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Final Environmental Impact Statement

(Final Statement to INT-DES-77-30)



**BONNEVILLE POWER
ADMINISTRATION**

Proposed Fiscal Year 1979 Program

U.S. Department of Energy

April 1978

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BONNEVILLE POWER ADMINISTRATION

Proposed Fiscal Year 1979 Program

Responsible Official:

James L. Livrman

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Acting Assistant Secretary for Environment

U.S. Department of Energy
Washington, D.C. 20545

April 1978

NOTE TO REVIEWERS

This final statement is one of a series prepared annually by BPA on each fiscal year's proposed construction and maintenance program. This statement covers the potential impact of the major new facilities and maintenance programs proposed for fiscal year 1979. It must be reviewed and used in conjunction with the overall programmatic environmental statement entitled "The Role of the Bonneville Power Administration in the Pacific Northwest Power Supply System, Including Its Participation in the Hydro-Thermal Power Program: A Program Environmental Statement and Planning Report" (The "Role EIS"), particularly Appendix B - BPA Power Transmission. For convenience, the various components and their relationship are outlined in the chart below.

Environmental Statements and Supplements on BPA Construction and Maintenance Activities

Appendix B to the "Role EIS" - BPA Power Transmission

Describes BPA's overall construction and maintenance program in general, the Pacific Northwest environment in which it operates, and the environmental impacts that typically occur from transmission line construction and maintenance activities. Provides a framework for evaluation of specific proposals.

Final Fiscal Year 1979 Program Statement)
)
) Bound Together
) in this Document
)
)
 Final Facility Planning Supplements)

Describes the cumulative impact on the Northwest environment of all of the specific major transmission facilities and maintenance activities included in BPA's Fiscal Year 1979 Proposed Program.

Identifies the need for a specific new transmission facility proposed as part of the Annual Proposed Program, and outlines in preliminary form the probable environmental impact of constructing the facility in accordance with a general proposed system plan and alternative plans.

Draft Facility Location Supplements

Draft location supplements are issued separately to facilitate review.

Expands the facility planning supplements to include alternative locations for the proposed new facility and environmental impacts associated with each alternative location. This supplement is prepared after public and agency review of the planning supplement has been completed and reconnaissance studies have been made.



SUMMARY

() Draft

(X) Final

Environmental Statement

Department of Energy, Bonneville Power Administration

1. Type of action: (X) Administrative () Legislative
2. Brief description of action: Proposed construction of fiscal year 1979 new facility additions and modifications to BPA's electric transmission system including approximately 110 miles (177 km) of new transmission line; three possible new substations and related structures, including power system control stations; possible equipment additions to 18 existing substation; maintenance of approximately 12,500 miles (20,060 km) of existing transmission lines including tower structures, conductors, and access roads; control of vegetation on approximately 19,080 acres (7,720 ha) of transmission line rights-of-way and 960 acres (390 ha) of substation property.
3. State and counties involved: Idaho -- Boundary, Bonner, Kootenai, Gem, Teton, Cassia, Minidoka, Clearwater, Nez Perce, Butte, Elmore, Shoshone, Benewah, and Latah; Montana -- Deer Lodge, Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Ravalli, Sanders, Silver Bow; Oregon -- Sherman, Wasco, Hood River, Klamath, Lane, Marion, Polk, Yamhill, Benton, Lincoln, Linn, Clackamas, Gilliam, Deschutes, Lake, Columbia, Multnomah, Washington, Clatsop, Tillamook, Coos, Curry, Douglas, Crook, Umatilla, Morrow; Washington -- Adams, Grant, Lincoln, Garfield, Benton, Franklin, Chelan, Clallam, Asotin, Clark, Walla Walla, Cowlitz, Wahkiakum, Douglas, Ferry, Pend Oreille, Stevens, Grays Harbor, Jefferson, King, Kitsap, Pierce, Snohomish, Kittitas, Lewis, Mason, Okanogan, Pacific, San Juan, Skagit, Skamania, Spokane, Thurston, Whatcom, Whitman, Island; Wyoming -- Teton.
4. Summary of environmental impact and adverse environmental effects: The Fiscal Year 1979 Proposed Program would result in the diversion of approximately 15 acres (6 ha) of forest land to other land uses compatible with transmission line rights-of-way. The permanent removal of approximately 35 acres (14 ha) of vegetative cover; the removal of up to approximately 12 acres (5 ha) of agricultural land from production; visual impacts to one scenic highway and other areas of scenic quality, disturbance of topsoil, temporary wind and water erosion, and a resultant increase in siltation and turbidity in one major waterway and numerous small and intermittent streams with consequential temporary adverse effects on fish mortality and spawning habitat; the introduction of particulates and combustion byproducts into the atmosphere during open burning of slash; introduction of herbicides into the environment; temporary reduction in wildlife habitat due to herbicides and clearing operations; audible noise during operation of construction equipment and transmission lines and substations; increased risk of man-caused accidents; and maintenance of a high standard of living and level of productivity for the Pacific Northwest through continued availability of reliable electric service.



5. Alternatives considered: Alternatives that were considered in the development of the Fiscal Year 1979 Proposal include delay or nonconstruction of facilities; direct-current (d-c) transmission; underground construction of transmission facilities; combustion turbines; alternative methods of vegetation control on rights-of-way; disposal of slash by methods other than open burning; construction of new transmission facilities on existing rather than new rights-of-way; limiting the consumption of electricity; and alternate locations for individual proposals (to be discussed in the facility location supplements).

6. Agencies requested to comment on Draft Environmental Statement:
See page 54.

7. Date made available to CEQ and the public:

Draft Statement: Sept. 1, 1977 (DES 77-30)

Final Statement: May 5, 1978 (DOE/EIS-0005)

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I. Introduction

The following final environmental statement describes BPA's proposed program for fiscal year 1979. This proposed program for which BPA is requesting approval consists of the construction of new additions and modifications to its existing transmission system as well as the continued maintenance of existing facilities during the fiscal year. It is essential that these system construction and maintenance activities be planned and carried out on a coordinated basis to preserve system integrity. Therefore, individual proposals can not be effectively viewed in isolation, but must be considered in the context of the entire proposed program. Further, the impacts of the individual actions are, in many cases, cumulative. Accordingly, we have taken our entire proposed program for fiscal year 1979 as a single major Federal action and have prepared the Fiscal Year 1979 Final Environmental Statement on that basis. 1/

However, BPA also recognizes that decisions on individual components of its proposed program have environmental importance. For this reason, narrative and map data on individual proposed new facilities are provided in that section of this Draft Environmental Statement entitled "Facility Evaluation Appendix" which is an integral part of this statement and is incorporated herein by reference.

This statement was prepared in compliance with the National Environmental Policy Act of 1969 (P.L. 91-190) and follows those guidelines established by the Council on Environmental Quality as published in the Federal Register (38 F.R. 20550-20562), August 1, 1973.

Background

The Bonneville Power Administration, as a Bureau of the Department of the Interior, was established by Congress in 1937 to act as the Federal wholesale marketing agency for electrical energy generated at the Bonneville Dam. Since that time, it has been designated as the marketing agency for electrical power generated at other Federal hydroelectric facilities in the Pacific Northwest--29 of which are existing and 2 more presently under construction. Together with BPA's transmission facilities, these Federal hydroelectric facilities, constructed and operated by the Corps of Engineers and the Bureau of Reclamation, comprise the Federal Columbia River Power System.

1/ For details on construction activities, their sequence and scope, see "Appendix B - BPA Power Transmission" to the environmental statement entitled "The Role of The Bonneville Power Administration In The Pacific Northwest Power Supply System, Including Its Participation In The Hydro-Thermal Power Program: A Program Environmental Statement and Planning Report" (The "Role EIS"). As outlined in the "Note to Reviewers," which precedes the title page of this document, Appendix B is a source document describing BPA's overall construction and maintenance program, and serves as a framework for evaluating specific proposals. For this reason, Appendix B should be read in conjunction with this final statement to fully evaluate the proposed program for fiscal year 1979.

To carry out its marketing functions, BPA has designed and constructed a network of high-voltage transmission facilities which serves as the main power grid for the Pacific Northwest, providing approximately 80 percent of the region's bulk power transmission capacity. Over this grid, BPA wholesales electrical power to 153 Pacific Northwest customers including 18 industries in the States of Oregon, Idaho, Washington, parts of Montana and Wyoming west of the Continental Divide, and small parts of northern Utah and California. Those facilities included in the Fiscal Year 1979 Proposed Program are necessary to fulfill BPA's legislative mandate.

To aid the reviewer in evaluating the fiscal year 1979 proposal, we have prepared the following diagram (figure 1) which shows the new major main grid transmission facilities that are projected through the year 1996. It must be noted that this presentation is, by its nature, tentative. The anticipated needs represented in this figure are based upon projections of long-range need, which, in spite of increasingly sophisticated forecasting methodologies are, nevertheless, subject to both human and technological variables.

The actual facilities which would have to be built to meet these forecasted system needs or requirements would be determined on the basis of environmental considerations 2/, system capabilities, and power flow studies.

2/ For an illustration of how BPA's EIS process relates to its decision-making process, refer to page III-1 of the attached Facility Evaluation Appendix.

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II. Description of the Proposed Program

The Fiscal Year 1979 Proposed Program consists of two major components: (A) construction of system additions and modifications necessary to integrate new electric power generation into the system, serve new electrical loads, improve reliability or quality of existing electric service where needed, or maintain electric service at existing levels of reliability or quality; and (B) maintenance of existing facilities necessary to continue service to electrical loads and to prevent damage to equipment. These two programs are described below:

A. Construction of System Additions and Modifications

BPA proposes to begin work on approximately 110 miles (177 km) of new transmission lines and three new substations. In addition, facility additions would be made at 18 existing substations, 2 of which would require additional land. General locations for the new transmission lines and new substations are indicated in red of the location map (figure 2).

In addition to the new facilities proposed for the first time in the Fiscal Year 1979 Budget, work will continue on approximately 690 structural miles (1110 km) of transmission line and 9 substations included in prior fiscal year construction programs.

