 2-5 in Section 2.3 of this FEIS. These measures would minimize many adverse environmental effects of the proposed Interconnection's construction and operation; impacts were assessed with these measures in place. The following section presents mitigation measures that were both contained in the DEIS and those that have been modified or added since publication of the DEIS. The additional and modified measures were developed primarily in response to agency and public comments received on the DEIS and were published in the Supplemental DEIS for review and further comment. Measures modified from the DEIS are indicated by a †; new measures developed in response to concerns raised in the DEIS comments are indicated by a ‡.

These mitigation measures have been developed by DOE to mitigate significant or potentially significant adverse impacts, as well as other impacts that have been identified in Sections 4.1 through 4.5 of this EIS. The measures would be made conditions of the Presidential permit. For each mitigation measure presented below, the measure is outlined and its effectiveness is assessed. Measures for significant impacts are identified by an asterisk (*). Not all mitigation measures will be completely effective in reducing potential significant impacts below the significance threshold. This will result in unavoidable adverse impacts that are discussed in Section 4.10 of this FEIS. All measures would be applied to any of the alternatives, variations, and route options analyzed in this document, except where noted otherwise.

In addition to the mitigation measures contained in this EIS, the Forest Service and BLM will attach standard and special ROW stipulations to their ROWs grants. These stipulations will contain generic measures that are applied to all ROWs, as well as site-specific measures whose need may be identified at the time the ROW centerline is surveyed. A Federal Authorized Office from the Forest Service will direct the detailed implementation of certain mitigation measures.

‡ **Measure 1: Geology.** Prior to construction, geological resources and mining claims will be identified on public lands crossed by the Interconnection to delineate potential areas of substantial mineral resources that may be precluded from development.

Effectiveness. Identification of important mineral resource locations and mining claims that may be precluded from development will allow design modifications to minimize impacts to these economically important areas.

‡* **Measure 2:** Wetlands and Vegetation. Upon route designation, WWP will coordinate with the appropriate federal and state agencies (e.g., COE, EPA, USFWS, Forest Service, BIA, WDW, WDE) to develop a wetlands mitigation plan to be implemented during project construction, operation, and abandonment. Construction activities at wetland crossings will not proceed until the mitigation plan has been reviewed and accepted by the appropriate federal and state agencies. The wetlands mitigation plan will comply with the EPA's Section 404(b)(1) guidelines. For those wetlands that will be potentially impacted (e.g., the 8.5 acres of forested wetlands for the Proposed Route), a function and value analysis will be conducted for each wetland. This analysis may follow such techniques as the Wetland Evaluation Technique (WET), the Habitat Evaluation Procedures (HEP), and/or WDE's wetlands rating system for eastern Washington. Specifics on the types of construction activities that can take place in certain areas, the vegetation species to be seeded or planted following construction, the types of noxious weed control to be implemented, and monitoring of restoration success will also be included in the plan.

Effectiveness. A wetlands mitigation plan will identify sensitive resources to be protected and outline specific measures to both create new wetland areas or enhance existing ones to ensure no net loss of wetlands.

* **Measure 3: Wetlands and Wildlife.** The proposed transmission line will follow the western side of the existing BPA ROW adjacent to the Lead King Lakes area. This measure applies only to the Eastern Route Option.

Effectiveness. Line placement along the western edge of the existing ROW will avoid disturbance of the wetland and potential significant impacts to bird species using the wetland areas.

* **Measure 4: Vegetation.** Prior to the initiation of transmission line and access road construction activities, clearance surveys will be conducted for plant species listed as sensitive by the State of Washington. These surveys will determine the locations of sensitive plant populations relative to the project ROW. These populations will be avoided to the extent possible during final centerline, access road, and structure siting.

Effectiveness. Clearance surveys will facilitate avoidance of state sensitive plant species and consequently minimize potential impact to sensitive populations. Residual impacts would not be significant.

†* **Measure 5: Wildlife.** WWP will coordinate with the USFWS, WDW, and Forest Service prior to the initiation of construction activities to identify bald eagle winter concentration areas crossed by the proposed interconnection. Construction activities will be suspended in these areas from November 1 to May 1, or for a period specified by the agencies.

Effectiveness. Avoidance of bald eagle winter concentration areas will prevent disturbance to individuals using these areas and prevent removal of important wintering habitat.

†* **Measure 6: Wildlife.** Prior to initiation of construction activities, clearance surveys for the identification of active bald eagle, golden eagle, and osprey nests located within 0.5 mile of project construction will be conducted. This 0.5-mile survey area would provide additional information on active nest sites. WWP will coordinate with the WDW, USFWS, and Forest Service, should an active nest be located within 0.5 mile of the line or new access road, to determine the time period and distance that construction constraints would be necessary for each individual nest site. Agency dialogue will identify other sensitive raptor species that may nest within the area (e.g., peregrine falcon) and develop measures to minimize significant disturbance to breeding birds.

Effectiveness. Avoidance of active nest sites of sensitive raptor species will prevent loss of annual production for those individuals. Residual impacts would not be significant.

‡* **Measure 7: Wildlife.** Since the transmission line shield wires are the primary cause of bird collisions, WWP will coordinate with the USFWS and WDW regarding the need to either install aerial markers on the overhead shield wires at major river crossings or remove the shield wires along these individual spans. Each river crossing will be examined on a case-by-case basis during detailed transmission line design.

Effectiveness. Installing aerial markers along the shield wires or removing these specific wires at river crossings will increase the visibility of the line and/or minimize the potential for collisions by bald eagles using the river corridors during their daily and migratory movements.

* **Measure 8: Wildlife.** Prior to transmission line and access road construction, WWP will coordinate with the WDW to identify specific locations of priority deer winter areas intersected by the route. Construction will be prohibited within these sensitive areas during periods of

concentrated deer use, typically from December 1 through March 31. WWP will confirm the need for these construction constraint periods with WDW, for each specified area.

Effectiveness. Limiting construction activities within priority winter range will avoid significant impacts to wintering deer populations during critical periods.

‡ **Measure 9: Wildlife.** In the event line construction occurs along the western edge of the existing transmission line corridor near Metaline Falls, WWP will coordinate with the WDW and Forest Service prior to project construction to identify specific mountain goat habitat that occurs directly adjacent to the proposed ROW. Project construction will be restricted within these areas during the kidding period, from March 15 to June 15, and new access roads will be reclaimed following line construction.

Effectiveness. Limiting construction activities within these designated areas will avoid adverse impacts to the reproductive success of this introduced mountain goat population. Access road reclamation will ensure limited access by the public and minimize harassment of individual mountain goats.

Measure 10: Wildlife. Following line construction, plant species (such as white dutch clover or other browse species recommended by the USFWS, WDW, or Forest Service) will be used for ROW reclamation, in addition to the plant species typically used by WWP during revegetation procedures.

Effectiveness. The introduction of forage species for ROW revegetation will benefit wildlife potentially impacted by the line (i.e., grouse, deer, elk, grizzly, and black bear). It will also minimize the invasion of grass species and noxious weeds into the open ROW area and may aid in reducing grazing competition with local livestock.

‡* **Measure 11: Wildlife and Vegetation.** WWP will coordinate closely with the Forest Service, USFWS, and WDW to identify any wildlife species dependent on old growth forest that would be impacted by removal of this unique habitat type. Site-specific construction modifications will be implemented to avoid old growth areas, if possible, thereby minimizing impacts to associated wildlife communities.

Effectiveness. Avoiding disturbance of old growth forest areas will prevent impacts to the wildlife species dependent on this unique ecosystem. In the event these areas cannot be avoided by transmission line construction, WWP's site-specific coordination with the appropriate state and federal agencies will minimize the effects to species occurring there.

Measure 12: Land Use. WWP will coordinate closely with the Forest Service to ensure compliance with the Colville National Forest Land and Resource Management Plan. Specific attention will be paid to Forest-wide standards and guidelines and to specific management area prescriptions, as detailed in Chapter 4 of the Forest Plan.

Effectiveness: This measure will reduce overall impacts on National Forest lands, ensure consistency with the Forest Plan, and facilitate implementation of Forest Service management objectives.

Measure 13: Land Use. The need for marking the transmission line static wires to increase line visibility near the landing strip located southeast of Sacheen Lake will be investigated by WWP, and marker balls will be installed, if required.

Effectiveness. Marking the transmission line near the landing strip will increase the visibility of the line to pilots, minimizing the potential for collision.

Measure 14: Land Use. Where the proposed Interconnection would parallel an existing transmission line across cultivated land, developed recreation sites, or commercial and industrial properties, the proposed structures will be located adjacent to (i.e., in step with) existing structures, wherever feasible.

Effectiveness. This measure will minimize potential impacts to these sensitive areas by locating the disturbance areas in line with previously disturbed sites.

*** Measure 15: Visual.** The proposed angle structure on Riecker Mountain will be placed off of the ridgetop to a less visual position. This measure applies only to the Southern Crossover Alternative.

Effectiveness. Relocating the angle structure will reduce the amount of visual impact to Highway 395 along this area of BLM-managed land. Residual impacts would not be significant.

*** Measure 16: Cultural Resources.** Potential adverse impacts to cultural resources will be mitigated in the following manner. Prior to construction, an intensive Class III (100 percent) cultural resource survey will be conducted on all affected federal land that has not previously been surveyed. Survey on non-federal lands will be conducted as specified by the Authorized Officer after consultation with the State Historic Preservation Officer (SHPO). During the survey, information will be gathered on all newly discovered and previously recorded archaeological sites to determine their potential eligibility to the National Register of Historic Places. Limited testing of some sites may be necessary in order to determine their eligibility. Following the survey, an

inventory report will be prepared and submitted to the Forest Service Authorized Officer for review and comment. The report will contain the results of the inventory, and all sites will be evaluated for potential eligibility to the National Register. The report will include a proposed mitigation plan for all sites t are considered to be potentially eligible for inclusion on the National Register. The mitig..ion plan may include avoidance of sites, data collection, site-specific control of access and construction, monitoring recommendations, and salvage excavation.

Based on the above mitigation plan, the Forest Service Authorized Officer will submit a treatment plan to the SHPO and to the Advisory Council on Historic Preservation. Following the consultation period, the treatment plan will be implemented. All field work must be completed before construction can begin in a given area. Monitoring will be implemented during construction where required by the treatment plan. Any sites located during construction or as the result of monitoring will be evaluated and a treatment plan will be developed as needed.

Effectiveness. The cultural resources treatment plan will ensure that the data which help determine a resource's significance will not be destroyed or lost and the effects of construction and operation on cultural resources are fully considered as required by law. While implementation of the treatment plan will avoid most significant impacts to cultural resources, it may not be possible to mitigate all impacts.

‡ **Measure 17: NEPA Compliance.** DOE will review the final project design of WWP's proposed Interconnection for consistency with the impacts and mitigation measures presented in this EIS. Any impacts that fall outside the range of impacts presented in this EIS will be addressed in additional NEPA documentation, most likely an Environmental Assessment. All mitigation measures will also be made conditions of the Presidential permit.

Effectiveness. This measure will assure implementation of required protection procedures and mitigation measures to minimize or prevent impacts to resources associated with the proposed Interconnection project. It will also ensure full disclosure of project impacts as required under NEPA.

4.10 No Action Alternative

As discussed in Section 2.2.5, under the No Action Alternative a Presidential permit would not be issued and the proposed Interconnection would not be constructed. This would preclude the construction, operation, maintenance, and abandonment impacts that would result from the implementation of one of the five action alternatives as presented in the preceding sections.

In the absence of the proposed Interconnection, WWP would develop other sources of energy to meet increases in demand for electricity. These could include purchase or exchange of power with cogenerators and electric utilities, conservation, combustion turbines, or the construction of base load generation stations such as the Creston Generating Station. Further discussion of energy supply alternatives can be found in Section 2.6.1. The selection of other sources of energy would be based on reliability and economic considerations and would likely include several of the sources mentioned above. Each of these other sources would have its own unique set of environmental impacts that would differ from those of the proposed Interconnection. For example, combustion turbines or base load generation stations would have air emissions that would not be associated with the proposed transmission line. Thus, while the No Action Alternative would avoid the direct impacts of the proposed Interconnection, it would also result in other impacts to different resources in different areas. These impacts would depend on WWP's ultimate course of action for ensuring electricity supplies, and they cannot be characterized further at this time.

4.11 Unavoidable Adverse Impacts

Those significant impacts that would remain following the implementation of the mitigation measures presented in Section 4.9 (i.e., unavoidable adverse impacts) are described below for the Proposed Route, the associated alternatives, project variations, and route options. Unavoidable adverse impacts for the alternatives include those portions in common with the Proposed Route.

4.11.1 Proposed Route

Floodplains and Wetlands. The Proposed Route would remove 8.5 acres of palustrine forested wetlands. The Eastern Route Option would remove 5.3 acres of forested wetlands, as compared to the segment of the Proposed Route replaced, which would remove a total of 8.5 acres. The Western Route Option would remove 7.9 acres of forested wetlands, as compared to 8.5 acres removed by the segment of the Proposed Route replaced.

Vegetation. The Proposed Route would remove 8.5 acres of forested wetland/riparian habitat. The Eastern Route Option would remove 5.3 acres of forested wetland/riparian habitat, as compared to the segment of the Proposed Route replaced, which would remove a total of 8.5 acres. The Western Route Option would remove 7.9 acres of forested wetland/riparian habitat, as compared to 8.5 acres removed by the segment of the Proposed Route replaced.

Existing and Planned Land Use. The Proposed Route would result in the removal of 7 residences. The Eastern Route Option would remove a total of 17 residences, as compared

to 7 residences removed for the segment of the Proposed Route replaced. The Western Route Option would remove 34 residences, as compared to the segment of the Proposed Route replaced, which would remove a total of 7 residences.

4.11.2 Eastern Alternative

Floodplains and Wetlands. The Eastern Alternative would remove 9.4 acres of palustrine forested wetlands. The Eastern Route Option would remove 5.3 acres of forested wetlands, as compared to the segment of the Eastern Alternative replaced, which would remove a total of 8.5 acres. The Western Route Option would remove 7.9 acres of forested wetlands, as compared to 8.5 acres removed by the segment of the Eastern Alternative replaced. The Chattaroy Variation would remove 0.6 acre of forested wetlands.

Vegetation. The Eastern Alternative would remove 9.4 acres of forested wetland/riparian habitat. The Eastern Route Option would remove 5.3 acres of forested wetland/riparian habitat, as compared to the segment of the Eastern Alternative replaced, which would remove a total of 8.5 acres. The Western Route Option would remove 7.9 acres of forested wetland/riparian habitat, as compared to 8.5 acres removed by the segment of the Eastern Alternative replaced. The Chattaroy Variation would remove 0.6 acre of wetland/riparian habitat.

Wildlife. The Chattaroy Variation would cross a sensitive riparian area within the Little Spokane River Natural Area, increasing the potential for bald eagle collisions.

Existing and Planned Land Use. The Eastern Alternative would result in the removal of 12 residences and two major inhabited buildings. The Eastern Route Option would remove a total of 17 residences, as compared to 7 residences removed for the segment of the Eastern Alternative replaced. The Western Route Option would remove 34 residences, as compared to the segment of the Eastern Alternative replaced, which would remove a total of 7 residences. The segment of the Eastern Alternative that would be replaced by the Chattaroy Variation would remove one residence and one major inhabited building. The Chattaroy Variation would conflict with 0.6 mile of the Little Spokane River Natural Area. Both the Marshall Variation and the segment of the Eastern Alternative replaced would result in the removal of two residences each.

Visual Resources/Aesthetics. The Chattaroy Variation would result in 0.4 mile of significant, long-term visual impact at the Little Spokane River Natural Area.

4.11.3 Western Alternative

Floodplains and Wetlands. The Western Alternative would remove 21.2 acres of palustrine forested wetlands.

Vegetation. The Western Alternative would remove 21.2 acres of forested wetland/riparian habitat.

Existing and Planned Land Use. The Western Alternative would result in the removal of seven residences and one major inhabited building. Both the Marshall Variation and the segment of the Western Alternative replaced would result in the removal of two residences each.

Visual Resources/Aesthetics. The Western Alternative would result in 14.5 miles of significant, long-term visual impacts. The segment of the Western Alternative that would be replaced by the Onion Creek Variation would result in 5.9 miles of significant, long-term visual impacts.

4.11.4 Northern Crossover Alternative

Floodplains and Wetlands. The Northern Crossover Alternative would remove 15.2 acres of palustrine forested wetlands.

Vegetation. The Northern Crossover Alternative would remove 9.1 acres of old growth forest and 15.2 acres of forested wetland habitat.

Wildlife. The Northern Crossover Alternative would remove 9.1 acres of old growth forest, impacting dependent wildlife species.

Existing and Planned Land Use. The Northern Crossover would result in the removal of eight residences and one major inhabited building. Both the Marshall Variation and the segment of the Northern Crossover Alternative replaced would result in the removal of two residences each.

Visual Resources/Aesthetics. The Northern Crossover would result in 1.8 miles of significant, long-term visual impacts.

4.11.5 Southern Crossover Alternative

Floodplains and Wetlands. The Southern Crossover Alternative would remove 9.1 acres of palustrine forested wetlands.

Vegetation. The Southern Crossover Alternative would remove 7.6 acres of old growth forest and 9.1 acres of forested wetland/riparian habitat.

Wildlife. The Southern Crossover Alternative would remove 7.6 acres of old growth forest, impacting dependent wildlife species.

Existing and Planned Land Use. The Southern Crossover would result in the removal of 10 residences and one major inhabited building. Both the Marshall Variation and the segment of the Southern Crossover Alternative replaced would result in the removal of two residences each.

4.12 Relationship Between the Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

This section summarizes the relationship between the proposed use of the environment implicit in the construction and operation of the transmission line interconnection and its related facilities and the actions that could be taken to maintain and enhance the long-term productivity of this same land and its resources. Short-term is defined as the construction period for the project plus 1 year for ROW rehabilitation. Long-term is defined as the remaining life of the project through abandonment and reclamation. Short-term disturbances of the existing environment would be necessary to construct the proposed interconnection. A total of about 1,548 acres would be initially disturbed by activities such as clearing of the ROWs for the Proposed Route. Of this total, less than 14 acres would be permanently converted to project-related uses that would preclude other uses such as farming.

4.13 Irreversible/Irretrievable Commitment of Resources

An irreversible commitment of a resource is one that cannot be changed once it occurs; an irretrievable commitment means that the resource cannot be recovered or reused. Use of sand, gravel, concrete, fuel, oil, and other materials during construction, maintenance, and operation of the proposed transmission facilities would constitute an irreversible and irretrievable commitment of resources. The sites occupied by transmission structures would commit underlying resources, such as agriculturally productive soil, throughout the life of the project. The ROW could not be used for timber production during the life of the project. The loss of crop and wood product production would be an irretrievable commitment of resources; however, the soil could be returned to production following the removal of project facilities at abandonment. Thus, the project would not represent an irreversible commitment of resources.

Although wildlife habitat would be altered for the lifetime of the project, cover similar to existing habitat could be recovered after decommissioning. Recovery could occur by natural succession or by revegetation programs. Recovery of forest habitat would take several decades. Aquatic and wetland habitat commitments would be relatively minor, except for the loss of forested wetland areas. In most cases, lost or modified habitat could be returned to original conditions after decommissioning. One other irreversible/irretrievable commitment of resources that might result from the proposed project would be the disturbance of cultural resource sites during construction. This could result in the permanent loss of data contained in the sites.

CONSULTATION AND COORDINATION

5.0

5.0 CONSULTATION AND COORDINATION

5.1 Public Involvement

In the course of preparation of the Draft, Supplemental Draft, and Final EISs for the WWP/B.C. Hydro Interconnection, the DOE has communicated with and received input from many federal, state, and local agencies; elected representatives; environmental and citizens groups; industries; and individuals. Many of these people participated in the public scoping meetings that were held in Spokane, Colville, and Newport, Washington in May 1988.

In addition, WWP held four public information meetings in northeast Washington during September 1987 to take public comments on the proposed Interconnection. These meetings were held in Spokane, Colville, Chewelah, and Newport. Approximately 150 people attended the 4 meetings.

The Draft EIS was released to various individuals, organizations, and government agencies January 12, 1990. Approximately 650 copies of the draft were distributed by the DOE. During the 72-day public comment period, many of those who received copies of the Draft EIS submitted written comments and/or presented verbal comments at the public hearings held in Spokane, Washington, on January 31, 1990, and in Newport and Colville on February 1, 1990. DOE received 71 comment letters, and a total of 56 speakers presented their comments during the public hearings. These comments are presented and responded to in the following sections.

The Supplemental Draft EIS was released for public review and comment on February 21, 1992. Approximately 500 copies were distributed for review. During and following the 68-day public comment period, DOE received 20 letters from government agencies and members of the public.

The following is a listing of the agencies, groups, and organizations who have provided input to and/or comments on the Draft and Supplemental Draft EIS. However, this list does not include all the individuals who provided comments on the EIS; this listing is shown on Table 5-1. The complete distribution list for the Draft, Supplemental Draft, and Final EIS is contained in Appendix C.

Federal Agencies

Department of Agriculture
- Forest Service - Colville National Forest
- Soil Conservation Service - Spokane

Department of Commerce
- National Oceanic and Atmospheric Administration

Department of the Interior
- Bureau of Land Management - Spokane
- Fish and Wildlife Service - Moses Lake
  - Denver
  - Endangered Species Office, Washington, D.C.
  - Olympia Field Office
  - Ecological Services

Environmental Protection Agency - Spokane
- Seattle

United States Geological Survey - Spokane

State of Washington Agencies

Department of Ecology

Department of Natural Resources
- Forest Regulation and Assistance
- Natural Heritage Program

Department of Revenue

Department of Wildlife
- Nongame Program

Employment Security Department

Office of Financial Management

Parks and Recreation Commission

County Agencies

Lincoln County
- Assessor
- Auditor
- Treasurer

Pend Oreille County
- Assessor
- Auditor
- Building Inspection Department
- Noxious Weed Control Board
- Planning Commission
- Planning and Community Development
- Public Utility District No. 1
- Treasurer

Spokane County
- Finance and Budget Department
- Assessor
- Auditor
- Permit Coordination
- Planning Department
- Treasurer

Stevens County
- Assessor
- Auditor
- Office of Planning
- Planning Department
- Treasurer

Local Agencies

City of Newport

City of Spokane
- Planning Department

Organizations

Cal-Poly University
Century 21 Real Estate - Colville
Coldwell Banker Real Estate Company
Council for Land Care and Planning, Inc.
Inland Empire Public Lands Council
Maria Regina Academy
Members of Mount Saint Michael's Church
Mike J. Thiel Constructor
Neighbors Opposed to Power Exploitation
Residents of Orchard Prairie
Spokane International Airport
Whitworth College

5.2 Written Comments Received and Responses

The DOE received 71 letters addressing the Draft EIS during the 72-day public comment period, and 20 letters addressing the Supplemental Draft EIS during the 68-day public comment period. All letters were reviewed and the substantive comments (those addressing the accuracy or completeness of the Draft or Supplemental Draft EIS) contained in each letter were delineated. Responses have been prepared for the 323 substantive comments that were identified (285 on the Draft EIS and 34 on the Supplemental Draft EIS); these responses are presented in this section. Other comments that were not addressed have been reviewed and considered by the DOE in determining the preferred alternative for the proposed Interconnection.

Table 5-1 lists each of the 91 comment letters by author and the reference number assigned to each letter. Numbers 1 through 71 apply to the letters received on the Draft EIS, while number 72 through 91 are for letters received on the Supplemental Draft EIS. In general, the letters have been arranged chronologically in order of receipt. All letters have been reproduced in their entirety, and all material has been reviewed and considered. The complete Public Comment Record containing the letters and public hearing transcripts is available for review at the DOE Office in Washington D.C. or WWP's office in Spokane, Washington.

The comment letters and responses are presented following Table 5-1. Each substantive comment is identified by a bracket and reference number keyed to the letter's reference number. Thus, Comment 34-2 refers to the second comment in Letter 34. The response to each comment accompanies the letter and is identified by the reference number of the respective comment (e.g., Response to Comment 34-2).

Table 5-1

Comment Letters on the Draft and Supplemental Draft EIS

Reference Number	Source of Letter
Draft EIS	
1	Board of Commissioners, Public Utility District No. 1 of Pend Oreille County (local utility)
2	City of Newport (local government)
3	Gordon and Marguerite Johnson (citizen)
4	Dr. and Mrs. Landes (citizens)
5	Mr. and Mrs. John R. Bafaro (citizens)
6	Everett and Irma Kytonen (citizens)
7	Council for Land Care & Planning, Inc. (organization)
8	Phillips Appraisal Services (business)
9	Lon R. Emmett (citizen)
10	Matthew O. Wolohan and Diane Hall (Rainbow Honey Company) (business)
11	Mary R. Wieman (citizen)
12	Helen Rishel (citizen)
13	Bob Jackman (citizen)
14	Jack C. and Eloise Miller (citizens)
15	Margaret Herzog (citizen)
16	Steve Viss (citizen)
17	Dr. and Mrs. John R. Heichel (citizens)
18	Pam Thompson (citizen)
19	Pamela A. Thompson (citizen)
20	Pend Oreille County Noxious Weed Control Board (county agency)
21	Donna Hohenschuh (citizen)
22	Donna Hohenschuh (citizen)
23	Heritage North (business)
24	National Oceanic and Atmospheric Administration (federal agency)
25	Helen Rishel (citizen)
26	Stan Bogosian (citizen)
27	U.S. Environmental Protection Agency (federal agency)
28	Dr. Sylvia Brock (citizen)
29	Joan Goldberg (citizen)
30	Pat and Kathy Inman (citizens)
31	Dave Jhura (citizen)
32	Jack Sackville-West (citizen)
33	Richard and Marcella Elston (citizens)
34	Washington Department of Wildlife (state agency)
35	Thomas Sweeney (citizen)
36	Sandy Jarvis (citizen)
37	Mel Goldberg (citizen)
38	Leon Nichols (citizen)
39	Washington Department of Ecology (state agency)
40	Janette M. Waller (citizen)
41	Jon C. Van Vogt (citizen)
42	Dora and Robert Vogt (citizens)
43	William Van Vogt (citizen)
44	Neighbors Opposed to Power Exploitation (organization)
45	Bassett & Morrison (business)
46	Laura Engle (citizen)

Table 5-1 (Continued)

Reference Number	Source of Letter
47	Karen J. Baker (citizen)
48	Eric Berg (citizen)
49	Jeanette R. Smith (citizen)
50	Jeanette Smith (citizen)
51	Ferdinand Velez (citizen)
52	Marc and Terry Schillios (citizens)
53	Paul Tigner and Family (citizens)
54	John and Kathleen Ives (citizens)
55	Inland Empire Public Lands Council (organization)
56	Dale Regan (citizen)
57	Donald J. Cagle (citizen)
58	Pend Oreille County Planning Commission (county agency)
59	Whitworth College (organization)
60	U.S. Department of Agriculture - Forest Service (federal agency)
61	Anita M. Gaskill (citizen)
62	Roberta L. Dicker (citizen)
63	Robert L. Jackman (citizen)
64	Mike and Connie Cooper Smith (citizens)
65	J. W. Baker (citizen)
66	Joseph W. Rough and Marther Rough (citizens)
67	Douglas V. Cooper (citizen)
68	Sharon L. Sorby (citizen)
69	Stevens County Office of Planning (county agency)
70	U.S. Department of the Interior (federal agency)
71	Mr. and Mrs. Joel Lenggel (citizens)
Supplemental Draft EIS	
72	Paul Wood (citizen)
73	Kathy and Bill Zenkert (citizens)
74	Spokane County Planning Department (county agency)
75	Mrs. Mary Dean (citizen)
76	Mrs. Albert S. Cyr (citizen)
77	Amelia Baldi (citizen)
78	Laurence and Andrea Green (citizens)
79	Sara Ott (citizen)
80	Catherine Rodecki (citizen)
81	Chammy Ott (citizen)
82	Harold and Mary Ann Williams (citizens)
83	Mrs. Frances Yturralde (citizen)
84	U.S. Environmental Protection Agency (federal agency)
85	U.S. Department of the Interior (federal agency)
86	B.J. Calloway (citizen)
87	K.J. Jahuhe (citizen)
88	Michael and Sharon McManus (citizens)
89	Maria Regina Academy (organization)
90	Residents of Orchard Prairie (organization)
91	Members of Mount Saint Michael's Church (organization)

Letter 1

STATEMENT

The Board of Commissioners of Public Utility District No. 1 of Pend Oreille County, Washington is please to support the location and construction of an electrical transmission line through Pend Oreille County by Washington Water Power Company.

The Board has cooperated with Washington Water Power for a considerable time on this project and we feel that it merits approval by the Department of Energy and other interested agencies. The proposed location paralleling the BPA transmission line through the County insures minimal environmental impact, and will provide substantial tax and other benefits to the people of Pend Oreille County. Our District has been granted an option to acquire up to a 10 percent ownership in the transmission line, and we as a Board feel that this option provides an alternative source of power for the District should the need arise in the future.

We therefore hope that an early approval will be provided by the Department so that construction plans may be implemented.

BOARD OF COMMISSIONERS
Public Utility District No. 1
of Pend Oreille County

By _____

By _____

By _____

Response to Letter 1

Your concerns are noted. No response necessary.

Letter 2

CITY OF NEWPORT, WASHINGTON
Post Office Box 548
Newport, Washington 99156
(509) 447-5611

January 18, 1990

Mr. Bill Freeman
Office of Fossil Energy
Department of Energy
1000 Independence Avenue
S.W., Washington, D.C. 20585

Dear Mr. Freeman,

This letter is a supportive response by the City of Newport Mayor and Council for the proposed Washington Water Power Company's 230-kilovolt transmisaion line linking WWP's electrical system with a Canadian utility that will be constructed in Pend Oreille County, Washington.

Sincerely,

Jack O. Henderson
Administrative Assistant

cc: file

Response to Letter 2

Your concerns are noted. No response necessary.

Letter 3

N. 1804 North Five Mile Road

Gordon N. Johnson
Spokane, WA 99208
29 January 1990

Phone # 509-466-0935

Hearing Examiner, Evironmental Impact Statement
Proposed WWP power transmission line, B.C. to Marshal-Spokane

Sir:

Gordon and Marguerite Johnson own property in the NW 1/4 of the NE 1/4 of Section 13,26,42 as well as adjacent part of Section 12. We feel that if the preferred route for the transmission line is selected our properties could well be adversely affected by the 220 KV line. Presently the WWP 110 KV line crosses our property via an easement 150' wide.

5-9

3-1 We have a large concrete shop building on ground adjacent to the line on its South side that would be halved and rendered useless if WWP were to widen the existing right of way to 200' as has been suggested. Just 32' further South of the building we have a permanently stationed mobile home that might also be affected by a 220 KV line.

Should the right of way be widened on the North side and over into Section 12, five prime building and view lots, partly developed, would be rendered almost worthless.

An ever increasing amount of evidence shows that the existing electrical field under a 220 KV line has a harmful effect on human life exposed to it for substantial amounts of time and this is perhaps our main concern. An easily demonstrable electrical field exists under the 220 KV Bonneville line nearby.

We are unable to attend the hearing and take this means to alert you to our concerns. Please keep us informed of future developments. Thank you for your attention.

Sincerely,

Gordon N. Johnson Marguerite T. Johnson

Response to Letter 3

3-1 As a result of the comments, the impacts on the shop building and mobile home referred to have been added to the analysis and comparison of alternatives. The text for the Southeast of Mead to North of Seven Mile Segment in Section 4.2.8 of this Final EIS has been expanded to mention these land use impacts. The ROW would not be widened on the north side, and therefore any effects on the building lots mentioned would not substantially change.

Letter 4

30 Jan. 1990

Dear Sir,

If you will refer to "Discover" dec. 1989 p. 62 ; you will read another reason why many of us who own land with power lines on them -- are most unhappy. We have talked to the scientist with Bonneville Power in Portland & they too have many concerns for any explosive item (like filling a gas tank) in any thing within 300 ft of 230 KV lines.

Since we already have >2500 ft of 230 KV lines going through our one place N of Spokane & since it has been on the market for about 9 years -- no one wants to buy it because of those awful power lines. We know they lessen the resale value of property!

We own 1 mile of property in Williams Lake area through which one of your alternate plans -- goes right through the middle of our farm & by our farm house.

No way! Do not now or ever use that route or any Congressman we know will hear about it. Sincerely

Mr & Mrs Landes
2750 Gregory Dr. N.
Billings, Mont 59102

Rt 1 Box 485
Colville 1 Evans, Wash. 99126

5-10

Response to Letter 4

Your concerns are noted. No response necessary.

Letter 5

February 1, 1990

Mr. and Mrs. John R. Bafaro
North 11218 Madison Street
Spokane, WA 99218

Bill Freeman
Office of Fossil Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Senator Gorton:

We are writing regarding Washington Water Power Company's proposed transmission line linking WWP's electrical system with British Columbia Hydro and Power Authority.

We live in Woodway Park in North Spokane and oppose the "preferred project route" which would run parallel to Bonneville Power Administration transmission lines which border our development. We do not want increased electromagnetic fields possibly affecting the health of our son. We also do not want to see our property value decrease because of these additional power lines.

5-1 We believe alternate route options should be explored and this project should not run through a residential area.

Sincerely,

Mr. & Mrs. John R. Bafaro

5-11

Response to Letter 5

5-1 Please refer to Response to Comment 63-13 pertaining to identification of alternative routes.

Letter 6

Page 1 of 9

Feb 3, 1990

To: William Freeman, et al
Dept. of Energy - Office of Fossil Fuels
1000 Independence Ave. S.W. (FE-52)
Washington, D.C. 20585 Room 3H-087

From: Everett + Irma Kytonen
Aladdin Rte. Box 151
Colville, WA. 99114

Re: DOE/EIS 0141-D
WWP-B.C. Hydro Project

Greetings -

In addition to presentation made at EIS hearing, Feb 1st, 1990, at Colville, WASH.) the following are added.

I. We were told at the hearing by you that DOE would decide on the project and route. It appears rather ridiculous ~~that~~ this be so, because we who live and work here (that includes WWP, all of us) are here continually, and know our environment. Why should decisions be made by others, ?!?

6-1

5-12

Response to Letter 6

6-1 The DOE does not determine the route of a proposed transmission line. The DOE, pursuant to Executive Order 10485, as amended by Executive Order 12038, is responsible for evaluating the electric reliability of the system and the environmental impacts of the action proposed by the utility. In the environmental review, the National Environmental Policy Act (NEPA) requires consideration of all reasonable alternatives to the proposed project. This may include evaluation of alternative transmission routes which would provide the same desired effect as the proposed route. Therefore, the utility, consistent with relevant state siting requirements, determines the route of a proposed transmission line. The DOE will either grant or deny a Presidential permit to build a transmission line after the evaluation of all reasonable alternatives to the proposed line. Please review Mitigation Measure 17, which has been added to Section 4.9 of this Final EIS, regarding NEPA compliance and DOE's review of the final project design.

Letter 6 Continued

Page 2 of 9

2. A written statement is needed, requested, and demanded that
6-2 clearly defines the limits to which WWP can move the route line after route decision is firmed up, if approved.

3. On page 2-11 of ~~draft~~ EIS, middle of top paragraph, "... compensation would be paid at the time of disturbance."

~~After the fact~~ is too late. There
must be discussion of planned
work, cognizance of probable
6-3 damage by all concerned, especially
property owner; and fair and
agreed up damage compensation
settled. Any further damage beyond
planned work damage would and
will be cause for ~~future~~ further
and additional compensation.

4. On page 2-10, bottom paragraph, and continuing top of page 2-11; "... would estimate market value of property..."

6-4 If the property owner owns the

5-13

Response to Letter 6 Continued

6-2 There is really no definitive answer to the comment, as posed Section 1502.9(c) of NEPA requires that supplements to Draft or Final EISs be prepared if, "...the agency makes substantial changes in the proposed action that are relevant to environmental concerns." A supplement to the EIS would have to be prepared if the transmission line were moved any distance from the "nominal" route studied in the EIS and if that movement resulted in new significant environmental impacts not yet addressed in the EIS. (This is why a Supplemental Draft EIS was prepared for the new Mead to Beacon route segment of WWP's revised Proposed Route.) In some areas, a relatively small change in location could result in significant environmental impacts. In other areas, large excursions from the studied route may be possible without a significant change in the impacts found. Please review Mitigation Measure 17 in Section 4.9 of this Final EIS, which has been added to ensure NEPA compliance in the event project modifications were submitted by WWP to DOE for review. As stated in Section 4.9 of the Final EIS, all mitigation measures would be made conditions of the Presidential permit.

6-3 Compensation for damage at the time of disturbance or "after the fact" is the only possible way to address the issue of property damage, in the event transmission line maintenance or repair activities disturbed or damaged adjacent property. It is impossible to predict the extent of damages prior to the repair or maintenance work. Planned maintenance would be conducted during times when minimum surface disturbance would occur (i.e., avoid wet periods), as discussed under Operation and Maintenance in Section 4.1.8 of this Final EIS. Repair work would be done as needed and compensation would be based on damages done.

Letter 6 Continued

Page 3 of 1

property for reasons other than saleability, market value becomes a false and wrong base for compensation. A property may have been obtained for absolutely other reasons and values than "market value", which is only one aspect out of many (and sometimes the least importance; sometimes of no importance to owner) Civil rights become affected; ref: 45C Title 42, et al; and even Title 18, Sec. 1964 may be involved.

6-4 Cont.

5. On page 4-137, full paragraph at top of page, "... modern farming machinery ... power lines... not a problem due to shielding of the electronics..."

All human body functions -- brain, nervous system, organs, heart, you name it, are stimulated and controlled by electro-neurological impulses. To state here that machinery is shielded to prevent problems and then to ignore effects on human and living

6-5

5-14

Response to Letter 6 Continued

6-4 As discussed in Section 2.3.2 of this Final EIS, ROW easements paid to the landowner would be determined in accordance with the Uniform Relocation Assistance and Land Acquisition Act of 1970. In the event WWP and a property owner were unable to agree on just compensation for an easement, an independent appraiser may be contracted to determine the fair market value of the property. It is recognized that all of the values that may be associated with land ownership may not be reflected in compensation; however, one of the factors an appraiser evaluates in determining fair market value is a concept known as "highest and best use." This takes into account not only the current use of property but also how it may best be used and enjoyed by current or subsequent landowners. Compensation for an easement is based on the effect the project will have on the portion of the property covered by the easement as well as on the remainder of the larger parcel.

6-5 The discussion of shielding equipment from electric fields presented in Section 4.6.3.3 of this Final EIS was included in the EIS due to concern about proper function of electronic equipment in various farm machinery. It was not intended to address concerns about human health issues, nor should conclusions about human health be inferred from this discussion. Human health issues are treated in Section 4.6.5, which has been expanded in this Final EIS to discuss the results of research on the topics raised in this comment.

Page 4 of 9

6-5 Cont. functions and tissue is just insane!

6. To further enlarge on the gross inconsistency of the draft EIS, in bottom paragraph, page 4-154 and continuing top of page 4-155 to middle of page, references are made to studies continuing on effects of electro-magnetic fields; including "... 1989 budget for U.S. programs is $4 6 million."

6-6 THEN! the last sentence in the next paragraph — "The overwhelming weight of scientific evidence available to date indicates that exposures to electric and magnetic fields, be they from power lines or other sources, do not constitute a risk to health."

That statement is not only insane, it approaches criminology! And in the face of the just preceding paragraph, it is not only

6-6 Based on this and other comments, Sections 4.6.5.1 and 4.6.5.2 have been revised and expanded to better explain the EMF analysis. Please note the modified conclusions presented in Section 4.6.5.2 of this Final EIS. Also, refer to Response to Comment 13-5 regarding the analysis conducted by independent scientific panels on EMF health issues.

Page 5 of 9

6-6 Cont.

inconsistent, it is just plain stupid!

All this causes a strong lack of credibility on the whole draft EIS; serious lack of credibility!

7. It is stated that "need and purpose" is not a duty of DOE in this matter. However, one can not overlook ~~consider~~ need in balancing reasons for need with impact of project on total environment.

On page B6, Spokesman Review, Sat., Jan 27, 1990 is an Associated Press article, "Lay-offs send pessimistic signal" Also, "in past two weeks -- Gen'l Electric - 5700 jobs to be eliminated; Boeing - 5000 jobs; Grumman - 1000; Caterpillar - 1200; Merrill Lynch - 3000; from Jan 1st, 1990 - 45,000 workers have been notified by auto industry that indefinite or temporary lay-offs would occur."

Locally, Northwest Alloys, near

dist. NBC evening news, Garrick Utley "9000 auto workers have become unemployed since Jan 1st 1990." !!! domino effects? New power needed?!?

5-16

Addy, WASH., has idled one line of production, and 82 workers laid off.

Also, in this area, Kaiser Aluminum, a heavy ~~[illegible]~~ supplier of aluminum for armed services, is facing a slump because of defense cuts. And aluminum manufacturing is an unusually heavy user of electric power.

6-7 So, is this new line necessary? Or will it be built with overkill, as in so many other areas of industry, and then power ratepayers be forced to pay for yet another mistake?!!?

Yes, the thrust to action of citizen-taxpayer-ratepayer is moving strongly to boycotts of services, and a general tax and rate-payer strike.

6-7 **Based on your comment, the purpose and need discussion for the proposed WWP/B.C. Hydro Transmission Interconnection has been expanded in Section 1.2 of this Final EIS.**

8. As much as we are bombarded with rosy statements about conditions, everyone realizes that we are in a critical and changing, dangerous time.

Because of this, and the resulting and accompanying disintegration, chaos; an d moving; yes, to a near frenzy to solve problems by treating symptoms instead of clearly delineating the causes.

For example, we pass laws to "buckle your seat belt, prevent accidents". Seat belts do not prevent accidents, SAFE DRIVING does!! But we emphasize, in a frenzy and by law, a treatment of the symptom (accidents & tragedy) instead of the cause -- unsafe and thoughtless driving!!

We do the same with insurance laws; and even with condoms!! (trying to fool the laws of nature, and Creator) We all know that our health

is being affected rather dramatically by new (?) diseases, and a break-down generally of our immune systems. (Note the widespread susceptibility of the general public to the "flu" bug (?) last few months)

the causes are likely many, some of which we are possibly not aware of at all.

We know there is potential adverse effects of EMF (~~elec~~ electrical/magnetic fields). Some individuals know by sad & painful experience, personally, with no doubt.

This issue demands a moratorium, for calm, thorough, continuing objective, thorough, across the board study and compilation on site of historical, progressive studies and analyses.

Or do we again continue.

to rush unabatedly, with greed and desire for progress (?) into another area of overkill?!? -- And then try, in a frenzy and mine "law-making", to solve the resulting problems by trying to treat the symptoms which result, instead of clearly delineating the causes, and treating and removing them ?!?

Let us "think like men and women of reason, and reason like men and women of thought"!!

Everett Cytowen
Irma Cytowen

P.S I feel that in order to get the great significance of your decision - you must walk the line (power) since you don't live in this environment. Human environment is #1.

Love
Irma

Letter 7

Council for Land Care & Planning Inc.

February, 4, 1990

Bill Freeman
Office of Fossil Energy
1000 Independence Ave. S.W.
Washington, DC 20585

We wish to speak to the planned power line in Spokane Washington that would be installed by WWP bringing power from Canada south.

Adding a power line just north of an existing power line taking an additional 125' of right away with metal towers up to 120'high is totally unacceptable as it affects the Little Spokane Natural Area as well as eliminates 10 homes.

We understand easements were sold to EPA only for their use.

WWP is a private company now in control of much Spokane property that has affected land use.

Land values will be destroyed in the residential area of West Plains by WWP support of a polluting mass burn incinerator.

The necessity of getting power to this garbage burner fits the scheme to run power lines from the Marshall substation across West Plains area adding insult to injury.

The mass garbage burner is a threat to the environment and human health and it is well understood that the electromagnetic field created by these power lines affect humans.

When will industry find limits to its behavior?

Sincerely,

Ora Mae Orton

Ora Mae Orton, Spokesperson for CLCP

5-21

Response to Letter 7

Your concerns are noted. No response necessary.

Letter 8

PHILLIPS APPRAISAL SERVICES
RESIDENTIAL · COMMERCIAL · AGRICULTURAL

February 5, 1990

Department of Energy
Office of Fuel's Programs
Washington, D.C. 20585

RE: Washington Water Power/BC Hydro
Transmission Interconnection Project
D.E.I.S.

Dear Sir;

Enclosed please find a letter from the BPA's Fire Protection Specialist, Robert W. Buscho to the chief of the Pierce County (Washington State) fire protection district #22, dated May 5, 1988.

It concludes that there be no open burning within rights-of-way of transmission lines and that this is the policy of the B.P.A.

I have had a copy of this letter in my BPA file (I have approximately 3 miles of the BPA's Bell-Boundary #3 line through my property) for approximately 1.5 years.

5-22

8-1 I was very distressed that this dangerous condition/situation was not mentioned in the D.E.I.S. for the proposed WWP/BC Hydro interconnection.

PLEASE address this dangerous situation in the final E.I.S. as it bears directly upon the safety of the general public.

Sincerely,
William J. Phillips

Response to Letter 8

8-1 WWP's policy does not permit open burning within its transmission line ROWs due to the possibility of phase-to-phase or phase-to-ground flashovers. In response to the comment, this restriction has been added to the ROW requirements discussed in Section 2.3.2 of this Final EIS.

Letter 8 Continued

Response to Letter 8 Continued

Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

MAY 8 1986

In reply refer to: SI

May 5, 1986

Theron D. Gibson, Chief
Pierce County Fire Protection District 22
3206 W. Tapps Drive E.
Sumner, WA 98390

Dear Chief Gibson:

5-23

I have received your recent letter in which you have asked for information regarding issuing burning permits. Our policy in the past and will continue to be is that no fire permits be issued for open burning within the BPA transmission/distribution right-of-ways.

There is a good reason for this policy. Tests have proven that under ideal conditions smoke, heat, gasses, flame and even particles of combustion can all cause a flashover. Whether it would go phase-to-phase, which is most common, or phase-to-ground would depend entirely upon the existing conditions at the time of the flashover.

I can assure you, Chief Gibson, no one should be in the close proximity of transmission/distribution lines during a fire as it could be extremely dangerous.

If a fire does occur and your personnel should respond, keep your distance, protect exposures and immediately contact the BPA Dispatcher as noted in the enclosed Guidelines for Firefighters In and Around Bonneville Power Administration Facilities.

Sincerely,

Robert W. Buscho
Fire Protection Specialist

Enclosure

Letter 9

5 Feb. 90

Dear Mr. Freeman,

I strongly oppose the 230,000 volt power-line proposed by Washington Water Power.
To date, the proposed route is to run, if approved by D.O.E., through Pend Oreille county. The alternate route would run thru Stevens County, at which my home and family would be directly impacted. We have a small ranch 22 acres, that lies directly in the path of the Western Alternative.
I am concerned about the health effects to my children, two boys ages 5-8. The effects on my wife + self, ages 33-39, let alone our farm animals + horse stock. Our property value would be all but ruined.
Washington Water Power has a very poor track record across the entire state as far as concern for the public welfare. They are concerned with making money for their stock holders.
Do not approve the Western Alternative, force the money hungry power company's to seek other alternatives. Thank you.

Lon R. Emmett
2300 Onion Creek Road
Colville, Wa. 99114

5-24

Response to Letter 9

Your concerns are noted. No response necessary.

Letter 10

Response to Letter 10

FEB. 6, 1990

Dear Mr. Freeman,

Enclosed in this letter is a response to the Draft Environmental Impact Statement for the Washington Water Power Co./ B.C. Hydro transmission interconnection project. My wife and I are beekeepers and as part of our business is pollination, we will be in California until the end of Feburary, preparing the bees and moving them into the almond orchards. This will make it impossible for us to attend any of the meetings set up for commenting on the E.I.S..

We have waited two years to build our future home because the Western Alternative route would pass between our honeyhouse and our future home site and probaly be as close as 100 feet from one or the other. We have already suffered emotionally from this threat and if this line is built would suffer

Letter 10 Continued

financially through adverse effects to our bus.

Although we have not had enough time to thoroughly study the E.I.S., we need to respond to it so that our voice can be heard. Some points where we disagree with their conclusions are as follows:

4.1.11.1 page 4-64 ① Property values: It is obvious to us that our property values would be negatively affected. As our property would be bisected between our warehouse and future homesite and at that point the land is considered an area that would receive "significant visual impact." How can this not affect our property values?

10-1

4.5.5 page 4-141 ② Health Issues: In 1989 we have seen several news

5-26

Response to Letter 10 Continued

10-1 Based on the comment, Section 4.1.11.1 in this Final EIS on property values has been modified to more clearly present updated information on studies dealing with the effects on land values. Also, refer to Response to Comment 26-11 for additional discussion on the assessment of land value per individual properties.

Letter 10 Continued

reports on National news both in the U.S.A. and Canada that have bolstered the evidence that E.L.F. radiation has a significant negative impact on health.

10-2 Although the people who wrote the impact study decided to ignore or discount this information, we don't want to be used as the basis of future evidence that E.L.F. radiation does indeed cause cancer.

4.5.3.4 page 4-137 ③ Effects on vegetation and animals: As reported adverse effects in bee hive weight gains and honey production have been noted due to low electric field values. We have seven bee locations representing a total of 280 hives

Response to Letter 10 Continued

10-2 In response to the comment, refer to Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to better explain the EMF analysis. Please note the modified conclusions in Section 4.6.5.2. Also, refer to Response to Comment 13-5 for additional discussion on the conclusions of the independent scientific panels and Response to Comment 51-7 pertaining to the resources used in the EMF effects analysis of this EIS.

Letter 10 Continued

along the Western alternative route and Onion Creek variation. This would have significant impact on our business and is more involved than just moving the bees. 10-3

In conclusion, I would like to say that when something like this happens to you, the impact is much more severe than that perceived by this draft.

Sincerely,
Matthew O. Wolohan
Diane Hall
Rainbow Honey Co.
P.O. Box 621
Northport, WA. 99157-0621

Response to Letter 10 Continued

10-3 **Please refer to Response to Comment 48-2 and Section 4.6.3.4 of this Final EIS, pertaining to potential impacts to honey bees and the associated honey business.**

Letter 11

W. 242 Riverside Ave., #311
Spokane, WA 99201-0147
February 11, 1990

Bill Freeman,
Office of Fossil Energy
Dept. of Energy
100 Independence Ave. S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

I am writing to you today in order to comment on the draft environmental statement for the "WWP/B.C. Hydro Transmission Interconnection Project" of Dec., 1989.

5-29

On p. 2-45 of the document, rejected alternatives listed 3rd and 4th, namely, replacing the 115-KV Line & construction of a triple circuit line should be reconsidered over the selected route. (I'm enclosing a photocopy of Map 2-3 on p. 2-9, "Existing Transmission Facilities" with the existing

11-1

double-circuit, 230-KV Line shown through most of Pend Oreille county & northern Spokane county marked in blue.)

A new 115-KV Line added to the existing double-circuit 230-KV Line, using the same towers, would establish a triple-circuit Line, which is much preferable to two double-circuit Lines strung on two sets of towers, as proposed. The existing double-circuit 230-KV Line could be used for transmitting Canadian power to northern California & the new 115-KV Line for supplying W.W.P.-

(cont.)

Response to Letter 11

11-1 **WWP does not currently operate an existing transmission line along the area that the comment has delineated on Map 2-3 of the Draft EIS (or Map 2-8 of this Final EIS). Possible upgrades, additions, and alternative transmission designs that were examined for existing and/or planned facilities (i.e., WWP's 115-kV Sunset-Kettle Falls existing line, BPA's four existing lines between the border and Spokane, and a new 500-kV line) are discussed extensively in Section 2.6.2 of this Final EIS. These alternatives conclude that upgrading an existing line would not be currently feasible. In addition, as discussed in Section 1.2, the potential for purchasing additional transmission services along these existing lines is not a viable alternative due to the lack of sufficient firm transmission capacity during peak periods and that only interruptible wheeling service is presently available over BPA's existing system. WWP currently foresees that the proposed Interconnection would ensure a long-term supply of guaranteed peaking capacity and energy from B.C. Hydro at a lower cost to the consumer. For additional information on this topic, please refer to Sections 1.2 and 2.6.2 in this Final EIS.**

(Wieman comment, cont.) - 2 -

generated power to the eastern Washington communities along the affected route. (There will be cost savings I'm sure.)

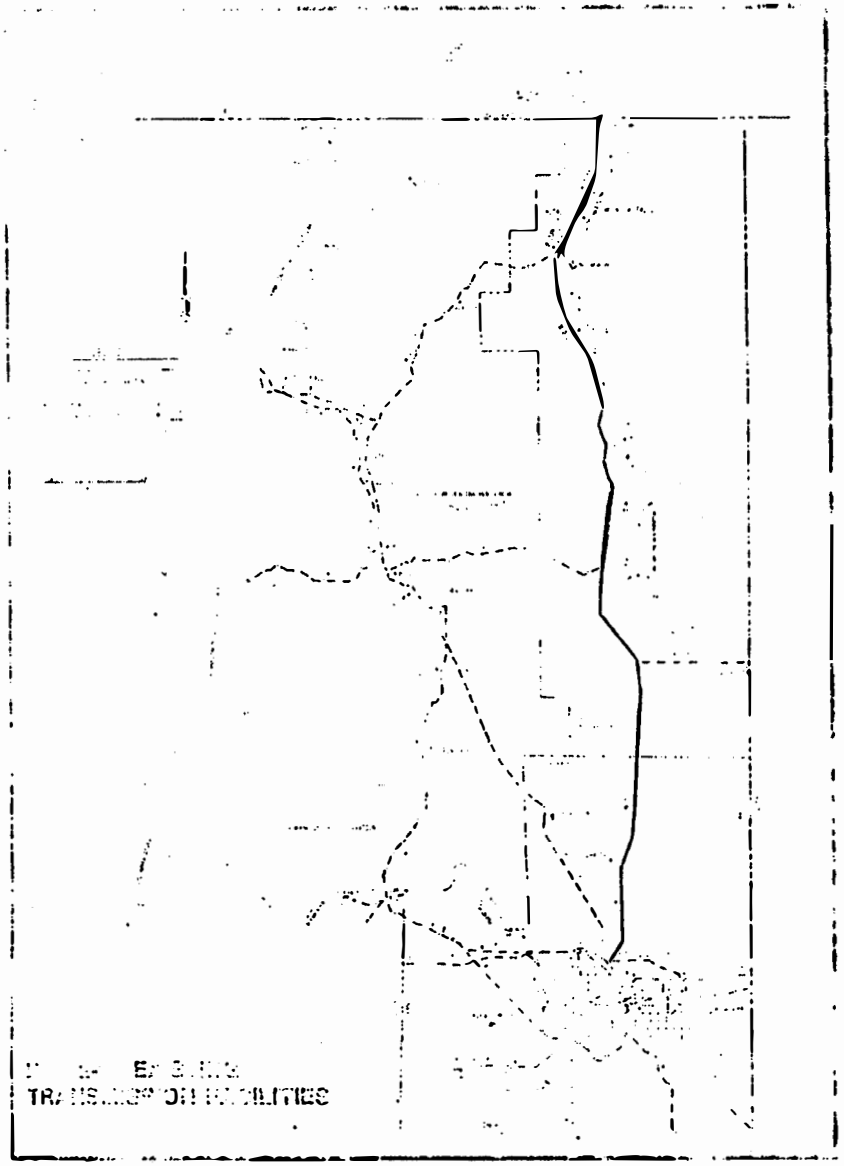
Additional benefits ~~to~~ of this project would be felt in fewer ELF extra-low frequency waves emitted, less environmental impact from tree cutting & ground clearing, and retention of 10 homes, etc.

Any reply that you care to make to my Letter will be appreciated, (except failure to consider it.)

Yours very truly,

Mary K. Wieman

Letter 11 Continued



Response to Letter 11 Continued

Note: Map quality was not sufficient for reproduction.

Letter 12

W 4211 Ogden Way
Spokane, Wa. 99208
Feb. 6, 1990

Mr. William H. Freeman
U.S. Dept. of Energy
Fossil Energy, Fossil Energy(FE-5?)
Office of Fuels Programs

Dear Mr. Freeman:

My concern about the proposed W.W.P.Co. transmission line is two-fold-- health and environment. There are three bills which have been introduced in the Washington State legislature regarding the health aspects of these transmission lines. Additionally, a good example of problems caused by a high concentration of electric power is the KGA Radio Tower which has become such a question to that neighborhood here in Spokane.
I am enclosing a copy of "Radiation Alert" which was given to me from the Electrical Engineering Dept. of Gonzaga University. I have taken the liberty of marking pertinent paragraphs.

My parents granted W.W.P. Co. an easement to construct transmission lines on 40 acres in 1910. This same acreage I now care for. In 1910 there were no homes or buildings in that area.and it was before we were aware of the health hazards created by these transmission lines. That 40 acres in Deep Creek Valley, which is referred to on page 4-147 of the Environmental Impact Statement--Title Five Mile Prarie to Marshall, has a County Road on the floor of the valley part of which parallels the present transmission line which is a 115,000 volt line. In a distance of .06 mile there are 11 homes facing the line. In addition to the 11 homes in the .06 mile there are at least 10 others in this short valley. Adding an additional 230,000 volt line to the existing 115,000 volt line would increase the electric field strength so greatly no one would dare live down there.

Several paragraphs in the Draft Environmental Impact Statement would apply to my acreage:

Page 4-24 Existing Land Use -- 3rd paragraph

Property would be crossed in such a way that ongoing land use activities would not practically continue or would be substantially disrupted or limited. (Source (EIS Team)

5th Paragraph

The presence of the line would result in a substantial decrease in recreational land use.

Page 4-25 6th paragraph

ROW restrictions would limit future improvements/expansion (particularly the location of buildings on existing residential, recreational, institutional, commercial and industrial properties within the transmission line ROW).

At present there are deer in the valley, beaver dams in the creek and

5-32

Response to Letter 12

Letter 12 Continued

ducks nest in the Johnson grass along the creek bed. A 230,000 volt transmission line would make that beautiful valley a death trap. It would be unlivable.

In the Fivemile Prarie to Marshall segment of the proposed line Page 3-47 it would cross the flight pattern of both the Spokane International airport and Fairchild Air Force Base. With 120 ft towers the line could be a very real hazard. Page 4-25 of the Draft Environmental Impact Statement 3rd paragraph reads: The presence of the line would prevent safe aircraft movement into or out of an established airport or airstrip(source- Federal Aviation Regulations, Part 77).

12-1 If a permit is granted to construct this line it should terminate north of Spokane in an unpopulated area and the substation constructed there. W.W.P.Co. should be required to use underground transmission line construction regardless of the added cost-even though it would decrease the earnings for stockholders.

I am enclosing clipping from The Spokesman Review dated Feb. 1,1990. Spokane Riverside Park is also located in the near vicinity in the Fivemile Prarie to Marshall segment. The Little Spokane River is another beautiful area that would be destroyed by the presence of the transmission line. I earnestly hope the line is terminated north of the city so that literally hundreds of Spokane residents do not suffer monetary,health and mental trauma.

Sincerely,

Helen Riehl

Helen Riehl

5-33

Response to Letter 12 Continued

12-1 Undergrounding the line as an alternative for the proposed interconnection is thoroughly discussed in Section 2.6.2.4 of this Final EIS. In reference to the comment, increased cost (10 to 15 times) for the ratepayers is not the only negative factor to consider when reviewing the possibilities of undergrounding a transmission line. Burying the line would indeed reduce the visual impacts of the overhead lines and supporting structures; however, as stated in Section 2.6.2.4, additional impacts would result from this proposal that would not be associated with an overhead line (e.g., greater construction disturbance resulting in increased disturbance to both terrestrial and aquatic habitats, potential for the release of toxic materials, and additional impacts to a variety of land uses). Please refer to this section of the Final EIS for a complete description of impacts associated with power alternatives.

Letter 13

Response to Letter 13

2-9-90

To Anthony Como –

Regarding our conversation on 2-1-90 in Colville, Enclosed are Copies of my NOTES used for my oral Presentation. My Presentation did not strictly follow these NOTES,

I am giving you these NOTES with the understanding that I still have the right to submit a written Presentation to further expand my views on the Draft E.I.S. prior to 3-28-90.

Thank you:

Bob Jackson
Box 588
Northport Wa
99157.

Letter 13 Continued

For The Record — 500 people at [illegible] [illegible] nights — This mtg set for 1:30 p — many working people could not come. (2)

I have better things to do with my life than fight power lines. I do not go out of my way looking for causes to fight. For now I will accept WWP's present decision ~~since the people [illegible]~~ to take the ~~Pend Oreille~~ Route, & I hope that the Dept of Energy concurs with their decision. ~~For~~ I hope to get back to my retirement and devote my full time to it.

~~However, For The Record~~ NOPE is still alive & viable and should the route be again changed back to Stevens County we will vigorously oppose it.

So what I am about to say in critiquing this E.I.S. is said as in regard to the Western Alternate Route — for this is where my personal concern lies.

Response to Letter 13 Continued

Note: Comment deleted by author.

Letter 13 Continued

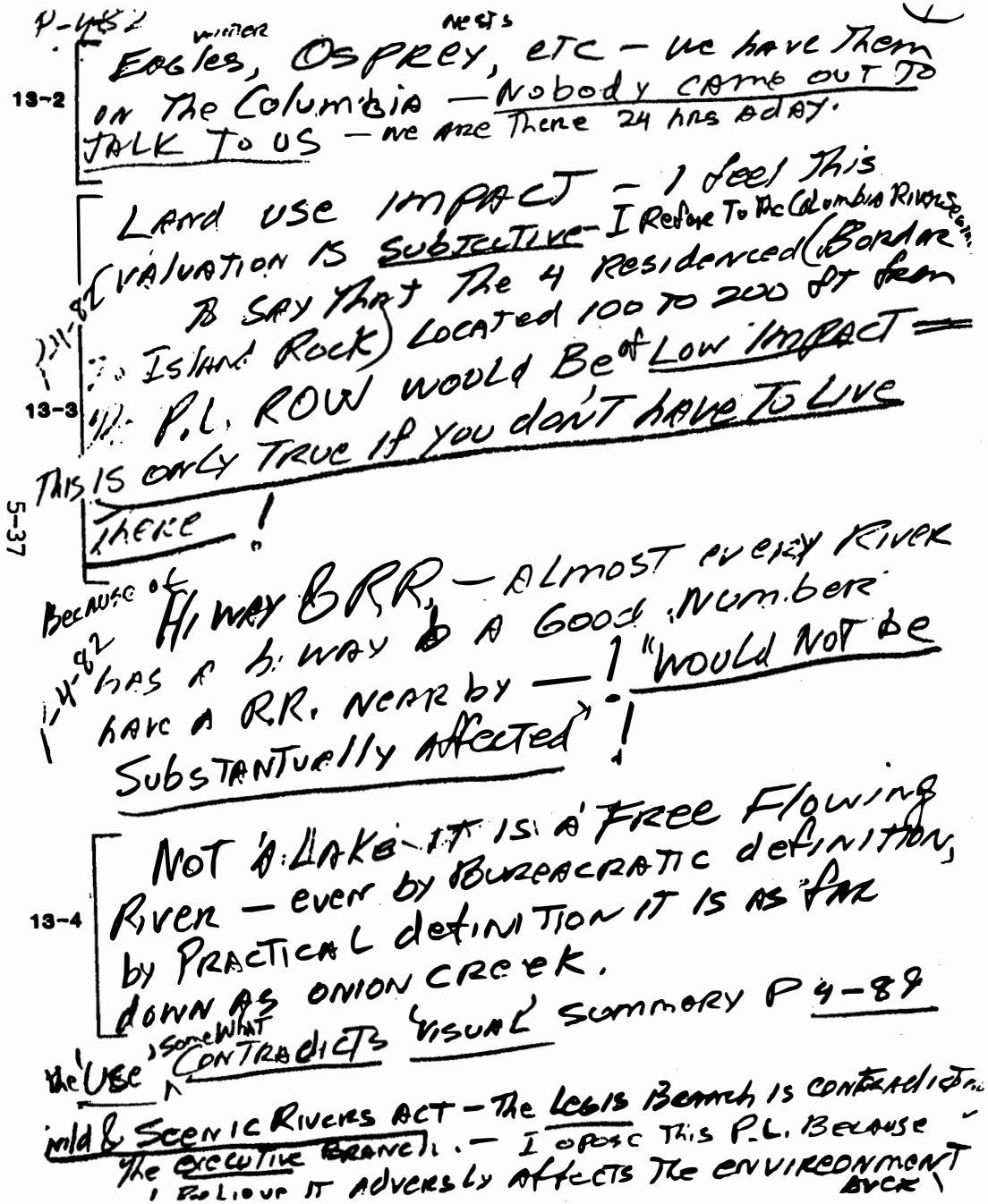
Economic Study is incomplete!
The EIS concludes that the Powerline is Fiscally Beneficial to Stevens Co—Soley on Property Tax Revenue!

But make no attempt to determine Property Tax Losses to Associated Properties, But dismiss it out of hand that there would be
13-1 no such Losses based on one Book that was prepared by the Power industry itself & even its Findings were not unanimous—How many other Power Industry studies never made the printers ink because they didn't reach the right conclusion
make no evaluation of other Losses,
Loss health Costs medical & Psycological,
Tourism Losses, etc
for the actual Value To our County
cannot be individually isolated, it must be treated as a whole, Gains & Losses.
5-36
Media attention to potential H/E fields of Powerline — I don't think we have seen
The ultimate impact on Property Losses
yet — because Television — Radio-Newspaper-Magazine & Book now have alerted the public.
The final & probably best test is
would you Buy under or near a H-Voltage
Powerline — I wonder how many Elec
Utility executives, mgrs, employees
Live under or adjacent To Them?

Response to Letter 13 Continued

13-1 Response to Comment 26-11 specifically addresses the concerns presented in the comment on property value literature and the assessment of these values.

Letter 13 Continued



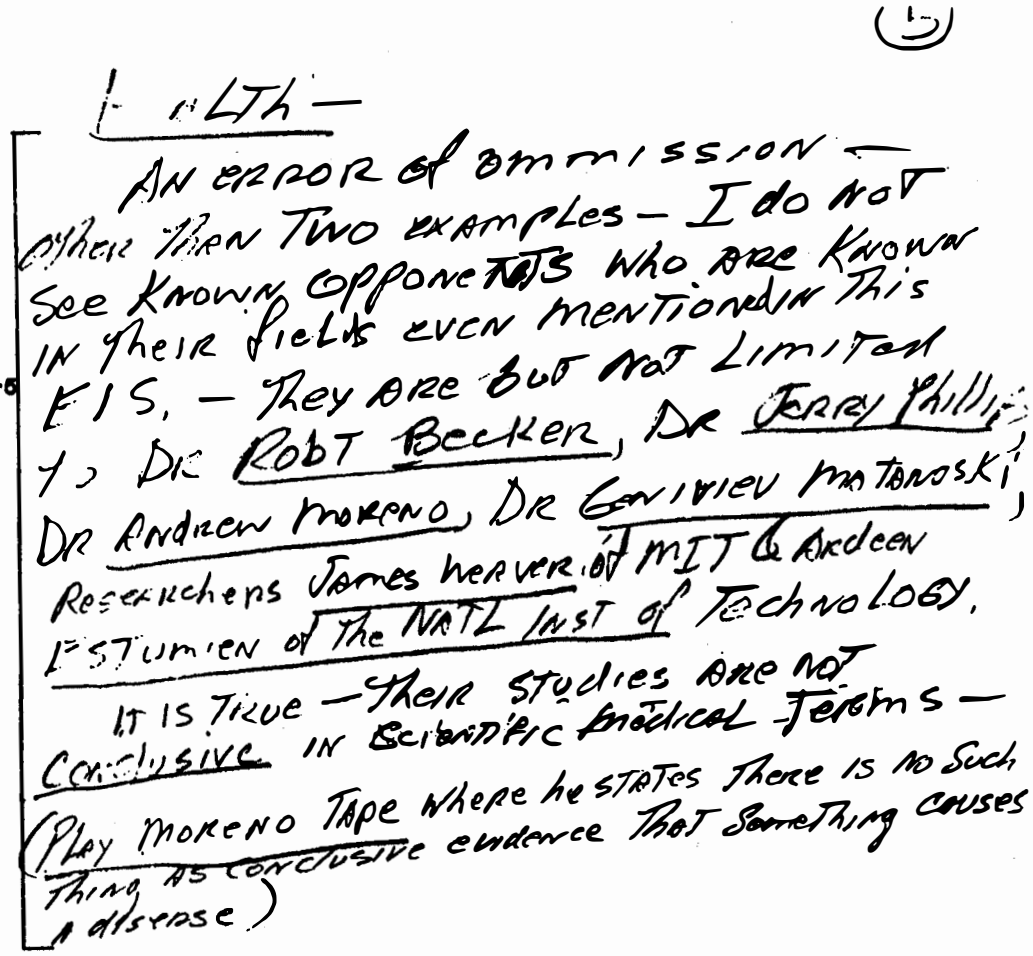
Response to Letter 13 Continued

13-2 The presence of bald eagles and ospreys along the Columbia River is noted in Section 3.3.7.3 of this Final EIS. In addition, these species are delineated on Table 3-7 for Stevens County. A computerized data base search was requested from the WDW Nongame Data Systems for any sensitive wildlife species occurring within 2 miles of the project alternatives. In addition, biologists from the WDW, USFWS, and Forest Service were contacted for current species information within the project area (see Section 3.1.7.3). The bald eagle and osprey may be present in the area and visible to local individuals daily; however, state and federal biologists that are directly involved with studies of these populations, in addition to the state's data base, were used as resources for baseline data and impact assessment. Every effort was made to address wildlife species that may be adversely impacted by the proposed interconnection. Please refer to Section 4.9 to review the applicable mitigation measures for identification of active osprey and bald eagle nest sites and eagle winter concentration areas prior to the initiation of project construction.

13-3 The reference on Page 4-82 in the Draft EIS is to land use impacts, of the types listed and explained in Section 4.1.8.6 in this Final EIS for Existing Land Use. The land use impact levels applied to all residences, based on their distance from the edge of the project's ROW, are shown on Table 4-3 in this Final EIS. Given these assumptions and this methodology, the land use impacts to the four residences are therefore correctly designated as low. The comment presumably refers to visual impacts (i.e., the effects on visually sensitive viewers, including those at residences) from the appearance of the project. Visual impacts are addressed separately in Section 4.3.9 of this Final EIS. As stated in the Boundary to Swede Pass Segment, the visual impacts to these four residences would be significant.

13-4 Please refer to Response to Comment 63-5 regarding the division between Franklin D. Roosevelt Lake and the Columbia River. Based on the comments, the Border to Island Rock Segments in Sections 3.3.8.1 and 4.3.8.1 have been modified to more accurately describe the area. The basic conclusions presented in the EIS have not changed.

Letter 13 Continued



13-5

5-38

Response to Letter 13 Continued

13-5 A large number of scientists have contributed to the work that is summarized in Section 4.6.5 of this Final EIS. Various independent scientific panels such as the Florida Electric and Magnetic Fields Science Advisory Commission, World Health Organization, National Academy of Sciences, American Institute of Biological Sciences, and New York State Powerlines Project have studied both sides of the health issue. The positions taken by people such as Dr. Marino and Dr. Becker, while not specifically mentioned in the EIS, were indeed considered by some of the independent scientific panels in their review of the literature and in developing their conclusions. There is some dissent in this area and it is recognized that not all would support the conclusions of Section 4.6.5.2. Nevertheless, the majority of evidence supports the existence of "biological effects" from specific electric and magnetic fields; however, such biological effects do not necessarily imply that these equate to "health" effects. Review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to better explain the EMF analysis and the associated scientific studies. Note the modified conclusions and additional studies presented in Section 4.6.5.2.

Letter 13 Continued

13-6 (4) In this EIS WWP was able to practically write their own Report as far as 'need' is concerned

There are organizations that think 'small is better' & others who might dispute this need.

(5) Why were experts like these not solicited? Becker-et al

So in conclusion I think the EIS

13-7 should CONTAIN ~~Opposing~~ Views written by these view holders themselves and incorporated as such.

A Jury cannot reach a just verdict if the Judge ~~excludes~~ excludes evidence which is legal & pertenant.

I too ask for a moritorium — However, if this is impossible - move the powerline completely away from human habitation — not 100 - 200 - 300 ft — but on top of the mountain Ridges - or where people don't object.

Thank you

Response to Letter 13 Continued

13-6 As discussed in the first paragraph of Section 1.2 of this Final EIS, the purpose of and need for the proposed interconnection was written from WWP's perspective. This information, however, will be reviewed by the Washington Utilities and Transportation Commission and the Idaho Public Utilities Commission before the proposed interconnection would be included in WWP's future power planning. Please review Section 1.2 where the purpose and need discussion has been expanded. Also, refer to Section 2.6.1, which discusses WWP's electrical resource plan, its review under the Washington Utilities and Transportation Commission, and WWP's energy supply alternatives.

13-7 From the content of your comment, it is assumed that the comment is referring to professionals involved in the study of EMF effects. To address this concern, please refer to Response to Comment 13-5 for discussion on the analysis conducted by independent scientific panels and Response to Comment 51-7 regarding the resources used in the EMF effects analysis for this EIS.

Letter 14

Spokane, Washington

February 14, 1990

Mr. William H. Freeman

U.S. Department of Energy

Office of Fuels Program, Room 3S-087

Independence Avenue, S.W.

Washington, D.C.

Dear Mr. Freeman,

We have several concerns about the proposed WWP Interconnection with B.C. Hydro.

14-1 1. What will the long term effect be on the financial position of BPA? Will the sale of B.C. Hydro power take away a market share from Bonneville, robbing them of revenues? Will this slow BPA to the point that taxpayers will have to pick up the slack?

14-2 2. It is common knowledge the U.S. has a large trade deficit. Will the purchase of power from Canada add to this problem?

14-3 3. New theories are surfacing that "electricity leaks" are harmful to life. This 230,000 volt electrical transmission line near Marshall is in an area proposed for urban residential. What will be the long-term damage in this situation?

Besides these concerns there is one that is very personal, but quite important to us. The idea of such a high-voltage line

Response to Letter 14

14-1 An analysis of the effect of the proposed interconnection on the revenues of BPA is beyond the scope of this EIS.

14-2 The State Department will review WWP's application for a Presidential permit. One of the issues that the Department will consider and comment on is the effect of the proposed interconnection on balance of trade.

14-3 In response to your comment, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections address the EMF health issue and the current assessment of potential health risks. This material has been expanded and modified to better explain the EMF analysis and the associated scientific studies. Please note the revised conclusions presented in Section 4.6.5.2.

Letter 14 Continued

Response to Letter 14 Continued

so close to our property is very traumatic in that we are in our 70's and, of course, retired. We have spent several years choosing our home, and time and effort making it exactly the way we want to live. Recently everyone and everything seems to think this area is the only one in the State that will fill their needs. We would like to spend our remaining years enjoying our home and "in the pursuit of happiness" as promised in the Constitution.

Thank you for listening.

Respectfully yours,

Jack & Eloise Miller

Jack C. & Eloise Miller

Letter 15

to: Bill Freeman
Office of Fossil Energy
Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

from: Margaret Herzog
2804 East Marshall
Spokane, Wa. 99207

Dear Mr. Freeman,

Regarding the proposed transmission line from British Columbia to Spokane County submitted by Washington Water Power, the following remarks are for your consideration.

15-1 1) As a ratepayer to WWP, I do not understand the need for this powerline through our state and into this county. This same company in the last years has refused to accept proposed power produced by the Wheelabrator incinerator plant. At public hearings, the WWP representatives said that they had more power than they needed (a surplus enough for ten years, I believe was their comment) and would not pay a decent price for the power produced right here in Spokane County. As a result, the city/county officials had to arrange with Puget Sound Power and Light to buy the power from the garbage plant.

15-2 2) Will these high kilovolt lines interfere with the flight patterns of Fairchild Air Force Base and Spokane International Airport? The poorly displayed map in the newspaper seems to indicate that the lines will cut between these two facilities. Lately, the science world has warned about the danger of magnetic fields related to highvoltage lines. The route of the lines does not seem safe.

15-3 3) Will these lines breach the limits of the Airport's Avigation Overlay which has been mandated for all area citizens and businesses? These limits are to assure the safety of air transportation. The height of these lines are considerably higher than allowed.

15-4 4) Again, as a ratepayer to this monopoly (my family has no choice of power source for gas and electricity for our home) it is difficult to accept the increase in rates which will inevitably arise from this venture to the profit of this privately held business. The past history of this company has forced ratepayers to pay the price of WWP's investments for the profit of the company with no voice or gain from the investment. We have paid increasing rates while the company has sold extra power out of state. We have paid rates inflated by East Coast standards when our power is produced hydroelectrically and cheaper, not with petroleum or coal based technology. We have had to subsidize this company's foolish investments, such as, WPPSS. The proposed project from Canada is not necessary and will bring profit to WWP, but no rate break to those of us living in this area.

Any further questions may be directed to me at (509) 534-4786 (home) after 3 P.M.

Margaret Herzog

Response to Letter 15

15-1 Please refer to Section 2.6 of this Final EIS for the expanded discussion of alternative power sources. WWP's previous actions are considered outside of the scope for this EIS.

15-2 The Eastern Alternative does not pass between Fairchild Air Force Base and the Spokane International Airport. The alternative ROW is located over 4 miles from the air base runway and would have no effect on flight patterns there. The project's relationship to Spokane International Airport is shown on Map 2-2, Sheet 5 in this Final EIS. Its effects on the airport's Federal Runway Flight Clearance Zones are explained in the Four Mound Prairie to East of Spokane International Airport Segment located in Section 4.2.8.1 of this Final EIS. The project would not intrude into these zones. Please refer to Section 4.6 regarding the comment on magnetic field effects of the proposed line.

15-3 The project's relationship to Spokane County's Airport Overlay Zone (which is more restrictive than the Federal Runway Flight Clearance Zones) is discussed in the Four Mound Prairie to East of Spokane International Airport Segment found in Section 4.2.8.1 of this Final EIS. It is estimated that the project could protrude into the County's clearance zone in a few locations by up to about 7 feet, and would therefore require a height variance from the Spokane County Planning Director. As stated in this section, the potential impacts to air transportation from this intrusion are considered moderate.

15-4 WWP's stated purpose of the proposed interconnection is to provide a cost effective source of power to WWP's customers. Relative to this purpose, WWP developed a Least Cost Plan in 1991, which is available to the public through WWP's Spokane office. This plan provides the policy statement for future additions of energy, prioritizes energy alternatives based upon cost and availability, and provides a basis for comparing alternatives. Please refer to Section 2.6.1 of this Final EIS, which as been expanded to provide a more detailed discussion of WWP's least cost planning program, and Section 1.2 for additional discussion on the purpose of and need for the proposed project. These sections discuss the incorporation of the proposed interconnection into WWP's rate base. The federal government does not regulate utility rates to consumers; state agencies are responsible. As discussed in Section 2.6.1, the Washington Utilities and Transportation Commission reviews and evaluates WWP's least cost plan and regulates the rates set by WWP in its service area.

Letter 16

2/20/90

R.E. WWP / B.C. Hydro Transmission Interconnection Project

Dear Sir,

As a resident of northern Pend Oreille County I would like to express my concern over the construction of yet another power line accross our landscape. Now we have from Box Canyon to Boundry Dam 3 steel Towers side by side Then from Metaline Falls to Boundry Dam an additional wooden Tower line parallels The 3 steel Towers.

5-43

16-1 I Think we have enough Transmission capabilities in The existing system. If more is needed why not modify one of The steel Towers to support another set of lines, (I have seen This done in other places) Thus doubling capacity within The existing right of way.

16-2 Why should The people who live near These power lines be forced To endure an even wider scar on our land solely for The benefit of WWP? The construction jobs created are only short Term, with very little positive effect on our communities.

Pend Oreille county is less populous and has less private land Than Stevens county (who yelled loud enough To move The preferred route To Pend Oreille county) but There are many of us here who don't like being pushed around and

Response to Letter 16

16-1 Please refer to Response to Comment 11-1 regarding potential upgrading of existing lines for a long-term source of power.

16-2 Please refer to the expanded purpose and need discussion in Section 1.2 and Table 1-1 in this Final EIS for a discussion of the overall purpose of and need for the proposed interconnection.

have "progress" shoved down our throat.
Please consider my sentiments as a no vote To The widening of The right of way Through Pend Oreille County.

Sincerely,

Steve Kiss
P.O. Box 67
Metaline, Wa. 99152

Letter 17

February 23, 1990

Mr. Bill Freeman
Office of Fossil Energy
Department of Energy
1000 Independence Ave. S W.
Washington, D.C. 20585

Dear Mr. Freeman: Re: WWP/B.C. Hydro-transmission
Spokane County, Washington

If the need for this power exists then we support a transmission line along the existing line of the Bonneville Power line which parallels the Pend Oreille River somewhat. This would cause less overall environmental degradation. Other factors, with a new proposed line in the western part of Stevens County, would be devaluation of property and the upsetting of a wildlife habitat from construction and maintenance.

We oppose any new line and suggest it follow the Benneville Power line right-of-way.

Respectfully,
John R. Heichel Shirley J. Heichel
Dr. and Mrs. John R. Heichel
1011 268th N.W.
Stanwood, Wa. 98292

Note: We own property in Stevens County.

Response to Letter 17

Your concerns are noted. No response necessary.

Letter 18

Dear MR Freeman, 2-26-1990

I read through the E.I.S. book but didn't see any mention of the man made fish pond located on Bond RD This is a dead end Road about 3 miles W. of Cusick. The transformer lines Runs accross this Road.

18-1 At this fish pond there have been blue heron cranes and Red hawks Signted. I believe expansion of the transformer lines will scare these birds away as they are quite timid. Just seeing a person walking down the road will often send these birds to hiding.

18-2 There is also a home next to the pond that I believe would have to be removed if the transformer lines are expanded.

The transformer lines are 1-2 hundred yards from the pond Right now.

Thank you for your consideration

5-46

Response to Letter 18

18-1 In the event the proposed Interconnection crossed the area referred to in your comment, it is likely that the lines would span the pond and associated riparian habitat. Please refer to Response to Comment 27-1 regarding avoidance of riparian areas. Construction activities may disrupt wildlife species; however, individuals (such as the great blue heron and red-tailed hawk) would likely return following construction to use the pond area, particularly since the water resource would not be disturbed.

18-2 As a result of the comments, the impacts on the residence located on the edge of the pond have been added to the analysis and comparison of alternatives. The text in Section 4.1.8.1 of this Final EIS has been modified to address this impact.

Letter 18 Continued

in this matter

Sincerely,

Pam Thompson

Response to Letter 18 Continued

Letter 19

January 30, 1990

Mr. William H. Freeman
U.S. Dept. of Energy
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C.

Dear Mr. Freeman,

As a citizen of Pend Oreille County, I have grave concerns about the Hydro Electric line that W.W.P. is considering putting in. Many studies are being conducted now that are showing the correlation from electric power or magnetic fields produced by power lines and the effects that this has on human life. This includes the detrimental effect on cells, moods, biological rhythms and cancer.

Though these electric fields were at one time believed to be harmless, studies being conducted now are raising doubts in many scientists minds.

One of the recent studies that was conducted on this problem was carried out by the Congressional Office of Technology Assessment. They acknowledge in their report that power lines "may pose public health problems" and recommend a policy of "prudent avoidance".

Four major studies are now in progress to research the correlation further. Until more answers emerge I feel it would be foolhardy to build more or expand any of these power lines.

The possible law suits that would emerge as risks are proven would hardly make such a business venture that W.W.P. is considering profitable.

Enclosed are a few of the many magazine articles that are now being written about this subject with a list of some other citizens who share this concern.

Sincerely,

Pamela A. Thompson

Pamela A. Thompson
611 Bond Rd.
Cusick, Wa. 99119

Response to Letter 19

In response to your letter, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS for a revised and expanded discussion of the EMF health issue and the associated scientific studies. Note the modified conclusions presented in Section 4.6.5.2.

CONCERNED CITIZENS WHO ARE AGAINST THE PROPOSED WASHINGTON WATER POWER TRANSMISSION INTERCONNECTION PROJECT UNTIL STUDIES PROVE CONCLUSIVELY THAT THERE ARE NO HARMFUL EFFECTS FROM ELECTRIC MAGNETIC FIELDS.

NAME	ADDRESS
Pamela Thompson	611 Bond RD Cusick, WA 99119
Leslie Sherman	442 Bond Road Cusick WA 99119
Mark A. Thompson	611 Bond Rd, Cusick Wa 99119

CONCERNED CITIZENS WHO ARE AGAINST THE PROPOSED WASHINGTON WATER POWER TRANSMISSION INTERCONNECTION PROJECT UNTIL STUDIES PROVE CONCLUSIVELY THAT THERE ARE NO HARMFUL EFFECTS FROM ELECTRIC MAGNETIC FIELDS.