In summary, the Fiscal Year 1979 proposed and ongoing construction programs will involve the transmission facilities shown in Table 2. 3/

3/ Additional information on BPA's program in relation to current and long-range needs for electric energy can be obtained from Part 2 of the "Role EIS" (The Role of BPA). The regional electric power supply system in which BPA operates is covered in detail in Part 1 of the "Role EIS" (The Regional Electric Power Supply System). Projected future transmission requirements over the next 20 years is covered in Chapter IX of Appendix B of the "Role EIS."

TABLE 1
Fiscal Year 1979 New Facilities Proposals
(see map opposite page)

<u>Appendix Designation</u>	<u>Major Facility Proposals</u>	<u>Energization Date</u>
S.A. 79-1	Franklin Area Service	Fall 1981
S.A. 79-2	San Juan Area Service	Fall 1981
S.A. 79-4	South Puget Sound Reinforcement	Fall 1981

TRANSMISSION & SUBSTATION LOCATION MAP - BPA PROPOSED F.Y. 1979 PROGRAM

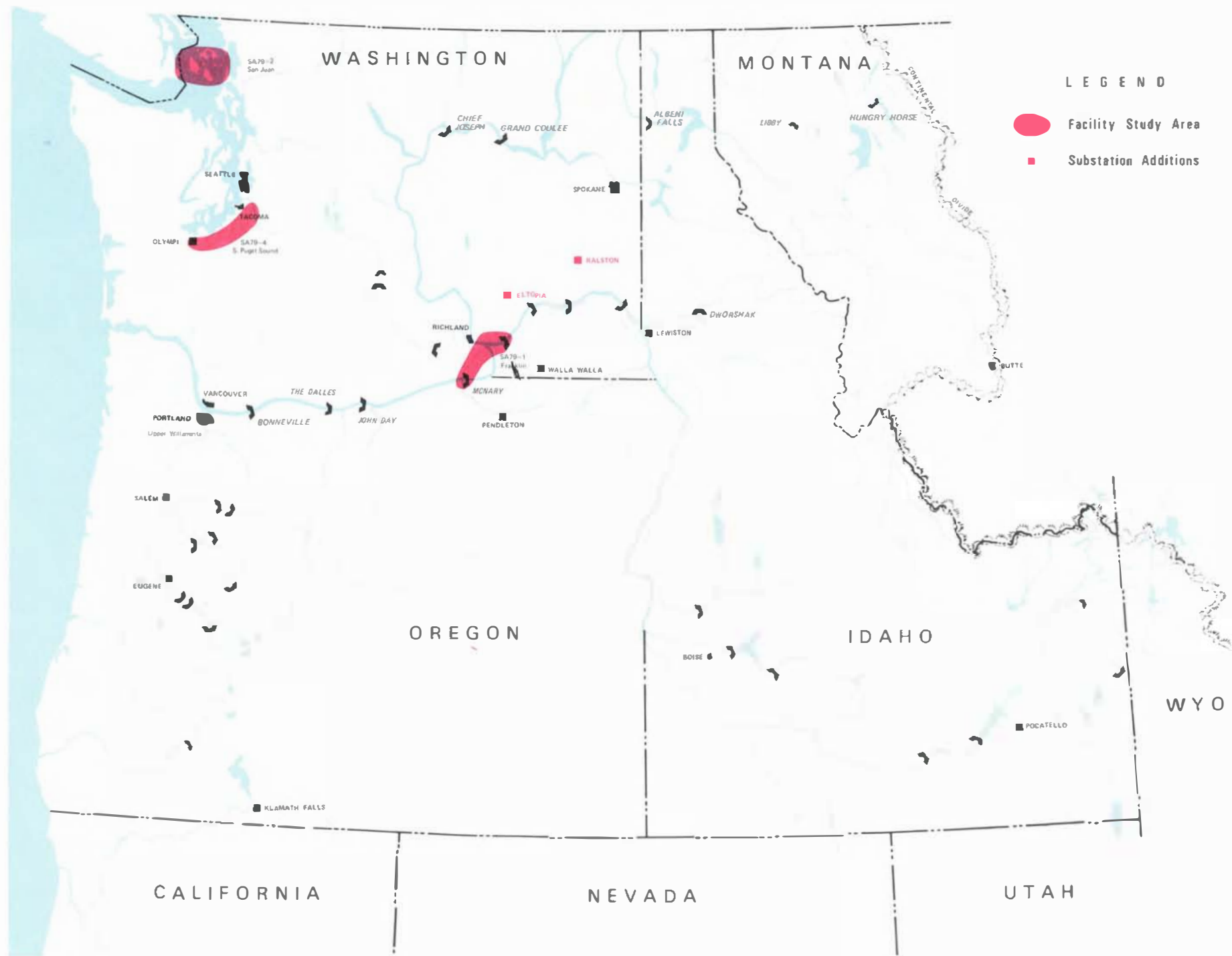




TABLE 2
Transmission Line Miles by Voltage
(Estimated)

	<u>500-kV</u>	<u>230-kV</u>	<u>115-kV</u>	<u>34.5-kV</u>	<u>Total 5/</u>
FY 1979 New Facilities <u>4/</u>	57 mi (92 km)	8-11 mi (13-18 km)	30 mi (48 km)	10 mi (16 km)	105-108 mi (170-174 km)
Programmed in Prior Years (Still under construction at end of FY 1977)	567 mi (912 km) 624 mi (1004 km)	92 mi (148 km) 100-103 mi (161-166 km)	33 mi <u>6/</u> (53 km) 63 mi (101 km)	0 10 mi (16 km)	692 mi (1113 km) 797-800 mi (1282-1287 km)

Construction of transmission lines involves establishment of temporary construction access roads for movement of materials and heavy erection machinery to construction areas; clearing vegetation, structures, and other obstructions on the rights-of-way that might interfere with construction or operation of the line; burning or otherwise disposing of cleared vegetation; leveling areas necessary for tower sites and tower steel storage and staging areas; excavating for and installing tower footings; erecting transmission towers; stringing and tensioning conductor; construction of permanent maintenance access roads and associated stream crossings on and off the right-of-way as dictated by terrain and other factors; and reseeding or otherwise revegetating disturbed soil areas where appropriate.

Also included in the proposed program is construction of three new substations with associated power system control facilities. Work will continue in fiscal year 1979 on 9 substations authorized in prior years but not yet completed, for a total of 12 substations.

4/ The phrases "Fiscal Year 1979 Proposed Construction Program" and the "Fiscal Year 1979 New Facilities" are used interchangeably. Both are used to designate only those facilities proposed for the first time in BPA's Fiscal Year 1979 Proposed Program. Previously authorized proposals (shown as programmed in prior years in the above table), although they may be currently under construction, were discussed in prior annual Environmental Statements.

5/ Figures on miles and kilometers of transmission lines are only estimates based upon assumptions of average or likely requirements.

6/ Includes 7 miles (11 km) of 138-kV.

Construction of substations and miscellaneous maintenance buildings involves establishing a permanent entrance road, clearing sites ranging in size from 1 to 50 acres (.4-20 ha), constructing a building or control maintenance complex (occupying 150 to 5,000 square feet or 14 to 465 square meters) and a fenced equipment yard, and installing electrical switchgear, line towers, and other support structures.

For details on construction activities, their sequence, and scope, see Chapter V of Appendix B of the Role EIS. 7/

B. Maintenance of Existing Facilities

The proposed program for fiscal year 1979 includes funds for maintenance of BPA's existing transmission facilities which, as of October 1977 will include 12,936 energized circuit miles (20,060 km) of transmission lines, 343 substations, associated maintenance buildings, and other support facilities in Oregon, Washington, Idaho, Montana, and Wyoming. BPA's existing transmission facilities as of April 1977 are shown in the System Map (fig. 3).

Activities during the year will include routine and emergency maintenance and repair of electrical equipment, tower structures, aerial and submarine conductors, bridges and culverts, communications equipment, and buildings.

Also included in the program is maintenance of transmission line rights-of-way, substations power system control stations, and permanent access roads. About 19,100 acres (7,730 ha) 8/, of transmission line rights-of-way and access roads, along with approximately 950 acres (380 ha) of substation property, within the States of Idaho, Montana, Oregon, Washington, and Wyoming will require vegetation control during fiscal year 1979. Vegetation control programs are necessary to prevent trees and other tall vegetation from growing up into the conductor and causing outages and possible forest fires. Approximately 1,900 acres (770 ha) of this right-of-way will be cleared utilizing hand and mechanical cutting; 4,600 acres (1,650 ha) of right-of-way will be treated by aerial application of herbicides; and 12,600 acres (5,100 ha) will be controlled utilizing herbicides applied selectively from the ground.

7/ Copies of BPA's General Construction and Maintenance Program Statement (FES 74-48), the Wholesale Power Rate Increase Statement (FES 74-46), the Draft Statement on BPA Participation in Regional Interutility Cooperation (DES 75-19), and environmental statements covering the Fiscal Years 1972, 1973, 1974, 1975, 1976, 1977, and 1978 Programs, and the Role EIS, which are referred to in this statement are available through the Environmental Manager's Office at the address indicated on the summary sheet.

8/ BPA currently maintains approximately 200,000 acres (80,920 ha) of transmission line right-of-way.

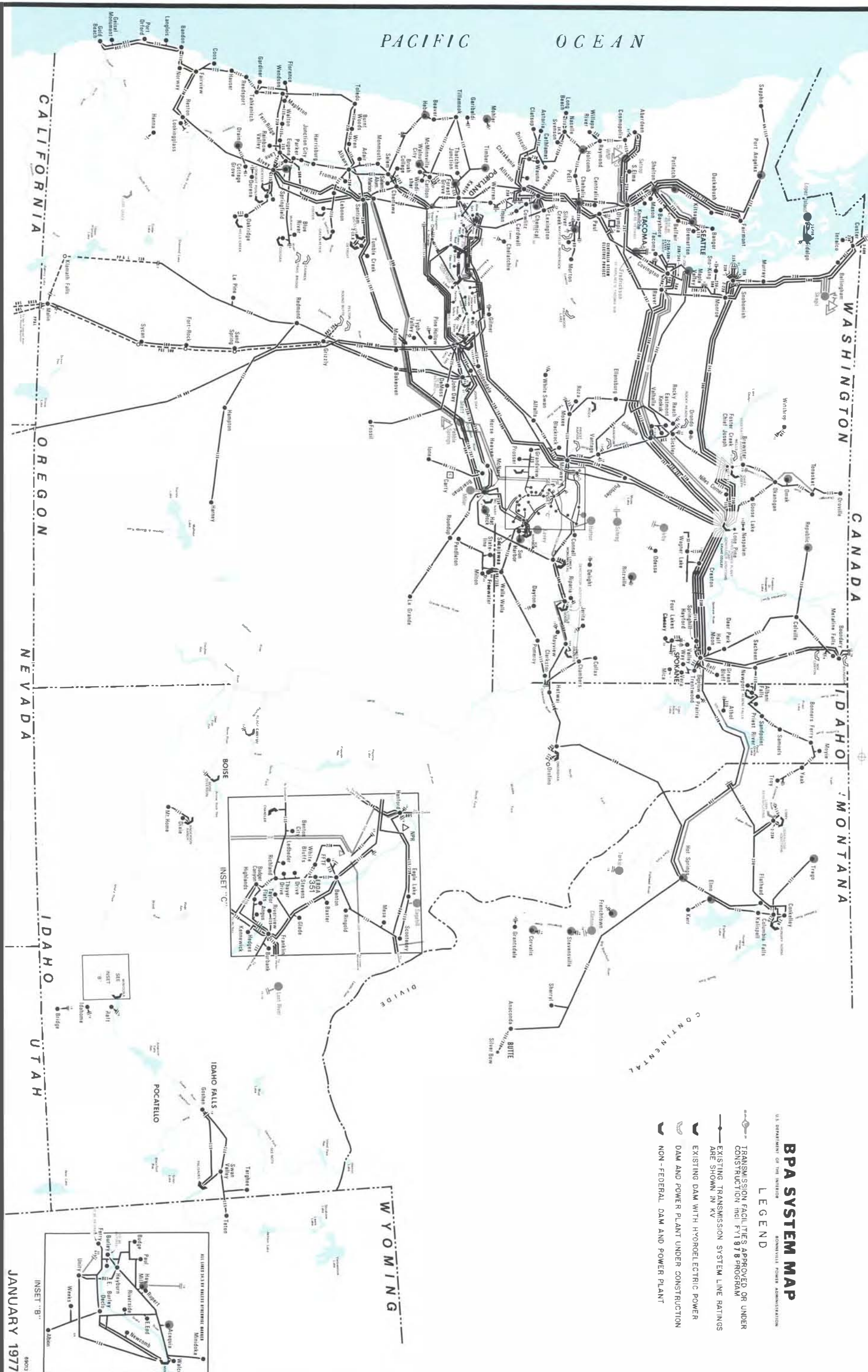


Figure 3

Details on the kinds of herbicides to be used, the quantities to be applied, and the transmission lines to be treated are included in the attached vegetation management appendix.

III. Description of the Existing Environment

The BPA service area as reflected in the System Map (fig. 3) consists of approximately 300,000 square miles (777,000 km²) in the States of Washington, Oregon, Idaho, western Montana, and small sections of Wyoming, Utah, Nevada, and California. Extending from the Pacific Coast inland to the Continental Divide, the service area covers many diverse physiographic regions, each with its unique topographical and climatological characteristics. A generalized description of the character and resources within the region is found in Chapter III of Part I of the Role EIS. A detailed description of the existing environment in the immediate area of the proposed major new facilities is contained in each of the individual draft facility planning supplements included in the Facility Evaluation Appendix. 9/

9/ The Facility Evaluation Appendix contains both a graphic (map) overview and a narrative evaluation of specific major new construction proposals included as part of BPA's Fiscal Year 1979 Proposed Program.

IV. Probable Impact of the Fiscal Year 1979 Proposed Program on the Environment 10/

The probable impacts of constructing the new facilities proposed as part of the Fiscal Year 1979 Program and the impacts resulting from maintenance activities associated with the upkeep of the existing facilities are summarized below. A detailed description of impacts frequently encountered in construction and future maintenance operations required for facilities of this kind and the mitigation measures normally employed to minimize these impacts can be found in Appendix B of the Role EIS (Chapters VII and VIII respectively). Specific data on regionally significant resources that could be affected is provided for each of the individual facilities in the Facility Evaluation Appendix. 11/

A. Impact on Natural Resources

The impact of the proposed new facilities and maintenance activities on natural resources of regional significance, including hydrologic, mineral, vegetation, fish and wildlife, and scenic resources is summarized below:

1. Hydrologic Resources

Water resources considered in this category are those recognized as having importance for use as domestic watersheds. Also considered in this category are wetlands, namely, those areas that are inundated by surface or groundwater with such a frequency that vegetative and aquatic lifeforms requiring saturated soil conditions can grow and reproduce.

A review of the fiscal year 1979 new proposals indicate that there will be no physical impact to drainage areas currently being used for formal domestic water supplies such as officially designated municipal watersheds.

10/ While preliminary planning has been initiated for the new facilities proposed for the first time in the Fiscal Year 1979 Proposed Program, specific locations for each of these facilities have not yet been determined. Probable impacts and other information in this program statement are based on preliminary planning data, including analysis of typical or likely facility locations.

11/ The acreage and hectare figures cited here and in other places in the text are for those new facilities which are proposed for the first time in the Fiscal Year 1979 Proposed Program as shown in Table 1. For corresponding information on facilities proposed and approved in prior years, see also BPA Environmental Statements covering the Fiscal Years 1972, 1973, 1974, 1975, 1976, 1977, and 1978 Programs.

At this early stage in the planning process it does not appear likely that any wetlands would be affected by the new facilities associated with the Fiscal Year 1979 Program. Once alternative and proposed facility and route locations are determined subsequent to reconnaissance, possible impacts to wetlands can be more readily evaluated.

Pursuant to Executive Order 11990, BPA will avoid undertaking new construction within wetlands unless there is no practical alternative. In the event that construction within wetlands proves unavoidable, all practicable measures will be taken to minimize any adverse effects that may result.

Many other water resources that would be involved by the proposed program are considered valuable to the Northwest from a recreational or scenic viewpoint and as such are discussed under those headings.

2. Mineral Resources

Transmission lines can have an impact on deposits of some low-unit value, high-volume mineral resources which can only be extracted economically through surface mining techniques. The most common of these is sand and gravel.

Known commercial deposits of these low-unit value minerals will be avoided wherever possible when selecting line or route locations. At this time direct impacts to this particular resource as a result of the Fiscal Year 1979 Proposed Program, are not foreseen.

3. Vegetation

Construction of transmission lines and substations requires the removal of native vegetation at tower footings, on access roads, and at substation sites. As a result of the new facilities proposed as part of the Fiscal Year 1979 Program, vegetative growth will be permanently removed from up to 15 acres (6 ha) of land that would be cleared for new substation sites and substation additions. Transmission line tower footings would require the removal of approximately 20 acres (8 ha) of vegetation. Permanent access roads, constructed where established access roads do not already exist, could also remove all vegetation from up to 60 acres (24 ha). ^{12/}

^{12/} Variations in the acreages required for construction of access roads are due primarily to the fact that approximately 1.0 to 1.5 linear miles of access road could be required per mile of right-of-way (1.0-1.5 km of access road per km of right-of-way) depending upon the topographic conditions encountered during construction. It is not possible at this time to estimate the precise acreage that would be involved in permanent access roads for fiscal year 1979, since the possibility of paralleling existing transmission or utility lines would allow for the sharing of access roads, thereby avoiding the necessity of constructing many new roads.

All tall growing vegetative species must be removed from new rights-of-way constructed as part of the proposed program in order to prevent power outages caused by trees growing into conductors.

The Right-of-Way Management Program for fiscal year 1979 will also affect vegetation. The proposal, as detailed in the attached Vegetation Management Appendix, will result in a temporary reduction in vegetative cover on approximately 19,100 acres (7,730 ha) of right-of-way and the permanent removal of all vegetative cover on approximately 950 acres (380 ha) of substation property scheduled for control. Of this 20,050 acres (8,110 ha) total, about 23 percent or approximately 4,600 acres (1,860 ha) will be controlled aerially; the remainder will be controlled utilizing selective methods of ground application of herbicides on 12,600 acres (5,100 ha) (about 63 percent), and by hand cutting of about 1,900 acres (770 ha) (10 percent). With the exception of grasses, forbs, and resistant shrubs, all vegetative growth will be affected to some degree as a result of aerial controlled methods. Only tall growing or target vegetation will be affected by the more selective ground control measures which represent a combined total of nearly 73 percent of the total right-of-way acreage scheduled for fiscal year 1979. The temporary and permanent changes in vegetative cover will in turn affect wildlife as described in section 5 below.

No unique vegetative stands of regional or national importance would be affected as a result of the Fiscal Year 1979 Proposed Program.

4. Fish Resources

In constructing the proposed new facilities, local impacts to fishery resources can be expected to occur as a result of construction and maintenance operations conducted adjacent to the major waterways as well as to the numerous smaller streams that would have to be crossed during construction and maintenance operations.

Impacts to waterways can result from the introduction of suspended solids or sediment caused by the disturbance of topsoil resulting from nearby clearing and construction operations. Nutrients leached from disturbed soils may also be introduced to nearby streambeds and result in the stimulation of growth of undesirable aquatic vegetation. Wherever possible, vegetative ground cover which poses no threat to transmission line operation is left intact or protected as much as possible from damage due to construction activities. Special care is taken to maintain as

much vegetative cover as possible within 100 feet (30 meters) of a waterway. This protective "buffer strip" effectively serves to minimize sedimentation by entrapping debris that would otherwise enter the aquatic environment.