NAME	ADDRESS
Joie Barker	P.O. Box 376 Newport WA
Bolimar Paar	1561 Tacoma CR. RD. Cusick WA
Janet Lyon	292 Yergens Rd. Newport WA 99156

Letter 20

PEND OREILLE COUNTY

Noxious Weed Control Board

Courthouse, Box 5000, Newport, Washington 99156 • (509) 447-3325

March 1, 1990

William H. Freeman
FE-52
Office of Fuels Program Rm 3H-087
1000 Independence Ave., S.W.
Washington, D.C. 20585

RE: Department of Energy hearing in regard to WWP transmission line and right-of-way (ROW) Draft Environmental Impact Statement (DEIS).

Testimony by: Sharon L. Bancroft, Coordinator of the Pend Oreille County (POC) Noxious Weed Control Board.

20-1 The principle concern of the Board is the introduction and/or spread of new or established noxious weed species. Upon review of the DEIS, in particular the standard mitigation measures. (Table 2-5 Environmental Protection Procedures) I could not find a direct reference to noxious weeds in either prevention or control.

The Board is concerned about this lack of address in both general noxious weed prevention and control as well as a number of specific sites where weeds of concern exist, or are likely to invade once soils are disturbed by either construction of vehicular traffic.

20-2 The Board considers the best weed control is prevention. The best prevention is to maintain a healthy vegetative cover, particularly of native species. In reference to page 2-20, "The transmission line ROW would be cleared of trees to the extent necessary..." There are powerline ROW maintenance districts that manage young forests under their lines. Selective commercial thinning is carried out when the trees reach the maximum allowable height. Another preventive measure is to implement a clean equipment policy for both your own maintenance vehicles and within your construction contracts for their vehicles. All vehicles should be inspected for weed fragments and lodged seeds before leaving the pavement to access the ROW and then again before leaving the ROW. A third preventative measure is to always revegetate disturbed soils within the growing season (spring or fall planting).

To address specifics, my refere es are primarily to the proposed route, however; they are applicable under the same circumstances for both the North and South crossing alternatives too.

20-3 The Weed Board works under the auspices of ROW 17.10. Under the Definitions title (17.10.010), "Owner" includes as definition, the possessor of an easement when they have the right to control or limit the growth of vegetation within the boundaries of an easement. Under 17.10.140, titled Owner's Duty to Control Spread

Response to Letter 20

20-1 WWP's stated goal is to revegetate disturbed areas with plant species (usually grasses) that are mutually agreeable with the landowner or land manager, coordinate reclamation efforts with the appropriate agencies, and stabilize the soil and prevent erosion, as discussed in the Draft EIS. Potential invasion of noxious weeds is a valid concern, and this discussion has been expanded in the Final EIS. In response to the comment, two environmental protection measures have been added to Table 2-5 (Measures 4 and 5) that discuss: 1) cooperation between WWP, the landowner/manager, state and federal agencies, and the local noxious weed control board; 2) assessing seed mixtures; 3) timing of the revegetation procedures; 4) a clean vehicle policy; and 5) the possible use of herbicides. These measures are incorporated into the discussions for both construction and operation and maintenance in Sections 2.3.4 and 2.3.5, respectively, and would be made conditions of the Presidential permit, if issued by DOE.

20-2 As discussed for Operation and Maintenance in Section 2.3.5, removal of vegetation that is becoming a hazard to the line may be required periodically. It is not WWP's policy to manage the ROW for the commercial sale of trees during project operation, since many of the species removed to prevent hazard to the line would not be of marketable value at the size of removal. In response to the comments on a clean equipment policy and the period of revegetation, please refer to Environmental Protection Measures 4 and 5 that were added to Table 2-5 in Section 2.3.4 of this Final EIS and Response to Comment 20-1.

20-3 Since the owner or manager of the land crossed by a ROW easement is ultimately responsible for noxious weed control on his/her property, it has been WWP's policy to agree upon applicable revegetation and weed control procedures with the landowner or land manager on a case-by-case basis. WWP would enter into an agreement with the landowner during contract negotiations on the easement; weed control measures would typically be determined at that time. However, as stated in Table 2-5 of the Final EIS, WWP would be cooperating not only with the landowner, but also with the appropriate state and federal agencies and the county noxious weed control board for the proposed interconnection. It is anticipated that specifics on these ROW agreements would vary, depending on the area crossed and the particular revegetation requirements. In response to the comment pertaining to weeds located at the base of towers, please refer to potential land use impacts listed in Section 4.1.8 of this Final EIS. It is acknowledged that weeds growing at the base of the transmission structures would contribute to noxious weed dispersal.

Letter 20 Continued

Pend Oreille County Noxious Weed Control Board
Sharon L. Bancroft, Testimony
Page 2

20-3 Cont. of Noxious Weeds, it is stated every owner shall do as necessary to control and prevent the spread of noxious weeds from his property. This is applicable to page 4-26 under section 4.1.8 Land Use...worst-case listings it was recognized that "weeds growing...at structure bases...could spread..." ("Would" substituted for "could" is a much more accurate statement). It is good that recognition of the phenomenon is made; however, responsibility needs to be included.

20-4 Next, under Table 2-5 Environmental Protection Procedures, I would like address #3 covering abandonment, and #13 treating construction road surfaces. The phrase "natural revegetation" needs definition. In the ROW area, disturbed soils would naturally revegetate to noxious weed. A stipulation should be included with the definition, that when noxious weeds are expected to revegetate, then active planting of accepted species needs to be done. Point #11 covering returning to preconstruction condition doesn't include any reference to planting back to a crop or original vegetation, nor the removal of introduced noxious weed species.

20-5 On page 2-20 section 2.1.1.4 "where ground distance occurs, soils would be stabilized as soon as practicable..." "As soon as practicable" should be refined to "within growing season." On page 2-24 under 2.1.1.5 Operation and Maintenance, if WWP does not normally use chemical spraying techniques in its ROW management, how will the control and spread of noxious weeds be addressed? On the same page under 2.1.1.6 Abandonment it states "...Reseeded to prevent erosion." With what needs to be described, as well as requiring all seeds to be certified to reduce the likelihood of noxious weed contamination, plus a visual inspection of seed to catch other noxious weed contaminants that are not restricted for certification purposes.

20-6 On page 4-4 u er 4.1.2.2 titled Soils: a five-year restablization period is way too long. It would constitite a significant impact to noxious weed control/spread. A one-year period would satisfactorily reduce the impact significance. Under the same section, regarding tower site reclamation it would be appropriate to tighten-up the time frame to "within the growing season" after "tower site areas would be reclaimed following construction..." and as a replacement to "as soon as practicable."

20-7 A good place to insert a "clean equipment policy" is on page 4-5, where prime farmland is described. Also on page 4-5 in talking about reclaiming and reseeding, reference to a mutual agreement with individual landowners is open-ended. It could be tightened by requiring ma atory reseeding within the growing season of all areas of disturbance, with the species alone being left to the discretion of the landowner.

20-8 Under Operation and Maintenance also on page 4-5, the phrase "Following ROW reclamation and revegetation..." should be defined or specified.

20-9 On page 4-12 the paragraph pertaining to the acres involved with ROW disturbance (approximately 1,938 acres) under the description of the impact to forest and non forest areas the inclusion of "the spread of noxious weeds," would be appropriate.

Response to Letter 20 Continued

20-4 Please note that since the Environmental Protection Measures 4 and 5 were added to Table 2-5 in this Final EIS, the remaining measures have been renumbered. The term "natural revegetation" was used to infer that plant species would be chosen during project reclamation that would create conditions similar to those existing prior to construction. This was not to assume that the areas would revegetate naturally without a specific reclamation plan. To avoid confusion, the term "natural" has been removed from Measures 3, 9, and 14 in this Final EIS. Also based on the comment, Measure 13 (previously 11 in the Draft EIS) was clarified that land restoration to near original conditions would be aided by revegetation procedures and noxious weed control.

20-5 Based on the comments, revegetation of disturbed areas within the first growing season has been added to Section 2.3.4 (including Table 2-5) of this Final EIS. Noxious weed control and herbicide use have also been clarified in Section 2.3.5. In reference to reseeding disturbed areas following project abandonment (Section 2.3.6), procedures would follow those discussed for project construction. Use of certified seed for reclamation would be determined during coordination with the state and federal agencies and the county weed control board. Please refer to Response to Comment 20-15 for additional discussion on determination of seed mixtures.

20-6 Based on the comment, the significance criteria for Soils in Section 4.1.2.2 of this Final EIS has been modified to more correctly reflect the initial soil stabilization period. As you may note, the statement has been clarified to "stabilize soils to predisturbance level of soil erosion within one growing season." This reclamation procedure is in line with the environmental protection measures listed in Table 2-5 in Section 2.3.4. Please refer to Measure 4 in Table 2-5 and Response to Comment 20-7 for additional discussion on revegetation of disturbed areas within one growing season following construction. Please refer to text modifications in Section 4.1.2.2 of this Final EIS, regarding tower site revegetation.

20-7 Based on the comment, prevention of noxious weeds on prime farmland has been clarified according to the protection procedures added to Table 2-5 of this Final EIS. It is WWP's position that the company would also consult with the noxious weed control boards within the applicable counties in conjunction with agreements with the private landowner (see Response to Comment 20-3). Every effort would be made to initiate reclamation within the first growing season following construction, as stated in Section 2.3.4 of this Final EIS, and to determine the appropriate seed mixture for the specific areas disturbed, as outlined in Response to Comment 20-15.

20-8 Under Operation and Maintenance in Section 4.1.2.2 of the EIS, ROW reclamation and revegetation has been defined as those procedures delineated in Table 2-5. The reclamation process, as discussed, would be implemented following construction. Therefore, impacts to soil resources during project operation and maintenance would not be considered significant.

20-9 As a result of your comment, the text located in Section 4.1.8 that discusses potential impacts to vegetation from the proposed project has been expanded to include reference to prevention of noxious weeds in addition to the minimization of soil erosion.

Letter 20 Continued

Pend Oreille County Noxious Weed Control Board
Sharon L. Bancroft, Testimony
Page 3

20-10 On page 4-16 under Operation & Maintenance, it states "Following ROW reclamation and revegetation" (which as before needs definition) "normal operations of transmission lines are not expected to result in significant impacts to vegetation resources." This could be true if (1) a clean equipment policy is followed, (2) noxious weeds are not allowed to invade, and (3) small patches are removed while they're still small. Continuing "All low-growing species would be allowed to remain on the ROW." Please add "except noxious weeds." In case of question, noxious weeds are defined, specified and identified in R.C.W. 17.10.

20-11 Page 4-16 in reference to Abandonment, it could be added that it would be a significant impact to vegetation if soils are disturbed and noxious weeds are allowed to invade.

20-12 Under the Significant Impact Summary on page 4-17, please define and explain the Statement "appropriate environmental protection measures would be implemented for ROW revegetation and restoration." Also, on page 4-17, section 4.1.7 titled Wildlife, the part discussing consideration of the significance of impacts to wildlife, please add "loss of natural forage and cover due to displacement by noxious weeds."

20-13 On page 4-25, section 4.1.8, please add to the 4th point in the worst-case listing of potential effect, "increased ROW access by trail bike and O R V's with resulting potential for..." the spread of noxious weeds.

20-14 Referring to page 4-159, section 4.7, Cumulative Impacts, any other project in the area resulting in soil disturbance would interact with transmission line soil disturbance resulting in a cumulative (increased) potential of noxious weed spread.

20-15 On page 4-162 & in Appendix D, page 3-12 as a mitigation measure, "white dutch clover or other browse species upon recommendation by USFWS, USFS, and WSDW will be utilized for ROW reclamation following line construction..." is that for the entire ROW, or the wildlife managements units only? It continues "...in addition to plant species typically used by WWP during revegetation procedures." Both of these could be defined. I did call the Spokane WWP office and was assured active revegetation was always pursued and there was no "typical plant species" seed mix, they always went with landowner request or agency suggestion. Verbal assurances are nice, but standard procedure guidelines are best to nail down in writing.

20-16 Now there are four weed species I would like to specifically discuss. The first, bighead knapweed (Centaurea macrocephalla), occurs on the present BPA ROW on Forest Service land at T39N, R43E, Section 4. It will need to be addressed. Tansy ragwort (Senecio jacobacal) occurs at T34N, R43E, Section 14 less than ½ mile from where the present BPA ROW crosses the Cusick Creek Road. There is tremendous potential for this weed to spread. Prevention is imperative. Scotch broom (Cytisus scoparia) also occurs in the vicinity of the proposed ROW, soil disturbances offer it just the advantage it likes to come in and take over, quickly. The last species, purple loosestrife (Lythrum salicaria) is a wetland plant, so the crossed wetlands are the only areas of concern in regard to it.

Response to Letter 20 Continued

20-10 "ROW reclamation and revegetation" has been defined for Operation and Maintenance in Section 4.1.8. The original assumption that no significant impacts are anticipated for vegetation resources, following the implementation of the environmental protection procedures outlined in Table 2-5, remains as stated. Please review the text modification under Operation and Maintenance in Section 4.1.8 of the Final EIS, regarding low-growing species within the ROW.

20-11 Please refer to Project Abandonment in Section 4.1.8 of this Final EIS. Reference to the environmental protection procedures located in Table 2-5 has been added to the impact discussion. Therefore, the original assertion regarding no significant impacts during project abandonment remains as stated, since noxious weed prevention would be implemented. Procedures during abandonment would parallel those used during project construction.

20-12 The "appropriate environmental protection measures" mentioned in the Significant Impact Summary for Section 4.1.8 refers directly to the procedures outlined in Table 2-5 and discussed in Sections 2.3.4 and 2.3.5 in this Final EIS for ROW reclamation. In reference to the comment concerning potential significant impacts to wildlife species due to loss of forage and cover, it is not anticipated that any loss of plant species or habitat to noxious weeds would present significant impacts to the wildlife species associated with this project. Species inhabiting these areas, whether for foraging or breeding, would not likely be dependent on the habitat type created by the proposed interconnection. Furthermore, implementation of the protection procedures stated in Table 2-5 would reduce any potential impacts associated with noxious weeds that may affect area wildlife.

20-13 The potential land use impacts listed in Section 4.1.8 refer only to existing land uses, which are specified as loss of privacy, increased disturbance, and vandalism. It is agreed that ORV use has the potential to spread noxious weeds; however, this is not considered a land use concern. Therefore, the basic scenario was not modified in Section 4.1.8.1 of this Final EIS. The potential spread of noxious weeds is addressed in the appropriate EIS sections.

20-14 It is not felt that "any other projects in the area resulting in soil disturbance" pose substantial enough impacts to warrant discussion under cumulative impacts with the proposed interconnection.

20-15 The fact that WWP does not maintain a predetermined seed mixture for ROW revegetation would be considered a "standard guideline" for project reclamation. This allows flexibility in providing the appropriate plant species for diverse habitat types. As stated in Measure 4 of Table 2-5 of this Final EIS, choice of seed mixtures for revegetation of disturbed areas along the proposed interconnection is a process that would be agreed upon between WWP, the landowner or manager, federal and state agencies, and applicable noxious weed control boards. These specifics cannot be determined until a preferred route is designated and the habitat types are identified. In addition, discussions with the WDW identified white dutch clover as a preferred species for wildlife, but this plant was presented only as an example of species types that may be used. Reclamation procedures, including reseeding, would be area specific along the transmission ROW. Use of plant species beneficial for wildlife use would be determined at the time of construction between the parties mentioned above, as would the overall seed mixture.

20-16 Your comments are noted. Please refer to Response to Comment 20-1 regarding both the prevention of noxious weed invasion during project reclamation and the implementation of the environmental protection procedures listed in Table 2-5 of this Final EIS.

Letter 20 Continued

Now I would like to return to those sections pertaining to wetlands and address purple loosestrife specifically.

20-17 All sections discussing the crossing of wetlands, sections 2.1.1.4, 2.1.1.5, 2.1.1.6, and 3.1.4, any disturbed soils in a wetland offer the opportunity for purple loosestrife to invade. In particular, where the ROW is to cross Moon Créek and the Little Spokane River, purple loosestrife is in the area and would readily take advantage of the opportunity to spread. I have some literature describing it to pass around to those who are interested and will include copies with the submission of this statement. Besides being illegal, the principle significance of this weed is its extreme negative impact on wildlife habitat, along with its tenacity and incredible propagation abilities.

20-18 On page 4-9 under the Significant Impact Summary, any disturbance of wetland soils opens the door to a full scale invasion by this weed. When equipment is moved between wet areas, a clean equipment policy would be of paramount importance. There is a lot of wetland habitat in this county. Its ability to maintain the wildlife dependant upon it is under direct threat by this weed. The more care WWP can take when working in and around wet areas, the better chance of keeping this weed at bay.

20-19 On page 4-12 under Significance Criteria, the reference to continuation resulting in long-term loss of riparian or wetland vegetation, invasion by purple loosestrife would equal such a loss.

20-20 Lastly, on page 4-166, section 4.11 title Irreversible/Irretreivable Commitment of Resources states, "...wetland habitat commitments would be relatively minor." If purple loosestrife were allowed to invade, the potential is permanent habitat loss resulting in loss of traditional wetland wildlife species, both migratory and resident.

In closing, I would like to reiterate the Weed Board's request to have noxious weeds specifically addressed in the final EIS, particularly where indicated in this testimony. I know I have their support in this request, as well as that of Spokane County Noxious Weed Control Board. In reciprocity, you have our co-operation w th assistance in the development of such address, as well as a weed control program.

Thank you for your time, and consideration of this testimony.

Most Sincerely,

Sharon L. Bancroft

Sharon L. Bancroft, Coordinator

cc: R. Scott Nielsen, Coordinator
Spokane County Noxious Weed Control Board

enclosures

Response to Letter 20 Continued

20-17 Please refer to Response to Comment 27-1 and Section 2.3.4 of this Final EIS for additional discussion on crossing of wetlands. In the event that a wetland would be disturbed by the proposed interconnection, WWP would implement the reclamation procedures outlined in the wetlands mitigation plan and agreed upon during coordination with the USFWS, EPA, Forest Service, WDW, and WDE prior to construction.

20-18 A clean equipment policy would be in effect during project construction as stated in Table 2-5 of this Final EIS. Please refer to Response to Comment 27-1 regarding crossing of wetlands.

20-19 Potential invasion of noxious weed into a wetland system resulting in the long-term loss of riparian or wetland vegetation would be considered a significant impact. Due to the measures outlined in Response to Comment 27-1 and Table 2-5 in this Final EIS, invasion of purple loosestrife into wetlands would not be expected.

20-20 Please refer to Response to Comment 20-19 regarding your concerns on wetland infestation by purple loosestrife.

Letter 21

Moss Beach, Ca. 94038
March 7, 1990

Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., SW
Washington, D.C. 20585

MAR 13 AM 10 SU

Dear Mr. Como:

I am writing to express my concern over the proposed power project linking the WWP plant at Marshall Lake to the British Columbia Hydro plant.

After reading the entire EIS report published by the Department of Energy, I am unconvinced that the benefits will compensate for the significant negative impact on our natural resources. This project will be a major health hazard to many of the residents of Pend Oreille and Spokane Counties.

I am concerned that it is only 2 miles from the natural habitats and wintering areas of deer, bear, and even some animals on the endangered species lists. The plant and fish communities will be adversely affected by the three-year construction project. It is endangering wetlands as well as prime farmlands.

21-1 Has Washington Water Power demonstrated a concerted effort to develop other sources of power? Have they thoroughly investigated Load Management and Conservation? It seems to me that they are mostly interested in the prospect of selling power to PG & E or others. I am not willing to have my land be the dumpsite for future industrialization of our neighboring states.

I am afraid of my children and grandchildren developing leukemia or other equally devastating illnesses caused by a small number of people carelessly abusing the environment. Who will I be able to hold responsible if and when it happens?

Thank you for taking the time to read my letter. Any help you can give to bringing about a **No Action Alternative** decision will be greatly appreciated.

Yours truly,

Donna Hohenschuh

Donna Hohenschuh,
New Property Owner, Pend Oreille County

Response to Letter 21

21-1 Based on the comment on development of alternative sources of power, please refer to Section 2.6 of this Final EIS where alternative electric resources and transmission systems were evaluated to potentially meet WWP's anticipated deficits. Sections 2.6.1, 2.6.1.1, and 2.6.1.6 have been expanded to provide a more detailed discussion of energy supply alternatives, including conservation and load management.

Letter 22

REC'D DOE/FE
OFFICE OF FUEL PROGRAM
1990 MAR 12 P 4: 24

P.O. Box 927
Moss Beach, Ca. 94038
March 8, 1990

William H. Freeman
U.S. Department of Energy
Office of Fuels (FE-52)
Room 3H-087
1000 Independance Ave., SW
Washington, D.C. 20585

Dear Mr. Freeman:

I am writing to express my concern over the proposed power transmission lines connecting the WWP plant at Marshall Lake, Washington to the British Columbia Hydro plant.

This proposal seems to have an unnecessary negative impact on the animal and plant communities in Pend Oreille County. After reading the entire EIS Report published by the Department of Energy, I remain unconvinced that sufficient need exists. I do not believe that Washington Water Power has spent enough time investigating alternative sources of energy or is utilizing Load Management and Conservation to the fullest extent.

This project will have significant impact on fish and wildlife in Pend Oreille and Stevens Counties as well as upon the endangered species, the grizzly bear, the mountain caribou, the gray wolf and the bald eagle, all who use the Salmo-Priest Wilderness area as habitats and/or feeding areas.

Residential exposure to electromagnetic fields probably causes cancer: acceptance of this proposal indicates a lack of concern for our children and grandchildren who might develop leukemia. The EIS statement is using 100 feet (200/2) ROW as its guidelines when studies have clearly shown that it should be one thousand (1000) feet. The **No Alternative Action** should be the decision on this proposal.

Yours truly,

Donna Hohenschuh,
New Property Owner,
Pend Oreille County

5-55

22-1

Response to Letter 22

22-1 In response to the comment regarding sufficient need for the proposed interconnection, please refer to Section 1.2 of this Final EIS for an expanded discussion on project purpose and need. In reference to WWP investigating altemative sources of power, please refer to Section 2.6 of this Final EIS. This section discusses the altemative electric resources and transmission systems that were previously evaluated by WWP to meet anticipated energy needs. As stated in Response to Comment 21-1, Sections 2.6.1, 2.6.1.1, 2.6.1.2, and 2.6.1.6 have been revised to provide a more in depth discussion of the energy supply altematives available to WWP, including conservation, load management, and cogeneration.

Letter 23

HERITAGE NORTH
11502 Phinney Avenue N.
Seattle, Washington 98133

March 8, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Programs, Rm 3H-087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Freeman,

Re: Comments on DEIS for Washington Water Power-B.C. Hydro Transmission Interconnection Project: CULTURAL RESOURCES

5-56

Under the four proposed alternatives, substantial cultural resources are known to exist* and there is a reasonable expectation that other cultural resources will be disturbed and/or discovered during construction of the transmission line:

Proposed Alternatives	Known Sites
Proposed	24
Western	9
Northern Crossover	18
Southern Crossover	29
TOTAL	80

23-1 Accordingly, I encourage, and it appears from the DEIS that all appropriate measures will be taken, that every recourse will be taken to protect known and potentially discoverable cultural resources during transmission line construction. My only concern that not every thing possible will be done relates to the section on environmental consequences (pg. 4-60 to 4-61) where it is stated that "the proposed route would have no significant impacts on cultural resources because most potential impacts should be avoidable." I believe that the DOE is assuming to much here and I urge that the final EIS replaces the word NO with something less forceful such as limited or reduced. Impacts to the environment should always be avoidable. But, regardless of how many rules and regulations are followed, impacts invariably occur.

Response to Letter 23

23-1 The complete sentence from the Draft EIS that you quote in your comment continues to state that, "most potential impacts should be avoidable (Hudson et al. 1988) through judicious route selection, compliance with all applicable state and federal procedural requirements and permit restrictions, and completion of field surveys prior to construction, where appropriate (see Section 4.9 in this Final EIS)." Upon implementation of these and other mitigation measures, as described in Section 4.9 of the Final EIS, the proposed route would have no significant impacts on cultural resources, and the impact summary remains as stated. In addition, review Mitigation Measure 17, which has been added to this Final EIS to ensure NEPA compliance and DOE's review of the final project design. As stated in Section 4.9 and Measure 17, all mitigation measures would be made conditions of the Presidential permit.

Letter 23 Continued

I appreciate this opportunity to be involved in the DEIS comment process and look forward to receiving a copy of the Final EIS.

Sincerely,

DALE A. STIRLING
Environmental Historian

Response to Letter 23 Continued

Letter 24

Response to Letter 24

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of the Chief Scientist
Washington, D.C. 20230

March 12, 1990

Mr. William H. Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Programs, Rm. 3H-087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

Enclosed are comments to your Draft Environmental Impact Statement for Washington Water Power, B.C. Hydro, Transmission Interconnection Project. I'm sorry our they are late. We hope our comments will assist you. Thank you for giving us an opportunity to review the document.

Sincerely,

David Cottingham

David Cottingham
Director
Ecology and Environmental
Conservation Office

Enclosure

Letter 24 Continued

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

MEMORANDUM FOR: David Cottingham
Ecology and Environmental Conservation Office
Office of the Chief Scientist

FROM: Rear Admiral Wesley V. Hull, NOAA
Director, Charting and Geodetic Services

SUBJECT: DEIS 9001.06 - Washington Water Power, B. C. Hydro, Transmission Interconnection Project, Washington/British Columbia

The subject statement has been reviewed within the areas of Charting and Geodetic Services' (C&GS) responsibility and expertise and in terms of the impact of the proposed actions on C&GS activities and projects.

A preliminary review of C&GS records has indicated the presence of both horizontal (H) and vertical (V) geodetic control survey monuments in the proposed project area. Attached are the published geodetic control data for quadrangles 471171, 471174, and 481171, 2, 3, and 4 (H). Also included are published data for Washington State Level Lines 25, 28, and 40 (V) as well as unpublished data for field survey projects L 24474 and L 24475, parts 4 and 5 (V).

24-1 This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project. If there are any planned activities which will disturb or destroy these monuments, C&GS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. C&GS recommends that funding for this project includes the cost of any relocation required for C&GS monuments. For further information about these monuments, please contact the National Geodetic Information Branch, N/CG17, Rockwall Bldg., room 20, National Geodetic Survey, NOAA, Rockville, Maryland 20852, telephone 301-443-8631.

Attachments

cc:
N/CG1x22 - Wegenast
N/CG17 - Spencer

5-59

Response to Letter 24 Continued

24-1 If a route is approved and a Presidential permit issued by DOE, WWP would be able to move into the detailed survey and design phase of the project. During this phase, WWP has indicated that all geodetic control monuments that would be within the ROW or along access roads outside the ROW would be identified. Any monuments that may be disturbed by construction activities would be located. WWP would then consult with the Office of Charting and Geodetic Services to determine how the monuments could be protected or if they would need to be relocated. It is anticipated that only monuments at tower sites or along access roads where excavation might be required would need to be relocated. The cost of the relocation of any monuments would be assumed by WWP.

Letter 25

[redacted] 4211 Osage Way
Spokane, Wa. 99203

RECD BONNE
OFFICE OF FUEL PROGRAM
'80 MAR 19 P 12:00

March 14, 1980

Dear Sirs:

I previously wrote you concerning the proposed Washington Water Power 230,000 Volt transmission line from B.C. Canada.

Since then several factors have been brought to my attention. While I was having my income tax prepared, I was told about the direct effects of being in the vicinity of transmission lines by someone who had experienced it. I am enclosing letter written by him.

I also learned that the area near Moses Lake Washington, where the Bonneville lines from Coulee Dam are concentrated, has an extremely high incidence of cancer.

As it has been proven that solar energy can be used to do everything that electrical power does and is safe - I think W.W.P.Co. should use its resources to that end result.

Sincerely,
[redacted]
Helen Rishel

5-60

25-1

Response to Letter 25

Note: Letter quality was submitted as presented.

25-1 Based on the comment, the discussion on solar energy in Section 2.6.1.14 of this Final EIS has been expanded.

Letter 25 Continued

2/6/7C

In 1947, I was working for the U.S. Coast & Geodet in Kennewick the Pasco, Wa. area, doing Triangulation work in the Hanford reserve, the Horse Heaven Hills, the Ply mouth area, and the area towards Saddle mountains.

5-61

25-2 We often worked near or under the Power Transmission Lines, and occasionally, if humidity or fog conditions were right (or wrong) the Coast Survey Trucks would build up a static charge from the aura around the lines. At times this charge was very potent - especially if our boots were wet and we touched the truck.

We really didn't think about these situations - but there is no question about the electrical field.

JC Braillie

Response to Letter 25 Continued

25-2 Please refer to Section 4.6.3.3 in this Final EIS regarding electric field induction.

Letter 26

REC'D DOE/FE 630 Lomita Av.
OFFICE OF FUELS PROGRAMS Saratoga, CA 95070
Mar. 12, 1990
90 MAR 19 P 3:07

Mr. Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Av., S.W.
Washington, D.C. 20585

RE: Comments of Draft EIS, Washington Water Power/BC Hydro Transmission Project

Please consider the following comments pertaining to the adequacy of this document. I will endeavor to reference each comment to the appropriate section of the EIS.

26-1 2.7.1.3 Conservation: The section inadequately addresses this potential option. The final EIS should include, but not be limited to, the following discussion of conservation:

1. The actual amount of savings of energy already accomplished by WWP conservation in place.
2. What future programs of conservation, if any, WWP plans to initiate, and the proposed power savings therefrom.
3. A summary of industry and non-industry literature which estimates the power that could be saved through conservation measures, which could be similar in format to the discussion on electric and magnetic fields later in the EIS.

26-2 Additionally, the section should include a discussion of 1 through 3 (above) for each of the potential customers who will be purchasing power from WWP as a result of this proposed transmission project. It should be included because it is estimated that 60 to 80 percent of the power made available from this project will be sold outside the WWP service area.

26-3 The grounds for including a more detailed analysis of conservation potential is that it would lend credibility for the no-action option, which has already been determined to be within the scope of the EIS. Furthermore, if a discussion of the economic benefits of this project to the counties involved is within the scope of the EIS (sec. 3.1.11.1 et seq.), then certainly a more specific discussion of conservation is in order. Quite simply, how much conservation would be needed to replace the shortfall within the WWP service area which WWP uses to justify the proposal in the first place? (see 1.2) In its present form, the inadequacy of the conservation section of the EIS effectively renders the no-action option meaningless as far as decision makers are concerned.

26-4 2.7.1.4 Utility Purchases/Exchanges: WWP should provide specific information in the EIS to actually show how much more it would cost to purchase the additional power from BPA to meet WWP's own needs over the next twenty years, over the cost of constructing this line. Again, if no-action is to be a realistic alternative, then the decision makers should be aware of specifically how much more (or less) that alternative would cost WWP.

Response to Letter 26

26-1 Please refer to Sections 2.6.1 and 2.6.1.1 of this Final EIS for an expanded discussion on conservation as an alternative energy source. These sections describe WWP's conservation programs currently in effect, future programs to be implemented, and energy savings associated with each. However, conservation measures and future conservation programs are not considered viable alternatives to the proposed interconnection, because such actions will not accomplish the purpose and need of the proposed project as stated in Section 1.2 of this Final EIS, which has also been revised. Once it is determined that an alternative is not a viable one, it is not necessary to assess that alternative in detail. For this reason, a summary of industry and non-industry literature estimating power that could be saved is not included.

26-2 Potential customers for the sale of surplus power from the proposed interconnection have not been identified. Section 1.2 of this Final EIS has been expanded to discuss project purpose and need and the proposed marketing of this additional transmission capacity.

26-3 The revised Sections 2.6.1 and 2.6.1.1 of this Final EIS outline the resource power alternatives incorporated into WWP's long-term planning, emphasizing energy conservation currently in use and presenting a viable conservation program for the future for both residential and commercial customers. As stated in the Conservation discussion (Section 2.6.1.1), estimated energy savings from these future programs approach 48 MW under average demands by the year 2000. In comparison, Section 1.2 and Table 1-1 of this Final EIS present the forecasted energy deficits, which are estimated to begin in 1994 for average energy demands. These deficits under the "most likely" load growth scenario are predicted to approach 202 MW under average demands and 445 MW under peak demands by 2010 (see Table 1-1).

26-4 Based on the comment, please refer to the information added to Section 2.6.1.3 of this Final EIS for utility purchases and exchanges.

Letter 26 Continued

26-5 2.7.2.4 Marshall Substation, operation and maintenance: The EIS should include noise tables (decibel levels) for substation operation, similar to those provided for the transmission lines themselves (see 4.5.2.2, 4.5.2.3). Additionally, the EIS should include specifically any mitigation measures proposed for this noise by WWP. This should show quantitatively how much the noise would be reduced by these measures.

26-6 2.1.3 Series Capacitor Station: WWP should specifically identify the location of this station on each of the proposed route options. Since this installation is qualitatively different from the lines themselves, it will have different environmental impacts. Again, noise tables and mitigation measures for these stations should be provided along with other environmental impacts (visual, economic). To treat these stations as environmentally equivalent to transmission lines amounts to a misrepresentation of their impact.

26-7 3.1.2.1 Geology, specifically Geologic Hazards, p.3-4: The EIS could include a detailed seismic report covering the entire length of the proposed and alternative route options. This report should include a soil stability survey of all points where towers and other structures would be located.

26-8 The existing section is inadequate and misrepresents the potential for seismic activity along the route. Referring to table 3-1 (p.3-6), this table is arranged so that one increment of the Richter scale corresponds linearally to one increment of the Mercalli scale. In actuality, these two scales do not correspond in this manner, and should be listed on separate pages. Richter measures intensity at the epicenter, and Mercalli represents ground motion intensity at any given location.

The conclusion one derives from this section is that since there have been only a few earthquakes of low Richter intensity in the area of the project, it represents a safe zone. In fact, one could have an earthquake of 4.5-5.5 magnitude Richter, but still have substantial Mercalli readings, depending on soil conditions. Therefore, a soil stability survey is necessary for all the alternative routes. Clearly, routes crossing sandy lakebeds might not be desirable.

26-9 4.1.8.2 Future land use plans and policies: The draft EIS does not discuss impacts of this line on future land uses in Pend Oreille County. The reason given for this is that Pend Oreille County does not have a general plan (see p. 4-42). Under NEPA, DOE is charged with assessing the environmental impact of the proposed transmission line. The lack of a general plan in Pend Oreille County makes discussion of the impact of this project on future land use no less significant for Pend Oreille County than for Stevens or Spokane counties. The draft EIS is essentially saying "There is nothing that will be spoiled in Pend Oreille County from this project, because the city fathers haven't defined anything to be spoiled." I can find nothing in the way of a statutory mandate in NEPA which binds DOE to assessing impacts on future land use only when a general plan exists.

In fact, it could be convincingly argued that the very lack of a plan in Pend Oreille County demands a more thorough discussion of the potential impacts on future land use. Specifically, a demographic survey should be taken throughout the

Response to Letter 26 Continued

26-5 As stated in Section 4.2.12, ambient noise levels at the planned Marshall Substation site would increase during the construction period due to the operation of heavy machinery. Following substation construction, the noise level would be limited to occasional operation of circuit breakers. During normal operation, the noise level at the property line of the Marshall Substation would be within the maximum permissible environmental noise as defined by WAC 173-60-040 for residential properties, currently at 55 dBA.

26-6 As the project is currently proposed by WWP, a Series Capacitor Station would not be authorized by the Presidential permit. A Series Capacitor Station would be needed only when electricity transfer exceeds 800 MW. If that level is reached, WWP would apply to DOE for an amendment to the Presidential permit to allow an increase in transfer up to 1,000 MW and construction of a Series Capacitor Station. The location of the station would not be determined until detailed electrical and design studies were completed. The noise level from a capacitor station would be within the limit described for the planned Marshall Substation (i.e., 55 dBA). Capacitor station location would be reviewed by the DOE, if and when one is proposed by WWP. Please refer to Mitigation Measure 17 added to Section 4.9 of this Final EIS, regarding DOE's review of WWP's final project design and the full disclosure of project impacts in accordance with NEPA regulations.

26-7 Detailed seismic and soils surveys were not required to assess the impacts of the proposed transmission line. Existing publications, such as the Soil Conservation Service soils surveys, were adequate to identify locations of highly erosive or unstable soils. During detailed design along an approved route, site specific soils limitations at tower sites or along access roads would be incorporated into tower footing and road designs and construction and restoration procedures.

26-8 Table 3-1 located in Section 3.1.2 of this Final EIS has been changed to more accurately reflect characteristic effects from an earthquake relative to both the Richter Scale and the Modified Mercalli Scale. Although there is always a potential for an earthquake anywhere in the United States, the WWP/B.C. Hydro project is located in a region that has a low potential of earthquake hazards and expected horizontal ground acceleration. A major cause of damage during earthquakes is due to liquefaction-induced ground failures. The project is located in a region where the probability of an earthquake occurring in a 50-year period, that is capable of generating liquefaction in susceptible sediments, appears to have less than a 10 percent probability.

The maximum magnitude (Richter) of earthquakes in the project region has been less than 6.5. Liquefaction has not been observed associated with earthquakes measuring less than 5.0 and is most likely associated with magnitudes of 7.5 or greater. In addition, published attenuation curves indicate that accelerations greater than 0.04 g should not be expected on rock sites at distances greater than 200 km from the source of magnitudes 7.5 or greater for earthquakes in the western United States. Assuming that bedrock accelerations may be amplified by a factor of 25 percent from 0.04 g to 0.05 g due to local soil conditions, the above arguments suggest that liquefaction should seldom develop at distances greater than 200 km from the epicenter of a large earthquake, should it occur in this region.

26-9 The studies suggested are beyond the scope of an EIS for a specific proposed action such as this one. The potential impacts of the project on future land use are, at worst, moderate (with the exception of potential intrusion of the Eastern Alternative into a Federal Flight Clearance Zone for a planned runway, which could be significant), as shown on Table 4-4 in this Final EIS. The Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act require that EIS's concentrate on significant impacts and issues (Section 1502.2(b)). Regarding the level of potential future land use impacts in Pend Oreille County, please see Response to Comment 26-10 below.

Letter 26 Continued

26-9 Cont. proposed route in Pend Oreille County. Potential development trends insofar as residential development in and along the route should be identified. Real estate brokers should be surveyed, and transactions researched. On p. 4-41, the draft EIS concludes:

"Where the proposed Interconnection would parallel an existing ROW, its effect on future land uses would tend to be less, since it would more likely be located along the predefined edges of future development proposals."

In the absence of the data which I am suggesting should be collected, it is inconceivable how such a conclusion could reasonably be drawn. In addition to the surveys which I have suggested, the demographic survey should also include the ages and occupations of persons owning land on or near the proposed route. It would be a way to fully understand the trend for future development along the route.

26-10

The glaring lack of discussion of impacts of this line on future land uses in Pend Oreille County unfairly biases decision makers in favor of this route.

5-64

4.1.11.1 Construction: Proposed line's impact on property values: This section inadequately addresses the issue of property values. The conclusion of the draft EIS is that no general conclusion regarding transmission lines' impact on property values can be drawn (see pp. 4-64, 4-65). It is based primarily on testimony from the Spokane County Assessor and from a publication commissioned by the Bonneville Power Administration. The BPA publication can hardly be considered an unbiased source, since the BPA is in the business to generate and sell power. A survey of real estate transactions, together with a survey of real estate agents, would more fairly represent the impact of the proposed project on property values. Likewise, the Spokane County Assessor may not be an unbiased source. It has already been shown in the draft EIS that this project will boost tax revenues in all the counties affected (3.1.11.4 et seq.)

26-11

Recently, the city of Fremont, CA (pop. 50,000+) has enacted a requirement that all real estate transactions within the city must include transmission lines on the disclosure form. This offers strong evidence that the lines may effect the value of real estate.

4.5.3 and 4.5.4, Electric Fields and Magnetic Fields, respectively: The conclusions reached in these sections proceed from the assumption that the BPA lines and WWP lines (preferred route alternative) will be together in the same right-of-way (see figs. 4-3,4-4,4-7). It is also assumed that no additional lines will be build on the Bell-Boundary BPA route. To date, none of these facts have been established. Although WWP apparently is negotiating with BPA for the use of the existing BPA right-of-way, the EIS should include all possible outcomes, including the possible outcome that WWP might have to take an additional 125 feet of right-of-way, with BPA then building an additional line within its own right-of-way.

26-12

In this scenario, a much greater area of land could be covered by powerlines than taken into account in the EIS. The electric fields would be spread over

Response to Letter 26 Continued

26-10 The conclusion that future land use would be less affected by the project where the project was located parallel to existing transmission lines is not in any way influenced by the availability of specific data on future land uses. The conclusion is derived from basic principles and is universally applicable. In the case of a new transmission line crossing undeveloped terrain, it might at some point cross the center of an area proposed for future development of a sensitive type, thus potentially impacting the plans for that future use. In the case of a new transmission line that parallels (i.e., closely follows the alignment of) an existing transmission line, the new line could not interrupt or divide an area planned for a sensitive future use, since the interruption (by definition) would already be present. Therefore, in these circumstances, the effects of the future line on future development, although not absent, would clearly be less. Note, with respect to the concerns expressed in Comment 26-9 above, that almost all of the project's proposed route in Pend Oreille County and over half of the alternative project routes in Pend Oreille County, follow existing transmission lines. Therefore, the total effect on future land use in the county would be low, and would be unlikely to affect the route comparison.

26-11 Based on your comment, Section 4.1.11 in this Final EIS has been modified to more clearly present updated information on studies dealing with the effects on land values. An additional eight studies were included in the literature review; one 1976 study, one 1978 study, one 1984 study, two 1988 studies, and three 1989 studies. These references have also been added to the literature cited section of the document. The new studies statistically analyzed residential, undeveloped residential, undeveloped rural, and farmland using multiple regression analysis and general statistical survey analysis. The studies were completed for areas in Saskatchewan, Canada; Decatur, Illinois; Orange County, New York; Penobscot, Maine; and Waterloo, Ontario. Each of the empirical studies was based on market sales data of residential properties, vacant land, and farmland.

Again, the results of the more recent studies (Section 4.1.11.1) showed a variety of conclusions. Five of the studies concluded that transmission lines had no effect or no significant effect on land value (Brown 1976; Kinnard et al. 1984; Kinnard and Mitchell 1988; Kinnard et al. 1989a; Kinnard et al. 1989b). One study reported mixed results, suggesting that selling prices for single-family residential properties located less than 300 feet from the transmission ROW were not affected; however, other tests suggested that possible negative effects were experienced on sales of vacant land suitable for residential development, if the property were located within 300 feet of the ROW centerline (Kinnard et al. 1988). Two additional studies concluded that transmission lines did conclusively impact the selling price of residential property within 400 feet of a line (Boyer et al. 1978; Colwell 1989).

As evident from these more recent studies, effects of electric transmission lines on land values can vary dramatically, depending on the relationship of the land and the transmission line to various factors. These factors include restriction to land use and control, effects on land productivity, perceived health and safety risks, distance from the line, visual and aesthetic effects, and market conditions. In response to the comment, a statistical survey of local property sales within the project area is beyond the scope of analysis of the EIS. The original conclusion cited in the Draft EIS is consistent with the current property value impact assessment. Property values may or may not be negatively affected, depending upon the factors described above.

26-12 In response to the comment, please refer to Figures 4-4 through 4-8 for electrical field comparisons and Figures 4-9 and 4-13 for magnetic fields in this Final EIS. It can be seen that the magnitude of the electric and magnetic fields outside the WWP side of a WWP/BPA corridor are essentially the same as those along the WWP line alone. The addition of a possible future BPA line between WWP's proposed line and BPA's existing lines would not have an appreciable effect on the field magnitudes outside the corridor, since those fields are predominantly influenced by the nearest line to the edge of the corridor.

Letter 26 Continued

26-12 Cont. a larger area, and the impact on residences and agriculture would be greater (see sec. 4.5.3.3, 4.5.3.4, 5.5.5, 4.5.5.1). The EIS should include diagrams that reflect this scenario. To leave the EIS in its present form amounts to allowing a policy decision to be made on insufficient data.

26-13 4.5.5.1 Independence of Information Sources: This section emphasizes the independence of the sources used to evaluate the health effects of electromagnetic fields and radiation. The criterion used is whether the panels deliberating the issue had "any adversarial interest in the outcome of its deliberations" (p. 4-145). Bias can exist even if no specific legal issue is being resolved. In fact, many of the references cited (see 4.5.5.3) are published by utilities, power cooperatives, or electrical industry associations. The EIS should include a survey of all legislation, domestic and foreign, which address the health risks of transmission lines.

Thank you for your consideration. Please acknowledge receipt of these comments as soon as possible.

Yours truly,

Stan Bogosian

Response to Letter 26 Continued

It is not required that an EIS explicitly evaluate every possible future development scenario. As discussed above, field strengths off of the WWP right-of-way are adequately evaluated in this Final EIS, regardless of the outcome of negotiations between WWP and BPA, or BPA's future development plans. These figures accurately display the field strengths for WWP alone (left side of WWP profile) and for a WWP line interacting with a BPA line (right side of WWP profile). If WWP constructs its line on a new ROW and BPA subsequently constructs a new line on its existing ROW at some time in the future, that federal action by BPA will require a separate NEPA compliance document (EA or EIS). BPA would be responsible for the preparation of that document at the time a new line is proposed.

26-13 The bibliography presented in Section 4.6.6 includes a total of 56 references ranging from individual studies to findings of various scientific panels which reviewed collectively all studies. Of these 56 sources only 7 of these references were published by the electric utility industry. The emphasis placed in the EIS on findings of scientific panels is appropriate due to the fact they were composed of experts with no ties to the electric utility industry. Please refer to Responses to Comments 13-5 and 51-7 for additional information on the resources included in the EMF effects analysis and expanded discussion on associated health issues for this Final EIS.

The most recent U.S. legislation (Florida) that addresses EMF is discussed in Section 4.6.5.1 of the EIS. Regulations are often based upon the most recent assessment of available scientific information as evidenced by the deliberations of the Florida Commission. The panels cited in Section 4.6.5.1 did not report to the electric utility industry: Florida Commission (Florida Department of Environmental Regulation); World Health Organization (United Nations); NAS panel (National Academy of Sciences); AIBS panel (American Institute of Biological Sciences); and the New York Powerline Project (New York State Department of Health). Some of the groups that did report directly to electric utilities (e.g., WEST Associates Report) were specifically not included in this section. The World Health Organization report does include the input from a number of international sources. It must be kept in mind that legislation or regulations do not establish scientific fact, and most United States and foreign regulatory agencies continue to permit construction of new electric power facilities without field strength standards.

Letter 27

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle WA 98101
Alaska
Idaho
Oregon
Washington

EPA

MAR 1 4 1990 REC'D DOE/FE

Reply To
Attn Of: WD-136

William H. Freeman
U.S. Department of Energy
Fossil Energy (FE-52), Office of Fuels Programs
1000 Independence Avenue S.W., Room 3H-087
Washington, D.C. 20585

Dear Mr. Freeman:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Washington Water Power/B.C. Hydro Transmission Interconnection Project, Washington. The DEIS evaluates alternatives for an electric transmission line that would connect with the electrical system of the British Columbia Hydro and Power Authority (B.C. Hydro) and would be composed of a double circuit, 230-kilovolt (kV) transmission line from the planned Marshall Substation southwest of Spokane, Washington to the international border northwest of Metaline Falls, Washington. Our comments are made in accordance with the National Environmental Policy Act (NEPA) and our responsibility under Section 309 of the Clean Air Act to determine whether impacts of proposed federal actions are acceptable in terms of human health and welfare and environmental quality.

5-66

Five alternatives evaluated in the DEIS are the Proposed, Western, Northern Crossover, Southern Crossover and No Action Alternatives. The Proposed Action would consist of 127.9 miles of double circuit, 230 kV transmission lines paralleling existing lines for 115.0 miles.

27-1

EPA is concerned with the potential impacts to wetland resources of the Proposed Alternative. Wetlands are nationally important resources which have already suffered significant levels of cumulative effects. The Proposed Alternative, while environmentally preferable to the other transmission line construction alternatives, will cross 53 acres of wetlands. There is insufficient information in the DEIS to determine the impact of this project to wetland resources. The sighting objectives discussed in Section 2.1.1.4, and the environmental protection procedures in Table 2-5, would minimize, not eliminate, wetland losses.

The Final EIS must clearly identify the wetland resources that will be impacted from the proposed project, both in terms of the number of acres and the functions and values of these wetlands. In addition, mitigation measures for unavoidable wetland impacts must be included in the Final EIS. The wetland mitigation plan should be designed to replace the full range of functions and values of all the wetlands potentially affected. The procedure in developing such a plan is to delineate the existing wetlands in the project

Response to Letter 27

27-1 The acreage numbers presented in Section 4.1.4 of the Draft EIS were not representative of the actual estimated disturbance for wetland or riparian areas. Based on the comment, the wetland analysis was revised and more detailed acreage numbers are presented in Sections 4.1.4, 4.2.4, 4.3.4, 4.4.4, and 4.5.4 of this Final EIS. The Draft EIS assumptions for the proposed route were 3.5 miles of wetland/riparian areas crossed, resulting in approximately 53 acres of wetland habitat affected. The updated analysis that has been added to Section 4.1.4 of this Final EIS presents the more detailed wetland types identified from the USFWS National Wetlands Inventory Maps and proposes a basic assumption that low-lying wetland areas would be avoided during project construction and operation activities in accordance with the measures outlined in Sections 2.3.4 and 2.3.5 of this Final EIS and committed to by WWP. However, palustrine forested wetlands were identified along the Proposed Route in this Final EIS and a total of 0.56 mile would be crossed at a number of locations along the Proposed Route. Assuming these areas could not be spanned by the transmission line and complete canopy removal would be required within the 125-foot ROW, approximately 8.5 acres of forested wetland areas would be affected. As stated in the Final EIS, this would result in a "long-term loss of wetland vegetation and would be considered a significant impact to this resource." These calculations were completed for proposed construction, operation and maintenance, and abandonment activities for all project alternatives.

Please refer to Table 2-5 in Section 2.3.4 of this Final EIS to review the measure added to ensure wetland protection. In addition, a mitigation measure was added to Section 4.9 of this Final EIS to address the significant impacts that would result from removal of palustrine forested areas by the proposed Interconnection. As discussed in this measure, WWP would coordinate with the appropriate state and federal agencies to develop a wetlands mitigation plan to ensure no net loss of wetlands from project activities. Please note the statements added to Sections 2.3.4 and 4.9 that all environmental protection procedures and mitigation measures outlined for the proposed Interconnection would be made conditions of the Presidential permit by DOE.

Letter 27 Continued

27-1 Cont. area, assess the existing functions and values of these wetlands, and develop a plan to fully compensate for the impacts. In-kind replacement should be the goal of any riparian-wetland mitigation plan.

27-2 The proposed project also requires a Department of the Army permit pursuant to Section 404 of the Clean Water Act. We recommend that the applicant immediately initiate discussions with the Corps of Engineers (Corps) regarding the project and permitting requirements. Early coordination with the Corps and review agencies is extremely important for a project of this magnitude.

Based on our review, we have rated the DEIS EC-2 (Environmental Concerns - Insufficient Information). A summary of the EPA rating system for EISs is enclosed.

Thank you for the opportunity to review and comment on the DEIS. We look forward to reviewing the Final EIS. If you have questions concerning our comments, please contact Gerald Opatz at (206)442-8505 or (FTS)399-8505.

Sincerely,

Ronald A. Lee

Ronald A. Lee, Chief
Environmental Evaluation Branch

Enclosure

cc: Corps
USFWS
BIA - Portland, Ron Eggers
Ecology
WDW
Kalispel Tribe, Washington
Spokane Tribe, Washington

Response to Letter 27 Continued

27-2 As presented on Table 1-2 in the EIS, a Section 404 permit may be required for access road crossings of streams and wetlands. If a route is approved and a Presidential permit issued by DOE, WWP would begin detailed survey and design work along the ROW. At that time, particular effects on specific streams and wetlands would be determined, and WWP would initiate discussions with the Corps of Engineers on filing requirements for a nationwide or individual 404 permit.

Letter 27 Continued

SUMMARY OF THE EPA RATING SYSTEM
FOR DRAFT ENVIRONMENTAL IMPACT STATEMENTS:
DEFINITIONS AND FOLLOW-UP ACTION *

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA intends to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment

February, 1987

Response to Letter 27 Continued

Letter 28

Sylvia Brock, M.D.
ROUTE 2, BOX 334A
CHEWELAH, WASHINGTON 99109
TELEPHONE 935-6476

REC'D DOE/FE

March 16, 1990

Mr. William H. Freeman
U.S. Department of Energy, Fossil Energy (FE-52)
Office of Fuels Programs
Room 3H-087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Re: Draft Environmental Impact Statement - Washington Water Power/ B.C. Hydro

Dear Mr. Freeman:

The following comments pertain to Section 4.5.5.2 Health Issue Conclusion of the above cited draft.

28-1 First, in paragraph 3 of this section a June 1989 paper published by the Office of Technology Assessment is referred to but not footnoted. This paper, "Biological Effects of Power Frequency Electric and Magnetic Fields," should be included in the references in Section 4.5.5.3.

28-2 To reach the conclusion, "The overwhelming weight of scientific evidence available to date indicates that exposures to electric and magnetic fields ...do not constitute a risk to health," conflicts with information presented and cited earlier in the draft and simply is not supported by current scientific work. The June 1989 OTA paper, "Biological Effects of Power Frequency Electric and Magnetic Fields," page 3, states, "In our view, the emerging evidence no longer allows one to categorically assert that there are no risks." Yet this draft does exactly that in its conclusion.

If this draft is to provide a clear assessment of health risks, then its final conlusion must be brought into alignment with today's scientific knowledge, not that of ten years ago. There is an enormous difference between saying there is no health risk and saying we do not know what the health risks are and there is basis for concern.

Please, rewrite the final paragraph of 4.5.5.2 in a more honest, scientific way.

Sincerely,

Sylvia Brock

Sylvia Brock, M.D.

sb

Response to Letter 28

28-1 A discussion of the Office of Technology Assessment (OTA) report referred to in the comment and identified in Section 4.6.5.2 has been added to Section 4.6.5.1 and as reference number 43 to the reference list in Section 4.6.6 of this Final EIS. There is also a condensed layman's version of this report (a brochure) that can be obtained directly from Carnegie Mellon University. It should be noted that the OTA report was prepared by the Department of Engineering and Public Policy at Carnegie Mellon University, and it is not a scientific panel with experts for all the necessary disciplines.

28-2 The Office of Technology Assessment (OTA) can find no solid basis for concluding that health risks exist from exposure to electric and magnetic fields. While the OTA report referred to in the comments does outline the sometimes different opinions on various aspects of this issue, it nevertheless does not recommend aggressive action on this subject. As discussed in Section 4.6.5.1 of this Final EIS, the Carnegie Mellon group prepared the OTA report as a compendium of the available science rather than a critical review. At its conclusion, the OTA report considers various approaches to deal with the issue of electric and magnetic fields. It does point out that there are no firm policy statements it can make because the science is not complete enough to support them. To say any more would go beyond science and involve judgments and values. Nevertheless, it does present a general framework to think about the available approaches for regulators. The three general policy options are: 1) Do Nothing; 2) Prudent Avoidance; and 3) Aggressive Regulation.

The OTA report seems to direct the reader toward the prudent avoidance options, which is to take modest steps to limit or reduce exposure that can be done with small investments of money and effort. Do not do anything drastic or expensive until research provides a clearer picture of whether there is any risk and, if there is, how big it is. Examples given of prudent avoidance include modest engineering design changes that reduce field levels and actions that make exposure comparable, such as making the field level from new transmission lines similar to the level for existing lines. The report defines prudence as "undertaking only those avoidance activities which carry modest costs." It gives examples of excessive steps that, in the opinion of the authors, go beyond prudence and are at lest, foolishly expensive, at the worst, signs of serious paranoia. Response to Comment 51-5 further discusses the "similarity-based approach" as a basis for setting field standards.

In response to this and other comments, Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to better explain the EMF health risk analysis and the associated scientific studies. Please note the additional material discussed in Section 4.6.5.2 on the Current Assessment of Potential Health Risks and the modified conclusions presented for the EMF health issue.

Letter 29

Newport, WA
Mar 14, 1990

REC'D DOE/FE
OFFICE OF FUEL PROGRAM
'90 MAR 21 A 10:52

Dear Mr. Freeman,

More & More we citizens must worry about what ~~what~~ the agency are doing to us. Both health and economic wise.

I dont think we need the power line through Pend Oreille County. I think if conservation issues were addressed the usage of energy could be curtailed to a greater extent. But no, the powers that be must grow, grow, grow to hell with the people, the animals, the environment. I want to see electrical conservation encouraged by rate schedules that encourage minimal use. I mean serious rate reductions for those of us who conserve. But no, our agency must

Response to Letter 29

Your concerns are noted. No response necessary.

think there is no tomorrow with
the way they operate.
Sorry to lack respect. However
it seems well earned.

[signature]

Letter 30

FEBRUARY 16, 1990

REC'D DOE/FE
OFFICE OF FUELS PROGRAM
90 MAR 22 AM 11:41

Mr. William Freeman
Mr. Anthony Como
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Freeman and Mr. Como:

The purpose of this letter is to provide a formal declaration of our opposition to the Washington Water Power/B.C. Hydro Transmission Interconnection Project as outlined in the Draft Environmental Impact Statement, DOE/EIS 0141-D, December 1989.

While we are opposed to the entire project as it is presently described, our primary opposition is to the Proposed Action (DOE/EIS 0141-D, 3.0), and specifically to the second deviation (DOE/EIS, 4-55) which occurs east of Mead on Peone Prairie.

The proposed route would parallel two existing transmission lines through most of the north Spokane area. However, in the second deviation it would cross a "gently rolling" NOT "relatively flat" open area of prime agricultural land which is in constant production of legume and grain crops with an as yet unobstructed, NOT "moderate" but very scenic view of Peone Prairie and the Pleasant Prairie and Greenbluff foothills extending all the way to Mount Spokane.

30-1 To state that "this line segment would result in 3.9 miles of moderate, long-term visual impact" (DOE/EIS, 4-55) is a contradiction in terms. The construction of an irreversible, long-term visual and geographic obstruction to a naturally unobstructed, scenic and productive portion of the environment creates an extreme impact which actually compounds its adverse effects over time. Not only are the transmission lines and towers an obstruction to the environment and agricultural production, but they also become an argument and rationale for future development since the natural area will have already been adversely impacted.

30-2 We have already experienced chaotic and sporadic development along the existing lines 1.25 miles to the west of the proposed deviation. To allow the deviation would only serve to encourage further development and infringement upon prime agricultural soil currently in production. As the EIS

Response to Letter 30

30-1 As the text in the Draft EIS clearly describes, the type of deviation proposed in the lower Peone Prairie area is visually disruptive. Were it not for the number of homes that would have to be removed adjacent to the existing ROW, this route deviation would not be considered.

Central to the development of the visual resource study approach was an objective determination of the relative levels of visual resource quality and sensitivity present in the region, so that a route of least impact within the study area could be developed and evaluated. The visual resource inventory and impact assessment processes for this project are based upon standard accepted Forest Service and BLM Visual Resource Program principles, with direct consideration for the specific conditions within this region. Landscape quality and visual impacts are therefore judged on a relative basis within the context of the full range of conditions within the region, rather than against any arbitrary or universal standard. The results of the visual analysis for your geographic area of concern have been reviewed and have been found to be within the relative range of values previously identified. The basic conclusions presented in the Draft EIS have, therefore, not changed. However, as a result of the comment, the text for the Highway 2/ Bare Mountain to Mead Segment in Section 4.1.9 of this Final EIS has been revised to indicate that the agricultural lands in the Peone Prairie are gently rolling rather than "relatively flat."

30-2 There is no evidence that transmission lines encourage development in their immediate vicinity. The concerns in the remainder of the comment are reflected in the Highway 2/Bare Mountain to Mead Segment in Section 4.1.9 of this Final EIS and contribute to the overall comparison of alternatives. The deviation from the existing ROW was formulated to avoid significant and moderate land use impacts to many residences that are located on either side of the existing lines in this area. These impacts are illustrated on Map 2-2, Sheet 4 in this Final EIS.

Letter 30 Continued

30-2 Cont.

states, "...the proposed line would be neither near enough to the existing lines to consolidate the impacts or far enough away to reduce them." (DOE/EIS, 4-55). In fact, one of the major adverse effects would be to unnecessarily and capriciously enclose an area of unobstructed farmland between <u>two sets</u> of transmission lines and towers 1.25 miles wide and 3.6 miles long, which would not only encroach upon the lifestyle of the residents within the enclosed area but also on the natural environment itself.

30-3

The visual simulation in the EIS (4-56) is erroneous and deceptive in that the view is actually to the northwest <u>NOT</u> to the north as stated, and pictures the sporadic development mentioned above in the area of the existing ROW. Those existing transmission lines are not visible since they are in a poorly exposed, shaded area of the photograph. We are enclosing a photograph labeled Exhibit A taken from within the shaded area showing the existing transmission lines to the west. A more accurate simulation would be a view from the existing ROW to the <u>north</u> and <u>east</u> over the presently unobstructed prairie. We are enclosing other photographs labeled Exhibit B from these viewpoints which provide a more accurate depiction of the affected area. The proposed lines would run directly across the center of these photographs.

In addition to our specific objection to the second deviation of the proposed route as described above, we also have many concerns regarding the overall project. There are a number of issues raised in the EIS which remain nebulous and unresolved. Until and unless these issues are resolved to the satisfaction of all parties involved, a Presidential Permit should not be granted.

30-4

<u>EIS viii</u>:
"However, the fiscal conditions of Pend Oreille County would be significantly benefited by the Proposed Action."

<u>Questions</u>
What exactly would the fiscal benefits be?
How would they occur?
How long would they last?
Who or what agency has determined them?
Would the fiscal advantages outweigh the disadvantages?
Have Pend Oreille County officials and citizens endorsed this project?

30-5

<u>EIS 1-2</u>:
"These purchase and exchange agreements are scheduled to expire at various times between 1988 and 2019, thereby reducing the availability of resources for WWP to meet projected customer electrical loads."

Response to Letter 30 Continued

30-3 Pictured in Figure 4-1 of the Draft EIS was the left-most portion of a larger original photo simulation that was oriented from north to northwest. As a result of the comment, the text for the Highway 2/Bare Mountain to Mead Segment in Section 4.1.9 of this Final EIS has been revised to indicate that the orientation of the photo simulation is to the northwest rather than to the north as previously indicated. The simulation admittedly suffered from the quality of reproduction in the EIS. However, there was no effort to distort the conditions of the scene depicted. Any number of locations over the 300 plus miles of proposed and alternative routes could have been chosen for depiction in the EIS. The deviation in the lower Peone Prairie area was, in fact, chosen to illustrate the type of visual problems which exist in such a deviation. It was not shown in an attempt to discount these problems. Further, the orientation of view was chosen to show the spatial relationship of the proposed route in context to the viewers near the existing line who would see it.

30-4 Please refer to Table 4-6 in Section 4.1.11.2 of this Final EIS for an explanation of fiscal benefits to Pend Oreille County associated with the Proposed Route. The fiscal benefits would be in the form of increased property tax receipts. Estimated property taxes would be 10.4 percent higher than 1991 property tax receipts and would accrue throughout the life of the project. Property taxes were estimated during the Draft EIS and Supplemental Draft EIS analyses, using Pend Oreille County assessment practices applied to an average tax rate of $13.50 per $1,000 of assessed valuation. The direct fiscal advantages appear to outweigh the disadvantages considering that all assessors consulted suggested that assessment values of industrial, commercial, or residential properties are not necessarily affected by transmission lines (Orf 1988; Williams 1992). In response to the comment whether Pend Oreille County officials and citizens have endorsed this project, such an opinion pole is not relevant to the analysis presented in the EIS.

30-5 WWP believes that renewal of the Purchase and Exchange Agreements referred to in Section 1.1.1 of this Final EIS are subject to future negotiations. A portion of the agreements may be renewed, while others may not. Obviously, power obtained under such agreements would have a cost associated with it, and the cost of such power would be compared with other alternatives available at the time to meet WWP's needs (see Section 2.6). WWP's position is that the company intends to meet its future power needs by pursuing cost-effective resource alternatives, while assessing the environmental consequences associated with the resources it selects. The cost of power from Canada plus the cost of the associated transmission must be competitive with the cost of other resource alternatives available to WWP in the northwest. WWP claims that it will not construct the proposed interconnection unless these criteria are met. Please review the expanded discussion on project Purpose and Need in Section 1.2 of this Final EIS.

In reference to WWP investigating alternative power sources, please refer to Section 2.8 of this Final EIS for further discussion on energy conservation and load management. This section discusses the alternative electric resources and transmission systems previously evaluated by WWP to meet anticipated energy needs. Also, please refer to Response to Comment 15-4 regarding rate comparisons.

Letter 30 Continued

30-5 Cont.

Questions
Has WWP been advised that these purchase and exchange agreements are not renewable?
Is it unrealistic to expect that WWP may, in fact, be able to "develop other sources of energy to meet increases in demand for electricity" (EIS vi) between 1990 and 2019?--a period of almost 30 years!

30-6

EIS 1-4:
"B.C. Hydro has indicated a willingness to consider firm sales of electricity from existing B.C. Hydro generating facilities to WWP."

Question
Should WWP delay the construction of a TIP and DOE the issuance of a Presidential Permit until a firm guarantee from B.C. Hydro is available?

30-7

EIS 1-5:
"However, the Washington Utilities and Transportation Commission and the Idaho Public Utilities Commission will review the purpose and need before the proposed interconnection is included in WWP's resource acquisition plans."

Question
Shouldn't the decisions and recommendations of these agencies based on their reviews be prime considerations of the DOE before granting a Presidential Permit?

30-8

EIS 1-5:
"However, the proposed interconnection would be built only if it provides the least-cost source of electrical power to WWP when compared to alternative sources or supplies."

Question
If the construction is scheduled to begin in April 1993 (EIS vi), does that provide enough time to adequately and honestly research alternative sources and supplies of low-cost electrical power, or is this simply rhetoric to make the project seem to have more integrity?

30-9

EIS 1-6:
"Deficiencies are estimated to continue increasing through the remainder of the 20-year forecast period so that by 2007-2008, the deficits are predicted to be approximately 188 MW under average demands and 221 MW under peak demands."

Question
Has B.C. Hydro, "which is currently responsible for the overall planning, generation, and supply of elctricity for more than 90 percent of the 2.9 million people of British Columbia, Canada," (EIS 1-4) also developed a long-term

Response to Letter 30 Continued

30-6 WWP's position is that it does not intend to construct the proposed interconnection until adequate firm power arrangements have been agreed to between WWP and Canadian utilities. WWP is currently in the process of negotiating the terms and conditions of these power arrangements. In the interim, WWP and B.C. Hydro are pursuing the necessary permits in the United States and Canada for construction of the interconnection as part of the power package, to show each party's commitment to the project and to avoid future delays.

30-7 The Purpose and Need section of the EIS is not an evaluation of whether the proposed project is needed. This section is merely a reiteration of the applicants intentions in initiating the proposed project. All state agencies have the opportunity to comment on the proposed project during the EIS and Presidential permit processes.

30-8 The Presidential permit is not a prudency finding to identify the most cost-effective alternative. In 1991, WWP completed its second formal Least Cost Plan, which addresses a number of alternative sources of power along with their projected costs. This plan is available for public review through WWP's Spokane office. WWP's position is that it is continually assessing the cost and availability of alternative sources of power to meet its future needs; therefore, these will have been examined prior to committing to construction of the proposed interconnection. Please refer to Response to Comment 30-5 for additional discussions on alternative energy sources, cost comparisons, and project purpose and need.

30-9 B.C. Hydro must obtain an export license from the National Energy Board of Canada, which will determine if surplus power exists for the term of the proposed interconnection contract with WWP. The proposed interconnection would obtain a long-term purchase of capacity and energy from B.C. Hydro, with the amount of the purchase remaining constant over the term of the agreement. By signing an agreement with WWP, B.C. Hydro would be contractually committed to provide a specific amount of power, according to the terms and conditions of the agreement.

Letter 30 Continued

30-9 Cont. (20-year) forecast of average energy and peak loads so that they can reliably guarantee the sale of surplus power to meet WWP's projected peak needs in their 20-year forecast?

30-10 Question
In light of recent developments and scientific research which possibly link strong electromagnetic fields with cancer and other human diseases, shouldn't the DOE proceed very cautiously in granting Presidential Permits until more conclusive research is available?

In conclusion, while we understand that WWP's decision to pursue the construction and operation of the proposed Interconnection has not been finalized and that their expressed purpose is only to proceed with the licensing application due to the lead time required, we do not feel it should be incumbent upon the DOE to grant a Presidential Permit at this time. If such a permit were granted, WWP would be under no obligation to give serious consideration to purchases or exchanges with cogenerators and utilities other than B.C. Hydro, conservation, solar or photovoltaic power generation, or the construction of base load generation as potential resource alternatives.

A more fair resolution and compromise would be for the DOE to issue an "Intent to Grant" permission contingent upon firm evidence that WWP has in fact completed exhaustive research in the above areas, has successfully resolved and answered all the questions raised not only in this letter but also in any other written comments as well as the concerns of the DOE itself, and has conclusively demonstrated the construction of this project is the most viable alaternative for reliably and economically meeting customer energy loads in the future.

Respectfully submitted,

Pat Inman Kathy Inman

Pat and Kathy Inman
Rt. 3, Box 11
Mead, Washington 99021

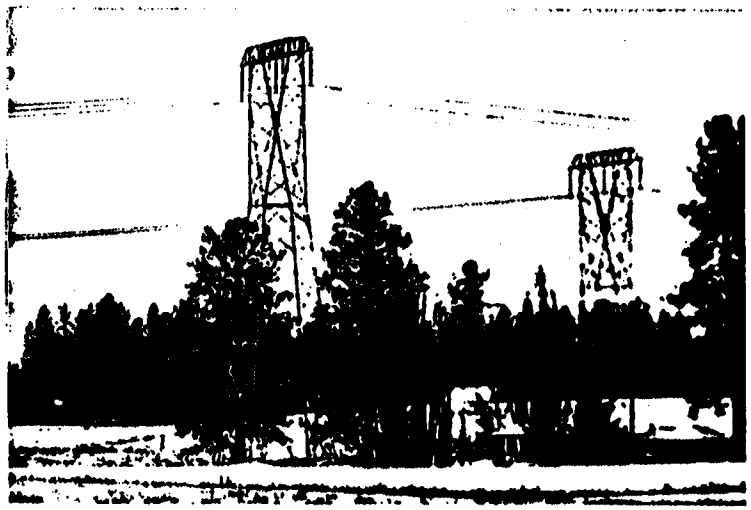
Response to Letter 30 Continued

30-10 Your comment is noted. Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to more adequately address the issue of the potential health effects of electric and magnetic fields. Please note the modified conclusions presented in Section 4.6.5.2. NEPA also permits/requires supplements to EISs whenever new, substantive information is made available. Please refer to Mitigation Measure 17 added to Section 4.9 of this Final EIS, regarding DOE's review of the final project design and the full disclosure of project impacts in accordance with NEPA regulations.

Letter 30 Continued

Response to Letter 30 Continued

EXHIBIT A



EXISTING TRANSMISSION LINES 1.25 MILES TO THE WEST
OF THE PROPOSED SECOND DEVIATION

Letter 30 Continued

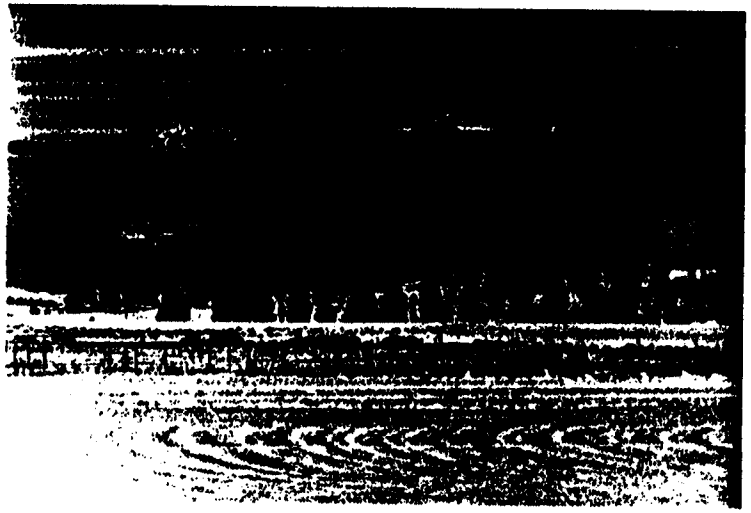
EXHIBIT B

THE PROPOSED LINES WOULD RUN DIRECTLY ACROSS THE CENTER OF THESE PHOTOGRAPHS.

Response to Letter 30 Continued

Letter 30 Continued

EXHIBIT B



THE PROPOSED LINES WOULD RUN DIRECTLY ACROSS THE CENTER OF THESE PHOTOGRAPHS.

Response to Letter 30 Continued

Letter 31

3-11-10

D.O.E
FE 52
WASHINGTON, D.C. 20585

RECD DOE/FE
MAR 22 A 11:41

RE: WWP TRANSMISSION LINE PROPOSAL: EIS COMMENT.

ASIDE FROM THE DUBIOUS OVERALL NEED FOR THIS PROJECT IN AN AREA THAT WILL REAP NO BENEFITS, ONLY IMPACTS, AND DESPITE A MANDATED SUPPOSED EMPHASIS ON CONSERVATION AS A 1ST CHOICE SOURCE, THIS PROJECT IS BEING RAILROADED IN BY AN INADEQUATE, INCOMPLETE AND BIASED EIS.

SPECIFICALLY:

5-79

31-1 1) THE TREATMENT OF PROPERTY VALUE IMPACT IS PARTICULARLY LAME. NO ORIGINAL RESEARCH WAS UNDERTAKEN, REPORTS CITED WERE ALL PREPARED WITH OR BY THE ELECTRIC GENERATING INDUSTRY. MY OWN SURVEY OF REALTORS IN THIS AREA, AS WELL AS COMMON SENSE, INDICATES A POTENTIAL DEVALUATION OF PROPERTY VALUES OF AS MUCH AS 50%. REGARDLESS OF THE PORTION OF LOSS, ALL IMPACTS ARE NEGATIVE. THE EIS GLOSSES OVER THIS ISSUE CONTINUALLY CONCLUDING " PROPERTY VALUES MAY OR MAY NOT BE NEGATIVELY AFFECTED." PG. 4-6

31-2 2) THE NEGATIVE IMPACT ON THE TIMBERLAND BASE IS DISGUISED BY FAILING TO ACCOUNT FOR THE FUTURE POTENTIAL HARVEST, INSTEAD ASSESSING THE LOSS AS A ONE TIME EVENT.

THERE ARE MORE EXCELLENT ARGUMENTS AGAINST THIS PROJECT, THERE ARE OTHER HUGE FAILURES IN THIS EIS. UNFORTUNATELY, UN-FUNDED PRIVATE CITIZENS ARE IN A POOR POSITION TO CONTRADICT EXPENSIVE PAID LOBBYISTS AND PROFESSIONAL "NO SIGNIFICANT IMPACT" EIS PREPARERS. THIS PROJECT IS FOR THE EXCLUSIVE ECONOMIC RENUMERATION OF WWP, IMPACTS ON CITIZEN'S HEALTH AND PROPERTY VALUES BE DAMNED.

I OBJECT STRENUOUSLY TO THE OBVIOUS UNFAIRNESS OF THE PROCESS AND THE PROJECT.

[redacted], P.O. BOX 461, NOOKSACK, WA. 98187

Response to Letter 31

31-1 Your comment regarding the adequacy of the property value analysis is noted. Please refer to Section 4.1.11.1 and Response to Comment 26-11 in this Final EIS for additional information on associated property values.

31-2 Please review Sections 2.3.4 and 4.1.11.2 of this Final EIS and refer to Response to Comment 6-4 regarding landowner compensation for both ROW easements and timber removal. The private landowner would receive a one-time compensation for timber removed on his property at the current market rates, in addition to the ROW easement compensation agreed upon with WWP. In the case of an established timber operation being crossed by the transmission line route, WWP's policy is to offer the business two options for a one-time compensation: 1) WWP would offer to purchase the ROW land from the business for the property's fair market value; or 2) the landowner would retain title to the property, but the easement amount would carry a higher cash value than non-commercial property (i.e., fair market value).

Letter 32

JACK SACKVILLE-WEST, Architect
Suite 1403
Washington Trust Financial Center
West 717 Sprague Avenue
Spokane, Washington 99204

Retired address:
South 1424 Maple
Spokane, WA 99203

March 18,1990

Mr. Bill Freeman
Office of Fossil Energy
Department of Energy
1000 Independence Avenue S.W.
Washington; D.C. 20585

Dear Mr. Freeman,

Having attended the public meeting January 31, 1990 at the Holiday Inn West, Spokane, WA regarding the Draft Environment Input Statement for the proposed WWP-BC Hydro Transmission Line, I wish to make a statement opposing the installation of this line in the proposed route through Pend Oreille County where I own eighty acres.

Property owners in this county purchased their land to either farm it by raising crops or livestock or to use it for purposes of recreation or as a retreat. Those along the proposed route already have to live with the disturbing element of two BPA transmission lines each requiring a 125' wide right-of-way which totals a 250'wide swath through the countryside. The proposed transmission line would add an additional 125' width to this swath which is just not acceptable. Just because we already have transmission lines in the area is no reason to assume it is acceptable to add another. If this is such a great asset, why not share the privilege of having a transmission line through your property with some other area that lacks this great opportunity.

It's hard to understand the need for this power when the NW Power Consortium indicates we don't face a power shortage.

Sincerely,

Jack Sackville-West

Response to Letter 32

Your concerns are noted. No response necessary.

Letter 33

RICHARD E. ELSTON, M.D.
DIPLOMATE, AMERICAN BOARD OF SURGERY
EAST 111 CENTRAL
SPOKANE, WASHINGTON 99207
TELEPHONE 487-2927

March 20, 1990

Mr. Bill Freeman
Office of Fossil Energy
Department of Energy
1000 Independence Avenue S.W.
Washington, D. C. 20585

Dear Mr. Freeman,

We are writing in regard to the proposed Presidential Permit to the Washington Water Power to construct a 230 Kilowatt transmission line extending 118 miles from British Colombia to the proposed Marshall Substation near Spokane, WA. Thia line, as presently proposed, will transverse or boarder approximately 80 acres of our land and will be visible from our house, damaging a beautiful view.

We strongly oppose such a line. It has been argued that the preferred eastern alternative would follow an existing transmission line. The previous lines, including the Bonneville Power Administration transmission lines, were contructed over 50 years ago through what was largely uninhabited land. In the meantime, Spokane has grown considerably and the right of way is nov surrounded in many places (especially near Spokane) by fine residential subdivisions. This factor alone makes it unsuitable for further expansion of lines. Washington Water Power has not even made an accurate survey to show how many homes would need to be destroyed. Their extimate of "11" is based upon maps approximately 40 years old. since that time, obviously, many more homes have been built and would need to be destroyed. Thus, the extimate given by Washington Water Power of affected residences is grossly understated.

33-1

It should be noted that Washington State does not yet have the safeguards available in other states. A utility, such as Washington Water Power need not notify affected property owners of their plans for construction, even including the proposed demolition of their bomes. This is a manifest injustice. Public hearings are not a substitue for notification. Only one person that we have spoken to yet, in this area, was even aware of this project. Thus they did not appear at the h arings. For this reason, we ask that the deadline for comment be extended, as it was in the Seattle area last year. This would give the average citizen a chance to be informed ebout thia issue.

33-2

Response to Letter 33

33-1 Some route segments of the proposed Interconnection project in the Spokane vicinity will be accommodated on existing but vacant ROWs, and therefore will not displace residences. Other portions of the project that parallel existing power lines do require the removal of residences, and these are reported in the EIS. In two locations only, near Chattaroy and near Mead, the ROW of the existing lines is closely bordered by multiple residences. In these locations, deviations from the existing ROW have been formulated specifically to avoid impact to these residences. See Map 2-2, Sheet 4 in this Final EIS.

In most urban fringe situations, existing transmission line ROWs generally provide the lowest overall impact opportunities for siting new lines, and this is considered to be clearly the case with the proposed project and its alternatives. As shown on Table 2-6 in Section 2.7 of this Final EIS, an estimated 7 residences would be removed along the Proposed Route from project construction. This estimate is based not on 40-year-old maps, but on 6-year-old aerial photographs (1986), in addition to data obtained during the field reconnaissances conducted in July 1988, May 1990, and April 1991. These photographs were the most recent ones available (see Existing Land Use in Section 3.1.8.1 of this Final EIS).

Based on the comments, it was recognized that some residences may have been constructed since both the 6-year-old aerial photographs were taken and since the 1988 reconnaissance surveys were performed. Therefore, WWP conducted an additional survey directly along the Proposed Route in May 1990, and ENSR conducted a survey along the new Proposed Route (Boundary Dam to Beacon), as well as the Mead to Marshall segment of the Eastern Alternative, in April 1991. As a result of these data collection efforts, the locations of a few residences and other structures were defined with greater accuracy. The result is that the estimated number of residences that would be removed by the Proposed Route total 7, and the number of residences that would be located within 100 feet of the new ROW edge total 10.

33-2 The process for implementing NEPA is intended to foster the freest possible dialogue among the public and state and federal agencies in assessing the environmental impacts associated with major federal actions. The closing date for submission of comments is intended to be a target date for beginning the preparation of responses to comments received and not a date after which no additional comments are accepted. Comments are accepted throughout the environmental review process and all comments are considered in the preparation of the Final EIS based on timeliness and relevance.

Letter 33 Continued

33-3

In the meantime, the belief that such lines pose no health hazard has also changed. The Carnegie Mellon OTA report urges "prudent avoidance" be practiced. This would certainly include not running these lines through several built-up residential neighborhoods and the campus of Whitworth College. While there are some conflicting reports, there is increasing evidence of damaging health effects. Other studies presently under way will not be finished for approximately 3 years. At that time, the picture may be clearer. In the meantime, we request that this premit be denied, or at least postponed for several years to allow further study of this dangerour matter.

Sincerely,

R E Elston

R. E. Elston, M.D.

Marcella K. Elston

Marcella K. Elston

Response to Letter 33 Continued

33-3 Your comment is noted. Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to more adequately address the issue of the health effects of electric and magnetic fields. Please note the modified conclusions presented in Section 4.6.5.2.

Letter 34

CURT SMITCH
Director

STATE OF WASHINGTON
DEPARTMENT OF WILDLIFE
North 8702 Division St., Spokane, WA 99218 Tel. (509) 456-4082

March 21, 1990

Mr. William H. Freeman
U.S. Department of Energy
Fossil Energy FE-52
Office of Fuels Programs
Room 3H-087, 1000 Independance Ave. S.W.
Washington D.C. 20585

Dear Mr. Freeman:

5-83

The Washington Department of Wildlife has reviewed the DEIS assessing environmental impacts of the construction, connection, operation, and maintenance of a double circuit 230,000 volt electric transmission line linking electrical systems of Washington Water Power and British Columbia Hydro Power. The proposed line would be approximately 118 miles extending from the Canadian Border near Northport to the proposed Marshall sub-station near Spokane, Washington.

This project would have a significant impact to fish and wildlife. Anticipated stream crossings range from 60 to 76. Sedimentation concerns exist anytime a stream crossing is required. Permit conditions are designed to minimize the impacts of stream crossings; however, a cumulative impact should be considered to result from the number of crossings proposed. All stream crossings should be planned to occur between July 1 and September 15 of any year. 34-1

A variety of wildlife habitats will be impacted. Riparian zones, wetlands, big game winter range, cliffs, old growth, and areas of special use designation such as non-motorized are included. These are habitats of wildlife both game and non-game.

The proposed route appears to have the least potential for negative impacts but is not without concerns. Mountain goats along the Linton Mountain area may be disturbed. Construction in the Linton Mountain vicinity should be limited to late summer and early fall to minimize goat disturbance. 34-2

On the extreme north end of the project, special wildlife habitat will be impacted by any proposed action. The proposed route travels through semi-primitive non-motorized use habitat including some old growth areas. this habitat is important to black bear, mule deer, lynx, franklin grouse, blue grouse, with possible use fisher, wolf,

Response to Letter 34

34-1 If a transmission route is approved and a Presidential permit issued by DOE, WWP would consult with the appropriate state and federal agencies regarding the appropriate timing for crossing streams during project construction. Please refer to Table 2-5 for Measures 8 and 16 in Section 2.3.4 of this Final EIS for wetland/riparian avoidance and protection. Also, refer to Response to Comment 27-1; text clarifications in Sections 4.1.4, 4.2.4, 4.3.4, 4.4.4, and 4.5.4; and the additional mitigation measure located in Section 4.9 of this Final EIS that would ensure preservation of sensitive riparian/wetland areas. Note that all environmental protection procedures and mitigation measures listed in Sections 2.3.4 and 4.9, respectively, would be made conditions of the Presidential permit by DOE.

34-2 Please review the text modifications for the introduced mountain goat population in the Linton Mountain vicinity in Section 3.1.7.2 of this Final EIS. Based on the comment, the impact assessment has also been expanded in Section 4.1.7 for the Proposed Route and in Sections 4.2.7, 4.3.7, and 4.4.7 for the Eastern Alternative and for the Northern and Southern Crossover Alternatives, respectively. Finally, please refer to the mitigation measure added to Section 4.9 of this Final EIS that delineates a construction constraint period to avoid disturbance to female mountain goats during kidding and a recommendation for timely access road reclamation to minimize public harassment of this population.