In addition to the impacts of adjacent construction activities, small streams will also be affected by fording operations. Where nearby roads or bridges are not available, smaller streams encountered will be either forded or culverts will be constructed in order to provide access for construction and maintenance equipment. During construction, streams encountered are often crossed 20 times or more. After construction, transmission lines are inspected on the ground at least once every year in nonmountainous terrain and twice a year in mountainous terrain when all streams would again be crossed. Prior to construction of the new facilities proposed for fiscal year 1979, State officials will be consulted and an agreement will be reached as to which streams may be forded and which will require culverts.

Aside from the fording of streams during construction and maintenance operations, past experience has shown that, although not authorized to do so, hunters and recreationists using four-wheel drive vehicles also utilize fords established as part of BPA facility construction, causing additional siltation and disturbance of the local aquatic environment.

Although the installation of culverts can effectively reduce stream siltation caused by the crossing of vehicles, these structures can, in themselves, result in a localized increase in water turbulence thereby altering the aquatic environment immediately around the installation.

In addition to the physical disturbance of gravel beds that would be caused by fording, the introduction of suspended solids into an aquatic environment will result in an increase in fish mortality by decreasing the flow of clean, oxygenated water through interstices or spaces in gravel beds. Any decrease in water velocity associated with a decrease in permeability of the gravel bed will directly affect hatching success, growth, and survival of fish fry deposited during spawning. These impacts become increasingly significant when they occur in combination with an increase in water temperature such as that caused by the removal of streamside vegetative cover. Normally, the clearing for transmission lines is not extensive enough to substantially increase water temperatures. High levels of suspended sediment can also be expected to cause some gill damage to resident fish. ^{13/}

^{13/} Warren, Charles E., 1971. Biology & Water Pollution Control. W. B. Saunders Publishing Co., Philadelphia, Pennsylvania, 434 p.

Impacts to fishery resources associated with construction are only temporary, and whenever possible construction operations will be scheduled to avoid periods of peak spawning activity. Nevertheless, some short-term localized reduction in fish production can be expected to occur in those streams that are traversed, especially during and immediately after construction activities.

Impacts to ocean-dwelling aquatic organisms would result from the construction trenching operations associated with one facility in the FY 1979 Program (Study Area 79-2). Submarine cable trenching operations on Lopez, Decatur, and Fidalgo Islands would adversely affect some of the slow moving aquatic organisms inhabiting the excavated areas, causing moderate to high mortality. These include adult shellfish such as clams and oysters, as well as larval and juvenile stages of other marine organisms which would be affected by resulting sedimentation which clogs their feeding and respiratory mechanisms.

Aside from those impacts that would result from the proposed construction activities, the herbicides to be used during fiscal year 1979 to control vegetation on existing rights-of-way could also have an adverse impact on fishery resources if applied directly to waterways or if significant amounts are carried off as surface runoff into adjacent streams.

Realizing this potential, BPA has developed standards governing the use and application of herbicides. Herbicides are not sprayed directly into streams, rivers, lakes, and other bodies of water. Moreover, aerial application of herbicides is not made within 100 feet (30 m) of a body of water; selective ground application is not made within 10 feet (3 m). Thickeners are used in spray mixtures to minimize drift. The possibility of spray drifting onto nontarget areas is further minimized by avoiding aerial application entirely when the wind velocity is 6 mph (9.6 kph) or greater; ground application is not permitted when the wind velocity is 10 mph (16 kph) or greater.

In order to minimize the concentration of these compounds in surface runoff, only those herbicides which are highly resistant to leaching and which decompose readily within the soil will be used. When applied as directed, there is no current evidence to indicate that the herbicidal compounds to be used will cause any harmful effects to aquatic organisms. ^{14/}

^{14/} Mullison, W. R., 1970. Effect of Herbicides on Water and Its Inhabitants, Weed Science, Vol. 18, No. 6, pp. 738-750.

Although, as a matter of policy, the above precautions are employed by BPA to minimize exposure of the aquatic environment to these compounds, the risk of accidents always exists. (See also subsection D, Risk of Accidents.)

A listing of the specific herbicidal compounds that will be used during fiscal year 1979 are included in the attached Vegetation Management Appendix. Label information, registration numbers for each of these compounds as well findings of studies regarding the physical distribution and persistence of some of the herbicidal compounds used by BPA are included in Appendix B of the Role EIS (Chapter VI, Chapter VII.C.6., and Chapter VIII.C.5.). A continuation report on BPA's Herbicide Residue Monitoring Program is also included as part of the Right-of-Way Management Appendix attached to this document.

5. Wildlife Resources

Construction of the transmission facilities and access roads included in the Proposed Fiscal Year 1979 Program will inevitably have some impacts upon wildlife, especially in forested areas. Impacts in these areas would result from the physical disturbance of wildlife habitat caused by opening up new areas to hunting pressures, the operation of heavy equipment routinely used in the construction of transmission facilities, increased human activity, noise, and dust, all of which could affect existing wildlife distribution patterns.

The greatest impact to wildlife can be expected to occur as a result of construction operations in previously inaccessible habitat. Where habitat is suddenly opened up by rights-of-way, resident wildlife populations will be subjected to increased exposure from predators, including man. Resultant increases in predation or hunting pressure could have long-term impacts on population levels and, if severe enough, certain species may even leave the area. Those Fiscal Year 1979 Proposals requiring new right-of-way in farmland and other previously disturbed areas would have minimal impact to wildlife.

The clearing of the rights-of-way which includes the construction of access roads where none are available will also reduce the total amount of cover available to resident species of wildlife. This consideration is especially significant in those areas where available cover is limited. However, in forested areas, clearing of the right-of-way during line construction and maintenance will usually result in an increase in the growth of available forage utilized by many of the larger herbivores. This particular impact is becoming increasingly beneficial,

especially in light of the growing decrease in available big game winter range associated with widespread fire suppression techniques and timber management practices. 15/ On BPA rights-of-way, for example, it has been found that big game species, such as deer, elk, and bighorn sheep, will utilize forage on the right-of-way. There is apparently no difference in animal use of transmission line rights-of-way as opposed to natural clearings. Both natural and man-made clearings in forested areas contain a greater percentage of understory vegetation than the surrounding forest. 16/ In addition, the clearing of rights-of-way can have a beneficial effect on wildlife by increasing the "edge effect" which results in an increased mixture or juxtaposition of the various vegetative or habitat types, thereby providing a beneficial diversity of both food and cover preferred by wildlife species in general.

The human activity, noise, dust, and other disturbance associated with construction activities could result in the dispersion of many of the wildlife species found in the area. This type of effect is expected to be temporary and most of the resident populations of larger wildlife species, especially deer and elk, should reestablish themselves once construction operations have been completed.

It is possible that resident populations of many of the smaller animals including rodents, rabbits, and other mammals may be affected to a greater degree. In this latter situation, the survival of individual animals will be noticeably decreased. This in turn could have a temporary effect on the density of these local populations but should not have any long-term (more than 2 years) effect upon these population levels, because of the recuperative ability of these smaller animals due to their generally higher reproductive potential.

Some reduction in wildlife habitat will result from the periodic vegetation control measures necessary to prevent interference of tall vegetation with line operation and maintenance access. In addition to approximately 1,900 acres (770 ha) of right-of-way which will be controlled by hand or mechanical cutting where only target plants are affected, herbicides will be used to maintain an estimated 17,200 acres (6,960 ha) of transmission line rights-of-way during fiscal year 1979. The extent to which trees and brush on the treated right-of-way will be

15/ Leege, Thomas A., 1975. Question: Timber or Elk in Northern Idaho. Idaho Wildlife Review. Vol. XXVII, No. 4, Jan.-Feb. 1975.

16/ Goodwin, John G. Jr., 1975. A 500-kV Transmission Line and Elk Movement. Unpublished Report

either killed or defoliated varies according to the treatment technique utilized, such as selective ground spraying or broadcast aerial delivery of herbicides, and the susceptibility of the various vegetative species to the particular herbicide that is used. During fiscal year 1979 all woody species will be defoliated on approximately 4,600 acres (1,860 ha) to be treated by helicopter application of herbicides, with the herbaceous plants, including grasses and forbs, and resistant shrubs remaining. An additional 1,900 acres (770 ha) are scheduled for hand cutting with 12,600 acres (5,100 ha) scheduled for selective ground application of herbicides. However, nontarget vegetation, valuable as wildlife forage, will not be affected by these more selective delivery techniques thereby limiting impacts to wildlife.

Impacts to wildlife habitat associated with the aerial application of herbicides will be similar to those resulting from construction operations, in that they both result in the temporary removal of forage and cover. In areas where either forage or cover may happen to be in short supply, any further reduction in availability could result in increased competition for the remaining habitat resulting in a corresponding increase in the level of stress. Significant increases in stress, especially in conjunction with a limited food supply or availability of cover, could result in an increase in individual animal mortality. However, since BPA's right-of-way management is concerned with the maintenance of existing transmission facilities, new or additional impacts to wildlife habitat and/or mortality rates are not expected to occur.

B. Impact on Socioeconomic Resources

The improvement, expansion, and maintenance of BPA's transmission facilities provide significant diverse social and economic benefits to the Pacific Northwest and to the entire nation, through the resulting contribution to an abundant, reliable regional power supply. As a member of the cooperative regional power program, BPA provides approximately 80% of the region's bulk power transmission capacity. The regional power program, which is based on close participation and coordination by Federal power-related agencies and the region's utilities, is designed to provide regional power requirements with the minimum investment of resources and the minimum impact on the environment.

The most important single benefit of an adequate, reliable regional power supply is its contribution to a relatively high regional standard of living. An abundant supply of electric energy is highly desirable to the various economic sectors which provide employment as well as goods and services for the region's inhabitants.