Letter 34 Continued

34-3 and wolverine, to name a few examples. It is important that the non-motorized security component of this area not be lost. Any roads constructed into this area should be temporary and of a low standard and be returned to a natural state upon completion of construction. The boundary Dam variation would cross the Pend Oreille River and impact valuable cliff habitat north of Boundary Dam. This cliff habitat may be important to peregrine falcon, bald eagles, a variety of bats, non-game birds, and some waterfowl. This variation would, however, be preferred to the proposed route.

From Metaline to the proposed Marshall sub-station, the proposed route is our preferred route. This appears to avoid the wetland and riparian areas associated with the Little Spokane River drainage.

All other alternatives offered are unacceptable to the Department of Wildlife at this time.

For questions please contact Allen Palmentaer, 509-738-6438 or Ted Gruenwald at 509-456-4086.

Sincerely,

Allen Palmentaer

Allen Palmentaer
Area Habitat Biologist

AP:img

c: Ted Gruenwald
Kaitlyn Watson

Response to Letter 34 Continued

34-3 WWP has committed to implementing the measures outline under project Operation and Maintenance in Section 2.3.5 of this Final EIS to reclaim new access roads and block the use of others following construction activities. These procedures are targeted to minimize public use, in cooperation with the landowner or land manager. As stated in Section 2.3.4, the WDW would be consulted prior to construction initiation.

Letter 35

March 22, 1990

Anthony J. Como
Department of Energy
Office of Fuels Program
1000 Independence Ave., SW
Washington , D.C. 20585

Dear sirs:

I have recently become aware of Washington Water Power (WWP) Company's intention to possibly route a major electrical transmission line near my residence in Chattaroy, WA. I am gravely concerned by these plans and have examined the projects Environmental Impact Statement from your office.

5-85

This letter is formal notification that if this project is carried forward along the Chattaroy Variation, where an abandoned Burlington Northern railroad right-of-way adjacent to ours and other local property owners land, is to be used for a major power transmission, that we will have no alternative but to initiate legal action against all involved parties.

We do not feel that adequate consideration has been given to the environmental and economic aspects of this project and wish to raise the following concerns:

35-1

1. Health risks posed by large electrical transmission lines. Recent studies indicate that intense electrical fields associated with these lines inhibits biologic development at the molecular level and that additional detailed studies are required.
Ted Koppel hosted a Nightline report on this very subject on Friday March 9, 1990 where many knowledgeable individuals indicated that health risks do indeed exist and that power companies are using further medical study proposals as a means of simply delaying action on this problem.
This project is proposed at a critical time when medical answers are near to being obtained on the affects of these lines. WWP's goal is to meet the areas projected future power needs, yet only 20 to 40 percent of the line capacity is accounted for in their own projections. We need to know if these projections are similar to those done for Washington Public Power Supply System (WPPSS) nuclear power generation system which failed miserably and has had little or no impact on power availability, is this another WPPSS type project?

Response to Letter 35

35-1 In response to the comment pertaining to EMF health effects, please refer to Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. This material has been revised and expanded to more adequately address the issue of the health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2.

Letter 35 Continued

35-1 Cont.

It is not wise to urgently construct a project whose capacity is far greater than projected area needs? We should be prudent and obtain critical health information, examine health effects in advance, then engineer around them rather than use the project as a worst case scenario in future studies. It would be much wiser to postpone this project of questionable purpose to give time to more fully evaluate the health problems and the subsequent. engineering required to minimize their effects.

To have such a health risk installed near my property on the Chattaroy Variation is unacceptable. Topography, soil saturation, and zoning requirements dictate that houses in this area be built on the portion of the lots that is adjacent to the proposed line. This allows no choice for residents but to be exposed to a potential hazard. The local residents ask that you consider our limited siting alternatives along this route.

5-86

35-2

2. Possible destruction of an endangered species. Our local area is winter habitat for at least three bald eagles. These birds could be seriously impacted or killed by such a project. It is not wise to have a major powerline parallel an eagle habitat simply because an existing railroad right-of-way might be easy to build on. I do not believe that a sufficient evaluation of these birds was done for the EIS because no information gathering from local residents that watch-over these birds was done. I personally have spent many winters watching the birds soar above my house in an area adjacent to the proposed lines. Not two weeks ago I saw a immature eagle fly a path intersecting the proposed route, at an elevation that would have potential for impact with either a tower or a suspended line. I strongly urge you to inquire as to the completeness of the biological studies and their quality. No major transmission corridor should follow adjacent to the Little Spokane River and adjacent wetlands.

35-3

3. Local property values will be decimated. As with my primary concern for health related problems associated with this proposed project, prospective buyers will have serious reservations about buying in the proximity of such a health risk. This will greatly reduce land values and make property sale virtually impossible.

Our subdivision was designed with no above ground powerlines specifically for the aesthetic effect and gigantic towers and high capacity wires would certainly impact our standard of living. We stand to lose a considerable amount of invested capital if the project is allowed through this area and we will seek compensation to offset the loss of value of prime river frontage lots that are rendered unsalable.

Response to Letter 35 Continued

35-2 The discussion for Threatened or Endangered Species in Section 4.1.7 of this Final EIS identifies the potential for impacting both nesting and wintering bald eagles; this information has been updated since the Draft EIS became available. Please review this section in conjunction with the specific mitigation measures outlined in Section 4.9 of this Final EIS to conduct clearance surveys for active bald eagle nests and winter concentration areas prior to project construction and for the placement of aerial markers over river crossings to minimize the potential for line strikes. Operation and Maintenance in Section 4.1.7 describes the potential for raptor collisions with the proposed line.

A computerized data base search was requested from the WDW Nongame Data Systems for any sensitive wildlife species occurring within 2 miles of the project alternatives. This included information on bald eagle nest sites and communal roosting areas. In addition, biologists from the WDW, USFWS, and Forest Service were contacted for current species information within the project area (see Section 3.1.7.3). Bald eagles may be present in your area and visible to local residents daily; however, state and federal biologists that are directly involved with studies of these populations, in addition to the state's data base, were used as resources for baseline data and impact assessment on all area wildlife species. Every effort was made to address wildlife species that may be adversely impacted by the proposed Interconnection, and further coordination between WWP and the appropriate agencies would occur prior to construction to ensure protection of this sensitive species. In response to your concern on the project crossing of wetland/riparian areas, please refer to Response to Comment 27-1, Section 2.3.4, and mitigation measures in Section 4.9 of this Final EIS for additional discussion on wetland avoidance.

35-3 Please refer to Section 4.1.11.1 and Response to Comment 26-11 for additional information on property values and how they may be affected by the proposed Interconnection.

Letter 35 Continued

Response to Letter 35 Continued

Please consider my aforementioned points in regard to this project and if you decide that a frivolous transmission line should be built, minimize the environmental, aesthetic, and private individuals economic impacts by a moratorium on construction until health effects and proper routing can be determined.

Sincerely,

Thomas M. Sweeney
Rt. 2, Box 21-J
Chattaroy, WA 99003

Letter 36

3/15/90

To whom it concerns,

I am writing concerning the proposed Washington Water Power electrical line that is to run from Canada to Marshall, S.W. of Spokane, WA.

I am specifically concerned about the Marshall variation (or route option), in the southern portion just before Marshall. I live at S. 4607 Marshall Rd and have 6½ acres adjacent to the Abandoned rail road tracks that is the 2nd option route for this portion of the line.

I am concerned about the health risks of the line and also the esthetics because I would be looking right at it.

I also want to make you aware that a Spokane Fish Lake-Cheney biking/hiking trail is planned by the Spokane Parks Board for this abandoned rail road track (see attached article). It seems it would be best not to build these poles and lines right over a public trail such as the one proposed.

I encourage you to consider the health effects and potential dangers and close the first option route to Marshall.

Thank you

Sandra Jarvis
S. 4607 Marshall Rd
Spokane, WA
99204

36-1

Response to Letter 36

36-1 The Marshall Variation of the Eastern Alternative would have land use and visual impacts on the proposed trail if it were built, and these impacts are factored into the comparison of alternatives. As shown on Table 4-4 in Section 4.1.8.2 and in Section 4.2.8.2 of this Final EIS, the future land use impacts (i.e., the impacts of the proposed line on the future trail) would be low. In addition, as reported for the Marshall Variation in Section 4.2.9 of this Final EIS, the visual impacts of the project on visually sensitive viewers (who include the future potential users of the proposed trail) would be moderate. These moderate impacts would derive from the presence of the project structures affecting visually sensitive viewers in a moderate visual quality landscape, i.e., one whose visual character is influenced by the scattered residences and adjacent two railroads and road in the area.

Letter 37

SIR

REC'D DOE/FE

I WISH TO REGISTER MY PROTEST TO THE CONSTRUCTION OF 500[illegible] POWER LINES THRU PEND OREILLE COUNTY.

APPARENTLY THE E.I.S. ADMITS TO AN EFFECT OF SUCH ON WILDLIFE.

37-1 WHAT ABOUT DOMESTIC ANIMALS THAT GRAZE BENEATH SUCH LINES? EVEN MORE

37-2 SO, WHAT ABOUT HUMAN BEINGS BEING SUBJECT TO TO IONIZATIONS AND OTHER UNKNOWN EFFECTS?

NOBODY SEEMS TOO CONCERNED ABOUT US PEOPLE AS LONG AS THERE ISN'T MUCH NOISE MADE WHEN THE BIG POWER COMPANIES LAYS A TRIP ON THOSE OF US WHO ARE SO AFFECTED, ALL FOR THE SAKE OF THEIR BIG MONEY PLANS.

WE ARE THE VOTING PUBLIC AND WE SHOULD BE HEARD

Response to Letter 37

37-1 Please refer to Section 4.6.3.4 in this Final EIS for a discussion of potential EMF effects on domestic animals.

37-2 Electric and magnetic fields from transmission lines do not cause ionization in biological tissue. Please refer to Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been expanded and revised to more adequately address the EMF health issue. Note the modified conclusions presented in Section 4.6.5.2.

Letter 38

3, 19, 90

Dear Sirs;

I am writing you to protest a proposed [illegible] which would cross [illegible] property here in Stevens County.

I bought 20.14 acres in Aug. 1987, just 2 miles south of Northport.

Washington Water and power already have a proposed route in Pend Oreille Co., East of here.

I see no point in W.W.p. wanting to come over here in Stevens Co., when they already have a right-of-way along side of Bonneville Power administration in Pend Oreille Co.

A large number of people have voiced their distaste for the alternate route here in Stevens Co. Nobody wants it over here, running through their property.

Many of us went to the open-house meetings held, W.W.p. maps don't show our homes at all. Their alternate route over here is poorly laid-out.

(over)

5-90

Response to Letter 38

Your concerns are noted. No response necessary.

Letter 38 Continued

Response to Letter 38 Continued

2

This is about all I can tell you on the not wanted alternate route here in Stevens Co.

Sincerely

Leon Nichols
4186 Wilcox Rd.
Northport, Wa.
99157-9704

Letter 39

Response to Letter 39

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

March 19, 1990

Mr. William Freeman
U.S. Department of Energy (FE-52)
Office of Fuels Programs, Rm 3H-087
1000 Independence Avenue SW
Washington, D.C. 20585

Dear Mr. Freeman:

Thank you for the opportunity to comment on the draft environmental impact statement for the Washington Water Power, B.C. Hydro Transmission Interconnection Project. Consistent with the Department of Ecology's responsibilities, we coordinated the review of this document with other state resource agencies, and received comments from the Washington State Parks and Recreation Commission, the Office of Archaeology and Historic Preservation, and Department of Ecology staff.

The Parks Commission is concerned that there will be major visual impacts on state parks. Please note that the Chatteroy Variation is unacceptable to the Parks Commission and we support that position.

The Office of Archaeology recommends development of a memorandum of agreement for identification and protection of the archaeological sites which may be impacted by the proposal.

Ecology's concerns relate to potential water and air quality impacts from the construction of the project.

Please refer to the attached letters for specific concerns. If you have any questions please call the appropriate agency contact.

Sincerely,

Barbara J. Ritchie

Barbara J. Ritchie
Environmental Review Section

Attachments

cc: Robert Whitlam, Archaeology
Mike Ramsey, Parks
Deborah Cornett, Ecology, ERO
Gregory Flibbert, Ecology, ERO
Dee Weber, Ecology, ERO

5-92

Letter 39 Continued

IAN TVETEN
Director

STATE OF WASHINGTON
WASHINGTON STATE PARKS AND RECREATION COMMISSION
7150 Cleanwater Lane, KY-11 • Olympia, Washington 98504-5711 • (206) 753-5755

March 8, 1990

35-27-10(E-3394)

TO: Barbara Ritchie, Environmental Review
Department of Ecology

FROM: Mike Ramsey, Asst. Chief, Environmental Coordination

RE: DEIS - WWP/BC Hydro Transmission Interconnection Project.
Impacts to Little Spokane Natural Area, Riverside State Park,
Centennial Trail, and Crawford State Park.

5-93

The staff of the Washington State Parks and Recreation Commission has reviewed the above-noted document and wishes to make the following comments.

It is staff's opinion that the Proposed Action will have irreversible visual impacts on Riverside State Park, Spokane River Centennial Trail, and limited impacts on Crawford State Park. Additionally, the Chatteroy Variation of the proposal will have unacceptable adverse impacts on the Little Spokane River Natural Area, therefore, State Parks opposes this aspect of the proposal. The following comments address State Parks concerns within the project areas indicated.

CHATTEROY VARIATION:

The Chatteroy Variation of the proposed project will cause irreversible damage to the Little Spokane River Natural Area (LSRNA). The LSRNA was established by the Washington State Parks and Recreation Commission to protect the natural resources, scenic beauty and tranquillity, but still allow necessary development to provide education opportunities, interpretive facilities, and passive recreational use. The proposed project would directly conflict with the natural and recreational value protected by the Commission.

Response to Letter 39 Continued

Letter 39 Continued

On Jan. 13, 1989 we received a letter from Bob Anderson, Environmental Coordinator for Washington Water Power (WWP) concerning the proposed project. The letter states that "the line in the vicinity of the LSRNA would create significant impacts...our preferred route, therefore, does not pass within the Natural Area." The Chatteroy Variation of the proposal is not the preferred route; however, the DEIS states that, if constructed it "would directly intersect the LSRNA and substantially affect the naturalness of the setting; resulting in a significant impact." Furthermore, this impact is not mitigated and is listed as an unavoidable impact. This is unacceptable due to the severe conflict with the management plan for the natural area, therefore, staff will recommend that the Washington State Parks & Recreation Commission will file formal objection to the acquisition/condemnation of the LSRNA if the Department of Energy (DOE) and WWP choose to pursue the Chatteroy Variation of the proposed project.

The Chatteroy route is shown as traveling along State Parks southern boundary of the LSRNA within the existing WWP Right of Way (ROW). The plan appears to widen the existing corridor on either side. This would impact the natural area's wildlife habitat and may cause the loss of old growth timber. An inventory has not been completed of our forest resources in this area; however, we feel confident that it contains old growth forest habitat.

5-94

Specific comments:

pp3-19 Sensitive plant species within the proposed Chatteroy Variation through the LSRNA have not been inventoried by the Department of Natural Resources Natural Heritage Program. The area is proposed for plant studies in the near future.

39-1 pp3-31 Typographical error. Should read "Natural" not "National".

pp3-33 Typographical error. Should read "Natural" not "National".

39-2 pp3-48 The Little Spokane River has not been designated a State Scenic River as of this date. We agree with the "high" and "moderate" landscape qualifications for the respective segments listed.

39-3 The Rutter Parkway, built by Works Project Administration from 1937 to 1938, has "high" scenic value. It is a beautiful scenic drive through the Little Spokane River corridor, due to these values it should be included in the Chatteroy Variation of Visual Resources.

pp4-9 We concur that impacts to the floodplain would be "significant" from an operations and maintenance standpoint.

39-4 pp4-12 Impacts to forest resources within LSRNA may be considered "significant" based on the "Significant Criteria" if old growth forest resource is inventoried and found to exist.

Response to Letter 39 Continued

39-1 Based on your comment, the text for the Southeast of Mead to North of Seven Mile Segment and for the Chatteroy Variation in Section 3.2.8.1 have been revised.

39-2 Based on your comment, the text for the Little Spokane River under the Chatteroy Variation in Section 3.2.9 has been revised.

39-3 As a result of the comment, the text applicable to the Chatteroy Variation in Section 3.2.9 of this Final EIS has been revised to include a reference to the Rutter Parkway. The description of the visual character of the Little Spokane River Natural Area was meant to be inclusive of the viewpoints within the parkway.

39-4 The EIS agrees with the statement presented in your comment that significant impacts would result if old growth forest is removed from implementation of the proposed interconnection.

Letter 39 Continued

39-5 pp4-20 The Chatteroy Variation may cross over a possible bald eagle roosting area existing on the north facing slope within the natural area. Bald eagles have been observed roosting in Douglas firs on the north facing slopes behind St. Georges School. The possibility that this is an active roosting area will need to be confirmed by Washington State Department of Wildlife and addressed in the Final EIS.

We agree that the impacts to wildlife habitat and resources would be significant.

39-6 pp4-31 The proposed lines for the Chatteroy Variation on the southern boundary of the LSRNA will cause a loss of valuable habitat.

39-7 pp4-34 State Parks staff disagree that the impacts to the LSRNA would be "moderate." Our management plan prohibits commercial development, therefore, the impacts would be "significant" as defined on pp4-24. Also, this action would adversely impact the naturalness of the area as stated on pp4-34.

39-8 pp4-165 We disagree that the Chatteroy Variation would only cause 0.4 mile of "significant, long term visual impact." The total distance would be greater due to the linear nature of the river valley and that the river recreationists floating the river would be able to view the transmission lines from a greater distance. Also, the primary hiking trail which runs east from Rutter Parkway above the river valley and ends near the fish hatchery off the St. Georges School Road would be significantly impacted. The lines would have to pass directly over this east-west trail. The lines would be visible for a long distance from the bluffs where the trail is located.

39-9 An additional 0.6 mile of the natural area would be adversely impacted due to the proposed lines passing along the edge of the natural area. This would add to the loss of wildlife habitat, scenic value, and semi-primitive recreational value for which the area was established by the Commission.

PROPOSED ROUTE:

39-10 The proposed route would additionally disrupt scenic views at the existing WWP ROW in Riverside State Park. This impact is discussed in the DEIS, but it is lacking in specific details. The Final EIS should offer specific detail on impacts to State Park land.

Response to Letter 39 Continued

39-5 The baseline data, particularly for sensitive species, were updated for the Final EIS, based on information provided by the USFWS, Forest Service, WDW, and WWP's on-going biological studies. Please refer to the current information on potential communal roosting areas and active nest sites for bald eagles added to Sections 3.1.7 and 3.2.7 of this Final EIS; the modified impact assessment for both project construction and operation in Sections 4.1.7 and 4.2.7; and the additional mitigation measure presented in Section 4.9, which was developed to minimize the potential for eagle collisions at river crossings. Studies are currently being conducted on both wintering and breeding bald eagles. As stated in the three mitigation measures applicable to bald eagles in Section 4.9 of this Final EIS, the appropriate agencies would be contacted prior to project construction to identify eagle winter concentration areas, active nest sites, and sensitive river crossings, in an effort to minimize potential impacts resulting from project construction, operation and maintenance, and abandonment.

39-6 It is agreed that "crossing of the Little Spokane River Natural Area...would be of significant impact to wildlife resources and associated habitats within this unique environment." Please review the impacts analysis for Threatened or Endangered Species during project construction in Section 4.2.7 of the EIS, where this is stated.

39-7 The impacts that reflect the concerns in the comment appear in two locations in this Final EIS: for the Chatteroy Variation in Section 4.2.8.1 where both significant and moderate impacts to existing land use are described, and for the Chatteroy Variation in Section 4.2.9 where significant visual impacts are reported at the crossing of the Little Spokane River. These impacts contribute substantially to the comparison of route alternatives and adequately reflect the concerns.

39-8 The number of potentially affected viewpoints indicated in the comment is noted and will be considered in the final decision making process. The distance of visual resource impact identified in the Draft EIS however remains at 0.4 mile, as it properly represents the distance of impact to the affected resource.

39-9 This specific impact is addressed for the Chatteroy Variation in Section 4.2.8.1 of this Final EIS, as follows; "This variation also passes along the natural area edge for a distance of approximately 3,000 feet, crossing undeveloped land. This portion of the route would produce a moderate adverse effect on the natural area."

39-10 As a result of the comment, the text for the Fivemile Prairie to Marshall Segment in Section 4.2.9 of this Final EIS has been expanded to clarify the discussion of impacts to Riverside State Park. The basic conclusions have not changed.

Letter 39 Continued

39-11 Currently, the Spokane River Centennial Trail is proposed to be routed on a closed section of Aubrey L. White Parkway, also a scenic drive that was built by the CCC and may be eligible for inclusion in the National Register of Historic Places (NRHP). The trail would pass under the proposed transmission line, further disrupting the recreational experience.

39-12 The proposed route may cross over a possible bald eagle night roosting area in the Deep Creek area of Riverside State Park. A WWP biologist is currently studying the area. The possibility that this is an active roosting area will need to be confirmed and addressed in the Final EIS.

39-13 Additionally, the existing ROW currently provides an opportunity for illegal access by off-road vehicles (ORV) into the natural area. The uncontrolled use of ORV's has caused adverse effects to soil, vegetation, and wildlife habitat, and may be impacting cultural and historic resources, as well. Our forest along this edge acts as a buffer zone from noise emanating from the ORV use in the BPA corridor. Recreationists along the Fivemile Prairie trail would be impacted and their semi-primitive experience diminished (one of the values our management plan seeks to promote). The additional widening of the ROW corridor will continue to deteriorate the environmental quality of the natural area, and it will compound the need for increased management and commitment of funds and personnel to rehabilitate damaged areas.

5-96

Specific Comments:

39-14 pp3-47 The landscape quality should be rated "high" in term of a visual resource in the section that passes through Riverside State Park.

39-15 pp3-51 The potential impacts to cultural resources should be moderate to high for the section which passes through Riverside State Park near the Spokane River. State Parks has conducted several archaeological surveys in this vicinity and have found it to be rich in archaeological resources.

GENERAL COMMENTS:

39-16 If construction of the proposed transmission line along the proposed route is "unavoidable", and routing along the southern boundary on the natural area and through Riverside State Park near Deep Creek is unavoidable, the lines should follow the existing BPA ROW which currently has a high visual impact from transmission towers and lines. Utilizing the BPA ROW would reduce visual impacts to State Park land.

39-17 The LSRNA and the Spokane River are known to have areas of high cultural significance. Site specific archaeological reconnaissance has been completed within the natural area and a few known sites of significance have been identified. Archaeologist, Alston Thoms of WSU has recently completed

Response to Letter 39 Continued

39-11 The proposed Spokane River Centennial Trail viewpoint has been noted. No response necessary.

39-12 Please refer to Response to Comment 39-5 regarding current bald eagle data.

39-13 Your comment is in agreement with the EIS impact analysis. Please refer to Sections 4.2.7, 4.2.8, and 4.2.9, where it is stated that crossing of the Little Spokane River Natural Area would result in significant impacts to area wildlife species, associated land uses, and visual resources, respectively. This conclusion would include impacts associated with increased use of ORVs within this sensitive community.

39-14 There are specific areas within Riverside State Park that are highly scenic. These include portions adjacent to the Spokane River and Coulee Creek, which are in a natural or near natural condition. However, the rating given this area was based on the overall condition of the area, most of which lacks the distinguishing characteristics found along the Spokane River and Coulee Creek. Also, the specific area proposed for the Eastern Alternative crossing contains two existing transmission lines. It is primarily for these reasons that this area was given a rating of Moderate rather than High landscape quality. For additional information, please refer to Response to Comment 30-1 for a discussion of the visual resource inventory and impact assessment procedures.

39-15 Please refer to Response to Comment 39-17 for a discussion of potential impacts to cultural resources.

39-16 The Eastern Alternative would follow existing powerlines through Riverside State Park and would be built on an existing ROW parallel to existing lines. Paralleling the BPA powerlines would require the acquisition of additional ROW from the park, and was therefore felt to be less desirable both financially and environmentally.

39-17 The information regarding the availability of additional cultural resources data is noted. If a route is approved and a Presidential permit issued by DOE, an intensive Class III (100 percent) cultural resource survey will be conducted prior to initiation of construction, in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and the provisions of 36 CFR 800. Surveys on non-federal lands will be conducted as specified by the Authorized Officer after consultation with the State Historic Preservation Officer. At that time, information will be gathered on all newly discovered and previously recorded cultural resources. Please refer to the mitigation measure for cultural resources in Section 4.9 in this Final EIS. As stated in Section 4.9, all mitigation measures would be made conditions of the Presidential permit.

Letter 39 Continued

39-17 Cont. a survey of archaeological resources along the Spokane River for siting of the Spokane River Centennial Trail. This was completed after the DEIS and may be helpful in preparation of the Final EIS. This information may be made available with approval of the State Historic Preservation Office.

Specific Comments:

39-16 pp3-35 State Parks should be included within Future Land Use Plans and Policies.

39-19 pp5-1 State Parks is not listed

In Summary, the Washington State Parks and Recreation Commission is committed to protecting the outstanding recreational value, cultural heritage, and natural quality of the Little Spokane River Natural Area, Riverside State Park, Crawford State Park, and Spokane River Centennial Trail. Most of the impacts to State Park land are moderate in nature and we feel optimistic they can be resolved through additional consultation with DOE and WWP officials; however, the Chatteroy Variation would cause irreversible damage to the Little Spokane River Natural Area if developed. Therefore, in staff opinion, the Washington State Parks and Recreation Commission would have no alternative but to file formal objection to the acquisition/condemnation of the LSRNA for the purposes of developing a transmission line, utilizing all appropriate channels.

State Parks staff is prepared to meet with project officials and other agency staff and believe such discussion should start soon, with solutions presented in the FSEIS.

Please call me at (206) 753-5769. Thank you for giving us the opportunity to comment.

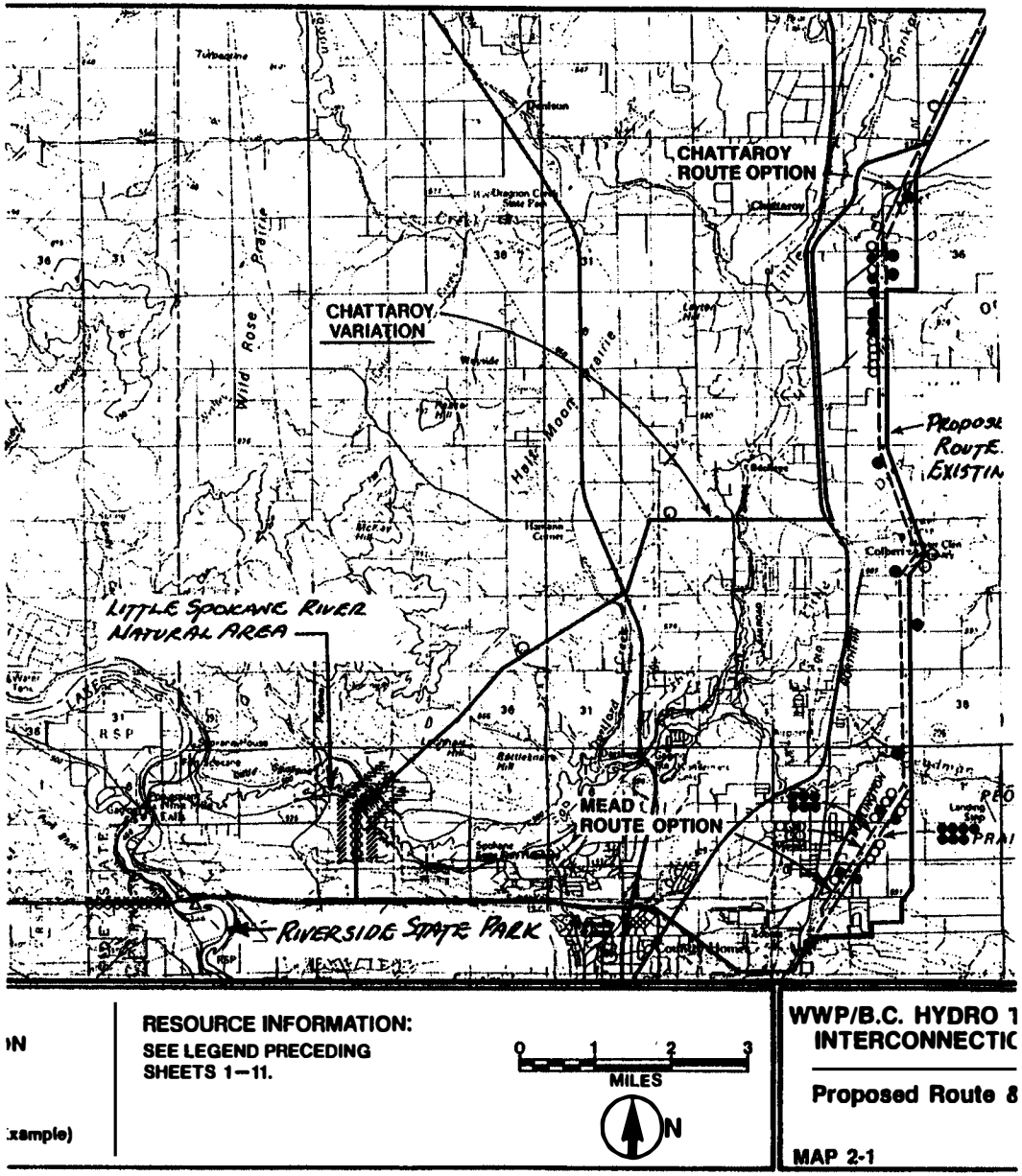
Attachment

cc: Bob D. Anderson, Environmental Coord., WWP
Alston Thoms, Archaeologist, WSU
David Mudd, Department of Wildlife
Rob Whitlam, Archaeologist, Arch. and Historic Preservation Office
Washington State Parks and Recreation Commission
Jan Tveten, Director, WSP&RC
T. J. France, Asst. Dir., Resources Development, WSP&RC
David W. Heiser, Chief, Environmental Coord., WSP&RC
Steve Starlund, Chief, Scenic River Preservation
Dick Fankhauser, Chief, Site Planning & Acquisition, WSP&RC
Bob Reiter, Park Planner, WSP&RC
Lynn Genasci, Asst. Dir., Operations, WSP&RC
Terry Patton, Horticulturist, WSP&RC
Glen Reiswig, Region 4 Supervisor, WSP&RC
Gary Herron/Mark Schultz, Riverside State Park, WSP&RC

Response to Letter 39 Continued

39-18 Section 3.1.8.2 of this Final EIS describes future land use plans that appeared to have the potential to be affected by the project. No future (as opposed to existing) state parks were identified in the data collection process as being likely to be affected. Existing state parks potentially affected are described in Sections 3.1.6.1 and 3.2.6.1 of this Final EIS.

39-19 Based on the comment, the State Parks and Recreation Commission has been added to the State of Washington Agencies consulted for the EIS analysis. This addition is located in Chapter 5.0 of this Final EIS.


CHATTAROY ROUTE OPTION
CHATTAROY VARIATION
Wild Rose Prairie
Half Moon Prairie
LITTLE SPOKANE RIVER NATURAL AREA
MEAD ROUTE OPTION
RIVERSIDE STATE PARK
RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.
0 1 2 3
MILES
N
WWP/B.C. HYDRO
INTERCONNECTIC
Proposed Route
MAP 2-1

Letter 39 Continued

CHRIS CLARKE
Director

STATE OF WASHINGTON
DEPARTMENT OF COMMUNITY DEVELOPMENT
OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION
111 West Twenty-First Avenue, KL-11 • Olympia, Washington 98504-5411 • (206) 753-4011 • SCAN 234-4011

January 31, 1990

TO: Barbara Ritchie, NEPA Coordinator

FROM: Robert G. Whitlam, Ph.D., State Archaeologist

SUBJECT: Washington Water Power/B.C. Hydro - Transmission Interconnection Project, Log Reference 1071-F-DOE-05

5-99

A staff review has been completed of the draft environmental impact statement for the Washington Water Power/B.C. Hydro - Transmission Interconnection Project.

39-20 We recommend that the Department of Energy initiate consultation with our office and interested Indian tribes concerning compliance with Section 106 of the National Historic Preservation Act. We also recommend a Memorandum of Agreement (MOA) be developed to address the identification, evaluation, and protection of archaeological, historic and traditional cultural properties that could be affected by the proposed project.

dw

Response to Letter 39 Continued

39-20 Please refer to Response to Comment 39-17 for a discussion of consultation with your office and compliance with Section 106 of the National Historic Preservation Act. Following the Class III survey, an inventory report will be prepared and submitted to the Forest Service Authorized Officer for review and comment. The report will include a proposed mitigation plan for all sites that are considered to be potentially eligible for inclusion on the National Register. Based on this mitigation plan, the Forest Service Authorized Officer will submit a treatment plan to the State Historic Preservation Officer (SHPO) and to the Advisory Council on Historic Preservation. Following the consultation period, the treatment plan will be implemented.

Letter 39 Continued

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

**Department of Ecology Comments on
Washington Water Power, B.C. Hydro DEIS**

Sections 3.1.3 and 3.1.4 discuss the surface water, floodplain, and wetlands which could potentially be impacted by the proposed project. Most of the proposed stream crossings will be spanned and do not require the construction of transmission line structures in the water. However, if any construction is required in the water, a water quality standards modification will be required from the Department of Ecology.

39-21 Construction activities near the water will require erosion control methods to prevent the deposition of materials into wetlands and the floodplains of streams and other water bodies, such as ponds. Crossings of streams or wetlands using heavy equipment will require a water quality standards modification from the Department of Ecology. These crossings should be minimized to avoid adverse impacts to water quality.

39-22 A logging operation has been proposed by the Department of Natural Resources in the Cedar Creek Watershed near Ione. Perhaps activities could be coordinated between the Washington Water Power and Natural Resources to minimize the impacts on this watershed.

39-23 In the section discussing non-game species, there is no mention of tundra swans. This species uses the Calispell Lake area and the Pend Oreille River extensively during the spring. Hundreds of swans, if not thousands, can be found on Lake Calispell during this time. Often trumpeter swans, a species federally listed as threatened, can be found with flocks of tundra swans. Trumpeters have been seen in the eastern region of the state, and may possibly be found in these flocks. The possible occurrence and the potential impacts of this proposed project to these two species should be addressed in the EIS.

39-24 Contractors need to develop and implement a fugitive dust mitigation plan for use during the construction phase of the project.

39-25 A permit from the Department of Ecology will be required for any debris or slash burning during construction.

If you have any questions, please call Ms. Deborah Cornett of the Water Quality Program at (509) 456-2877 or Mr. Gregory Flibbert of the Air Program at (509) 456-3114.

Response to Letter 39 Continued

39-21 Please review the environmental protection measures that are outlined in Table 2-5 (Section 2.3.4) of this Final EIS. Measures 6, 8, and 16 delineate protection of water resources from material deposition, sedimentation, and loss of cover, respectively. WWP has committed to implementing these procedures during project construction, operation, and into abandonment in conjunction with the WDE Water Quality Certification/Modification Permit requirements (see Section 1.3). In reference to construction equipment crossing water resources, please refer to Response to Comment 27-1 and Section 4.1.4 concerning the avoidance of wetland/riparian areas, when possible, and to the mitigation measure presented in Section 4.9 of this Final EIS regarding a wetland mitigation plan. Note that all environmental protection procedures and mitigation measures listed in Sections 2.3.4 and 4.9, respectively, would be made conditions of the Presidential permit by DOE.

39-22 Coordination with the Washington DNR on logging operations is definitely advisable due to the permit responsibilities of the agency, e.g., Forest Practice Application and Slash Predisposal Plan (see Table 1-2). If a route is approved and a Presidential permit issued by the DOE, WWP would consult with the DNR regarding timber removal along the ROW during the detailed survey and design phase of the project. Please refer to Mitigation Measure 17 added to Section 4.9 of this Final EIS, regarding DOE's review of the final project design and the full disclosure of project impacts in accordance with NEPA.

39-23 Based on the comment, the tundra swan was added to the baseline discussion for the Proposed Route in Section 3.1.7 of this Final EIS. It was acknowledged both in the Draft and Final EIS that both Calispell Lake and the Pend Oreille River support large numbers of birds (see Operation and Maintenance discussion in Section 4.1.7) and line collisions were considered a potential impact. As discussed in Section 4.1.7, due to specific environmental and project-related factors, significant impacts to these resident and migratory bird concentrations were not anticipated. Please note that the trumpeter swan referred to in your comment is not currently federally listed, proposed for listing, or a federal candidate species (USFWS 1990; Haas 1990). This species would be considered under the nongame impact analysis in Section 4.1.7 of the EIS; therefore, the basic conclusions presented for these species remain as stated.

39-24 Please refer to construction procedures in Section 2.3.4 of this EIS, where the use of dust-control methods, such as watering, is delineated. Site-specific mitigation to minimize fugitive dust during dry periods will be implemented during construction, as required.

39-25 Based on the comment, the permit for burning of slash or debris during project construction has been added under the Washington State Department of Ecology in Table 1-2 of this Final EIS.

Letter 40

Mrs. Janette M. Waller
P.O. Box 952
Pomeroy, WA 99347

March 20, 1990

Ms. Connie Buckley
U.S. Department of Energy
Office of Fuels Program (FE-52)
1000 Independence Ave., SW
Washington D.C. 20585

Dear Ms. Buckley,

I am writing to communicate my objection to the power transmission line - the WASHINGTON WATER POWER/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT - that is being proposed by Washington Water Power to be built between Canada and Spokane, Washington.

My family directs a music conservatory that is located immediately adjacent to the proposed route, north of Mead, Washington. Several families live on the premises and many students - children, as well as men and women - come to the school daily for musical training. Needless to say, we are seriously concerned for the safety of everyone who uses this facility.

S-101

One of the reasons so many have chosen to pursue their musical training at our conservatory is its setting of quiet serenity among the beautiful Ponderosa pines. The adjacent property has already been marred by a major power transmission line, and an additional line would unconscionably devastate the natural beauty that surrounds the school. Plans are presently under consideration by our board of directors for the expansion of the institution, but the project is seriously jeopardized in anticipation of Washington Water Powers' planned encroachment.

The proposed line would also be a mile-long violation of our property, unquestionably reducing its present and future value, and vandalizing established plans for the development of the property for residential homesites.

We, together with the neighbors and landowners that surround us, are resolute in our objection to this further blemish to our environment and are determined that Washington Water Powers' unreasonable plans for our neighborhood will not be consummated at our expense.

Respectfully,

Janette M. Waller

Janette M. Waller

Response to Letter 40

Your concerns are noted. No response necessary.

Letter 41

March 21, 1990

U.S. Department of Energy
ATTN. Connie Buckley
Office of Fuels Program (FE-52)
1000 Independence Ave., SW
Washington D.C. 20585

REC'D DOE/FE
OFFICE OF FUELS PROGRAM
90 MAR 28 A 9:01

Dear Ms. Buckley:

As property owner and director of a conservatory of music located immediately within the proposed route of the power transmission line by Washington Water Power/B.C. Hydro Transmission Interconnection Project, I must voice my objection.

Our institution, north of Mead, Washington, was cruncially placed at its present location because of the tranquil setting which surrounds it, allowing hundreds of students to learn the fine arts in the quietness and beauty of the natural landscape. The propoeed transmission lines will, without doubt, spoil our beautiful setting, and I, along with our staff and students, strongly object to the project being carried through.

As property owner of adjacent property, I must object to the project in light of future value and use of the land. The center of my property is already marred by large transmission lines, and I do not want more of the same.

Please consider this opposition to the project, and do not grant permission for its construction.

Thank you very much.

Most sincerely yours,

Jon C. Van Vogt

Jon C. Van Vogt
E. 5221 Lowe Rd.
Mead, WA 99021

5-102

Response to Letter 41

Your concerns are noted. No response necessary.

Letter 42

Mrs. Dora Ruth Vogt
E. 5221 Lowe Rd.
Mead, Wa. 99021

March 21, 1990

Ms. Connie Buckley
U.S. Department of Energy
1000 Independence Ave., SW
Washington D.C. 20585

Dear Ms. Buckley:

We would like to registef our opposition to the proposed WWP-B.C. Hydro Transmission Line to be built between Canada and Spokane, Washington. This line would go through a mile of our property north of Mead, Washington, destroying the beautiful Ponderosa Pines and getting dangerously close to a music conservatory where three families live and hundreds of others come to study music.

We do not believe the benefits to WWP justify the devastation of these many miles of beautiful land.

Sincerely,

Dora Ruth Vogt Robert E. Vogt

Response to Letter 42

Your concerns are noted. No response necessary.

Letter 43

William R. VanVogt
REDUxDOE/FE
Fomeroy, WA 99[illegible]
March 21, 1990

Ms. Connie Buckley
U.S. Department of Energy
Office of Fuels Program (FE-52)
1000 Independence Ave., SW
Washington D.C. 20585

Dear Ms. Buckley:

I strongly object to the proposal of the WWP-B.C. transmission line to be built between Spokane, Wa. and Canada.

Already a major power transmission line goes across my property; I hate to see the devastation that would be caused by another. It is such a beautiful area, sadly affected by the present power lines but would definitely be additionally marred by even more! We appreciate the lovely trees and wildlife.

Thank you for considering our position. Part of my family living on the property would have to be in very close proximity too to this line, and it would be very disturbing to a number of people in the area.

Sincerely,

William R. VanVogt

5-104

Response to Letter 43

Your concerns are noted. No response necessary.

Letter 44

Neighbors Opposed to Power Exploitation
P.O. Box 662, Northport, WA 99157

March 22, 1990

Mr. William Freeman
Department of Energy - Office of Fossil Fuels (FE-52)
Room 3H-087
Washington, D. C. 20585

Re: EOE/EIS 0141-D
Washington Water Power/B. C. Hydro
Transmission Interconnection Project

Dear Mr. Freeman:

At a hearing on the above-listed draft EIS held in Colville, Washington on 2/1/90 Bob Jackman, spokesman for N.O.P.E. stated that it was unfortunate that only "pro's" and none of the "con's" were published in the draft EIS.

It is felt that statements taken at hearings and letters of comment to your agency, although very important, do not carry the impact that they were intended to due to the fact that they are necessarily somewhat piecemeal in coverage - even though the numbers of such communications, along with the approximately 800 signatures of area residents opposed to this proliferation of high voltage lines in general, and to this transmission line in particular (which have been sent to you) are very impressive for an area of a low density of population.

In addition, the Commissioners of Stevens County have had the courage and foresight to express their opinion that this transmission line would not be in the long-term best interest of Stevens County.

Therefore, in an attempt to offer a more balanced picture, we respectfully present for your consideration the attached summary of major areas of disagreements or oversights, along with an item by item explanation of findings and conclusions on this opposing view.

In preparing this statement, interviews with individuals and excerpts from letters of comment and statements given at Colville during scoping and draft EIS hearings are quoted, along with other sources, as listed in the text.

Response to Letter 44

Letter 44 Continued

Response to Letter 44 Continued

page #2

The preparers of this statement (who are residents of the Western Alternative route) have entered into this endeavor with a commitment to fairness and a desire to maintain a dispassionate attitude, (aside from the conclusions on scenic values, which after all can only be made on the basis of personal opinion on both sides of the question).

Further, we are willing to acknowledge the effort which was put into this draft EIS by the consultants and WWP. In view of the DOE policy of having the applicant stand the cost of preparation of the EIS, we consider the apparent bias understandable, but most unfortunate considering the enormous adverse impact this proposed transmission line would have on the area residents and the environment. (In line with this, it is our understanding from conversations with WWP representatives, that B. C. Hydro has offered WWP the added incentive of reduced rates for a stated period of time should the line be built.)

Also, when the fact that DOE has never denied any applicant since it assumed jurisdiction in 1979 (as we understood Mr. Como to say at the hearing in Colville on 2/1/90) is taken into consideration, it is clear that this policy opens the door to biased studies and conclusions presented in environmental impact statements, with the above result of seeming to put the utility interests in the position of the boll weevils taking complete charge of the cotton patch.

In summary, the many areas of disagreement, particularly in outdated discussion of health hazards and the rather unintellegible assessments of environmental impacts make for an enormous lack of credibility on the entire draft EIS.

This flawed draft EIS cannot go unchallenged.

It is therefore imperative thatyou and your associates give this opposing view your closest attention; and then, that you will conclude that this project should be either denied or put "on hold" pending definitive studies and findings on health hazards.

Very truly yours,

Neighbors Opposed To Powerline Exploitation

O. M. Buchanan

O. M. Buchanan, Spokesman

Letter 44 Continued

RECAP OF AREAS OF DISAGREEMENT

44-1 OMISSIONS OF PERTINENT INFORMATION - For instanoe, no mention is made of the potential damage to the Columbia River flow with its resultant ripple effeots to both the environment and to the looal economy.

44-2 OVERSIGHTS - for instance (in part only) the failure to take into account that the suggested transmission line oorridors fall within major North/South flyways for migrating birds.

44-3 OUTDATED INFORMATION both on maps and on bird population and species. Some of the maps were dated 1952 and 1962, and failed to reflect the growth of this area. Even with fly-overs by WWP and consultants, at least one home whioh is directly impacted by the transmission lines was missed. Serious errors were made due to outdated information on bird population, species and current habitat.

44-4 FAILURE TO EXPLORE AND EXPLAIN THE POSSIBLE EFFECTS ON LAND VALUES. This area of real oonoern was handled in a superficial manner.

ERRONEOUS STATEMENTS in at least one instanoe on right-of-way procedures in the past by WWP, leading one to assume that this is not an isolated instance possibly.

44-5 INAPPROPRIATE CHOICE OF CONSULTANTS AND EXPERTS - case in point - landscape architects, trained in other areas, to decide what is high, medium, or low scenio quality on privately owned land. That decision belongs to local residents with the reminder to all ooncerned that "beauty is in the eye of the beholder". Also, the choice of out-of-state consultants unfamiliar with the area, its people, and its economy is felt to be unfortunate and unfair.

44-6 FAILURE TO EXPLAIN that the line drawn down through sections, townships, and ranges is not a hard and fast route, but may vary widely - according to information from WWP's Environmental representative at a meeting on March 5, 1990.

44-7 FAILURE TO EXPLAIN That in the event WWP should increase the voltage on the proposed transmission line at some future date, as they have indicated, that 190' is a normal ROW width for a 500 kV line, according to the Florida Power Commission; and a recent Texas oourt ruling indioated a 1,000' ROW need to meet safety standards near a sohool.

Response to Letter 44 Continued

44-1 Please refer to Response to Comment 48-9 regarding Columbia River flows in relation to the proposed interconnection.

44-2 The studies suggested are beyond the scope of an EIS for a specific proposed action such as this one. The Regulations for implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) require that EISs concentrate on significant impacts and issues (Section 1502.2(b)). Specific locations along the proposed project alternatives that maintain large concentrations of birds, particularly migratory species such as waterfowl and other water birds, were identified in the EIS. Refer to project Operation and Maintenance in Section 4.1.7 where it states, "Impacts to both resident and migrant waterfowl, other waterbirds, and raptor species located along the Proposed Action could occur from mortality associated with collisions with transmission line conductors and shield wires. Numerous species utilize the water resources located along the proposed route. Calispell Lake near Usk, the Pend Oreille River, and scattered riparian areas support a large number of birds, particularly during migration." This discussion proceeds, concerning the collision potential being dependent on a variety of factors, including line orientation to flyways. Please continue in this section to review the discussion on potential bird strike analysis and how this relates to the proposed interconnection. It is felt that the wildlife resource analysis for this EIS examined the potential conflicts applicable to this project and the species involved under the Endangered Species Act. If a route is approved and a Presidential permit issued by DOE, WWP has committed to consult with state, federal, and Tribal agencies regarding the environmental protection procedures and mitigation measures developed to ensure minimal environmental degradation. These procedures and measures would be made conditions of the Presidential permit, as stated in Sections 2.3.4 and 4.9 of this Final EIS. Therefore, the impacts analysis for wildlife resources associated with the proposed interconnection remain as stated.

44-3 Please refer to Responses to Comments 33-1 and 48-7 for a description of the resources examined during the EIS impact analysis. It is impossible to determine from your comment, which residence would be directly impacted by the proposed interconnection. Please review the resource maps at the back of the document regarding this location. In reference to data used for area bird species, the most recent data were obtained from both the WDW and USFWS for the Final EIS. State and federal biologists that are directly involved with studies of these wildlife populations, in addition to the state's data base, were used as resources for baseline data and impact analysis. In response to your comment, please review the information updated since the printing of the Draft EIS presented in Sections 3.1.7, 3.2.7, 3.3.7, 3.4.7, and 3.5.7 of the Final EIS.

44-4 Please refer to Section 4.1.11.1 and Response to Comment 26-11 for additional information on property values and how they may be affected by the proposed interconnection.

44-5 Your comment regarding the adequacy of the visual analysis is noted. Please refer to Response to Comment 44-32 pertaining to your concern and Response to Comment 30-1 for additional information on the development of the visual resource inventory and impact assessment procedures. Also, please review the List of Preparers located at the back of this EIS.

44-6 The lines drawn on Map 2-1 in the Draft EIS represent the alternative routes that were analyzed in the EIS. They are accurate to the limits imposed by the scale of the maps. This map is presented as Map 2-2 and is located in the back of this Final EIS. Small changes in any route approved by DOE may be required during detailed surveying and design; however, major changes would be subjected to environmental review by DOE before they could be implemented by WWP. Please refer to Mitigation Measure 17 added to Section 4.9 of this Final EIS, regarding DOE's review of the final project design and the full disclosure of project impacts under NEPA.

Letter 44 Continued

44-8 IN THE SECTION ON NEED though EIS states that DOE does not have the responsibility of confirming or justifying the need, yet a projection of need presented and prepared by WWP is included. It is felt that there are factors not taken into consideration in this projection as presented by WWP. Further, it is felt that this is self-serving, cannot help but be a subtle influence on any decision, and therefore should not have been included.

44-9 CONSERVATION once again is totally from a rosy, self-serving WWP statement, presents a one-sided view, and overlooks additional possibilities for the conservation which is so vital to the future. The Canadian example of attaining total petroleum independence in 15 years through conservation technology only is a compelling option totally unrecognized by DOE in thie EIS report and everywhere else.

44-10 AMBIGUOUS STATEMENTS such as those on "off-ROW" cutting of trees and statements on vegetation control.

44-11 APPARENT LACK OF A BASIS other than opinions of the EIS team for many very important conclusions on impacts - for instance on homes near lines.

44-12 OTHER IMPORTANT FACTORS HAVE BEEN IGNORED - such as the adverse and unfortunate impact on recreation areas - case in point, the crossing of Haller Creek Recreation Area which would result in destroying the beauty and tranquility of a lovely and much-used area.

44-13 ANOTHER OVERSIGHT OF GREAT CONCERN is the failure to mention the oxygen depletion due to clear-cutting of affected forest land within the transmission line corridor. This land can never be replanted so long as the lines are there. The planet cannot afford any such loss.

44-14 THE MOST GLARING OVERSIGHT, HOWEVER, IS THAT THE IMPACT ON HUMANS IS ALMOST TOTALLY IGNORED. The effects on human health has been given scant attention, and the conclusions are inconsistent with the facts presented.

The EIS goes into some detail on the effects on soil and wild life - albeit superficial and confused. It follows that equal attention should be given to humans and farm animals. Some of the human families have been here for generations, and very few are migratory! The conclusions on harm to dairy cattle are more than open to question, and other domestic animals have not been given consideration.

44-15

Response to Letter 44 Continued

44-7 NEPA requires disclosure of complete plans for the proposed interconnection. No plans for increasing the voltage of the proposed transmission line have been made known to DOE. Future upgrading of the proposed interconnection to a line of a higher voltage would require amending the Presidential permit, resulting in review of all potential environmental impacts by the DOE prior to line modification. Please refer to Mitigation Measure 17 added to Section 4.9 of this Final EIS that outlines DOE's review of WWP's final project design and the full disclosure of project impacts in accordance with NEPA regulations. This measure also states that all mitigation measures will be made conditions of the Presidential permit.

44-8 CEQ regulations (40 CFR 1502.13) require that need be addressed in an EIS. Please refer to the expanded discussion of project purpose and need in Section 1.2 of this Final EIS for further information on the need for the proposed interconnection. As is the case with Section 1.2 in the Draft EIS, this information was prepared using information submitted by WWP. Refer to Response to Comment 63-30 for discussion on the role need plays in making a decision on a Presidential permit.

44-9 Please refer to the additional information presented in Section 2.6.1.1 of this Final EIS for discussion on conservation and Response to Comment 26-3 regarding projected energy deficits.

44-10 Please refer to Section 2.3.4 of this Final EIS regarding off-ROW cutting of trees and the associated landowner compensation. The presentation of this subject was not intended to be ambiguous to the reader; those areas requiring removal of off-ROW trees cannot be determined until a final route is approved and a Presidential permit issued by the DOE, as stated in Chapter 2.0. At that time, particular efforts would be initiated to identify those areas and notify the property owner. In reference to vegetation control, again these specifics would be determined on a case-by-case basis. Please refer to Response to Comment 20-1 for clarification on WWP's revegetation procedures, Table 2-5 where additional environmental protection measures have been outlined, and Response to Comment 20-3 for additional discussion on the contract agreements between WWP and the landowner concerning revegetation plans and noxious weed control.

44-11 As is the case with most EISs, the assessment of impacts was based to a large extent on the professional experience and judgment of the resource specialists who prepared the analyses for the various disciplines. Please refer to the List of Preparers located in the back of this document. Also, please refer to Response to Comment 63-12 for a discussion of the basis for the assessment of impacts on homes.

44-12 It is assumed that the comment refers to what is shown on the USGS 1:24,000 scale topographical map as Cole Creek Picnic Area. This area lies on a secondary road paralleling Haller Creek and leading southwest from the Colville Valley at a point west of Arden. The potential land use effects on this recreation site from the Western Alternative are reported within the Echo to southwest of Arden Segment in Section 4.3.6.1 of this Final EIS. The line would be located about 1,200 feet from the picnic area and would have no effect on the use of the area. Based on a visit to the site by the visual resources specialist, it was also determined that because of the dense trees, there would be no visibility of the project from the picnic site. The road along Haller Creek that gives access to the picnic site runs along the bottom of a steep, narrow and heavily wooded valley. The transmission line conductors would, therefore, span over this road. Visibility of the transmission line structures from the road would be minimal when traveling northeast, and probably moderate when traveling southwest. The overall visual impacts of the project on the picnic area would not be substantial.

Letter 44 Continued

Response to Letter 44 Continued

44-13 As discussed under Construction in Section 2.3.4 of this Final EIS, the proposed ROW would be cleared of trees to the extent necessary to facilitate line construction, maintenance, and conductor clearance. Low growing woody vegetation, shrubs, and grasses would either remain within the transmission corridor or the ROW would be revegetated according to the guidelines outlined in the EIS. The EIS analysis estimates that approximately 1,035 acres of forested lands would be removed along the Proposed Route. This is a conservative estimate, because many of the trees would not be removed in low lying areas (e.g., ravines). In comparison, the Colville National Forest alone contains 1,013,734 acres of forested lands (Forest Service 1987), in addition to the thousands of acres of timbered areas that are privately owned within the three counties crossed by the line. When examining these figures, it is reasonable to assume that loss of the trees along the proposed transmission line for the life of the project would not be considered a significant impact to oxygen depletion.

44-14 Based on this and other comments, Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to more adequately address the issue of the potential health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2. Also, please refer to Responses to Comments 13-5, 26-13, and 51-7 for additional information on the EMF analysis.

44-15 Sensitive elements that may be potentially affected by the proposed interconnection were examined during the EIS impact analysis; concerns that are commonly associated with projects of this type (e.g., impacts to human resources) are discussed in the EIS. As the comment points out, potential effects to dairy cattle are addressed in Section 4.6.3.4. No impacts to other domestic animals are anticipated; therefore, they were not delineated in this EIS analysis.

Letter 44 Continued

OMISSIONS OF PERTINENT INFORMATION:

Wildlife 4.1.7 p. 4-18

EIS: "Impacts to wildlife would be considered significant if: Loss of or disturbance to bald eagle nesting or wintering sites and foraging areas due to project construction and operation affects this species."

44-16 COMMENT: No mention is made of the fact that Bald Eagles gather in the Colville Valley at the Marble Valley/Addy-Gifford Road intersection (T33R39), that they have been seen there in winter months, nor that they are regular visitors to Stranger Creek in Marble Valley and Echo Valley, bringing their lines of flight across the transmission line areas and putting them in jeopardy from transmission line injuries while following their regular foraging patterns in their regular areas.

44-17 Further, no mention can be found to have been made of the swans which rest in the Colville Valley in the area of the proposed crossover of Highway 395 by the proposed transmission lines, on their migratory flights. Also, on recent dates, a great number of Canadian Geese were found to be using this area as a resting and feeding area due to the standing water on the grain fields there.

In addition, the area between the Colville Valley and Marble Valley is host not only to migrating waterfowl, but is also a summer nesting area for ducks.

44-18 Not mentioned also is the fact that this area between the Colville Valley and Marble Valley is host on an irregular basis to the Snowy Owl, and that the Marble Valley area, as well as the Haller Creek area, have a population of Great Blue Herons whose flight patterns lie across the proposed proposed transmission lines on their visits to the Colville River, and various bodies of water in the general area of the proposed lines.

44-19 Again, in "Wildlife 4.1.8 p. 4-17" no mention is made of a specific case of Ospreys' nesting over a period of four seasons in the area of Western Alternative Route. This was cited at the scoping hearing of May, 1988, but was omitted in this draft EIS. Also omitted is any mention of the fact that embryos in eggs, and young birds are particularly in danger from electromagnetic radiation.

Response to Letter 44 Continued

44-16 As discussed in Section 3.3.7.3, concentrations of wintering bald eagles occur along the Western Alternative and adjacent areas. Although no specific locations were identified, the areas referred to in the comment would be included in the project analysis and associated mitigation. Please refer to Operation and Maintenance in Section 4.1.7 for discussion on bird collisions with transmission lines and the potential for bald eagle impacts associated with the proposed interconnection. Also, an additional mitigation measure is presented in Section 4.9 of this Final EIS concerning modifications to line design along river crossings to minimize the potential for line strikes in these areas.

44-17 Please refer to Response to Comment 39-23 regarding tundra swans and Response to Comment 44-2 for additional discussion on migratory species.

44-18 Ground and aerial reconnaissance surveys, in conjunction with state and federal agency contacts, identified specific sensitive locations within the project area that may be significantly impacted by the proposed project. Please refer to Response to Comment 44-2 for additional discussion on impact assessment in accordance with NEPA regulations. Also, please refer to the impact discussion under Operation and Maintenance in Section 4.1.7 regarding potential bird collisions. As stated in Sections 4.1.7, 4.2.7,, 4.3.7, and 4.9 and in Response to Comment 44-2, every effort has been made to address potential impacts that may significantly affect sensitive species, and specific measures will be implemented prior to construction to minimize effects on environmental resources.

44-19 In response to your comment on osprey, please refer to Section 3.3.7.3 where it is stated that the sensitive wildlife species for the Western Alternative parallel those listed for the Proposed Route. Table 3-7 in Section 3.1.7.3 also shows the osprey occurring in Stevens County. Based on the comment, however, "nesting ospreys" has been added to the last paragraph in Section 3.3.7.3 for both the Colville and Columbia Rivers. To ensure protection of eagle and osprey nest sites, a mitigation measure was developed (see Section 4.9 of this Final EIS) to conduct clearance surveys within 0.5 mile of the proposed ROW prior to project construction. Finally, please refer to Section 4.6.3.4 in the EIS for a discussion on EMF effects on vegetation and animals, and refer to Sections 4.6.5.1 and 4.6.5.2, which have been revised and expanded to better explain the EMF health issues and concerns. Note the modified conclusions presented in Section 4.6.5.2.

Letter 44 Continued

44-20 OF FURTHER CONCERN is the fact that no mention can be found of the impact on the environment due to clear-cutting of trees of from 1,289 to 1,744 acres of forest land - depending on the various routes as listed on page 4-70. (It is also noted there there is no estimate of any cutting of trees which might be necessary due to access roads, which is, or course understandable; but this loss should be considered).

Particularly in view of the drought conditions of recent years in this area and projections for future lack of relief, this loss of cover to hold back runoff and ensure the slow absorption of moisture into the soils is a serious consideration.

In addition - a quote from "Readers Digest", March 1990 - "What Good Is A Tree" by Lowell Ponte - "....trees also make life possible. Trees draw oarbon dioxide from the air. Then, with the action of sunlight on cells containing chlorophyll and other materials, chemical reactions occur, and oxygen is released. Through photosynthesis, an acre of trees produces enough oxygen to sustain three humans."

There are enough forested acres in the proposed Western Alternative route, for instanoe (exclusive of access roads) to meet the oxygen need of 3,867 people, on this stated basis.

44-21 ANOTHER SERIOUS OMISSION is the failure to mention that there is a current proposal by B. C. Hydro to to dam up Murphy Creek, which is a short distance north of Trail on the Columbia River and is believed to be tied in with WWP/B.C.Hydro's Interconnect plan. The area residents question why this is not addressed in the draft EIS. It is an impact on the environment where the existence of an artificial imaginary line between the United States and Canada is not recognized by the natural environment.

44-22 There is the question of what effect this would have on the water flow of the Columbia River, particularly through Trail, which is where Comico, Ltd. dumps their waste runoff from the Comico Smelter. There is the related question of what effect it would have on the cleansing flow of the river on whatever is ooming downstream from the Celgar Pulp Mill in Castlegar. This mill is one of the major sources of Dioxin in the Columbia River, particularly in Lake Roosevelt.

The further question arises as to what effect this reduced flow would have on the Dioxin levels on the fish in Lake Roosevelt, which is already of concern to Washington State Department of Ecology; and further, what effect that ripple effect would have on the Lake Roosevelt tourist industry.

Response to Letter 44 Continued

44-20 From the comment, it is assumed that "...impact on the environment due to the clearcutting of trees..." is referring to potential oxygen depletion from the loss of trees. Response to Comment 44-13 addresses this specific concern. The removal within and adjacent to the transmission ROW is discussed in depth in Sections 2.3.4 (see also Table 2-5), 2.3.5, 4.1.2.2, 4.1.4, 4.1.5, 4.1.6, 4.1.7, 4.1.9, and 4.1.11.1. The estimated loss of forested areas for access roads is included in the anticipated ROW requirements for the proposed line. Please refer to Section 4.1.6 of this Final EIS, where access road construction is addressed simultaneously with line clearance. In response to the concern on possible erosion, please review the applicable data presented in Sections 2.3.4 (see also Table 2-5), 4.1.2.2 and 4.1.5. A number of measures have been outlined to minimize erosion and ensure ROW revegetation.

44-21 NEPA does not require an analysis of effects on the environment outside the United States. Please refer to Section 1.1 in this Final EIS.

44-22 Response to Comment 48-9 discusses the Columbia River flows in relation to the proposed interconnection. Because the Columbia River flows would not be affected by the proposed interconnection, no impacts to existing water quality would result.

Letter 44 Continued

OMISSIONS AND OVERSIGHTS: General

As stated at the hearing of 2/1/90 in Colville by the owner of a large tree farming enterprise, no reasoning is given on the decision to use a disappropriate amount of privately owned land with its attendant serious impact on individual landowners when Federal and State lands are equally available in many instances.

44-23

For instance, (re. chart p.2-12) 80.5% of the land on the proposed route is privately owned, and on the Western Alternative 85% of the land is privately owned. On P 4-12, Table 41, of the 85 miles of mixed forest and ponderosa pine listed, 68 miles are on private land on the Western Alternative, for instance. This puts an unjust burden on individual landowners.

COMMENT: The thought occurs that perhaps this might be due to the stated fact that the Colville National Forest has stringent standards and guidelines which must be followed (p. 4-162) and this is undoubtedly true also for BLM and State lands...and that these options will not be offered to individual private landowners. Such discrimination, if this proves to be true, would not only be grossly unfair, but might possibly be illegal.

ANOTHER AREA OF REAL CONCERN was stated at the hearing in Colville on 2/1/90 by Eric Berg, who raised the question of the

44-24

basis for decisions by the DOE, in view of the fact that there is no set national energy policy on which to base a decision. No mention of such a basis for decisions can be found in the EIS.

IN ADDITION: Mr. Berg also stated at the above-mentioned meeting that the DOE took testimony in all the affected areas in May, 1988 at the scoping hearings, and then chose to address

44-25

some of the questions raised, and chose to ignore others. Nowhere in the EIS has a statement been found for the reasoning behind this arbitrary decision to ignore valid aesthetic, economic, wildlife, and health concerns expressed by area residents.

Response to Letter 44 Continued

44-23 Land ownership was not a criterion used in locating the proposed and alternative routes; however, this information was presented in the EIS for comparative purposes. Other factors such as the location of existing transmission lines that could be paralleled were important considerations, and these are discussed in Section 2.3.1. There was no intent to locate the routes on either private or public lands.

44-24 The basis for decisions by the DOE in these proceedings is the impact that the proposed project would have on the human environment, as defined by NEPA, and on the electric reliability in the region. Please see Response to Comment 63-2.

44-25 As discussed in Section 1.5 of the EIS, an Implementation Plan was prepared and distributed to interested members of the public (including NOPE) in March 1989. This plan discussed why certain scoping comments would not be addressed in the Draft EIS. DOE reviewed all scoping comments and following CEQ regulations (40 C FR 1501.7), eliminating 26 from detailed study as being too general, not related to the proposed project, not needed to adequately address impacts, or beyond the scope of the EIS.

Letter 44 Continued

DISCUSSION OF NEED (from "Introduction" p 1-2 through 1-10)

EIS states: re purchases and exchange agreements between WWP and various sources:

"These purchase and exchange agreements are scheduled to expire at various times between 1988 and 2019, thereby reducing the availability of resources for WWP to meet projected customer electrical loads."

EIS notes that WWP regularly purchases and exchanges power with B. C. Hydro, Bonneville Power Administration (BPA), municipalities, public utility districts, and other investor-owned utilities.

COMMENT: To begin, re "for WWP to meet projected customer electrical loads"....only a small percentage of the anticipated power from this proposed interconnection with B. C. Hydro is targeted for WWP's service area.

44-26 It is noted that there is nothing mentioned about the possibility of renewal for the purchase and exchange agreements mentioned. Common reasoning leads to the conclusion that it would be highly unlikely that most, if not all would be renewed, particularly in view of the fact that WWP chose to ignore the renewal picture here.

44-27 Also, in addition to the real contribution made by co-generation by industries, and in particular the large Waste-To-Energy plant now being built by Spokane, WWP chose to overlook mentioning that even though these sources are not a huge source of power, nevertheless they are a stable, year-round source, and not affected by drought or fluctuations in water flow. If memory serves one preparer correctly, it has not been very long ago that it was mentioned in the Spokesman-Review that WWP was fretting over the necessity to purchase this power which was in excess of their need...but this is from memory only.

44-28 In addition, no mention is made in this EIS of the possibility of WWP replicating the success of its Kettle Falls Generating Plant. Wood waste from area mills is a local energy source, and is plentiful and inexpensive enough to bring from any point to any point in the tri-county area. The Kettle Falls plant has been WWP's showcase thermal plant.

WWP is a prime consultant in the design and engineering of a waste wood generating plant north of Vancouver, B. C. If it is good enough for the Canadians to want one, why not a second plant here?

Response to Letter 44 Continued

44-26 Please refer to Response to Comment 30-5 regarding renewal of the Purchase and Exchange Agreements.

44-27 Please refer to Section 2.6 of this Final EIS for the expanded discussion of alternative power sources. WWP's past actions are considered outside of the scope of this EIS.

44-28 Wood waste generation, similar to WWP's Kettle Falls Generating Station, falls within cogeneration options. Alternative energy sources are discussed in Section 2.6 of this Final EIS. Please refer to the modifications to Section 2.6.1.2 on cogeneration.

Letter 44 Continued

DISCUSSION OF NEED (continued)

One would also wonder about the eeconomics of continuing the established procedures compared with the millions of dollars which will have to be spent on the proposed transmission interconnection project. In view of the unfortunate WPPSS situation, it would seem that the rate payers will bear the burden of cost in higher rates, plus also pay for any errors in judgment WWP may possibly make - all the while stock holders of WWP would continue to benefit from increased dividends and appreciation in value of stock due to the added asset of the new transmission line in the possibility (probably not remote) of a takeover by another utility company.

As noted in the Spokesman Review from the Fall of 1989, the Washington Utilities and Transportation Commission rejected a WWP plan for adjusting electricity rates when low streamflows reduce the supply of cheap hydro-power; and also said that WWP did not give rate payers any benefit in return for the greater revenue stability it was seeking for its shareholders.

WWP's rationale for this project is essentially that it would facilitate the purchase of the least expensive power to meet increased energy needs projected in the future. (More on this later) This is a good argument in favor of this project, if their assumptions and arithmetic are correct. While WWP may be able to provide its customers with the least expensive power, the exporting of millions of U. S. dollars (specifically dollars from WWP's service area) to a foreign energy supplier, has a decidedly negative impact on the United States, particularly the rate payers economy by reducing the money supply in the region. That necessarily results in tighter credit, higher interest rates, a contraction in productive output, fewer jobs, smaller tax receipts, and a generally reduced standard of living for all. (A real domino effect)

Unless it can be shown that the foreign energy will produce value equal to or greater than the value of the lost dollars paid to the foreign energy producer, the buyer of foreign energy is economically the loser in the deal. That bad deal is source of the energy component in our national trade deficit and one of the primary reasons for the creation of the National Energy Policy that has as its paramount goal to reduce our dependency on foreign energy.

44-29 IN SPITE OF THE FACT THAT THERE WAS A REPRESENTATIVE FOR THE NATIONAL ENERGY POLICY PROGRAM PRESENT AT THE HEARING IN COLVILLE, NO MENTION OF THIS ISSUE APPEARED IN THE DRAFT REPORT.

Response to Letter 44 Continued

44-29 The basis for decisions by the DOE in these proceedings is the impact that the proposed interconnection would have on the human environment, as defined by NEPA, and on the electric reliability in the region. See Response to Comment 63-2 regarding issuance of a Presidential permit.

Letter 44 Continued

DISCUSSION OF NEED (continued)

As for the issue of continued growth, on page B6, Spokesman Review, Saturday, January 27, 1990 is an Associated Press release "Lay-offs send pessimistic signal." Also, since the first of this year General Electric - 5,700 jobs to be eliminated; Boeing - 5,000 jobs; Grumman - 1,000; Caterpillar - 1,200; Marrill Lynch - 3,000; and from January 1st, 1990 - 45,000 workers have been notified by the auto industry that indefinite or temporary lay-offs would occur.

NOTE: NBC Evening News and ABC Nightline on 2/28/90 - "80,000 auto workers have become unemployed since January 2, 1990".

Locally, Northwest Alloys, near Addy, Washington, has idled one line of produotion, and 82 workers were laid off in December of 1989. There cannot help but be a ripple effect from this in the local economy, with families moving elsewhere to find jobs, thus once again with diminished demand for energy not only Northwest Alloys but from households either economizing or leaving the area.

All of these things can have a local impact on the eoonomy, and the times are troubled and the situation can change quickly - with Northwest Alloys, the price of their products on the world market is in an unstable situation. More power is needed?????

44-30 Because of the omissions in the reasoning processes displayed by WWP in this draft EIS, we seriously question their conclusions on projected needs.

Response to Letter 44 Continued

44-30 Please refer to the purpose and need discussion for the proposed interconnection, which has been expanded in Section 1.2 of this Final EIS.

Letter 44 Continued

Response to Letter 44 Continued

CONSERVATION: 2.7.1.3

EIS states: "Conservation is the more efficient use of electricity, and therefore, is considered as a resource equivalent to one that generates electricity.

"This is based on the idea that one less MW of energy would need to be generated at a new power plant for each MW of electricity saved."

COMMENT: WWP's listed programs such as water heater insulation and home weatherization have undoubtedly been a help. HOWEVER, WWP has a history of promoting consumerism in the inserts in its monthly bills. In recent months alone they have encouraged the use of hot tubs, electric heat under walkways to avoid snow shoveling, and heating garages, to name a few. This irresponsible encouragement of frivolous excess usage is certainly at odds with their stated stand on conservation. Also, to further encourage higher usage, they list financing availability on these items with others.

It is felt that the real conservation must be in cooperation with an informed and concerned public. Further, it is felt that it is the responsibility of utility companies such as WWP to educate, encourage, and facilitate their customers in responsible conservation. In any area in any given time of year one can see block after block of homes ablaze with light. Even small savings can have an effect - for example, during the severe drought of about 12 years ago, people in our area were asked, or perhaps ordered by Washington State, to turn off their all-night yard lights. This, along with whatever other cooperative efforts were made, resulted in such a reduced demand that WWP was immediately back before the Washington State Utilities and Transportation Commission requesting a rate increase.

THE BOTTOM LINE ON THIS was tellingly put by a WWP employee at a recent meeting in rebuttal to complaints on lack of WWP's real commitment to conservation. "After all," he said, "we're selling a product."

That statement is exactly correct, of course, and the change in this situation won't come until WWP agrees that they should look at the long-term wellbeing of their customers and the area by understanding that they should be offering a service, not "selling a product".

THIS SELLING A PRODUCT mind set leads to excess usage, which leads to need for additional sources of energy, which in turn

Letter 44 Continued

CONSERVATION (continued)

in this instance leads to the request to build a transmission line from a foreign country, which will result in a very adverse impact on people and the environment.

"Selling a product" is not out of line with any business-for-profit thinking - except that in this instance WWP has totally unfair advantages - it has a monopoly, and it has the right to take land-owners property whether they wish it or not through exercising the Right of Eminent Domain - all to generate increased revenue to shareholders. They could achieve very good profits by other means than increasing sales volume. Many utilities have done so.

VISUAL RESOURCES 3.1.9 AND PREPARERS, P. L2 (also 4.1.9)

FROM EIS: "The lands within each unit were then evaluated based on their quality and character, considering the condition of the landform, rockform, vegetation, and water. Special consideration was then given to the degree of naturalness of these lands. A final rating of High, Moderate, or Low Landscape quality was then assigned to all units containing private land."

5-117

44-31

COMMENT: To begin with, to those who love the land and nature, there is no such thing in country and rural areas as "Low Scenic Quality". It is felt that "naturalness of these lands" should not enter into the picture - how was this judged? Is not nature and all growing things "natural"?....including meadows and cultivated crops? The fact that there are no mountains in view, as on the EIS Low Scenic Quality picture, and the land is relatively level and cultivated, with houses in view, should not cause it to be considered of low scenic quality. On this basis, one would like to ask Mr. Bowie, Discipline Manager for Existing and Future Land Use: Recreation - provided that his Landscape Architecture Certificate was obtained in London, England - if he was taught that "this green and sceptered isle, this England" was of low scenic quality?

In addition, one would wonder how a rating would be arrived at when there is a river or free flowing creek through cultivated land as well as wild meadow land, and forested hills.

As to EIS - "blending in with the landscape" - that is patently impossible with a power transmission line which requires a

Response to Letter 44 Continued

44-31 Naturalness was judged by the degree to which the natural landscape has been altered by human development. For this study, four levels of naturalness were established:

1. Entirely Natural -- The landscape appears either untouched, or any modifications that do exist are not visible from sensitive viewpoints.

2. Natural Dominated -- The landscape has either been altered to a minor degree such that the overall impression a person is left with is of its natural character, or modifications are in harmony with the surrounding natural environment (e.g., an agrarian or pastoral landscape set in otherwise natural setting).

3. Man-Natural Mix -- The landscape contains roughly an even visual mix of natural and man-introduced elements.

4. Man-Dominated -- The landscape has been altered by development to such a degree that for all practical purposes, any element of naturalness has been eliminated (e.g., urban subdivisions, strip development, industrial areas, etc.).

The strength of the character of the natural landscape is important here because a landscape of weak elements (e.g., flatter terrain and lack of distinctive vegetation, water, or rock features) will visually give way more quickly to development of various types than a strong, more busy landscape, which can visually absorb more modification without as great a change in its overall character. Please refer to Response to Comment 30-1 for additional information on the development of the visual resource inventory and impact assessment procedures.

Letter 44 Continued

VISUAL RESOURCES (continued)

clearcut corridor 125' wide. If a 125' clearcut strip were to cross the side of a mountain or hill, it would stand out forever as an intrusion on the landscape, even when brush or other vegetation softened it; and always there would be the 80' to 120' high poles 40 feet apart along with the connecting lines. If the line crossed the ridge of a hill or mountain, shearing the trees of the forested land in a 125' wide strip, it would devastate the beauty of the view.

Further, when a string of 80' to 120' high double poles 40' apart go down through agricultural land, from a visual standpoint they destroy the pastoral beauty and flavor of cultivated fields, grazing lands, and meadows.

44-32 It is felt that these determinations were made in error by consultants with inappropriate backgrounds/training for this particular area and study. In addition, the findings are so at variance with the understanding of local residents, one is tempted to judge that these findings are biased in favor of TVP.

44-33 In addition, it is felt that your attenion should be called to the opinions expressed in letters of comment that the proposed lines should have been, if not walked, at least driven. In particular, we call your attention to the video shown at the scoping meeting in Colville in May, 1988 showing the unusual beauty of the area; but also showing the aesthetic desecration of the lovely little valley along the Aladdin Route north of Colvile where BPA's lines march down through the valley, as well as the transmission lines in the Colville Valley as they come down from the hill into the valley just north of the N. W. Alloys plant at Addy and continue on south through the scenic and fertile Colville Valley.

Attenion is called to the video which was also shown at the scoping meeting, and then presented to Mr. Como as a permanent exhibit showing, in part, scenes of severe problems all over the United States due to adverse impact from high voltage transmission lines - scenes from New England opposing the New York Power Commission's Interconneot proposal with Quebec, a scene near a school in Texas, and an interview with a farm couple who have had severe problems with domestic animals and egg and chick production, to name but a few scenes.

44-34 COMMENT SUMMARY: It is felt that the conclusions drawn in this entire section regarding visual resources and visual impacts are flawed, for they have as part of their basis the entirely arbitrary "scenic quality" standard. Also, it surely cannot be denied that no matter where a transmission line

Response to Letter 44 Continued

44-32 Visual analysis has been within the recognized preview of landscape architecture for a great many years. The concepts and practices are valid wherever applied, as long as they are applied within the context of the local region. As indicated in Response to Comment 30-1, this was the case. It is probably not as "inappropriate" as it is unusual to have someone with 15 years experience conducting visual analyses for transmission line projects from coast to coast doing the hands-on analysis for a project. Besides its value in landscape analysis and transmission line siting, this experience has demonstrated that one cannot long survive professionally by conducting "biased" studies for or against certain types of projects or clients.

44-33 All routes studied were seen and photographed from the air in their entirety, and were seen from the nearest accessible roads on the ground.

44-34 A point of clarification may be appropriate. The double pole structure will have an average span (linear distance between structures) of 1,000 to 1,200 feet. There are numerous examples of lines of this size and larger, through very similar landscapes, which are very difficult for the casual viewer to detect. Others that were completed several years ago with the clearing practices of the day, in addition to the lack of tower and conductor treatments that are currently available, do often demand attention. For this analysis, a "reasonable worst case," using today's design and treatment standards, was assumed as the baseline condition.

Additionally, a visual analysis, of necessity, must be conducted with a consideration of the viewer. Without a viewer, the assessment of a landscape modification cannot go beyond consideration of the on-site physical effects. Please refer to Table 4-5 in this Final EIS for an illustration of the way in which the physical effect is distinguished from the visual effect.

Letter 44 Continued

VISUAL RESOURCES (continued)

44-34 Cont. requiring a ROW of this magnitude, with double poles 40' apart and 80' to 120' tall would be constructed, it could not fail to dominate any landscape.

Further, it should be pointed out that whether this transmission line would be seen by many, by but a few, or by no one at all, the visual impact would remain the same. It would seem here that the draft EIS is using the question "if a tree falls in the forest and nothing is there to hear it fall, does it make a sound when it falls?"

When the basis for conclusions is flawed, the entire conclusions are of questionable accuracy.

EXISTING LAND USE 4.1.8.1 page 4-26

EIS: "The presence of the proposed interconnection in areas irrigated by moving equipment could interfere with irrigation operations."

EIS: (page 4-82) "Echo to Southwest of Arden: The segment would cross 8,200 feet of agricultural land. One active sand/gravel pit would be crossed over at a distance of about 300 feet, resulting in a moderate impact to the facility. A picnic area is located about 1,200 feet from the proposed line, west of Arden. The project would have no effects on the use of this picnic area."

44-35 COMMENT: The above statement does not mention the presence of at least one circle irrigation system in Echo Valley, even though it was pointed out by the landowner at the Scoping meeting held in Colville in May, 1988. As he stated, poles down through such agricultural land would make it impossible to operate a circle irrigation system, rendering such expensive equipment useless and lowering the productivity of the entire field.

44-36 COMMENT #2: The statement above that the project would have no effects on the use of this picnic area is an arbitrary assessment made by the consultants. It is felt that most of those who use this lovely picnic area, with its adjoining secluded camp grounds and hiking areas would disagree. Such visual intrusion on the atmosphere of this sylvan retreat would spoil it for many who now use it because of its close proximity to Colville, and who might not otherwise have the time or opportunity to often enjoy such surroundings if they were a greater distanoe. This area is partioularly well suited for elderly and handicapped users, and is a heavily used area.

Response to Letter 44 Continued

44-35 The significant effects of transmission line towers located in areas irrigated by moving equipment are recognized in the significant impact listing and in the delineation of adverse impacts, both of which are shown in Section 4.1.8.1 of this Final EIS. A close review of the aerial photography (dated 1987 for this segment of the Western Alternative Route) reveals no indication of any center pivot irrigation crossed by the proposed ROW. The site survey photographs (1988) taken along the route of the Western Alternative likewise reveal no circle irrigation located there. If the Western Alternative Route would in fact cross a recently-installed circle irrigation system, then additional significant land use impacts would be applied to the route. These impacts, if they occurred, would improve the advantages of the Proposed Route over the Western Alternative Route, and would therefore not change the basic conclusion of the route comparison.

44-36 Please refer to the Response to Comment 44-12 regarding the Cole Creek Picnic Area.

Letter 44 Continued

EXISTING LAND USE (continued) 4.1.8.1 (page 4-24)

EIS: "Impacts to existing land use, zoning, and reoreation would be considered significant if: the presence of structures in cultivated fields would result in the loss of 100 acres from cultivation." (Source - EIS Team)

"Structures located in cultivated areas would also remove a small amount of land from production. On the average, it is estimated that about 2,000 square feet per structure, or 0.03 acres per mile, would be taken out of produotion when crossing cultivated land." (University of Minnesota 1978)

44-37 COMMENT: It is felt that when the two above-listed statements are put side by side, bias in favor of WWP is evident, and the credibility of the draft EIS is to be seriously questioned.

EXISTING LAND USE continued

GENERAL COMMENT: For impact assment on residences, an arbitrary standard of 100' from the transmission line to indicate moderate impact and 100'-200' to indicate low impact was used in this draft EIS.

If this is to indicate the aesthetic and emotional impact on the residents, this standard must, or necessity, be based entirely on the opinions only of the EIS team.

44-38 If this is to indicate the impact on the value of the residence, the impact would have to be judged on an individual basis in the area of Property Values and Just Recompense.

If this is to indicate the impaot on health, this standard would seem to be based entirely on fallacy. (Please see the discussion on Health Hazards and the discussion on ROW requirements.)

Once again, this lack of a REAL BASIS FOR ASSESSMENTS OF IMPACT instead of conjecture and opinions opens the entire range of conclusions in the draft EIS to question.

FUTURE LAND USE - page 4-50

Significant Impact Simmary

EIS: "Neither the proposed route, variations,or route options would produce significant impacts on future land use."

44-39 COMMENT: It is felt that this is not true in view of conversations with realtors. This is addressed in the oomment on Land Values.

Response to Letter 44 Continued

44-37 As shown on Table 2-6 in Section 2.7 of this Final EIS, the total area of agricultural land estimated to be lost from cultivation is 4.2 acres for the Proposed Route. To put this in perspective, this is an area of land equal to that lost by developing about 9 residences on 0.5-acre lots, or by building less than 1 mile of 2-lane roadway. Land use acreage statistics are available for Spokane County. In a 1981 report (Spokane County Data Atlas), the area of cropland and pasture in the county is given as 479,903 acres. The agricultural area lost to the entire project along the Proposed Route (only a portion of which is in Spokane County) totals approximately 0.0009 percent of the County's entire amount of agricultural land. The figure of 100 acres loss as a threshold of significance for impacts to agriculture is thought to be reasonable and objective.