While the availability and reliability of the power supply does not itself cause residential, commercial, or industrial development, nor the resulting economic growth and population concentration, the lack of electric energy may inhibit these activities. In other words, the role of electricity can be considered permissive in that it allows growth to occur if conditions are otherwise favorable, and limiting in that it imposes a relative ceiling on the level of economic activity which can be conducted. Therefore, depending on a variety of factors other than the availability of reliable electric energy, construction of transmission facilities may eventually be accompanied by various kinds of development and growth. New commercial and industrial construction may occur which will have direct impacts on the environment. This may in turn lead to undesirable impacts on land use, increased solid waste production, increased liquid waste and sewage disposal problems, increased air pollution, and increases in local traffic associated with population concentration in areas of new or improved electric service where industrial or commercial development occurs. In some locations, population concentration and expanded public services could ultimately lead to recreational development in previously undeveloped areas, with attendant environmental impacts.

Impacts resulting from the line construction activities themselves primarily affect the local communities surrounding the construction site, especially since the specialized construction methods used usually makes it necessary for contractors to bring in a labor force from outside the area. The extent of these impacts to the community are determined by the type and size of the construction project and the size of the existing community.

For example, if we examine the construction schedule for two transmission lines, a 10-mile (16 km) segment of a small capacity 115-kV line and a 100-mile (161 km) section of a high-capacity 500-kV line, we find that the former construction time may be as little as 4-1/2 months with a maximum workforce of about 20 men; whereas with the larger project, construction may take as long as 20 months, requiring a peak workforce of as many as 170 workers.

It can be expected that impacts to the surrounding community resulting from construction of the smaller line would be minor and of a short duration. Similar impacts involving the need for housing for the construction workers, increases in road traffic and noise levels, etc., would occur during the construction period for the larger project, but these impacts could potentially affect a larger number of communities for a longer period of time.

Similarly, with the construction of a substation, impacts to adjacent communities would also vary depending upon the construction workforce involved, which could be from 12 to 30, depending upon size and the duration of the construction period. The construction period could vary from less than 2 months to almost 8 months.

1. Land Use

The transmission lines, substations, switchyards, and related facilities in the proposed program will have an impact on the use of the land they occupy and, to a lesser extent, on adjacent lands. The nature and scope of this impact depends upon the type of facility and the existing and potential uses of the land involved.

Substations - The three new substations and associated switchyards included in the proposed program, together with additions at existing substations, will occupy an estimated 15 acres (6 ha) of land.

This 15 acre (6 ha) figure consists largely of rangeland and dryland wheat.

Since substation sites represent a single-purpose or dominant use, the total of approximately 15 acres (6 ha) involved in the Fiscal Year 1979 Program will be removed from their existing use for the life of the facilities. In addition, some substations, by nature of their location, may serve as a focal point for future transmission lines and, as such, represent a potential impact greater than that resulting from the substation itself.

Transmission Lines - Existing land uses that would be affected by typical transmission routes for the fiscal year 1979 new transmission line proposals will depend on the type of land use as described below. For a more detailed breakdown of the impacts to the various land uses and natural resources for the individual facilities, please refer to the attached final facility planning supplements.

a. Forest Land

The Fiscal Year 1979 Proposals will require approximately 50 linear miles (80 km) of new and parallel right-of-way through existing forest land, involving approximately 80 acres (32 ha) of right-of-way. Except where the lines span canyons or other areas where vegetation cannot grow tall enough to interfere with

the lines overhead, tall-growing trees and brush are removed from the right-of-way to allow for construction, operation, and maintenance of the new transmission facility. Commercially valuable timber is removed and sold, in some cases before the timber has reached maturity. Because most of the new transmission line to be constructed in forested areas would be entirely upon existing easements, the facilities associated with the Fiscal Year 1979 Proposed Program would only require the clearing of approximately 15 acres (6 ha) of forest.

After construction is complete, the right-of-way is maintained to prevent regrowth of tall-growing vegetation for the life of the new facility. In addition, timber immediately adjacent to the cleared rights-of-way may also be adversely affected in that it may be subject to an increased chance of wind throw and sun scald.

As discussed in Appendix B of the Role EIS, the rights-of-way involved are sometimes suitable for other economic uses such as cattle range, crop production, and Christmas tree farming. However, they may become idle except for use by certain species of wildlife including the larger herbivores which may benefit from the increase in "edge" caused by the clearing operations.

Where existing access roads in forested areas cannot be used for construction and maintenance, temporary and permanent access roads are built, thereby imposing an additional impact. These roads, which are normally about 14 feet wide, can usually be located within the cleared right-of-way. However, additional access roads are sometimes necessary from the right-of-way to the nearest existing commercial roads to allow access around steep slopes and other natural obstructions on the right-of-way.

Because most of the new transmission line through forested areas would be parallel and over existing right-of-way, virtually no new access roads will be required through forest land, although approximately 5 miles of existing road would require improvements.

b. Cropland

Transmission lines for the Fiscal Year 1979 Proposals could cross up to 30 linear miles (48 km) of cropland. Impacts to cropland would occur as land occupied by tower bases is removed from production. In addition, decreased crop production may occur in the immediate vicinity of tower sites.

Preliminary design plans for fiscal year 1979 indicate that wood poles could be utilized as support structures over 25 miles (40 km) of the 30-mile (48 km) total. The remaining 5 miles (8 km) would employ the use of steel towers.

The total acreage of cropland permanently removed from production for tower footings would be approximately 2 acres (.8 ha). New substations and substation additions located in cropland could remove as much as 10 acres (4 ha) from production. The remainder of the right-of-way would be compatible with crop production, although some adverse impacts such as the overworking of soil, seed loss, overfertilization, overlapping coverage of weed control chemicals, and harvest losses may occur immediately around the tower. This could result in an additional reduction in crop yield. The extent of any adverse effects adjacent to towers will depend upon the type of crop growth and the farming practices followed, as well as the kind of equipment used for cultivating, planting, irrigation, pest and disease control, and harvesting. The total amount of cropland to be traversed by new right-of-way easements would be approximately 200-250 acres (80-100 ha).

In general, the area of the right-of-way between the towers can continue to be used for crop production. However, where towers or poles are in the path of cultivation, some inconvenience and additional operator time may result, especially where large equipment such as wheat combines are utilized. As a result, operators might choose not to bring new land on the right-of-way under cultivation, although experience indicates that land presently under cultivation will continue to be farmed.

Depending upon their final locations, the facilities proposed as part of the Fiscal Year 1979 Proposed Program may impact approximately

50 acres (20 ha) of irrigated farmland. Some special effects may result in these irrigated areas. Where lines will traverse existing irrigated farmland, tower sites will be chosen which minimize their conflict with existing irrigation system(s). In some instances, realinement of the irrigation pattern may be required to obtain maximum use of the remainder of the field. Towers are not usually located within fields being irrigated by circular sprinkler systems. However, opportunities for changes in the irrigation pattern may be limited by the existence of the towers in adjacent land.

The above effects on agricultural land use are long term. There will also be some unavoidable short-term effects as a result of construction access, tower assembly, erection, and stringing of the conductor. A temporary construction access road is often needed. Where the tower erection area is on cultivated land, loss of production from staging areas and access roads will result if construction is carried on during the crop season. However, construction can usually be completed in one growing season. A small reduction in crop yield in the years following construction may result from the temporary effects of soil compaction and disturbance.

The landowner is compensated on an individual basis for the land occupied by the tower sites, for the right-of-way easement, and for any crop damage that occurs. Actual compensation depends upon the extent and duration of any damage and the type of crop under cultivation.

Since access is usually available along the right-of-way in cropland, permanent access roads in these areas are not normally established.

c. Rangeland

Approximately 15-18 linear miles (24-29 km) of rangeland vegetation could be crossed in the construction of the Fiscal Year 1979 Proposals depending on final location. Since only that land actually occupied by the tower footings will be removed from production, a total of less than 4 acres (less than 1.6 ha) of rangeland would be permanently affected by the

proposed program. In addition, approximately 2 acres (.8 ha) of rangeland would be permanently removed due to the construction of a substation.

The remainder of the right-of-way would generally be compatible with range activities, although some clearing of brush and trees may be necessary to provide access for the heavy construction equipment.

Since access roads on rangeland are temporary and are generally seeded or allowed to grow over with natural vegetation after construction, no additional grazing land would be permanently removed from production by these roads.

d. Other

(1) Major Urban and Residential Areas

The only major urban or residential area that may be affected by construction activities in the Fiscal Year 1979 Program are various residences in the vicinity of the existing Olympia-Frederickson and the Frederickson-White River 230-kV lines (Study Area 79-4), and on Decatur Island (Study Area 79-2).

The presence of transmission lines or substations in such areas could have an impact upon the suitability of adjacent land for future land uses. Adjustments may have to be made in plot layout patterns and residential lot sizes to reflect the presence of the new facilities.

At this time, we are not aware of any existing or proposed Federal, State, or local land use plans which would be affected by the proposed facilities. We will be examining the possibility of conflicts with land use plans in more detail when alternative locations have been identified and the results of these evaluations will be included in the Facility Location Supplements when they are issued.

On the basis of preliminary planning data it now appears that some residences and buildings would need to be removed as a result of the Fiscal Year 1979 Program.

Once it is determined exactly which residences and buildings require removal, procedures specified in the Uniform Relocation and Assistance and Land Acquisitions Policies Act of 1970 will be followed.

(2) Recreation Lands

Because of the scenic and diverse character of the Pacific Northwest and the variety of recreational resources that exist in this region, it is inevitable that some of the new facilities proposed in fiscal year 1979 will pass near existing recreational areas. Some of the new proposals will also pass through locations identified as having potential recreation use. In either situation, transmission lines, substations, and power system control stations can be expected to have an adverse visual impact upon the natural scenic character of the area, and since this character is frequently a factor contributing to an area's importance as a recreational resource, any visual impact could potentially affect its recreational value.

Much of the public demand for recreation within the region is centered around scenic lakes, streams, and rivers. Therefore, transmission lines and associated electrical facilities affecting these types of resources would have an impact upon the quality of many recreational uses.

Even though the actual impact of the proposed new facilities on recreational resources will ultimately depend upon the final transmission line location or crossing, it can be assumed that the transmission lines, tower structures, and associated clearings would be visible to recreationists using these resources. Depending upon the degree to which structures will intrude upon the scenic attributes of these areas, the quality of the recreational experience otherwise available would be reduced.

Transmission line rights-of-way and their associated access roads are often used for various types of recreational activities

such as bicycle trails, horse trails, snowmobile routes, and off-road vehicle access. Since transmission line rights-of-way are held in easement by BPA, rather than fee-ownership, recreational use depends upon the landowner or land managing agency in question.

Use of transmission line rights-of-way by snowmobiles and off-road vehicles can and has resulted in detrimental effects, including increased erosion, wildlife disturbance, increased fire hazards, and streambed disturbance. BPA cooperates with landowners and land managing agencies in preventing unauthorized use of rights-of-way and access roads by installing gates and locks. Pursuant to Executive Order 11989, BPA will cooperate with Federal land management agencies whenever the latter determines that the use of off-road vehicles in particular areas must be controlled or prohibited in order to prevent additional adverse effects.

(3) Scenic Resources

Substations, transmission lines, and associated access roads that are part of the Fiscal Year 1979 Program Proposal represent a potential impact on the natural beauty of the scenic areas they traverse.

A few of the facility proposals could affect certain scenic resources that exist within their respective study areas. Under preliminary plans, new facilities could cross and therefore be visible from one existing scenic roadway (Study Area 79-1). In such situations visual impacts result from the clearing of right-of-way which, in addition to disrupting the existing vegetative pattern, can result in undesirable visual effects such as "skylining" where transmission towers are set in relief, making them visible for long distances.

Each of the resources mentioned above will be affected to varying degrees depending upon site location and any mitigation measures that would normally be employed as part of the facilities' design.

Guidelines relative to various screening and design measures have been established and are applied wherever appropriate (see Chapter VIII.B.2. of Appendix B of the Role EIS, and Environmental Criteria for Electric Transmission Systems published by USDI/USDA).

(4) Cultural Resources (Historical, Architectural, and Archeological)

An examination of the National Register of Historic Places (including lists published in the Federal Register, Vol. 42, No. 21, on February 1, 1977, and in subsequent monthly addenda) has revealed that no sites listed in or eligible for nomination to the National Register will be affected by the proposed plans of service described in the three fiscal year 1979 facility planning supplements.

Some sites of local importance, as well as some sites listed on the Washington Statewide Inventory of Historic Places, could possibly be affected by the proposed program. Furthermore, an identified archeological site, whose eligibility for nomination to the National Register is yet to be determined, could possibly be affected by one of the proposals (Study Area 79-2), depending upon final line location.

In addition to examining the National Register and contacting State Historic Preservation Officers, BPA is soliciting comments from local and/or regional historical and archeological authorities relative to the completeness and accuracy of BPA's analysis of these resources. Comments and information obtained as a result of these consultations will be included in the final facility planning supplements. Of course, the extent to which any cultural resource could be impacted depends upon final line or facility locations, which have not yet been determined. If, during the location and design phase, it appears that an historical or archeological site listed in or eligible for nomination to the National Register could be affected by any of the fiscal year 1979 proposals, BPA

will comply with the procedures required by the National Historic Preservation Act of 1966 (P.L. 89-665) as well as the requirements of Executive Order 11593, as outlined in Section XII (Historical and Archeological Appendix).

In compliance with the Wild and Scenic Rivers Act (P.L. 90-542) and the National Trail Systems Act (P.L. 90-543) BPA has examined all known sections of rivers and trails belonging to the national system as they apply to the Fiscal Year 1979 Proposed Program and has determined that there will not be a potential impact to any such resource.

In order to further assure compliance with each of these two Acts, BPA will forward copies of draft location supplements on its Fiscal Year 1979 Proposed Program to both the Bureau of Land Management and the Bureau of Outdoor Recreation for their review and comment.

(5) Natural Landmarks

As outlined in the Federal Register (F.R. Vol. 40, No. 87, May 5, 1975), the National Park Service has established a natural areas program which includes those sites identified in the National Register of Natural Landmarks. No listed sites will be affected by the Fiscal Year 1979 Proposed Program in either that listing nor supplementary addenda as of January 1977 (F.R. Vol. 42, No. 2, January 4, 1977).

C. Impacts on Physical Environment

1. Air Quality

As previously mentioned, the Fiscal Year 1979 Proposed Program would involve maintenance activities on some forest lands. Unmerchantable trees and brush cleared from this acreage during construction and maintenance operations will be disposed of. Historically, open burning has been regarded as the standard method of disposal for this type of debris. Where permissible by local regulations and State and Federal law, BPA will allow contractors to continue to use open burning during the construction of those facilities included in the

Fiscal Year 1979 Program. This burning will result in the introduction of combustion byproducts, including particulates and gasses, into the atmosphere. (See Section IX.B.6. of this statement for additional information).

With increasing frequency, county and State air pollution control regulations are requiring improved disposal methods, such as forced-air burning which, although effective in reducing particulate emissions, involves considerable expense. In disposing of slash and unmerchantable timber cleared from forested land during fiscal year 1979, BPA's contractors will consult with the State and local authorities regarding permissible techniques and will follow all applicable regulations governing burning methods and times permissible.

Since new substations and maintenance buildings constructed as part of the Fiscal Year 1979 Proposed Program will be heated and cooled electrically, there will be no air emissions from these sources.

2. Water Quality

The Fiscal Year 1979 Program may require the fording of numerous small or intermittent streams or waterways.

The disturbance of topsoil and removal of vegetative ground cover associated with these construction and maintenance operations will result in an increase in erosion and subsequent introduction of suspended solids, including organic debris and nutrients, into the aquatic environment. These effects will result in short to moderate term increases in turbidity, increased growth of undesirable aquatic vegetation, and reduction in the dissolved oxygen concentration of the water, rendering the aquatic habitat less suitable for fish life during this period. The fording of smaller streams will result in similar effects as well as cause a physical disturbance of the streambed.

The removal of vegetative cover along riverbanks can increase the exposure of the water surface to sunlight which would result in a localized increase in water temperature. ^{17/} Increase in water temperature can result in a decreased level of dissolved oxygen. Since transmission lines are usually constructed perpendicular to major waterways and since vegetative "buffer strips" are normally left intact, impacts associated with the clearing of streamside vegetation will be negligible.

^{17/} Brown, George W., & James T. Krygier, 1967. Changing Water Temperatures in Small Mountain Streams, J. Soil Water Conserv. 22(6): 242-244.

3. Noise

Operation of high-voltage transmission lines, particularly those above 345 kV, results in some radio, television, and audible noise interference immediately adjacent to the right-of-way. As previously mentioned, approximately 57 miles (92 km) of 500-kV lines could be required for the Fiscal Year 1979 Program. The audible noise level of a 500 kV line incorporating BPA's new triple-bundle conductors measured at the edge of the right-of-way averages 47 decibels (equivalent to the noise of light highway traffic at 100 feet). The major impact to local residents resulting from the operational noise of these transmission lines would be annoyance. Reactions to this impact will vary depending upon the actual level of noise, distance from the line, and individual or subjective sensitivities. Since the 500-kV lines that would be built as part of the Fiscal Year 1979 Program are at some distance from most residences, and because the noise level of BPA's new triple-bundle conductors for 500-kV lines are well below the level at which noise complaints are received,^{18/} no adverse noise impacts are expected.

Noise from substations consists primarily of a low-level hum from transformer equipment and corona noise associated with the incoming lines. Impacts from these sources will be similar to those resulting from operation of transmission lines. Automatic circuit breakers in substations, which are activated during circuit failures and in switching operations, can produce a noise pulse of up to 100 decibels. Substations included in the Fiscal Year 1979 Program are not expected to be located close enough to any existing private residences to cause adverse noise impacts.

Pursuant to the Noise Control Act of 1972, State governments have developed and implemented noise control regulations. It is the intent of the Noise Control Act and Executive Order 11752 that Federal agencies comply with substantive state and local noise standards and limitations.

Realizing its obligations, Bonneville contracted the services of a consultant, Bolt, Brannick and Newman, to determine the status of BPA facilities in terms of their compliance with noise standards within the State of Oregon. As a result of this survey, it was determined that there existed at least four BPA substation facilities in Oregon that did not comply with the State's standards. Those identified were:

^{18/} Electric Light and Power Magazine, T/D Edition, August 1974.

1. McLoughlin Substation located in Oregon City, Clackamas County.
2. Alvey Substation located in Eugene, Lane County.
3. Gold Beach Substation located in Gold Beach, Curry County.
4. Keeler Substation located in Portland, Washington County.

The Gold Beach and Keeler Substations exceed Oregon State standards by 2dB with the Alvey Substation exceeding state standards by 4dB. These are considered to be very minor violations and no remedial action is planned at this time.

However, the violation at McLoughlin Substation is felt to be substantially above the levels established by the State of Oregon. A mitigation measure, namely the construction of sound barriers at the cost of \$150,000, will be employed by Bonneville to lessen this violation. Although the construction of these barriers will substantially minimize the violation, it will not bring the substation into full compliance with the standards established by the State of Oregon.

At this time, the full resolution of this matter is pending the outcome of discussions currently being conducted between BPA, EPA and Oregon Department of Environmental Quality. The dilemma being faced by BPA, and the one towards which these discussions are being aimed, is the desirability and feasibility of requiring BPA to adhere to local standards which differ widely from state to state. The problem here is quite simply the practicality of Bonneville building electrical facilities to different noise standards depending upon the state involved. An alternative to this approach, which Bonneville is suggesting, is the adoption of uniform standards that can be applied throughout the whole region.

Another source of noise expected to occur in conjunction with the Fiscal Year 1979 Program arises from the use of helicopters in patrolling transmission lines, in the aerial application of herbicides, and sometimes in tower construction. Other sources of noise emission are the use of heavy construction equipment and occasional blasting during construction operations. Noise levels resulting from these operations, which are described in Appendix B of the Role EIS (Chapter VII.C.1.), will temporarily disturb nearby residents.