44-38 The moderate impact level applies to residences within 100 feet of the edge of the transmission line ROW, not from the line itself. Likewise, low impacts apply between 100 feet and 200 feet of the ROW-edge. These impact levels apply to land use impacts (i.e., impacts of the types listed for Existing Land Use in Section 4.1.6.1 of this Final EIS) not to aesthetic or visual impacts which are addressed separately in Sections 4.1.9, 4.2.9, 4.3.9, 4.4.9, and 4.5.9. No attempt has been made to assess emotional impact of itself. Such impacts, insofar as they are measurable, are appropriately represented by and included in visual impacts. The impact levels do reflect generalized, anticipated effects on property value. These effects are discussed in Section 4.1.11.1 in this Final EIS.

Regarding your concerns on the EMF health issue, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to more adequately address the issue of the potential health effects of electric and magnetic fields. Additionally, please see Responses to Comments 13-5, 26-13, and 51-7 for discussion on related EMF concerns. The basic conclusion for Section 4.6.5 supports the existence of "biological effects" from specific electric and magnetic fields; however, such biological effects do not necessarily imply that these equate to "health" effects. Therefore, the land use impact levels do not reflect any level of risk to health since no such risks have been established. Land use analysis does reflect established effects from the energized lines, including noise and possible television and radio interference. These effects are discussed in Sections 4.6.2.2 and 4.6.2.3 of this Final EIS.

44-39 The effects of transmission lines on land values are discussed in Section 4.1.11.1 in this Final EIS. Adverse effects have been documented in some circumstances; significant adverse effects have not.

Letter 44 Continued

PROPERTY VALUES 4.1.11 page 4-64

On property values, the EIS does not offer a specific conclusion; but, rather, suggests that each situation could be different and should be evaluated individually.

44-40 COMMENT: It is felt that the above, taken at face value, is true. However, it is a general statement which sidesteps the real and difficult problems of determining value.

RIGHT OF WAY REQUIREMENTS 2.1.1.2 (and SIGNIFICANT VISUAL IMPACT SUMMARY p 4-50

EIS: "Following final determination of the transmission line route, a WWP representative would contact property owners to discuss with the landowner the proposed location of the line and obtain permission to conduct detailed surveys. WWP has made it a policy to work with the landowner to locate transmission facilities, access roads, and construction staging areas where the least impact might occur to the property." (Note: comment on this is made in Recap of Areas of Disagreement, Item 5)

"Following the ROW survey, a determination would be made of the transmission facilities location and a WWP representative would estimate the market value of the property crossed by the proposed facilities. The landowner and representative would then meet to negotiate a ROW easement which would provide for compensation for the line construction, operation, and maintenance.... Easement payments would be paid prior to the construction. WWP does not plan to acquire ROW through land purchases."

WWP has the authority to implement the right of eminent domain which provides for the taking of private property for public purposes without the owners consent, upon payment of just compensation for the right."

COMMENT: There are many areas of concern to landowners in the above statement;

To begin with, very few landowners would voluntarily invite WWP's proposed transmission line across their property. Once the fact is established that this whole procedure is an issue forced on individual landowners who value their property, there are certain things to consider.

44-41 From the statement in the EIS "WWP representative would estimate the market value of the property"...If the property owner owns the property for reasons other than saleability

Response to Letter 44 Continued

44-40 **In response to the comment, Section 4.1.11.1 has been updated and Response to Comment 26-11 further explains the analysis of property value effects for the proposed interconnection.**

44-41 **Based on the comment pertaining to compensation, please refer to Response to Comment 6-4 for additional information on ROW easements. The assessment of property values in relation to the proposed interconnection is discussed further in Response to Comment 26-11 and under the Property Values in Section 4.1.11.1.**

PROPERTY VALUES -(continued)

44-41 Cont.

"market value" becomes a false and wrong base for compensation. A property may have been obtained for absolutely other reasons and values than "market value", which is only one aspect out of many (and sometimes of the least importance, and sometimes of no importanoe to the owner). Civil rights become affected: Ref: USC Title 42, et al, and even Title 18, Seo. 1964 may be involved.

Further, in establishing "market value", the devaluation of the entire parcel of property due to the transmission lines must be considered for just compensation to the owner.

Conversations with local realtors reveal that transmission lines crossing a property may not only make it less valuable, in one instance they made it unsaleable for the purpose for which it was purchased. A local realtor stated that he had a client who purchased a property with transmission lines on it, with the idea of subdividing it. Even though subdivision was the order of the day and the real estate business was heated up, this realtor had the property for two years and was unable to sell it because of the lines. He believes it was finally sold, but not in a manner to meet the expectations of the investor.

Another realtor consulted stated that it has been his experience that any time a property is encumbered for any reason, including easements, the property value is diminished and the property is more difficult to sell.

Local realtors have estimated that a transmission line of this size would devalue the impacted property (as well as neighboring property visually impaoted) by as much as 40% for the entire affected parcel.

In one case, should the proposed transmission cross this property, which consists of forested hillsides on two sides, a year-round creek flowing the full length down the middle of the property, with meadow land, and cultivated land, the entire property would be ruined if subdivision were in the future use plans; and without subdivision the property would be much less valuable - and possibly unsaleable because of the lines and the oourse they might take through the property. The owners in this instance consider this investment of years of hard work to be their future security should the need ever arise for sale due to long-term illness, etc. The proposed transmission line on this property, used here as an example of many such properties and conditions, would seriously injure their entire financial future.

Letter 44 Continued

PROPERTY VALUES (continued)

In addition, a further consideration in figuring ROW compensation on forest land was mentioned at the Colville hearing of February 1, 1990 by Norm Mikalson, owner of a large tree farming enterprise. He stated that with no trees being allowed to be replanted following clear cutting of the ROW, the land would be useless to the owner, yet the OWNER would continue to pay the taxes on it forever. Also, another consideration here is the loss of long-term investment on the small trees which would be removed and which would have been harvested at maturity had they been allowed to grow.

44-42

It should be noted here that the Freemont, Ca. Planning Commission is requiring California Department of Real Estate to warn potential home buyers in a subdivision that nearby 230 kV power lines may pose a health risk. (thus affecting saleability) In 1986, a Florida jury awarded $1.6 million to owners of land adjacent to lots condemned for a 500 kV line. (Note: WWP has stated that they may in the future greatly increase the voltage on the proposed line)

So this brings us down to what is "just" compensation, and is "just" compensation possible under eminent domain laws?

5-123

SUMMARY: It is felt that this problem of diminished land value on properties crossed by the proposed transmission line and caused by that line, as well as adjacent properties, clearly indicates a massive adverse effect on the area's economy and its citizens.

44-43

ELECTRIC FIELDS 4.5.3 pg. 4-128 and 129

COMMENT: Draft EIS seems to paint a very interesting and benign picture as regards any problems in this area. However, at the Colville hearing on 2/1/90 a statement by Grady Knight, made in behalf of his neighbors Ben and Janet Schoenwold, who were not able to attend, paints a very different picture.

44-44

Mrs. Schoenwold was contacted to expand on their problems which are as follows:

They do indeed have the corona effect, and on wet nights the lines glow for as far as they can be seen. In addition, the noise is considerable and very annoying, and can be heard well over the noise of the creek, even though the home is approximately 500' away from the lines. They have an electric wire fence on insulators which crosses underneath the transmission

Response to Letter 44 Continued

44-42 Please refer to Fiscal Conditions in Section 4.1.11.2 and to Construction in Section 2.3.4 of this Final EIS for a discussion of compensation for timber removal. Response to Comment 31-2 discusses WWP's policy in compensating established tree-farming operations. In reference to the comment on taxes on unproductive timbered land, taxes would be assessed for the property owner (e.g., WWP or the previous landowner); however, this is not anticipated to significantly impact any individual, considering the small area affected per mile of transmission line and the small tax paid per acre of land. According to the Stevens County Assessor (Estep 1990), the average assessed value of timbered land (not timber) is $20 to $30 per acre. Applying an average tax rate of $13 per $1,000, the estimated average tax on the land is estimated to be $0.39 per acre per year.

44-43 Please refer to Response to Comment 6-4 pertaining to landowner compensation for ROW easements. In response to the comment on land values, please refer to Response to Comment 26-11 and the additional information incorporated under Property Values in Section 4.1.11.1 of this Final EIS.

44-44 Please refer to Section 4.6.2 in this Final EIS for a discussion of corona. Transmission lines are designed to minimize corona activity at the conductor surface, based on engineering principles and years of high voltage research. Also, please refer to Sections 4.1.12, 4.2.12, 4.3.12, 4.4.12, and 4.5.12 in this Final EIS, regarding potential noise impacts. In reference to appliance exposures, these can be short-term in duration but people often move from one source of exposure to another in a somewhat continuous manner. It should also be noted that houses provide significant shielding from transmission line electric fields (i.e., the electric field inside the house is reduced).

Letter 44 Continued

ELECTRIC FIELDS (continued)

line. The fence is always charged without benefit of an electric charger, sparks at the gate which is at least 100' to 150' from the crossunder, and gives a shock when accidentally touched. In addition, exposure to the area directly under the line causes Mr. Schoenwold's hair to rise. Mrs. Schoenwold does not experience this unsettling happening due, she thinks, to the fact that her hair is long and therefore heavier.

44-44 Cont.

Further, in the EIS's noting typical electric field values for household appliances - at 12 inches - it should be remembered that the exposure to these are of short duration at any one time on any one day (aside from electric blankets). In addition, these items are turned on and used by choice, while there is no such option available for those whose homes are exposed to high voltage power transmission lines. These power lines are bombarding the environment and its inhabitants - human and all other living beings in its path - 24 hours a day, 365 days a year, year after year, with humans totally trapped in this environmental distress.

5-124

EFFECTS ON VEGETATION AND ANIMALS 4.5.3.4 pg. 4-137

"IS: there are no indications that exposure to the electric fields beneath operating transmission lines affect livestock behavior or productivity. However, both ac and dc currents can cause definite behavoral responses in dairy and beef cattle..."

Also, on page 4-66, second paragraph..."No effects on dairies, dairy cows, or milk production are antioipated."

COMMENT: This problem with dairy cattle's getting mastitis from stray voltage from any source, including high voltage transmission lines has been widespread enough to lead to the manufacture of appliances to block stray voltage on farms. (ref. Ronk Electrical Industries, Inc., Nokomis, Il.)

44-45 Further, DOE and EIS writers are also reminded of the personal testimony of a Stevens County dairy farmer at the DOE Colville scoping meeting. He described in detail the severe health problems and failing milk production with his dairy herd caused by the nearby power line installation.

If this stray voltage can cause such a reaction in large-bodied cows, it follows that other farm animals would be similarly affected in an adverse manner. No mention of other domestic animals or fowls was noted in the EIS.

Response to Letter 44 Continued

44-45 As discussed in Section 4.6.3.4 of this Final EIS, stray voltage is not a problem due to transmission line electric and magnetic fields. Rather, it is due to problems with the electric supply system at the dairy (e.g., poor grounding, loose connections, etc.). There are methods to identify and fix the dairy wiring problems that may cause stray voltage.

Letter 44 Continued

MITIGATION 4.8 page 4-162

Mitigation Measure 6 - Wildlife:

EIS: "Following line construction, plant species such as white dutch olover or other browse species recommended by the USFWS, WDW, or Forest Service will be utilized for ROW reclamation, in addition to the plant species typically used by WWP during revegetation procedures."

COMMENT:

This paints a very rosy but unrealistic picture, it is felt. Experiences of ranchers have shown that wherever the ground cover is disturbed and the soil is disturbed, Knapweed, a Category I noxious weed, takes over. This weed is extremely tenacious, especially where soil is disturbed. In addition, its roots exude chemicals which kill competing natural grasses. In addition, Canadian thistle and other noxious weeds make it nearly impossible for planted vegetation to compete and survive unless carefully and persistently attended to. Also, EIS states elsewhere WWP will not use herbicides on ROW vegetati on - this poses the problem that such weeds as mentioned above could only be controlled by such measures, and that would result in killing the white dutoh clover in the event that herbioides were used.

44-46

In addition, in line with past experiences on range management, animals oassing through weeded areas scatter the seeds throughout the entire range area, across oultivated lands, and on to road sides as well.

THE ABOVE MAKES ALL OTHER DISCUSSIONS ALONG THESE LINES OPEN TO QUESTION.

Response to Letter 44 Continued

44-46 Please refer to Table 2-5 of this Final EIS to review the additional environmental protection measures developed to prevent noxious weed invasions during project revegetation. Also, Response to Comment 20-1 addresses this issue more completely. In reference to the use of plant species preferred by wildlife, please refer to Response to Comment 20-15.

Letter 44 Continued

AMBIGUOUS STATEMENTS

Environmental Impacts (4.1.5) Aquatic Ecology p. 4-10

EIS: "The removal of conifer species along specific areas would allow the re-establishment of hardwoods and could improve beaver habitat."

44-47 COMMENT: This statement leads to a bit of confusion on several instances - probably of no importance - but one cannot help but be curious about the statement of removal of conifer species and replacing with hardwood for beavers when it was thought to be understood that the ROW would need to be clearcut, and also, (a very minor question here) our beavers prefer soft woods such as cottonwoods.???

OPERATION AND MAINTENANCE - p. 4-16

EIS: "The only effect on off-ROW vegetation would be that very tall trees would be cut to prevent them falling on the line.

44-48 COMMENT: The question comes to mind of what is WWP doing cutting off-ROW trees. This is an ambiguous situation for the owner as it stands in the statement; and if carried out by WWP, in simple terms is theft or destruction of private property, since no mention is made of permission from the landowner or reimbursement to the landowner.

EIS: "WWP would not use herbicides for vegetation control"

44-49 COMMENT: This is truly a complicated situation which is not addressed at all, it seems. Many area residents are totally against chemical control of vegetation, which of course includes weeds. On the other hand, as mentioned elsewhere, uncontrolled weedy patches on ROW would serve to spread noxious weed infestations to adjoining lands, both range and cultivated, by livestock and wildlife.

Response to Letter 44 Continued

44-47 As stated in Section 2.3.4 in this Final EIS for project construction, "The transmission line would be cleared of trees to the extent necessary to facilitate line construction, maintenance, and conductor clearance." Although much of the low-growing vegetation would remain, larger trees that exceed the minimum line clearance would be removed, allowing young trees to begin to reestablish within the ROW. As inferred in your comment, these new trees would be removed during maintenance activities when they begin to exceed the maximum height. In areas near aquatic habitats where beaver occur, it is likely that opening of forested areas would improve forage for beaver, since they prefer these young saplings over older, mature trees. In addition, "hardwoods" is a general forestry term that typically signifies any deciduous (or non-conifer) tree. Therefore, the impact conclusions for beaver described in Sections 4.1.5 and 4.1.7 of the EIS remain as stated.

44-48 As discussed under Construction in Section 2.3.4 of this Final EIS, specific trees located outside the project ROW that are deemed to be a threat to the line would be cut only after an agreement to that effect was reached between WWP and the landowner. It is WWP's policy to then compensate the landowner for the loss of such trees.

44-49 Please refer to Table 2-5 of this Final EIS for review of two additional environmental protection measures developed to prevent infestations of noxious weeds. Response to Comment 20-1 also addresses this issue. In reference to the use of herbicides, it is WWP's policy to not typically use herbicides for weed control within their ROWs. However, in the event the identified preventative measures did not satisfy the federal, state, and local agency guidelines, then herbicides may be used in cooperation with the applicable county noxious weed control board.

Letter 44 Continued

HEALTH ISSUE 4.5.5 p. 4-137

COMMENT in letter of 2/3/90 to Department of Energy from Everett Kytonen regarding EIS statement in part..."Modern farming machinery...power lines...not a problem due to shielding of the electronics."

Mr. Kytonen stated "all human body functions - brain, nervous system, organs, heart - are stimulated and controlled by electro-neurological impulses. To state here that machinery is shielded to prevent problems and then to ignore effects on human and living functions and tissues is insane.

"To further enlarge on the gross inconsistency of the draft EIS, in bottom paragraph, page 4-154 and top 4-155 references are made to studies continuing on effects of electro-magnetic fields including .."1989 budget for U. S. programs is $4 - 6 million.'

44-50 "THEN: the last sentence in the next paragraph, 'the overwhelming weight of scientific evidence available to date indicates that exposure to electric and magnetic fields, be they from power lines or other sources, do not constitute a risk to health

"In the face of the just-preceding paragraph, this statement is grossly inconsistent."

FURTHER, at the Colville hearing on the draft EIS on 2/1/90, Roger Sammons cited a recent report of the Congressional Office of Technology Assessment correlating higher rates of

44-51 leukemia in children living near such lines as the proposed line, based on three separate studies. Other studies have positively linked the presence of such radiation to learning disabilities, miscarriages, fetal deformities, and cancer. These studies, he stated, were available to the DOE prior to completing its draft report, and appear to be unknown to them.

EIS: "To date, the concensus of reviews by independent scientific panels, as presented below, is that exposure to electric and magnetic fields like those found under transmission lines have not been shown to produce adverse health effects."

COMMENT: It is felt that this conclusion is in error, and is based on a one-sided and biased view.

44-52 All around the world, studies are being done on the effects of radiation from high voltage power lines. Obviously this is an area of growing public concern.

Response to Letter 44 Continued

44-50 Please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to more adequately address the issue of the potential health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2.

44-51 The childhood epidemiology studies mentioned in this comment (i.e., Savitz, Wertheimer, and Tomenius) are referred to in Section 4.6.5.1 of this Final EIS. The studies are listed in the Reference Section 4.6.6 as reference numbers 31, 32, and 40. A summary of the OTA report has also been added to Section 4.6.5.1 to further document these analyses (see reference number 43). Refer also to the previous Response to Comment 44-50 regarding the EMF health issue.

44-52 Please refer to Response to Comment 44-50 pertaining to the EMF analysis for this Final EIS. The story televised on Nightline featured a lay author, a utility executive, and one scientist/engineer who is a professor at Carnegie Mellon University. The program demonstrated that people can hold different views, but a clear link between human exposure to electric and magnetic fields and health effects has not been established by research scientists. The bibliography referenced in the comment is a collection of selective weekly newsletters, periodicals, and other sources. Most of the material contained in these items has been available to a variety of scientific panels who have concluded that health effects are unlikely. Please refer to Responses to Comments 13-5 and 51-7 regarding the resources used in the EMF effects analysis of this EIS.

Letter 44 Continued

Response to Letter 44 Continued

HEALTH ISSUE (continue)

44-52 Cont.

ABC's prestigous "Nightline" program on March 9, 1990 devoted an entire program to this problem and its attendant fears for human safety. Unfortunately, the Department of Energy and EPA declined an invitation to engage in this discussion. Of the three experts who participated in the discussion, the two "unaffiliated" scientists felt that there is grave danger or grave potential danger, while the Senior Vice President of the N. Y. Power Authority presented dissenting opinions.

(We present in passing the following quetation for your consideration: "Almost all the research done in this country on non-ionizing radiation is funded by the military, electric utilities or the electronics industry." from "The Dangers of Non-Ionizing Radiation" by Mark W. Cherman, Intern at the Public Disclosure Commission of the State of Washington - 3/10/88.)

NOTE: In his appearances to make statements at both the scoping hearing in Colville and the recent hearing of 2/1/90 in Colville Ferdinand Velez, Human Biologist, has presented many references and sources from studies world wide on the dangers under discussion. (Please see the attached Bibliography)

5-128

People are becoming more and more concerned - on the "Nightline" program it was mentioned that of the N. Y. Power Authority's $670 million spent on its 280 mile line, 2.6 million has gone to lawsuits. Spokane currently has a lawsuit brought by a man who feels his wife's death was caused by the problems addressed above.

SUMMARY: It is felt world wide that the high voltage transmission lines already in place may have already produced an unintended tragedy of enormous proportions.

Must we wait for a total disaster before a moratorium on new power line construction pending definitive studies?

We in this area remember the Hanford "Downwinders" and their sad fate.

A MORATORIUM ON NEW HIGH VOLTAGE POWER LINE CONSTRUCTION SHOULD BE MANDATED.

Letter 44 Continued

Response to Letter 44 Continued

M.O.P.E. BIBLIOGRAPHY ON HAZARDS OF ELECTROMAGNETIC FIELDS (EMF)

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Letter 44 Continued

U.S. Navy, "The Sanguine report", 1973. 15 years of research were reviewed on ELF effects. Scientists warned that the health of a large part of the population might be impaired by 60 hertz power lines. The Navy refused to discuss results with anyone else.

Andy Marino and Robert O. Becker presented evidence at PSC meeetings in N.Y. that ELF fields at power line inteneity or less had been linked to bone tumors in mice, slowed heart beat in fish, and various chemical changes in the brain, blood, and liver of rats. Bees exposed to a strong ELF field for a few days in Russian research had begun to sting each other to death or leave the area. Some sealed off their hives and asphyxiated themselves.

Robert O. Becker, The Body Electric, p.280, Experiments with rats exposed one month to 60 hertz electric fields of 100 to 150 volts per centimeter (simulating ground level underneath a typical high-tension line) resulted in three generations of rats showing severely stunted growth. Between 6 and 16 of the pups born in various tests failed to live to maturity because of the electric field.

Andy Marino, Maria Reichmanis, Robert Becker and F. Stephen Perry, 1979, in The Body Electric, pp. 287-288. Study conducted near Wolverhampton, England. People living near overhead high-voltage lines seemed more prone to depression. Magnetic fields averaged 22% higher at suicide addresses than at controls, and areas with the strongest fields contained 40% more fatal locations than randomly selected houses.

The Body Electric, p. 288. In the 1970s several reports showed that exposure to energy levels below the American safety guideline of 10,000 microwatts stimulate the thyroid gland, resulting in an increase in the basal metabolic rate.

Battelle Pacific Northwest Laboratory, Richland, WA, 1980. Rats exposed to a 60-hertz field (only 3.9 volts per centimeter) did not have their normal nightly rise in the hormone melatonin, the main hormonal mediator of biocycles.

Richard Lovely, University of Washington, 1978-79. His work confirmed Soviet reports of harmful effects of microwaves (500 microwatts, 7 hrs. a day for three months in rats).

Dietrich Beischer found that a one day exposure to an ELF antenna caused a 50% increase in triglycerides in 9 out of 10 human subjects.

Yu. N. Achkasova and colleagues, Crimean Medical Institute, 1978. 13 standard strains of bacteria exposed to electric fields only slightly stronger than Earth's background had increased growth rates and increased resistance to antibiotics.

Hylar Friedman, Army Medical Center, El Paso, 1981. Radar technicians were 5 to 12 times more likely than the rest of the population to get polycythemia.

R.D. Phillipe, 1980. Power-frequency electric fields severely retard fracture healing in rats.

Wendell Winters, University of Texas Health Sciences Center, San Antonio. While working for the N.Y. State Dpt. of Health's power line project he recently reported that human cancer cells exposed to 60-hertz EM fields for 4 hrs. showed a sixfold increase in their growth rate 7 to 10 days later.

Response to Letter 44 Continued

Letter 44 Continued

Response to Letter 44 Continued

John R. Lester, Dennis F. Moore, University of Kansas School of Medicine, Wichita. They found an increase in incidence of cancer in people living in direct line of radar beams.

Johns Hopkins School of Medicine, 1964. Higher than normal numbers of chromosome defects were found in blood cells of radarmen.

Dr. Peter Peacock, Public Health, Alabama, 1971. Apparent surge in birth defects (17 clubfoot children within a 16-month period vs. the statistical number of 4) among children of radar-exposed Army helicopter pilots at Fort Rucknar, Alabama base hospital. The Army tried to cover it up.

Nancy Wertheimer, 1984. Found a statistical correlation between use of electric blankets and the occurrence of birth defects.

Air Force sponsored study, 1961. 200 male mice were dosed with 100,000 microwatts (what some antenna repairers receive) at radar-pulse frequencies, four minutes a day for one year. 35% of the animals developed leukemia and 40 had degenerated testicles. The Air Force cut off all funds for follow-up work.

David Savitz, Nancy Wertheimer, Ed Leeper, Microwave News, September 1987, p. 11. Power-line frequencies have been found to be associated with higher rates of cancer and leukemia among children living in neighborhoods where such fields are strong. The risk was from 50 to 100% higher, depending on exposure

Robert B. Becker reports that cows on a farm in N.Y. have produced dead or defective calves since a 765 kv line through the property began operating in 1982.

Robert Becker, Microwave News, September 1987, p. 9. Dramatic increase in the incidence of Down's syndrome in a small New Jersey town that ranks fifth in the nation in the concentration of microwave transceivers.

Sam Milham, DSHS Epidemiologist, Environmental Health Perspectives, Vol. 62, pp. 297-300, 1985. Documents higher rates of cancer and leukemia among those with occupational exposure to non-ionizing radiation. His data is drawn from a study of all causes of death among men in Washington State from 1950 to 1982.

Jukka Juutilainen, Microwave News, May 1987, p. 2. The incidence of leukemia among Finnish electrical linemen and cable joiners was found to be three times the expected rate.

University of Southern California School of Medicine, Los Angeles, Microwave News, September 1986, p. 14. Doctors found that patients with Lou Gehrig's disease (amyotrophic lateral sclerosis) were almost four times as likely as those without the disease to have worked in electrical occupations.

Swedish study, Microwave News, July 1986, p. 4. Out of more than 4,000 births between 1980 and 1983 there were nearly twice as many significant malformations among the offspring of women who worked at video display terminals as among those with no such exposure.

Paul Brodeur, The Zapping of America, New York: Norton, 1977. p. 136 - Dr. Peter B. Peacock found an abnormally high rate of birth defects. There are 46 radar installations within 30 miles of the base at Fort Rucker, Alabama. p. 185 - In 1970 Dr. Irvin Emanuel, University of Washington, found that the rate of Down's syndrome among the children of the 1500 pilots in the Seattle area was twice the expected rate. The Air Line Pilots Association squelched an attempt to expand this study nationwide.

Letter 44 Continued

Response to Letter 44 Continued

Microwave News, November 1986, p. 12. Nancy Wertheimer and Ed Leeper report that pregnancies among couples who use electric blankets are more likely to end in miscarriages than those among couples who do not heat their beds.

Parents magazine, in Microwave News, November 1987, p. 7, has warned pregnant women to avoid using electric blankets.

Milton H. Zaret, in The Zapping of America p. 76, notes that while "the sun is our strongest natural source of microwaves, the microwave-oven-leakage standard set by the Bureau of Radiological Health is approximately one billion times higher than the total, entire microwave spectrum given off by the sun."

David A. Savitz (University of North Carolina), Howard Wachtel and Frank Barnes (both of the University of Colorado). Tabulated cancers in kids up to age 14 living in Denver, diagnosed between 1976 and 1983. The study suggested that prolonged exposure to low-level magnetic fields can increase the risk of cancer in children.

Kansas City's Midwest Research Institute recently studied effects of 60-Hz electric and magnetic fields on human functions under a DOE contract. ... " The findings from this initial screening study suggested that exposure had small but statistically significant effects on several physiological and biochemical measures.

Sam Koslov, Johns Hopkins University, in Acres, U.S.A., April 1987, pp. 6-7. Microwave radiation may influence the development of Alzheimer's disease. Also in Acres: in discussing high tension wires, "the distance a disturbance will reach goes up as the square of the voltage... That's why extremely high tension lines, like the 250,000 volt super powerline, can create negative effects or stressful effects at great distances, meaning a couple of miles from the line.

Cancer Therapy and Research Center, San Antonio. They discovered that human cancer cells exposed to 60-Hz fields (the frequency of a high-voltage power line) grew up to 24 times as fast as unexposed cells and showed "greatly increased resistance to destruction by the cells of the body's defense system."

Letter 44 Continued

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Robert O. Becker, letter to Judy Corbitt, December 15, 1985, 2 pages.

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Karen J. Ray (legal assistant to Dixon Montague, counsel), letter to Zetta Wojcik giving names of experts used in the Klein Independent School District vs. Houston Lighting & Power Co. case, June 3, 1987.

Response to Letter 44 Continued

Letter 44 Continued

Response to Letter 44 Continued

NO THANK Q HYDRO-QUEBEC BIBLIOGRAPHY 7/27/87

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Letter 45

LAW OFFICES OF
BASSETT & MORRISON
PROFESSIONAL SERVICE CORPORATION
SUITE 2600 SEATTLE TOWER ONE
1001 WESTERN AVENUE
SEATTLE, WASHINGTON 98121-2187
FACSIMILE: (206) 441-1782
(206) 443-1920

W. GEORGE BASSETT
WILLIAM M. CLUMPNER, JR.
PHILIP B. CROESSMANN, AIA*
LAURIE B. ELSTON
K. MICHAEL FANDEL
DANIEL F. GANFIELD, AIA
STEPHEN H. GOODMAN
CORINNA D. HARN
PETER G. LIVENGOOD
KATHRYN A. MAJNARICH
STANLEY D. MALOS**
MARGARET A. MORGAN

FRANK B. MORRISON, JR.
DANIEL F. MULLIN***
MARK S. NORTHCRAFT
JAY D. O'SULLIVAN
LISA L. PAN
PATRICK G. TOULOUSE
CHARLES H. VAN GORDER
DONALD J. VERFURTH
MARLIN L. VORTMAN
WILLIAM K. YATES
MARTIN L. ZEIGLER

March 23, 1990

Bill Freeman
Office of Fossil Energy
1000 Independence Avenue S.W.
Washington, DC 20585

Dear Mr. Freeman:

5-135

I have recently become aware of the fact that Washington Water Power and BC Hydro intend to install a 230-kilovolt transmission line between Trail, B.C., and Marshall in Spokane County. The proposed project route runs parallel to Bonneville Power Administration transmission lines through north Spokane County, adjacent to some real property I own on Five Mile Prairie. The purpose of this letter is to advise you that I am against the location currently planned for these lines, and would like your help in opposing the route currently proposed.

Since the proposed transmission lines would run adjacent to my property, I am concerned that these lines will affect my view, property value, and possibly my health. As you may be aware, there is mounting evidence of health and safety hazards associated with exposure to electromagnetic fields, such as those emitted from high voltage power lines. Additionally, because of the potential adverse health effects and impaired view, these lines pose a real threat of property devaluation.

45-1

I do not believe the proposed project belongs in a residential area, particularly when there are alternative routes which would not affect residential property. Moreover, I believe there are serious legal questions regarding the effect this project would have on the easements previously granted the Bonneville Power Administration. It is my understanding that the easements granted by my predecessors were given only to Bonneville Power Administration, and not the entities involved in the proposed WWP-BC Hydro transmission line. Additionally, I understand that the new towers may be as high as 120 feet and could require additional right-of-way footage.

Response to Letter 45

45-1 The vacant BPA ROW that WWP is investigating for part of the proposed Interconnection exists from just south of Boundary Dam to the Bell Substation. No BPA ROW is available between Bell and Beacon or along the Eastern Alternative, west of the Bell Substation. The easements acquired by the U.S. Government for the vacant ROW are assignable by virtue of language in the documents.

Letter 45 Continued

Response to Letter 45 Continued

In summary, I have many reasons to oppose the proposed route for this project. I am very unhappy that the project owners have shown little regard for the effect their project will have on adjacent property owners. I would appreciate anything you can do to support the property owners' concerns regarding the potential adverse health effects and devaluation of property.

Thank you for your assistance in this matter.

Very truly yours,

Laurie R. Elston

Laurie R. Elston
Attorney at Law

LRE:em/1119g

Letter 46

March 18, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

I [redacted] have read the letter dated February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As (a) resident landowner [redacted], who would also be affected by this project, I [redacted] endorse the objections stated in the Inmans' letter and wish this letter to be considered my [redacted] formal declaration of opposition to this project.

Sincerely,

Laura L. Engle

10925 N. WAIKIKI ROAD
SPOKANE WA 99218

5-137

Response to Letter 46

Your concerns are noted. No response necessary.

Letter 47

March 18, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

5-138

Dear Mr. Freeman:

I [redacted] have read the letter deted February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Washington Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As (a) resident landowner[redacted], who would also be affected by this project, I [redacted] endorse the objections stated in the Inmans' letter and wish this letter to be considered my [redacted] formal declaration of opposition to this project.

(copies to Cong Tom Foley)

Sincerely,

Karen J Baker

Box 28127
Spokane WA 99228-8127

Response to Letter 47

Your concerns are noted. No response necessary.

Letter 48

Response to Letter 48

Note: Original letter quality produced poor copy.

(Page 1) 1 25 March 90

TO: D.O.E. (Regarding Washington Water Power's proposed BC Canada intertie to Spokane)

I'm writing this letter to state my continued opposition to WWP's proposed Power Line connecting B.C. Hydro's Selkirk Substation with the Marshall Substation in Spokane. Specifically, I'd like to point out some of the inadequacies of the Draft E.I.S dated Dec. 89.

48-1 First of all, as stated numerous times at the Feb 1st Colville Hearing, the section dealing with Health Hazards is inadequate and subjective, because the history of the suppression of studies (and objective thinking) on the potential links between Health issues and ELF Radiation is eloquently documented in the 3-part series in the June '89 issues of the "New Yorker" magazine, which along with the research cited, I submit as evidence in support of a moratorium of this proposed project until the Health Issues are adequately addressed. Even the Draft E.I.S., despite its bias, cannot avoid the conclusions of numerous scientific panels and commissions that further studies are needed, and until this issue is clarified, it is unconscionable that our government and the Utilities Industry would consider subjecting biological life forms, be they people, animals, or even plants, to ELF Radiation, outside a controlled laboratory environment. We are still reeling from the revelations about radiation releases at Hanford not so very far from here — we do not intend to become subjects in an experiment again.

48-2 The Draft E.I.S. does acknowledge effects on Honeybees, however (pg 4-137). But it does not mention that the "[illegible] Co." (on the Waneta Rd. near Northport) lies almost directly underneath the Western Alternative. This is due, no doubt, to a systematic flaw in the Draft E.I.S. methodology, which will be discussed further below.

48-3 Furthermore, the Draft E.I.S. fails to mention the importance of [illegible] South Valleys, particularly the Columbia / Colville / [illegible] Valley, as flyways for migratory birds such as ducks, geese, and swallows (to name a few) and what effects this proposed project [illegible].

On a closely related topic, at the Colville Hearing, representatives of the DOE expressed concern about wetlands. That, I [illegible] to map 2-1 (Sheet 9) [illegible] the Western Alternative in the [illegible] of the Draft E.I.S. [illegible] specifically, I refer to the [illegible] center of that map, south of "Silver Crown" mountain, west [illegible]

48-4 3 miles, to north of "Island" [illegible] the Western Alternative in that area. [illegible] the scale & quality of the maps in the Draft E.I.S. [illegible])

5-139

48-1 The articles in the New Yorker magazine by Mr. Paul Brodeur are a collection of stories about powerlines, radar, video display terminals, and other items. The articles rely on selected material to present and promote the author's point of view. This approach has been criticized by others as unscientific, and Mr. Brodeur's material cannot be evaluated in any scientific manner. Some of the studies he cites (e.g., Wertheimer and Savitz) were included in this Final EIS in Section 4.6.5.1. Please refer to Responses to Comments 13-5 and 51-7 regarding the resources used in the EMF effects analysis for this EIS.

48-2 An Environmental Impact Statement (EIS) is not required to identify every potential impact that is of less than significant levels. The omission of such potential, relatively minor impacts from an EIS does not mean that they will not be mitigated if the route along which they occur should be selected. On the basis of what is known about the effects of electric fields on honey bees (as discussed in Section 4.6.3.4 of this Final EIS), it is unlikely that the 230-kV project would have substantial effects on the hives if they were located on the ROW, or any effects if they were off the ROW. If the Western Alternative or Onion Creek Variation were selected, and if the hives reported were on the ROW and appeared likely to suffer adverse effects, WWP has committed to cooperate with the owner to mitigate any such effects by grounding the hives or by arranging for their removal to a location off the ROW. These measures would ensure the economic viability of the honey business.

48-3 Please refer to Response to Comment 44-2 for additional discussion on migratory species impact analysis.

48-4 In selecting a base map to display alternative routes in the EIS, a trade-off was made between the level of detail shown and the number of map sheets required. It is felt that the 1:100,000 scale selected provides the reader with adequate detail on the location of the alternative routes and adjacent features but still holds the number of sheets (11) to a level reasonable for publication. For assessing impacts, the resource specialists used much more detailed maps and aerial photographs. Specifically for wetlands, 1:24,000 scale National Wetland Inventory maps and 1:58,000 scale color-infrared aerial photographs were utilized.

Letter 48 Continued

(Page 2)

48-4 Cont. of the attempt to determine the impact of this portion of the route. In any event, within this 2 mile stretch of route exist no less than 3 small wetland areas (approximately 1-3 acres in size) directly or across directly beneath the indicated route line, with several others within ½ mile. These wetlands are periodically occupied by Ducks, Osprey, and other upland and predatory birds, and some or all contain nesting sites. None of this is mentioned in the Draft EIS. Several flaws become immediately apparent, such as the failure to conduct field studies (over seasonal cycles), and the failure of WWP or the DOE-sponsored EIS group to contact property owners along the various routes. Either / both of these failures constitute prevention of this oversight - which of course is applicable to the twelve routes" of all the route configurations, not just this isolated 2 mile segment affecting property. Consider the above, and the reference cited in the "New Yorker" series regarding the effects of E.L.F. radiation on child Embryos. The Draft EIS is superficial.

48-5

48-6

5-140

48-8 The same conclusions can be drawn when one considers the number of homeowners that pointed out at the Cobville Hearing that the route appeared to be going directly over their homes, yet these instances were not documented in the Draft EIS comparative summaries. In the same 2 mile corridor lives a man in a hand-hewn cabin - his mountain is made of the fact that the line will pass almost directly over his house. Again, the failure in this 2-mile segment can be expanded to the entire route configuration.

At the Cobville Hearing I signed a list circulated by WWP, and days later was contacted by phone by GARY CRISEY, a WWP Public Relations man in their Spartan Office. I discussed some of the above weaknesses in the Draft EIS, particularly the omissions of "existing homes". His response to me was very illuminating, and I believe warrants further attention. He stated that aerial photos from 1984-86, and USGS maps from early - to mid - 80's were used in the Draft EIS preparation. These sources are clearly outdated, as evidenced by the aforementioned omissions. When I pointed this out to Mr. Casey, and suggested that WWP could've avoided this inadequacy and obtained a more accurate assessment by physically inspecting the properties along the various routes and contacting the various landowners for comments, he replied that "WWP diligently used the resources" &c. do that although an assessment, but would do so after the (specific) route had been chosen, and only on the "preferred" route. If you don't get the implications of this, please re-read

48-7

Response to Letter 48 Continued

48-5 In reference to your concern on wetlands and associated wildlife species, please refer to Response to Comment 27-1 regarding wetland impacts and Sections 4.1.7, 4.2.7, 4.3.7, 4.4.7, and 4.5.7 in this Final EIS for impact discussions on species such as the bald eagle, osprey, and waterfowl. The basic baseline data and impact assessments for area wildlife species were derived from a variety of sources. The WDW Nongame Data Systems computerized data base was utilized for information on sensitive wildlife species occurring within 2 miles of the project alternatives, and biologists from the WDW, USFWS, and Forest Service were contacted for current species information within the project area (see Section 3.1.7.3). These individuals are directly involved with studies of wildlife populations occurring in the area. Therefore, the combination of these resources was able to provide the most up-to-date information on sensitive species associated with the proposed project.

In reference to your comment on WWP failing to contact property owners along the project alternatives; in accordance with NEPA Regulations (40 CFR 1506.6) the lead agency (DOE) shall, "make diligent efforts to involve the public in preparing and implementing their NEPA procedures." The agency shall, "provide public notice of NEPA-related hearings, public meetings, and the availability of the environmental documents so as to inform those persons and agencies who may be interested or affected; explain in its procedures where interested persons can get information or status reports on environmental impact statements; and make [all information] available to the public pursuant to the provisions of the Freedom of Information Act (5 U.S.C. 552)." Attempts to notify the public were carried out as required under NEPA. If a route is approved and a Presidential permit issued by DOE, WWP would contact all property owners that would be affected by the transmission line project at that time. Please refer to Response to Comment 63-19 for additional information on property owner notification.

48-6 As reported under Existing Land Use in Section 3.1.6.1 of this Final EIS, the locations of sensitive existing land uses (including residences) were identified using low altitude aerial photography. These photos were 1 inch = 1,000 feet scale dated (in this portion of the route) 1987. Any residences identified in these detailed photographs that were on any portion of the network of alternative routes and were located either within the proposed ROW or within 100 feet of the ROW edge appear on Map 2-2 and in Table 2-6 in this Final EIS. A close check of the aerial photography for the 2-mile line segment referenced revealed no residences within 100 feet of the proposed ROW edge.

48-7 A variety of resources were examined in assessing impacts for the proposed interconnection. A few of these resources include color-infrared, high-altitude aerial photographs dated 1983; black and white, low-altitude aerial photographs dated 1987, and USGS topographical maps ranging from the mid- to early 1980s. In order to adequately assess project impacts, a field reconnaissance was also conducted in July 1989 to identify sensitive areas. It was recognized that some features (particularly residences) may have been constructed since the aerial photographs were taken and since the reconnaissance surveys were performed. Therefore, additional surveys directly along the Proposed Route were conducted in May 1990 and April 1991 to identify more recent sensitive resources. These additions have been incorporated into the appropriate disciplines in this Final EIS (e.g., Sections 3.1.6.1 and 3.2.6.1).

Letter 48 Continued

Page 31

48-8 First of all, this constitutes an admission that the Draft E.I.S. is insufficient and inadequate in accurately assessing the impact along the various routes, and as claimed by numerous speakers at the Cobrille Hearing Furthermore, if WAP in fact doesn't have the resources to fund an adequate E.I.S., then it has no business proposing the project in the first place, nor does the D.O.E. have the right to simplify the EIS process in order to keep WAP's costs down, which, judging by the (lack of) quality of this Draft E.I.S., is exactly what's going on (for example, no field studies, dated data, etc.)

Secondly, it indicates that insofar as Mr. Carey's statement reflects the attitude of WAP towards the E.I.S. procedure, WAP is attempting to circumvent the procedure by failing to adequately assess the various routes of the proposal. At a minimum it indicates a ~~gross~~ misunderstanding of the E.I.S procedure, as it's necessary to assess the impacts of the various routes before a specific route is chosen, not after, as the route selection should be based on this assessment.

5-141

Finally, this seems to contradict WAP's claims, as stated in the Draft EIS, that they are willing to work with landowners.

48-9 I would like to re-state a question I posed at the Cobrille Hearing: What effect will the proposal, if approved, have on water flow in the Columbia River above Lake Roosevelt. B.C. Hydro has proposed the Murphy Creek Dam (above Trail, B.C.) - I believe in anticipation of WAP's project approval. Both Celgar Pulp (in Castlegar) and Cominco (in Trail, B.C.), periodically (often "accidentally") release dioxins into the Columbia River (Dioxins, Furans, & Metals) which are accumulating in the upper tracks of Lake Roosevelt, and in the fish as well, according to the WA. State Dept. of Ecology. To water-sheds are regulated further by (an) additional dam(s), what effect will this have on these toxin levels, sediment disruption, fish - and human - intake (via accumulation in the food chain) and on the Hydelley Expansion programs in progress on Lake Roosevelt?

48-10 During the Cobrille Hearings it was stated by DOE that they (DOE) and WAP, would be responsible for route selection.

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Response to Letter 48 Continued

48-8 Your comment regarding the adequacy of the Draft EIS analysis is noted. Please refer to Response to Comment 48-7 for additional information on the data utilized in the impact analysis.

48-9 Currently, releases of water from Canadian storage reservoirs are governed by the requirements of the Columbia River Treaty. As a result, the operation of the interconnection should have no adverse impact on Columbia River flows.

48-10 The DOE does not select the route for the proposed transmission line. Please refer to Response to Comment 6-1.

Letter 48 Continued

Page 4

48-10 Cont. Is this in fact correct? Since when did this become part of the D.O.E. mandate. I was under the impression that the DOE was involved only because a "Presidential Permit" was required to cross the International Boundary, and that the mandate was limited to approval/disapproval of this "permit". I believe the specific route selection should be determined at the state or local level, if the project is approved.

Furthermore, I believe the Bonneville Power Administration (BPA) is under the jurisdiction of the DOE. Is this correct? However, BPA is also an intervenor in WWP's proposed project. If D.O.E. disallows the Presidential Permit, DOE will be subject to a charge of "conflict of interest" by WWP, while if DOE approves the project the conflict between DOE & BPA over WWP's project becomes an internal DOE matter. If this scenario is in fact as stated, then I question (ie. "challenge") DOE's role in the evaluation process due to an apparent conflict of interest, as DOE cannot objectively evaluate WWP's proposal.

5-142

In the weeks subsequent to the Colville Hearing (at which I questioned DOE's ability to evaluate WWP's proposal due to the absence of any contextual framework - that is - National Policy), I have been coming across numerous references to a "National Energy Policy" being formulated, and due for release by year's end. I therefore request a postponement of the entire process, or at least any final decision, until the release of this Policy, in order to ascertain the viability of WWP's proposal in light of this (soon-to-be) Policy.

48-11 I believe the Draft EIS fails to address the option of Conservation and its impact, and that of increased Energy efficiency, as opposed to WWP's proposed project. The "Rocky Mountain Institute" in Old Snowmass, Co. conservatively estimates a 50% ~~reduction~~ energy savings ⇐ would result from pressuring the Utilities and Industry with legal and economic incentives, and retrofitting existing structures. The current economic structure does not reward utilities for encouraging efficiency and conservation, and I believe this issue needs to be addressed as an alternative in the Draft EIS.

These types of issues will be coming more and more to the fore front as the environmental "squeeze" becomes more apparent during the

Response to Letter 48 Continued

48-11 Based on the comment on development of alternative sources of power, please refer to Section 2.6 of this Final EIS where alternative electric resources and transmission systems were evaluated to potentially meet WWP's anticipated deficits. Section 2.6.1 and Section 2.6.1.1 have been expanded to provide a more detailed discussion of energy supply alternatives and energy conservation.

coming years. The DOE and the current administration, with its so-called "environmental president", should be taking the lead rather than being dragged kicking and screaming into the 21st century.

In light of all my above statements and concerns, I believe the project should be postponed indefinitely until the Health Issues are clearly resolved, Energy Efficiency and Conservation are given top priority, and then, if necessary, be open to reconsideration only after a thorough and objective EIS has been conducted. Thank you

Sincerely,

Eric Berg

ERIC BERG
HC 3 - Box 202
NORTHPORT, WA. 99157

Letter 49

Jeanette R. Smith
13411 12th Ave. S.
Seattel, WA 98168
March 19, 1990

Mr. Anthony J.. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independende Ave., S.W.
Washington, D.C. 20585

Dear Sir:

I am requesting under The Freedom Of Information Act a copy of the petition of intervention of the Bonneville Power Administration against the Washington Water Power plans to install hydroelectric power linea from the Marshall Lake area in Spokane, Washington to the British Columbia Hydro Plant.

If the cost of this is more than $15.00 please contact me at:

206-244-7375 (home phone)
206-442-8274 (work phone)
13411 12th Ave. S., Seattle, WA 98168

Thankyou for your cooperation.

Sincerely,

Jeanette R. Smith

Response to Letter 49

Your concerns are noted. No response necessary.

Letter 50

March 25, 1990
Jeanette Smith
13411 12th Ave. S.
Seattle, WA 98168

Mr. Bill Freeman
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave. S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

I have read with interest the DEIS on the Washington Water Power hydroelectric power lines project. I would like to be put on record as protesting the installation of these lines.

I feel their are too many questions left unanswered. i.e.
50-1 Does the Northwest really need the additional 230 kv to the 115 kv lines that BPA already has; the excess power would obviously be sold to other areas at the expense of the Northwest; The
50-2 hazzard to the health of human beings by these lines has yet to
50-3 be determined; The disruption to the wildlife and endangered species is immeasurable.

I think that the Washington Water Power shbuld explore alternate methods for the additional power more thoroughly before this presidential permit is granted.

If indeed the presedential permit is granted I also want to be put on record as requesting that the WWP lines are installed on the western side of the BPA lines which would still place them within 1000 feet of my retirment home but a little farther than if they were on the east side.

Sincerely,

Jeanette Smith
Pend Orielle property owner

Response to Letter 50

50-1 Based on the comment, the purpose and need discussion for the proposed WWP/B.C. Hydro Transmission Interconnection has been expanded in Section 1.2 of this Final EIS.

50-2 Please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to more adequately address the EMF health issue. Note the modified conclusions presented in Section 4.6.5.2.

50-3 Your concerns are noted. Please review Section 4.1.7 regarding potential impacts to wildlife species of concern and refer to Sections 2.3.4, 2.3.5, and 4.9 in this Final EIS for specific measures developed to protect these sensitive species.

Letter 51

Ferdinand Vélez
P.O. Box 537
Northport, WA 99157-0537

March 25, 1990

Bill Freeman
U.S. Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., S.W.
Washington, D.C. 20585

Re: Draft Emvironmental Impact Statement, Washington Water Power/
B.C. Hydro, DOE/EIS 0141-D

Dear Mr. Freeman:

I am concerned about the biased presentation of Electric and Magnetic Field Effects in section 4.5 of the EIS. The conclusion states that "The overwhelming weight of scientific evidence available to date indicates that exposure to electric and magnetic fields, be they from power lines or other sources, do not constitute a risk to health." Herewith I include part of a substantial bibliography which supports an entirely different conclusion, namely that electromagnetic fields (EMFs) affect living systems in disturbing or unknown ways, and that more research is needed before we allow high power lines to be built near human habitation or many other living systems.

51-1

We should bear in mind that one probable reason for not finding more hard evidence on the adverse effects of EMFs is the pitiful amount of money allocated to such research in this country, which last year was in the order of $4-$6 million (p. 4-155 of the EIS). An article in the San Francisco Sunday Examiner & Chronicle dated December 6, 1987 brings out an interesting point. As questions are raised about widespread health effects of extremely low frequency EMFs, funds for research drop. Federal funds spent on reasearch in 1986 were $4 million (Rep. George Miller, D-Martinez, chairman of the House subcommittee on water and power resources called that amount peanuts.) The Electric Power Research Institute planned to spend $3.2 million on research in 1988, another bowl of peanuts.

Another important reason is that epidemiological studies, which are the strongest from a biological perspective, take time, and this is a relatively new field. An important consideration when discussing effects of power lines is that, if you live close enough to them,

Response to Letter 51

51-1 Please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to more adequately address the EMF health issue. Note the modified conclusions presented in Section 4.6.5.2. Also, please refer to Responses to Comments 13-5 and 51-7 for additional information on the resources used in the EMF effects analysis for this EIS.

Letter 51 Continued

their effect on the body's biochemical functions is practically continuous if you're home most of the time. This is a lot more serious than the sporadic use of certain appliances which emit EMFs. The Health Issue Conclusion in section 4.5.5.2 of the EIS implies that there is not much difference.

51-2

The Health Issue section 4.5.5 shows a lack of scientific balance: 1) on p. 4-141: "consensus of reviews by independent scientific panels..." shows that EMFs produce no adverse effects. That does not mean they're safe. How independent are those panels? Why haven't long term studies been done? Why don't government agencies spend more money on research?

51-3

2) Since 1986, when a Florida hearing examiner stated that no evidence of adverse health effects (not true even then) was presented on a proposed line, many studies have appeared supporting possible ill effects.

51-4

3) The standards for EMFs set by the State of Florida (p. 4-147) on March 1, 1989 are completely arbitrary. No standard has ever been set based on objective biological research.

51-5

4) On pp. 4-147 to 149 several quotes from the World Health Organization (WHO) are presented. One says that adverse human health effects have not been established (1984). But it doesn't say that adverse effects have been ruled out. On the contrary: "the possibility of some perturbing effects occurring following longterm exposure cannot be excluded." More epidemiological studies are needed. Another quote compares current densities in the human brain and those induced by an external magnetic field such as power lines. We should keep in mind that currents in our brains are due to the effects of charged ions such as sodium and potassium, which form part of interacting biochemical pathways, whereas power line currents are due solely to traveling electrons.

51-6

5) On p. 4-153 there is insufficient evidence presented to conclude that "transmission lines do not produce effects on the general health... or produce cellular effects indicative of transformation to a cancerous state." Read works by the following researchers in my bibliography: Craig Byus, Susan E. Pieper, Joseph Bowman, Jerry Phillips, Geneviève Matanoski, and at least 9 papers in the Fifth International Symposium on Man and His Environment in Health and Disease, Dallas, Texas, Feb. 1987.

51-7

Response to Letter 51 Continued

51-2 Please refer to Response to Comment 44-44 regarding the potential impacts from appliance exposure, and review the modified EMF conclusions presented in Section 4.6.5.2 of this Final EIS.

51-3 Please refer to Response to Comment 26-13 for a discussion of scientific panel independence and Responses to Comments 13-5 and 51-7 regarding the resources used in the EMF effects analysis for this EIS. In reference to funding allocation, the amount of research is not evaluated for its adequacy as part of an EIS. We could not speculate on reasons for the level of funding or if it were appropriate.

51-4 In reference to the comment on recent studies of EMF effects, a discussion of the Office of Technology Assessment (OTA) report has been added to Section 4.6.5.1 of this Final EIS. Please refer to Response to Comment 13-5 for a discussion of the analysis conducted by independent scientific panels on the EMF health issues and Response to Comment 51-7 regarding the resources used in the EMF analysis for this EIS. Also, review the Sections 4.6.5.1 and 4.6.5.2 for a modified discussion on EMF effects.

51-5 It is agreed that at this point in time, any standards for electric or magnetic field strength at the edge of a ROW cannot be based on the results of scientific research. This would be fiction. As discussed in the OTA report (see Section 4.6.5.1 of this Final EIS), while simple field strength safety standards may be "administratively convenient for both regulators and utilities, they unfortunately cannot be justified on the basis of the available science. If they are presented as assuring safety, they may produce a false sense of protection, and in some circumstances could arguably do more harm than good." Rather, the OTA report suggests a "similarity-based approach" as a basis for setting field standards. This means that the fields from new transmission lines are to be made similar or comparable to the fields associated with existing lines. It is our understanding that this approach was used by the State of Florida in setting standards rather than the "completely arbitrary" approach suggested by this comment. Further research will determine whether such standards are appropriate and whether there is any biological basis for field strength standards.

51-6 The World Health Organization (WHO) holds to the accepted principle that one can never prove the absence of a health effect from environmental exposures, including electric and magnetic fields. However, the WHO analysis does not find sufficient cause to conclude that there are adverse effects. Please refer to the modified and expanded Sections 4.6.5.1 and 4.6.5.2 of this Final EIS that better explain the EMF health issue. Note the revised conclusions presented in Section 4.6.5.2.

51-7 Please review the modified conclusions on the EMF health issue presented in Section 4.6.5.2 of this Final EIS. Also, note the additional references associated with the expanded discussion in Section 4.6.5.2. While the bibliography in Section 4.6.6 of this Final EIS is not exhaustive (i.e., it does not include every newspaper, magazine, or similar material), it nevertheless includes a brief summary of the most important studies conducted to date. As discussed in Response to Comment 13-5, independent scientific review panels reviewed many studies that are not specifically itemized and included in the EMF references cited in Section 4.6.6 of this Final EIS. The discussion presented in this EIS was intended to bring the most important studies to the reader's attention. The reader may also want to refer to the Report to the California State Legislature by the California PUC - "Potential Health Effects of Electric and Magnetic Fields from Electric Power Facilities" (1989) for additional references on this topic.

Letter 51 Continued

51-7 Cont.

I feel strongly about the omissions in the bibliography on electromagnetic health effects, due, apparently, to Mr. Rob Kavet, even though he seems qualified in both education and experience. The public deserves a more balanced treatment of the available scientific data. I hope this time you pay more attention to my bibliography. During the public scoping meeting in Colville in May 1988 I presented an extensive bibliography to Mr. Como, chairman of the meeting, and it was apparently ignored.

BIBLIOGRAPHY

Astumian, R. Dean, and Weaver, James, Journal of Science, Feb. 1990. This article is about potential dangers of low level electric fields to human and other living cells because of the biochemical activities of living cells.

Achkasova, Yu. N. and colleagues, Crimean Medical Institute, 1978. Thirteen standard strains of bacteria exposed to electric fields only slightly stronger than Earth's background had increased growth rates and increased resistance to antibiotics.

Air Force sponsored study, 1961. 200 male mice were dosed with 100,000 microwatts (what some antenna repairers receive) at radar-pulse frequencies, four minutes a day for one year. 35% of the animals developed leukemia and 40% had degenerated testicles. The Air Force then cut off all funds for follow-up work.

Battelle Pacific Northwest Laboratory, Richland, WA, 1980. Rats exposed to a 60 hertz field (3.9 volts/cm) did not have their normal nightly rise in the hormone melatonin, the main hormonal mediator of biocycles.

Becker, Robert O.
- in Psychology Today, Feb. 1979, "Brain Pollution", p. 124.
- and Marino, Andy. They presented evidence at PSC meetings in New York (1976) that EMFs at power line intensity or less had been linked to bone tumors in mice, slowed heart rate in fish, and various chemical changes in the brain, blood, and liver of rats. Bees exposed to a strong EMF for a few days in Russian research had begun to sting each other to death or leave the area. Some sealed off their hives and asphyxiated themselves.
- in The Body Electric, coauthored by Gary Selden, William Morrow & Co., New York, 1985, p. 280. Experiments with rats exposed one month to 60 Hz electric fields of 100 to 150 V/cm (simulating ground level underneath a typical high-tension line) resulted in three generations of rats showing severely stunted growth. Between 6 and 16% of pups born in various tests failed to live to maturity because of the electric field.
- in The Body Electric, pp. 287-288. A study conducted near Wolverhampton, England in 1979 (with Andy Marino, Maria Reichmanis and Stephen Perry) showed that people living near overhead high-voltage lines seemed more prone to depression. Magnetic fields averaged 22%

Response to Letter 51 Continued

Letter 51 Continued

higher at suicide addresses than at controls, and areas with the strongest fields contained 40% more fatal locations than randomly selected houses.
- in The Body Electric, p. 288. In the 1970s several reports showed that exposure to energy levels below the American safety guideline of 10,000 microwatts stimulate the thyroid gland, resulting in an increase in the basal metabolic rate.
- Cows on a farm in N.Y. have produced dead or defective calves since a 765 KV line through the property began operating in 1982.
- in Microwave News, Sept. 1987, p. 9. He reports a dramatic increase in the incidence of Down's syndrome in a small New Jersey town that ranks fifth in the nation in the concentration of microwave transceivers.

Beischer, Dietrich. A one day exposure to an antenna emitting EMFs caused a 50% increase in triglycerides in 9 out of 10 human subjects.

Bise, William, "Electromagnetic Plague", in Communications/Engineering Digest, Jan. 1977, vol. III, no. 1, p. 20

Born, David O., "Power Line Safety: An Unsettled Question", Farm Journal, Nov. 1980, p. 1

Bowman, Joseph, Ass. Prof. Preventive Medicine, Univ. of So. California, Los Angeles, Science News, Vol. 131, No. 17, April 25, 1987, p. 259. He states that Drs. Wertheimer and Leeper's study linking EMFs to cancer has been replicated twice for childhood cancer.

Brambl, Robert, "Minority Report, Evaluation of the Health and Welfare Hazards of the CPA/UPA High Voltage DC Transmission Line (CU-TR-1)",1982

Brodeur, Paul, The Zapping of America, New York: Norton, 1977, p. 136 - Dr. Peter B. Peacock found an abnormally high rate of birth defects at Fort Rucker, Alabama, where there are 46 radar installations within 30 miles. p. 185 - In 1970 Dr, Irvin Emanuel, Univ. of Washington, found that the rate of Down's syndrome among the children of the 1500 pilots in the Seattle area was twice the expected rate. The Air Line Pilots Association squelched an attempt to expand this study nationwide. p. 76 - Milton M. Zaret notes that while "the sun is our strongest natural source of microwaves, the microwave oven leakage standard set by the Bureau of Radiological Health is approximately one billion times higher than the total, entire microwave spectrum given off by the sun."

Cancer Therapy and Research Center, San Antonio, Texas. They discovered that human cancer cells exposed to 60-Hz fields (the frequency of high voltage power lines) grew up to 24 times as fast as unexposed cells and showed "greatly increased resistance to destruction by the cells of the body's defense system."

Choy, Ray V.S., Monro, Jean A., and Smith, Cyril W., Clinical Ecology, Vol. IV, No. 3, p. 93. Non thermal and non-ionizing EMFs can have a profound effect on biological systems and this can account for illnesses that have hitherto not been explained by current knowledge.

Clinical Ecology, Vol. IV, No. 3, p. 92. An important reference to the Fifth International Symposium on Man and His Environment in Health and Disease, Dallas, Texas, Feb. 1987 in which at least 9 papers dealt with various aspects of adverse reactions to components of the electromagnetic spectrum.

Response to Letter 51 Continued

Letter 51 Continued

Edwards, Diane D., "ELF: The Current Controversy", Science News, Feb. 14, 1987, pp. 107-109, and response letters, 4/25/87, p. 259

Electrical Week, "Swedish study indicates exposure to EMFs increases risk of genetic damage", November 5, 1979. "New Swedish study appears to confirm genetic damage from EMF exposure", Feb. 16, 1981.

Friedman, Hylar, Army Medical Center, El Paso, 1981. Radar technicians were 3 to 12 times more likely than the rest of the population to get polycythemia.

Hendrickson, Riley, memo to George Durfee in response to Dr. William Hoppel's comments on "Electrical Environment Outside the Right of Way of CU-TR-1 Report 5, May 1985", Jan. 4, 1986

Johns Hopkins School of Medicine, 1964. Higher than normal numbers of chromosome defects were found in blood cells of radarmen.

Juutilainen, Jukka, Microwave News, May 1987, p. 2. The incidence of leukemia among Finnish electrical linemen and cable joiners was found to be three times the expected rate.

Koslov, Sam, Johns Hopkins University, Acres, U.S.A., April 1987, pp. 6-7. Microwave radiation may influence the development of Alzheimer's disease. Also in the same Acres: in discussing high tension wires, "the distance a disturbance will reach goes up as the square of the voltage... That's why extremely high tension lines, like the 250,000 volt super powerline, can create negative effects or stressful effects at great distances, meaning a couple of miles from the line.

Matanoski, Dr. Geneviève, Johns Hopkins University, "Electric Exposure, Cancer May Be Linked", Spokesman-Review, Nov. 30, 1989. This professor of epidemiology found a statistically significant link between cancer and human exposure to electromagnetic fields (to be published in 1990).

Microwave News, "Australian Power Line Dispute" (July/Aug. 1986), - Sept. 1986, p. 14. Doctors at the University of Southern California School of Medicine in Los Angeles found that patients with Lou Gehrig's disease (amyotrophic lateral sclerosis) were almost four times as likely as those without the disease to have worked in electrical occupations.

Milham, Sam, DSHS epidemiologist, Environmental Health Perspectives, Vol. 62, pp. 297-300, 1985. He documents higher rates of cancer and leukemia among those with occupational exposure to non-ionizing radiation. His data is drawn from a study of all causes of death among men in Washington state from 1950 to 1982.

Minnesota Legislature Science and Technology Research Office, "Information Highlight: Possible Biological Implications of Ions Produced by High Voltage Transmission Lines", 1981

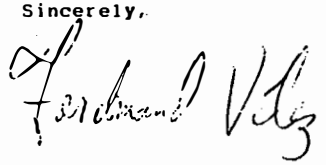
Minnesota Environmental Quality Board, "Conclusions, Electrical Environment Outside the Right of Way of CU-TR-1, Report 5, May 1985", and "Reports of the Science Advisors to the Minn. Env. QB, April 1986.

Response to Letter 51 Continued

Letter 51 Continued

I hope that this sample of my bibliography will serve to prove my point, namely that there is cause for concern for people living near high power lines. In the three years I have been following research on EMFs I notice a serious tendency from a number of public and private agencies to deliberately squelch research on any ill effects that may be linked to EMFs. I pray that you and others in a position to do so will present to the public both sides of the aforementioned issue.

Sincerely,



Response to Letter 51 Continued

Letter 52

26 March 1990

Dear Sirs:

We would like to comment on the proposed Washington Water Power/British Columbia Hydro 230 KV electric transmission project, which will pass from a Selkirk, B.C. substation to a proposed Marshall substation southwest of Spokane, Washington.

It seems at this point a forgone conolusion that the project has approval to prooeeed. After reviewing available literature and listening to various experts, it seems to us that the jury is still out with regard to potential adverse side effects from electromagnetic fields. It is, however, quite disturbing to note that a lot of the research references possible ohildhood leukemia and brain cancers.

The Washington Water Power commissioned Environmental Impact Statement reveals some of the pros and cons of the various proposed line routes. It is a great concern to us that it is oonsidered an option to route this power through any area other than the least populated oorridor. The proposed route would increase power transmission through a populated area within the City of Spokane service area by almost 50% (from 1035 KV to 1495 KV). Further, this route is in an area in which the City is rapidly expanding. There has even been a proposed community park in one neighborhood of the City adjacent to this power route which is not even indicated on the Environmental Impact Statement.

5-152

52-1

It seems to us most prudent and foresightful to consider one of the alternate routes as the final pathway. The alternate routes have existing electric lines and the Northern or Southern Crossovers appear to be more appropriate choices in that they do not encroach on an expanding metropolitan area.

Sincerely,

Maro Schillios

Terry J. Schillios

Maro and Terry Schillios
N. 10309 Moore Ct.
Spokane, WA 99208

Response to Letter 52

52-1 Without any indication of the location of this proposed community park, it is not possible to respond in a specific way to this comment. In the early phases of this study, the planning agencies of Spokane County and the City of Spokane were contacted, shown the alternative routes, and asked for their concerns about the project and for future land use data. The agencies provided good information on various long-range and short-range, planned future land uses, but these did not include any future neighborhood parks that could have been affected by the project.

Letter 53

Paul Trajner and Family
Box 207, Metaline Wa
99152

March 22, 1990

(and
certified P 448 716 981

Anthony J. Como
Department of Energy
Office of Fuels programs (FE-52)
1000 Independence Ave., SW
Washington, D.C. 20585

RE: Washington Water Power
B.C. Hydro Transmission
Intertie Project E.I.:
Draft and omission of
same.

Dear Mr. Como;

Our first Concern is:

53-1 (1) health effects of the transmission line. Many studys have been done since 1987. The Draft E.I.S. does not take current findings and concerns into consideration. The Latest Studys your E.i.s acknowledges are already three years old. Check-Science Digest December issue 198

Our second concern is:

53-2 (2) The Mountain Goats that live on the North end rock cliffs from Mt Linton and between Flume Creeks and South Flume creek will be negatively effected. Why is no mention of this in the Draft E.i.S? These Goats bear their young and virtualy live on these Sunny Rock cliffs, sleeping, mating, ect. Many Folks enjoy watching their activities all year long. This is no "moderate impact" to propose a 120' power line directly between the viewer and aproximately 50 head of these fine animals. What about "Landform Modifications consisting of blasting their habitat away? These are very impressive natural cliffs and we enjoy the view from our yard counting goats and kids with the naked eye.
[4.1.9 page 4-54 Boundary Dam to Lone.]

5-153

Response to Letter 53

53-1 Please refer to Responses to Comments 13-5, 51-4, and 51-7 regarding the concerns on recent EMF studies.

53-2 Please refer to Response to Comment 34-2 and Sections 3.1.7.2, 4.1.7, and 4.1.8 for additional discussion on the introduced mountain goat population in the Linton Mountain vicinity.

Letter 53 Continued

P. 448-716-981
Certified

Our third concern is:

③ Our pond and water comes from Flume creek and South Flume creek. During construction flood and muddyness will effect the fish, beaver & lynx that live here. We will also be effected and our water rights on both creeks are put in jeopordy. Nothing is mentioned in the draft E.I.S. about water supply disruptions and pollution to these waters. What will happen if we have muddy waters all season? these creeks are both on this property and we only have about 4 acres here with the proposed route at one side of the house. What about the Pileated Woodpecker

53-3

Our fourth concern is:

④ Visual impact will be very great from our property and that section of Boundary Dam Road that views these Rock cliffs as well as Lehigh Hill View from across the river. The E.I.S Draft estimates this VQR as being moderate at this point at our property. This is simply not true. VQR will be not only significant but drastic for this area. Again "Landform modifications" and tree removal should not be described as only moderate in these circumstances by the Draft E.I.S.

53-4

⑤ We find that it is hard to believe someone from the E.I.S. reporter would come all the way out here to do work pertaining to a proposed Power lines and not stop by. Our house is mistakly represented by a circle on the Draft E.I.S. map. Sheer Rock cliffs with goats are within a few hundred yards from our front door. We have been here 40 years. Our View of this cliffs is very important to us. So is our health regards E.L.F. We feel this act is adverse condemnation.

5-154

Response to Letter 53 Continued

53-3 In reference to your concern on water quality and possible effects to your existing water supply during project construction, please refer to Section 2.3.4, particularly Table 2-5, of this Final EIS. WWP has committed to these environmental protection measures to prevent soil erosion and associated water degradation. Also, please refer to Response to Comment 58-1 regarding water quality monitoring. In response to your concern on birds in the area, please refer to Section 4.1.7 of the EIS for the discussion on potential impacts from the line to wildlife species.

53-4 It is unclear from your comment precisely where your home and land are located. It is assumed to be in the segment south of Boundary Dam along the Pend Oreille River. This area was rated a moderate level of impact rather than significant primarily due to the influence of the existing transmission line corridor. The degree of existing modifications in your area relative to a similarly scenic area without such existing transmission lines is less and was rated accordingly. Please refer to Response to Comment 30-1 for additional information on the visual resource inventory and impact assessment procedures.

Letter 54

To Whom It May Concern,

We are writing in regards to the proposed installation of the B.C. Hydro Electric Transmission Project, which could put the 230ku transmission lines within 100 feet of our house or should you acquire B.P.A.'s already existing easement, or right over our house should you have to purchase one next to theirs.

This property has been in our family for approximately 30 years. Within that space of time we have accumulated many great memories and a deep love of the land. However should the proposed line go through our property we would like you to purchase all 78.5 acres that we own. Because the line would decrease the value of the land, and because of the path it would follow would require us to spend a large percentage of our time under them harvesting and working on the land. Also any recreation done along the creek would be done under or right alongside them concerns us for health reasons. We are aware that the studies done to determine the health risks of power lines are inconclusive, but the chance that the lines maybe harmful to someone working under and around them is one that we do not wish to take.

Because of these reasons we would like you to purchase our land if and when the proposed lines goes through.

Sincerely,

John Ives
Kathleen Ives

John & Kathleen Ives

Response to Letter 54

Your concerns are noted. No response necessary.

Letter 55

INLAND EMPIRE PUBLIC LANDS COUNCIL

P.O. Box 120 Coeur d'Alene, ID 83814 · P.O. Box 2174 Spokane, WA 99210

Mr. Bill Freeman
Office of Fossil Energy
Dept of Energy
1000 Independance Ave. S.W.
Washington, D.C. 20585

March 27, 1990

Dear Mr. Freeman,

Please accept the following comments on the DEIS: Washington Water Power/B.C. Hydro Transmission Interconnection Project.

55-1 1. Impact on the Colville National Forest. The transmission line, as proposed, would have a significant impact on this National Forest and the human environment adjacent to the forest. The specific proposal is not discussed in the FEIS of the Forest Plan for the Colville NF. The DEIS fails to disclose these impacts to the public.

55-2 2. Impacts on rivers in British Columbia. In compliance with Executive Order 12114 as discussed in the DEIS 1-17, WWP is required in certain cases to assess the impacts outside of the U.S.

The DEIS does not discuss the relationship between the intertie and the adverse environmental impacts of damming rivers in British Columbia. For example, the document fails to explore whether the intertie will have impacts of B.C. Hydro's present of future plans for dam construction.

55-3 3. Energy Conservation as an alternative to an international transfer of energy. The intertie is part of a larger energy transfer plan from British Columbia to energy markets in the southwestern U.S. As such, the DEIS should discuss the intertie from this larger perspective. Included in this discussion should be disclosure of energy conservation initiatives undertaken in areas ostensibly to be served by the intertie, such as southern California.

Thank you for this opportunity to comment.

Sincerely,
John Osborn, MD
Council Coordinator

5-156

Response to Letter 55

55-1 The entire purpose and intent of the EIS is to disclose all significant impacts of the project to all aspects of the environment, both within and outside of the National Forest. Any and all significant impacts identified are fully disclosed. The relevance of the reference to the Final EIS for the Colville National Forest Plan is not clear. The producers of the WWP EIS clearly had no control over the content of the National Forest Plan and related documents. However, National Forest planners were consulted regarding the WWP project. As reported for Planned Land Use in Section 3.1.8.2 of this Final EIS, the Forest Service's Land and Resources Management Plan for the Colville National Forest was a major source used in determining the impacts of the proposed project.

55-2 NEPA does not require an analysis of effects on the environment outside the United States in this case.

55-3 Potential customers for the sale of surplus power from the proposed interconnection have not been identified. Response to Comment 57-2 discusses the proposed marketing of this additional transmission capacity.

Letter 56

Box 595
IONE, WA 99139
MARCH 27, 1990

REC'D DOE/FE
OFFICE OF FUELS PROGRAMS
APR 3 P 1:59

MR. ANTHONY J. COMO
DEPTMENT OF ENERGY
OFFICE OF FUELS PROGRAMS (FE-52)
1000 INDEPENDENCE AV, S.E.
WASHINGTON, D.C. 20585

RE: COMMENTS OF THE DRAFT E.I.S
W.W.P— B.C. HYDRO TRANSMISSION PROJECT

5-157

PLEASE CONSIDER MY FOLLOWING COMMENTS PERTAINING TO THE DRAFT E.I.S. AND HEARINGS HELD BY THE D.O.E.

I HAVE LISTENED TO STATEMENTS MADE BY EMPLOYEES OF W.W.P. AND I READ THE SUBJECT MATTER CONTAINED IN THE E.I.S.

MUCH OF THE REFFERENCE CITED WAS PUBLISHED DIRECTLY AND INDIRECTLY BY PUBLIC AND PRIVATE UTILITIES, ELECTRICAL PERSONEL AND W.W.P ABOUT ENVIORMENTAL FACTS AND ISSUES ADDRESSED IN THE E.I.S.

56-1 IN THIS CASE THE INFORMATION CITED IS BIAS, INCOMPLETE, MANIPULATIVE, AND SELFSERVING. THEREFORE IT NESSESSARILEY FOLLOWS THAT THE E.I.S. IS WRONG IN THE ANALYSIS OF ENVIORMENTAL IMPACTS AND SHOULD BE SET ASIDE.

Response to Letter 56

56-1 Your comment regarding the adequacy of the Draft EIS analysis is noted. Refer to Responses to Comments 13-5, 26-13, and 51-7 regarding the EMF resources used in this EIS analysis.

Letter 56 Continued

FOR THOSE REASONS, I PRAY, THE PRESIDENTIAL ORDER TO CROSS THE BORDER IS DENIED AND AT this time there is no construction of the TRANSMISSION INTERCONNECTION PROJECT. AS THE TRUE FACTS BECOME available I RESERVE my RIGHT to BRING the Relitive ENVIORMENTAL facts AND ISSUES to the D.O.E. AND that I, AND also the PUBLIC, HAVE the opportunity to attend PUBLIC HEARINGS to ADDRESS those facts AND ISSUES AND/OR to SUBMIT formal COMMENTS ON A NEW E.I.S.

5-158

Thank You Very Much

Dale Regan

PAGE 2 of 2 pages—

Response to Letter 56 Continued

Letter 57

March 28, 1990

Dear Mr. Freeman:

I just completed a conversation with Mr. Gary Casey, a representative of the Washington Water Power Company concerning the proposed WWP-B.C. Hydro Transmission Line.

I understand the need and desire to anticipate future power requirements of the 1990; however, I also understand the more important need to consider the impact on our enviornment and the need to consider health and safety factors.

This porposed transmission line will literally be in my back yard and I am concerned. I certainly do not intend to single out Mr. Casey of WWP, but frankly, many of my questions to him remained unanswered. For example, when I asked why the line could not be placed underground, he simple answer was "cost". When I asked what the cost difference would be, he did not know. When I asked what the cost would be to place the line underground in just residential areas, again, he did not know. Mr. Casey steted that 20 to 40% of the power was for local use, which prompted me to ask where the remaining 60% would be utilized, again, he did not know. He stated that no contract has been proposed to supply this power to Northern California, but that sure would seem like a reasonable option to WWP. I am not concerned with the "cost", I am concerned with the environment and safety and health factors.

57-1

57-2

The most disturbing part of my conversation with Mr. Casey stemmed from a comment he made which in his mind seemed to justify the entire project. That was that the existing power lines that are currently in place have been there for the past twenty years. Well, I certainly don't know if that is true or not, but I do know that my house is only four years old. My point is, if we are moving forward into the 1990's and beyond based on thinking that exists on how things have always been or because things have been that way for the last twenty years, we our indeed a more troubled nation than I thought.

If WWP really has future concerns for our community and our welfare in mind, they would do the right thing for our environment, safety, and health. Why would WWP be concerned about "cost"? We all know that it is us, the consumer, that will bear that "cost" not WWP. If this power is going to California, good, let them bear the "cost" also.

I ask only this, how would you react or act if WWP decided to place a Hydro Transmission Line in your back yard?

Sincerely,

DONALD J. CAGLE

W 307 Elcliff
Spokane, Wa 99218

Response to Letter 57

57-1 Please refer to Response to Comment 12-1 for a discussion on undergrounding the proposed transmission line.

57-2 The discussion on the sale of surplus power from the proposed Interconnection has been expanded in Section 1.2 of this Final EIS. Please refer to Responses to Comments 15-4, 30-5, and 30-8 for additional discussions on rate comparisons, agreement renewals, and WWP's Least Cost Plan, respectively. Also, Sections 2.6.1, 2.6.1.1, and 2.6.1.6 have been expanded in this Final EIS to provide a more detailed discussion of energy alternatives, including conservation and load management.

Letter 58

PEND OREILLE COUNTY
PLANNING COMMISSION
COUNTY COURTHOUSE — P. O. BOX 5000
NEWPORT, WASHINGTON 99156

March 28, 1990

Mr. William H. Freeman
U. S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S. W.
Washington, D. C. 20585

RE: Washington Water Power / B. C. Hydro Transmission Interconnection Project

Dear Mr. Freeman:

The Pend Oreille County Planning Commission has reviewed the draft environmental impact statement for the above referenced project and offers the following comments on the draft statement:

1. The Commission is opposed to leaving a narrow strip of trees between the two existing 230 KV B.P.A. lines and the new line proposed by W.W.P. It is the Commission's position that a narrow belt of trees are of little benefit as wildlife cover.

58-1 2. The draft document states that water quality will be monitored, however the statement fails to state who will be responsible for monitoring water quality or what water quality parimeters will be monitored.

58-2 3. The draft document discusses the environmental impact of a new 125 foot right-of-way, but fails to adequately address the cumulative environmental impact of the W.W.P. 125 feet adjacent to an existing B.P.A. 375 foot right-of-way with 2 existing B.P.A. 230 KV lines and sufficient right-of-way for a third B.P.A. line. What has to be analyzed is the total cumulative impacts of a 500 foot wide corridor with two existing B.P.A. 230 KV lines, a W.W.P. proposed 230 KV line and the possibility of a third 230 KV B.P.A. line.

Response to Letter 58

58-1 As stated in Section 1.3 of the EIS, the State Department of Ecology would issue a Water Quality Certification/Modification Permit to WWP prior to project construction. WWP would operate under the permit requirements to ensure water quality, in addition to implementing the environmental protection procedures outlined in Table 2-5 and discussed in Section 2.3.4. Please review these specific measures that WWP has committed to as part of the Presidential permit process.

58-2 The existing BPA lines were treated as part of the existing environment; that is, they form an existing transmission line corridor, and the impacts of adding the proposed WWP line to that corridor were analyzed. It is not appropriate to analyze impacts starting from a no transmission line corridor situation or to analyze the impacts of the existing BPA lines. Further, BPA has expressed no intent to construct a third line on their existing ROW, so this development was not included as an interrelated project (see Section 2.5 in the EIS). If and when BPA decides to utilize their vacant ROW, that project would be subject to environmental review under NEPA, i.e., the preparation of a project-specific EA or EIS.

Letter 58 Continued

58-3 4. The draft document fails to adequately address the problem of noxious weeds on the right-of-way. The Planning Commission urges the Department of Energy to carefully address the comments of the Noxious Weed Board which are outlined in a letter to the Department of Energy dated March 1, 1990.

Thank you for the opportunity to comment on the draft statement.

Sincerely,

Phil Hobbs

Phil Hobbs, Chairman
Pend Oreille County Planning Commission

PH:lb

Response to Letter 58 Continued

58-3 Please refer to Table 2-5 of this Final EIS to review additional environmental protection measures that were developed to prevent noxious weed infestations during project revegetation. Also, refer to Response to Comment 20-1 regarding the process that WWP has committed to follow in implementing ROW reclamation.

Letter 59

WHITWORTH COLLEGE

1890-1990

March 28, 1990

Mr. William Freeman
U. S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3-H - 087
1000 Independence Avenue S.W.
Washington, D.C. 20585

RE: Washington Water Power/B.C. Hydro Transmission Interconnection Project, Draft Environmental Impact Statement, DOE/EIS 0141-D, December 1989

Dear Mr. Freeman:

S-162

The purpose of this letter is to formally object to the herein referenced proposed interconnection project as outlined in the Draft Environmental Impact Statement, DOE/EIS 0141-D.

As presently proposed, this transmission line will cross the entire width of Whitworth College property running east to west a length of over 3000 feet while passing within 300 feet of existing dormitories and within 50 feet of existing athletic facilities. Future development plans of the college (see attached) will eventuate in construction of dormitories within 50 feet of the existing right-of-way.

59-1 It is our belief that the Environmental Impact Statement inadequately addresses the impact of this project on Whitworth College, its faculty, staff, and students; and therefore, the public comment period should be extended a minimum of 90 days to allow a more thorough evaluation of several serious issues.

Whitworth College is a private four-year liberal arts institution associated with the Presbyterian Church (U.S.A.) and has operated on this campus continually since 1914. The College has a full-time enrollment of approximately 1300 students with projected expansion to accommodate 2500.

Of the current student population, nearly 1000 live in campus dorms, several of which are immediately adjacent to the existing Washington Water Power right-of-way and proposed path of the new transmission line.

In addition to the full-time student population, over 500 part-time and evening students utilize the campus as well as nearly 400 faculty, staff, and service personnel. In total, at any given time, the population on campus will range from 2,000 to 3,000 people.

Whitworth College, Spokane, Washington 99251-0002 (509) 466-1000

Response to Letter 59

59-1 Please refer to Response to Comment 33-2 regarding extension of the public comment period.

Letter 59 Continued

Given the density of this population and the fact that a large number of these young people are in residence, we feel that a significant health hazard may exist which must be reviewed. There is currently no mention of this issue in the Environmental Impact Statement relative to Whitworth College. Comments related to Whitworth are limited to the following:

59-2

> Whitworth College campus is located south of this segment. Its nearest buildings are located over 300 feet from the ROW edge and beyond an existing transmission line. Therefore, no adverse effect would occur on the college from this project.

We believe that serious questions about the health effects of such powerlines exist and that given these questions it would be unwise and irresponsible for the Department of Energy to recommend approval of a permit for this project when the health effects on so many young people is in question. Evidence of this concern is articulated in the BPW Review titled "Electrical and Biological Effects of Transmission Lines" in the summary section of Health Effects on Humans which notes:

> During the last 10 years, the number of studies looking for an effect of powerlines on human health has continued to increase. Laboratory studies have documented some short-term changes in physiological functions in people exposed to electric and magnetic fields.
>
> Most research with people has involved residents living near powerlines, or people who work around power facilities or other electrical devices. Three of the five studies done to investigate a possible association between childhood cancer and powerline magnetic fields reported some positive results.
>
> A major problem with the body of research described in this section is that actual exposures to electric and magnetic fields have, to date, been rather crudely measured, or have not been measured at all.
>
> Overall, the research with humans, supplemented by laboratory animal research, suggests the possibility for adverse effects from human exposure to electric and/or magnetic fields. Only further research will allow this uncertainty to be resolved. Extensive research is underway in the U.S. and in several other countries, mostly focusing on the cancer issue.

Response to Letter 59 Continued

59-2 Your comment is noted. Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to more adequately address the issue of potential health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2. We respect the point of view stated in your comment, and it is not our objective to alter your personal opinions or contest your objections. Rather, the summary of the health issue in this EIS (Section 4.6.5) attempts to provide an objective treatment of the available scientific information. It should be emphasized that along the entire northern boundary of the Whitworth College campus, the Eastern Alternative would be located on an existing transmission line ROW, which is currently occupied by two 115-kV transmission lines (see text revisions in Section 4.2.8). In addition, because the EMF issues were addressed in an overall manner, specific locations along the project alternatives were not mentioned individually in this EIS.

Letter 59 Continued

As cited here, there appear to be health-related questions and some statistical evidence to support a legitimate concern for human well being as a result of exposure to high voltage fields. Due to our concern and apprehension, we will find it necessary to object to any expansion of power transmission lines in the existing Washington Water Power right-of-way which crosses Whitworth College property.

59-3 Underscoring this concern is the fact that a 90-day extension has been granted in the similar Intertie Connection proposed in the Seattle area. If health concerns exist for that project (which we believe they do); and if these concerns were sufficient to grant extension of the public comment period there, then certainly when dealing with a high density impact such as the Whitworth College situation, the Department of Energy should be consistent in approach and grant an extension in the comment period for the WWP project.

59-4 Concern over the health aspects of this issue is not limited to just those directly affected by such projects. In the current session of the Washington State Legislature Senate Bill #6771 passed both houses and was signed into law, empowering the Washington State Utilities and Transportation Commission to study alternative methods of locating electrical transmission and distribution lines to minimize human exposure to electrical and magnetic fields. Surely such legislation points out the state-wide concern for protecting human health as it relates to such projects.

We believe that unless and until the Environmental Impact Statement specifically addresses the health concerns and issues raised in the studies conducted by epidemiologists Nancy Wertheimer and colleague Ed Leeper (1979, 1982, 1986, 1988, 1989), researcher David Savitz (1987, 1988), Public Health officer Sam Milham (1982, 1983, 1985), and the current study now underway in Los Angeles that the study is incomplete and therefore inadequate. We would like the Environmental Impact Statement to comment on these studies and their relationship to the health impact on the thousands of future resident students who will be housed in Whitworth dorms which are adjacent to the proposed high voltage lines.

59-5 In addition to the health concern, the proposed project will have two other significant effects on the college. The first is truly an environmental issue. The visual impact of this project on the environment of the college will be significant and will scar the aesthetic feel of a campus developed in the midst of a natural stand of Ponderosa pine trees. Although the plan is to use an existing right-of-right, this path will be wider and more obvious than that which exists with the current lower voltage lines. In addition, new poles of two to three times the height will be installed, elevating the line, thus making it visible to many parts of the campus. This visual impact has not been addressed in the impact statement. We believe the impact statement needs to be corrected to point out this negative effect on our densely-populated college campus.

Response to Letter 59 Continued

59-3 Please refer to Response to Comment 33-2 for discussion on the requested extension of the comment period.

59-4 The Washington Senate bill acknowledges the existence of some level of uncertainty in the scientific literature and seeks engineering solutions to reduce potential exposure to electric and magnetic fields. While the legislation was passed in the interest of public health, there is no evidence that exposure reduction would be associated with a drop in adverse health outcomes.

Please refer to Response to Comment 44-51 for a discussion of the Savitz and Werthemier references and to Responses to Comments 13-5 and 51-7 regarding the resources used in the EMF effects analysis of this EIS. Also, Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to more adequately address the issue of potential health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2.

59-5 As a result of the comment, the text for the Mead to Fivemile Prairie Segment in Section 4.2.9 of this Final EIS has been expanded to clarify the discussion of visual effects to Whitworth College. Also, please refer to Response to Comment 59-6 pertaining to the ROW location along Whitworth College's property.

Letter 59 Continued

59-6 A further impact to Whitworth College is an economic one and has to do with the future of the college. Planned development of the college property is by necessity in the direction of the proposed line. The college is precluded from expanding to east, south, or west by existing residential property. The only direction for future construction is to the north. Construction of the proposed line will preclude any significant expansion of the college in that direction. It will in effect, serve as the northern border of the property as we will be unable to build structures beyond that point and will be forced to reevaluate proposed construction adjacent to it. The visual impact and the health concerns associated with this line will severely limit the options of the college when it looks toward future development and expansion.

While we understand there may be an economic reason why this transmission line should be constructed, we do not see why such a development should necessarily cut off the viability for future expansion of our educational institution. We have a future to consider and in light of that we respectfully submit that this line should be constructed in one of the alternative corridors.

59-7 We ask that the Environmental Impact Statement be corrected to include comments on each of the above-mentioned concerns and that a minimum 90-day extension be granted for further consideration of these issues and public comment relative to these concerns.

Respectfully,

Thomas A. Johnson
Vice President for Administrative Services

cc: Dr. De Jong, President
Cabinet

67/1

5-165

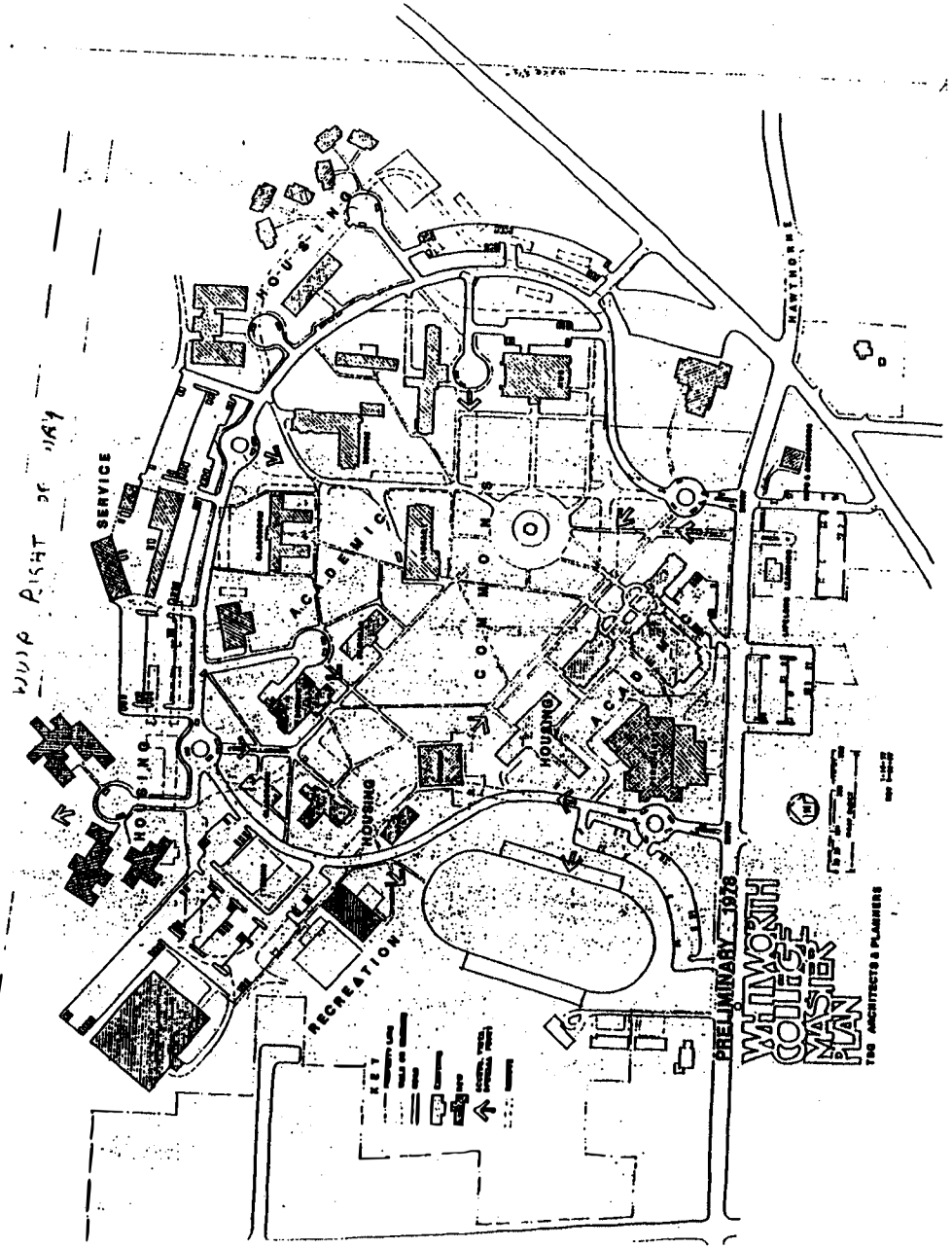
Response to Letter 59 Continued

59-6 The Whitworth College property is currently crossed by two parallel WWP 115-kV transmission lines on a 200-foot ROW. The proposal for the Eastern Alternative would be to reconstruct the two 115-kV lines onto a single set of structures and construct the proposed Interconnection all within the same 200-foot corridor. Whitworth College is currently precluded from expanding to the north by the existing ROW. However, to provide the college with more space for expansion than what the currently existing lines allow, WWP has reported that the company and Whitworth College have discussed the possibility of adjusting the transmission ROW to the north to a location more compatible with the college's desired use of the property.

59-7 Please refer to Response to Comment 33-2 regarding the EIS review period in accordance with the NEPA regulations.

Letter 59 Continued

Response to Letter 59 Continued



5-166

Letter 60

United States Department of Agriculture | Forest Service | Colville National Forest | 695 South Main Federal Building Colville, WA 99114

RECD DOE/FE

Reply To: 2700/1950

Date: March 29, 1990

Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., SW
Washington, D.C. 20585 (202) 586-5935

Dear Mr. Como:

This letter is in reference to the Draft Environmental Impact Statement for the Washington Water Power/B.C. Hydro Transmission Interconnection Project.

As a cooperating federal agency for this proposed project, we would like to commend the authors for a well organized and developed document.

Our comments are restricted to the proposed alternative (Eastern route including the Boundary Dam Variation). In addition to the proposed methods of project design and construction contained in section 2.1 and mitigation measures identified in section 4.8, we would like to see the following concerns addressed more fully:

60-1 1. There is need to protect a mountain goat area, located adjacent the project in Section 17, T.39N.,R.43E. Our wildlife biologists recommend that construction activities be restricted between March 15th and June 15th in order to provide more solitude during the kidding period.

60-2 2. Noxious weed estsblishment within the ROW corridor snd support roads is a concern. The prompt establishment (including nurturing) of desired vegetation is a must.

60-3 3. Portions of the proposed project lie within cattle allotments that include fences and gates. Mitigation measures will be needed to control cattle movement when site specific operating plans are drafted.

60-4 4. As described in section 2, "tree removal would be feathered at ROW edges to avoid sharp visual contrast". We are especially concerned that in Management Area (MA) 3A (Recreation emphasis) and MA 5 (Scenic/timber emphasis) that these measures be carried out in order to meet the visual standards as described in the Colville National Forest Land and Resource Management Plan.

60-5 5. It's hoped that the design and placement of structures will minimize the clearing of vegetation adjacent stream crossings. This riparian vegetation is very important to the fishery, wildlife, and watershed resources.

5-167

Caring for the Land and Serving People

Response to Letter 60

60-1 Please refer to Response to Comment 34-2 and the modifications to Sections 3.1.7.2, 4.1.7, and 4.1.8 for additional discussion on mountain goats in the Linton Mountain vicinity. As stated in the mitigation section, a construction constraint period and timing of access road reclamation will be in effect to minimize potential impacts to this population. Note that all environmental protection procedures and mitigation measures listed in Sections 2.3.4 and 4.9 of this Final EIS, respectively, would be made conditions of the Presidential permit by DOE.

60-2 The potential for noxious weeds to spread into adjacent areas is a valid concern; this discussion has been expanded in the Final EIS. Please refer to the environmental protection measures that were added to Table 2-5 to prevent noxious weed infestations during project reclamation. These measures have also been incorporated into Sections 2.3.4 and 2.3.5 for project construction, operation, and maintenance. Please refer to Responses to Comments 20-1 and 20-3 for additional discussion on the process that WWP claims it typically follows in implementing ROW reclamation procedures and Response to Comment 20-15 pertaining to the choosing of seed mixtures for ROW revegetation and how this may apply to area wildlife species.

60-3 Please refer to Section 2.3.5 of the EIS regarding locking of access road gates where it is stated, "access roads may be gated (or otherwise blocked) to minimize public use, in cooperation with the landowner or land manager. The U.S. Fish and Wildlife Service, Washington Department of Wildlife, and Forest Service would be consulted on such measures. Landowners and land managers (such as the Forest Service) would retain keys to [locked] gates to assure their use of the access roads for authorized activities, such as fire protection." This policy would aid in controlling cattle movement during project construction or operation. Any other special measures that the Forest Service feels are necessary can be included in the detailed Construction and Use (CU) Plan described in Section 1.3. The CU Plan would be developed for the federal ROW grants and would contain site-specific mitigation measures developed by the Forest Service.

60-4 By including protection measures in their project description in Chapter 2.0 of the EIS, WWP is committing to implementing these measures. Such protection would also be included as part of the Presidential permit and may be incorporated into the Forest Service ROW grant. Therefore, prior to the initiation of project construction, WWP would consult with the Forest Service on site-specific implementation of any protection measures.

60-5 As discussed in Sections 4.1.3 and 4.1.4 of this Final EIS, the majority of the water resources and sensitive riparian areas crossed by the proposed interconnection would be spanned by the line. Please refer to Response to Comment 27-1 for a discussion on wetland and riparian area avoidance.

Letter 60 Continued

60-6 6. In addition to curtailing construction activities during the critical winter use season in MA 6 (Visual/big-game winter range emphasis) and MA 8 (Big-game winter range emphasis) areas, we would like to restrict year-long road access to the general public. This could be achieved through a combination of gates and/or barrier devices.

60-7 7. How successful has the proposed structure design been in preventing the electrocution of raptors?

The Boundary Dam Variation route creates the least impact to the National Forest. Along with being much shorter in distance, the visual impact is less for both the ROW and needed road access.

We highly encourage the purchase of the uncleared ROW controlled by the BPA so that the two lines are located within the same corridor. It's judged that this 125 foot strip of predominantly dense timber located between the two transmission lines will quickly blow down.

Sincerely yours,

Edward L. Schultz

EDWARD L. SCHULTZ
Forest Supervisor

Response to Letter 60 Continued

60-6 Please refer to Response to Comment 60-3 regarding restricted public access along project roads and the associated role of the Forest Service.

60-7 Section 4.1.7 of the EIS presents a discussion on the potential for raptor electrocution under Threatened or Endangered Species for project Operation and Maintenance. Due to transmission line design, electrocution would not be considered a problem for a project of this size. Please refer to Response to Comment 70-11 for additional discussion on raptor electrocution. For additional information, Olendorff et al. (1981) outlines the specifics required for design of smaller distribution lines to prevent electrocution of raptors.

Letter 61

March 18, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

S-169

Dear Mr. Freeman:

I (We) have read the letter dated February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Washington Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As (a) resident landowner(s), who would also be affected by this project, I (we) endorse the objections stated in the Inmans' letter and wish this letter to be considered my (our) formal declaration of opposition to this project.

Sincerely,

Anita M. Diskill

Response to Letter 61

Your concerns are noted. No response necessary.

Letter 62

March 29, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

I have read the letter dated February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Washington Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As a resident landowner, who would also be affected by this project, I endorse the objections stated in the Inmans' letter and wish this letter to be considered my formal declaration of opposition to this project.

Sincerely,

Roberta L. Decker

Roberta L. Decker

5-170

Response to Letter 62

Your position is noted. No response necessary.

Letter 63

CERTIFICATE OF SERVICE

I hereby certify that I have caused the foregoing document to be served on the following individuals:

Lise C.M. Howe, Esq. GC-41
Anthony J. Como
U.S. Department of Energy (RG-22)
Economic Regulatory Administration
1000 Independence Ave., SW.
Washington, D.C. 20585

Sarah R. McNary/James O. Luce
Office of General Counsel
Bonneville Power Administration
P.O. Box 3621 - APP
Portland, OR 97208

Jerry K. Boyd, Esq.
Hamblen, Coffin, Brooke
& Miller
1200 Washington Trust Financial
Center
Spokane, WA 99204

Lee S. Sherline, Esq.
Leighton & Sherline
Suite 101
1010 Massachusetts Ave. NW.
Washington, D.C. 20010-5402

David Damiano
Vice President
Washington Water Power Company
P.O. Box 3727
Spokane, WA 99220

William A. Szuch
Spokesperson
N.O.P.E.
P.O. Box 662
Northport, WA 99157

Ferdinand Velez
HCR 11 Box 148-B
Colville, WA 99114

Mr. & Mrs. Wilburn L. Combs
Rt. 3 Box 205
Northport, WA 99157

Eric Berg
Senior Partner/Spokesperson
Berg, Greer, and Associates
H.C. 3, Box 202
Northport, WA 00157

Stan Bogosian
20630 Lomita Avenue
Saratoga, CA 95070

Lon Emmett
P.O. Box 162
Northport, WA 99157

Mr. & Mrs. Kytonen
Aladdin Rte Box 151
Colville, WA 99114

William J. Nicholson
Potlatch Corporation
244 California Street
Suite 610
San Francisco, CA 94111

Paul G. Thompson
Ginsburg, Feldman and Bress
1250 Connecticut Ave., NW.
Washington, DC 20036

C. CLARK LEONE - Office of General Counsel
Bonneville Power Adm.
P.O. Box 3621 / APP - PORTLAND, ORE. 97208

Edmond Chang -
Bonneville Power Adm
P.O. Box 3621 PMT 1 - PORTLAND, ORE. 97208

Signed Robert L. Jackman
DATE 3-28-90

5-171

Response to Letter 63

Letter 63 Continued

TO DR. William Freeman: Subject: (2) Freedom of Information Act Requests; (5) Intervenor Motions; & (1) Critique of Draft EIS. 0141D.

I am more disappointed Rather Than Surprised by the D.O.E.'s Draft E.I.S. which was as about as one sided Favoring WWP & The electric Power industry as a study can be without being ludicrous. In view of the Growing evidence of the Potential Hazardness of Powerlines, this study (?) All But ignores Researchers Dr. Robt. Becker author of "Body Electric"; Dr Sam Milham Jr Wash. State Dept of Health; Dr John Zimmerman of the Bio electric-magnetics institute; Dr. Andrew Moreno of Louisiana State Univ; Dr Richard Phillips of E.P.A. Research & Development; Dr Sam Koslov of John Hopkins Univ; Dr. Geary Phillips; Dr. Genview Matanoski John Hopkins Univ.; James Weaver of M.I.T; Andrew Estumen Natl. Inst. of Technology; & Paul Brodeur author of "The Zapping of America" as none of them were listed nor were their professional opinions expressed in the Draft E.I.S. All or nearly all of the above Researchers were submitted by N.C.P.E. and others during the Scoping Process. Surely All of these Researchers are not Qualified for exclusion from this E.I.S, or is it because they question the infallibility of the established view point of the Electric Power industry & raise the specter of Health Hazard that might open the Floodgates of Litigation?

63-1

Apparently your Standard of Proof relating to Cause & Effect of Disease is too strict from a Legal Standpoint because Dr. Marcho states there is not & never will be "Conclusive evidence" from a medical Standpoint.

I had hoped our Gov't had more integrity than what

(over) RSP

5-172

Response to Letter 63 Continued

63-1 Please refer to Responses to Comments 13-5 for a discussion of the analysis conducted by independent scientific panels on EMF health issues, 51-7 regarding the references used in the EMF analysis of this EIS, and 48-1 pertaining to Mr. Paul Brodeur's articles. Also, Sections 4.6.5.1 and 4.6.5.2 of this Final EIS have been revised and expanded to more adequately address the issue of potential health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2.

Letter 63 Continued

WHAT HAS BEEN SHOWN TO DATE IN THIS EIS PROCESS. IT AMOUNTS TO LITERAL ADMINISTRATIVE 'STONEWALLING' OF SCIENTIFIC-MEDICAL PROGRESS AND THE ABANDONMENT OF THE GENERAL WELFARE FOR THE SPECIAL WELFARE OF VESTED INTERESTS.

UNLESS THE RESULTS OF THIS PERMIT PROCESS ARE ALREADY A FOREGONE CONCLUSION & WE DISSIDENT INTERVENORS ARE BUT BEING TREATED TO A BUREAUCRATIC 'DOG & PONY SHOW' HOW CAN AN ADMINISTRATOR AT THE DECISION MAKING LEVEL COME TO ANY CONCLUSION OTHER THAN FAVORABLE TO GRANTING THIS PERMIT, & UNDER THE OLD 'BUSINESS AS USUAL' TERMS IN SPITE OF THE GROWING EVIDENCE OF HAZARDNESS, IF THE EIS IS USED AS THE BASIS FOR DECISION & IT IS IN SUBSTANCE THE SAME AS THE DRAFT EIS WE ARE CRITIQUING, WHEN AVAILABLE CONTROVERTING EVIDENCE IS OMITTED?

INTERVENOR MOTION #1

AS AN INTERVENOR I FORMALLY MOTION:
THAT A CHANGE TO AN ADVERSARIAL FORMAT IS MADE FOR THE EIS, REPORTING BOTH THE PRO & THE CON SIDES OF ISSUES. THIS REPORT SHOULD PRESENT ONLY FACTS WHICH SHOULD SPEAK FOR THEMSELVES. CONCLUSIONS, ESPECIALLY WHEN SO MANY ARE SUBJECTIVE, SHOULD BE DRAWN BY THE DECISION MAKING ADMINISTRATORS, NOT BY PRIVATE RESEARCHERS DEPENDENT UPON REPEAT BUSINESS. PRIVATE RESEARCH SHOULD BE IN A SEPARATE REPORT & EACH AUTHOR IDENTIFIED WITH HIS RESEARCH FOR ACCOUNTABILITY. CONCLUSIONS SHOULD BE IN A SEPERATE REPORT & SUPPORTED BY FACTS FROM THE RESEARCH REPORT OR OTHER IDENTIFIED SOURCES, AND EACH CONCLUSION SHOULD BE IDENTIFIED BY AUTHOR FOR ACCOUNTABILITY. BOTH REPORTS SHOULD BE ENTERED. (DOE/EIS-0141D) (PP86)

63-2 IF THE EIS IS NOT THE SOLE BASIS FOR THE PERMIT DECISION & OTHER FACTORS ARE INVOLVED, THESE OTHER FACTORS SHOULD BE MADE AVAILABLE TO THE DISSIDENT INTERVENORS & IN AMPLE TIME FOR REBUTTAL OR CONSIDERATION

(CONTD) RBP.

5-173

Response to Letter 63 Continued

63-2 The sole criterion for issuance of a Presidential permit is the impact of the proposed project on the reliability of the United States electric power supply system. An EIS is required to be prepared only if it is determined that the granting or denial of a Presidential permit for a proposed interconnection would constitute a major federal action significantly affecting the quality of the human environment. The preparation of an EIS is in keeping with NEPA and is separate and apart from the Presidential permitting process. This criterion for issuing Presidential permits in conjunction with the NEPA process were both explained and made a part of the record in the EIS hearings held on January 31, 1990 and February 1, 1990 in Colville, Spokane, and Newport, Washington. NEPA is not a decision-making process. NEPA is an information gathering process used by decision makers to better understand the environmental consequences of the decisions they make and to take actions that protect, restore, and enhance the environment.

Letter 63 Continued

3

(cont'd) Prior to the decision being made. In addition to the DRAFT E.I.S. it is apparent that other decisions are being made by the DOE. in favor of WWP & against we dissenters interests, we are not being made aware of them until after the fact when they are already DOE. Policy. There appear to be communications between DOE. & WWP. which we as intervenors are not aware of & are entitled to. It is obvious that the electric power industry & WWP have far more influence & input into this process than we as evidenced by this Biased Draft E.I.S. which lacks balance on the health, Property & Power need issues; & draws subjective conclusions in several other areas which are not buttressed by facts. Yet this Draft EIS completed by by an independent (?) Research Company is an official publication of the DOE. who is supposed to be an 'honest Broker' in this Process.

5-174

Some of the subjective conclusions, errors, & omissions are:

63-3 ① P 1-16 - "Any export of electricity to Canada is covered under Fed. Power act" - not so, what about Power Covered under the Columbia River Treaty? This is a misleading omission. "If such exportation is ultimately determined to be appropriate, economical, & in the best interests of WWP. & BC. Hydro." what about the best interests of the U.S.A.?

(over) RTJ

Response to Letter 63 Continued

63-3 Your comment is noted. Section 1.3 has been revised to more adequately address the issue of electricity exports.

Letter 63 Continued

63-4 ② P-III "To Authorize exports" - If this be the case the 'need' aspect of this project is negative & Environmental Impact cannot be Justified.

63-5 ③ P 3-73 Land Use-Boundary to Northport-This Section has several errors.
(a) This Section is NOT a Reservoir, but one of the few Remaining Free Flowing Sections of the Columbia River (which P 3-80 State is a designated State Scenic River," Normally from the border to Northport usually as far South as Canon Creek depending on F.D.R. Lake Level. Officially the Potential hi water Point of F.D.R. Lake (by Bureaucratic edict) is 4 mi's So of the Border, but in 20 yrs Residency I can't Remember seeing it much above Northport. So for Practical Purposes it should be Considered a River Section

63-6 (b) Although the only Formal Marina is at Northport this Portion of the River is Popular with Bank & Boat Recreation. There are Private Boat Docks in this area, Pat Gresham for one.

63-7 (c) The River Valley does not Contain a hi way, - Between the Border & Northport, But an Oiled Narrow County Road". So narrow that Chip & Freight Trucks are Restricted from this Road

63-8 (d) The Rail Road is used but a few times a week.

63-9 (e) This Valley Presently Contains No Hi Voltage Powerlines

63-10 (f). "Sparse Scatter of Residences" There are Aprox 25 Residences on the East Side of the River alone (Powerline Side) and Probably as many on the other side Between Northport & the Border. Residents on the other Side of the River would have an unobstructed view of said Powerline.

63-11 (g) This Study neglects to mention a Private Airport on the West Side of the River whose Flight Path could Conflict with this Powerline.

63-12 (h) P 4-82 Land Use Zoning & Recreation-Boundary to Rock Island, Columbia River This Paragraph Reported by drawn Subjective Conclusions, low impact when the Powerline is within 100 to 200 ft of Residences, Industry & disrupting of Agriculture. The "Naturalness & setting would not be substantially affected" Contradicts the Significant Visual Conclusion (P 4-89). Concludes that because a Highway (3) & a Rail Road are Present the Powerline would have Little effect on the Valley, This is an erroneous Conclusion for every River in NE Wash. has a Road & all but Two have Railroads Paralleling them, Plus the Pend Oreille has Rivers, Lakes in addition. This contradicts the intent of the Wild & Scenic Rivers Act which the Federal Govt tried to impose on the Near by Tributary of the Columbia, the Kettle River.

Response to Letter 63 Continued

63-4 Page III of the Draft EIS merely denotes a reorganization within the DOE and is not meant to imply how the proposed project may be used. The purpose and need of the project is explained in detail in Section 1.2 of the EIS. The use of the proposed project in the export mode is discussed in Section 1.3.

63-5 The USGS topographic maps, whose nomenclature was accepted as authoritative for the purposes of this EIS, label the waterbody both "Franklin D. Roosevelt Lake" and "Columbia River" to a point approximately 3 miles above Northport. Upstream of this point, the labeling is "Columbia River" alone. Based on the comments, the Border to Island Rock Segments in Sections 3.3.6.1 and 4.3.6.1 of this Final EIS have been modified to more accurately describe the area. The basic conclusions presented in the EIS have not changed.

63-6 Please refer to Section 3.3.6.1 of this Final EIS for a discussion of developed facilities located along the reservoir/river areas.

63-7 Please refer to Section 3.3.6.1 of this Final EIS for a discussion of the transportation routes located nearby.

63-8 Please refer to Section 3.3.6.1 of this Final EIS for a discussion of the local railway.

63-9 The text for the Border to Island Rock Segment in Section 3.3.6.1 of this Final EIS has been expanded to emphasize that the valley contains no major existing transmission lines.

63-10 The text for the Border to Island Rock Segment in Section 3.3.6.1 of this Final EIS has been revised in response to this comment.

63-11 It is assumed that the comment refers to Lowry landing strip located north of Northport. The proposed project occurs at all points more than 2 miles from this airstrip and would have no effect on the airstrip's flight clearance zones. In order to keep the document to a reasonable size, the EIS does not describe land uses unless there is a reasonable chance that they may be affected by the project.

63-12 It appears to be assumed in the comment that the impacts discussed for Existing Land Use in Section 4.3.6.1 of this Final EIS are visual impacts, or include visual impacts. This is erroneous; the section deals with land use impacts exclusively. Land use and visual concerns are related but separate, and are addressed separately in this EIS. The types of impacts that are classed as land use impacts are described in Section 4.1.6.1; whereas, impacts to visual resources are described in Section 4.1.9 of this Final EIS. The land use, as opposed to visual, impacts of the transmission line on residences between 100 feet and 200 feet from the ROW edge, on industrial buildings, and on agricultural land uses when a moving irrigation rig is slightly disrupted are shown on Table 4-3 in this Final EIS. It is believed that the assigned land use impact values are the correct ones.

The "naturalness of setting" discussion referenced applies to the anticipated effects on the number of recreationists using the river/reservoir. The conclusion in the Draft EIS that the project would have few effects on the naturalness of the setting of the river/reservoir (as perceived by recreationists using the river/reservoir and as influenced by the presence of the existing state highways and railroad) is believed to be correct. Therefore, the land use impacts of the project on recreation in this area would be low. The "naturalness of setting" conclusion that is referenced has no direct relationship to the conclusions on significant visual impacts outlined specifically for the Boundary to Swede Pass Segment and again for the overall Western Alternative in Section 4.3.9 of this Final EIS. The first conclusion, as explained above, refers to the effects on numbers of recreational users of the river/reservoir. The second refers to the visual effects of the project on visually sensitive viewers along the entire Western Alternative Route from the border to the Marshall Substation.

Letter 63 Continued

(2) 4-28 Table 4-3 [illegible]

This has to be the most subjective evaluation in the Draft EIS. Obviously ordained by God or the electric Power industry who do not live next to a Power Line. It is especially ludicrous when it is considered that this Powerline is to be built in a sparsely populated rural area where in most cases it can be moved a significant distance away from residences due to the wide open spaces, there is no true need that this Powerline be so close to Residences!

63-13

Powerlines unlike canals, Aqueducts, Railroads, & Freeways are very flexible, they can span canyons, go up or down steep grades, make Right Turns, etc. Their flexibility is more is only limited by the Rigidity of the electric Power industry which does not wish to relinquish its Power, not electric Power, but the unnecessarily excessive Power of their eminent Domain Laws. The flexibility of Powerlines when coupled with modern construction techniques, such as industrial helicopters for construction, maintenance, and patrol, call for Policy Changes by the electric Power industry & a mitigation of their eminent Domain Laws to actual Geographical need not costs.

Although cost is not supposed to be a consideration of this EIS Process it is a factor never the less. When I was requested to reduce the Environmental impact of this Power-Line by moving it away from all Residences to atop a mountain accessable by Road, the Response was no, as it would increase construction costs by approximately 20%. Since this Power-Line was was to Trespass Taku Stevens Co. with little proportionate Benefit to its residents; at a later date I asked this person how much more on a cents per K.W. hour such environmental construction would cost the end

(over) Ryg

5-176

Response to Letter 63 Continued

63-13 The effect of a highway (State Highways 25 and 251) and a railroad in reducing the naturalness of setting of the area is not in any way influenced by the presence of highways and railroads in other valleys, but is derived from basic principles. If all of a group of valleys have highways and railroads, then they all have lessened naturalness as compared to an undisturbed valley. The Wild and Scenic Rivers Act classifies candidate rivers into "wild," "scenic" and "recreational," in descending order of naturalness. The presence of highways and railroads in a river valley prevents it from being assigned to the more natural classes. The reasoning behind the methodology in this EIS does not contradict but reflects the reasoning behind the established application of the Wild and Scenic River Act.

The impact levels delineated on Table 4-3 of this Final EIS are land use impacts exclusive of visual impacts. The types of land use impacts reflected here are described in Section 4.1.6 for Existing Land Use, and visual impacts are explained in Section 4.1.9 of this Final EIS.

In response to the comment regarding line placement, a variety of factors were examined throughout the route selection process. Please review Section 2.3.1 of this Final EIS, which describes this process and the objectives used to identify potential routes. As one can see, two objectives of route selection were to minimize contact with designated avoidance and exclusion areas (e.g., residences) and to maximize the use of existing transmission corridors. In certain areas where a route is paralleling an existing transmission line in the vicinity of residences, it is not feasible or desirable to divert from the existing corridor. Such a diversion was judged to have greater land use impacts than remaining in the existing corridor.

Letter 63 Continued

use Recipient who is the Real Benefactor along with Bpa. & the Response was That They didn't Know, They hadn't done their home work.

The Two Previous Paragraphs Reflect the attitude of the Power industry from the Perspective of a Potential impact Victim. This is important Because This is a Pivotal Period as the Public is awakening. While this imbalanced Draft EIS denies a Power Line Risk to health. It also Points out Several new Studies That have or are about to be Started. Now is the Time to Build this Power Line with an ample margin of Safety, not 100 to 200 feet from the R.O.W. edge, but as far away from Residences as Reasonably Possible. Where not Possible, Such as by

63-14 Whitworth College and the Little Spokane Natural Area put These short Distances underground.

63-15 ⑥ P4-92 Significant impact Summary - increase to Tax Base & Tax Receipts would "Significantly Benefit" Stevens Co. Fiscally. Again a Subjective Conclusion - To say That it would increase Tax Revenues might be correct, but even This is open to Question. Again only a The Pro Powerline side has been Brought into The EIS. And Since The DOE. has Allowed it in The EIS, equity demands That the dissidents be allowed to have The Con side Brought in. With Studies Showing The Tax Losses due to Property devaluation by all Properties impacted. The EIS makes no attempt to determine these Losses and

Response to Letter 63 Continued

63-14 Please refer to Response to Comment 12-1 regarding impacts resulting from undergrounding the proposed transmission line. In response to the comment on Whitworth College and the Little Spokane Natural Area, undergrounding the line along the boundaries of these two areas would not appear to be justifiable from the limited benefits, due to both the remaining presence of the adjacent BPA transmission lines and those factors identified in the EIS that may in fact increase environmental impacts.

63-15 The reference to increases in the Sieven's County tax base and property tax receipts being "significantly benefitted" is related to the fact that the tax base would increase by a magnitude larger than 10 percent both for the Western Alternative and the Northern Crossover Alternative. This level is a standard measurement used to determine the level of impact often referred to as a significance criteria. In this case, it merely designates that tax receipts are estimated to be above the standard significance rate of 10 percent; therefore, the county would be "significantly benefitted."

Please refer to Response to Comment 26-11 and the modifications to Section 4.1.11.1 for further discussions of property values. Those studies outlined under Property Values in Section 4.1.11.1 have been updated to support the original conclusion cited in the Draft EIS analysis: that the level of impacts to a property crossed by the proposed interconnection would be dependent on a variety of factors, and may or may not be negative.

Letter 63 Continued

63-15 Cont.

7

Dismisses it out of hand That There would be no Such losses based on one Book (p. 9-64) Prepared For The Power Industry itself (BPA), & even its Findings were not unanimous! How many other studies Financed by the Elec. Power industry never made the Printers ink because they did not Reach the Right Conclusion? Even The above BPA Publication Predicted (1959 to 1981) The RECENT & Growing media attention To Electric & magnetic Radiation affects To Human Health. Now That There is a Growing Public awareness of the Problem, PowerLine affected Property values will Fall more Than Before & Therefore So will Tax Revenues, Regardless as To how STATISTICIANS manipulate numbers OR what academic mercenaries Publish, The Bottom Line is what The MAN in The STREET thinks, why not at LEAST in addition To DOE. conducting new Research in This area, Fund a Simple Gallop Type Poll? The Conclusion is So obvious That Judicial Notice should be Taken of it.

63-16

Additionally The DRAFT EIS does not evaluate other FISCAL impacts From This PowerLine. Increased Health Care Costs MEDICAL & PSYCHOLOGICAL, Tourism, Dairy Cows (whose Production is Sensitive To electricity), and intangibles Such as Traumatic effects.

The Value effects To our County cannot be individually isolated & selectively chosen or deleted from This Study. Our County (citizens) must be treated as a whole & all Factors considered which Benefit or detract All Subjects even including intangibles Such as AESTHETICS. Therefore this EIS is incorrect when it Concludes

(over) RYS

Response to Letter 63 Continued

63-16 Estimating other fiscal impacts related to subjective, non-quantifiable concerns is beyond the scope of analysis of this EIS. Please refer to Section 4.6.3.4 in this Final EIS for additional information on EMF effects to dairy cattle and the Economic Base discussion in Section 4.1.11.2 regarding potential impacts to area tourism.

Letter 63 Continued

That this Powerline will Fiscally Benefit Stevens Co, 8
the DOE office of Energy Research should Fund
the above Fiscal Loss studies as per their mandate to
"administer financial support Program for Research
& development of Projects not Funded elsewhere in
the Dept." (U.S. Govt manual P#258),

IT IS AGAIN obvious that WWP & the electric Power
industry have more than unfair input in this EIS Process
than we dissenters by:

63-17 ① Scheduling the Colville Draft EIS hearing date 1st on
which prohibited working people from attending, whereas
the Spokane & Davenport Draft EIS Hearings were scheduled
for the evening. This is significant if the amount of opposi-
tion is a factor in Route determination, as Colville had
approx. 300 people attending the Scoping hearing.
The attendance for the Draft Hearing was significantly
down, this time in Colville indicating we were Gerry-
mandered out of a Full Participatory hearing by the DOE.

② By the D.O.E. now stating that they would choose
the actual Power Line Route. (Stated by Constance Buckley on
2-1-90 at Colville). On 9-14-1988 WWP. V.P. Dave Damiano
announced that WWP had now chosen the Pend Oreille
Co. Route as its now Preferred Route, He gave Technical
analysis, considerations from Public Comment, Support
by P.O. Co. PUD & economic considerations as all contributing
to the decision to change. "Advantages of this Route in-
clude the fact that the terrain is generally more suitable,
as well as the fact that 93% of the Line can make use

(continued) DSP

Response to Letter 63 Continued

63-17 The Draft EIS hearings were scheduled to accommodate interested parties as well as the additional work demands of officials conducting the hearings. It was anticipated that the hearings were in close enough proximity that persons working a particular shift could attend at least one of the three hearings held in the area.

Letter 63 Continued

of existing Transmission Corridors." - 4

This last statement is very significant for it shows WWP's intent to utilize BPA's existing Power Corridor in Pend Oreille Co. Since then BPA revised WWP access to their Power Corridor and in my opinion makes the Pend Oreille Route less desirable for WWP. But now WWP could have a Public Relations dilemma if the wish to return to Stevens Co after their reasoned change to Pend Oreille.

63-18 The Question at hand is the DOE taking WWP off the hook, and is the DOE usurping its' authority?

63-19 (3) By the D.O.E. refusing to see that potentially impacted residents along the proposed Powerline Routes were personally notified by Postings on Routes or by mail, or by Hearing. WWP make these notifications so that all impacted Parties would have knowledge of the Proposed Powerline.

There are Precedents for such notifications in County Road Vacations, Timber Sales on State Lands, & Probably more that I am not aware of.

We Laymen have been earnestly striving to introduce objective evidence & Comments to improve this Study not only to make our own case but for the health Protection, Property Rights, & environmental Protection for the Public at Large, Present & Future, who could be adversely affected by electrical & magnetic Radiation, Property Devaluation

(over) RLL

Response to Letter 63 Continued

63-18 Please refer to Response to Comment 6-1 concerning the DOE's responsibilities under NEPA.

63-19 Existing NEPA regulations do not require personal notification of all potentially impacted residents. However, in addition to publication of a Federal Register notice announcing DOE's intent to prepare the EIS, to conduct scoping meetings, and to conduct hearings on the Draft EIS, the DOE and the applicant placed notices in several newspapers and on the radio announcing both the scoping meetings held in May 1988 and the Draft EIS hearings held in January and February 1990. Please refer to Response to Comment 48-5 for additional discussion on property owner notification.

Letter 63 Continued

& confiscation, and environmental damage. Now we find that we have been unwittingly duplicating in large the responsibility of the DOE's own "Office of Energy Research who advises the Secretary on Physical & Energy Research & Development Programs of the Dept, the use of Multi Purpose Laboratories, education, & training for Basic & Applied Research." "The office manages the Basic energy Sciences, high energy Physics & Fusion energy Research Programs, administers DOE Programs supporting university Researchers." "The office manages a Research Program directed at determining directed at determining the generic, environmental, health, & safety aspects of energy Technologies & Programs". "The office monitors DOE. Research & development Programs for deficiencies or duplication of effort," (U.S. Govt manual). 10

It is the DOE. Secretary & his office who are at the apex of Command & are responsible for decision making, management, & all activities including health, environmental Research, & BPA. He is responsible for this "Permit decision & the EIS while at the same time Responsible for all of the above Subject areas.

63-20 Why was my Scoping Letter Request Turned Down when I asked the DOE that Basic Research be conducted to Prove or disprove the health Hazards of Power Lines

5-181

Response to Letter 63 Continued

63-20 Please refer to Response to Comment 44-25 for a discussion of scoping comments that were not addressed in the Draft EIS. While DOE as an agency is conducting basic research on EMF effects, it is not the role of this EIS to conduct basic research and definitively answer this complex question. The EIS has attempted to present an up-to-date summary of this issue. Please refer to Sections 4.6.5.1 and 4.6.5.2 of this Final EIS, which have been revised and expanded to more adequately address the issue of the potential health effects of electric and magnetic fields. Note the modified conclusions presented in Section 4.6.5.2.

Letter 63 Continued

63-20 Cont. When this is a Listed Responsibility of the DOE.? The way I read these Responsibilities is that it is the DOE's duty to keep on top of all new developments that effect the energy field. Either they are not doing the JOB we TAXPAYERS are paying FOR (not the electric power industry), or the DOE is so compartmentalized they don't know what each other are doing, or the Basic integrity of this whole process has been compromised.

63-21 The absense of Qualified Researchers who have studied & reported the negative health aspects of Electrical or Magnetic Radiation in this DRAFT EIS, is inexcusable. Not only the studies & data submitted by NOPE & others, but also the studies & data in DOE. Files. Even if this evidence is not conclusive, which it will never be, it is the 'best evidence' available. The data collected & researched by the Office of energy Research & other Branches of the DOE were obtained at TAXPAYER expense for the Public Good. Since vital HEALTH issues are at stake they should be included in this EIS. for the ultimate objective of the EIS is the 'Public Benefit.'

It is Reasonable to believe that there is information in the DOE files that Support, Indicate, or Question the Health Hazard side of this controversy. Be they favor-

(over) R2

Response to Letter 63 Continued

63-21 In reference to the comment on the "absence of qualified researchers," please refer to the List of Preparers for the WWP/B.C. Hydro Transmission Interconnection located on pages L-1 and L-2 at the back of this Final EIS. The technical specialists responsible for the analysis of the EMF effects have each demonstrated over 20 years of professional experience in this field. Not only is this experience valuable to the analysis of EMF effects, it also supports the professional integrity required to objectively address these issues. Please refer to Responses to Comments 13-5 regarding the analysis conducted by independent scientific panels on EMF health issues and 51-7 pertaining to the references cited in the EMF analysis of this EIS. Also, Sections 4.6.5.1 and 4.6.5.2 have been revised in this Final EIS to better explain the EMF health issue. Note the modified conclusions presented in Section 4.6.5.2.

Letter 63 Continued

lines, sub stations, Radar, Computers, Home Wiring, Appliances, or any other type of Electronic or Electrical Device. Since this Data has not voluntarily incorporated in this Draft EIS by the DEO I hear by Request under the Freedom of Information Act 5 USC 552 access to all of this Data & that it be sent to me & or NOPE. (FOIA #1)

As an Intervenor I hereby Formally Motion that the above copies obtained by the F.O.I.A. be incorporated into the EIS along with Health-Hazard Data previously submitted by NOPE, & others during the Scoping & Draft EIS Process. Also that the research Publications, Reports, Books, Articles, etc. of the aforementioned, Drs. Becker, Milham, Zimmerman, Moreno, Richard Phillips, Koslov, Jerry Phillips, Matanoski, & Weaver, Estrumen, & Brodeur be sought out & incorporated in this EIS. (DOE/EIS-0141D) (PP 86) (Intervenor Motion #2)

63-22

I further Request that the DOE. waive the cost of such a search & copying since they are remiss in their duty to the public by not incorporating it in the Draft EIS. & that furnishing such information should be considered as benefitting the General Public Good.

Preferred Route

This Presidential Permit & the EIS are needed because this "is a major action affecting the quality of the human environment" (Draft EIS). Since the County Commissioners & the P.U.Dof Bend Oregon Co actually desire this Powerline & the P.O. co. Residents showed little or no opposition at the Scoping & the Draft EIS hearings, in effect they are waiving their environmental Rights & cannot be environmentally impacted.

(Cont'd) R.Y.Q.

Response to Letter 63 Continued

63-22 Requests for information filed pursuant to the Freedom of Information Act are not a part of the NEPA process. The commentor's data request has been forwarded to the Freedom of Information and Privacy Acts Branch within the DOE. Also, please refer to Responses to Comments 26-13, 51-7, and 13-5 for additional discussion on the resources used in the EMF analysis of the EIS.

Letter 63 Continued

Although The DRAFT EIS is an environmental Report a Section was devoted to energy needs & I question its one sided inclusion in this study. Equity then demands that we dissidents be allowed to contribute to 'need' & related subjects in this EIS. By the Draft EIS's own words it "is written from WWP's perspective" as the basis to justify the DRAFT EIS. 'need' category & I think un-

63-23 justly so, should it not be written from at least a neutral perspective? Again we have clear cut bias, but at least it is admitted bias. However, we need an objective evaluation of 'need' if an objective permit decision is to be made. This is very important because 'need' is the counter balance to environmental Damage. If 'need' cannot be justified, neither can the environmental Damage associated with Powerlines be justified.

First we must distinguish between WWP's actual need to supply its franchised customers, an addition 20 to 90% of this Powerlines capability, & a desired need, motivated by profit, to potential customers out side of their franchised area of service who therhave no legal responsibility to service. Should this desired need, go to 80% of this Powerlines capacity be considered real need to counter-balance the potential environmental Damage? I say no because this portion of the need could be serviced

(over) RPP

5-184

Response to Letter 63 Continued

63-23 Please refer to Responses to Comments 44-8 and 63-30 for a discussion of the presentation of need for the project in the EIS and its effect on the decision to issue a Presidential permit.

Letter 63 Continued

Response to Letter 63 Continued

BY BPA ON THEIR EXISTING Pend OREille Co R.O.W. WITH 14
LITTLE OR NO ADDITIONAL ENVIRONMENTAL DAMAGE
UNLESS WWP WERE ALLOWED TO USE THIS ROW.

WWP'S ACTUAL NEEDS ARE ONLY THOSE LEGAL & MORAL OBLIGATIONS TO THEIR FRANCHISED SERVICE AREA CUSTOMERS, THIS IS ONLY 20 TO 40% OF THIS POWER LINES CAPACITY (WWP'S OWN FIGURES). THE BALANCE OF THE POWERLINES CAPACITY, 60 TO 80% IS NOT NEED BUT DESIRE. THE ONLY OBLIGATION SERVED HERE WOULD BE TO FULL FILL ITS CORPORATE RESPONSIBILITY TO ITS SHAREHOLDERS OF MAXIMIZING PROFITS.

EVEN THIS 20 TO 40 % CAPACITY SHOULD BE QUESTIONED, IS IT REAL NEED ? NOT SO IF ROCKY MOUNTAIN INSTITUTES HEAD, AMORY LOVINS, IS TO BE BELIEVED. HE STATES THAT::

25% of all U.S. electricity could be saved by improved elec. motors.
25% " " " " " " " " " Lighting.
25% " " " " " " " " every thing else.

75% decrease in U.S. electricity consumption cost effectively thru increased efficiency (P.S Vol V number 4 of the WINTER R.M.I. NEWSLETTER.)

IF THIS BE TRUE THIS POWERLINE IS NOT NEEDED FOR THE % of decrease FOR EXCEEDS THE % of increase.

ONE ORGANIZATION I WOULD LIKE TO SEE EVALUATE THIS NEED QUESTION TO GIVE BALANCE TO THE EIS IS THE ROCKY MOUNTAIN INSTITUTE, AN INDEPENDENT NON PROFIT RESOURCE POLICY CENTER AT 1739 SNOWMASS CREEK ROAD, OLD SNOWMASS, COLORADO 81654-9199 PHONE 303-927-3851. THERE GOAL IS TO FOSTER THE EFFICIENT

CONTD PG

Letter 63 Continued

and Sustainable use of Resources. I don't know if WNP Subscribes To their goals, but WNP's constant campaign to increase the use of electricity by the use of electric Heat makes it doubtful.

Regardless, R.M.I. would be one of the organizations Qualified to evaluate WNP's need Forecast & make a Forecast of their own Based on their efficiency Research so that this area of the EIS has Balance.

Again the DOE. has information in their own Files that should have precluded such a one sided evaluation of need as stated in the Draft EIS. For it turns out that the DOE. is a subscriber to the R.M.I.'s Energy Competitek along with 100 other organizations, roughly half are utilities and their trade Groups, in 23 countries. RMI Competitek Researches & reports on energy efficient Lighting, Appliances, Advanced insulation, office equiptment, drive Power efficiency etc. DOE. is also Buying Reprint Rights To RMI's 'Energy Case Book'.

63-24 Again DOE. has more knowledge than we lay interveners and again the DOE has not on their own initiative incorporated this knowledge of energy efficiency into the Draft EIS. which would benefit the Public Good.

FOIA #2 Therefore I hereby Request under the Freedom of Information Act 5 USC 552 Access to all Data Regarding electrical Need Forecasts that would have a Bearing on this Draft EIS & said Powerline. which are in DOE Files, & all information on energy efficiency Research, ideas, Plans, inventions,

(over) RTJ

Response to Letter 63 Continued

63-24 Energy efficiency is an integral part of energy conservation. Please refer to Sections 2.6.1 and 2.6.1.1 in this Final EIS for an expanded discussion of energy alternatives, including conservation.

Letter 63 Continued

designs & improvements that would increase the efficiency of electricity or lessen its need that are in DOE files especially that of the Rocky Mountain Institute & other similar organizations but not limited to same, & that it be sent home & or N.O.P.E.

Intervenor motion #3

As an intervenor I formally motion that the above copies obtained by the F.O.I.A. be incorporated into the E.I.S. along with data previously submitted to the DOE. by N.O.P.E. & others relating to the same subject matter during the scoping & Draft EIS process, (DOE/EIS-0141D) (PP-86)

63-25

I further request that the DOE. waive the cost of such a search & copying since they are remiss in their duty to the public by not incorporating it into the Draft EIS, & that furnishing such information should be considered as benefitting the general public good.

Intervenor motion #4

As an intervenor I formally motion that the DOE engage the Rocky Mountain Institute to complete a impartial study on this 'need' issue incorporating

63-26

their energy efficiency ideas, plans, & research as a factor in this study & that this study be incorporated into the E.I.S. (DOE/EIS-0141D) (PP-86)

Response to Letter 63 Continued

63-25 Please refer to Response to Comment 63-22.

63-26 The DOE distributed the Draft EIS for public review and comment on January 12, 1990. Comments were solicited from all interested parties; the Rocky Mountain Institute was not prevented from presenting its views on the need for power issue. Also, please see Response to Comment 30-7.

Letter 63 Continued

Also effecting this 'need' issue is who will need this powerline? WWP & its actual & desired customers, or B.C. Hydro, who is also involved in financing of the initial phases of this powerline for WWP. As I stated in the Scoping process & at the Draft EIS Hearing, will this powerline end up depleting our national energy supply & actually increasing our need because under the terms of the Columbia River Treaty when this powerline is completed we have to repay British Columbia with electricity. According to the Seattle Post Intelligencer of 12-14-89 B.C. has decided to reclaim 600 megawatts of power (an amount equal to the energy consumed by a city the size of Portland) starting in 1998.

63-27 The Draft E.I.S. states (P-1-16) "any export of electricity to Canada would be covered by Sec 202(e) of the Fed. Power Act & would require a seperate application to export" This is correct as far as it goes, but grossly omits the fact that International Treaties, which is what the Columbia River Treaty is, are the Supreme Law of the Land Co-equal with the Constitution. If Canada wished to invoik its treaty rights they would override all lesser laws & regulations.

If this powerline were to deplete our energy supply by exporting power under the terms of this treaty, it would conform to the intent of the Presidential Permit "to authorize the exports of electricity" (P-1i Preface), it does not say import

(over) Ryg

5-188

Response to Letter 63 Continued

63-27 Your comment is noted. Section 1.3 has been revised to more adequately address the issue of electricity exports.

Letter 63 Continued

electricity. Does this Powerline Conform with Natl. energy Goals? I think not, but since our National Policy for Decades has been to export our Tax dollars, export our industry, & export our Jobs Perhaps it Does.

63-28 This raises another point, since the DOE's Presidential Permit is to authorize exports, where is the authority to authorize imports? Is there any & if so Please send me a Copy of this Law. If not, Let's stop this E.I.S. Process Right Now.

63-29 Here is another new development that will reduce 'Need.' That was not in the DRAFT E.I.S. The Solar Energy Research Institute reports an efficiency improvement in wind turbine Blades that will cut the cost of wind Generated electricity by 38% from 10 to 15 ¢/Kwh to 7 to 10¢/Kwh. This item was in the Northwest Power Planning Magazine, & their source was – you Guessed it – the DOE (11-89)

And Here is one more energy potential - a Recently Patented Strontium-90 Battery the size of a Soup can that puts out 75 watts & its cost is stated to be competitive with other power sources. Phillip Talbert of Peripheral Systems States this is a Radioisotopic Generator still in the Prototype stage & the ultimate Goal is home use. The Point in Reporting this unproven Battery (STAT) is, There are Potentials in Photovoltaic, Solar, Wind that Could alter the need Picture at any time so a Proviso should be incorporated into this Presidential Permit that it be Rescinded at any time Prior to Construction if Technology eliminates its need.

(Name) Ryg

Response to Letter 63 Continued

63-28 The commentor is incorrect. The issuance of a Presidential permit does not authorize the permittee to export electric energy (see Response to Comment 63-3). As discussed in Section 1.3, a Presidential permit is issued for the construction, connection, operation, and maintenance of electric transmission facilities that cross the international border. No authorization from the Federal government is required to import electric energy over existing transmission facilities. The Federal government does not regulate the import of electric energy or the commercial arrangements between United States and foreign utilities.

63-29 Alternative energy sources are discussed in Section 2.6 of this Final EIS. Refer to Section 2.6.1.15 of this Final EIS regarding wind energy.

Letter 63 Continued

There is an inherent conflict of interest within the DOE. caused by the contradictory functions & responsibilities of its subordinate offices and administrations. The Secretary of Energy has the ultimate responsibility for his Departments approval of this Presidential Permit, the E.I.S., & now we are told the authority to actually choose the powerline route (Constance Buckley 2-1-90 Colville). The Secretary is responsible for the Administration of the Office of Fuels Program which is conducting this E.I.S.

Since there is no index in the Draft-EIS & it is so voluminous I find it hard to determine just what criteria will be used by the Office of Fuels Program & the Secretary of Energy to justify granting of the Permit & selection of the specific route. As close as the DRAFT EIS comes to this is in the introduction (P.1-1) that the proposed interconnection constitutes a "major Federal action significantly affecting the quality of human environment" which requires a E.I.S. I assume that since the Draft EIS (covers two areas) a 'need for electricity' & 'environmental impact' that these are the two subjects that will determine the decision. Especially so since the EIS does state "the DOE's decision will not be based on economics." I am glad to hear this since higher construction costs have been WWP's excuse for not moving this route atop mountains to distance it away from human habitation.

63-30

Then route selection should be based on minimizing the environmental impact on Human Beings. This is where is where the conflict of interest lies. For the two routes that would impact the human environment or the environment

R.S. (over)

5-190

Response to Letter 63 Continued

63-30 DOE's decision on whether or not to issue a Presidential permit for the proposed interconnection will be based on two factors: 1) the environmental effects of the proposal, analyzed in this EIS; and 2) the effects of the proposal on system reliability, analyzed in a separate study prepared by WWP and submitted to DOE for review. The decision will not consider the topics of need or economics.

Letter 63 Continued

.2C

In General the least are in large on Federal Land. The least impacting is controlled by the BPA, and next least impacting controlled by the U.S. Forrest Service.

The Present WWP Preferred Transmission line route of 127 miles would Parallel the existing BPA Transmission line corridor for 115 miles. This Preferred WWP route regardless of which side of BPA's R.O.W. it is built will impact the environment more than if this WWP Powerline were built on & within the existing BPA. R.O.W. This location would also conform to the DOE's requirement that the Powerline be built on one of the designated Preferred or Alternate Routes (Constance Buckley 2-4-90 Colville) For on the BPA ROW was WWP's choice for the Eastern Route before BPA subsequently Refused them access.

The conflict of interest lies in that the BPA. is under the administration of the DEO. (DEO, organization Act of 1977 91 STA 569; 42 USC 7131). The BPA. is not independent like the T.V.A. which is an independent Government Corporation with all of its functions vested under its Board of Directors. The Secretary of Energy is at the apex of the Command Hierarchy that administers & is responsible for both the Office of Fuels Program & the BPA. The DOE Secretary is ultimately responsible for the Presidential Permit, the EIS, & the Route location while at the same time ultimately Responsible for BPA's Refusal to allow WWP to locate its powerline on the least environmentally impacting location, the BPA ROW. In Pend Oreille Co. I say least environmentally impacting because the Presense of BPA's Two Hi Voltage Powerlines have already deflowered the environmental Virginity of this Power Corridor.

.2D

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Response to Letter 63 Continued

Letter 63 Continued

Additional Conflict of Interest lies in that the Secretary of Energy also has the ULTIMATE RESPONSIBILITY VIA. BPA in the MARKETING of Hydo electric Power Thru Regionwide Interconnecting Transmission System in the Pacific Nw West; Also to Construct, Operate, & Maintain a Transmission System that Integrates Federal Power with Non-Federal Utility Systems; & Represents the U.S. in Implementing the Columbia River Treaty. This elaborates on the Theme of my Complaint in the Scoping Process the Basic Responsibility of the DOE is the NATIONS ENERGY Supply and the APPROVAL of the Presidential Permit & the related EIS, is another Conflict of Interest. Which Prejudices this decision."

7. The DOE's Internal Conflicting Authority & Responsibility Cannot be compartmentalized & isolated To Negate this Conflict of Interest because they converge at the Secretary of Energy. He can delegate his authority, but not his Responsibility, the Secretary Cannot Recuse himself from the obligations of his office Better the D.O.E. Recuse itself from this EIS. Process & Permit APPROVAL.

If environmental impact is the real issue as to where this Powerline is located & unless the DOE can Prove otherwise the existing Pantorcille B.P.A. ROW owned collectively by the citizens & under the Stewardship of the DOE, via the BPA is the logical choice.

If the 'need' truely exists why doesn't the DOE-BPA Put this Pantorcille ROW to its 'Best use', the maximum transmission of electric Power, for which this ROW was Appropriated." Be it Public Power or leased To Private Power?" Why should more Private Property be condemned for this Function when a Suitable ROW exists nearby, which would <u>serve the Public Benefit</u> by putting a <u>Gov't</u> owned ROW To <u>Best Use</u>' & <u>impact the environment the least</u>.?

Encl Ltr

5-192

Response to Letter 63 Continued

Letter 63 Continued

AGAIN IF IMPACTING THE HUMAN ENVIRONMENT IS THE CRITERIA, THE COLVILLE NAT'L. FORREST HAS LAND IN THE TARGET AREA THAT RUNS CONTIGUOUSLY FROM THE CANADIAN BORDER TO JUST NORTH OF SPOKANE COUNTY. WHY HAS IT OVERLOOKED AS A POSSIBLE ROUTE SINCE FEW IF ANY PEOPLE LIVE IN THIS FORREST. IF POWERLINES ARE AS HARMLESS AS PURPORTED TO BE, AND IF OUR NATION REALLY NEEDS THE ENERGY WHY DOESN'T THE GOVT. MAKE IT EASY FOR POWER CO'S TO OBTAIN ROW.S IF THIS WOULD ENHANCE ITS' 'BEST USE'. SINCE THERE IS A RELUCTANCE ON GOV'TS PART THESE POWERLINES MUST NOT BE SO HARMLESS & DESIRABLE AFTER ALL.

63-31

(INTERVENOR MOTION #5) AS AN INTERVENOR I FORMALLY MOTION THAT THE DEPT. OF ENERGY RECUSE IT SELF FROM THIS E.I.S. (DOE/EIS-0141D), & APPROVAL OF PRESIDENTIAL PERMIT DOCKET NO P.P 86, AND ROUTE SELECTION FOR THIS POWERLINE DUE TO THE AFORE MENTIONED CONFLICTS OF INTERESTS, KNOWINGLY OMITTING EVIDENCE RELEVANT TO THE STUDY, & LACK OF OBJECTIVITY WHICH SHOWS A PREDISPOSED STATE OF MIND UNABLE TO EQUITABLY DECIDE THESE ISSUES.

THANK YOU:

ROBERT L. JACKSMAN
BOX 588
NORTHPORT WA 99157
NO PHONE

DATED: 3-27-90

Response to Letter 63 Continued

63-31 Please refer to Response to Comment 44-23 regarding location of public versus private land along the proposed ROW.

Letter 64

March 18, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

I (We) have read the letter dated February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Washington Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As (a) resident landowner(s), who would also be affected by this project, I (we) endorse the objections stated in the Inmans' letter and wish this letter to be considered my (our) formal declaration of opposition to this project.

Sincerely,

Mike Cooper Smith
PO-456
Mead WA. 99021
Connie Cooper Smith

5-194

Response to Letter 64

Your concerns are noted. No response necessary.

Letter 64 Continued

March 18, 1990

The Wash. State Utilities and Transportation Commission
c/o Mr. Tony Cook, Director of Utilities
1300 S. Evergreen Park Drive, S.W.
Olympia, Washington 98504-8002

Dear Mr..Cook:

Please find attached a copy of a letter we have sent to the Department of Energy in Washington, D.C.

In a telephone conversation with Mr. Freeman we were informed that the DOE does not make the final decision on whether or not to issue a Presidential Permit. According to Mr. Freeman, the DOE bases its decision on the decision of the Washington Transportation and Utilities Commission.

As citizens who are opposed to the granting of this permit, we find this confusion between the State and Federal agencies to be of great concern.

We are requesting a formal clarification in writing as to which agency has the final and official decision-making authority.

In addition, we would like clarification of the exact role and steps each agency plays in the entire process.

We believe that it is our right to be informed of the above before any decision is made and that we be given an adequate amount of time under due process to appeal to the specific agencies after this clarification has been made.

I Support Them In This Issue
Comm. Mike Cooper Smith

Sincerely,

Pat and Kathy Inman
Rt. 3, Box 11
Mead, Washington 99021
509-466-6315

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Response to Letter 64 Continued

Letter 64 Continued

FEBRUARY 16, 1990

Mr. William Freeman
Mr. Anthony Como
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Freeman and Mr. Como:

The purpose of this letter is to provide a formal declaration of our opposition to the Washington Water Power/B.C. Hydro Transmission Interconnection Project as outlined in the Draft Environmental Impact Statement, DOE/EIS 0141-D, December 1989.

While we are opposed to the entire project as it is presently described, our primary opposition is to the Proposed Action (DOE/EIS 0141-D, 3.0), and specifically to the second deviation (DOE/EIS, 4-55) which occurs east of Mead on Peone Prairie.

The proposed route would parallel two existing transmission lines through most of the north Spokane area. However, in the second deviation it would cross a "gently rolling" NOT "relatively flat" open area of prime agricultural land which is in constant production of legume and grain crops with an as yet unobstructed, NOT "moderate" but very scenic view of Peone Prairie and the Pleasant Prairie and Greenbluff foothills extending all the way to Mount Spokane.

To state that "this line segment would result in 3.6 miles of moderate, long-term visual impact" (DOE/EIS, 4-55) is a contradiction in terms. The construction of an irreversible, long-term visual and geographic obstruction to a naturally unobstructed, scenic and productive portion of the environment creates an extreme impact which actually compounds its adverse effects over time. Not only are the transmission lines and towers an obstruction to the environment and agricultural production, but they also become an argument and rationale for future development since the natural area will have already been adversely impacted.

We have already experienced chaotic and sporadic development along the existing lines 1.25 miles to the west of the proposed deviation. To allow the deviation would only serve to encourage further development and infringement upon prime agricultural soil currently in production. As the EIS

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Response to Letter 64 Continued

Letter 64 Continued

states, "...the proposed line would be neither near enough to the existing lines to consolidate the impacts or far enough away to reduce them." (DOE/EIS, 4-55). In fact, one of the major adverse effects would be to unnecessarily and capriciously enclose an area of unobstructed farmland between two sets of transmission lines and towers 1.25 miles wide and 3.6 miles long, which would not only encroach upon the lifestyle of the residents within the enclosed area but also on the natural environment itself.

The visual simulation in the EIS (4-56) is erroneous and deceptive in that the view is actually to the northwest NOT to the north as stated, and pictures the sporadic development mentioned above in the area of the existing ROW. Those existing transmission lines are not visible since they are in a poorly exposed, shaded area of the photograPh. We are enclosing a photograph labeled Exhibit A taken from within the shaded area showing the existing transmission lines to the west. A more accurate simulation would be a view from the existing ROW to the north and east over the presently unobstructed prairie. We are enclosing other photographs labeled Exhibit B from these viewpoints which provide a more accurate depiction of the affected area. The proposed lines would run directly across the center of these photographs.

In addition to our specific objection to the second deviation of the proposed route as described above, we also have many concerns regarding the overall project. There are a number of issues raised in the EIS which remain nebulous and unresolved. Until and unless these issues are resolved to the satisfaction of all parties involved, a Presidential Permit should not be granted.

EIS viii:
"However, the fiscal conditions of Pend Oreille County would be significantly benefited by the Proposed Action."

Questions
What exactly would the fiscal benefits be?
How would they occur?
How long would they last?
Who or what agency has determined them?
Would the fiscal advantages outweigh the disadvantages?
Have Pend Oreille County officials and citizens endorsed this project?

EIS 1-2:
"These purchase and exchange agreements are scheduled to expire at various times between 1988 and 2019, thereby reducing the availability of resources for WWP to meet projected customer electrical loads."

Response to Letter 64 Continued

Letter 64 Continued

Response to Letter 64 Continued

Questions
Has WWP been advised that these purchase and exchange agreements are not renewable?
Is it unrealistic to expect that WWP may, in fact, be able to "develop other sources of energy to meet increases in demand for electricity" (EIS vi) between 1990 and 2019?--a period of almost 30 years!

EIS 1-4:
"B.C. Hydro has indicated a willingness to consider firm sales of electricity from existing B.C. Hydro generating facilities to WWP."

Question
Should WWP delay the construction of a TIP and DOE the issuance of a Presidential Permit until a firm guarantee from B.C. Hydro is available?

EIS 1-5:
"However, the Washington Utilities and Transportation Commission and the Idaho Public Utilities Commission will review the purpose and need before the proposed interconnection is included in WWP's resource acquisition plans."

Question
Shouldn't the decisions and recommendations of these agencies based on their reviews be prime considerations of the DOE before granting a Presidential Permit?

EIS 1-6:
"However, the proposed interconnection would be built only if it provides the least-cost source of electrical power to WWP when compared to alternative sources or supplies."

Question
If the construction is scheduled to begin in April 1993 (EIS vi), does that provide enough time to adequately and honestly research alternative sources and supplies of low-cost electrical power, or is this simply rhetoric to make the project seem to have more integrity?

EIS 1-6:
"Deficiencies are estimated to continue increasing through the remainder of the 20-year forecast period so that by 2007-2008, the deficits are predicted to be approximately 188 MW under average demands and 221 MW under peak demands."

Question
Has B.C. Hydro, "which is currently responsible for the overall planning, generation, and supply of electricity for more than 90 percent of the 2.9 million people of British Columbia, Canada," (EIS 1-4) also developed a long-term

Letter 64 Continued

(20-year) forecast of average energy and peak loads so that they can reliably guarantee the sale of surplus power to meet WWP's projected peak needs in their 20-year forecast?

Question
In light of recent developments and scientific research which possibly link strong electromagnetic fields with cancer and other human diseases, shouldn't the DOE proceed very cautiously in granting Presidential Permits until more conclusive research is available?

In conclusion, while we understand that WWP's decision to pursue the construction and operation of the proposed interconnection has not been finalized and that their expressed purpose is only to proceed with the licensing application due to the lead time required, we do not feel it should be incumbent upon the DOE to grant a Presidential Permit at this time. If such a permit were granted, WWP would be under no obligation to give serious consideration to purchases or exchanges with cogenerators and utilities other than B.C. Hydro, conservation, solar or photovoltaic power generation, or the construction of base load generation as potential resource alternatives.

A more fair resolution and compromise would be for the DOE to issue an "Intent to Grant" permission contingent upon firm evidence that WWP has in fact completed exhaustive research in the above areas, has successfully resolved and answered all the questions raised not only in this letter but also in any other written comments as well as the concerns of the DOE itself, and has conclusively demonstrated the construction of this project is the most viable alaternative for reliably and economically meeting customer energy loads in the future.

Supported By Mike & Connie Cooper Smith

Respectfully submitted,

Pat and Kathy Inman
Rt. 3, Box 11
Mead, Washington 99021

Response to Letter 64 Continued

Letter 65

March 29, 1990

Anthony J. Como
Department of Energy
Office of Fuels Program (FE 52)
1000 Independence Ave, S. W.
Washington, D C 20585

RE: WWP BC Hydro Transmission Interconnect

65-1 I have read nearly all of the EIP regarding the proposed line and would have to conclude that it is very well written and complete. I do believe, however, that the landowners rights have not been considered enough or making better use of existing lines and rights of way.

It is stated in the EIP that working with a third party (PBA) that WWP and BC Hydro are not able to make the best use of available power. It seems to me that this is problem "A." I do not feel it is in the best interest of BPA or WWP stockholders to proceed with another line until all options are exhausted. If in fact the capacity of the existing lines will exhaust, it would seem an overbuild would be a better solution.

There seems to be no limitation or consideration given to the land that it takes to support these transmission lines. I feel very strongly that we must avoid disrupting our natural resources.

Please reconsider building this line!

Respectfully,

J. W. Baker

J. W. Baker

cc: Congressman Tom Foley

Response to Letter 65

65-1 Responses to Comments 6-4 and 6-3 discuss landowner compensation for ROW easements and property damage, respectively. Response to Comment 11-1 addresses the potential for upgrading an existing line as an alternative to the proposed Interconnection.

Letter 66

March 18, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

5-201

Dear Mr. Freeman:

I (We) have read the letter dated February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Washington Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As (a) resident landowner(s), who would also be affected by this project, I (we) endorse the objections stated in the Inmans' letter and wish this letter to be considered my (our) formal declaration of opposition to this project.

Sincerely,

Joseph W. Rough

Response to Letter 66

Your concerns are noted. No response necessary.

Letter 67

March 18, 1990

Mr. William Freeman
U.S. Department of Energy
Fossil Energy (FE-52)
Office of Fuels Program
Room 3H-087
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Freeman:

5-202

I (We) have read the letter dated February 16, 1990, to your department from Pat and Kathy Inman stating their objections to the granting of a Presidential Permit to the Washington Water Power Company for the B.C. Hydro Transmission Interconnection Project.

As (a) resident landowner(s), who would also be affected by this project, I (we) endorse the objections stated in the Inmans' letter and wish this letter to be considered my (our) formal declaration of opposition to this project.

Sincerely,

Douglas V. Cooper

Rt 1 Box 386
MEAD, WA
99021
(509) 466-9093

Response to Letter 67

Your concerns are noted. No response necessary.

Letter 68

Sharon L. Sorby
P.O. Box 5000
Newport, WA.
99156 - 5086

April 5, 1990

William H. Freeman
FE-52 Office of Fuels Program Rm 3H-087
1000 Independance Ave, S.W.
Washington, D.C. 20585

Gretings Mr. Freeman:

Thank you for extending the comment period as stated at the public hearing the Department of Energy (DOE) held at Newport last February.

68-1 I feel the draft environmental impact statement did not adequately address energy conservation as a viable option to increasing available power by purchasing it from Canada.

I've enclosed a copy of an editorial from the Washington State Energy Office. It indicates this state's commitment to, and success with employing energy efficiency and conservation measures.

Response to Letter 68

68-1 Sections 2.6.1 and 2.6.1.1 of this Final EIS have been expanded to provide a more detailed discussion of energy supply alternatives, including WWP's current and future conservation programs. Response to Comment 26-3 applies these program estimates to the anticipated energy deficit.

Letter 68 Continued

The success can be measured by the steady economic growth along with a substantial increase in population over the last 18 years in spite of the boom and bust nature of our predominant timber industry.

Presently, interest rates are up and it may not seem an opportune time to offer lending incentives for conservation measures. However, we may no longer make decisions today without taking the future into consideration.

Economies can fluxuate so wildly, that their strongest element should be flexibility, allowing for bend and sway without breaking and crashing. When those in positions of power (including lending institutions) remove greed from their modus operandi and turn to a win/win philosophy upon which to base their decisions, the flexibility will be ensured and our children and grandchildren will have a better shot at a future.

Thank you for the opportunity to address my concerns and offer my opinion

Most Sincerely,
Sharon L. Sorby

Response to Letter 68 Continued

Letter 69

April 5, 1990

Mr. Anthony J. Como
DEPARTMENT OF ENERGY
Office of Fuels Programs FE-52
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. Como:

The following comments are made in reference to the Draft EIS proposal developed by Washington Water Power and B.C. Hydro. It is hoped that the comments we have provided to you will be useful in further determinations as to the significant planning problems and/or implications this project may produce.

5-205

All alternatives will impact our jurisdictional boundary, however the bulk of our comments are to be applied to the Western, Northern Crossover and Southern Crossover alternatives.

If you should need further information regarding these concerns, please feel free to contact our office.

Sincerely,

Hal H. Hart

Hal H. Hart,
Planning Director

HHH:pfh
Attachment

BOX 191, COURTHOUSE, COLVILLE, WA. 99114 509-684-2401

Response to Letter 69

Letter 69 Continued

STEVENS COUNTY'S
RESPONSE TO
E.I.S.

April 5, 1990

The following comments with regards to the proposed Transmission Interconnection Project of the Washington Water Power Company.

Stevens County Planning Department:
Technical Review Comments

GENERAL COMMENTS

1. The proposed transmission line will connect (renewable) natural hydro power from British Columbia Canada to local and regional consumers through Washington Water Power.

2. The transmission line proposal may be substantially less expensive than the more costly alternatives such as local power generation from either nuclear power, coal fired generation plants. The transmission line alternative is also less expensive additional hydro electric sources in Washington would carry with it additional physical environmental and scenic impacts on Stevens County.

3. Depending upon the proposed location/route the local impacts vary considerably. The proposed Western alternative has a great impact on Stevens County, while the Northern crossover has a lesser impact and the Southern crossover has the least impact of the three proposed routes.

4. An understated impact associated with the development of a major transmission line corridor would be the construction of access roads to service the towers and lines.

69-1 A) A concern for potential siltation coming from the roads, skid trails and associated soil disturbance impacts during road construction.

B) The impact of introducing a new land use will be to create a long and very narrow prairie zone through Cyric soil zones. These Cyric soil zones are identified as being highly erodible, especi-

5-206

Response to Letter 69 Continued

69-1 It is assumed that Part A of your comment refers to the potential for increased sedimentation to aquatic resources crossed by the proposed Interconnection, due primarily to access road construction. In response to this concern, Table 2-5 in this Final EIS outlines a variety of environmental protection procedures, including those developed to minimize soil erosion near surface water resources. These procedures would be made conditions of the Presidential permit by DOE, and WWP has committed to following these measures as part of their project description. Also, please note that under Aquatic Ecology (Section 4.1.5) it states that although a majority of the aquatic resources and riparian zones would be spanned by the proposed transmission line, "Access road construction could have a greater impact on these resources, depending on the stream crossing location, sensitivity of the species inhabiting the water resource, and the timing of the construction period." No significant impacts from increased sedimentation were determined because of the implementation of the procedures discussed in Table 2-5 and Sections 2.3.4 and 2.3.5 of this Final EIS and the fact that construction and maintenance activities along the proposed Interconnection would be required to comply with WDW and WDE regulations pertaining to stream and water quality protection (see Section 2.3.4). The original conclusions of the Draft EIS remain as stated. Finally, please refer to Response to Comment 27-1 for additional discussion on avoidance of wetlands and riparian zones during project construction and operation.

In reference to Part B of the comment, new access roads required for construction and maintenance activities of the transmission line and towers would be designed to ensure natural drainage and limit the potential for erosion. As stated under Construction in Section 2.3.4 of this Final EIS, water bars and other structures would be installed, as required, to control surface runoff, and road surfaces would be stabilized with gravel or rock to prevent soil damage during wet soil conditions. Access roads may also be gated and locked, as described under Operation in Section 2.3.5, thereby limiting vehicular traffic; please refer to Responses to Comments 34-3 and 60-3.

The potential for mass wasting along the proposed ROW would be reduced and/or controlled in part by revegetation with plant species that are acceptable to agencies coordinating with WWP on ROW reclamation. Please refer to Response to Comment 20-15 regarding the selection of the seed mixtures following project construction. Also, please refer to Table 2-5 and Section 2.3.4 of this Final EIS to review specific procedures designed to minimize the effects of soil erosion that may result in mass wasting.

Letter 69 Continued

ally in areas where roads must traverse slopes in excess of 40%, or are found in areas of southern exposure.

C) Mass wasting episodes are not uncommon in Stevens County. This action occurs during winter snow melt cycles as frozen ground thaws. These areas when left to nature are generally protected or minimized due to the presence of a forest layer of roots and duff that prevents significant soil movement events, removing or exposing this layer to greater erosive forces may encourage the wasting cycle to begin. 69-1 Cont.

D) Impacts associated with erosion on South facing [slope] roads at high elevations accelerate the mass wasting episodes.

5. A) Since reforestation can help to prevent the mass wasting processes, it is the recommendation that where possible forest practices such as tree farming be initiated in or near the areas that are subject to these natural processes.

B) Soil erosion within this complex geologic region of recent glacial deposits and volcanic ash additions could become particularly acute if compactions and major displacements of these soils take place due to the loss of forest covered soils under the proposed alternatives. Where moisture contents exceed 20% (the thixotropic water holding capacity of these soils) the soils become muddy in the late Winter or Springtime. This in turn means a period of general road restrictions in the affected areas or more bank or slope failures. 69-2

C) Where the Cedonia layers occur in conjunction with steep slopes (often unstable slopes) additional erosion episodes can be expected over time.

6. Few comments were made regarding the potential rates of metal rusting within these watersheds. Such a natural process will introduce additional amounts of Zn and Fe into several of the watersheds. 69-3

Response to Letter 69 Continued

69-2 Please refer to Response to Comment 20-2 regarding the potential for tree farming or commercial thinning beneath the proposed transmission line. Also, Response to Comment 20-15 discusses the determination of seed mixtures for ROW reclamation procedures. As stated in Section 2.3.4 in this Final EIS, stumps, root systems, low-growing vegetation, shrubs, and grasses would be left in place to stabilize the soil cover and decrease the potential for soil erosion. Road surfaces would be stabilized with gravel or rock to prevent soil damage during wet soil conditions, and vehicle traffic may be restricted. Based on your comment, please refer to the additional statement (Section 2.3.4) concerning access road construction during extremely wet periods, where construction activities would temporarily cease if soil conditions in specific areas along the ROW became too wet to ensure the successful implementation of erosion and sedimentation control measures.

The Cedonia soil consists of well drained, medium textured, nearly level to moderately steep soils that formed in calcareous glacial lake sediments that included volcanic ash. The CeC3 soil map unit (Cedonia silt loam, 20 to 30 percent slopes, severely eroded) is along drainageways and has experienced erosion losses of about 5 to 7 inches of surface soil compared to the Cedonia soil in other locations (SCS 1968). Cedonia is not found along the proposed alternatives on slopes exceeding 30 percent, and should not present an additional erosion hazard beyond that already described for the map unit (moderate to severe). If a transmission route is approved and a Presidential permit issued by DOE, WWP would begin detailed surveys and design work along the ROW. At that time, areas of Cedonia soils on slopes of 20 to 30 percent would be noted and treated as a sensitive soil area (high erosion hazard). If standard erosion and sedimentation control measures, as stated in Sections 2.3.4 and 2.3.5 in this Final EIS, are not sufficient to ensure successful erosion control, then additional treatment measures would be implemented or the areas would be avoided to the extent possible. Please refer to this site-specific reference located in Section 2.3.4 of the EIS.

69-3 Based on the comment, the discussion in Section 2.3.3 of this Final EIS has been expanded to better explain self-weathering steel structures. Please refer to this information regarding steel oxidation. In response to your concerns, during the initial oxidation process, a certain amount of rust will be washed off the structures onto the surrounding soil. However, due to the limited surface area of the structures, the 1,000 to 1,200-foot distance between the structures, and the declining rate of oxidation with time, the total amount of leachates entering both the soil and nearby water resources is expected to be insignificant.

Letter 69 Continued

Response To EIS
April 5, 1990
Page 3.

7. Existing research on soil leachates beneath the tower structures was not mentioned.

69-4 Similar studies using tension lysimeters have been established for the careful study and anaiysis of water quality. This task may be undertaken by the County in conjunction with Centennial Clean Water Funding grants for watershed monitoring in the near future.

8. During Spring and Fall inversion episodes whereby vertical mixing in the atmosphere is severely limited thus increasing transmission line expotures to these man made pollutants.

69-5 What will the effects of weathering have upon the transmission lines (ceramics, etc.) near the existing COMINCO plant in British Columbia? What ramifications exist for the areas beneath the lines?

9. Exact amounts of timber can be calculated that would be lost to the R.W.O. if the exact R.O.W. requirements were known for the various alternatives.

69-6 Soil surveys with Basal Area/Site Index, CMAI and local volume tables can calculate more precisely than 10-21 million board feet. The factors of precision should get to within one million board feet.

10. Stevens, Pend Oreille, and Ferry Counties have long been known as Panorama Land. Real estate advertising and promotional brochures have long touted the areas scenic quality as a major selling point of the region. The western alternative therefore would be a serious threat to these values.

69-7 Stevens County is characterized by broad U-shaped valleys. The route proposed in the Western alternative would impact the greatest number of house owners, recreational property owners due to the shape of the valley. Potential future growth decisions based upon scenic values associated with a largely rural environment, and the real estate market it effects could be impacted.

11. Concern for air traffic in areas such as the Mill
69-8 Creek Colville River area. Currently, air traffic is constricted to the narrow valleys. Smaller air

Response to Letter 69 Continued

69-4 Refer to Response to Comment 69-3 for further discussions on soil leachates beneath the transmission line towers.

69-5 Refer to Response to Comment 69-3 regarding weathering of the steel structures.

69-6 No accurate site-specific timber surveys have been conducted along the alternative routes, particularly off of National Forest lands. Until a route is approved by DOE, the representative data cannot be presented as requested in the comment. Actual timber volumes and economic losses will be determined by WWP prior to construction, upon the implementation of detailed ROW surveys and final ROW and access road design. Please refer to Response to Comment 31-2 on compensation for removal of timber.

69-7 Your concerns are noted. No response necessary.

69-8 General cross-country air traffic would not be affected by any transmission line, except possibly in deep narrow valleys which, if spanned by a transmission line, might present a hazard to aircraft. No such valleys have been identified, either in Stevens County or elsewhere on the network of alternative routes. If any such valleys are identified on the route selected for construction, WWP has committed to work with the FAA and other appropriate agencies and to come to an agreement on the installation of visibility markers on the project's shield wires or conductors, where necessary, keeping in mind the possibility of adverse visual effects from these.

The 1 inch = 1,000 feet scale aerial photography used to identify sensitive land uses for the impact analysis was rechecked in the Mill Creek and Colville River areas, in the vicinity of the Western Alternative, for evidence of air strips. None was found. However, it is recognized that small grass or gravel airstrips are not readily distinguishable on aerial photography because of the multitude of superficially similar linear features (e.g., access roads, cultivation patterns, etc.). There is no known published data source showing minor private airstrips. If the flight clearance zones of any unidentified airstrips in Stevens County are affected by the project, there would be additional impacts to air transportation applicable to the Western Alternative or the Northern Crossover Alternative. (The Southern Crossover Alternative parallels existing transmission lines and therefore would be very unlikely to constitute a substantial new hazard to air transportation.) These impacts (if they were found to occur) would tend to slightly weight the comparison of alternatives in favor of the proposed route, and therefore would not be an influence for changing the conclusions of the route comparison.

Letter 69 Continued

69-8 Cont. strips other than Colville may be impacted in this area. The Mill Creek Watershed could be impacted since smaller air strips are located in the vicinity of the proposed route.

12. 69-9 State Highway 395 is considered to be a scenic highway yet lines will be visible from Blue Creek to Palmer Siding again diminishing the value of the valley as a tourist attraction force.

13. 69-10 Power lines near one of the last free flowing stretches of the Columbia River will again impact scenic qualities as well as possible eagle habitats, nesting areas, etc.

14. 69-11 What is the potential of future additions, expansions or modifications to R.O.W. within Stevens County?

15. 69-12 In the future, the County residents may be more concerned with the aesthetic impacts of such R.O.W.'s: What impact will these lines have upon future land use values?

Response to Letter 69 Continued

69-9 The scenic values of this area are described and identified as moderate in the Draft EIS. This rating is consistent with the relative range of values given study area wide and is consistent with the existing Variety Class (scenic quality) ratings of adjacent National Forest lands. The Draft EIS indicates, as you point out, that much of the transmission line in this area would be visible from numerous highway and residential viewpoints and would have an adverse visual impact to this setting.