D. Risk of Accidents

Transmission line failures resulting from an energized conductor falling to the ground can occur as a result of intentional vandalism, such as rifle fire, or as the result of natural calamities such as severe storms and landslides. In either case, when a line drops to the earth, it is usually switched off in less than one-half of a second. For this duration, a voltage would appear in the vicinity of the tower involved, resulting in a localized hazard.

All electric transmission lines, including approximately 105-108 miles (170-174 km) of overhead transmission line proposed for fiscal year 1979 pose an inherent hazard if objects such as irrigation pipe or construction booms are brought in contact with the conductor. Because conductor height from the ground increases with voltage, the probability of such accidents is much smaller with the higher voltage lines of the type built by BPA. However, construction of any transmission line across agricultural land does create a hazard, and farm operators must observe basic precautions in their activities underneath and immediately adjacent to the lines. In an effort to minimize the possibility of accidents, BPA has published a brochure entitled "Tips on How to Behave Near High-Voltage Power Lines."^{19/} As is demonstrated by the frequent occurrence of farming underneath existing BPA lines, these rules should pose no additional hindrance to use of agricultural land occupied by the new facilities constructed as part of the Fiscal Year 1979 Program.

Accidents associated with the maintenance of existing transmission lines are always a possibility. The greatest risk is of the misapplication of herbicides as the result of human error. Additional impacts could occur from the inadvertent application or drift of herbicides off of the right-of-way affecting nontarget vegetation.

One of the principal chemicals used by BPA to control vegetation on rights-of-way is Tordon (picloram and 2,4-D). This is one of the approved herbicides which will effectively control coniferous species, particularly when applied aerially. The effectiveness of Tordon is attributed to the relative persistence of its main ingredient, picloram, which is slow acting and continues to be absorbed by vegetation for 1 to 2 years after application. Although Tordon is slow acting and consequently reduces the brownout effect it is classified as persistent, and does, therefore, represent a potential for long-term nonselective setback of vegetation on the rights-of-way where it is used.

^{19/} Bonneville Power Administration. Nov. 1973. Tips on How to Behave Near High-Voltage Power Lines.

Monitoring studies, including soil sample analyses on treated rights-of-way, have indicated that Tordon remains in the uppermost layers of the soil where it is degraded through natural processes. Other tests indicate that there is no significant movement of the herbicide off the right-of-way through water runoff. (copies of test reports are available by request by writing to BPA at the address indicated on the Summary Page to this document. A continuation report covering BPA's herbicide monitoring program for the period May 2, 1974, through August 1, 1975, is included as part of the Vegetation Management Appendix to this statement.)

The herbicides used by BPA are very low in toxicity to animals and humans. Because these herbicides are used in diluted form, potential hazards are further minimized. Studies have indicated that 2,4-D and picloram are readily excreted by animals and no accumulation in the food chain will result.

The electrostatic and electromagnetic fields associated with the high-voltage lines proposed as part of the Fiscal Year 1979 Program can induce voltage and currents in metallic structures and equipment near the line. The magnitude of the induced voltage and associated ground-discharge current due to the electrostatic field depends upon the line voltage, the size of the object being charged, and the object's distance from the line conductors. The magnitude of induced current due to the electromagnetic field depends upon the load current in the conductors, the orientation and length of the object, and its distance from the conductors. Procedures for grounding metal structures and equipment along with other precautions used by BPA substantially eliminate the potential hazard and nuisance associated with this phenomenon.

E. Flood Hazards

BPA has reviewed the new facilities in the Fiscal Year 1979 Program with respect to floodplain management. Although precise locations have yet to be determined at this early stage in the planning process for most of the Fiscal Year 1979 Proposals, it does not appear that any of the new facilities will be located within a floodplain. Once alternative and proposed facility locations are determined subsequent to reconnaissance, possible facility locations within floodplains will be more readily identifiable. Generally speaking, transmission facilities are not located within floodplains in order to avoid the possibility of flood damage. Facilities that must necessarily be constructed in flood plains would be provided maximum flood protection.

Pursuant to Executive Order 11988, BPA will evaluate the potential effects of any actions it may undertake in a floodplain. Unless there is no practicable alternative, actions undertaken within floodplains will be avoided. In the event that the siting of a facility within a floodplain proves unavoidable, the action will be modified and designed so as to minimize potential harm to or within the floodplain.

V. Mitigating Measures Included in the Fiscal Year 1979 Program

Measures specifically employed to lessen the potential adverse impacts of transmission lines are of two basic types: (1) those measures that are incorporated into the location or design of a transmission facility, and (2) those which are utilized subsequent to the construction of the facility. Both types will be utilized during the development of the Fiscal Year 1979 Proposals and during the maintenance operations scheduled for fiscal year 1979.

A. Construction

A description of the standard mitigation measures that are routinely used during construction operations to lessen the previously identified impacts to the natural, cultural, and socioeconomic resources can be found in Appendix B of the Role EIS (chapter VIII). In addition to Appendix B, the publication entitled "Environmental Criteria for Electric Transmission Systems" jointly published by the Departments of Agriculture and Interior summarizes the measures normally used to lessen visual impacts of transmission lines. This latter document is intended to serve primarily as a guideline in the development of mitigation measures that are broadly applicable to transmission facilities in general. Not all the criteria discussed in this document would have applicability to the specific proposals contained in the Fiscal Year 1979 Proposed Program, but every consideration will be given to incorporate these measures into the ultimate design of the Fiscal Year 1979 Proposals where feasible.

In developing a detailed plan of service for the new facilities, two key mitigation measures that will receive consideration are the paralleling of existing transmission lines and the upgrading of lower voltage lines to higher capacities.

1. Paralleling

Preliminary planning indicates that approximately 15 miles (24 km) of new transmission line and cable right-of-way required for the Fiscal Year 1979 new facilities could be located parallel to existing transmission right-of-way.

Where new rights-of-way must be utilized, careful consideration will be given to compatibility of the new right-of-way with current and potential future uses of the land. Special consideration will be given to the actual line location in order to avoid direct physical impacts to significant regional resources.

2. Upgrading of Existing Lines

Historically, Bonneville has adopted technological advancements in electrical transmission which increases the efficiency of its transmission system. With projected peakloads estimated to triple within the next 20 years, substantial amounts of additional right-of-way will be required to provide adequate service. Realizing this, BPA is making every effort practicable to minimize additional right-of-way that would otherwise be required by replacing existing lower voltage transmission lines with lines of higher capacity.

Consistent with this policy, the upgrading or replacing of existing low-voltage lines will be a primary consideration for the South Puget Sound Reinforcement proposal (Study Area 79-4) in the FY 1979 Program. This proposal would involve replacing approximately 50 miles (80 km) of existing 230-kV line with a line of higher capacity using existing right-of-way.

The development of a 1,100-kV transmission line, initially discussed in BPA's Fiscal Year 1975 Environmental Statement, represents a major effort on the part of BPA to research and develop a technology which will enable the agency to transmit electricity at a much higher capacity than possible on the existing 500-kV transmission grid. Once available, this technology will greatly minimize line impacts, particularly those on land use, by substantially reducing future right-of-way requirements.

3. Other

Specific mitigation measures to be employed during the construction operations of major Fiscal Year 1979 Proposals will be covered in facility location supplements once a proposed route has been selected. Appendix B of the Role EIS does contain a description of those mitigating measures that are generally used in construction operations.

B. Maintenance

Mitigation measures that will be employed during the proposed maintenance activities are primarily those concerned with the use of herbicides in BPA's program of vegetation management. In order to improve right-of-way appearance and decrease the impact on adjacent lands, BPA has (1) reduced the use of herbicides, resulting in a decreased reliance upon aerial spraying and an increase in more selective spraying techniques, (2) emphasized development of compatible and mutually beneficial

uses of the right-of-way by landowners, (3) improved access road design and maintenance practices, and (4) developed and implemented a tree removal program which has been effective in reducing adverse effects associated with maintenance clearing operations, by permitting certain stable 20/ trees to remain adjacent to the right-of-way.

In those cases where it is determined that aerial application of herbicides is appropriate, special measures, including the use of thickeners in the spray mixture, limiting application operations to the early morning hours when the air is still, and termination of aerial application when wind speed exceeds 6 miles per hour will be followed. These measures will afford an increased control over the dispersion of the herbicidal compounds. In addition, no herbicidal compound will be aerially applied within 100 feet (30 meters) of a stream, river, or lake.

In conjunction with an ongoing program initiated in July 1970, Bonneville is utilizing the services of a consultant to monitor and investigate herbicide residues in soil, water, and vegetation resulting from chemical brush control activities. 21/

Water samples taken in the course of the herbicide residue monitoring program have shown the presence of herbicides at very low levels. The observed levels diminish rapidly with the passage of time until they approach minimum levels of detection. These observations are consistent with other studies on forest lands, and they show the effectiveness of retaining buffer strips adjacent to bodies of water and other mitigation measures such as those mentioned above.

Transmission line structures in certain parts of BPA's service area provide ideal nesting places for large birds of prey. When nests are built directly over an insulator string, there is a danger that bird excrement deposited on or close to the insulators could result in a flashover and subsequent line outage. Another cause of line outage is that long pieces of debris used by the birds in building a nest can drop and make contact with the conductor.

20/ Any stable tree outside of the immediate right-of-way which does not come closer than the minimum safe working distance from the outside conductor when displaced to its maximum design swing is allowed to remain. Unstable trees which, when falling, would strike the outside conductor when in a static condition are removed. Unstable trees include decayed, insect-infested, leaners, and burn-damaged trees.

21/ Norris, Logan A., Herbicide Residues in Soil and Water from Bonneville Power Administration Transmission Line Rights-of-Way. Reports of 8-24-71, 5-19-72, 2-14-73, 5-9-74, and 8-25-75.