69-10 Your concerns are noted. Please refer to Threatened or Endangered Species in Section 4.1.7 of this Final EIS for a discussion on potential impacts to wintering and nesting bald eagles from project construction and operation; and refer to Section 4.3.7 in this Final EIS for the Western Alternative. As stated in Section 4.9 of this Final EIS, three mitigation measures were developed to ensure protection of the bald eagle. Clearance surveys for communal wintering areas and active nest sites will be conducted prior to project construction, and transmission line design will be modified at river crossings to minimize any potential impacts to the bald eagle.

69-11 WWP claims that no projects are being considered in WWP's current 10-year planning period that would result in the expansion or modification of, or addition to the proposed ROW in Stevens County. Future, as yet unforeseen, developments may occur which could result in changes to the transmission line or ROW. However, such modifications would require amending the Presidential permit, and the environmental consequences of such an action would be evaluated under all applicable regulations in effect at that time. Please refer to Mitigation Measure 17 added to Section 4.8 of this Final EIS regarding review of the final project design in accordance with NEPA regulations.

69-12 Please refer to the updated information presented under Property Values in Section 4.1.11.1 and Response to Comment 26-11 regarding the effects on land values associated with the proposed Interconnection.

Letter 70

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
1002 NE Holladay Street, Suite 354
Portland, Oregon 97232-4181

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ENSR CORP.

April 16, 1990

Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., SW
Washington, D.C. 20585

Dear Mr. Como:

The Department of the Interior has reviewed the Draft Environmental Impact Statement (DEIS) for the Washington Water Power/British Columbia Hydro Transmission Interconnection Project, (DOE/EIS 0141-D), Washington. The following comments are provided for your use and consideration when preparing the final document.

General

70-1 All of the proposed routes would involve a crossing of the Spokane River. Other major rivers which would be crossed under some alternatives include the Little Spokane River and the Pend Oreille River. These potential crossings could result in the loss of valuable riparian habitat along the river banks. Care should be taken in these areas to minimize the loss of riparian habitat. To the extent possible, facilities should be located outside of the riparian zone and revegetation of disturbed areas should occur promptly after construction is completed. Native species with high value to wildlife should be used.

70-2 Both the northern and southern cross-over alternatives would require clearing of some old-growth forest. While these losses would be relatively small (8-9 acres), we do not agree that no significant impacts to wildlife would occur. Old-growth forest is a relatively scarce cover type in the project area and supports a unique wildlife community. This cover type is also replaceable only over very long time periods, so losses associated with the project could extend over 200-300 years. As a result, even small acreage losses would be significant over those time periods. Wherever possible, old-growth losses should be avoided.

70-3 The construction of project facilities in wetlands would result in significant, long-term impacts. This possibility should be noted in the DEIS. While a commitment is made in the DEIS to locate facilities outside of wetlands whenever possible, it appears that some wetland losses would still occur. Consequently, an additional commitment to provide full mitigation for any unavoidable wetland losses should also be included in the DEIS. Mitigation for wetland losses could take the form of wetland restoration, creation, or enhancement.

5-210

Response to Letter 70

70-1 In reference to the transmission facilities being located within or impacting riparian areas, please refer to Response to Comment 27-1 for discussion on wetland/riparian avoidance. Also, please review protection measures added to Table 2-5 in Section 2.3.4 of this Final EIS; clarifications for wetland/ riparian habitats in Sections 4.1.4, 4.2.4, 4.3.4, 4.4.4, and 4.5.4; and the associated mitigation measure listed in Section 4.9 of this Final EIS for development of the wetland mitigation plan prior to initiation of project construction. Note that all environmental protection procedures and mitigation measures listed in Sections 2.3.4 and 4.9 of this Final EIS, respectively, would be made conditions of the Presidential permit by DOE. In reference to the comment on revegetation of disturbed areas, please refer to Response to Comment 20-1, which identifies environmental protection measures designed to maximize success of reclamation efforts and minimize soil erosion, noxious weeds, and associated habitat degradation. Finally, please refer to Response to Comment 20-15 for additional discussion on appropriate plant species and predetermined seed mixtures to be used during project revegetation.

70-2 Based on the comment, please note the impact modifications for wildlife species dependent on old growth forested areas for both the Northern and Southern Crossover Alternatives in Sections 4.4.7 and 4.5.7 in this Final EIS. Also, please refer to the mitigation measure added to Section 4.9 concerning avoidance of old growth areas by project construction and site-specific coordination with the appropriate state and federal agencies to minimize impacts to unique wildlife communities. If a route is approved and a Presidential permit issued by the DOE, WWP has stated that it would initiate detailed survey and design work along the chosen ROW. At that time, WWP has committed to coordinate with the agencies involved to identify any old growth areas crossed by the route and develop construction techniques to avoid these areas, if feasible.

70-3 Please refer to Response to Comment 27-1 for additional discussion on wetland impacts and review the text clarifications for protection measures located in Sections 2.3.4 (see also Table 2-5), 4.1.4, 4.2.4, 4.3.4, 4.4.4, 4.5.4 and 4.9 in this Final EIS.

Letter 70 Continued

70-4 No projects interrelated to the proposed interconnection have been identified in the DEIS. As proposed, however, the project dead-ends with transmission line at the non-existent Marshall substation without any means for interconnecting it to Washington Water Power's existing transmission system. Additional transmission facilities to complete the interconnection would appear necessary. The plans for the Marshall substation (pages 2-28) indeed show three additional 230 kV lines leaving that facility but they are not discussed in the DEIS. At a minimum, the DEIS should discuss Washington Water Power's long-range plan for completing the interconnection and actually connecting it with the existing transmission system.

The summary of concerns and impacts of the Proposed Alternatives shows that the Western Alternative has more adverse effects that can not be avoided or mitigated. The Western Alternative has areas with the highest potential for landslides, has the highest number of streams crossed, would have the highest number of structures built in floodplains, has the highest number of priority deer winter areas crossed, required the most rights-of-way (ROW) to be acquired, is the only alternative which would cross a designated housing development area, covers the most miles which would exceed the visual quality objectives, and would provide the least socioeconomic benefits.

The Western Alternative covers 3.4 miles of the Spokane Indian reservation and crosses Chamokane Creek five (5) times. President Hayes' Executive Order that established the Spokane Indian Reservation in 1881 states that the eastern boundary of the Spokane Indian Reservation is the east bank of Chamokane Creek from the 48th parallel (North Latitude) to the confluence with the Spokane River.

70-5 Discussion of a right-of-way alternative across an Indian reservation should be preceded by a discussion during the scoping process with the tribe, in this case the Spokane Tribe. Acquisition of the right-of-way must also be pursued early-on through the tribe and should be documented in the DEIS.

70-6 Since the Western Alternative proposes to parallel existing powerline right-of-ways and would result in doubling the capacity of the existing transmission lines, the Bureau of Indian Affairs will be closely reviewing the original conveyance instruments to ensure that all activities are in compliance with original conveyance instruments. We are assuming that all proposed activities would be conducted within the existing 100 foot right-fo-way, otherwise additional Bureau of Indian Affairs coordination an approval would be necessary.

Cultural Resources

There are important known cultural resources along the Western Alternative which will be negatively impacted, including two prehistoric campsites, one tipi ring, talus pits, a prehistoric village, the Long Lake Dam pictographs, and the Chamokane Mission. There is a strong possibility of impact to prehistoric sites where the

Response to Letter 70 Continued

70-4 A Presidential permit for WWP's current proposed action (Boundary Dam to Beacon) would not include authorization of the planned Marshall Substation. This important change in the proposed action was presented in the Supplemental Draft EIS. WWP states that it has no immediate plans to develop the Marshall site or transmission lines through it.

70-5 WWP has informed DOE that its representatives first met with the Spokane Tribal Business Council regarding the proposed Interconnection on August 31, 1987; the potential for a route paralleling the existing WWP 115-kV line along the eastern boundary of the Reservation was discussed. The proposed licensing/construction schedule was described along with upcoming public information meetings scheduled in September 1987. Following the WWP public information meetings and the DOE scoping meetings for the EIS, the preferred route was designated in Pend Oreille County leaving the route in Stevens County and across the Reservation boundaries as an alternative. Since the route on the Reservation was only an alternative, further contact was not made with the Tribal Council to discuss acquiring ROWs. The Spokane Tribe has been included on the DOE mailing list for the EIS, and the Bureau of Indian Affairs (BIA) is also a formal cooperating agency for the preparation of this EIS and will review and comment on the document. Please refer to Table 1-2 for the permit requirement to cross Spokane Indian Reservation lands.

70-6 Please refer to Response to Comment 70-5 for a discussion of the BIA review of the proposed Interconnection.

Letter 70 Continued

line crosses Chamokane Creek, which is a major concern. If the Western Alternative is selected a cultural resources survey will be required to identify and evaluate potential impacts to any sites that could be present. The line also passes within approximately 250 feet of a tribal cemetery located in the SE1/4 SE1/4 of Section 23 R39E T28N.

Compliance with the provisions of the National Historic Preservation Act will apply to any of the alternative routes selected. The Bureau of Indian Affairs (BIA) and the potentially affected Indian tribes should be consulted in the Section 106 process.

70-7 BIA opposes implementation of the Western Alternative, due to it's anticipated impacts to the Spokane Indian reservation and it's potential to negatively impact fisheries and cultural resources important to the Spokane Tribe. If, however, the Western Alternative is selected, an Archeological Resources Protection Act (ARPA) permit will be required prior to the archeological field survey on the Spokane Reservation. ARPA permits are issued by the BIA Portland Area Office, in consultation with the affected tribe. Sites identified as a result of this survey, as well as the known sites previously mentioned, are subject to Section 106 of the National Historic Preservation Act of 1988, as latter amended. The BIA and the Spokane Tribe should be consulted in the evaluation (eligibility for the National Register of Historic Places) and mitigation of adverse effect process. In addition, we recommend that DOE carefully consider the written comments submitted separately by the Spokane Tribe.

70-8 Measure 11, which addresses the mitigation of potential adverse impacts to cultural resources, recognizes the need to conduct appropriate studies. However, the entire focus of the survey, evaluation and mitigation process is archeological properties. The occurrence of mining camps and associated features also suggests that mining landscapes may be present, which will need identification, evaluation and treatment as well. The final EIS should fully address all types of expected cultural resources in the commitments made in Measure 11.

70-9 The proposed route of the transmission line would cross the proposed route of the Centennial Trail which would then follow the Aubrey White Parkway to Nine Mile Dam. We recommend that Washington Water Power consult with the Superintendent of Riverside State Park and the Washington State Parks Environmental Coordinator to assure that impacts to the proposed trail are minimized and the concerns of Washington State Parks are addressed.

Fish and Wildlife Resources

70-10 The Fish and Wildlife Service (Service) concurs that adverse impacts to the woodland caribou and the grizzly bear are not anticipated from this project, providing the following recommendation is implemented: access to the right-of-way should be by use of existing roads where possible, requiring minimal construction of additional roads.

Response to Letter 70 Continued

70-7 Your position is noted. If the alternative route that crosses the Spokane Indian Reservation is approved, all cultural resource requirements will be complied with. Please refer to Responses to Comments 39-17 and 39-20 for additional information on the Class III survey and associated resource inventory report, and review the mitigation measure for cultural resources in Section 4.9 of this Final EIS.

70-8 The commitments made in the mitigation measure section (Section 4.9 of this Final EIS) do include all cultural resources, including prehistoric and historic sites and historic structures, eligible for or listed in the National Register of Historic Places. Please refer to Responses to Comments 39-17 and 39-20 for additional discussion on cultural resources surveys, inventory reports, and applicable agency consultation.

70-9 WWP has committed to the consultation that the comment recommends prior to detailed project design, once a final routing alternative has been permitted.

70-10 The EIS analysis agrees with your concern regarding access roads and the potential for increased harassment for species such as the grizzly bear and woodland caribou. Please review the information presented for Threatened or Endangered Species in Section 4.1.7 of this Final EIS. As stated for project Operation and Maintenance in Section 2.3.5 and Table 2-5 in this Final EIS, specific protection measures have been developed to not only use existing access roads but also to reclaim or block new roads upon completion of construction. WWP has committed to implementing these measures outlined in Section 2.3.5, targeted to minimize public use, in cooperation with the landowner or land manager. As stated in Section 2.3.4, WWP has committed to consult with the applicable state and federal agencies prior to construction initiation to ensure species protection.

Letter 70 Continued

70-10 Cont. Additional roads would provide people with easier access to otherwise undeveloped areas. Few new roads should be required since 115 miles of the proposed 128 miles of right-of-way parallel the existing right-of-way.

A conclusion or determination of effect (whether this project is likely to adversely affect the bald eagle) was not provided in the biological assessment. It is the responsibility of the acting Federal agency to assess impacts and make this decision.

70-11 The Service could concur with a decision of "no effect" concerning the bald eagle if the following measures were implemented: to reduce the possibility of bald eagle electrocution, the proposed transmission interconnection project should be built in accordance with the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines." Highly visible aviation balls should also be installed on power lines at river crossings to prevent bald eagle power line collision.

70-12 It is stated in the DEIS that gray wolves have been sighted in or near the proposed project area. Project impacts to the gray wolf should also be considered in the biological assessment as well, even though it was not included as a species of concern in the list provided (FWS reference 1-3-89-SP-197). As above, it is the responsibility of the acting Federal agency to assess project impacts and make a determination of effect for all Federally listed species known to occur in the project area.

Chamokane Creek has excellent water quality and presently supports an important fishery. Navarre (1974) identified six (6) species of fish in Chamokane Creek including brown trout (Salmo trutta L.), rainbow trout (Salmo Gairdneri Richardson), brook trout (Salvelinus fontinalis Mitchell), largescale sucker (Catostomus macrocheilus Girard), chiselmount (Acrocheilus alutaceus Agassiz and Pickering), and sculpin (Cottus sp.). Additional species documented by Barber et al. (1988) included: Redside shiner (Richardsonius balteatus Richardson), pumpkinseed (Lepomis gibbosus Linnaeus), and two (2) species of sculpin, the Paiute sculpin (Cottus beldingi Eigenmann and Eigenmann) and the torrent sculpin (Cottus rhotheus Smith).

The Paiute sculpin has been listed as a species of special concern in Washington by the American Fisheries Society (Johnson 1987). According to Scholz et al. (1988), large numbers of brown trout, rainbow trout, and sculpins are present above Chamokane Falls. Growth rates of brown and rainbow trout in Chamokane creek were higher than those reported for other streams in the Pacific Northwest, Rocky Mountains and United States (Scholz et al. 1988). It is perhaps, the highest quality stream fishery for naturally produced resident trout in eastern Washington, the Idaho panhandle, and northwestern Montana (Scholz et al. 1988).

70-13 Although environmental conditions in the Chamokane Creek area are stable at present, the proposed transmission line crossings of the

Response to Letter 70 Continued

70-11 Based on the comment, a statement of the determination of no effect to nesting and wintering bald eagles has been clarified in the biological assessment, which is located in Appendix B of this Final EIS. In reference to the comment on possible eagle electrocution, this would not be considered a problem for a line of this size. A discussion of this topic is presented for Threatened or Endangered Species under project operation in Section 4.1.7 and has been added to the impact discussion in the biological assessment. One point of clarification is that the reference cited in the comment (Olendorff et al. 1981) applies primarily to distribution lines that carry between 12 kV and 69 kV and would not be appropriate for the 230-kV line proposed for this project. "Higher voltage transmission lines pose little electrocution hazard because wire separation is adequate" (Olendorff et al. 1981). Finally, an additional mitigation measure is presented in Section 4.9 of this Final EIS, which outlines procedures at river crossings to either mark or remove the shield wires of the proposed transmission line to minimize the potential for line strikes. As stated, these measures would be made conditions of the Presidential permit, and WWP will coordinate these measures with the appropriate state and federal agencies during detailed transmission line design.

70-12 As directed by the USFWS, the gray wolf has been added to the biological assessment. Please review Appendix B of this Final EIS.

70-13 The BIA's concerns are noted. If a route is approved and a Presidential permit issued by the DOE, WWP has committed to consult with the BIA and Spokane Indian Tribe on project-related concerns, in the event the line would affect tribal areas. Please refer to Table 1-2 in Section 1.3 of this Final EIS regarding permit requirements prior to construction initiation. In reference to surface water degradation and riparian impacts, please refer to Response to Comment 27-1, Table 2-5, and Section 4.9 in this Final EIS regarding protection measures for water resources and avoidance of wetland/riparian areas. Also, please refer to Section 4.6.3.4 for discussion on the EMF effects on vegetation and animals and Sections 4.6.5.1 and 4.6.5.2, which have been expanded and modified to better address the EMF health issue.

Letter 70 Continued

Western Alternative could negatively affect this important trout fishery. Major concerns would be potential impacts to springs in the area that contribute 50% of the summer flow to Chamokane Creek, stream sedimentation resulting from construction and maintenance activities, and potential unknown biological effects associated with close proximity to high voltage transmission lines. The importance of the Chamokane Creek as a fishery is underlined by the fact that the Spokane Tribe is currently in the process of developing a large fish hatchery on its west bank. Given the economic investment represented by this hatchery development and the intrinsic value of the existing trout fishery, BIA strongly recommends that other alternatives be selected which would prevent possible environmental degradation to this area so crucial to the Tribe.

70-13 Cont.

Minerals

The DEIS fails to address impacts to mineral resources other than those at existing mineral extraction facilities (p. 4-2). The DEIS does not identify high potential areas for future mineral exploration and development that would be precluded by the establishment of new transmission line rights-of-way (ROWs).

70-14

Brief inspection of the proposed route maps, present areas of mineral resource concern. Examples include, but are not limited to, quarries near Bluecreek on the southern crossover: marble quarries near Northport on the western alternative; and mines along the Onion Creek alternative. THe final EIS should describe specific geology crossed by the ROWs that have moderate to high potential to host economic mineral resources. Also, a record search for past and current mining claims on public lands within or adjacent to the ROW should be completed, not only to assess mineral potential but to identify valid preexisting mineral rights which might be adversely affected by the proposed action.

70-15

Contact Points

Fish and Wildlife Service, General:

Mr. Dave Kaumheimer
Moses Lake Suboffice
P.O. Box 1157
Moses Lake, Washington 98837
(509) 765-6125

Fish and Wildlife Service, Endangered Species:

Mr. Jim Michaels or Mr. Jeff Hass
Olympia Field Office
2625 Parkmont Lane SW, #B-3
Olympia, Washington 98502
(206) 753-9440

Response to Letter 70 Continued

70-14 Based on the comment, the Mineral Resources information in Sections 3.1.2.1, 3.2.2.1, 3.3.2.1, 3.4.2.1, and 3.5.2.1 of this Final EIS has been expanded to include potential areas for future minerals exploration and development; and a mitigation measure has been added to Section 4.9 of this Final EIS. These areas occur within the Colville National Forest (Forest Service 1987) and represent only those potential areas associated with National Forest lands. If a route is approved and a Presidential permit granted by DOE, WWP has committed to initiate detailed survey and design work along the route. At that time, specific undeveloped geological resources crossed by the ROW would be assessed and any mining claims occurring along the ROW on public lands would be identified.

70-15 Please refer to Response to Comment 70-14 pertaining to mineral rights potentially occurring along the project alternatives.

Letter 70 Continued

Response to Letter 70 Continued

Bureau of Indian Affairs:

Mr. Ron Eggers or Mr. Buz Cobell
Portland Area Office
1002 N.E. Holladay St.
Portland, Oregon 97232-4181

Bureau of Mines:

Mr. Michael Dunn
Western Field Operations Center
East 360 3rd Ave
Spokane, Washington 99202-1413
(509) 353-2664

Sincerely,

Charles S. Polityka
Regional Environmental Officer

Letter 71

April 20, 1990

Bill Sheelman
Office of Fossil Energy
1000 Independence Ave S.W.
Washington, D.C. 20585

Dear Mr. Sheehan,

We are writing to express our concern about a proposed transmission line through our neighborhood by Washington Water Power. We DO NOT want it and would appreciate any help from you in re-routing this line away from our children, our school, our church + us!! Spokane is north side is going through a much-needed growth spurt now + we see new homes going up every week. This would truly be a detriment

5-216

Response to Letter 71

Your concerns are noted. No response necessary.

Letter 71 Continued

Response to Letter 71 Continued

if this huge new power line comes through our neighborhood, not to mention our concern for our health!

Please help us in our case in stopping this Power company in constructing this line through our home neighborhood!

Thank you.

Mr. + Mrs. Joel Henggel
N. 11116 Wall
Spokane, WA 99218

5-217

Letter 72

PAUL WOOD
RT. 1 BOX 9
RICE, WA 99167

FE-52 USA 19

TONY J. COMO
DEPT OF ENERGY
OFFICE OF FUELS PROGRAMS
1000 INDEPENDENCE AVE, SW
WASH DC 20585

AW JA 3-10-92 ac 9/20/92

RECD SUPPLEMENTAL DRAFT DOE/EIS 0141D RE WASHINGTON WATER POWER / B.C. HYDRO INTERCONNECTION PROJECT. I SEE CONTINUING LISTING OF THE ROOSEVELT LAKE/COLUMBIA RIVER, NORTHPORT AREA AS AN ALTERNATIVE ROUTE. THIS IS INEXCUSABLE, IT WOULD BE RUINOUS TO THIS AREA. THANK'S PAUL WOOD

Response to Letter 72

Your concerns are noted. No response necessary.

Letter 73

3-19-92

Mr. William N. Freeman
U.S. Dept. of Energy
fossil Energy
Office of fuels Programs
Room 3H-087
1000 Independence Ave.
S.W. Washington, D.C. 20585

Dear Mr. Freeman:
We received the supplemental Draft Environmental Impact Statement for WWP/ B.C. Hydro transmission Interconnection project.
As land owners along the power line this proposed route will drastically alter our lives. The map shows our home as "residence removed". Please
73-1 advise as to the exact meaning of this. This leads us to believe we will no longer have a home.
Your immediate attention will be greatly appreciated.
Sincerely. Kathy & Bill Jentoft
PO Box 1573
Ione Wa 99139

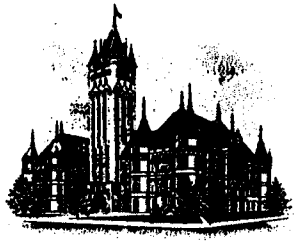
Real Estate description: 3-70
51/2SW 1/4SE 1/4/13/37/42
residence North of Diamond Creek at the dividing point of Northern Crossover alternate.

5-219

Response to Letter 73

73-1 **An aerial reconnaissance was conducted in April 1991 to update the land uses that may have changed along the Proposed Route, since public review and comment on the Draft EIS. The residence referred to in the comment had been constructed since the Draft EIS was prepared. Based upon the limitations of this aerial survey, it appeared that this specific residence would have to be removed to allow the safe construction and operation of the proposed transmission line. However, the need to remove any particular structure would be confirmed by WWP during the detailed design of and survey for the proposed transmission facilities. Please refer to Response to Comment 6-4 for additional information on the determination of and compensation for a ROW easement.**

Letter 74



SPOKANE COUNTY COURT HOUSE

SPOKANE COUNTY

PLANNING DEPARTMENT

BROADWAY CENTRE BUILDING N. 721 JEFFERSON STREET

PHONE 456-2205

SPOKANE, WASHINGTON 99260

April 8, 1992

Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., SW
Washington, D. C. 20585

SUBJECT: Supplemental Draft EIS
WWP/B.C. Hydro Transmission Interconnetion Project

Staff of the Spokane County Planning Department has reviewed the above document and offers the following comments. We note and approve of:

1. A total route reduction from US/Canada border to Spokane area, from 127.9 miles to 102.2 miles;
2. The use of a n existing substation (Beacon) with no expanded area verses proposed construction of a new Marshall substation;
3. Lower rate payer impact of $102 million construction cost (even with the not yet needed Series Capacitor Station) versus $124 mittion;
4. Lower electrical system losses; and
5. Apparent increased flexibility for meeting future needs.

More specifically, we note the newly proposed route right of way effects no new residences or businesses not already impacted by existing installations and right of way (map 2-3 and pages 2-4 & 2-6). The proposed double-circuit 230-kV lines are on rights of way which will have (conservatively) only a moderate impact on a total of 6 residences and 2 industrial buildings.

74-1 Also, please be edvised that the Zoning Code of Spokane County requires administrative approval of the public utility transmission facility by the Planning Department. Additionally, a portion of the proposed installation is in the City of Spokane and may require approval from the City.

In summary, we support the thesis that the proposed route modification to the existing Beacon substation is a positive adjustment; not withstanding the slight to moderate impacts it will bring to the 5.7 miles of newly proposed route from the Mead area to the Beacon Substation.

Spokane County Planning Department
Wallis D. Hubbard

by Thomas G. Mosher, AICP

c: Charles Dotson, Director, City Planning Department

RP COMO WWP/BC Hydro

Response to Letter 74

74-1 As indicated on Table 1-2 in the Final EIS, WWP would obtain administrative approval from the Spokane County Planning Department for the proposed transmission interconnection. In response to your comment, WWP will also consult with the City of Spokane to determine if any approvals are necessary for modification of the Beacon Substation or reconstruction of transmission lines within the City limits.

Letter 75

April 14, 92

Dear Mr. Como,

This letter is to let you know I am totally against the Transcontinental power line that they are wanting to put right through my property at E5303 Orchard Prarie Rd, Spokane, Wa I have lived here for about 14 yrs. I had cancer about 30 yrs ago and then had radiation treatment. The Doctor told me I have had enough radiation for life. I'm not even supposed to go out in the sunshine because of the radiation.

I couldn't live under these power lines. If I tried to sell my house no one would want it under power lines. I'm a Senior citizen + disabled and trying to live on disabilty pay + a little Soc. Sec.

Please do all in your power to stop this. We don't need any power from Canada We have plenty here. It's just a trick to get it + sell it to Calif.

Sincerely,

Mrs. Mary Doan

5-221

75-1

Response to Letter 75

75-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

Letter 76

Rec'd 4/22/92

April 17, 1992
[redacted] Mt St Michaels Rd
Spokane, Wa.
99207

Dear Mr. Comd

It is necessary for me to express my opposition to your proposed route for power lines, Orchard Prairie Var.
E.I. Statement 1992
D.O.E./EA 0-0141D

My husband and I have been residents of Washington, less than 2 years. We moved to this lovely spot, chosen for its natural beauty.

76-1 Two of our sons are planning to buy property here on Mt. St. Michael's. This proposed power line could curb their plans.

76-2 Surely you are aware of the historic value of this land, the early Missions and the

5-222

Response to Letter 76

76-1 Please refer to Response to Comment 26-11 regarding the potential effects to property values from the proposed Interconnection.

76-2 Please refer to Mitigation Measure 16 in Section 4.9 of this Final EIS regarding protection of cultural resources.

Letter 76 (Continued)

76-2 Cont.

Indian burial grounds. These should be preserved unchanged.

76-3

Lastly, and not least is the health effects. We have 3 grandchildren, our concern is for Mt. St. Michael's Church and School, There are already power lines across the front of Mt. St. Michael's property, more lines would create a double effect, and health hazard for children and religous.

Consider my concerns.

Sincerely

Mrs. Albert S. Cyr

NOPE

Response to Letter 76 (Continued)

76-3 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2.

Letter 77

Rec'd 4/27/92

E. 5701 Orchard Prairie Rd.
Spokane
Wash 99207
April 23, 1992

Anthony Como
Dept of Energy
Office Fuels Program FE-52
1000 Independence Ave SW
Wash DC 20585

Dear Mr. Como:

It has come to my attention that in order to provide power from Canada to service areas south, a new transmission line is proposed which will cross the Orchard Prairie area of north east Spokane. This Orchard prairie Variation crosses very near my property and the variation route passes directly over my property (see yellow area) This line appears to be unneeded because only a portion of it will be used in Spokane & the remainder transfered to other areas

77-1

These power lines present many problems for us as residents. Referring to EIS report DOE-EIS-0141-D done several years ago, the lines will present health problems for all of us located near the lines. There have been many studies done which have concluded that electromagnetic fields are dangerous to the health of residents living near them. At the base of the hill near Mt. St. Michaels Seminary, there are several high power lines. Six deaths from cancer have occurred there in the last 10 years. Several

77-2

5-224

Response to Letter 77

77-1 The Orchard Prairie Variation would not cross the parcel of land indicated on your attached map. The variation is to the west of the parcel; the line that you note is the bracket that indicates the segment of the variation that would require new right-of-way. Map 2-3 in the Final EIS has been modified to avoid this confusion.

77-2 Section 4.6 in this Final EIS is an updated version of the EMF discussion you reference from the Draft EIS (DOE-EIS-0141-D). Human health issues are treated in Section 4.6.5, which has been expanded to discuss the result of the most recent studies on this issue.

Letter 77 (Continued)

others are now ill. On the area where the proposed lines will go, at St. Michael's Scholasticate is an elementary & high school, attended by over 200 children.

St. Michael scholasticate, St. Michael's mission and the Indian Burial grounds in the area are valuable historical properties, and the lines will dissect these properties. These lines cross the existing church property.

77-3 Unsightly power lines severely reduce property values. Not very many people want to live near the lines. The land around my property is all divided into 5 or 10 acre parcels and homes are being built there. My home on the yellow marked parcel will be completed in October of 1992.

There are no existing power lines in this area now and I strongly oppose putting any in the ~~near~~ future. Please do not allow these lines to cross beautiful orchard Prairie.

Sincerely

Amelia Baldi

Response to Letter 77 (Continued)

77-3 Please refer to Response to Comment 26-11 regarding the potential effects to property values from the proposed Interconnection.

Letter 78

4-22-12

Dear Mr. Como,

My husband and I are writing in regards to the

*(Orchard Prairie Variation Transmission Interconnection Project DOE/EIS 0141-D)

We're strongly opposed to this ① as these power lines are hazardous to ones health. We have quite a few children plus there are many children in this area including a private school with many little children attending. ② They would cross new private property ~~with~~ when another right of way exists. ③ it will lower the property values here. ④ it will cross ⓐ Mt. St. Michaels Mission Ⓑ Indian burial grounds. ⑤ It will impede future development of land ⑥ it crosses church property ⑦ radio interference as there are ham radio operators in the area.

Thank you for your cooperation

Please keep this project Out of our area.

5-226

Response to Letter 78

Your concerns are noted. No response necessary.

Letter 79

Rec'd 5/1/92

4-28-92

Ms. Anthony Como
Dept. of Energy
Washington, D.C.

Dear Miss Como,

I'm writing to urge you to take a NO action on the Presidential Permit for the Transmission Interconnection Project DOE/EIS 0141-D.

Your Orchard Prairie Variation route in Spokane, Washington will be right next to our property. We fear for the health of our children and all of the children along the route. Also you will be destroying our property value and the future use of our land. We protest your use of the Orchard Prairie Variation. There is no reason for the high tension lines to destroy a new area.

79-1

Thank you for your time and attention.

Sincerely,
Sara Ott
5103 Orchard Prairie
Spokane, Washington
99207

5-227

Response to Letter 79

79-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

Letter 80

Rec'd 5/7/92

April 1992

Dear Mr. Coons,

I'm enclosing a map I've recently received, showing proposed routes for high powered tension lines.

80-1 Surely you know the devastating financial and health effects these have wherever they are located.

The proposed Orchard Prairie Variation would be totally new and totally objectionable to a well-populated and as yet, a good place to live.

80-2 Line marked in yellow where I live. These lines would be intolerable.

I made a little star at the top of the map, where big lines already exist. I ask you to use your

80-3 influence to locate your lines along those lines, rather than cause all the heartache and distress that

5-228

Response to Letter 80

80-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

80-2 The Orchard Prairie would not cross the parcel of land indicated on your attached map. The variation is located to the west of the parcel; the line shown on Map 2-3 that crosses your property is the bracket that indicates the segment of the variation that would require new right-of-way. Map 2-3 in this Final EIS has been modified to clarify the proposed project variation.

80-3 The star that you indicated at the top of your attached map coincides with WWP's Proposed Route to the Beacon Substation. The Proposed Route segment from Mead to the Beacon Substation would be located within existing corridors, except for the 0.5 mile of new right-of-way that would be required directly south of these transmission line rights-of-way that your comment refers to (see Map 2-3).

Letter 80 Continued

Response to Letter 80 Continued

invading new areas would cause.

Graciously,
Catherine Radecki
E. 5901 Orchard Rd.
Spokane, Wa.
99207

We have at least 25 children within a half mile of this "Orchard Prairie Version," plus immediate proximity to the Mt. St. Michael's School of some 200 children! Darlene, this is intolerable.

Letter 81

Rec'd 5/7/92

Anthony Como
Dept. of Energy
Office Fuels Program FE-52
1000 Independence Ave. S.W.
Washington D.C. 20585

RE: Orchard Prairie Variation

Dear Mr. Como

I urge you to take a NO action on the Presidential Permit for the Transmission Interconnection Project DOE/EIS 0141-D.

81-1 I have great concern for the health and well being of the many children directly in line. Our property value will be destroyed and future development of our land and its surrounding areas will be negatively affected.

I Myself, along with many others do not want the high tension lines on the Orchard Prairie Variation route Spokane, Washington! Please, help put a stop to this.

Thankyou for your time and attention to this matter.

Sincerely,
Tammy Ett

5-230

Response to Letter 81

81-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

Letter 82

4-28-92

Rec'd 5/7/92

Dear Sirs.

We urge you to take a "No" action on the Presidential Permit for the "Transmission Interconnection Project DOE/EIS 0171-D.

82-1 We have "grow homes" sheets with many children directly in line. Our property value will be destroyed & future development of our land will be effected.

We are a community that has celebrated its 100th yr. Anniversary a few years ago & a book was even written about us on the history of our Community. "Please" do not endanger that? Our Congressional speaks for the kind of people we have in our Community. We care very much what happens "Now" & in the "future" for the next generations of children being raised here. Please listen to us!

"We do not want" the high tension line on the Orchard Prairie Carnation Route, Spokane, Washington.

Sincerely,

Harold & Mary Ann Williams

Response to Letter 82

82-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

Letter 83

Rec'd 5/7/92

April 28, 1992

Dear Mr. Condo,

It is with deep concern that I write to you about DOE/EIS 0141-D project in Spokane Wa. These high power-
83-1 ed lines would cross a high school, grade school, and many private homes. In our immediate area located there are will soon have some 13 children. The health hazard is large and questionable. In the June 12th 1989 issue of The New Yorker magazine "Annals of Radiation," "The Hazards of Electromagnetic Fields," I. Power
83-2 Lines - we learn that children

5-232

Response to Letter 83

83-1 As indicated in the Supplemental Draft EIS and in this Final EIS on Map 2-3 and in Section 4.1.8.1 for the Southeast of Mead to Beacon segment and the Orchard Prairie Variation, no schools or residences would be crossed by these route segments. Please review this information for the complete impact identification associated with the Proposed Route, its variations, and route options.

83-2 The paper that your comment refers to appears to be the Wertheimer and Leeper 1979 publication that was cited in Section 5.5.1 of the Supplemental Draft EIS and in Section 4.6.5.1 of this Final EIS. Regarding your concerns for potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2.

83-2 Cont.

living near an electromagnetic field can and have gotten leukemia and died. Permit others have gotten brain tumors. This has been written by the American Journal of Epidemiology which is published by the John Hopkins University School of Hygiene and public Health, in Baltimore, and is considered one of the foremost epidemiological journals in the world. After peer review, the paper was accepted and it appeared in the journals March 1979 issue, under the article "Electrical Wiring Configurations and Childhood Cancer." The first paragraph said:

> Electrical power came into use many years before environmental impact studies were common, and today our domestic power lines are taken for granted and generally assumed to be harmless. However, this assumption has never been adequately tested. Low-level harmful effects could be missed, yet they might be important for the population as a whole, since electric lines are so ubiquitous. In 1976-1977, we did a field study in the greater Denver area which suggested that, in fact, the homes of children who developed cancer were found unduly often near electric lines carrying high currents.

5-233

Letter 83 Continued

3

Human life should always be of first consideration in undertakings such as these and I beseech you to realize this, particularly as regards our dear children.

83-3 We are also informed that this project would lower our property values.

83-4 If there is an alternative R.O.W. away from the Orchard Prairie Variation now, we would ask you kindly to take it and remember our children & request.

Thank you for your times. It would be nice to hear from you now in this regard.

Sincerely,

Mrs. Frances [illegible]

#1 [illegible] Chula Vista Ca. 91910

Response to Letter 83 Continued

83-3 Please refer to Response to Comment 26-11 regarding the potential effects to property values from the proposed Interconnection.

83-4 The Orchard Prairie Variation was presented in the Supplemental Draft EIS as an alternative route to a segment of the Proposed Route. Therefore, WWP's currently Proposed Route would travel primarily within existing transmission line rights-of-way between Mead and the Beacon Substation, avoiding the Orchard Prairie area (see Map 2-3 of this Final EIS).

Letter 84

United States Environmental Protection Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

APR 30 1992

REPLY TO ATTN OF: WD-126

Anthony J. Como
Department of Energy
Office of Fuels Programs (FE-52)
1000 Independence Ave., SW
Washington, D.C. 20585

Dear Mr. Como:

The Environmental Protection Agency (EPA) has reviewed the Supplemental Draft Environmental Impact Statement (EIS) for the **Washington Water Power/B.C. Hydro Transmission Interconnection Project**. Our review was conducted in accordance with the National Environmental Policy Act (NEPA) and our responsibilities under Section 309 of the Clean Air Act.

This supplemental draft EIS examines the environmental consequences of a new 5.6 mile portion of the overall route and compares the effects of the new route to the alternatives presented in the draft EIS. The original draft EIS was circulated for review in December, 1989. The supplemental draft EIS also updates information dealing with electric and magnetic field effects, effects on threatened and endangered species in the project area, and modifications and additions to mitigation measures.

In our comments on the draft EIS we expressed concern about the potential impacts of the proposed action on wetland resources. We requested that the final EIS clearly identify the wetlands that could be affected, describe their areal extent as well as their functions and values, and present mitigation measures for unavoidable wetland impacts. The supplemental draft EIS presents no new information about the acres of wetland affected or the functions and values of these wetlands. It does contain a new mitigation measure that commits to coordination with appropriate state and federal resource agencies to develop a wetlands mitigation plan.

84-1

84-2

The coordination with resource agencies, including EPA, should begin as soon as possible so that the mitigation plan can be included in the final EIS. The need to select alternatives which avoid impacts to waters of the U.S. must be addressed during the 404 permit process. This selection should be based on a formal delineation of the waters of the U.S. in the project area. If coordination with resource agencies is not initiated until after the final EIS is completed, it is conceivable that alternative routings to avoid wetlands, which have not been evaluated in this EIS, could be developed during the 404 permit process. The final EIS for this proposal must present

84-3

84-4

5-235

Response to Letter 84

84-1 The Supplemental Draft EIS text presented only the floodplains and wetlands associated with the Mead to Beacon route segment and the Orchard Prairie Variation. However, based on EPA's comments received on the Draft EIS, the entire wetland analysis was recalculated, and individual wetland types were delineated for each of the project alternatives, variations, and route options. Please refer to Response to Comment 27-1, which addresses the EPA's original concerns on the Draft EIS.

In reference to the comment that no new wetlands data were incorporated into the Supplemental Draft EIS, the number of acres of forested wetlands that may be changed to other wetland types by the proposed Interconnection project (i.e., unavoidable adverse impacts) was presented in the impact summary tables of the Supplemental Draft EIS for all of these project components (see Tables 4-1 and 4-2 of the Supplemental Draft EIS and Tables 2-6 and 2-7 in this Final EIS). To clarify the wetlands analysis, the wetlands baseline discussion, impact assessment, and associated mitigation plan have been expanded in this Final EIS (including Sections 3.1.4, 4.1.4, and 4.9).

84-2 The wetland mitigation plan is intended to be a site-specific plan and cannot be prepared in the level of detail identified in your other comments until a final route is approved by DOE. While a detailed mitigation plan cannot be included in the Final EIS, Mitigation Measure 2 in Section 4.9 of this Final EIS has been expanded to present the types of information that would be included in the plan. Coordination with the Corps of Engineers (COE) is discussed in Response to Comment 84-3, and the U.S. Fish and Wildlife Service (USFWS) discusses its involvement in wetland review and mitigation in Comment 85-5.

84-3 Please refer to Response to Comment 27-2 for EPA's original comment on the Section 404 permit process. As you indicate in your comment, impacts to waters of the United States (including wetlands) are evaluated in detail as part of the 404 permit process. Once WWP would receive approval of a route from DOE, they would then submit a formal application to the COE for a 404 permit. This application would contain formal delineation of wetlands, if this information is requested by the COE. In regards to alternative routings, WWP's Proposed Route (Boundary Dam to Beacon) follows an existing transmission line corridor for the majority of its length. Impacts along both sides of this corridor were analyzed and are presented in the Final EIS. This information should prove useful as the COE and other agencies review potential impacts to wetlands along the Eastern and Western Route Options (alternatives routings). Since the wetlands crossed by the Proposed Route are predominantly along streams (riparian) that cross the corridor in a perpendicular orientation, the potential to avoid a wetland through a routing not evaluated in the EIS is extremely limited. Such a deviation from the existing corridor would probably not eliminate the impact, and the advantages of consolidating impacts to all resources to a single, existing corridor would be lost.

Letter 84 Continued

84-4 Cont. the actions that would be undertaken if significant wetland resources are determined to be present.

We concur with the Department of Energy's decision to prepare a supplemental EIS to evaluate the impacts associated with the revised route. Based on our review, we are rating this supplemental draft EIS EC-2 (Environmental Concerns - Insufficient Information). Our environmental concerns are based on the potential impacts to wetland resources. Additional information is needed to describe the wetlands that will be affected by the proposed project, the functions and values of the affected wetlands, and the detailed mitigation measures that will be included in the preferred alternative. An explanation of the EPA rating system for draft EISs is enclosed for your reference. This rating and a summary of our comments will be published in the Federal Register.

84-5

We appreciate the opportunity to review this supplemental draft EIS and provide comments. If you have any questions about our review comments or our review procedures please contact Sally Brough in the Environmental Review Section at (206) 553-4012.

Sincerely,

for Ronald A. Lee, Chief
Environmental Evaluation Branch

5-236

Enclosures

cc: Corps of Engineers
USFWS
Department of Ecology
WDW
Kalispel Tribe, Washington
Spokane Tribe, Washington

Response to Letter 84 Continued

84-4 Based on your comment, Mitigation Measure 2 in Section 4.9 of this Final EIS has been expanded to discuss actions that could be undertaken if it is determined during the preparation of the wetlands mitigation plan that important wetland values would be impacted by construction along the approved route.

84-5 In regards to the concerns for potential wetland impacts, please refer to the responses to EPA's Letter 27, submitted on the Draft EIS, and refer to the responses to comments on the Supplemental Draft EIS listed for this Letter 84.

Letter 84 Continued

SUMMARY OF THE EPA RATING SYSTEM
FOR DRAFT ENVIRONMENTAL IMPACT STATEMENTS:
DEFINITIONS AND FOLLOW-UP ACTION *

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities with no more than minor changes to the proposal.

EC--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment

Response to Letter 84 Continued

Letter 85

rec'd 5/11/92

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
500 NE Multnomah Street, Suite 600
Portland, Oregon 97232-2036

May 6, 1992

ER 92/228

Anthony J. Como
Department of Energy
Office of Fuels Programs
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Como:

The Department of the Interior (Department) has reviewed the Supplemental Draft Environmental Impact Statement (SDEIS) for Washington Water Power (WWP)/British Columbia Transmission Interconnection Project. The following comments are provided for your information and use in preparing the final documents.

5-238

Fish and Wildlife Resources

The Department found the mitigation measures identified in section 6.0 of the SDEIS to be relatively general in nature. They mostly call for the applicant to coordinate with the various resource agencies measures for avoiding or rectifying impacts which may occur tb particular resources. In many cases, the mitigative measures call for avoiding impacts "to the extent possible." If project impacts to important wildlife habitats can be avoided, then the proposed mitigation measures would be acceptable. However, in cases where habitats and resources would be impacted, additional specific mitigative measures may be necessary. This would include measures which provide complete compensation for unavoidable impacts to important fish and wildlife habitats. In that regard, the Department's April 16, 1990, comments on the Draft EIS expressed concerns about constructing project facilities in wetlands, riparian zones, and old-growth forest habitats.

85-1 The proposed mitigation measures provide only limited specificity concerning what the actual mitigation measures might entail for the destruction of wetlands, riparian habitat or old-growth habitat. The final documents need to provide some insight to what the specific mitigation measures might include, in order to determine the adequacy of the proposed measures.

85-2 The "no effect" determination given for federally listed species is not supported by the text. The U.S. Fish and Wildlife Service (Service) believes there cannot be a "no effect" determination to species when their habitat would be removed or when there is a

Response to Letter 85

85-1 WWP has committed to a number of environmental protection measures that are presented in Table 2-1 of the Supplemental Draft EIS and in Table 2-5 of this Final EIS. Potential impacts to sensitive resources (e.g., wetlands, old growth forest, threatened or endangered species) from the proposed Interconnection were assessed with these protection measures in place. The additional mitigation measures presented in Section 4.9 of this Final EIS have been developed to further protect these sensitive resources. Many specific methods that may be employed during project construction or operation are discussed in Table 2-5 in Section 2.3 of this Final EIS. Other specifics may not be determined until final route approval by DOE, as discussed in Response to Comment 84-2. Mitigation Measure 2 in Section 4.9 of this Final EIS has been expanded to discuss actions that could be taken if it is determined during the preparation of the wetlands mitigation plan that important wetland values would be impacted by construction along the approved route. As indicated in Mitigation Measure 11, site-specific measures to avoid old growth forest would be delineated with the appropriate state and federal agencies, upon final route approval. Also, please refer to responses to the Department of the Interior's Letter 70 on the Draft EIS.

85-2 The EIS and biological assessment (located in Appendix B of this Final EIS) both present and discuss the potential impacts to federally-listed wildlife species from the proposed Interconnection construction, operation, maintenance, and abandonment. These potential impacts were analyzed with WWP's committed environmental protection procedures in place, which are discussed in Section 2.3 and delineated in Table 2-5 of this Final EIS. Specific mitigation measures were then developed for any impacts to these sensitive species that remained following the implementation of these committed protection procedures. In reference to the specific comment on the potential impacts to grizzly bears from project operation, the document states that increased access into the grizzly territories would result in harassment and potential poaching during line operation; however, the environmental protection procedures presented in Sections 2.3.4 and 2.3.5 and in Table 2-5 in this Final EIS indicate that WWP has committed to closing and reclaiming project access roads and gating (or otherwise blocking) mandatory access roads, in cooperation with the landowner. These committed protection procedures (developed in coordination with the USFWS, WDW, and Forest Service) would ensure sensitive species protection. Therefore, the impacts analyses led to a "no effect" decision for the grizzly bear within the proposed study area. This same impact assessment methodology, based on the committed protection procedures and developed mitigation measures, was followed for the bald eagle, woodland (mountain) caribou, and the gray wolf.

Letter 85 Continued

85-2 Cont.

potential for disturbance to the species, even when impacts are being minimized. In addition, for each of the species evaluated, the SDEIS states that there is the potential for impacts due to construction and/or operation of the project. For example, as it is stated in section 8 on page 8-15 (part 8.2.6 - Impact Evaluation) "potential impacts to grizzly bears...would be limited to...an increase in harassment and potential poaching during line operation"; how, then, is it possible to make a "no effect" determination for grizzly bears? The Service found that similar inconsistent statements exist with each of the listed species evaluated. If the Department of Energy recognizes that effects may occur to listed species and that measures to minimize the effects may be implemented, then a "not likely to adversely affect" determination may be appropriate.

Cultural Resources

85-3

Compliance with the provisions of the National Preservation Act will apply to any of the alternative routes selected. The proposed western alternative route would cross the Spokane Indian Reservation in two locations (Map 2-2 of SEIS). Access to the right-of-way (ROW) would require coordination and consultation with the Spokane Tribe. Any compensation, permission and mitigation issues would need to be negotiated with the affected Tribe and the Superintendent, Bureau of Indian Affairs, Spokane Agency. Their addresses follow:

Spokane Business Council
Bruce Wynne, Chairman
Post Office Box 100
Wellpinit, Washington 99040-0100

Spokane Agency
Michael P. Whitelaw, Superintendent
Post Office Box 389
Wellpinit, Washington 99040-0389

Specific Comments

85-4

Page 3-9, Section 3.5: The discussion in this section states that "no impacts to aquatic resources are anticipated...". Table 3-1 (page 3-6) however, identifies that five water bodies would be crossed by the Mead to Beacon route, one water body by the Orchard Prairie variation, and three water bodies by the currently proposed route segment. Even if any of these water bodies are intermittent, their associated wetland and riparian vegetation and their indigenous wildlife could be impacted. Potential impacts may include: altered hydrology, removal of canopy and ground cover, increased predation, and increased human disturbance. These potential impacts and proposed mitigative measures need to be identified and addressed in the final documents.

Response to Letter 85 Continued

Also, please refer to Comments 70-10 and 70-11 from the Department of the Interior's letter on the Draft EIS. Comment 70-10 states that the USFWS concurs that, "...adverse impacts to the woodland caribou and the grizzly bear are not anticipated from this project, providing the following recommendation is implemented: access to the right-of-way should be by use of existing roads where possible..." As indicated in Response to Comment 70-10, this measure and more were incorporated into the EIS and biological assessment to ensure species protection. In addition, Comment 70-11 states that the USFWS would concur with the "no effect" decision on the bald eagle if the possibility of eagle electrocution were eliminated. As indicated in Response to Comment 70-11, this potential hazard was addressed in the EIS, and an additional mitigation measure was added to Section 4.9 of this Final EIS to minimize the possibility of eagle line collisions at river crossings. All mitigation measures would be made conditions of the Presidential permit.

Based on the Department ofthe Interior's most recent letter received on the Supplemental Draft EIS, the impact statements in the biological assessment will be modified to read, "not likely to adversely affect."

85-3 Please refer to Responses to Comments 70-5, 70-6, and particularly 70-13 for additional information on the required project coordination and consultation with the Spokane Tribe, in the event the route alternatives that cross Tribal lands were pursued.

85-4 The water bodies that occur along the Mead to Beacon segment of the Proposed Route and along the Orchard Prairie Variation travel perpendicular to the route and would be spanned by the proposed transmission line project. As presented in Table 2-1 in the Supplemental Draft EIS and in Table 2-5 in this Final EIS, WWP has committed to avoiding riparian areas, whenever possible. Also, refer to Responses to Comments 27-1, 84-2, and 84-3, regarding the wetland mitigation plan and to Mitigation Measure 2 in Section 4.9 of this Final EIS that has been expanded to address wetland/riparian issues and concerns.

Letter 85 Continued

85-5 Page 6-2, Mitigation Measure 2: The SDEIS indicates that, "upon route designation, WWP will coordinate with the appropriate State and Federal agencies to develop a wetlands mitigation plan..." The Service concurs that if the project were constructed, a detailed wetland mitigation plan would need to be developed and implemented. Construction of the proposed project facilities may require approval and issuance of a section 404 permit by the Corps of Engineers, Department of Army, if fill is to be placed in wetlands or waters of the United States. If a permit is required, the Department would review the permit application and any accompanying mitigation proposal. The Department may concur, with or without conditions, or object to the proposed work depending on the project's effects on fish and wildlife identified at that time. The Department may recommend denial of the permits if the identified wetland impacts are avoidable and/or the specific mitigation measures designed to offset impacts are insufficient.

85-6 Page 6-3, Mitigation Measure 6: This measure states that prior to any construction activities, clearance surveys for active bald eagle, golden eagle, and osprey nests within 0.5 mile of the transmission line or access roads would be conducted. Steps would then be taken to protect identified nests within the surveyed area. However, no biological justification for the 0.5-mile criterium is included in the SDEIS. Documentation of how the 0.5-mile criterium was selected as the survey area should be incorporated in the final documents.

We appreciate the opportunity to comment.

Sincerely,

Charles S. Polityka
Regional Environmental Officer

Response to Letter 85 Continued

85-5 Please refer to Responses to Comments 84-2 and 84-3 regarding the wetland mitigation plan and coordination with the Corps of Engineers on the Section 404 permit.

85-6 According to the Pacific Bald Eagle Recovery Plan (USFWS 1986), activities such as project construction should not be allowed within 400 meters (1,200 feet or 0.2 mile) of an active nest site. Following conversations with federal and state wildlife personnel, the 0.5-mile survey area for active bald eagle, golden eagle, and osprey nest sites was determined to be a conservative estimate for the survey clearance area. This survey area would provide additional information on active nest sites, beyond the minimum 0.2 mile buffer area outlined in the bald eagle recovery plan. Also, please note that WWP would coordinate with the USFWS, WDW, and Forest Service, should an active nest be located within this 0.5-mile survey zone, as indicated in Mitigation Measure 6 in Section 4.9 of this Final EIS. Based on the comment, an additional statement on the 0.5-mile survey area has been added to this mitigation measure.

Letter 86

May 9, 1992

Anthony Como
Department of Energy
Office Fuels Program FE-52
1000 Independent Ave SW
Washington DC 20585

Dear Mr. Como:

I am a resident of the Orohard Prairie oommunity in Spokane County Washington where the Transmission Interoonneotion Projeot DOE/EIS 0141-D is being oonsidered to pass through as it delivers Eleotrio power to California.

86-1 All of the residents of our area have grave oonoerns for the ohildren who will grow up, go to school, and play under these proposed lines. Addidtionally, our property values will be destroyed and the future development of our land will be affeoted.

WE DO NOT WANT THE HIGH TENSION LINES ON THE ORCHARD PRAIRIE VARIATION ROUTE THRU SPOKANE WASHINGTON!!

WE URGE YOU TO TAKE A NO ACTION ON THE PRESIDENTIAL PERMIT FOR THE TRANSMISSION INTERCONNECTION PROJECT DOE?IES 0141-D!!

Sinoerely,

[author block]

copy sent to Speaker Foley.

5-241

Response to Letter 86

86-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

Letter 87

May 9, 1992

Anthony Como
Department of Energy
Office Fuels Program FE-52
1000 Independent Ave SW
Washington DC 20585

Dear Mr. Como:

I am a resident of the Orchard Prairie community in Spokane County Washington where the Transmission Interconnection Project DOE/EIS 0141-D is being considered to pass through as it delivers Electric power to California.

87-1 All of the residents of our area have grave concerns for the children who will grow up, go to school, and play under these proposed lines. Addidtionally, our property values will be destroyed and the future development of our land will be affected.

WE DO NOT WANT THE HIGH TENSION LINES ON THE ORCHARD PRAIRIE VARIATION ROUTE THRU SPOKANE WASHINGTON!!

WE URGE YOU TO TAKE A NO ACTION ON THE PRESIDENTIAL PERMIT FOR THE TRANSMISSION INTERCONNECTION PROJECT DOE?IES 0141-D!!

Sincerely,

[signature]

N 4103 St Michaels Rd
Spokane WA 99207

5-242

Response to Letter 87

87-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

Letter 88

Rec'd 5/28/92

May 18, 1992

Anthony Como
Dept. of Energy
Office of Fuels Program FE-52
1000 Independent Ave. S.W.
Washington D.C. 20585

Dear Mr. Como,

We recently became aware of a high voltage power line coming down the east side of the state of Washington. The part that most concerns my family and I is the "Orchard Prairie Variation". This would run adjacent to my property and only a hundred feet or so away.

5-243

We recently moved here and love our beautiful clear view to the east and plan to install a deck to take further advantage
88-1 of it. The power line would ruin our view, property value, and cause a great health risk. I turned down a deal on property near here because of large power lines close by and the health risk they would have presented. Also, I picked our present
88-2 location because I am an Amateur Radio Operator and plan to install some radio antennas. The proximity of the power lines would ruin radio reception, making my hobby useless.

Including our own, we counted seventeen children living near us that would be at health risk from the high levels of E.M.F. There are other routes already spoiled by these towers and this "Orchard Prairie Variation" could be spared by following them, or better yet, by passing the entire area.

I hope you will take our concerns under consideration before finalizing your plans.

Sincerely, Michael E. McManus Sharon Y. McManus

Michael E. McManus
Sharon Y. McManus
5201 E Orchard Rd
Spokane, WA
99207

cc to: Gary Casey, W.W.P.
enclosed: map of our property

Response to Letter 88

88-1 Regarding the comment on potential health effects from the proposed transmission line, please review Sections 4.6.5.1 and 4.6.5.2 of this Final EIS. These sections have been revised and expanded to more adequately address the EMF health issue. Also, note the modified conclusions presented in Section 4.6.5.2. Regarding the comment on effects to property values, please refer to Response to Comment 26-11.

88-2 Please refer to Section 4.6.2.3 in the Final EIS for a discussion of the effects of the proposed transmission line on radio reception.

Letter 89

MARIA REGINA ACADEMY
North 8500 St. Michael's Road
Spokane, WA 99207
(509) 467-0986

Dept of Energy
Office Fuels Program
SE-52 1000 Independent Ave. SW
Washington DC 20585
Case # DOE-EIS0141-D
June 1, 1992

Dear Sirs,

We are writing this urgent request in regards to your proposal of running a high tension power line over Mount St. Michael's property. This property is used as a school for grades Kindergarten through Twelfth.

We are petitioning, therefore, for the safety of our children,that a more suitable location for this power line be found.

The health and well-being of many young lives are at stake and we ask that you seriously consider the consequences before making your decision.

Thank you very much!

Sincerely,

Sr. Maria Inviolata, CMRI

Sr. Maria Inviolata, CMRI
Principal

Response to Letter 89

Your concerns are noted. No response necessary.

Letter 90

1992 JUN -5 P 3:39

WE, RESIDENTS OF ORCHARD PRAIRIE, PROTEST THE USE OF
THE ORCHARD PRAIRIE VARIATION IN SPOKANE, WASHINGTON
FOR THE 230 KV POWER LINE IN THE DOE/EIS 0141-D PROJECT!

Signed petition attached.

5-245

Response to Letter 90

Your concerns are noted. No response necessary.

Letter 91

1992 JUN -5 P 3:39

WE, THE MEMBERS OF MOUNT SAINT MICHAEL'S CHURCH, PROTEST THE USE OF THE ORCHARD PRAIRIE VARIATION IN SPOKANE, WASHINGTON FOR THE 230 KV POWER LINE IN THE DOE/EIS 0141-D PROJECT.

Signed petition attached.

5-246

Response to Letter 91

Your concerns are noted. No response necessary.

5.3 Public Hearing Comments and Responses

This section presents the comments that were received at the three public hearings held on the proposed WWP/B.C. Hydro Transmission Interconnection on January 31 and February 1, 1990, in Spokane, Colville, and Newport, Washington. Table 5-2 identifies the 56 speakers who presented their comments during the hearings; each person has been assigned an index number for ease of responding. The verbal comments have been abstracted to reduce the volume of the transcripts. Complete copies of the hearing transcripts are available for review in the DOE's office in Washington D.C. or in WWP's office in Spokane, Washington. They can also be purchased directly from Scott Engstrom, C.S.R., 18 Pine Terrace, Liberty Lake, Washington 90019. Formal responses have been prepared only for those comments/questions that address the accuracy and/or adequacy of the Draft EIS. However, DOE has reviewed all statements, opinions, and concerns that have been submitted, and these have been considered in the decision-making process.

Table 5-2

Public Hearing Comments

Reference Number	Source of Verbal Comments
January 31, 1990 Spokane, Washington	
1	Herman Marciel (citizen)
2	Brenda Bodenstein (citizen)
3	Thomas Johnson - Vice President Administrative Services, Whitworth College (institution)
4	Julia McHugh (citizen)
5	Don Peters (citizen)
6	Cyrill Wolff (citizen)
7	Bruce Vails (citizen)
8	Jesse Van Troba (citizen)
9	Don Stephens (citizen)
10	Cheryl Stitt (citizen)
11	Mike Kaufman (citizen)
12	Sandy Jarvis (citizen)
13	George Compton (citizen)
14	Ed Anderson - Dishman Properties (business)
15	Norm Clouse (citizen)
16	Sam Angove - Director of County Parks of Spokane (local agency)
17	Rick Stucky (citizen)
18	Harry Alexander (citizen)
19	Harold Erntman (citizen)
20	Maury Haggin - Conservation Chairman Spokane Chapter of the National Audubon Society (organization)
21	Robert Vogt (citizen)
22	Cecil Morrow (citizen)
February 1, 1990 Colville, Washington	
1	Roger Sammons (citizen)
2	Norman Mikalson - Arden Tree Farms/Forest Green Tree Farms (business)
3	Joe Bradley (citizen)
4	C. R. Conn (citizen)
5	Everett Kytonen (citizen)

Table 5-2 (Continued)

Reference Number	Source of Verbal Comments
January 31, 1990	
Spokane, Washington	
6	Chuck Hockley (citizen)
7	Quayle Bateman (citizen)
8	Lewis Lundy (citizen)
9	Sylvia Brock (citizen)
10	Ferdinand Velez (citizen)
11	Grady Knight (citizen)
12	Bob Jackman (citizen)
13	Allen Taylor (citizen)
14	Opal Buchanan (citizen)
15	Sarah Millls (citizen)
16	Linda Sundheim (citizen)
17	Judd Phillps (citizen)
18	Life Has Meaning (citizen)
19	Gail Knight (citizen)
20	Daniel Henry (citizen)
21	Eric Berg (citizen)
22	Steve Campbell (citizen)
February 1, 1990	
Newport, Washington	
1	Arlin Beehler (citizen)
2	Sharon Bancroft - Pend Oreille County Noxious Weed Control Board (county agency)
3	Karen Soenke - U.S. Forest Service (federal agency)
4	Mike Herrin - U.S. Forest Service (federal agency)
5	George Bratt (citizen)
6	Jim Hiebert - Conservation District (local agency)
7	Bob Johnson - Public Utility District No. 1 of Pend Oreille County (local agency)
8	Harley Young - Pend Oreille County Commissioner (county agency)
9	Charles McCain (citizen)
10	Dale Regan (citizen)
11	John Krogh (citizen)
12	Paul Tigner (citizen)

Comment Summary		Response
January 31, 1990 - Spokane, Washington		
1. Herman Marciel	Requests more specific details on the alternative route north of the planned Marshall Substation. Disagrees with the land use designation as essentially undeveloped property. Requests single-shaft pole to mitigate visual impacts. Would like to see substation design finalized prior to issuance of Presidential permit.	The land use characterization of the area in the vicinity of the planned Marshall Substation was determined from both an on-site and aerial reconnaissance in July 1988 and April 1991. Please refer to Sections 3.1.8 and 3.2.8 in this Final EIS where the determination of land use types is delineated. The term "essentially undeveloped" does not indicate that developments do not exist in this area, such as the military housing and school mentioned in your comment; however, relative to the surrounding areas, the Marshall vicinity would be considered typically more rural than the other land use classifications (e.g., industrial, residential, commercial). In response to your inquiry on single-shaft poles, the single-shaft steel pole design is not well suited for cross-country transmission lines due to its reduced span length capability, which results in more structures per mile, higher cost, and increased visibility. Therefore, use of these structures would not in fact reduce the visual impact in the area referred to in your comment. Single-pole design may, however, be used in sections of the transmission line that pass through urban or other areas where ROW widths are limited. A Presidential permit for WWP's current proposed action (Boundary Dam to Beacon) would not include authorization of the Marshall Substation.
2. Brenda Bodenstein	Concerned about the land use designation of rural near the Marshall Substation, did not feel that the southern portion of the proposed Interconnection received equal treatment in the EIS. Requested the number of residences and associated population base that would view the line. Here area is serviced by Inland Power and Light and she feels that she will not receive benefits from the project, only impacts. Requested additional discussion on the lines leaving the Marshall Substation and the potential for unforeseen impacts. Questioned if any modifications can be made following route determination.	Please refer to the previous response considering your concerns on the land use characterization for the Marshall vicinity. All alternatives of the proposed Interconnection were assessed equally; additional discussion may have been presented on specific areas, due to their sensitivity or issues involved. Your request for information on the population base and associated visual impacts is beyond the scope of the EIS. In addition, review of potential future projects that may be connected to the proposed Interconnection or any of its components is also beyond the scope; other developments would fall under a separate environmental review, depending on the specifics proposed. A Presidential permit for WWP's current proposed action (Boundary Dam to Beacon) would not include authorization of the Marshall Substation. Please refer to Responses to Comments 6-2 and 30-10 for additional discussion on review of project modifications under NEPA.

	Comment Summary	Response
3. Thomas Johnson	Concerned about the health and welfare of the Whitworth College's students and staff and the inconclusive research of EMF effects. Summarized that the alternative route crosses within an area that would be inconsistent with the college's Master Plan; the presence of the line would preclude any future development. Concerned about recreational activities on campus. Disagrees with the conclusion of low visual impacts to the college.	Please refer to the responses to the comments provided for Letter 59, which address the concerns presented by Whitworth College on the proposed interconnection.
4. Julia McHugh	Requests additional information on tower height in the area of the Spokane River crossing along the Eastern Alternative. Also requests more timely information from DOE.	Thank you for comment. The structure heights along the Spokane River crossings would be determined during the detailed alignment surveys and structure design prior to construction.
5. Don Peters	Disagrees with the moderate visual impact rating for the area from Four Mounds to Marshall and states that the rating is too subjective and generalized. Feels that not enough detail was given to use of existing BPA lines. Questioned the placement of the line near the Spokane Airport and if FAA had been notified. Concerned about potential EMF effects on health.	Please refer to Response to Comment 30-1 for additional discussion on the determination of visual ratings. Response to Comment 11-1 discusses the potential for use of existing BPA lines. Also, please note in Table 1-2 of this Final EIS, that the FAA is listed as a permitting agency that would review WWP's proposed route near any airports or small airfields. Please refer to Response to Comment 6-6 regarding the basic EMF conclusions presented in this EIS.
6. Cyril Wolff	Concerned about EMF effects. Opposes the proposed Project.	Thank you for your statement.
7. Bruce Valls	Questioned the format of the EIS. Remarked that a residence located along the Eastern Route Option of the Proposed Action northwest of Cusick was listed as within 100 feet of the ROW. Feels that the residence would be removed, since it is currently located immediately adjacent to the existing BPA corridor. Requests the amount of expansion that would be required for the proposed ROW. Feels that project construction would fall under state regulations of strip mining and the EIS should address that possibility.	The WWP/B.C. Hydro EIS is formatted according to the Council on Environmental Quality (CEQ) regulations (40 CFR Part 1502). Please refer to Response to Comment 33-1 for additional discussion on the ROW reconnaissance; the three aerial and two ground surveys conducted for the proposed route did not indicate that this specific residence would require removal. In response to your question on ROW width, please refer to Section 2.3.2 of this Final EIS, where it presents a width of 125 feet, with 62.5 feet on each side of the centerline. In reference to federal, state, and local regulations, please refer to Table 1-2 of this Final EIS, where applicable permitting requirements are listed.

	Comment Summary	Response
8. Jessie Van Troba	No comment.	No response required.
9. Don Stephens	Requests a more defined limit of eminent domain and questions who will grant that power. Feels that the report makes generalized assumptions that cannot be supported by original data and that the speculations on wildlife and cultural resources are not adequate or appropriate for this level of impact. Requests field crews research site-specific information. Wildlife species are lacking in certain areas. Fears that sensitive plant and animal species may be present, yet unknown. Questions cultural resource sites that are listed for Western Alternative, and states that several other sites would be present. Questions the statement of project purpose and need in relation to the amount of power supplied to the Northwest.	Please refer to Section 2.3.2 in this Final EIS and Response to Comment 6-4 regarding landowner compensation for ROW easement. In response to your question, the State of Washington is responsible for granting eminent domain. The content of this EIS is consistent with other Presidential permit EISs in terms of the level of detail presented for impact assessment. It is the responsibility of the EIS under the regulations of NEPA, to identify potentially significant impacts associated with the proposed project (see Response to Comment 44-2). Section 4.9 of this Final EIS presents specific mitigation measures, in addition to the protection procedures outlined in Table 2-5, to be implemented in the event a Presidential permit is issued by DOE. As an example, a Class III cultural resources survey, specific bald eagle surveys, and wetlands identification would be required prior to construction to identify sensitive locations to be avoided during project construction; these site-specific studies would determine the resources present and the associated level of impact to those resources. Regarding your concern on purpose of and need for the project, please refer to Response to Comment 6-7.
10. Cheryl Stitt	Questions the rural land use designation in the Marshall Substation area. Was not able to locate property value discussion. Concerned about the EMF health issues and the inconclusive data presented in the EIS.	The land use characterization of the area in the vicinity of the planned Marshall Substation was determined from both on-site and aerial reconnaissance in July 1988 and April 1991. Please refer to Sections 3.1.8 and 3.2.8 in this Final EIS where the determination of land use types is delineated. The term "essentially undeveloped" does not indicate that developments do not exist in this area; however, relative to the surrounding areas, the Marshall vicinity would be considered typically more rural than the other land use classifications (e.g., industrial, residential, commercial). Please refer to Section 4.1.11 of the EIS and Response to Comment 26-11 regarding property values. Also, please refer to Response to Comment 6-6 and the modifications of the statement on health effects located in Section 4.6.5.2 of this Final EIS for additional discussion on EMF effects.
11. Mike Kaufman	Addressed the audience regarding the proposed project for Puget Sound Power and Light near Bellingham, Washington, and the opposition organized against the project.	No response required.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
12. Sandy Jarvis	Concerned about the presence of the proposed line near the proposed Centennial Trail and its affects on recreational activity. Remarked that no information on this issue is listed in the EIS. Requests the distance between the tower structures. Questions the notification of property owners.	Please refer to Response to Comment 35-1 regarding the proposed Centennial Trail and Responses to Comments 63-19 and 48-5 for additional information on notification of property owners. In reference to your question on distance between structures, please review Table 2-4 in this Final EIS for the specific design features of the proposed interconnection.
13. George Compton	Opposes the proposed project. Questions the purpose of the EIS and the lack of discussion on the psychological effects of the project on local individuals. Feels that DOE is not addressing the quality of life chosen by the residents in the project area. Requests that project need be added to the EIS analysis. Questions the document format and content and feels that the report followed a standard outline, with no original information. Requests information on the EIS analysis, and was it performed for the international permit and would it not be necessary otherwise? Questions the determination of impact levels for environmental resources. Does not feel that the EIS analysis is adequate and questions the approach presented for EMF effects. Feels that the data are inconclusive.	In accordance with the CEQ regulations (40 CFR part 1501.7) that direct the federal lead agency to review the issues raised during scoping and eliminate from detailed study those issues which are not significant, certain issues that were raised during scoping were not addressed in the EIS. For this reason, the potential for psychological effects was considered beyond the scope of the EIS. No attempt has been made to assess emotional impact, of itself. Such impacts, insofar as they are measurable, are appropriately represented by and included in visual impacts. The impact levels, however, do reflect generalized, anticipated effects on property values. These effects are discussed in Section 4.1.11.1 of the EIS. In reference to your questions on purpose of and need for the project, please refer to Section 1.2 of this Final EIS and Response to Comment 6-7, where this is discussed. The WWP/B.C. Hydro EIS is formatted according to the CEQ regulations (40 CFR Part 1502) and incorporated applicable data on resources that may be significantly impacted by the project (see Response to Comment 44-2). In reference to your questions on the Presidential permit and NEPA regulations, please refer to Response to Comment 63-2. To determine impact levels, specific significance criteria are developed for each resource. As an example, please review Responses to Comments 30-1 and 44-38 for visual resource impact assumptions and Section 4.1.8.1 for discussion on land use impact assessment. The EIS agrees with your statement that the data on EMF effects are inconclusive. Please refer to Response to Comment 6-6 and the modifications presented in Section 4.6.5.2 of this Final EIS.
14. Ed Anderson	Supports the proposed project.	Thank you for your statement.
15. Norm Clouse	Questions the notification process of landowners that will be crossed by the line and feels that the lack of notification represents poor management.	Please refer to Responses to Comments 63-19 and 48-5 for additional information on notification of property owners.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
16. Sam Angove	Requested that the Spokane County Parks Department receive project notification. Opposed to line crossings of Little Spokane River.	Thank you for your statement.
17. Rick Stucky	Opposed to the line crossing the Little Spokane River Natural Area.	Thank you for your statement.
18. Harry Alexander	Questioned the notification of property owners. Requested the side of the existing BPA ROW the line would be placed north of Highway 2. Concerned about potential impacts to the Spokane Polo Club.	Please refer to Responses to Comments 63-19 and 48-5 for additional information on notification of property owners. The EIS evaluated both sides of the existing BPA ROW along the segment located north of Highway 2. Please refer to Map 2-1, Sheet 3 located in the back of this EIS to review WWP's preferred route for the specific area in question.
19. Harold Emtman	Requested the estimated noise level of the planned Marshall Substation.	Please refer to Response to Comment 26-5 for information on the anticipated noise level at the planned Marshall Substation.
20. Maury Haggin	Opposes the proposed project.	Thank you for your statement.
21. Robert Vogt	The EIS did not address one residence located along the proposed route north of Mead.	From the content of your comment, the location of the music conservatory (residence) is not apparent. Please refer to Responses to Comments 33-1 and 48-6 regarding the methods for identifying sensitive land uses along the proposed interconnection.
22. Cecil Morrow	Concerned about line placement near his residence.	Thank you for your statement.

Comment Summary		Response
February 1, 1990 - Colville, Washington		
1. Roger Sammons	Does the Presidential permit specify the route? Opposes the project and the EIS analysis. Questions the definition of long-term impacts and how impact levels are assigned. Concerned about the discussion on both nesting and wintering bald eagles and the association with communal roosting sites. How is significant impact determined for threatened or endangered species? Disagrees with document format and feels that the EIS's conclusions are indistinct and unclear. Questions the discussions on wetlands, ROW maintenance, and use of herbicides. Questions the National Energy Policy and how this relates to the purchase of foreign energy. Feels that the reference to beneficial significant impacts to Stevens County was unfair in presentation. Concerned about EMF effects. Cited the OTA study's findings regarding "prudent avoidance" and requested additional information on EMF references used in the EIS analysis.	Please refer to Responses to Comments 6-1 and 63-2 for information on the Presidential permit process. For an accurate definition of long-term impacts and how this applies to the impact analysis, please review Section 4.11 of the EIS. In response to your question on determination of impact levels, specific significance criteria are developed for each resource. As an example, please review Responses to Comments 30-1 and 44-38 for visual resource impact assumptions and Section 4.1.8.1 for discussion on land use impact assessment. For an update on resident and wintering bald eagles and the impact assessment of communal roost sites, please refer to Response to Comment 39-5. Impact levels for threatened or endangered species are typically determined by the state and federal agencies associated with the project. The WWP/B.C. Hydro EIS is formatted according to the CEQ regulations (40 CFR Part 1502) and incorporates applicable data on resources that may be significantly impacted by the project (see Response to Comment 44-2). Regarding your concerns for wetland protection, please refer to Response to comment 27-1, the additional protection measure presented in Table 2-5, and the mitigation measure presented in Section 4.9 of this Final EIS. For additional information on ROW reclamation and the use of herbicides, please refer to Response to Comment 20-1 and the additional protection measures presented in Table 2-5. Regarding your reference to the National Energy Policy, please refer to Responses to Comments 44-24 and 63-2. The presentation of any significant impacts in the EIS, whether they are adverse or beneficial impacts, is required under the regulations of NEPA (see Response to Comment 44-2). To not submit this analysis would incorrectly reflect the associated economic impacts of this project, in addition to disregard the regulations implemented by CEQ (40 CFR Part 1502). In response to your concerns on the EMF analysis in the EIS, please refer to Response to Comment 6-6 on basic health conclusions; Responses to Comments 28-2 and 51-5 regarding the OTA study cited in your comment; and Responses to Comments 51-7, 26-13, and 13-5 for additional information on the EMF resources used in this analysis.
2. Norman Mikalson	Concerned about long-term loss of timber during the life of the project and about property taxes for the unusable ROW. Recommends that WWP purchase the ROW from timber producers.	Please refer to Responses to Comments 6-4 and 31-2 and Section 2.3.4 in this Final EIS for additional information on landowner compensation and long-term loss of timber production. In addition, please review Section 4.1.11.2 and Response to Comment 44-42 regarding associated taxation.
3. Joe Bradley	Opposes Western Alternative	Thank you for your statement.

	Comment Summary	Response
4. C. R. Conn	No comment.	No response required.
5. Everett Kytonen	Questions ENSR's technical and project staff and how long the firm has been conducting EIS analyses. Feels that site-specific research should be conducted and the EIS's data were insufficient, since they were collected from existing sources. Questions the omissions of the U.S. Department of Health and the Washington State Department of Health for consultation on the EMF health effects. Concerned about EMF health effects on animals and humans and opposes project until further research presents more conclusive data. Felt that bias exists in Section 2.1.1.4 concerning WWP's construction procedures and does not present the procedures objectively.	In response to your questions on the EIS contractor and the qualifications of the technical and project staff, ENSR Consulting and Engineering has been conducting impact analyses since the company began in 1971 and is working on its 50th EIS since 1980, when formal third-party EIS contracting became allowable under CEQ regulations. Please refer to the List of Preparers located at the back of this document. The WWP/B.C. Hydro EIS is formatted according to CEQ regulations (40 CFR Part 1502) and incorporates applicable data on resources that may be significantly impacted by the project (see Response to Comment 44-2). Content of this EIS is consistent with other Presidential permit EISs in terms of the level of detail presented for impact assessment. It is the responsibility of the EIS lead agency under the CEQ regulations for implementing NEPA, to identify potentially significant impacts associated with the proposed project (see Response to Comment 44-2). Section 4.9 of this Final EIS presents specific mitigation measures, in addition to the protection procedures outlined in Table 2-5, to be implemented in the event a Presidential permit is issued by DOE. As an example, a Class III cultural resources survey, specific bald eagle surveys, and wetlands identification would be required prior to construction to identify sensitive locations to be avoided during project construction; these site-specific studies would determine the resources present and the associated level of impacts to those resources. In response to your question on resources used for the EMF health effects analysis, please refer to response to Comment 6-6. The environmental protection procedures outlined in Table 2-5 and discussed in Sections 2.3.4, 2.3.5, and 2.3.6 in this Final EIS were developed to ensure environmental protection during project activities. The effectiveness of these measures was evaluated as part of the EIS analysis. WWP has committed to implementing these procedures as part of their Presidential permit for the proposed interconnection.
6. Chuck Hockley	Opposes proposed project. Feels that the transmission line would require removal of his residence near Blue Creek, but it is not shown on the EIS map. Disagrees with route selection process and WWP's operating procedures.	The location of your residence near Blue Creek is not apparent form the description in the comment. Please refer to Responses to Comments 33-1 and 48-6 regarding the method of identification of residences located along the alternatives.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
7. Quayle Bateman	Feels that the project would require removal of his residence, but it is not shown on the EIS maps. Opposes the project and is concerned about health effects and potential impacts to irrigation systems.	The location of your residence is not apparent from the description in the comment. In regards to your concern about EMF effects, please refer to Response to Comment 6-6. For additional information on the potential impacts to irrigation systems, please refer to Response to Comment 44-35 and Section 4.1.8.1 of the EIS.
8. Lewis Lundy	Opposes the proposed project in Stevens County. Questions the feasibility of continuing agricultural practices beneath the proposed line. Feels that the land use impacts do not address the 10,500 feet of agricultural land crossed within the Island Rock to Echo Segment or that it is assuming low impacts. Also feels that the two residences mentioned for the segment, rated at moderate impacts, are inconsistent with the three rated at low impact. Stated that WWP has not addressed his direct questions on the project.	Concerning your comment on potential impacts to irrigation systems, please refer to Response to comment 44-35 and Section 4.1.8.1 of the EIS. Agricultural land located along the project alternatives and irrigation systems apparently crossed by the proposed line were identified in both baseline and impacts for the land use resource. As stated in Response to Comment 44-35, if any of the route alternatives would in fact cross a recently-installed irrigation system, then additional significant land use impacts would be applied to the route. These specific impacts would be delineated during the detailed route surveys and line alignment conducted prior to construction. In response to your comment on the impact levels for residences on the Island Rock to Echo Segment, the applicable significance criteria for land use impacts in Section 4.1.8.1 and more specifically on Table 4-3 in this Final EIS outline the post-mitigation impact levels. Please review this table in regards to your concerns.
9. Sylvia Brock	Questions the EMF conclusions and resources used in the EIS. Requests additional studies, such as the OTA report, to be included. Questions the lack of project-related research on health effects for the routes.	Please refer to the responses to Letter 28 regarding your concerns on potential EMF health effects and the on-going technical research.
10. Ferdinand Velez	Questions the EMF resources used in the EIS analysis and the lack of specific studies. Questions the validity of the studies and the technical specialists for the EMF analysis.	Please refer to the responses to Letter 51 regarding your concerns on the sources used in the EMF analysis.
11. Grady Knight	Concerned about the notification of property owners. Questions the EMF statement on power leakage from lines.	Please refer to Response to Comments 63-19 and 48-5 for additional information on notification of property owners. Please review Section 4.6.3.3 regarding induced currents.

	Comment Summary	Response
12. Bob Jackman	Questions the process of property owner notification. Opposes the purpose and need perspective from WWP. Feels that the socioeconomic study is incomplete in the EIS, particularly that the significant beneficial impact for Stevens County is misleading. Questions the analysis on property values, health issues, tourism, and psychological costs. Questions the information on wintering eagles along the Columbia River and the lack of contacting local residents on wildlife issues. Concerned about the land use impact analysis and the designation of impact levels. Disagrees with the designation in the EIS for the Franklin D. Roosevelt Lake in association with the Columbia River. Feels that the EMF resources used are incomplete and inconclusive and does not agree with the EMF conclusion presented in the EIS. Recommends that the report contain opposing views.	Please refer to the responses to Letters 13 and 63 in regards to your concerns.
13. Allen Taylor	Questioned the location for the No Action Alternative affected environment in the EIS. Questions the written report of a bald eagle nest that is refuted by WDW biologist.	The WWP/B.C. Hydro EIS is formatted according to CEQ regulations (40 CFR Part 1502), including placement of the No Action Alternative. In response to your comment on the active bald eagle nest sites located within the project area, your assumption is incorrect. To begin with, the letter written by C.A. Dunn was submitted in 1987, which obviously predates the information provided directly by USFWS and WDW biologists for the EIS analysis, and Dunn's information in his letter was likely provided by the federal and state field biologist. Furthermore, Steve Zender with the WDW conducts specific bald eagle studies for both wintering and nesting birds throughout the year and submits his data to the WDW and the USFWS. Information from Zender that was incorporated into the Draft EIS and Final EIS analysis is dated 1989, 1990, and 1992. One can assume that his information is the most current and correct. Please refer to Response to Comment 13-2 regarding the use of state and federal sources for baseline information and impact analysis and Response to Comment 39-5 for the updated information on bald eagles inhabiting the project area.
14. Opal Buchanan	Requested detailed maps of the project area and disagreed with public hearing meeting time.	Thank you for your comment.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
15. Sarah Millis	Disagrees that environmental protection procedures outlined in Chapter 2.0 would be carried out during project activities. Questions the significance criteria, particularly for visual resources.	The environmental protection procedures outlined in Table 2-5 and discussed in Sections 2.3.4, 2.3.5, and 2.3.6 in this Final EIS were developed to ensure environmental protection during project activities. The effectiveness of these measures were evaluated as part of the EIS analysis. WWP has committed to implementing these procedures as part of their Presidential permit for the proposed interconnection. Prior to project construction and during the detailed route surveys and line alignment, WWP would coordinate with the appropriate state and federal agencies (e.g., Forest Service, USFWS, EPA, WDW, WDE) to identify sensitive resources to be avoided during project construction. Any other special measures that these agencies may feel are necessary to prevent environmental degradation can be included in their permitting plans and requirements, as described in Section 1.3 (see Table 1-2 in this Final EIS). In response to your comment on development of significance criteria for visual resources, please refer to Response to Comment 30-1 for additional information.
16. Linda Sundheim	Disagrees with low impacts being assigned to rural residences and higher impacts being associated with urban residences.	In response to your comment on the impact levels to residences, the applicable significance criteria for land use impacts in Section 4.1.8.1 and more specifically on Table 4-3 in this Final EIS outline the post-mitigation impact levels. Please review this table in regards to your concerns. As shown in Table 4-3, any residence that would require removal would be considered a significant impact that cannot be mitigated, whether or not the residence is located in an urban or rural area.
17. Judd Philips	Questions the implementation of environmental protection procedures and mitigation measures for the proposed project. Concerned about open burning within the ROW.	The environmental protection procedures outlined in Table 2-5 and discussed in Sections 2.3.4, 2.3.5, and 2.3.6 in this Final EIS and the mitigation measures developed in Section 4.9 in this Final EIS were formulated to ensure environmental protection during project activities. The effectiveness of these measures were evaluated as part of the EIS analysis. WWP has committed to implementing these procedures as part of their Presidential permit for the proposed interconnection. Prior to project construction and during the detailed route surveys and line alignment, WWP would coordinate with the appropriate state and federal agencies (e.g., Forest Service, USFWS, EPA, WDW, WDE) to identify sensitive resources to be avoided during project construction. Any other special measures that these agencies may feel are necessary to prevent environmental degradation can be included in their permitting plans and requirements, as described in Section 1.3 (see Table 1-2 in this Final EIS). In response to your concern on open burning, please refer to written Response to Comment 8-1.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
18. Life Has Meaning	Feels that bald eagle habitat is not sufficiently addressed in the EIS. Concerned about EMF issues.	The bald eagle data presented in the Draft EIS were the most current available during the impact assessment. Please refer to Response to Comment 39-5 for the updated information on bald eagles presented in the Final EIS. Also, refer to Response to Comment 6-6 regarding the EMF analysis for the EIS.
19. Gail Knight	Concerned about final project decision.	Thank you for your comment.
20. Daniel Henry	Concerned about health affects from the line and impacts to bald eagles.	Thank you for your comment.
21. Eric Berg	Questioned the EIS comment period under NEPA and the ability to include supplemental data following a project decision. Asked what liability WWP would have for possible health effects. Disagrees that the environmental assessment does not address impacts in Canada. Concerned about flow in the Columbia River. Feels that the land use data on residences along the routes are outdated. Disagrees with statement in EIS regarding notification of property owners. Questions the price of energy and conservation as an alterative.	In regard to your concern about the EIS comment period and inclusion of supplemental data, please refer to Responses to Comments 33-2, 6-2, and 30-10. For additional information on notification of property owners, refer to Responses to Comments 63-19 and 48-5. The question on impact analysis outside of the United States and the NEPA process, please see Responses to Comments 44-21 and 6-1. In regards to your concern on the Columbia River flow, please refer to Response to Comment 48-9. Identification and analysis of the land use data are discussed in Responses to Comments 33-1 and 48-6. Finally, refer to Responses to Comments 21-1, 26-3, and 26-1 for additional information on conservation as a project alternative.
22. Steve Campbell	Questions the resources used in the EMF analysis of the EIS.	Please refer to Responses to Comments 51-7, 26-13, and 13-5 for additional information on the resources used in the EMF analysis of the EIS.

Public Hearing Comments and Responses (Continued)

Comment Summary		Response
February 1, 1990 - Newport, Washington		
1. Arlin Beehler	No comment.	No response required.
2. Sharon Bancroft	Concerned about noxious weed invasions into areas disturbed by line construction and maintenance. Requested additional protection procedures presented in Table 2-5 of the EIS to reflect both weed prevention and control. Supports commercial thinning within the ROW and a vehicle clean equipment policy. Recommends revegetation within one growing season following construction. Identified specific locations within the EIS text to be modified for noxious weed prevention. Discussed specific ROW reclamation procedures to be followed, including seed mixture certification. Concerned about invasions of noxious weeds, particularly purple loosestrife, into wetland systems.	Please refer to the responses for Letter 20 regarding the prevention of noxious weed invasions.
3. Karen Soenke	Concerned about noxious weed invasions and potential impacts to fisheries. Concerned about possible effects to cattle grazing and cultural resources.	Please refer to the responses for Letter 20 concerning the prevention of noxious weed invasions into areas disturbed by the proposed interconnection. Also refer to Section 4.1.5 of the EIS and Response to Comment 27-1 regarding potential impacts to fisheries and avoidance of riparian areas. In regards to your concerns about cattle grazing, see Response to Comment 60-3. Finally, refer to Responses to Comments 39-17 and 39-20 and the appropriate mitigation measure in Section 4.9 in this Final EIS for the discussion on cultural resources.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
4. Mike Herrin	Requested that the winter range for area wildlife species be examined further in the EIS. Feels that the potential presence of bull trout should be examined for streams crossed by the proposed project. Concerned about invasions of noxious weeds following project construction and how this might affect forage for wildlife species. Requests coordination with the National Forest Service during reclamation procedures. Concerned about grazing allotments.	In response to your comment on winter range, it is felt that the EIS adequately addressed winter range impacts based on discussions with state and federal wildlife biologists directly involved with these species. Please note that the effect to winter range is listed as a potentially significant impact in Section 4.1.7 of the EIS and a specific mitigation measure has been developed to protect these sensitive areas during the critical periods (see Section 4.9 in this Final EIS). Please review Response to Comment 60-3 regarding any additional measures that the Forest Service feels are necessary to include in the detailed Construction and Use (CU) Plan. Similarly, the discussion in the EIS on sensitive aquatic species addressed bull trout, specifically the last paragraph in Section 3.1.5. If additional data become available, these should be incorporated by the state and federal agencies into the detailed, site-specific analyses identified during riparian/wetland delineation and the permitting requirements, as discussed for the CU Plan (see Section 1.3). Please refer to the responses to Letter 20 regarding the prevention of noxious weed invasion following construction, particularly 20-15 for information on seed mixtures and associated wildlife forage. Finally, refer to Response to Comment 60-3 for additional discussion on cattle grazing.
5. George Pratt	Concerned about possible EMF health effects.	Thank you for your statement
6. Jim Hiebert	Concerned about noxious weed control and requested timely revegetation, possible use of herbicides, and reclamation to be initiated within one growing season.	Please refer to the responses for Letter 20 regarding your concerns.
7. Bob Johnson	Supports the proposed project.	Thank you for your statement.
8. Harley Young	Supports the proposed project.	Thank you for your statement.
9. Charles McCain	Supports the proposed project ROW.	Thank you for your statement.
10. Dale Regan	Opposes the proposed project.	Thank you for your statement.

Public Hearing Comments and Responses (Continued)

	Comment Summary	Response
11. John Korgh	Opposes the proposed project. Feels that the EIS is too vague and questions the lack of specifics presented for property owners.	The content of this EIS is consistent with other Presidential permit EISs in terms of the level of detail presented for impact assessment. It is the responsibility of the EIS lead agency under the CEQ regulations for implementing NEPA, to identify potentially significant impacts associated with the proposed project (see Response to Comment 44-2). Additional site-specific studies to be completed prior to construction initiation are discussed in Section 4.9, Mitigation Measures in this Final EIS.
12. Paul Tigner	Questioned the selection of project alternatives and the selection of the proposed route by WWP. Questioned the public review process under NEPA.	Refer to Chapter 2.0 of the EIS regarding WWP's selection of route alternatives. Also, refer to the Responses to Comments 6-1, 6-2, 33-2, and 63-2 for additional discussion on the NEPA process and how it relates to the Presidential permit.

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GLOSSARY

Arbitrage: otherwise known as brokering, is similar to wheeling except that instead of receiving wheeling payments from the purchasing utility, the arbitrageur buys a block of power from the selling utility and then resells the same block of power to the purchasing utility at a higher rate.

Base Loaded: a resource which operates more efficiently without being cycled.

Capacity: the maximum power that a machine or system can produce or carry under specified conditions.

Capacity Sale: the sale of energy, equivalent to borrowing the energy for short time periods. Payment is received for energy delivered during the peak demand hours; an equivalent amount of energy is then returned over the lightly-loaded hours. The amount of energy delivered equals the amount of energy returned.

Cogeneration: a facility that generates electricity and uses the waste steam for other purposes.

Conservation: spending dollars on capital improvements to reduce electrical consumption.

Economy Sale: often referred to as a non-firm energy sale, which is generally scheduled on an hour-by-hour basis and utilizes the diversity of short-term operating costs between companies and short-term hydrological variabilities.

Energy: the amount of electrical usage or output averaged over a specified period.

Firm Capacity: maximum electrical served by a utility without a contractual provision for curtailment.

Firm Energy Sale: energy is delivered (or received) often on a 24-hour basis for the duration of the contract. Occasionally, the delivery is made for part of the year, part of the day, or both.

Firm Load: customer load served by a utility without a contractual provision for curtailment.

Interconnection: transmission facilities constructed between adjacent electrical systems.

Load Factoring: this is a daily transaction involving off-peak deliveries of energy from a company with excess energy to a company with excess reservoir capacity, with return of the energy during the on-peak hours.

Load Growth: increase in electrical demand over a period of time usually expressed as a percentage.

Pacific Northwest: states of Idaho, Washington, and Oregon.

Peak: the 1-hour maximum load usage or resource output.

Photo Voltaic Power Generation: direct conversion of sunlight to electricity using solar cell panels.

Scheduling: the utility purchasing a block of power must agree to schedule with the selling utility on the amount of power, price, initial starting time, and ending time for power delivery.

Storage: this is the same type of transaction as load factoring, with energy storage occurring for a period longer than one day.

Wheeling: a third-party company which owns interconnecting transmission facilities and can transfer power from a point of interconnection with a selling utility to a point of interconnection with a purchasing utility on a firm or non-firm basis. A charge for this service is made either to the purchasing or selling utility; payment is made in dollars plus energy to account for energy losses during transmission.

ACRONYMS AND ABBREVIATIONS

AC	- alternating current
ACSR	- aluminum cable steel reinforced
AIBS	- American Institute of Biological Sciences
ANSI	- American National Standards Institute
B.C.	- British Columbia
B.C. Hydro	- British Columbia Hydro and Power Authority
BIA	- Bureau of Indian Affairs
BLM	- Bureau of Land Management
BPA	- Bonneville Power Administration
CEQ	- Council on Environmental Quality
cfs	- cubic feet per second
cm	- centimeter
CO	- carbon monoxide
CPS	- cubic feet per second
CSPP	- cogeneration and small power production
CU Plan	- Construction and Use Plan
dB	- decibels
dBA	- decibels A-weighted
DEIS	- Draft EIS
DER	- Florida Department of Environmental Regulation
DOE	- Department of Energy
EIS	- environmental impact statement
ELF	- extremely-low-frequency
EMF	- electric and magnetic field
EPA	- U.S. Environmental Protection Agency
EPRI	- Electric Power Research Institute
ER	- environmental report
ERA	- Economic Regulatory Administration
FAA	- Federal Aviation Administration
FAB	- Fairchild Air Force Base
FEIS	- Final EIS
FPC	- Florida Power Corporation
HEP	- Habitat Evaluation Procedures
HL&P	- Houston Lighting & Power
Hz	- cycles per second
I-90	- Interstate 90
IEEE	- Institute of Electrical and Electronics Engineers
kV	- kilovolt

kV/m	- kilovolts per meter
KCM	- thousand circular mils
Ldn	- day-night average noise levels
mG	- milliGauss (thousands of a Gauss)
MW	- megawatt
NAS	- National Academy of Sciences
NEB	- National Energy Board (of Canada)
NEPA	- National Environmental Policy Act of 1969
NERC	- North American Electrical Reliability Council
NESC	- National Electrical Safety Code
NOI	- Notice of Intent
NO_x	- nitrogen oxides
NRHP	- National Register of Historic Places
O_3	- ozone
OAHP	- Washington State Office of Archaeology and Historic Preservation
ORV	- off-road vehicle
OTA	- Office of Technology Assessment
PCB	- polychlorinated biphenals
PLP	- New York State Power Lines Project
PM	- particulate matter
ppb	- parts per billion
PSC	- New York Public Service Commission
PURPA	- Public Utility Regulatory Policies Act of 1978
ROW	- right-of-way
R.V.	- recreational vehicle
SCS	- Soil Conservation Service
SEPA	- Washington State Environmental Policy Act
SHPO	- State Historic Preservation Officer
SIA	- Spokane International Airport
TSP	- total suspended particulate
U.S.	- United States
USDA	- U.S. Department of Agriculture
USFWS	- U.S. Fish and Wildlife Service
USLE	- Universal Soil Loss Equation
Vm	- volts per meter
VMS	- Visual Management System
VQO	- Visual Quality Objective
WDE	- Washington State Department of Ecology
WDOT	- Washington Department of Transportation
WDW	- Washington State Department of Wildlife
WET	- Wetland Evaluation Technique

WHO - World Health Organization
WNHP - Washington Natural Heritage Program
WSCC - Western Systems Coordinating Council
WUTC - Washington Utilities and Transportation Commission
WWP - Washington Water Power Company

List of Preparers for the WWP/B.C. Hydro Transmission Interconnection

Name	Education/Experience	EIS Responsibility
ENSR Consulting and Engineering		
Drew Ludwig Project Manager	M.S., Resource Planning & Conservation, University of Michigan M.S., Zoology, University of Michigan B.S. Zoology, University of Michigan 19 Years of Professional Experience	EIS Manager; Coordination, Planning, Quality Review, Agency Liaison.
Lori Nielsen Project Coordinator and Discipline Manager	B.S., Wildlife Ecology and Management, Oklahoma State University 8 Years of Professional Experience	EIS Assistant Manager, Project Coordination, and Technical Editing. Wildlife Resources.
Phil Hackney Discipline Manager	B.S., Botany, Colorado State University 15 Years of Professional Experience	Vegetation Resources.
Bill Theisen Discipline Manager	M.S., Recreation Resources, Colorado State University B.S. Natural Resources, University of Michigan 10 Years of Professional Experience	Human Resources.
Bob Hammer Discipline Manager	M.S. Meteorology, South Dakota School of Mines and Technology B.S., Meteorology, Metropolitan State College 7 Years of Professional Experience	Air Quality.
Ted Boss Discipline Manager	Ph.D., Geography/Botany, Oregon State University M.S., Geography/Ecology, Western Washington University B.A., Geography/Biology, Western Washington University 16 Years of Professional Experience	Geology.
Bob Kloepfer EMF Specialist	M.S., Resource Policy and Management, University of Michigan B.S., Environmental Management, Allegheny College 12 Years of Professional Experience	EMF Review.
Jim Nyenhuis Discipline Manager	M.A., Communication Theory Research, Michigan State University B.A., History, De Pauw University 15 Years of Professional Experience	Solis.

List of Preparers (Continued)

Name	Education/Experience	EIS Responsibility
Jon Alstad Discipline Manager	M.S., Range Science, North Dakota State University B.S., Animal Science, North Dakota State University A.A., Liberal Arts, Golden Valley Lutheran College 6 Years of Professional Experience	Surface Water.
Jennifer Kathol Discipline Manager	B.S., Natural Resource Economics, Colorado State University 13 Years of Professional Experience	Economics.
EDAW, Inc.		
Michael Bowie Discipline Manager	M.L.A., University of Pennsylvania Certificate in Landscape Architecture, University College, University of London Diploma in Architecture, Dundee School of Architecture, Scotland 25 Years of Professional Experience	Existing and Future Land Use; Recreation.
Craig Taggart Discipline Manager	M.S., Landscape Architecture, Iowa State University B.S., Zoology, Northern Arizona University 15 Years of Professional Experience	Visual Resources.
ENER TECH		
J. Michael Silva Discipline Manager	M.S., Engineering, Auburn University B.S., Engineering, University of Alabama 20 Years of Professional Experience	Electromagnetic Effects.
Environmental Research Information		
Rob Kavet Technical Specialist	Sc.D., Respiratory Physiology, Harvard University, School of Public Health M.S., Environmental Health, Harvard University, School of Public Health B.S., Electrical Engineering, Cornell University 21 Years of Professional Experience	Electromagnetic Health Effects.

APPENDIX A

SOIL ASSOCIATIONS

APPENDIX A

General Information on Soil Associations Potentially Crossed by the Proposed Interconnection

Soil Associations (Grouped by County)	Erosion Factor-K Values (Surface Layers Only)	General Description
STEVENS COUNTY		
Spokane- Moscow- Rock Outcrop	0.24-0.28 0.43 0	Moderately deep, well-drained, nearly level to very steep soils formed in material weathered from granite, with an admixture of loess and volcanic ash, and rock outcrop; on mountains.
Huckleberry- Raisio- Hartill	0.37 0.37 0.43	Moderately deep, well-drained, nearly level to very steep soils formed in material weathered from shaly rocks; on mountains.
Aits- Newbell- Donavan	0.37-0.43 0.37 0.32-0.37	Very deep, well-drained, nearly level to very steep soils formed in mixed glacial till, with a mantle or admixture of volcanic ash and loess; on foothills.
Belzar- Smackout- Maki	0.43 0.43 0.32	Moderately deep and very deep, well-drained, nearly level to very steel soils formed in glacial till from shaly rock and residuum and colluvium from limestone, with a mantle or admixture of volcanic ash and loess; on foothills.
Stevens- Rock Outcrop- Dragoon	0.32-0.37 0 0.43	Moderately deep and very deep, well-drained, nearly level to very steep soils formed in residuum from granite and glacial till and rock outcrop; on foothills.
Bernhill- Green Bluff- Dearyton	0.43 0.43 0.37	Very deep, well-drained and moderately well-drained, nearly level to very steep soils formed in glacial till, with a mantle or admixture of loess and volcanic ash; on basalt plateaus and foothills.
Clayton- Cedonia- Martella	0.37 0.43 0.43	Very deep, well-drained and moderately well-drained, nearly level to very steep soils formed in lake sediment and glaciofluvial material; on terraces and terrace escarpments.

APPENDIX A (CONTINUED)

Soil Associations (Grouped by County)	Erosion Factor-K Values (Surface Layers Only)	General Description
Bonner- Eloika- Scrabbers	0.32-043 0.37-0.43 0.43	Very deep, well-drained, nearly level to very steep soils formed in glacial outwash; on terraces and terrace escarpments.
Springdale- Spens- Bisbee	0.17-0.20 0.15-0.20 0.37	Very deep, somewhat excessively drained, nearly level to very steep soils formed in glacial outwash; on terraces and terrace escarpments.
Colville- Peone- Narcisse	0.37 0.43 0.43	Very deep, moderately well-drained and poorly drained, nearly level soils; on bottom lands, floodplains, alluvial fans, perimeters of lakes, and in depressional areas.
<u>SPOKANE COUNTY</u>		
Garrison- Marble- Springdale	0.24-0.32 0.20 0.17-0.20	Somewhat excessively and excessively drained sandy and gravelly soils formed in glacial outwash.
Bernhill	0.43	Deep, well-drained and moderately well-drained soils that formed chiefly in glacial lake sediments and glacial till on uplands.
Hesseltine- Cheyen- Uhlig	0.37-0.43 0.37-0.43 (unavailable)	Dominantly moderately deep to shallow, gravelly or rocky soils of the channeled scablands.
Clayton- Laketon	0.37 0.43	Very deep, medium-textured, and moderately coarse textured soils on terraces.
Bonner- Eloika- Hagen	0.32-0.43 0.37-0.43 0.24	Gravelly and sandy soils that formed in glacial materials.
Moscow- Vassar	0.43 0.49	Moderately deep and deep, medium-textured soils of the hilly and mountainous areas.

APPENDIX A (CONTINUED)

Soil Associations (Grouped by County)	Erosion Factor-K Values (Surface Layers Only)	General Description
LINCOLN COUNTY		
Badge- Bakeover- Rock Outcrop	0.28 0.15-0.20 0	Steep, very deep and very shallow, well-drained soils on canyon slopes and plateaus, and rock outcrop.
Ewall- Springdale	0.10 0.17	Nearly level to steep, very deep, excessively drained and somewhat excessively drained soils on river terraces.
PEND OREILLE COUNTY		
Moscow- Rock Outcrop- Prouty	0.37 0.24 0	Moderately deep, well-drained, nearly level to very steep soils formed in material weathered from granitic rock with a mantle or admixture of volcanic ash and loess, and rock outcrop; on mountains.
Huckleberry- Hartill- Buhrig	0.32 0.32 0.15	Moderately deep, well drained, nearly level to very steep soils formed mainly in material weathered from shale, phyllite, and quartzite with a mantle of volcanic ash and loess; on mountains.
Boundary- Waits- Smakcout	0.32 0.43 0.43	Very deep, well-drained, nearly level to very steep soils dominantly formed in mixed calcareous glacial till with a mantle of volcanic ash and loess; on foothills.
Newbell- Manley- Aits	0.24-0.28 0.32 0.24-0.32	Very deep, well-drained, nearly level to very steep soils formed in mixed glacial till with a mantle of volcanic ash and loess; on foothills.
Cusick- Martilla- Anglen	0.32 0.32 0.43	Very deep, moderately well and somewhat poorly drained, nearly level to steep soils formed in glacial lake sediments, and some soils have a mantle of volcanic ash and loess; in basins and on terraces and terrace escarpments.

APPENDIX A (CONTINUED)

Soil Associations (Grouped by County)	Erosion Factor-K Values (Surface Layers Only)	General Description
Bonner- Orwig- Kaniksu	0.24-0.32 0.24 0.28	Very deep, well-drained, nearly level to very steep soils formed in glacial outwash with an admixture or mantle of volcanic ash and loess; on terraces and terrace escarpments.
Kegel- Blueslide- Uucas	0.32 0.43 0	Very deep, somewhat poorly drained and very poorly drained, nearly level soils formed in mixed alluvium; on bottom lands and floodplains, and in lake basins.

Source: SCS 1968, 1981, 1982, and In Press.

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APPENDIX B

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B1.0 INTRODUCTION

Federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS), are required to ensure that any action they authorize, fund, or carry out will not adversely affect a federally listed threatened or endangered species. A biological assessment is required if federal actions of major construction activities potentially may affect federally listed species or critical habitat. This biological assessment is presented in compliance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973.

The Department of Energy (DOE) is the federal agency responsible for issuance of the Presidential permit for construction of international transmission lines and is responsible for the preparation of the biological assessment for the proposed WWP/B.C. Hydro 230-kV Transmission Interconnection. DOE will determine either a "no effect" or "may affect" conclusion for threatened or endangered species based on this assessment. A may affect decision would initiate a request for formal consultation with the USFWS under Section 7(a) of the Endangered Species Act of 1973. The USFWS would then prepare a Biological Opinion on the projected effects of the project on threatened or endangered species, if further consultations are required.

A biological assessment is required for the proposed Interconnection because four federally endangered species may occur within the study area based on range, habitat requirements, and historical occurrence; therefore, these sensitive species could be adversely affected by construction and operation of the transmission line. These species include the bald eagle, grizzly bear, mountain caribou, and gray wolf. Assessments were prepared from the USFWS Recovery Plans; Washington State Department of Wildlife (WDW) Nongame Data Systems; existing research information; and contacts with local, state, and federal biologists involved in studies on these sensitive species.

This biological assessment was published in the DEIS, addressing the bald eagle, grizzly bear, and mountain caribou. Based on new data and agency concerns, the USFWS subsequently requested that the DOE include the gray wolf in its analysis. Therefore, the biological assessment addresses all project alternatives, variations, and route options for the four sensitive species. All public and agency comments received on the biological assessment published in the DEIS have also been addressed and incorporated into the document. Therefore, the species' analyses are reproduced in their entirety for further review.

B2.0 PROJECT DESCRIPTION

B2.1 Overview

The study area for the proposed WWP/B.C. Hydro Transmission Interconnection Project is located within the boundaries of the United States and would consist of a new double-circuit 230-kV transmission line constructed between WWP's existing Beacon Substation and the United States-Canada international boundary. The Proposed Route, alternatives, variations, and route options are described in detail in Chapter 2.0 in this FEIS and are shown on Map 2-2, Sheets 1 through 11 located at the back of this document.

The following planning schedule for the proposed Interconnection would incorporate licensing, design, ROW acquisition, and construction:

- April 1987 - April 1988 - Preliminary Design
- October 1987 - September 1992 - Permitting
- September 1992 - April 1995 - Final Design and ROW Acquisition
- April 1995 - November 1997 - Construction

Changes in projected electrical loads or other factors affecting the timing and feasibility of the proposed Interconnect could alter this schedule.

B2.2 Transmission Facilities

B2.2.1 Route Selection

WWP evaluated potential 230-kV transmission line routes between the international boundary and a number of terminal locations. This route evaluation is described in detail in WWP's environmental report (ER) and is summarized in Section 2.3.1 of this FEIS.

Within the study area, avoidance and exclusion areas were defined and delineated. Wherever possible, routes were identified that minimized contact with avoidance areas, bypassed exclusion areas, and used existing transmission corridors.

As part of the preparation of the EIS, WWP's proposed and alternative transmission routes were reviewed and evaluated for effects on biological resources. Potential conflicts were carried

through impact analysis, and mitigation measures were developed as appropriate (see Chapter 4.0 of the EIS).

B2.2.2 Right-of-Way Requirements

The proposed 230-kV transmission line would require 125 feet of ROW, 62.5 feet on each side of the centerline. The proposed placement of the transmission line parallel and adjacent to existing lines may reduce the required width of new ROW, since some overlap may occur. Section 2.3.2 of this FEIS describes the specific ROW requirements for the proposed Interconnection.

B2.2.3 Structure Design

Design features for the proposed Interconnection are described in Section 2.3.3 of this FEIS. WWP would determine the type of supporting structures to be used on this transmission line, depending on safety, economic constraints, terrain, soil type, ROW constraints, aesthetic considerations, and other factors. Structure design and configuration may vary depending on the requirements of specific structure locations. The proposed and alternative structure types are shown on Figures 2-2 and 2-3 in Section 2.3.3 of this FEIS. The ability to adjust construction methods on a site-specific basis allows for cost-effective construction and tends to reduce ground disturbance.

B2.2.4 Construction

Transmission line construction normally includes ROW clearing, access road construction, structure foundation construction, structure assembly and erection, conductor and shield wire stringing and tensioning, and site restoration. Environmental protection procedures that would be implemented by WWP during construction are summarized in Table 2-5 in Section 2.3.4 of this FEIS and discussed in Sections 2.3.4, 2.3.5, and 2.3.6.

The proposed Interconnection would be routed to avoid large areas of steep or unstable slopes, to ensure the stability of the supporting structures, and to lessen erosion losses. Where slopes could not be avoided, they would be spanned by the line, where practicable, or the line would follow topographic contours. Access roads would also follow topographic contours, where possible. During detailed line surveys and design, sensitive soils located along the route would be identified.

The transmission line ROW would be cleared of trees to the extent necessary to facilitate line construction, maintenance, and conductor clearance. Where possible, tree removal would be

'feathered' at ROW edges. Stumps, root systems, low-growing vegetation, shrubs, and grasses would be left in place to stabilize the soil structure and decrease soil losses due to erosion.

Revegetation procedures for disturbed areas would be agreed upon between WWP, the land manager, and the local noxious weed control board. Seed mixtures would be chosen, depending on the type of area requiring reclamation. Where ground disturbance occurs, soils would be stabilized as soon as practicable; efforts to reclaim these areas would be initiated within the first growing season following construction. As a preventative measure to minimize the invasion of noxious weeds into areas disturbed for transmission line or access road construction, a clean vehicle policy would be implemented during project construction.

During project construction, WWP would refrain from placing transmission structures or access roads within a wetland or riparian area. Use of special construction techniques would span these areas, when possible, thereby avoiding disturbance to low-lying wetland/riparian areas. Crossing of wetlands classified as Palustrine forested, however, may require removal of trees that exceed the maximum allowable height beneath the transmission line.

Existing roads would be used to the extent possible to access the ROW and structure sites, but may require improvements such as alignment modifications, grading, widening, and reinforcement in order to safely accomplish the work. New access roads may be required both within the ROW and from existing roads to the ROW; however, structure and access road locations would be determined during detailed engineering and are not known at this time. Access roads would be designed to ensure natural drainage and limit erosion. Where new access roads are required to cross streams, the construction would comply with the Washington State Department of Wildlife (WDW) and the Washington State Department of Ecology (WDE) regulations pertaining to stream and water quality protection. Section 2.3.4 of this FEIS outlines additional construction procedures proposed by WWP.

B2.2.5 Operation and Maintenance

During operation, routine aerial or ground inspections would be conducted along the transmission line every 6 to 12 months to monitor the condition of the towers, insulators, and conductors. WWP has found that it has been more economical to conduct these inspections by air; although, ground surveys may be required under certain conditions.

In areas determined to be environmentally sensitive, (e.g., wetlands, deer winter range, unique habitats) access roads may be gated (or otherwise blocked) to minimize public use, in cooperation with the landowner or land manager. The USFWS, WDW, and Forest Service would

be consulted on such measures. Wetlands or riparian areas would not be crossed by WWP during maintenance activities.

Throughout the life of the project, it may be necessary to periodically remove vegetation that has grown near the conductors. Mechanical cutting of this vegetation may be used where ground conditions are favorable and slash disposal may be accomplished by scattering, piling and burning, chipping, or burying. WWP currently implements preventative measures against noxious weeds and does not typically use chemical spraying techniques in its ROW management. In the event that herbicides would be required for the control of noxious weeds, WWP would coordinate these activities with the local noxious weed control board. Additional operation and maintenance procedures for the proposed Interconnection are discussed in Section 2.3.5 of this FEIS.

B2.2.6 Abandonment

At the end of the useful life of the proposed project, the transmission structures would be dismantled and removed, along with their foundations. The natural contour in areas leveled for equipment required to dismantle the line would be reclaimed to its original condition. Similarly, areas disturbed and stripped of vegetation during the dismantling process would be regraded and reseeded as described for ROW reclamation to prevent erosion and the invasion of noxious weeds. As discussed for project construction, wetland and riparian areas would be avoided during abandonment activities. Environmental protection procedures would follow those proposed for line construction (see Sections 2.3.4 and 2.3.6 of this FEIS).

B2.3 Substations

B2.3.1 Terminal Selection

WWP evaluated one planned (Marshall) and four existing (Westside, Beacon, Bell, and Rathdrum) substations in the Spokane area as terminals for the proposed Interconnection. WWP's amended Presidential permit application establishes WWP's existing Beacon Substation, rather than the planned Marshall Substation (as indicated in the DEIS), as the southern terminus of the proposed Interconnection project. Substation selection for the proposed Interconnection is discussed in detail in Section 2.4 of this FEIS.

B2.3.2 Construction

The proposed Interconnection would terminate at WWP's existing Beacon Substation. Any future transformation from 230-kV to a lower voltage (e.g., 115-kV) would not be directly associated with the proposed Interconnection. Construction at the existing Beacon Substation is described in Section 2.4.1 of this FEIS.

B2.3.3 Operation and Maintenance

The Beacon Substation would not be manned. Electric equipment would be remotely controlled from WWP's operations center. The new facilities would be fenced, locked, and secured. Entry would be restricted to appropriate WWP personnel. Maintenance would include equipment testing and routine and emergency procedures. The area inside the fence would be maintained to prevent intrusions of any vegetation within the substation site, in cooperation with the county noxious weed board. Additional information on the operation and maintenance of the existing Beacon Substation is presented in Section 2.4.2 of this FEIS.

B2.3.4 Abandonment

The facilities associated with the proposed Interconnection at the Beacon Substation would be abandoned at the end of the project, if no longer needed. Methods for dismantling equipment and for equipment removal would depend on system requirements at the substation.

B3.0 ENDANGERED SPECIES EVALUATIONS

B3.1 Bald Eagle

B3.1.1 Status

The bald eagle (Haliaeetus leucocephalus) is federally listed as endangered in 43 of the 48 conterminous United States. The species is federally listed as threatened within the states of Washington, Oregon, Minnesota, Wisconsin, and Michigan (USFWS 1990). Bald eagles are also protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act in all states, including Alaska.

An accurate population estimate for the bald eagle is difficult to establish, especially for remote regions of Alaska and Canada. The estimated world population in 1987 was approximately 80,000 eagles, with the majority occurring in Alaska and Canada. Individuals that typically breed in Alaska and Canada may migrate into and disperse throughout the lower 48 states during the winter period. Within these states, the 1988 mid-winter bald eagle survey estimated 11,241 eagles for the 40 states that regularly participate in this annual count. In 1986 and 1987, estimated eagle numbers in these areas were 9,279 and 9,258, respectively. The 1989 breeding population in the lower 48 states was recorded as 1,482 nesting pairs; Alaska contained an estimated 7,500 breeding pairs (Hastings 1989).

B3.1.2 General Distribution

The bald eagle's breeding range formerly included most of the continent; the species historically nested in areas where suitable habitat occurred (USFWS 1986). During the 19th and 20th centuries, the bald eagle breeding range diminished, and the species disappeared from many parts of its range. However, in recent years, eagles have been returning to breed successfully at historic nest sites and have been establishing new territories. Bald eagles currently nest in Alaska, Canada, the Pacific Northwest, the Great Lakes area, Florida, and Chesapeake Bay. The winter range includes most of the breeding range but extends predominantly southward from southern Alaska and southern Canada (USFWS 1986).

Most bald eagles that breed in the 48 conterminous states also winter there. Individuals nesting in northern states may migrate south in the winter to utilize the more open water areas and increased prey availability. In addition, some eagles that nest in Alaska and Canada also migrate south to wintering areas within the lower 48 states. These movements begin during the

post-fledgling dispersal period and are usually triggered by freezing water in northern areas. The largest wintering eagle concentrations occur in the Klamath Basin, California; in the Midwestern states along the Mississippi, Missouri, Illinois, Platte, and Arkansas Rivers; and in the Northwest, encompassing Washington, Oregon, Idaho, and western Montana. Major rivers and other open water bodies in Wyoming, Montana, and North Dakota also serve as wintering grounds for the bald eagle (Spencer 1976).

In 1985, approximately 77 percent of the bald eagle breeding territories within the State of Washington were occupied; these breeding populations are still widely distributed, but historical information suggests significant declines and changes in distribution. The majority of the nesting habitat is located within western Washington. More than 25 percent of all wintering bald eagles in the lower 48 states occur within the Pacific northwest region, with a total of 1,542 individuals recorded during the 1984 mid-winter surveys. The Columbia River Valley contains high numbers of wintering individuals, which consists of both resident and migrant eagles (USFWS 1986).

B3.1.3 Life History and Habitat Requirements

The breeding season of the bald eagle varies with latitude. Bald eagles normally reach breeding age at about 5 years, which roughly coincides with full adult plumage (Hancock 1973). Pre-nesting activities occur as early as January, but typically take place in February or early March, and include courtship flights, nest repair, and nest building. Egg laying and incubation usually begins in March, lasting 34 to 35 days. One to four eggs (average two) are layed (Brown and Amadon 1968). The period from hatching to fledgling is about 10 to 13 weeks, with a post-fledgling period of 3 to 10 weeks (Todd 1979).

Bald eagle nests in the Pacific northwest region are usually located in uneven or multi-storied trees (Anthony et al. 1982); optimum nesting habitat includes proximity to open water providing an adequate food source, large nest trees with sturdy branches at sufficient height, and stand heterogeneity. Good visibility from the nest and a clear flight path are essential requirements (Grubb 1976). Eagles often use the same nest each year and will supplement with new nesting material or rebuild the nest, if destroyed. Prey items during the nesting season consist primarily of fish (Grubb and Hansel 1978). Other food items include songbirds, invertebrates, small animals, and carrion.

Bald eagles migrate from breeding areas between September and December and generally winter as far north as open water and food are available. The major components of habitat on wintering grounds include a food source and suitable trees for diurnal perching and night roosting. Wintering eagles usually gather along lakes and major river systems, but may use arid valleys as well (Edwards 1969). Bald eagles may gather in large aggregations and share

communal roosts, diurnal perches, and feeding areas. Food availability is probably the single most important factor affecting winter eagle distribution and abundance (Steenhoff 1976). Waterfowl, particularly dead or crippled individuals, are often taken when fish are not readily available (Shickley 1961; Spencer 1976). In some regions, carrion is also an important food source. Deer, cattle, sheep, antelope, and road-killed cottontails and jackrabbits are readily utilized. Live mammals such as mice, cottontails, jackrabbits, gophers, woodrats, and kangaroo rats are also taken (Lish and Lewis 1975; Platt 1976; Beck 1980). Eagles may use alternate food sources, as availability changes.

Perches are an essential element in bald eagles' selection of foraging areas, since they are necessary for hunting and resting (Stalmaster and Newman 1979). Perch sites must be in open view of potential food sources and are generally within 160 feet of water (Vian 1971). Night roost sites offer protection from predators and a degree of protection from inclement weather. Large, live trees that occur in sheltered areas are preferred (Lish 1975). Eagles may roost individually or in small groups, and roosts can be used for successive years. Eagles generally leave the roost for feeding areas in the early morning and return in the evening, except during severe weather when they may remain at the roost throughout the day.

Artificial perches may be important to wintering bald eagles in areas lacking natural perch sites. Perching trees are not plentiful along the Columbia River, and eagles will readily utilize artificial perches in this area (USFWS 1986).

B3.1.4 Endangerment Factors

The decline in eagle numbers, especially nesting pairs, was first reported by Howell (1937), with breeding populations disappearing entirely in some regions (Sprunt 1969). These declines were attributed to loss of habitat; human disturbance of nests, roosts, and perches; pesticide and lead contamination of prey, resulting in thinning egg shells and reduced reproductive success; illegal shooting, poisoning, and trapping; and electrocution (USFWS 1986). Increasing human activity and land development is adversely affecting the suitability of wintering and breeding habitats. Although isolation is an important feature of bald eagle wintering habitat, approximately 98 percent of wintering eagles within the State of Washington have been shown to tolerate human activities at a minimum distance of 328 yards (0.2 mile) (Stalmaster and Newman 1978).

Direct and indirect effects of organochlorine pesticides have severely impacted bald eagle populations (Bailey 1984). Dieldrin and DDE (DDT) are implicated most often in deaths of individual birds. Chronic exposure to DDE is known to inhibit reproduction by interfering with calcium metabolism that results in thin eggshells and hatching failure (Bailey 1984). Bald eagle reproduction throughout the species' range seems to have improved since DDT and other

organochlorine pesticides have been banned for most uses since the early 1970s (Postupalsky 1978). However, DDE and PCBs are present in bald eagle populations along the lower Columbia River and are associated with severe eggshell thinning and low breeding success (USFWS 1986).

Heavy metals such as mercury and lead have also caused eagle deaths. Secondary poisoning from eating lead-contaminated prey, particularly in wintering areas where eagles feed on crippled ducks and geese, appears to be a growing problem.

Electrical distribution lines do pose an electrocution hazard to bald eagles, although electrocutions of raptors have decreased in recent years due to suggested standards for raptor protection (Olendorff et al. 1981). Transmission lines, however, do not present the same electrocution hazard as smaller distribution lines. Eagle collisions with power lines seem to occur with less frequency than electrocutions (USFWS 1986).

B3.1.5 Presence in the Study Area

Wintering bald eagles occur along the Pend Oreille, Little Spokane, Spokane, Colville, and Columbia Rivers, usually from mid-November to early May (Hickman 1987). Individuals may also inhabit other water resources within the project area (e.g., lakes, reservoirs). Winter population estimates reported by the USFWS (1986) totaled 15 individuals for the Pend Oreille River, Calispell Lake, and Sullivan Lake; 15 individuals for the Little Spokane and Spokane Rivers; 5 individuals for the Colville River; and 40 individuals for the Columbia River/Franklin D. Roosevelt Lake and Twin Lakes. The majority of wintering eagles along the Columbia River, however, occur to the west and southwest of the Western Alternative (Zender 1989; Dunn 1987).

Wintering eagles are prevalent throughout the project region and extensively use the river corridors for daily movements, foraging, and during seasonal migrations (Haas 1990). Although bald eagles are numerous along these areas, no communal roosting sites had been identified within 2 miles of the proposed project alternatives until recently (Pharness 1990). The Eastern Alternative crosses south of a likely roosting area near Deep Creek and the Riverside State Park (Pharness 1990). The Chattaroy Variation may also cross near an active roosting area within the Little Spokane River Natural Area, along a north-facing slope in the extreme northeastern portion of the park (Schulz 1990; Pharness 1990). On-going studies on these areas and the wintering populations will determine the extent of bald eagle use.

Other concentrations of wintering eagles occur along the Colville and Columbia Rivers; although, a majority of these wintering birds are primarily found along the Columbia River to the west and southwest of the Western Alternative, outside of the project area. Another area that supports a

large number of eagles is below Long Lake Dam along the Spokane River; several birds regularly forage downriver from the proposed crossing site (Pharness 1990). No communal roosting areas have been identified for the Western Alternative.

Available population data within the proposed project area currently report 3 active bald eagle nest sites located within 2 miles of the proposed project alternatives. Two of these sites were occupied beginning in the spring of 1990 (Zender 1990). One new nest occurs along the eastern bank of the Pend Oreille River near Sand Creek; the other recent nest site is along the eastern bank of the river near Jared (Zender 1990; McAllister 1990). The third nest was previously occupied by breeding birds until 1989 along the western edge of the Pend Oreille River also near Jared (Dunn 1987; Zender 1989); however, the site did not appear to be active in 1990 (Zender 1990). All three sites identified are considered active by the WDW and are associated with the Proposed Route, Eastern Alternative, and the Southern Crossover Alternative; the nest located in the vicinity of Sand Creek would also apply to the Northern Crossover Alternative.

An additional bald eagle nest that was identified by Dunn (1987) to occur within 2 miles of the line near Calispell Lake was used only once by young birds and is no longer used (Zender 1989). In addition, a bald eagle nest site was previously recorded along the Northern Crossover Alternative, east of Colville; however, this site is unconfirmed and probably does not exist (Zender 1989). Other active bald eagle nests occur in the vicinity of the proposed Interconnection (Zender 1990 and 1992; McAllister 1990); however, they are located over 2 miles from the proposed project ROWs. The exact locations of active bald eagle nest sites are not revealed to ensure protection of the nests and their inhabitants.

B3.1.6 Impact Evaluation

Communal roosting sites for bald eagles have not been confirmed within the project area; however, two likely roosts have been identified along the Eastern Alternative near Deep Creek (Pharness 1990) and along the Chattaroy Variation within the Little Spokane River Natural Area (Schulz 1990; Pharness 1990). In addition, a large number of eagles forage downriver of Long Lake Dam, where the Western Alternative crosses the Spokane River (Pharness 1990). Project construction activities during the winter period would inhibit eagles from using the habitat located in the vicinity of the disturbance; however, individuals would return upon completion of construction. To prevent potential impacts to communal roost sites, resulting in impacts to wintering eagles, WWP will coordinate with the USFWS, WDW, and Forest Service prior to the initiation of construction activities to identify all bald eagle winter concentration areas crossed by the proposed line. Construction activities would be suspended in these areas from November 1 to May 1, or for a period specified by the state and federal agencies (see mitigation measures in Section 4.9 of this FEIS).

In the event project-related activities occurred within 0.5 mile of an active bald eagle nest, the individual production for that nest would likely be limited for that year. Impacts to the three active bald eagle nests identified for the project area are not anticipated from project construction, operation, maintenance, or abandonment, since all nests are located greater than 0.5 mile from the proposed line. Upon route determination, clearance surveys for the identification of any additional bald eagle nests that may be active within 0.5 mile of project construction will be conducted prior to the initiation of construction activities. WWP will coordinate with the WDW, USFWS, and Forest Service, should an active nest be located within 0.5 mile of the line or new access road, to determine measures minimizing any significant disturbance from the proposed project (see Section 4.9 in this FEIS).

During project operation, wintering bald eagles may be impacted where the designated route would cross rivers, such as the Spokane, Little Spokane, or Pend Oreille. River crossings would depend entirely on the route alternative approved by DOE in the Presidential permit. Because wintering birds typically use the river corridors for daily movements and foraging, the potential for eagle collisions with the transmission line increases at these crossings, particularly if a communal roosting site occurs nearby. Although eagles may be susceptible to line strikes under these conditions, raptors generally exhibit several physical and behavioral attributes, such as keen eyesight, slow flight speed, maneuverability in flight, and use of utility poles for nest and perch sights to decrease their susceptibility to collisions (Olendorff and Lehman 1986; Thompson 1978).

To minimize this potential, WWP will conduct clearance surveys for communal roosting areas, as discussed above for wintering birds. Because a transmission line's shield wires are the primary cause of line strikes, WWP will coordinate with the USFWS and WDW regarding the need to either install aerial markers on the overhead shield wires located at the river crossings or to remove the wires along these individual spans. Each river crossing will be examined on a case-by-case basis. These measures would identify sensitive areas and increase the visibility of the line to minimize the possibility of eagle collisions in these areas (see mitigation measures in Section 4.9 of this FEIS).

As discussed for Endangerment Factors in Section B3.1.4, electrocution of bald eagles during line operation is not typically considered a problem with transmission lines of this size. Most lines that electrocute raptors are smaller distribution lines that carry between 12 kilovolts (kV) and 69 kV, where the distance from a conductor to an electrical ground or to another conductor is often within the distance of a raptor's wingspan. Higher voltage transmission lines pose little electrocution hazard because the separation between the conductors is sufficient to prevent contact that would result in electrocution (Olendorff et al. 1981).

As proposed for this project (see Table 2-4 in this FEIS), the minimum distance between a conductor and a ground (short-circuit distance) would be about 6 feet 8 inches; this would be a vertical distance between the conductor and the structure crossarm. A bald eagle's wingspan ranges from approximately 6 feet 6 inches to 7 feet 6 inches; however, an eagle would ordinarily approach the structure in a horizontal flight pattern. The minimum horizontal short-circuit distance for the proposed line would be approximately 11 feet between a conductor and the structure, and estimated distance from conductor to conductor is about 22 feet. Therefore, no significant impacts to bald eagles from electrocution would be anticipated from this 230-kV transmission line.

In summary, the construction and operation of the proposed Interconnection is not likely to adversely affect breeding or wintering bald eagles within the project area, due to the environmental protection procedures and mitigation measures developed for the species protection (see Sections 2.3 and 4.9 of this FEIS).

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B3.2 Grizzly Bear

B3.2.1 Status

The grizzly bear (Ursus arctos) was federally listed as threatened in 1975, pursuant to the Endangered Species Act of 1973. Two subspecies of brown bear occur within North America; these include the grizzly bear (U. a. horribilis) located on the North American mainland and the Kodiak bear (U. a. middendorffi) located on Kodiak, Shuyak, and Afognak Islands (Rausch 1963).

Between 1800 and 1975, grizzly populations within the United States declined from an estimated 100,000 individuals to less than 1,000 bears (USFWS 1982). Livestock depredation control, habitat deterioration, commercial trapping, and sport hunting were the leading causes in these declines (Stebler 1972; Martinka 1976). Conflicts between bears and livestock were common during the settling of the west, and attitudes were typically characterized by complete eradication of the species (Bailey 1931). The westward push of ranching, farming, fur trapping, and mining interests further increased the pressure on the Great Plains grizzly populations, which were extirpated by the early 1900s (Wright 1909). Logging and recreational development added to the man-induced mortality of the grizzly bear, as the mountainous areas were settled (USFWS 1982).

Currently, six areas within the conterminous 48 states contain grizzly bear populations (USFWS 1982). Population estimates are less than 1,000 bears for these areas. Alaska

maintains approximately 30,000 to 40,000 individuals, including the Kodiak subspecies (Servheen 1989).

B3.2.2 General Distribution

Historically, the grizzly's North American range extended from Ontario, Canada westward to the California coast and south into Texas and Mexico (Herrero 1972; Storer and Tevis 1955). The westward development caused a rapid distributional recession (Guilday 1968) into what is now the limited range of the grizzly bear. The six ecosystems that are potentially capable of supporting viable grizzly populations are located near Yellowstone National Park, Glacier National Park, Cabinet Mountains, Selkirk Mountains, Selway-Bitterroot Wilderness Area, and Northern Cascade Mountains (USFWS 1982).

A portion of the Selkirk Mountains Grizzly Bear Ecosystem (SMGBE) is located on the Colville National Forest in Washington State, with the remainder extending into Idaho and British Columbia (Forest Service 1988). Canada maintains a grizzly population contiguous to this area; therefore, an interchange of individuals is likely to occur between these two areas.

B3.2.3 Life History and Habitat Requirements

The grizzly bear is individualistic in behavior and typically a solitary wanderer. Except when caring for young or during the breeding period, grizzlies maintain individual patterns of behavior (USFWS 1982). This species is relatively long-lived, with an average life span of 25.5 years for both sexes (Craighead et al. 1974).

Age of sexual maturity and litter size may vary, depending on the individual's nutritional state (Herrero 1978; Russell et al. 1978). Both male and female grizzlies reach sexual maturity at 4.5 years of age. Larger and more dominant males may preclude young adult males from breeding at this time (Hornocker 1962). Only 69 percent of the females conceive at this age (Craighead et al. 1974); although, they are probably capable of reproducing throughout their lifetimes after reaching maturity (Pearson 1975). Mating occurs from late May through mid-July, peaking in mid-June. Estrus may last from a few days to over a month (Craighead et al. 1969; Herrero and Hamer 1977). Delayed implantation postpones embryonic development until late November or December and is believed to occur approximately 0 to 30 days after denning (Craighead et al. 1969). Female grizzlies give birth to the young within the den around February 1. Litter sizes range from one to four, with the average being two cubs (Craighead and Craighead 1972). The cubs stay with the mother and are weaned either as yearlings or 2-year-olds. They then disperse as subadults. The female does not breed again until the cubs are weaned (USFWS 1982).

The home range of adult grizzlies frequently overlap, with the home range of adult males generally found to be larger than that of adult females (Servheen and Lee 1979). Grizzly bears hibernate from October/November to March/May. The bear's heart rate and respiration decreases markedly, with a relatively slight drop in body temperature (Craighead and Craighead 1972). Den locations are typically found at higher elevations on steep slopes where an accumulation of deep snow is not likely to melt during warm winter periods.

Grizzly bears are typically opportunistic feeders and will use a variety of food sources. Depending on the habitat area, grizzlies will forage on berries, tubers and roots, forbes, small mammals, ungulates, and carrion (Hamer 1974; Servheen and Lee 1979). Grizzly bears must use forage high in protein and carbohydrates in excess of maintenance requirements in order to survive denning and post-denning periods (USFWS 1982). This is especially critical following hibernation, when food resources are low and energy requirements are high.

B3.2.4 Endangerment Factors

The decline of the grizzly bear within North America is attributable to its persecution from man and loss of habitat through the exploration and settlement of its historic range. The expansion of human settlements has ultimately eliminated the grizzly from all but remote areas within the contiguous 48 states, resulting in the isolation of small subpopulations. Loss and fragmentation of natural habitat is particularly relevant to the management and survival of grizzly bears. These animals require extensive home ranges to provide the amount of resources needed. In addition, their low densities, low reproductive potential, individualistic behavior, and utilization of riparian habitat (also used extensively by man) cause this species to be vulnerable to possible extirpation (USFWS 1982).

Currently, nearly 95 percent of the land occupied by grizzlies is state or federally owned, and much of that land is maintained as multiple-use. Grizzly bears face continued habitat destruction, human disturbances, and direct mortality as man/bear encounters increase.

B3.2.5 Presence in the Study Area

Two of the six distinct grizzly bear ecosystems occur within the State of Washington. One is located in the Selkirk Mountains, the other occurs in the northern Cascade Mountains. The region east of the Pend Oreille River within the Selkirk range is a designated grizzly bear recovery area. Evidence suggests that as many as 25 individuals may inhabit the Selkirk Mountains; although, this is difficult to estimate because the bears are highly mobile (WDW 1987). Both confirmed and unconfirmed grizzly sightings have been reported by the WDW (WDW 1988; Bertram 1992) west of the Pend Oreille River within the project area. Map 2-2 located in the back

of this FEIS presents the sightings located within 2 miles of the proposed Interconnection according to the map section, the year it was reported, and whether the observation was confirmed or unconfirmed. The primary concentration of bears occurs in the vicinity of the Boundary Dam; however, individuals may be found sporadically throughout the northern portion of the study area. Following hibernation in mid-April, individuals will often travel down from their denning sights to lower elevations to graze on new vegetation, particularly along the riparian areas (Hickman 1987). During these periods, grizzlies may be observed more often than other times of the year.

B3.2.6 Impact Evaluation

Impacts to the grizzly bear would not be anticipated during project construction. Potential impacts to the grizzly bear from the proposed Interconnection would be limited to increased access to habitat areas, resulting in an increase in harassment and potential poaching during line operation. As stated in Sections 2.3.4 and 2.3.5 in this FEIS, access roads will be closed and reclaimed within the first growing season following construction. Some roads may be necessary for maintenance activities or emergency access. In areas determined to be environmentally sensitive (e.g., grizzly habitat), mandatory access roads may be gated (or otherwise blocked) to minimize public use, in cooperation with the landowner or land manager. The USFWS, WDW, and Forest Service will be contacted prior to construction initiation to identify these specific areas during final line sighting and to develop the appropriate protection procedures. Landowners/managers will retain keys to the applicable gates to assure their use of the access roads for authorized activities. The closed access roads would be reopened only as needed, and areas disturbed during these activities would be restored as agreed with the landowner/manager.

ROW reclamation would incorporate use of plant species, such as white dutch clover or other browse species recommended by the USFWS, Forest Service, or WDW to aid in increasing the amount of forage available to grizzlies and other wildlife species, particularly during the spring period when resources are low and demand is high (see Section 4.9 of this FEIS). These plant species would be used in conjunction with the seed mixture typically used by WWP during revegetation procedures to restabilize soils and prevent noxious weed invasions.

Because of the environmental protection procedures that were developed to ensure sensitive species protection, the construction and operational activities of the proposed Interconnection are not likely to adversely affect the grizzly bear. Sections 2.3.4 and 2.3.5 of this FEIS outline and discuss these measures that WWP has committed to enforcing.

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B3.3 Woodland Caribou

B3.3.1 Status

The Selkirk Mountain caribou (Rangifer tarandus caribou) are an ecotype of woodland caribou. This population is the only woodland caribou herd frequenting the contiguous United States. The Selkirk Mountain population of woodland caribou was emergency listed as federally endangered on January 14, 1983. A final listing was enacted on February 28, 1984 (USFWS 1984a).

The historic population estimates for this herd unit are based on limited information. Flinn (1956) and Evans (1960) estimated that approximately 100 caribou occurred within the Selkirk Mountains in the 1950s. However, Freddy (1974) asserted that the Selkirk population has numbered less than 50 animals since 1900. Studies since 1970 have shown that the North American woodland caribou populations have been declining throughout their range. The southern limit of caribou populations is the Selkirk Mountains in northern Idaho and northeastern Washington. The southern Selkirk Mountain herd of woodland caribou can be ranked as one of the Nation's most critically endangered mammals. In 1984, an estimated 30 individuals composed the herd, based on surveys conducted since January 1983 (USFWS 1984b). Approximately 48 woodland caribou from Canadian herds were transplanted to augment the Selkirk Mountain herd in February and March of 1987 and 1988. Population estimates in 1989 ranged from 65 to 85 individuals (Rominger 1989; Hickman 1989).

B3.3.2 General Distribution

The woodland caribou once occupied nearly the entire forested region from southeastern Alaska and British Columbia to Newfoundland and Nova Scotia (USFWS 1983). Estimated numbers of North American caribou at the time of settlement were three to five million animals (Bergerud 1978). In the conterminous United States, populations previously occurred in New

England, New York, the upper Great Lakes States, Montana, Idaho, and Washington. Primarily because of habitat alteration and hunting pressures, indigenous caribou disappeared from New England by about 1908 and from the Great Lakes States by 1940 (USFWS 1983). Excluding an occasional wandering animal, caribou have been eliminated from the eastern United States and most of eastern Canada (Bergerud 1978). Currently, an estimated 1.1 million caribou occur in North America, predominantly in northern Canada and Alaska (USFWS 1984a).

The Selkirk Mountain caribou are the remaining ecotype of woodland caribou that are found within the lower 48 states. The herd occupies parts of northeastern Washington, northern Idaho, and southern British Columbia. Estimates of the historic population are not detailed, but the range was known to be much more extensive that it is today; caribou previously occurred as far south as the Salmon River (Evans 1960).

B3.3.3 Life History and Habitat Requirements

The woodland caribou inhabit glaciated valleys typically occurring above 4,000 feet in elevation. They utilize old-growth or mature forests for thermal and snow-intercept cover and for the arboreal lichens which grow there. Arboreal lichens are a vital winter food source for the caribou (WDW 1987). Caribou also forage on herbaceous vegetation, mushrooms, shrub leaves, grasses, and sedges (Edwards and Ritcey 1960; Evans 1960). Unlike other ungulates, caribou do not consume much browse species (USFWS 1984a).

Caribou are a relatively late-maturing, low fecundity ungulate. Females breed at 2.5 to 3.5 years of age and produce one calf per year. The rut for the Selkirk Mountain herd typically occurs in mid-October (USFWS 1984a). The females leave the herd in the spring and calve at higher elevations away from possible predators and where sufficient lichens are present (Servheen and Lyon 1989; Rominger 1989; WDW 1987).

Woodland caribou do not congregate in large herds like barren-ground caribou, although they do cluster in small groups. Group size is largest during the rut, with winter groupings being second largest (USFWS 1984a; Rominger 1989). Woodland caribou also do not generally make the mass migrations that barren-ground caribou perform annually. Woodland caribou typically conduct seasonal elevational movements (Servheen and Lyon 1989; Shoesmith and Storey 1978). The species typically spends winter at high elevations feeding on arboreal lichens, descending to lower elevations in the spring to use newly emergent green forage. The caribou return to higher elevations as the snow melts and spend the summer months in the alpine and subalpine areas. In late autumn and early winter, the animals are pushed down to lower elevations until the snow conditions change in late winter and allow them to move into the higher elevations to take advantage of areas of high lichen densities (Servheen and Lyon 1989;

WDW 1987). Although woodland caribou do not undertake long migrations, they do maintain large home ranges and low population densities, and may move considerable distances between summer and winter ranges (USFWS 1984a).

Early-winter habitat is critical to the Selkirk Mountain herd. The caribou typically use mature stands of timber during early winter, because the community provides protection from intense early-winter storms, intercepts snowfall, and subsequently provides a greater amount of green forage later in the season than the more exposed, higher elevation communities. The transition from this summer forage to the arboreal lichens, comprising the majority of the winter diet, also occurs at this time (Rominger and Oldemeyer 1989).

B3.3.4 Endangerment Factors

Habitat loss, vehicle collision, illegal hunting, and potential inbreeding comprise the primary threats to the Selkirk mountain caribou (USFWS 1983, 1984a). Logging, fire, and development over the last century have reduced the caribou habitat and further isolated the population (WDW 1987; USFWS 1984a). The completion of British Columbia Highway 3 in 1963 has impacted the herd, particularly during the winter, when de-icing agents, such as salt, attract the caribou to the highway and individuals have been struck and killed by vehicles. In addition, a utility corridor was developed adjacent to this highway, which further reduces suitable caribou habitat within their critical habitat area (WDW 1987; USFWS 1984a). With increasing accessibility in this critical area, caribou have been lost to poaching and accidental shooting from the resulting increase in area utilization (WDW 1987; USFWS 1984a).

Among the other factors, calf survival rates have been low and the lack of immigration from other herds threaten the Selkirk Mountain herd with potential inbreeding (USFWS 1984a). The U.S. Fish and Wildlife Service, Washington Department of Wildlife, Idaho Department of Fish and Game, British Columbia Fish and Wildlife Branch, British Columbia Forest Service, U.S. Forest Service, and University of Idaho are coordinating efforts to augment the Selkirk herd to minimize this inbreeding potential (WDW 1987).

B3.3.5 Presence in the Study Area

Historically, this species occupied much of the northern states near the Canadian border. In 1984, the resident caribou herd within Washington and Idaho numbered approximately 30 animals. However, mountain caribou from Canada have been introduced into this small herd unit; therefore, population estimates in 1989 ranged from 65 to 85 individuals (Rominger 1989; Hickman 1989). This herd currently comprises the only population of caribou that regularly occurs in the conterminous United States (USFWS 1984).

Within the State of Washington, mountain caribou are predominantly located east of the Pend Oreille River. According to the WDW data base (WDW 1988), however, this species has been historically reported west of the river and may occur in the project area on rare occasions (Zender 1989). No herd activity presently occurs west of the Pend Oreille.

Unlike deer, caribou require old growth forests, which produce the arboreal lichens consumed by the animals. The mountain caribou critical habitat that supports the majority of this population is located within the grizzly bear recovery area east of the Pend Oreille River. Therefore, the caribou's critical habitat does not intersect with the proposed Interconnection area. Map 2-2 located in the back of this FEIS shows general areas and dates of unconfirmed caribou observations previously reported to the WDW (WDW 1988). Specific locations for these individuals have not been made public for the protection of the few remaining animals (Owens 1988).

B3.3.6 Impact Evaluation

Impacts to the Selkirk Mountain caribou are not expected from project construction activities. Although individual caribou have been reported along the western portion of the Pend Oreille River and any losses to this herd would be considered a significant impact, the population does not inhabit the area intersected by the proposed Interconnection.

Mountain caribou tend to use elevations approaching 3,800 feet and above. Potential impacts to this species would result from harassment to individual animals from increased public access along project roads, particularly from snowmobiles (Hickman 1989). As stated in Sections 2.3.4 and 2.3.5 of this FEIS, access roads will be closed and reclaimed within the first growing season following construction. The roads that may be necessary for maintenance activities and emergency access may be gated (or otherwise blocked) to discourage public use. These measures would be in cooperation with the landowner/manager, USFWS, WDW, and the Forest Service, depending on the specific area to be protected and the associated land use. The closed access roads would be reopened only as needed, and areas disturbed during these activities would be restored as agreed with the agency and/or landowner and committed to in Sections 2.3.4 and 2.3.5 of this FEIS.

Impacts to the limited population of mountain caribou would not be significant, since the current population level and associated herd distribution would not be directly affected by the proposed project. Any potential for residual impacts from area access would not be expected, with the implementation of the protection procedures outlined and discussed in Sections 2.3.4 and 2.3.5 and the additional mitigation measures presented in Section 4.9 of this FEIS. Therefore, it is

determined that the proposed Interconnection would not likely adversely affect the rare mountain caribou.

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B3.4 Gray Wolf

B3.4.1 Status

The gray wolf (Canis lupus) is identified by some taxonomists as having up to 32 subspecies (Mech 1970); 24 of these subspecies once inhabited North America. The Northern Rocky Mountain wolf (Canis lupus irremotus), considered a subspecies, was listed as endangered by the Secretary of the Interior in 1973 (38 Federal Register 14678, June 4, 1973). However, the entire species was listed as endangered throughout the lower 48 states, except Minnesota, in 1978 (43 Federal Register 9612, March 9, 1978) because of the general trend among taxonomists to recognize fewer subspecies of wolves and enforcement problems for protection of the individual subspecies were likely to be encountered (USFWS 1987).

During the late 1800s, the westward expansion of settlers contributed to decimating the vast buffalo herds and other ungulates that provided prey for wolves roaming the plains and northern Rocky Mountains (Ream 1982; Mattson 1983). Simultaneously with these extreme declines in

ungulate species, the domestic livestock industry was increasing throughout North America, primarily in the west. At that time, some wolves began attacking alternative prey sources (i.e., livestock). The local governments and area ranches initiated a bounty program for wolves, which attracted many of the buffalo hunters, who then became wolf bounty hunters. The federal government also hired professional trappers as part of a national control program (USFWS 1987). Because a few wolves became notorious livestock killers (Curnow 1969), large bounties were offered for their capture, and a basic fear and hatred for all wolves was generated widely among the settlers. Overall, USFWS (1973) lists land development, loss of habitat, poisoning, trapping, and hunting as the primary factors for the decline of the gray wolf within the northern Rocky Mountains. By the 1920s, wolf populations were decimated, and the few wolves remaining in the western United States were probably limited to wild areas within the National Parks and Forests (USFWS 1987). As an example, resident wolf packs were not present in Yellowstone National Park after the 1930s, although unconfirmed sightings of individuals or pairs continued until 1966 (Weaver 1978).

Currently, both confirmed and unconfirmed sightings of wolves throughout the northern Rocky Mountains, primarily within Montana and Idaho, are submitted to the U.S. Fish and Wildlife Service (USFWS) annually. Sporadic reports of individuals also occur in Washington and Wyoming (USFWS 1987). Three recovery areas have been identified by the Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987) to secure and maintain a minimum of 10 breeding pairs of wolves in each of the 3 recovery areas for a minimum of 3 successive years. These areas include northwest Montana, central Idaho, and the Greater Yellowstone Area.

B3.4.2 General Distribution

Historically, the Northern Rocky Mountain wolf occurred throughout Idaho, the eastern third of Washington and Oregon, all but the northeastern third of Montana, the northern two-thirds of Wyoming, and the Black Hills of South Dakota (Hall and Kelson 1969). The early exploitation (beginning in the 1870s) and the later wolf control measures (until the 1930s) caused a rapid distributional recession into what is now the limited range of the gray wolf. According to USFWS (1987), the current approximate distribution of wolves in the northern Rocky Mountains includes northern and central Idaho and northern and western Montana. One pack of approximately 12 individuals was documented in 1987 in northwestern Montana; active reproduction for this pack has been reported (USFWS 1987). Currently, another three or four viable wolf packs are known to occur within Glacier National Park, in addition to a pack that was recently translocated into the southern portion of the park by the USFWS (Fritts 1990). Individual wolves are recorded throughout the northern region of the Rocky Mountains and may indicate wolf movement into specific areas (USFWS 1987). It should be noted that the number of individual wolves and active wolf packs are continually changing, along with their occupied territories.

Wolf observations in these and other areas have been reported by local residents, outfitters, hunters, backpackers, trappers, loggers, and agency personnel. Despite the limitations that are inherent in verifying these observations, wolf sightings were consistently made in certain areas by well-qualified individuals. Many of these reports cannot be used to determine the actual number of wolves in the northern Rocky Mountains; however, they can indicate areas where wolves occur.

The Northern Rocky Mountain wolf has inhabited eastern Washington (Herman and Willard 1978), but has been considered eliminated from within this area since 1950 (Layser 1970; Nielsen 1978). As discussed in Section B3.4.5 of this biological assessment, confirmed sightings of the gray wolf have again been reported in eastern Washington within the last few decades; therefore, the species should be considered present within the proposed project area.

B3.4.3 Life History and Habitat Requirements

The niche or ecological role of the wolf has been the predominant predator of large ungulates in the Northern Hemisphere; from its survival capabilities to its unique behavior, the wolf has adapted well to this role. Wolves have occupied nearly all habitat types except for true deserts (Mech 1970; Pimlott 1975). Habitat for wolves would be defined as including: 1) an adequate year-round prey base of ungulates and alternate prey species, 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient range with minimal exposure to humans (USFWS 1987).

The basic unit of wolf populations is the pack, which is typically a cohesive group of two or more individual wolves traveling, hunting, and resting together throughout the year (Mech 1970). Most packs include a pair of breeding adults, pups, and often yearlings and/or extra adult wolves (Murie 1944; Fuller and Novakowski 1955; Mech 1970). The number of wolves in a pack varies from a minimum of 2 to a maximum of 36 reported in Alaska (Rausch 1967) and is regulated by specific social and nutritional factors (Mech 1970).

Behavioral interactions within a wolf pack occur in an established but dynamic framework (Mech 1970; Fox 1973). A dominant (alpha) male and female are the central members of the pack, and the other pack members are typically related to the alpha pair. The alpha pair maintains social order within the pack and promotes pack stability (Peterson 1977). The size and location of a pack's territory may be stable or shifting (Mech 1973; Haber 1977; Carbyn 1980; Fritts and Mech 1981), and wolves associated with a pack often exhibit a certain pattern of individual movement within the territory during the year (Mech 1970). These variables can be dependent on factors such as prey availability, season, and breeding activities (USFWS 1987).

Typically, the alpha pair will mate and prevent subordinates within the pack from mating through active harassment (USFWS 1987). The breeding season occurs from late January through April, with wolf pups arriving in late March to May following a 63-day gestation period (Woolpy 1966; Mech 1970). Wolves may dig out or visit whelping dens weeks before the birth of the pups, and some particular dens or denning areas may receive traditional use by a wolf pack over time (USFWS 1987). Litter sizes of wolves generally range from four to seven (Mech 1970). Wild wolves do not typically breed until 22 months of age (Mech 1970; Rausch 1967), and 2-year-old females will have slightly smaller litter sizes on the average than older animals (Rausch 1967).

Wolves use rendezvous sites, which are specific resting and gathering areas occupied by wolf packs during summer and early fall, after the whelping den has been abandoned. These are typically characterized by matted vegetation in a meadow, a system of well-used trails through the adjacent forest and across the meadow, and resting beds adjacent to trees. A pack will usually move from the whelping den to the first rendezvous site when the pups are 6 to 10 weeks of age (in late May to early July). The first rendezvous site is often located within 1 to 6 miles of the whelping den, and a succession of sites are used by the pack until the pups are mature enough to travel with the adults (from September to early October). Rendezvous sites may also receive traditional use by wolf packs (USFWS 1987).

Dispersal of individual wolves from a pack unit appears to be related to associated wolf density and prey resources (Fritts and Mech 1981; Zimen 1976). Wolves may disperse at ages ranging from 9 to 28 months, or more (Packard and Mech 1980), and dispersal in the fall by yearlings (17 to 20 months old) is common (Fritts and Mech 1981).

Communication between members of a wolf pack and between other packs basically includes howling and scent-marking. Communication maintains social order within an individual pack and will delineate specific territories to avoid conflicts with other wolf packs (USFWS 1987).

Wolves are basically opportunistic predators (Mech 1970); however, specific prey selection is apparent with wolves. In general, wolves depend upon ungulates for food in the winter and supplement this from the spring to the fall with beaver and smaller mammals (Mech 1970; Pimlott 1975). Because the wolf's prey varies in size from beaver to bison, the kill rate of each species varies according to the amount of food each provides in relation to the number of wolves it feeds (Mech 1970). Most of the research on wolf-prey relations indicates that wolves usually do not deplete their prey populations (Murie 1944; Mech 1970); however, wolf predation may be a factor in ungulate populations in certain areas (Mech and Karns 1977).

B3.4.4 Endangerment Factors

According to Young and Goldman (1944) and Mech (1970), the population decline of the eastern timber wolf that occurred within the eastern United States was a result of: 1) intensive human settlement, 2) direct conflict with domestic livestock, 3) a lack of understanding of the wolf's ecology and habits, 4) human fears and superstitions, and 5) the control programs designed to eradicate the species. These factors caused the decline in all the wolf populations within the United States, including those located in the northern Rocky Mountains. Land development, habitat loss, poisoning, trapping, and hunting are the primary factors related to the decline of the gray wolf populations located in the northern Rocky Mountains (USFWS 1987).

The expansion of human settlements has ultimately eliminated the wolf from all but remote areas within the contiguous 48 states, and within these areas, wolf sightings are predominantly composed of lone or transient individuals. A few locations, primarily National Parks and Forests, could currently support a viable wolf population. Although maintenance and improvement of suitable habitat may be the key long-term factors in wolf conservation, an important element limiting wolf recovery in the northern Rocky Mountains is human-induced mortality (USFWS 1987). Because depredation by wolves on livestock has been the fundamental reason for the virtual extermination of wolves in the western United States, wolf recovery in certain areas will depend, in part, upon enlightened management which recognizes and addresses the ecological, ethical, and economic aspects of the relationship and overall public information and education.

B3.4.5 Presence in the Study Area

As stated in Section B3.4.2 of this biological assessment, the Northern Rocky Mountain wolf had historically inhabited eastern Washington (Herman and Willard 1978) but had been considered extirpated in this area since 1950 (Layser 1970; Nielsen 1978). However, both confirmed and unconfirmed gray wolf sightings have been reported in the project area within the last few decades, with evidence of wolf activity in the Colville National Forest and surrounding habitats in Pend Oreille and Stevens Counties (Bertram 1992; WDW 1988; Nielsen 1978; Layser 1970). Between 1973 and 1988, 24 sightings of wolves were reported within northeastern Washington, most were accounts of lone animals (Forest Service 1988). These individuals are believed to be transient, since no pack activity has been observed (McAllister 1990; Hickman 1989; Zender 1989; WDW 1987). One confirmed sighting of a pair of gray wolves was reported within 2 miles of the Proposed Route on November 1, 1990 near Ione (Bertram 1992) (see Map 2-2, Sheet 1); the other sightings recorded within 2 miles of the proposed Interconnection have been unconfirmed individuals (see Map 2-2).

B3.4.6 Impact Evaluation

Although the gray wolf presence has been increasing within the project area during the last decade, the wolf sightings reported within 2 miles of the project ROW by the WDW are currently listed as observations that have not been associated with a pack unit (see Map 2-2 located at the back of this FEIS). No construction-related impacts would be anticipated to the gray wolf from the proposed Interconnection because of the infrequent occurrences of individuals within the project area, and because no pack activity or natal denning areas are currently known to occur in the project vicinity.

The possibility for impacts during project operation would be associated with increased access into remote regions, resulting in a potential for harassment to area wolves. At this time, no significant impacts to wolves would be expected during project construction due to: 1) the lack of pack activity within eastern Washington; 2) the individual nature of wolves that may inhabit the region; and 3) the protection procedures and mitigation measures listed in Sections 2.3 and 4.9, respectively, that were developed to minimize the use of access roads following project construction. In the event additional data become available concerning the project area, WWP has committed to coordinate with the appropriate federal, state, and tribal agencies regarding the identification of sensitive locations prior to construction. Therefore, it is believed that the proposed Interconnection would not likely adversely affect the gray wolf within the project area.

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B3.5 Summary

B3.5.1 Bald Eagle

Wintering bald eagles occur along the Pend Oreille, Little Spokane, Spokane, Colville, and Columbia Rivers, usually from mid-November to early May. Two likely roosting areas have been identified for the Eastern Alternative and Chattaroy Variation. To prevent potential impacts to wintering eagles, communal roosting areas crossed by the proposed line will be identified by the USFWS, WDW, and Forest Service prior to construction. Construction activities would be suspended in these areas from November 1 to May 1, or for a period specified by the agencies (see Section 4.9 of this FEIS).

Three active bald eagle nest sites are located near Sand Creek and Jared along the Pend Oreille River. These nest locations occur greater than 0.5 mile from the proposed Interconnection; therefore, no impacts are anticipated for these active sites. In addition, clearance surveys for additional bald eagle nests that are active within 0.5 mile of the line or access road will be conducted prior to project construction. In the event active sites occur within the 0.5 mile, the USFWS, WDW, and Forest Service will be contacted to determine measures to minimize any significant disturbance from the proposed WWP Interconnection (see Section 4.9 of this FEIS).

To minimize the potential for eagle collisions over river crossings, WWP will either install aerial markers on the line's shield wires or remove the shield wires along these individual spans upon discussion with the appropriate state and federal agencies, if necessary (see Section 4.9 of this FEIS). Electrocution of bald eagles would not be considered a problem with a transmission line of this size. in summary, the proposed Interconnection would not likely adversely affect the bald eagle.

B3.5.2 Grizzly Bear

One of the six remaining areas within the contiguous United States of viable grizzly bear habitat occurs in the Selkirk Mountains east of the Pend Oreille River. Both confirmed and unconfirmed grizzly sightings have been reported by the WDW west of the river within the project area. The primary concentration of bears is located in the vicinity of Boundary Dam. Construction of the proposed Interconnection is not likely to impact area grizzlies. To prevent potential impact from increased accessibility from the line and its access roads during project operation, WWP will consult with the USFWS, WDW, and Forest Service to further implement the environmental protection procedures (such as gating or blocking of access roads and planting preferred vegetation species during ROW reclamation) to minimize project effects to area grizzlies (see Section 2.3.5 of this FEIS). In summary, the WWP Interconnection would not likely adversely affect the grizzly bear.

B3.5.3 Woodland Caribou

Within the State of Washington, the Selkirk Mountain caribou are located predominantly east of the Pend Oreille River. However, unconfirmed sightings of lone individuals have been reported within the project area west of the river on rare occasions. The caribou's critical habitat areas do not intersect with the proposed Interconnection, nor does any herd activity occur west of the Pend Oreille River. Potential construction impacts to this population of woodland caribou are not anticipated from the proposed project, due to the limited occurrence of these individuals in the project area. Environmental protection procedures would be implemented, such as access road reclamation and gating or blocking of other roads to discourage public use that may result in increased harassment to individual caribou during line operation (see Sections 2.3.4 and 2.3.5 of this FEIS). In summary, the proposed Interconnection would not likely adversely affect the woodland caribou.

B3.5.4 Gray Wolf

The Northern Rocky Mountain wolf had historically inhabited eastern Washington, but had been considered eliminated from this area since 1950. Both confirmed and unconfirmed gray wolf sightings have recently been reported within the project area, with one confirmed sighting of a pair of wolves occurring within 2 miles of the Proposed Route. No pack activity or natal denning areas have been recorded for the project area. Impacts to area wolves would not be anticipated because of the infrequent occurrence of this species in the project area and because of the protection procedures that were developed to minimize public access on new roads necessary for project construction (see Sections 2.3.4 and 2.3.5 of this FEIS), thereby preventing increased

harassment to wolf individuals. In summary, the proposed Interconnection would not likely adversely affect the gray wolf.

APPENDIX B

ATTACHMENT 1

AGENCY CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
3704 Griffin Lane SE, Suite 102
Olympia, Washington 98501
203/753-9440 FTS 434-9440

May 9, 1991

Ms. Lori Nielsen
District Environmental Coordinator
ENSR Consulting and Engineering
1716 Health Parkway
Fort Collins, Colorado 80524

FWS Reference
1-3-91-SP-294

Dear Ms. Nielsen:

As requested by your letter, dated April 9, 1991 and received in this office on April 11, we are enclosing a list of endangered and threatened species that may be present in the area of the proposed British Columbia hydroelectric transmission line interconnection in Lincoln, Stevens Pend Oreille, and Spokane counties, Washington. This list supersedes prior species lists (1-3-87-SP335, 1-3-88-SP3, and 1-3-89-SP197) and fulfills the requirements of the Fish and Wildlife Service under Section 7(c) of the Endangered Species Act of 1973, as amended. We are also enclosing a copy of the requirements for Department of Energy compliance under the Act.

Should the biological assessment determine that a listed species is likely to be affected (adversely or beneficially) by the project, the Federal Highway Administration should request formal Section 7 consultation through this office. Even if the biological assessment shows a "no effect" situation, we would appreciate receiving a copy for our information.

Also included is a revised list of candidate species presently under review by the Service for consideration as endangered or threatened. Candidate species are included simply as advance notice of species that may be proposed and listed in the future. However, protection provided to candidate species may preclude possible listing in the future. If early evaluation of your project indicates that it is likely to adversely impact a candidate species, you may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. Should you have any additional question regarding your responsibilities under the Act, please contact Jeff Haas or Richard Carlson of my staff at the letterhead phone/ address.

Sincerely,

David C. Frederick
Field Supervisor

rc/kr

Enclosures

c: WDW, Olympia (Nongame)
WNHP, Olympia
FWS, Boise (Parenti)

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR WITHIN THE AREA OF THE PROPOSED BRITISH COLUMBIA HYDRO TRANSMISSION LINE INTERCONNECTION IN LINCOLN, STEVENS, PEND OREILLE, AND SPOKANE COUNTIES, WASHINGTON
1-3-91-SP-294

LISTED

Woodland caribou (*Rangifer tarandus caribou*) - may be present east of the Pend Oreille River.

Grizzly bear (*Ursus arctos = u.a. horribilus*) - may be present east of the Pend Oreille River.

Bald eagle (*Haliaeetus leucocephalus*) - wintering bald eagles may occur in the vicinity of the project from about October 31 through March 31. Our most recent information shows wintering eagles in XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX).

Bald eagle nesting territories also occur in the areas of your proposed project in Pend Oreille County at XXXXXXXXXXXXXXXXXXXXXXXXXX.

Major concerns that should be addressed in your biological assessment of project impacts to bald eagles are:

1. Level of use of the project area by bald eagles.

2. Effect of the project on the eagles primary food stocks and foraging areas in all areas influenced by the project.

3. Impacts from highway construction (i.e., habitat loss, increased noise levels, increased human activity) which may result in disturbance to bald eagles and/or their avoidance of the project area.

PROPOSED

None

CANDIDATE - Plants

Haplopappus liatriformis (no common name) - XXXXXXX

Howellia aquatilis (Howellia) - XXXXXXXXXXX

Silene spaldingii (no common name) - XXXXXXXXX

CANDIDATE - Wildlife

Wolverine (*Gulo gulo*) - may occur within the vicinity of your project. Our most recent data shows sightings at XXXXXXXXXXXXXXXXXXXXXXXXXXXXX.

Kinkaid meadow vole (*Microtus pennsylvanicus kinkaidi*) - may occur within the vicinity of the project ar XXXXXXXXXXXXXXXXXXXXXXXXXXXX.

ATTACHMENT B

FEDERAL AGENCIES [illegible]
OF THE ENDANGERED SPECIES ACT

SECTION 7(A) - Consultation/Conference

Requires: 1. Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2. Consultation with FWS when a federal action may affect a listed endangered or threatened species to ensure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after it has determined if its action may affect (adversely or beneficially) a listed species; and

3. Conference with FWS when a federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or an adverse modification of proposed critical habitat.

SECTION 7(c) - Biological Assessment for Construction Projects *

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify any proposed and/or listed species which is/are likely to be affected by a construction project. The process is initiated by a federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, please verify the accuracy of the list with our Service. No irreversible commitment of resources is to be made during the BA process which would result in violation of the requirements under Section 7(a) of the Act. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct an onsite inspection of the area to be affected by the proposal, which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within the FWS, National Marine Fisheries Service, state conservation department, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures; and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. Upon completion the report should be forwarded to our Endangered Species Division, 2625 Parkmont Lane SW, Bldg. B, Olympia, WA 98502.

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* "Construction project" means any major federal action which significantly affects the quality of the human environment (requiring an EIS), designed primarily to result in the building or erection of human-made structures such as dams, buildings, roads, pipelines, channels, and the like. This includes federal actions such as permits, grants, licenses, or other forms of federal authorization or approval which may result in construction.

APPENDIX C

EIS DISTRIBUTION LIST

EIS DISTRIBUTION LIST

Curtis Eschels
Chairman
Energy Facility Site Evaluation Council
Mail Stop: PY-11
Olympia, WA 98504

Sierra Club
Northwest Office
1516 Melrose Avenue
Seattle, WA 98122

Mid-Columbia Archaeological Society
P.O. Box 901
Richland, WA 99352

K.C. Golden
Executive Director
Northwest Conservation Act Coalition
Suite 15
6532 Phinney Ave., North
Seattle, WA 98103

John Osborn, MD
Council Coordinator
Inland Empire Public Lands Council
P.O. Box 2174
Spokane, WA 99210

Dinah Bear
Acting General Counsel
Council on Environmental Quality
722 Jackson Place, NW
Washington, DC 20006

Bruce Blanchard
Director
Environmental Project Review
Department of Interior (Room 4258)
18th and C Streets, NW
Washington, DC 20240

Richard Brown
Department of HUD (Room 5136)
451 7th Street, SW
Washington, DC 20410

Richard Brozen
Budget Examiner
Office of Management and Budget
NEOB #8222
726 Jackson Plane, NW
Washington, DC 20503

John Carley
General Counsel
Federal Trade Commission
RM 568
6th Street and Pennsylvania Avenue, NW
Washington, DC 20580

Robert Copeland
U.S. Department of Labor
RM S-2121
200 Constitution Avenue, NW
Washington, DC 20210

Anne Cyr
NEPA Liaison
Occupational Safety and Health Administration
RM 3657
200 Constitution Avenue, NW
Washington, DC 20210

William Dircks
Executive Director of Operations
Nuclear Regulatory Commission
Washington, DC 20555

Quentin Edson
Director
Environmental Analysis
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, DC 20460

Dr. Donald D. Emig
Director
Environmental Policy
DASD (MRA&L)I
The Pentagon
Washington, DC 20310

Don L. Klima
Chief
Eastern Division of Project Review
Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW
Washington, DC 20004

Irene Friedrichs
Environmental and Health Affairs
Department of State (Room 7820)
2201 C Street, NW
Washington, DC 20520

Orin Hanson
Department Director Agric. Stab., & Conservation
Department of Agriculture
14th and Independence Avenue, SW, #360
Washington, DC 20013

Richard Sanderson
Director
Office of Federal Activities
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Raphael Kaspar
National Academy of Science
RM JH804
2101 Constitution Avenue, NW
Washington, DC 20418

David Ketcham
Forest Service
Department of Agriculture (Room 3208)
14th & Independence Avenue, South Building
Washington, DC 20013

Leon Larson
Director
Environmental Policy
Federal Highway Administration
400 7th Street, SW, HEV-1
Washington, DC 20590

Corporal John Lawton
Deputy Assistant Director
OJARS
Department of Justice (Room 1109)
633 Indiana Avenue, NW
Washington, DC 20531

Margaret Love
Office of Legal Council
Department of Justice (Room 5238)
10th Street & Constitution Avenue, NW
Washington, DC 20530

LTC Thomas Magness, III
U.S. Army Corps of Engineers, HGDA
20 Massachusetts, NW
Washington, DC 20314

John Matheson
Environmental Impact Staff
Food & Drug Administration
5600 Fishers Lane, HFV-310
Rockville, MD 20857

Joseph Napolitano
Appalachian Regional Commission
1666 Connecticut Avenue, NW
Washington, DC 20235

Thomas Novak
Assistant Director, Licensing
Office of Nuclear Reactor Reg.
Nuclear Regulatory Commission
Washington, DC 20555

Paul Regan
Director, Regs. Office
Food, Safety, and Insurance
Department of Agriculture-So. Bldg.
Room 2940
Washington, DC 20250

John Scheibel, Esq.
Assistant General Counsel
Federal Emergency Management Agency
500 C. Street, SW #840
Washington, DC 20472

Matthew Scocozza
Assistant Secretary
Policy and International Affairs
Department of Transportation, P-30
400 7th Street, SW
Washington, DC 20590

Patricia Silvey
Director
Mine Safety & Health Administration
4015 Wilson Blvd, #625
Arlington, VA 22203

John E. Esler
Director
Environment & Energy Office
Federal Aviation Administration
AEE-1
800 Independence Avenue, SW, RM 432C
Washington, DC 20591

Joyce Wood
Director
Office of Ecology and Conservation
NOAA, U.S. Department of Commerce
14th & Constitution Ave., NW
Washington, DC 20230

Joseph Zoller
Assistant Administrator, REA
Department of Agriculture
14th and Independence, SW, #4056
Washington, DC 20250

Ms. Marylin W. Klein
Federal Railroad Administration
Department of Transportation
Room 5100
400 7th Street, SW
Washington, DC 20590

Ms. Adair F. Montgomery
National Science Foundation
Astron., Atmos., Earth and Ocean Sciences
Room 641
1800 G Street, NW
Washington, DC 20550

Robie Russell
Regional Director
Environmental Protection Agency
1200 - 6th
Seattle, WA

Charles A. Dunn
Field Supervisor
U.S. Fish and Wildlife Service
2625 Parkmont Lane SW, Bldg. B
Olympia, WA 98502

Rolf Wallenftrom
Regional Director
U.S. Department of the Interior
U.S. Fish and Wildlife Service
500 NE Multnomah
Portland, OR 97232

Roy Zingmark
Colville National Forest
U.S. Forest Service
695 South Main
Colville, WA 9114

Joseph K. Buesing
District Manager
Bureau of Land Management
E. 4217 Main
Spokane, WA 99202

Jim Gleaton
Soil Conservation Service
185 E. Hawthorne
Colville, WA 99114

Dean White
Area Conservationist
Soil Conservation Service
W. 920 Riverside
Spokane, WA 99201

Stanley Speaks
Area Director
Bureau of Indian Affairs
The Federal Bldg.
1002 NE Holiday Street
Portland, OR 97232-4182

U.S. Army Corps of Engineers Regulatory Branch
NPSOP-RF
Federal Center South
4735 E. Marginal Way South
Seattle, WA 98134-2385

Lynn P. Childers
Acting Field Supervisor
U.S. Department of the Interior
U.S. Fish and Wildlife Service
2625 Parkmont Lane SW, Bldg 8
Olympia WA 98502

T. Sary
Director
U.S. Department of the Interior
Bureau of Mines
2401 E. Street, NW
Washington, DC 20241

Mr. Stanley Speaks
Portland Area Director
U.S. Department of the Interior
Bureau of Indian Affairs
P.O. Box 3785
1425 Irving Street, NE
Portland, OR 97232

Mr. Jim LeBrett
U.S. Department of the Interior
Bureau of Indian Affairs
P.O. Box 3785
1425 Irving Street, NE
Portland, OR 97232

Al Skoglund
Sulivan Lane Ranger District
U.S. Forest Service
Metaline Falls, WA 99153

William S. Vinikour
Environmental Assessment and Information Sciences Division
Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439

The Honorable Booth Gardner
Governor of Washington
Legislative Building
Olympia, WA 98504-0413

The Honorable John D. Dingell
Chairman, Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

The Honorable Norman F. Lent
Ranking Minority Member
Committee on Energy and Commerce
U.S. House of Representatives
Wasington, DC 20515

The Honorable Philip R. Sharp
Chairman, Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

The Honorable Carlos J. Moorhead
Ranking Minority Member
Subcommittee on Energy and Power
Committee of Energy and Commerce
U.S. House of Representatives
WAshington, DC 20515

The Honorable George Miller
Chairman, Committee on Interior and Insular Affairs
U.S. House of Representatives
Washington, DC 20515

The Honorable James V. Hansen
Ranking Minority Member
Subcommittee on Water, Power and Offshore Energy Resources
Committee on Interior and Insular Affairs
U.S. House of Representatives
Washington, DC 20515

The Honorable Rod Chandler
U.S. House of Representatives
Washington, DC 20515

The Honorable Norman D. Dicks
U.S. House of Representatives
Washington, DC 20515

The Honorable Thomas S. Foley
U.S. House of Representatives
Washington, DC 20515

The Honorable Jim McDermott
U.S. House of Representatives
Washington, DC 20515

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U.S. House of Representatives
Washington, DC 20515

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U.S. House of Representatives
Washington, DC 20515

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Washington, DC 20515

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U.S. House of Representatives
Washington, DC 20515

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Ranking Minority Member
Committee on Interior and Insular Affairs
U.S. House of Representatives
Washington, Dc 20515

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Chairman, Subocmmittee on Energy
and the Environment
Committee on Interior and Insular Affairs
U.S. House of Representatives
Washington, DC 20515

The Honorable John J. Rhodes
Ranking Minority Member
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
U.S. House of Representatives
Washington, DC 20515

The Honorable George Miller
Chairman, Subocmmittee on Water,
Power and Offshore Energy Resources
Committee on Interior and Insular Affairs
U.S. House of Representatives
Washington, DC 20515

The Honorable Jamie L. Whitten
Chairman, Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

The Honorable Joseph M. McDade
Ranking Minority Member
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

The Honorable Sidney R. Yates
Chairman, Subcommittee on Interior
and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

The Honorable Ralph Regula
Ranking Minority Member
Subcommittee on Interior and
Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Mr. Ferdinand Velez
HCR 11 Box 148-B
Colville, WA 99114

Mr. Robert Jackman
Box 588
Northport, WA 99157

Brian Silverstein
Office of General Counsel
Bonneville Power Administration
P.O. Box 3621 / APP
Portland, OR 97208

Mr. and Mrs. Wilburn L. Combs
Rt. 3 Box 205
Northport, WA 99157

Mr. and Mrs. Kytonen
Aladdin Route Box 151
Colville, WA 99114

William A. Szuch
Spokesperson
N.O.P.E.
P.O. Box 662
Northport, WA 99157

Stan Bogosian
20630 Lomita Ave.
Saratoga, CA 95070

Eric Berg
Senior Partner/Spokesperson
Berg, Greer, and Associates
H.C. 3, Box 202
Northport, WA 99157

Sarah McNary
Office of General Counsel
Bonneville Power Administration
P.O. Box 3621 / EOB
Portland, OR 97208

Chewelah Public Library
Box 87
Chewelah, WA 99109

Colville Public Library
195 S. Oak
Colville, WA 99114

Kettle Falls Public Library
605 Meyers St.
Kettle Falls, WA 99141

Pend Oreille County Library District
P.O. Box 1708
116 S. Washington Avenue
Newport, WA 99156

Calispell Valley Library
1st
Cusick, WA 99156

Pend Oreille County Library
112 Central
Ione, WA 99156

Metalines Community Library
201 E. 5th Avenue
Metaline Falls, WA 99156

Spokane County Library District
N. 2901 Argonne Rd.
Spokane, WA 99212-2101

Spokane Public Library
Comstock Bldg.
906 Main Ave.
Spokane, WA 99201-0976

Ms. Sharon L. Bancroft
Pend Oreille County Noxious Weed
Control Board
P.O. Box 5000
Newport, WA 99156-5085

Mr. R. Scott Nielsen
Spokane County Noxious Weed
Control Board
N. 222 Havana Ave.
Spokane, WA 99212

Mr. Phill Hobbs
Chairman
Pend Oreille County Planning Commission
P.O. Box 5000
Newport, WA 99156

Kathryn L. Hoverter
Stevens County Office of Planning
Box 191
Courthouse
Colville, WA 99114

Board of Commissioners
Stevens County
Courthouse
Colville, WA 99114

Wallace Hubbard
Spokane County Planning Department
N. 721 Jefferson
Spokane, WA 99260

Board of Commissioners
Spokane County
W. 1116 Broadway
Spokane, WA 99260

Paul Wilson
Pend Oreille County Planning
Department
Box 5000
Newport, WA 99156

Board of Commissioners
Pend Oreille County
Box 5000
Newport, WA 99156

Terry Goodman
Lincoln County Planning Department
Box 297
Davenport, WA 99122

Board of Commissioners
Lincoln County
450 Logan
Davenport, WA 99122

Glen Nenema
Tribal Chairman
Kalispell Tribe of Indians
Box 38
Usk, WA 99180

Joe V. Flett
Tribal Chairman
Spokane Tribe of Indians
P.O Box 100
Wellpinit, WA 99040

Wendell George
Tribal Chairman
Colville Confederated Tribes
P.O. Box 150
Newpelem, WA 99155

George P. Terrill
Weed Board Commissioner District #1
Stevens County Weed Board
Post Office Building, Box 32
Colville, WA 99114

Mr. Tom Mosher
Spokane County Planning Dept.
W. 721 Jefferson St.
Spokane, WA 99206

Mr. Paul Wilson
Pend Oreille County Planning Dept.
P.O. Box 5000
Newport, WA 99156

Scott Veggeberg
News Data Corp.
Box 9157
Queen Ann Station
Seattle, WA 98107

Kevin Hanson
Editor
Cheney Free Press
P.O. Box 218
Cheney, WA 99214

Liz Reilly
Editor
Chewelah Independent
P.O. Box 5
Chewelah, WA 99109

James Hubbart
Editor
Newport Miner
P.O. Box 349
Newport, WA 99156

Bert Caldwell
Energy Reporter
Spokesman-Review/Chronicle
W. 999 Riverside Ave.
Spokane, WA 99201

Mike Vlahovich
Editor
Spokane Valley Herald
P.O. Box 14027
Spokane, WA 99214

Don Birch
Editor
Statesman-Examiner
P.O. Box 271
Colville, WA 99214

Hosey Horton
Editor
Tri-County Tribune
P.O. Box 400
Deer Park, WA 99006

Norm Thorpe
Editor
Journal of Business
S. 104 Division
Spokane, WA 99202

Glen Warhol
Bureau Chief
United press International
P.O. Box 1475
EWU Building #315
Spokane, WA 99201

Susan Guffey
Bureau Chief
Associated Press
W. 999 Riverside
Spokane, WA 99201

Dave Wilbur
Publisher
Davenport Times
P.O. Box 66
835 Morgan
Davenport, WA 98122

Dean Mell
News Director
KHQ-TV
S. 4202 Regal
Spokane, WA 99223

Steve Johnson
News Director
KXLY-TV
W. 500 Boone Ave.
Spokane, WA 99201

Phil Wenstrand
News Director
KREM-TV
S. 4130 Regal
Spokane, WA 99223

Doug Raper
News Director
KXLY Radio
W. 500 Boone Avenue
Spokane, WA 99223

Dave Sposito
News Director
KZZU Radio
S. 5501 Regal
Spokane, WA 99223

Ross Woodward
News Director
KGA Radio
S. 6228 Regal
Spokane, WA 99223

Scott Carlon
News Director
KJRB Radio
P.O. Box 8007
Spokane, WA 99203

Tim Burrows
News Director
KAQQ Radio
E. 300 - 3rd
Spokane, WA 99202

D. Birdsell
News Director
KCVL Radio
P.O. Box 111
Mantz and Rickey Rd.
Colville, WA 99114

Shannon Vinson
Manager
The Tribune
P.O. Box 400
S. 22 Vernon
Deer Park, WA 99006

Norma Jean Griswold
P.O. Box 599
Colville, WA 99114

Jean Green
Rt. 3, Box 188
Northport, WA 99157

Mr. and Mrs. W. C. McNinch
Box 146 HCR 11
Colville, WA 99114

Mr. and Mrs. John E. Christensen
Aspen Valley Christian Ministries
P.O. Box 599
Colville, WA 99114

Oliver R. Nixon
HC11 Box 148A
colville, WA 99114

Debra S. Johnson
P.O. Box 546
Northport, WA 99157-0546

Debra S. Johnson
P.O. Box 546
Northport, WA 99157-0546

Diane Hall
P.O. Box 621
Northport, WA 99157

Mr. and Mrs. Szuch
HC11 Box 151
Colville, WA 99114

Bert Fischer
P.O. Box 550
Northport, WA 99157

Helen Dee Hokom, Esq.
300 E. Birch
Colville, WA 99114

Robert A. Simeone, Esq.
300 E. Birch
Colville, WA 99114

Mr. and Mrs. John Steinkraus
Route 2, Box 394-E
Colville, WA 99114

Les Waldron
430 Dennis Place
Kennewich, WA 99336

Helen N. Rishel
W 4211 Osage Way
Spokane, WA 99208

David R. Sturges
Delaney and Balcomb, P.C.
Drawer 790
Glenwood Springs, CO 81602

Dave A. Stirling
Environmental Historian
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102-3699

Ms. Linda Sundheim
Rt. 2 #313A
Colville, WA 99114

Mr. George Compton
Rt. 4 Box 611
Spokane, WA 99204

Ms. Debbie Stucky
8812 W. Rutter Parkway
Spokane, WA 99208

Mr. David L. Chapman
Box 309
Northport, WA 99157

Mrs. Ruth Smith
Rt. #1, Box 377
Deer Park, WA 99006-9607

Mr. Joe Bradley
Rt. 2 Box 312-C
Colville, WA 99114

Mr. Bill Szuch
304 W. 5th
Cheney, WA 99004

Mr. Daniel Gruener
Lower Deep Creek
Northport, WA 99157

Mr. Ferdinand Velez
N.O.P.E.
P.O. Box 662
Northport, WA 99157

Mr. George Voile
Route 1, Box 100
Addy, WA 99101

Mr. Larry W. Liddle
Trustee: Sunland Owners League
13624 S.E. Fairwood Boulevard
Renton, WA 98058

Mr. Doug Elledge
route 1, Box 185
Valley, WA 99181

Mrs. Luch Greer Burton
P.O. Box 678
Chewelah, WA 99109

Mr. Roger Sammons
516 East 6th Avenue
Colville, WA 99114

Mr. Lioyd Henry
Aladdin Route, Box 64
Colville, WA

Mr. Lewis E. Lundy
Route 1, Box 680
Evans, WA 99126

Mr. Randy Cofer
422 E. Birch
Colville, WA 99114

Mr. Eric Berg and Ms. Sarah Milis
Berg, Greer & Assoc.
HC 3; Box 202
Northport, WA 99157

Mr. Frank Zilbert
Route 3, Box 675
Colville, WA 99114

Ms. B. J. (Sherie) Johnson
P.O. Box 523
Northport, WA 99157

Honorable Steve Fuhrman
Rt. 1, Box 320
Kettle Falls, WA 99141

Mr. Don Stephens
P.O. Drawer 1441
Spokane, WA 99210

Ms. Brenda Bodenstein
W. 4715 Richland Lane
Spokane, WA 99204

Mr. Norman Mikalson
President
Arden Tree Farms, Inc.
Box 391
Colvelle, WA 99114

Dr. Syliva Brock
Rt. 2, Box 334A
Chewelah, WA 99109

Ms. Paula Steinkraus
route 2, Box 394-E
Colville, WA 99114

Mr. Roger K. McMillan
545 S. Jefferson
Colville, WA 99114

Mrs. Jeanie Nixon
Box 208
Northport, WA 99157

Mr. W. E. Green
Rt. 1, Box 449
Evans, WA 99120

Mr. Douglas W. Falstud
Rt. 1, Box 134
Addy, WA 99101

Ms. Gayle Lott
HC11 Box 148
Colville, WA 99114

Ms. Susanne Griepp
Rt. 2, Box 335
Chewelah, WA 99109

Ms. Dee L. Terr7
Rt. 2, Box 213
Colville, WA 99114

Ms. Jean Wood
P.O. Box 451
Northport, WA 99157

Mrs. Opal M. Buchanan
Rt. #1, Box 125
1980 Marble Valley Road
Addy, WA 99101

Mr. William J. Nicholson
Manager, Corporate Energy Services
Potlatch Corp.
244 California Street, Suite 610
San Francisco, CA 94111

Mr. William A. Wilson
Rt. 1, Box 122
Valley, WA 99181

Mr. and Mrs. Stan Chambers
Rt. 1, Box 219
Valley, WA 99181

Mr. Grady Knight
Box 535
Kettle Falls, WA 99141

Mr. and Mrs. Jim Schramm
Rt. 2, Box 394G
Colville, WA 99114

Ms. Ellen Breiter
Rt. 1, Box 123
Valley, WA 99181

Mr. and Mrs. Marshall Elzig
10731 148 Ave.
Renton, WA 98056

Mr. and Mrs. Greg Black
Rt. 3, Box 722
Colville, WA 99114

Mr. and Mrs. John Bowers
Rt. 1, Box 218
Valley, WA 99181

Washington Energy Extension Service
Rm 627
West 808 Spokane Falls Blvd.
Spokane, WA 99201

Ms. Angela Jennings
Rt. 3, Box 681-B
Colville, WA 99114

Mr. Floyd Wilson
Rt. 3, Box 542A
Colville, WA 99114

Ms. Cathy Terrill
Rt. 2, Box 394H
Colville, WA 99114

Life Has Meaning
Rt. 2, Box 394C
Colville, WA 99114

Ms. Ruby Page
Rt. 2, Box 342
Colville, WA 99114

Quayle Bateman
Rt. 2, Box 222A
Colville, WA 99114

Ms. Jill Mathews
Rt. 3, Box 547
Colville, WA 99114

Ms. Shirley King
Rt. 2, Box 284
Colville, WA 9114

Ms. Sheryl Braswell
Rt. 3, Box 409A
Colville, WA 99114

August Martin
Rt. 1, Box 425C
Colville, WA 99114

Sean and Pat Daly
Box 35-B
Aladdin SR
Colville, WA 99114

Mr. Jim Kreis
Rt. 1, Box 409C
Colville, WA 99114

Mr. Robert D. Sisseck
Rt. 3, Box 30
Colville, WA 99114

Mr. Richard Walton
P.O. Box 562
Colville, WA 99114

R. A. Hancock
Rt. 1, Box 89
Rice, WA 99167

Mr. Simon Abrid
Rt. 1, Box 65
Rice, WA 99167

Mr. Earl Nicholas
Rt. 1, Box 83
Rice, WA 99167

Mr. Paul Wood
Rt. Box 10
Rice, Wa 99167

Shelley Ramey
Box 124
Inchelium, WA 99138

Mr. Larry Santoyo
Rt. 1, Box 122
Addy, WA 99101

Mr. Roger Peffer
P.O. Box 539
Northport, WA 99157

A. Soueaid
Rt. #, Box 60
Northport, Wa 99157

S. Milis
HC 3, Box 202
Northport, WA 99157

Mr. Bob Palm
Box 285
Northport, Wa 99157

Mr. Matt Wolohan
P.O. Box 621
Northport, Wa 99157

Mr. Robert Mitchell
Northrop, Devine and Tarbell
500 Washington Avenue
Portland, ME 04103

Mr. Fred Yost
Director, Research Services
Utility Data Institute, Inc.
1700 K Street, N.W., Suite 400
Washington, DC 20006

Ms. Jeanette R. Smith
13411 12th Ave. S.
Seattle, WA 98168

Mr. Harry E. Wilson
2120 N. Callow Ave.
Bremerton, WA 98312-2908

Mr. Gary Lauerman
c/o Zeck Butler Architects
W. 505 Riverside, Suite 400
Spokane, WA 99201

Douglas J. Marsh
Legal Assistant
Suite 4301
1001 Fourth Avenue Plaza
Seattle, WA 98145

Mr. Jack M Hall
N. 5711 Division
Spokane, WA 99207

Mr. Paul Selle
S. 1616 Lewis St.
Spokane, WA 99204

Mrs. F. Ame Meekin
R.R. 16-Box 145
North Five Mile
Spokane, WA 99208

Mr. Ken Baker
W. 5115 Hallett Rd.
Spokane, WA 99206

Mr. Earl G. Petit
W. 5008 Hallett Rd.
Spokane, WA 99204

Les Cook
Box 9067
W. 5005 Hallett
Spokane, WA 99209

Mr. Bruce V. Valls
E. 603 Joseph Ave.
Spokane, WA 99207

Randy Carstens
P.O. Box 1095
Newport, WA 99156

Ms. Bonnie McDonald
5452 Hwy. 211
Newport, WA 99156

Mr. Harley Young
Box 295
Ione, WA 99139

Michail Tachell
N. 26620 Hardesty Rd.
Chattaroy, WA 99003

Mr. James Bond
1411 Bond Road
Cusick, WA 99119

Mr. and Mrs. Donald Hiller
R. 2, E. 8724 Valley Rd.
Elk, WA 99009

Mr. Lawson S. Kaler II
2281 Donforth Rd.
Usk, WA 99180

Mr. David W. Fitzgerald
4752 N. Hwy. 25
Northport, WA 99157-9703

Mr. Kenneth E. Ginter
976D Philpott Rd.
Colville, WA 99114

B. Smith
Rt. 1, Box 15
Clayton, WA 99110

Mr. and Mrs. Bill Schlechter
W. 3811 Rutter Pkwy.
Spokane, WA 99208

David Lundgren
W. 15601 Lincoln Rd.
Spokane, WA 99204

Mr. Kenneth W. Phillips
Phillips Appraisal Services
Rt. 2, Box 145
Colville, WA 99114

Gig Labret
Box 942
Kettle Falls, WA 99141

Mr. Ernie H. Sackman
766 Towsend Sackman RD
Colville, WA 99114

Mr. Paul Schuerman
735 Mahoney Rd.
Colville, WA 99114

Jan Doppenberg
828 Towsend Rd.
Colville, WA 99114

Jean Blass
E8619 Bridges Road
Elk, WA 99009

Mr. Joseph O. Sherman
442 Bond Rd.
Cusick, WA 99119

Mr. John M. Ives
2261 Danforth Rd.
Usk, WA 99180

Arlin Beehlor
P.O. Box 1850
Newport, WA 99156

Mr. George F. Pratt
Rt. 1, Box 206
Elk, WA 99009

C.R. Conn
270D Williams Lake Road
Colville, WA 99114

Mr. Allan C. Six
Rt. 2, Box 400
Cusick, WA 99119

Mr. Tom Mackey
Box 614
Ione, WA 99139

Mr. Thomas A. Johnson
Vice President for Adminitrative Services
Whitworth College
W. 300 Hawthorne Rd.
Spokane, WA 99251

Mr. Herman J. Marciel
W. 4914 Richland Ln.
Spokane, WA 99204

Mick Edwards
Riverside State Park
N. 4427 Aubrey L. White Pkwy
Spokane, WA 99205

Mr. Don Peters
8405 W. Greenwood Rd.
Spokane, WA 99204

Cyril T. Wolff
S. 5507 Marshall Rd.
Spokane, WA 99204

Ms. Lois Schulte
E. 14812 Lincoln
Spokane, WA 99207

Jesse Van Troba
4806 S. Assembly Rd.
Spokane, WA 99204

Ms. Cheryl Stitt
S. 8105 Assembly Rd.
Spokane, WA 99204

Jack Sackville-West
South 1424 Maple
Spokane, WA 99203

Mr. Rick Stucky
6818 Rutter Parkway
Spokane, WA 99208

Mr. and Mrs. Clayton Steele
4122 N. Garfield Rd.
Spokane, WA 99204

Kopplin
W. 5204 Handy Rd.
Colbert, WA 99005

Mr. Roy L. Swenson
N. 10808 College Pl. Dr.
Spokane, WA 99218

Ms. Pam Lahde
5605 E. Greenbluff Rd.
Colbert, WA 99005

Mr. Jim Lahde
N. 17602 Hardesty Rd.
Colbert, WA 99005

Mr. Ed Anderson
S. 1109 Robinhood
Spokane, WA 99206

Mr. Tom Tilford
P.O. Box 3224
Spokane, WA 99220

Mr. Frank Williams
E. 1811 Empire, Apt. 1
Spokane, WA 99207

Mr. Donald G. Roe
N. 25310 Elk-Chattaroy Rd.
Chattaroy, WA 99003

Mr. Lloyd Lundgren
Rt. 4, Box 300
Spokane, WA 99204

Ms. Hazel Smith
10710 E. Empire
Spokane, WA 99206

Mr. John W. Flynn
E. 14022 8th St.
Veradale, WA 99307

Mr. Boyd G. Hill
P.O. Box 113
Reardan, WA 99029

Les Harris
Cheney School Dist. #360
520 4th Street
Cheney, WA 99004

Mr. Ed Willey
E. 4224 Rigina
Mead, WA 99021

Ms. Sandi Jarvis
S. 4607 Marshall Rd.
Spokane, WA 99204

Mr. Daniel Miller
W. 6104 Deno
Spokane, WA 99204

Mr. Norman Clause
8817 W. Greenwood Rd.
Spokane, WA 99204

Mr. Dwane Skjothaug
4807 W. 61st STreet
Spokane, WA 99204

Mr. Kenneth F. Wall
722 W. 16th
Spokane, WA 99203

Mr. Robert H. Jackson
E. 4223 Regina Rd.
Mead, WA 99021

John J. Demakas, M.D.
W. 3926 Center Lane
Spokane, WA 99208

Mr. Cecil W. Morrow
E. 214 Franklin Dr.
Nine Mile Falls, WA 99002

R. P. Stafford
W. 110 Falcon
Spokane, WA 99218

Ms. Brenda Hooe
S. 4606 Grove Rd.
Spokane, WA 99204

Mr. Gary L. Johnson
S. 2011 Sunrise Rd.
Spokane, WA 99206

Mr. Larry Hampson
Washington Native Plane Society
S. 1717 Buttercup
Spokane, WA 99212

Mr. Norman Rubens
Rt. 5, Box 319
Spokane, WA 99208

Mr. and Mrs. Robert Vogt
Box 337
Pomeroy, WA 99347

Mr. William Johns
Rt. 4, Box 416
Cheney, WA 99004

Mr. Jack C. Miller
4620 W. Hallett Rd.
Spokane, WA 99204

Harry Alexander
Rt. 1, Box 2
Reardan, WA 99029

Mr. Richard P. Kohn
E. 4317 Regina Rd.
Mead, WA 99021

Ms. Sandy Christensen
9807 E. Broadway
Spokane, WA 99206

Mr. Dan Charbonneau
E. 4911 Big meadows Rd.
Chattaroy, WA 99003

Mr. Steve Czako
S. 2515 Geiger Blvd.
Spokane, WA 99204

Mr. Sam Angove
Spokane County Parks
W. 1115 Broadway
Spokane, WA 99260

Rochelle Blake
S. 5206 Dorset
Spokane, WA 99204

Community Antenna System
S. 729 Bernard St.
Spokane, WA 99204

Ms. Lori Trayer
S. 601 Flint Rd.
Spokane, WA 99204

Mr. David R. Swenson
N. 11811 Morrill Dr.
Mead, WA 99021

Mr. and Mrs. Dave Henry
W. 4312 Rutter Pkwy
Spokane, WA 99208

Mr. William Meyer
S. 7227 Mayflower
Spokane, WA 99204

Mr. Don Olmstead
5316 N. Elton Dr.
Spokane, WA 99212

Marti Wrigley
N. 15111 Chronicle
Mead, WA 99021

Dale V. Mendenhall
Rt. 2, Box 465
Ione, WA 99139-9802

Mr. and Mrs. R. J. Myers
N. 3510 Rambo Rd.
Spokane, WA 99204

Mr. and Mrs. William Zenkert
P.O. Box 573
Ione, WA 99139

Mr. Brian Strand
Dames and Moore
Suite 100
102 S. 17th St.
Bosie, ID 83702

Mr. John Kirkman
1141 N. East Ave.
Oak Park, IL 60302

Mr. C. Frank
P.O. Box 296
Northport, WA 99157

Mr. Pat Hasenoehrl
P.O. Box 70
Boise, ID 83707

Diane Hall Matthew O. Wolohan &
Rainbow Honey Co.
P.O. Box 621
Northport, WA 99157-0621

Ms. Carol A. Roberts
Staff Secretary
Dames & moore
Suite 145
7500 North Dreamy Draw Drive
Phoenix, AZ 85020

Mr. Brian Hoefler
3814 N.E. 90th Street
Seattle, WA 98115

Ms. Kathy Inman
Route E, Box 11
Meade, WA 99021

Mr. Louis Musso III
Attorney at Law
320 South Washington Ave.
Newport, WA 99156

Mr. and Mrs. Ray L. Fry
Rt. 1, Box 181
Colfax, WA 99111

Mr. Samuel F. Sampson
P.O. Box 683
Omak, WA 98841

Dale A. Stirling
Environmental Historian
Heritage North
11502 Phinney Ave., N.
Seattle, WA 98133

Mr. David A. Bise
4715 W. 61st St.
Spokane, WA 99204

Mr. Tom Sweeney
Rt. 2, Box 21J
Chattaroy, WA 99003

Ms. Jeanette Flowers
Seattle City Light
1015 3rd Ave.
Seattle, WA 98104-1198

Mr. Andy Linehan
c/o CH2M Hill
2020 Southwest Forth
Portland, OR 97201

Ms. Donna L. Hohenschuh
P.O. Box 776
Moss Beach, CA 94038

M. H. and JoAnn Goldberg
P.o. Box 1800
Newport, WA 99156

Mr. Donald J. Cagle
W. 307 Elcliff
Spokane, WA 99218

Mr. Irvin Poirier
Box 207
Metaline, WA 99152

Ryder Chronic
Washington State Department of
Natural Resources
P.O. Box 190
Colville, WA 99114

Ted Gruenwald
Washington State Department of Wildlife
N. 8702 Division
Spokane, WA 99218

John Arnquist
Regional Manager
Washington State Department of Ecology
N. 4601 Monroe St., Suite 100
Spokane, WA 99205-1295

Jacob E. Thomas
State Historic Preservation Officer
Washington State Office of Archaeology and Historic Preservation
111 West 21st
Olympia, WA 98504-5411

David W. Heiser
Chief Environmental Coordinator
Washington State Parks and Recreation Commission
7150 Cleanwater
Olympia, WA 98504

Norval Johnson
Department of Agriculture
4430 John Luhn Road N.E.
Olympia, WA 98506

Bert Baron
Department of Community Development
Mail Stop: GH-51
Olympia, WA 98504

Steve Mitchell
Department of Ecology
Mail Stop: PV-11
Olympia, WA 98504

Ed McGuire
State Energy Office
Mail Stop: PA-11
Olympia, WA 98504

Bette Johnson
Department of Fisheries
Mail Stop: AX-11
Olympia, WA 98504

Nancy Burnett
Department of Natural Resources
Mail Stop: PY-11
Olympia, WA 98504

Mike Reed
Parks & Recreation Commission
Mail Stop: KY-11
Olympia, WA 98504

Bill Bakamis
Department of Trade & Economic Development
Mail Stop: AZ-13
Olympia, WA 98504

Duane Berentson
Director
Department of Transportation
Mail Stop: KF-01
Olympia, WA 98504

Jerry Neal
Acting Director
Department of Wildlife
Mail Stop: GJ-11
Olympia, WA 98504

C. Robert Wallis
Utilities & Transportation Commission
Mail Stop: FY-11
Olympia, WA 98504

Dr. C. Alan Pettibone
Director
Department of Agriculture
Mail Stop: AX-41
Olympia, WA 98504

Andrea Beatty Riniker
Director
Department of Ecology
Mail Stop: PV-11
Olympia, WA 98504

Robert G. Whitlam, Ph.D.
State Archaeologist
Department of Community Development
Office of Archaeology & Historic Preservation
111 West Twenty-First Avenue, KL-11
Olympia, WA 98504-5411

Mr. A. J. Pardini
Washington Utility & Transportation Commission
South 1300 Evergreen Park Drive, SW
Olympia, WA 98506

Mr. Robert Anderson
Chewelah Local Manager
Washington State Dept. of Natural Resources
P.O. box 190
Colville, WA 99114-0190

Mr. Don Strand
Kettle Falls Local Manager
Washington state Dept. of Natural Resources
P.O. Box 190
Colville, WA 99114-0190

Ms. Barbara J. Ritchie
Environmental Review Section
Department of Ecology
State of Washington
Mail Stop PV-11
Olympia, WA 98504-8711

Gary W. Herron
Park Manager
Washington State Parks and Recreation Commission
7150 Cleanwater Lane, KY-11
Olympia, WA 98504-5711

Tom McKern
Chairman
Stevens County Conservation District
185 East Hawthorne Street
Colville, WA 99114

Ms. Julie Meffugh
Washington State Parks & Recreation Commission
Rm 762, City Hall
Spokane, WA 99201

The Honorable Timothy E. Wirth
Chairman, Subcommitte on Energy Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Don Nickles
Ranking Minority Member
Subcommittee on Energy Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Bill Bradley
Chairman, Subcommittee on Water and Power
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Conrad Burns
Ranking Minority Member
Subcommittee on Water and Power
Committe on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Brock Adams
United States Senate
Washington, DC 20510

The Honorable Slade Gorton
United States Senate
Washington, DC 20510

The Honorable J. Bennett Johnston
Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Malcolm Wallop
Ranking Minority Member
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Robert C. Byrd
Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Mark O. Hatfield
Ranking Minority Member
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Robert C. Byrd
Chairman, Subcommitte on Interior and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Don Nickles
Ranking Minority Member
Subcommittee on Interior and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

David Damiano
Vice President
Washington Water Power Company
P.O. Box 3727
Spokane, WA 99220

Jerry K. Boyd, Esq.
Paine, Hamblen, Coffin, Brooke & Miller
1200 Washington Trust Financial Center
Spokane, WA 99204

Lee S. Sherline, Esq.
Leighton & Sherline
Suite 101
1010 Massachusetts Avenue, NW
Washington, DC 20010-5402

Paul G. Thompson
Ginsburg, Feldman and Bress
1250 Connecticut Avenue, NW
Washington, DC 20036

The Honorable Joseph E. King
Speaker of the House
Mail Stop AS-33
309 Legislative Bldg.
Olympia, WA 98504

The Honorable Ellen Craswell
President Pro Tem
Mail Stop AS-32
309 Legislative Bldg
Olympia, WA 98504

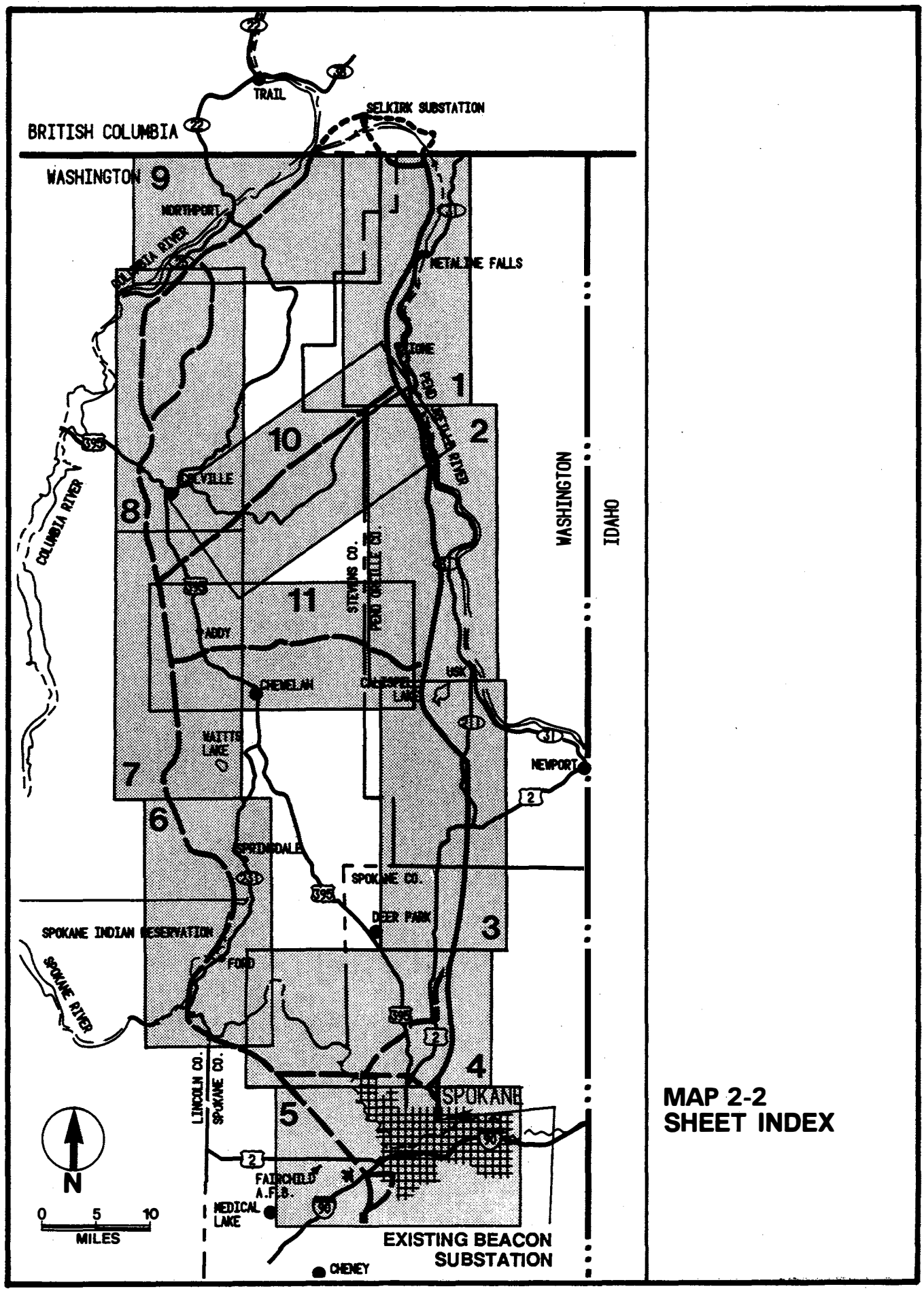
Russell D. Hulse
Vice President
Arizona Public Service Company
P.O. Box 53999
Station 1960
Phoenix, AZ 85072-3600

Vicki G. Sandler, Esq.
Law Department
Arizoan Public Service Company
Suite 2100
201 North Central Avenue
Phoenix, AZ 85037

Washington PUD Association
Suite 102
19518 Pacific Hwy South
Seattle, WA 98188

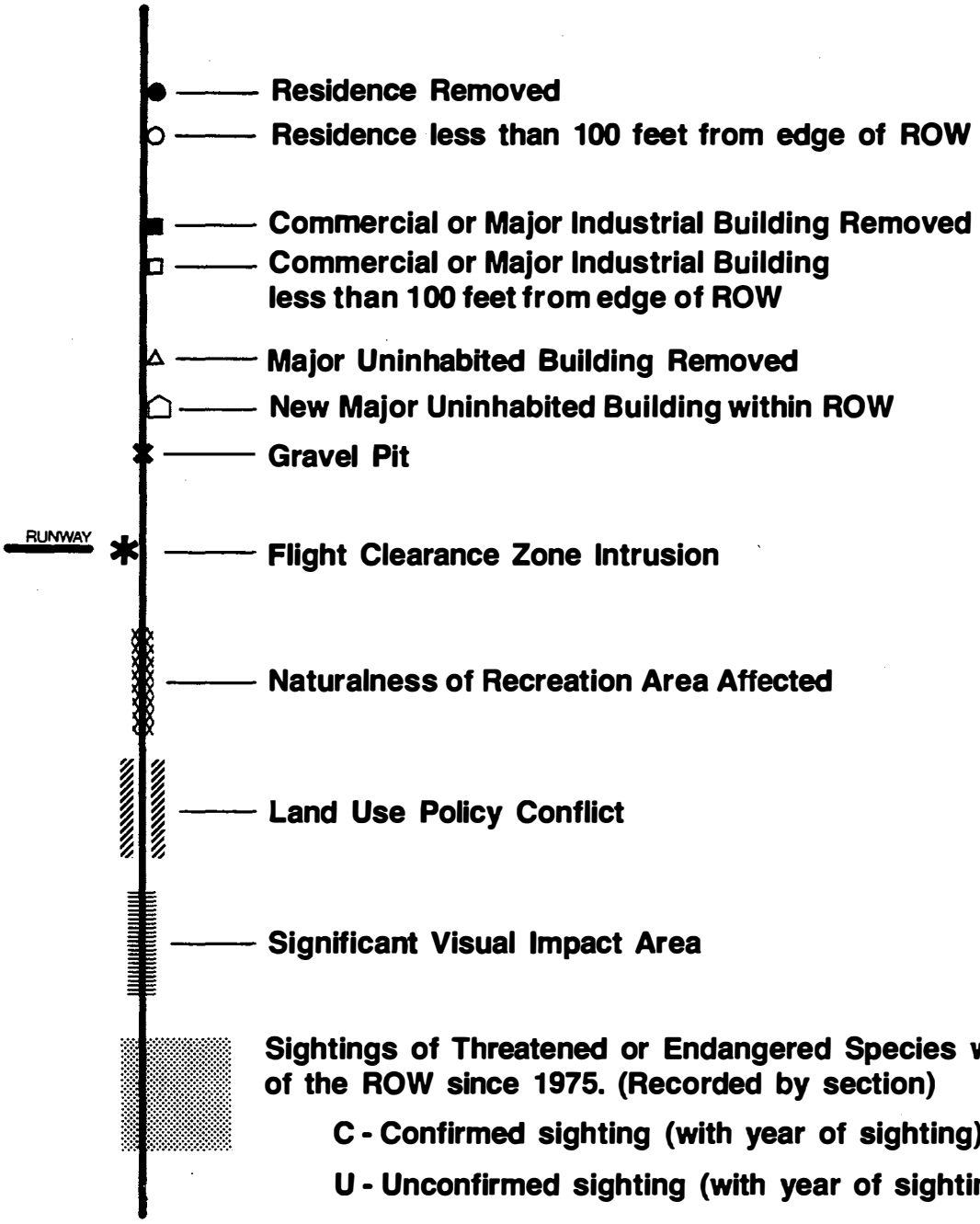
Ms. Susan Matchett
Power Supply and Planning
Seattle Power and Light
111 3rd Avenue Room 420
Seattle, WA 98104

MAP 2-2

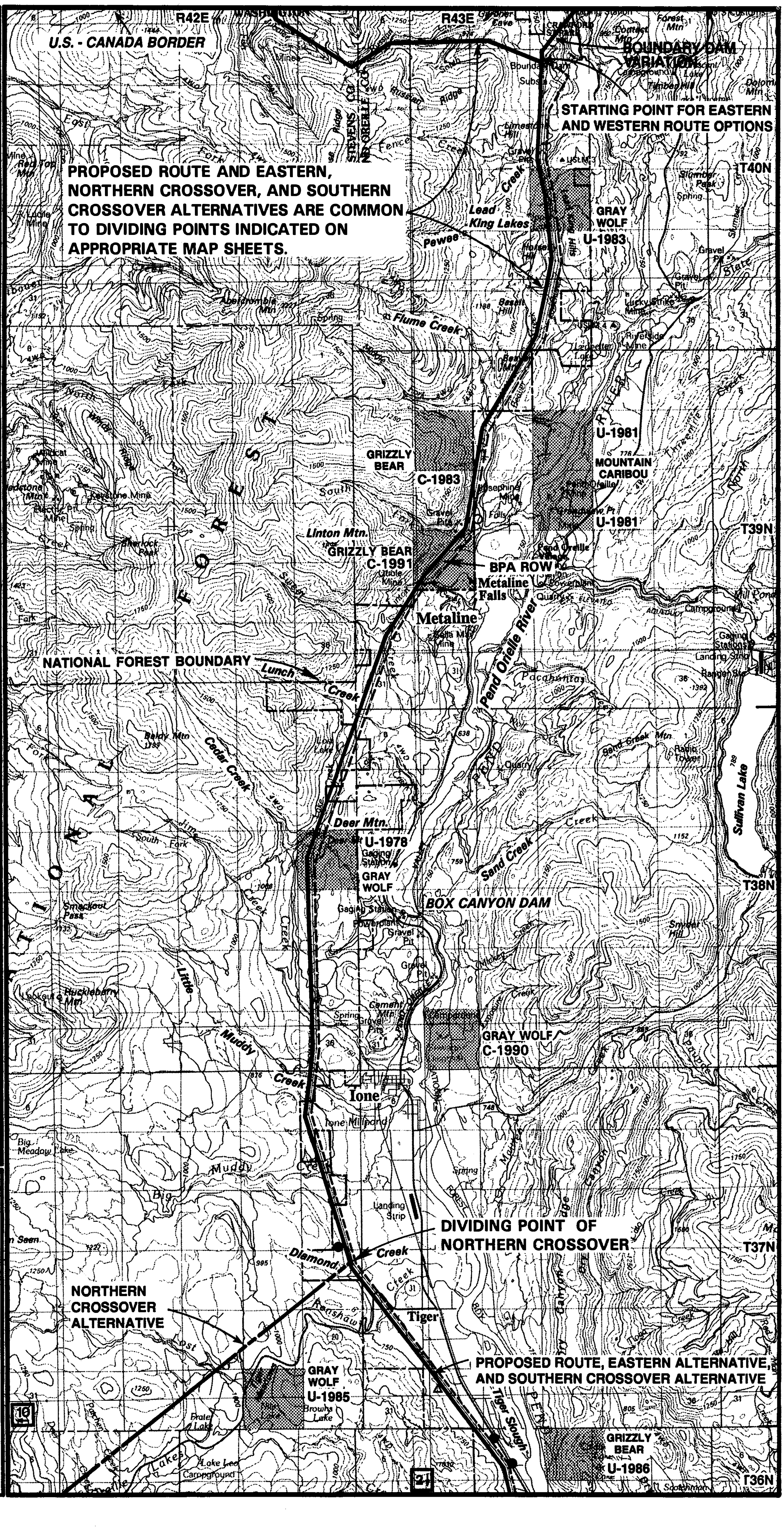


MAP 2-2
SHEET INDEX

Proposed Route and Alternatives
RESOURCE INFORMATION



MAP 2-2 LEGEND



LEGEND

PROPOSED ROUTE
WESTERN ALTERNATIVE
NORTHERN CROSSOVER
SOUTHERN CROSSOVER
EASTERN ALTERNATIVE
ROUTE OPTION
21 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

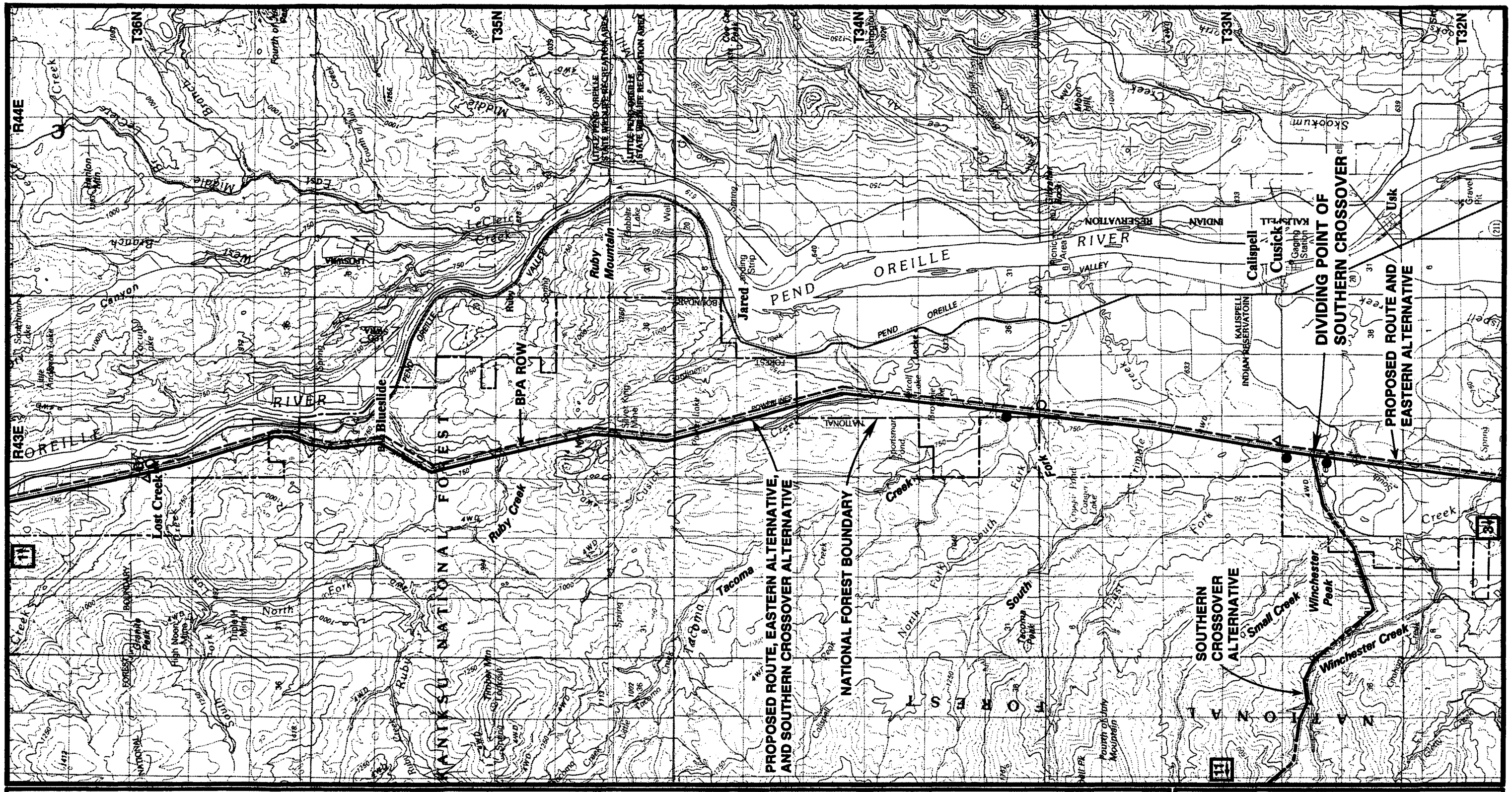
0 1 2 3
MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 1



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 21 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

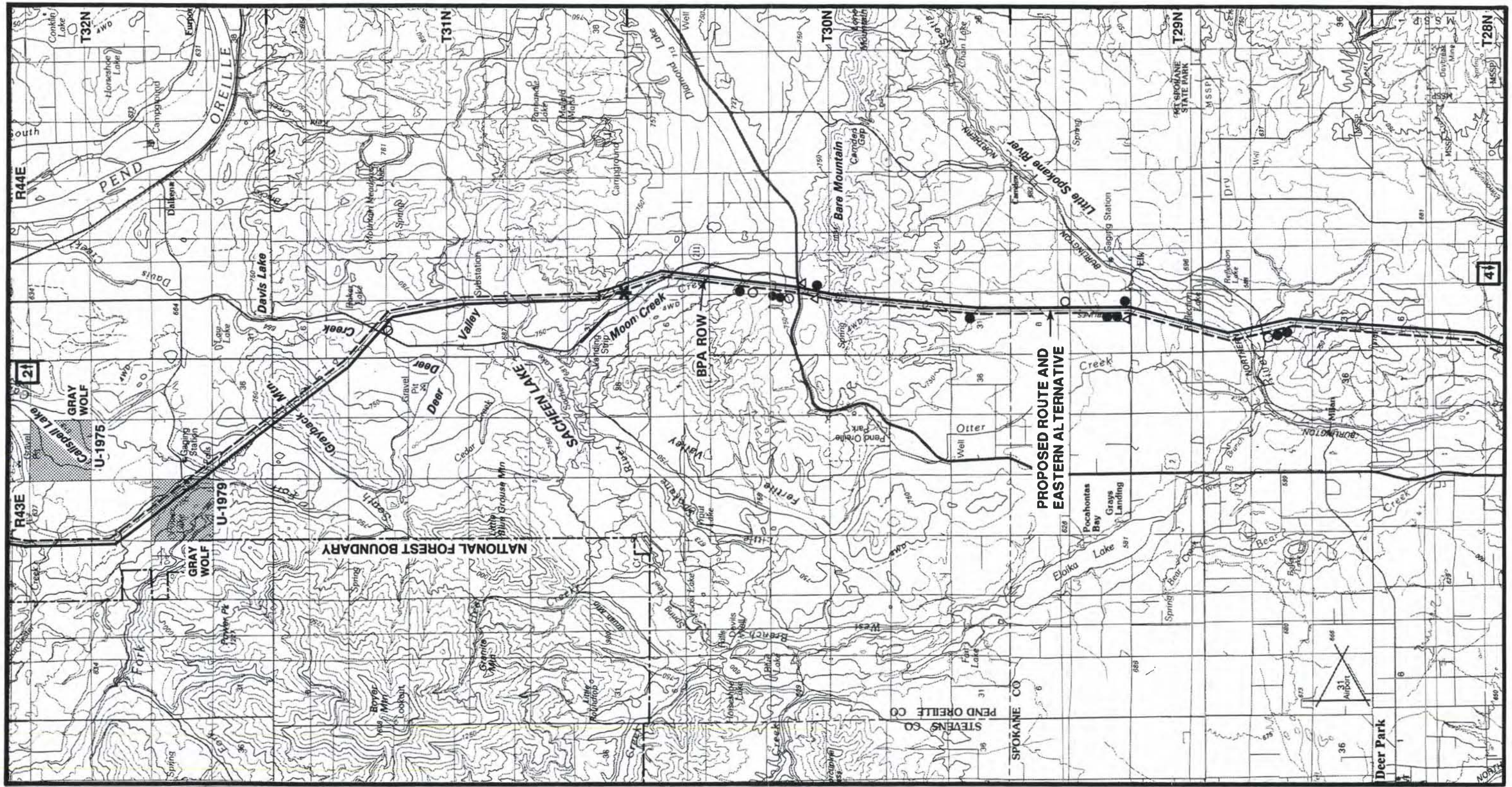
0 1 2 3
MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 2



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 2↓ Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:

SEE LEGEND PRECEDING SHEETS 1–11.

Note: On this sheet, the Proposed Route crosses from the west side to the east side of the existing BPA right-of-way.

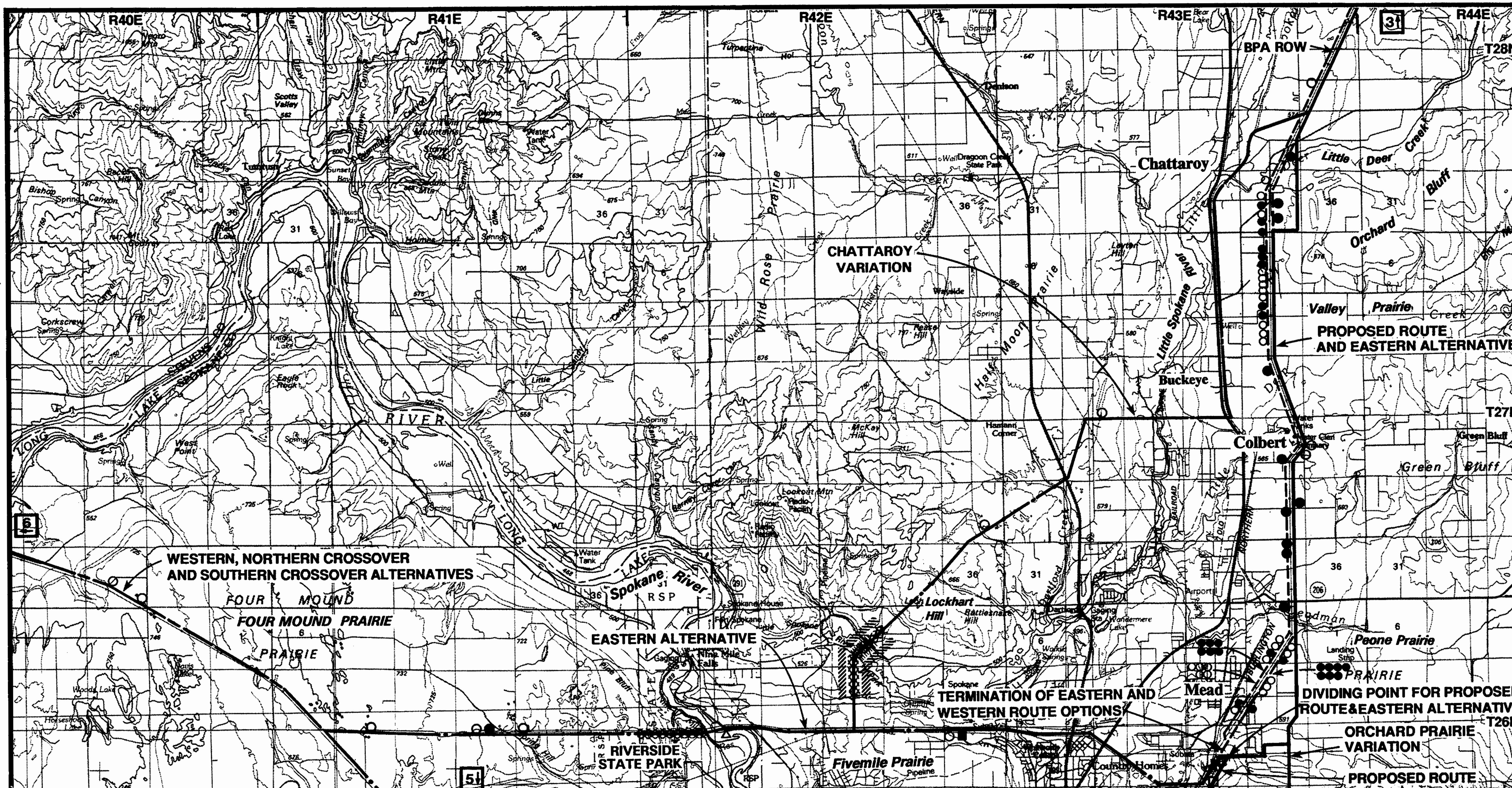
0 1 2 3 MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 3



LEGEND

PROPOSED ROUTE	EASTERN ALTERNATIVE
WESTERN ALTERNATIVE	ROUTE OPTION
NORTHERN CROSSOVER	
SOUTHERN CROSSOVER	2 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

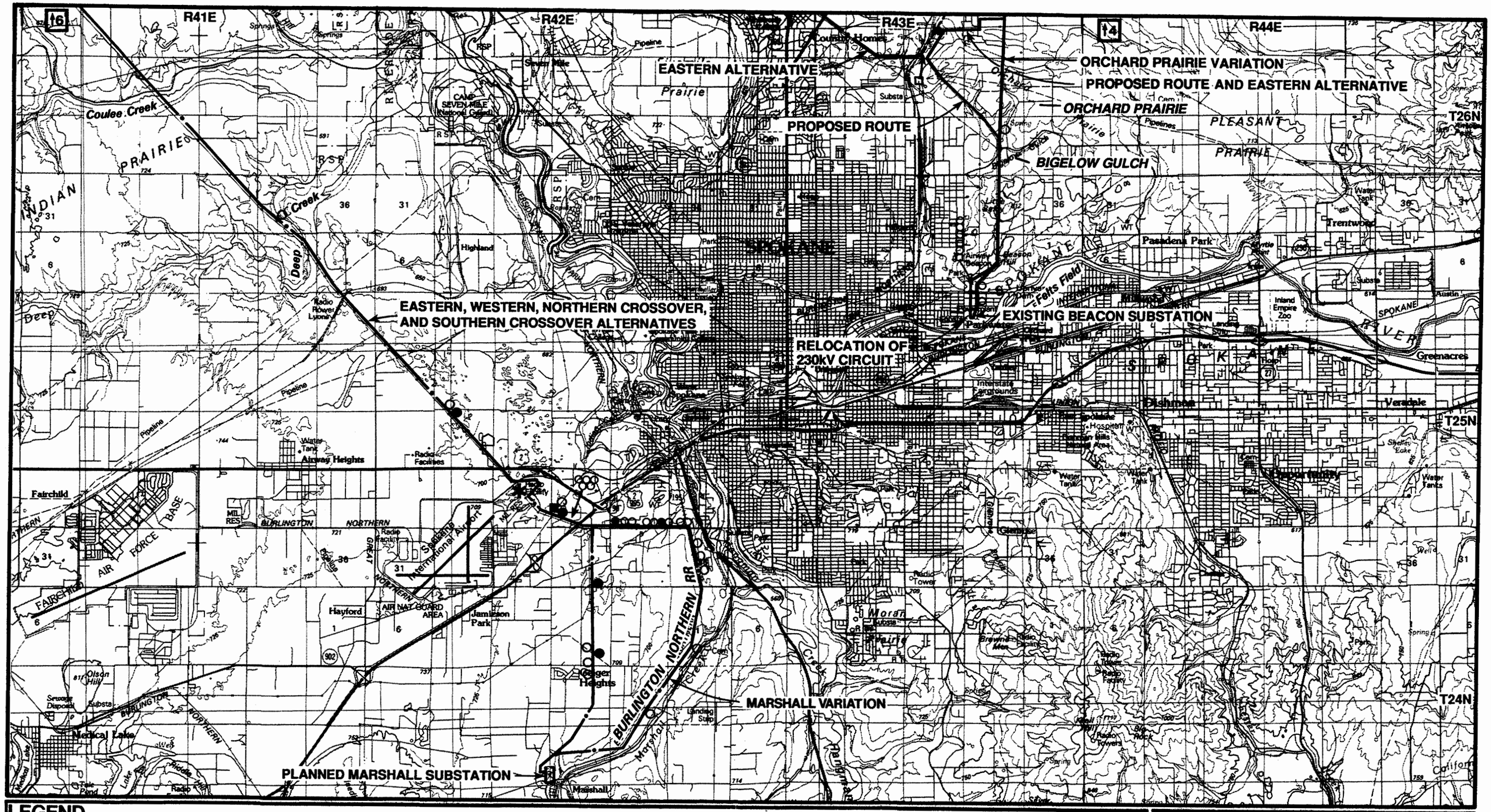
0 1 2 3 MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 4



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 24 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:

SEE LEGEND PRECEDING SHEETS 1–11.

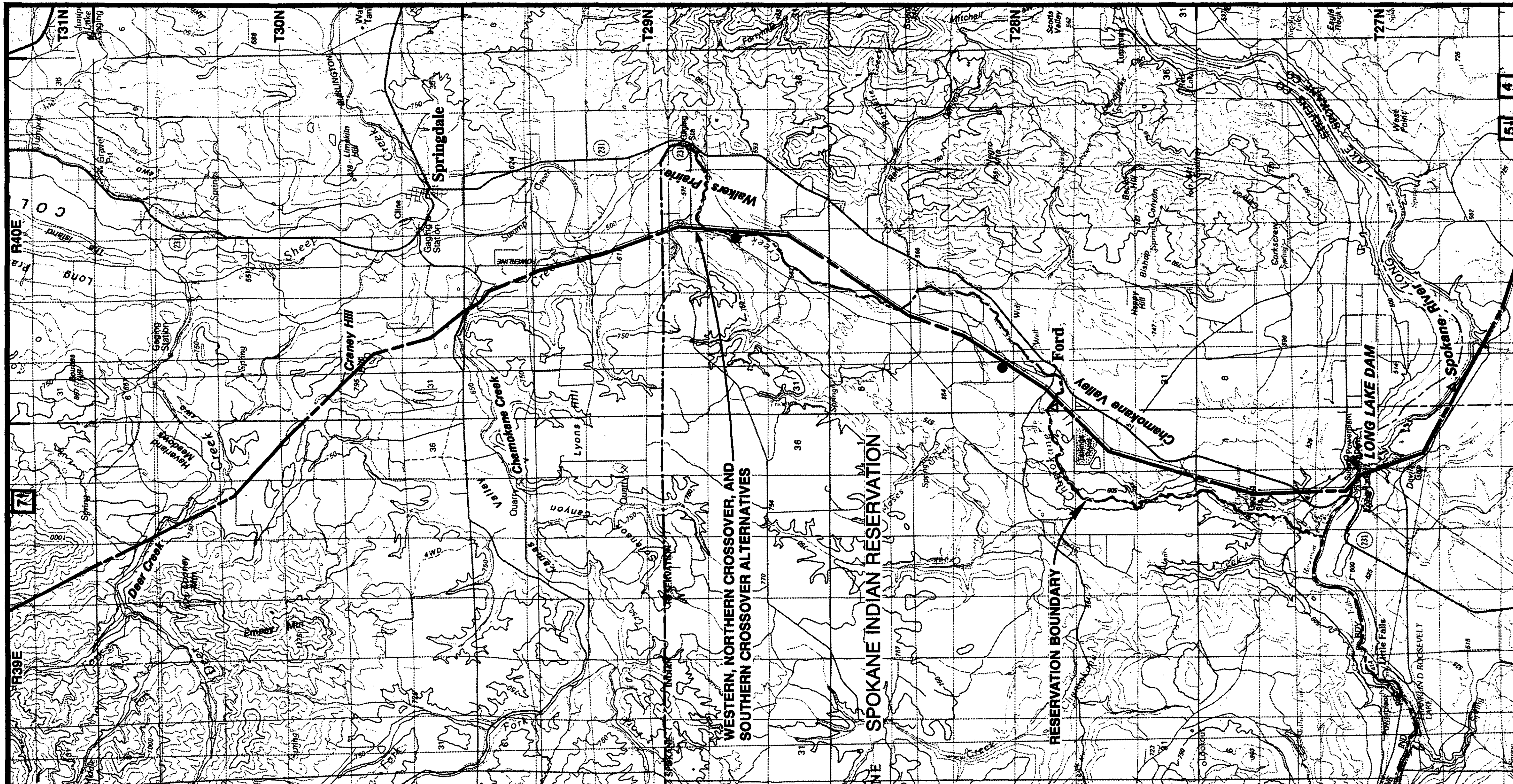
0 1 2 3 MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 5



LEGEND

PROPOSED ROUTE	EASTERN ALTERNATIVE
WESTERN ALTERNATIVE	ROUTE OPTION
NORTHERN CROSSOVER	
SOUTHERN CROSSOVER	2 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

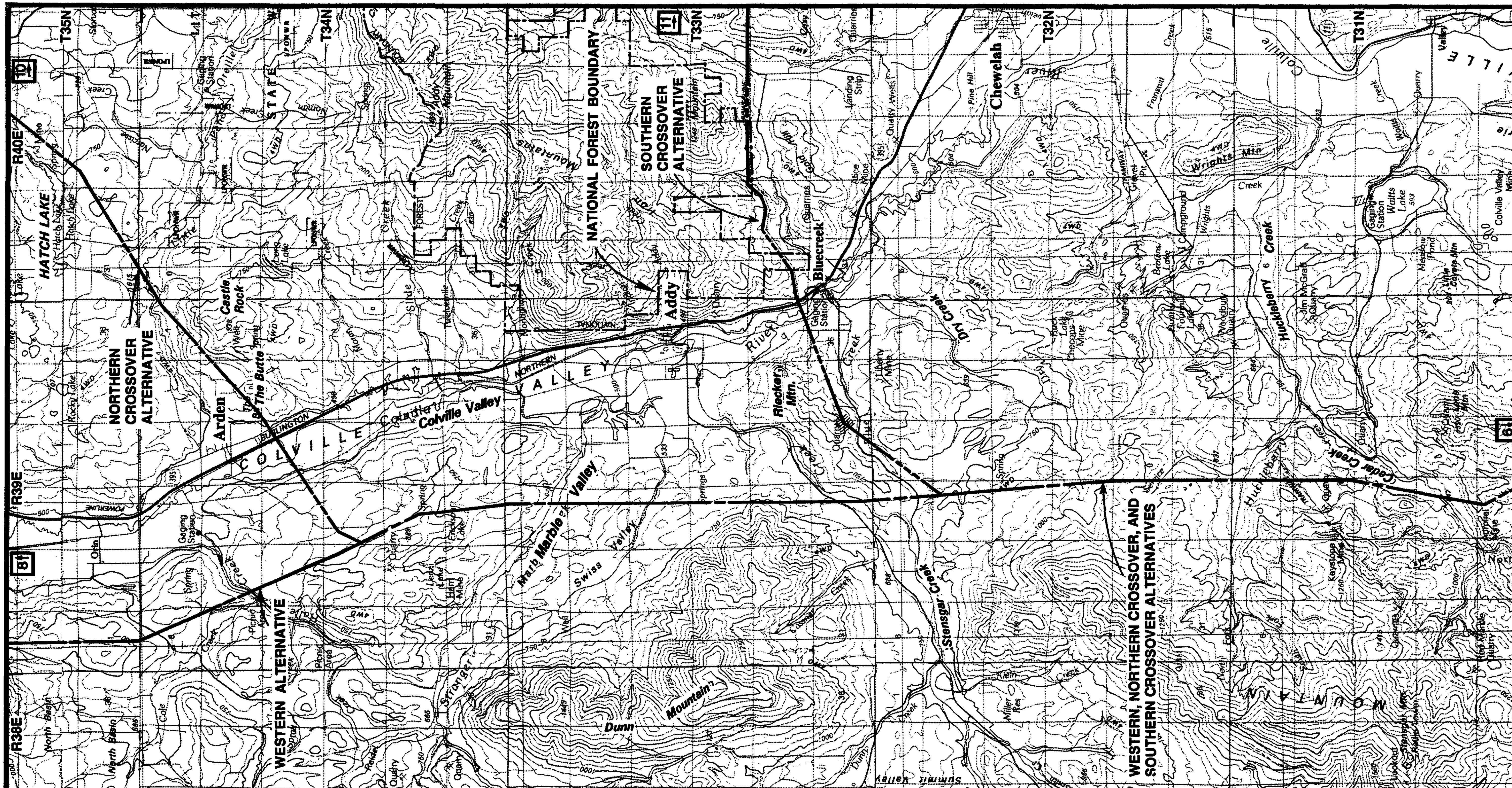
0 1 2 3
MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 6



LEGEND

——— PROPOSED ROUTE	—•— EASTERN ALTERNATIVE
— — — WESTERN ALTERNATIVE	- - - - ROUTE OPTION
—-—- NORTHERN CROSSOVER	2 Number of Adjacent Sheet (Example)
----- SOUTHERN CROSSOVER	

RESOURCE INFORMATION:
SEE LEGEND PRECEDING
SHEETS 1–11.

0 1 2 3
MILES

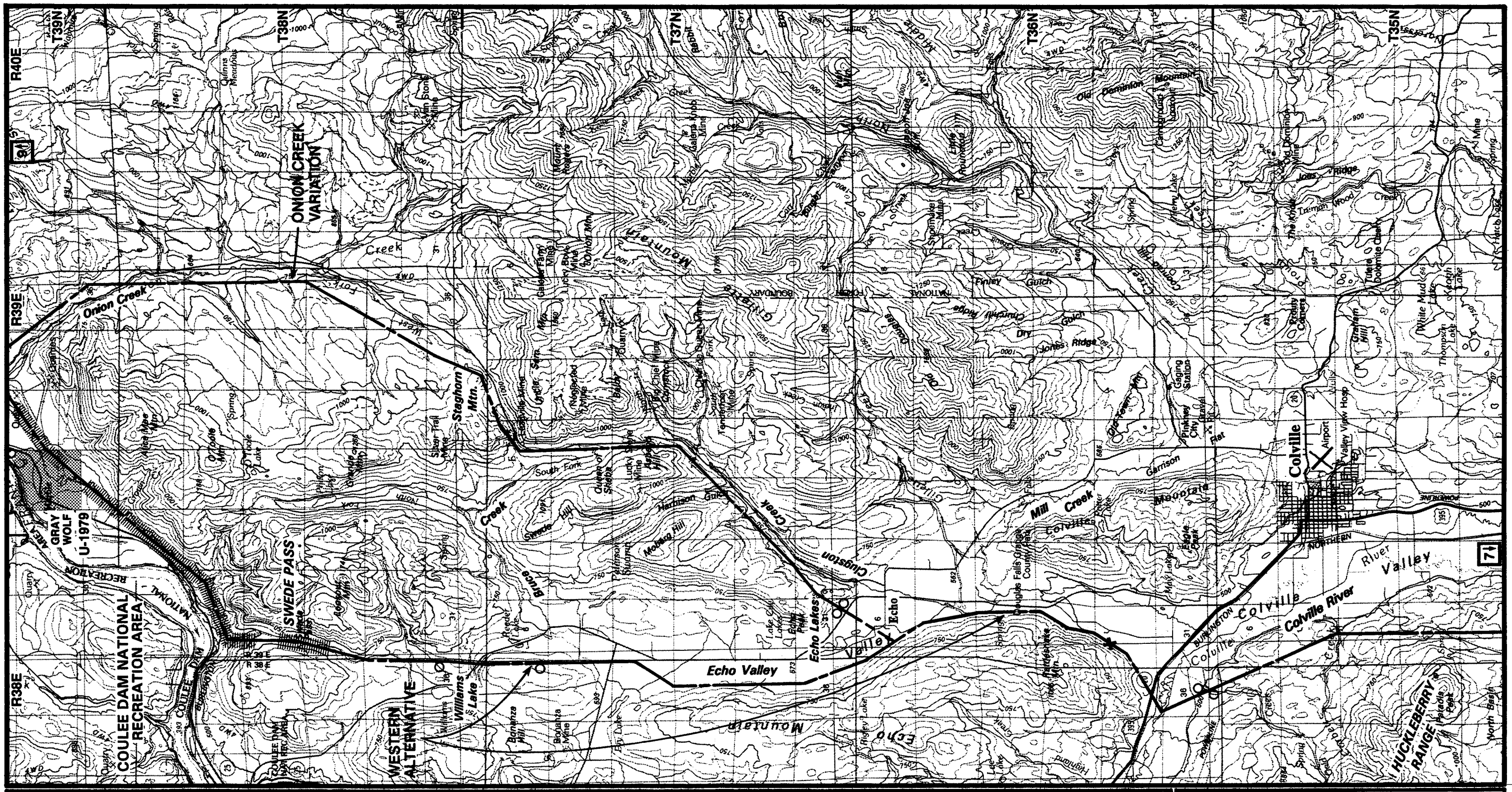
N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2

SHEET 7



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 2↓ Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

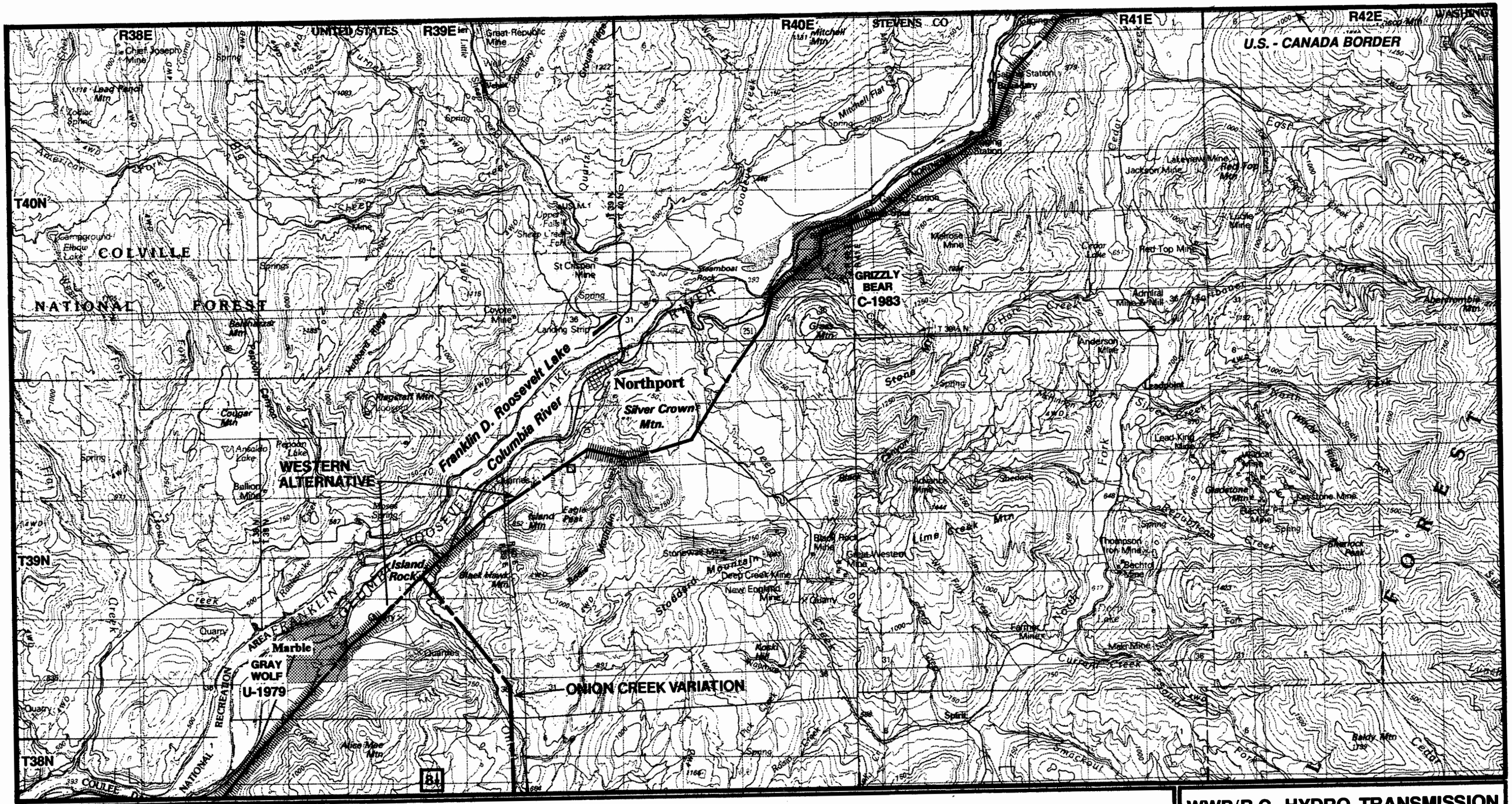
0 1 2 3 MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 8



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 24 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:

SEE LEGEND PRECEDING SHEETS 1–11.

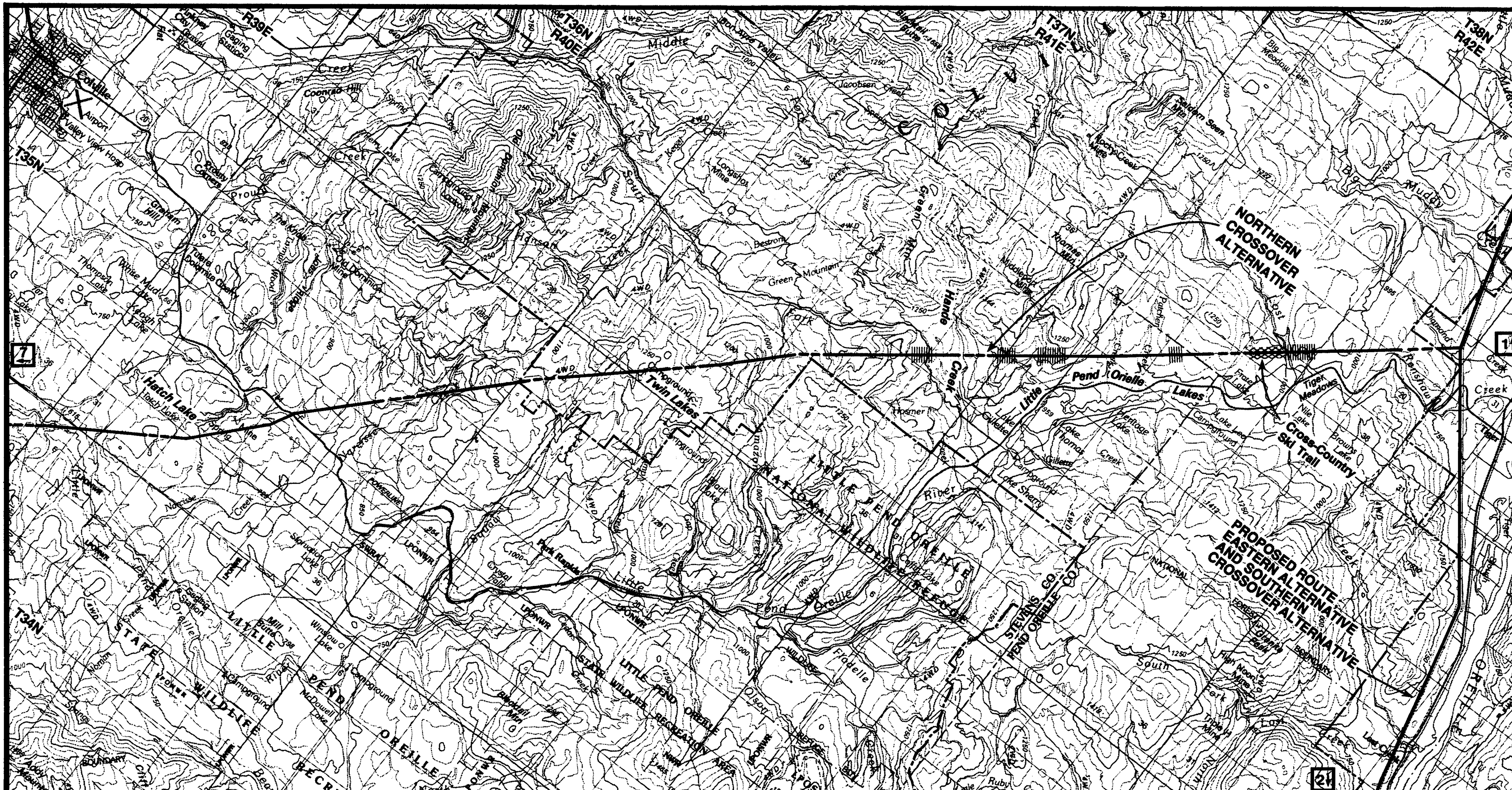
0 1 2 3 MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 9



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 21 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

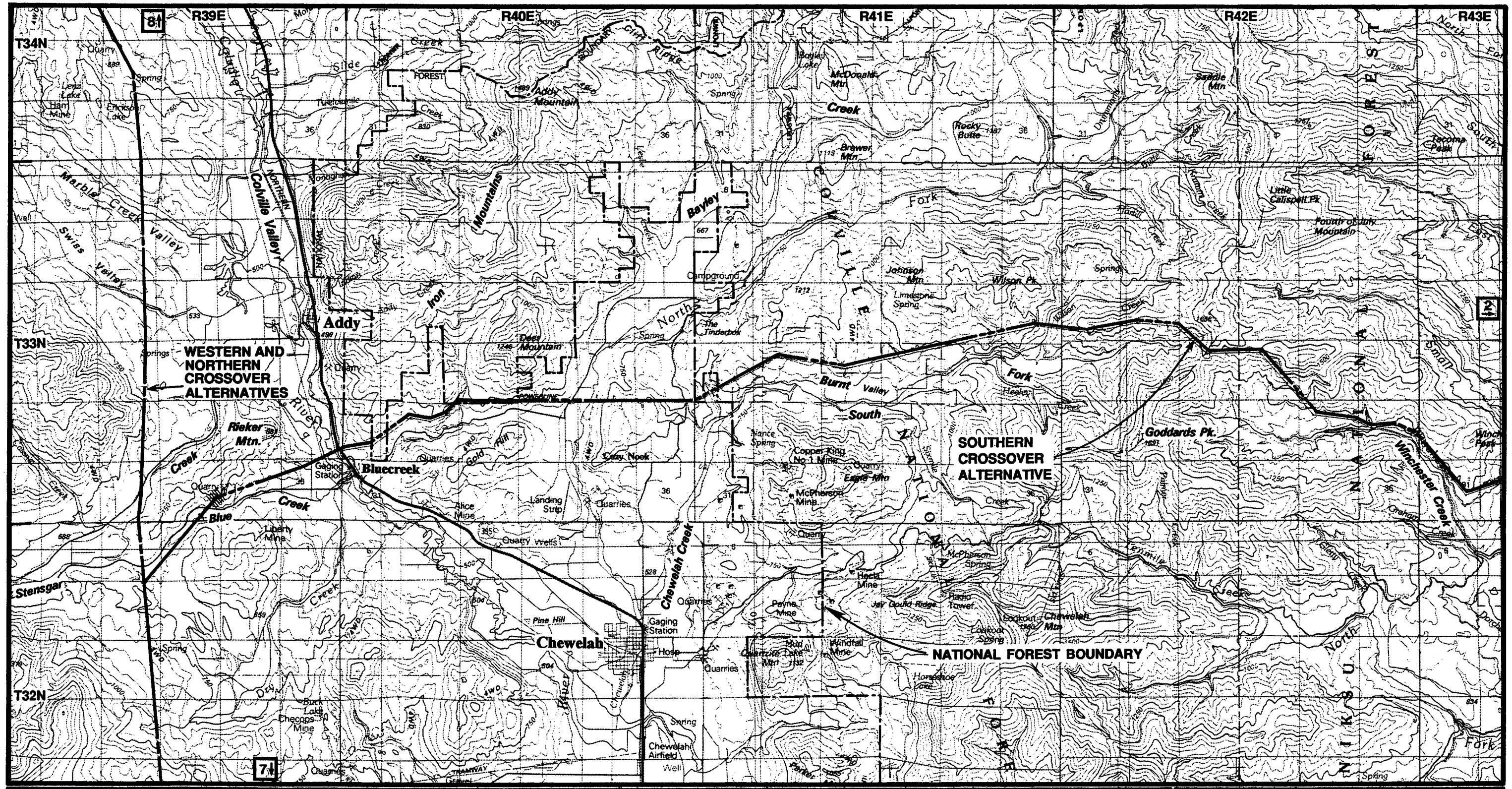
0 1 2 3
MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 10



LEGEND

- PROPOSED ROUTE
- WESTERN ALTERNATIVE
- NORTHERN CROSSOVER
- SOUTHERN CROSSOVER
- EASTERN ALTERNATIVE
- ROUTE OPTION
- 2 Number of Adjacent Sheet (Example)

RESOURCE INFORMATION:
SEE LEGEND PRECEDING SHEETS 1–11.

0 1 2 3
MILES

N

WWP/B.C. HYDRO TRANSMISSION INTERCONNECTION PROJECT

Proposed Route & Alternatives

MAP 2-2 SHEET 11