In the past, nests were completely removed from structures. Recently, however, BPA has adopted a policy of not destroying nests. Nests are left intact unless they are located directly over an insulator string. When nests are situated directly over a string of insulators, maintenance personnel are instructed to move the nest intact to a distance midway between phases on single circuit structures, or toward the center of the tower on double circuit structures. Experience has shown that birds will remain in relocated nests and will not build a new nest at the previous location.

All rights-of-way to be aerially sprayed with herbicides are preflown by the contractor with a BPA inspector prior to application to identify areas not to be sprayed (i.e. residences, water courses, recreation areas, rangeland). This is done so that people and livestock are not inadvertently exposed.

When herbicides are to be used that contain label restrictions on grazing of meat and dairy animals in treated areas, BPA contacts the owner/occupants of the areas to be treated. Every owner or occupant in areas where evidence of grazing exists is personally notified of any pending application of herbicides with grazing restrictions. This is accomplished by having BPA personnel contact owner/occupants personally. Once personal contact has been made a completed and signed "door hanger" notice is left as a reminder. When personal contact cannot be made a completed "door hanger" notice is left at the residence, attached to the door. If after a week no response is received, an additional effort is made to contact the owner/occupant.

Owner response is required to confirm that the "door hanger" notice was received. A self addressed envelope is attached with the "door hanger" to facilitate this. No application of herbicides with grazing restrictions will be made where personal owner/occupant contact has not been made.

VI. Unavoidable Adverse Environmental Impacts

The unavoidable impacts to natural resources and land uses as a result of the Fiscal Year 1979 Proposed Program are similar to those as previously discussed under Section IV. Included in this category are the following:

- permanent removal of all vegetative cover from approximately 30-35 acres (12-14 ha) as a result of the construction of the new substations and transmission lines.
- control of all tall woody vegetative species on forest land that would be required for maintenance activities during the fiscal year 1979.
- removal of up to 12 acres (5 ha) of cropland from production.
- vegetative control measures which will reduce vegetative cover on about 19,100 acres (7,700 ha) of existing right-of-way and 950 acres (380 ha) of existing substation property.
- effects both beneficial and adverse on existing wildlife habitat which would occur as a result of construction and maintenance operations as indicated above.
- impacts to fishery and ocean dwelling aquatic organisms as represented by the shorelines, waterways, or tributary streams that would be crossed during construction.
- visual impacts to recreational resources including Decatur Island, and various areas in the South Puget Sound area, and one existing scenic roadway.
- introduction of combustion byproducts into the atmosphere as a result of open burning of slash timber from clearing approximately 15 acres (6 ha) of forest land as well as slash associated with regular vegetation management activities.
- resultant soil erosion and losses attributable to the clearing, construction, and maintenance activities involved in the proposed program.

VII. Relationship Between Local Short-Term Uses of the Environment and Long-Term Productivity

The high-voltage facilities proposed for construction have an expected average useful life of 50 years for transmission lines with steel or concrete supporting towers and for associated substations. Wood-pole lines have an expected useful life of 35 years.

Some of the environmental consequences associated with creation of the facility can be considered short term. These are primarily associated with construction activity itself, and vary in duration. Construction activity interferes with the use of the land within the corridor while construction is underway (generally 3 months to 2 years for a specific location), and may also result in a disturbance to nearby wildlife and residents because of noise, dust, and visibility of men and equipment. Some construction impacts may also extend for a short term beyond the actual construction period. These are principally associated with the disturbance of vegetation by construction activities. Included among these are changes of habitat for certain wildlife species within the corridor, increased erosion, and resultant siltation, and they generally end with the regrowth of natural or introduced vegetation. Short-term impacts are covered in more detail in Section IV, Probable Impact of the Proposed Program on the Environment.

The long-term impacts on the environment and productivity, including the increased productivity of other activities resulting from the availability of electric energy, are directly dependent on continued existence of the transmission facility itself. The productivity resulting from the use of the electricity provided by new facilities will be substantially the same over the life of the facility. Similarly, the adverse effects on productivity, which are primarily related to land use considerations, will last as long as the facility remains in place.

If changes in technology make a transmission line obsolete, it can be dismantled and removed, although experience in past years indicates that corridors are usually upgraded to higher capacity as technology advances, rather than being entirely removed from service. Retirement would permit substantial return of the area to its natural state (vegetative regrowth may take several years), which will terminate any adverse impact on land and its productivity directly created by the line, and would also terminate the benefits to productivity resulting from the availability of the power provided. Retirement and removal of the line would make the corridor available for a full range of uses. However, if adjacent land use patterns (at the time of dismantling) have been modified by the existence of the line, the economic uses of the corridor may continue to be limited after removal of the line. No other direct long-term impacts on productivity have been identified.

VIII. Irreversible and Irretrievable Commitments of Resources

Construction and maintenance of facilities included in the Fiscal Year 1979 Proposed Program will require clearing and disposal of approximately 15 acres (6 ha) of timber from forested land. This land will be committed to other uses such as agriculture, range, or recreation for the life of the transmission facilities, or it may become unused except by wildlife. If the new transmission facilities are eventually retired, a return to the original forested state will be possible. This would take from approximately 20 to 50 years, depending upon location, although tree growth will begin to provide substantial ground cover after about 5 years. In addition, approximately 20 acres (8 ha) of agricultural, range, and other land will be occupied by construction of towers, substations, and other types of structures which represent comparatively permanent uses of the land.

Soil lost as a result of increased erosion during construction and maintenance operations will be irretrievably lost.

In addition to the commitment of land resources, approximately 11,000 tons (10,000 metric tons) of steel and 4,300 tons (4,300 metric tons) of aluminum required for the manufacture of the tower structures and conductor will be irreversibly committed to transmission uses.^{22/} If any of this equipment should later be retired, materials used in their construction can normally be reused elsewhere or recycled.

During the life of the facilities certain uses of the land will be restricted, limiting the range of beneficial uses of the land involved. The principal limitation will result from the restriction of large structures from the right-of-way. This limits the use of the right-of-way as a site for residential, commercial, industrial, and agricultural buildings. Because of the linear nature of a right-of-way, other suitable lands are generally available nearby.

Also, certain types of agricultural activities, such as wheel and circular irrigation, dependent on large areas of unobstructed access, may be affected. In areas where these activities are practiced, construction of the proposed facilities may necessitate adjustments in crop layout to obtain optimal use of the land and small portions of a holding may, in some cases, become uneconomic to farm. Where these situations occur, the landowner will be compensated.

^{22/} These figures are those based upon average conditions. The actual design of individual facilities will depend upon topography, soil characteristics, meteorological conditions, and the tower configurations utilized.

IX. Alternatives

A. Alternatives to the Program

1. Delay

The environmental impacts of the proposed new facilities will not vary significantly with time of construction, except that certain construction activities should and will be timed to occur during certain seasons. Except for corresponding delays in the impacts associated with the facilities, delaying construction of the proposed new facilities would be of environmental benefit if technological improvements made it possible to reduce impacts, or if these improvements or changes in local or regional power demand would avoid the necessity of building the proposed facilities.

No such changes are anticipated. Lead time necessary to incorporate new technological improvements preclude the possibility of utilizing any such development in time to meet projected loads and scheduled energization dates. Currently projected loads or demands are increasing at an annual rate of about 4.5 percent, about 980 MW in average energy demand per year (1600 MW yearly increase in peaking demand) in the Pacific Northwest. It is unlikely that changes in projected demands, which these new facilities are designed to serve, would obviate the construction of the Fiscal Year 1979 Proposals.

2. Nonconstruction

Cancellation of the Fiscal Year 1979 Program would most likely have only marginal, and probably adverse, impacts on the physical environment, since the chances are extremely high that the electric utilities in the Northwest would individually construct any transmission facilities that would be necessary to meet their utility obligations. BPA's proposals are the minimum necessary to meet forecasted load estimates, and are developed jointly with the electric utilities; consequently, any program undertaken by the utilities on an individual basis would be at least equal to and more probably would exceed the size, cost, and environmental impact associated with BPA's proposed plans.

If neither BPA nor the Northwest utilities decide to provide new or additional service to an area, it would only be possible to speculate on the impact of such a decision. However, it is most reasonable to believe that general economic development would continue and electrical

demand would rise until, in certain periods of high peak demand, the system would be overloaded, resulting in repeated power failures. Those businesses or industries that critically rely on continuous electrical service might decide to relocate in an area where reliable service is available. This would mean some people will move out to follow that business employment. However, other businesses that do not rely critically on continuous electrical service would probably take its place, and the electricity demand would continue to push up against the maximum allowed by the existing system capacity. Voluntary rationing systems, switching to alternate energy sources where available and applicable, and simply living at lower per capita energy consumption levels are all ways in which the population could continue to increase, despite the lack of larger electricity supplies.

The lower reliability of electric service could present hardships or even physical hazards to many people in situations dependent upon electricity. Undoubtedly the population would be considered to be at a lower "standard of living." Secondary impacts on the environment brought about by population concentration would probably be less than if abundant supplies of electricity were available. The additional secondary impacts that could have been imposed on this area, had adequate electricity supplies been available, would be shifted to other areas that would consequently become more populated.

Cancellation of the Fiscal Year 1979 Proposed Program would constitute a default on commitments made by the Federal Government to implement, in conjunction with 108 Northwest utilities, a cooperative regional power program aimed at meeting local growth on a basis that minimizes economic and environmental costs.

B. Alternative Methods of Carrying Out the Program

1. Direct-Current (d.c.) Transmission

Direct-current (d.c.) transmission lines have been used for purposes of moving large amounts of electricity over long distances. Because of the high cost associated with conversion from a.c. to d.c., direct-current transmission only becomes economical at line lengths of 400-600 miles (644-966 km) or greater. At such distances, the economic advantages of d.c. offset the high cost of building converter stations at both ends of the line.

Environmental impacts associated with d.c. transmission lines are virtually the same as those of a.c. lines. D.C. lines require only two conductors; accordingly, less tower steel and conductor cable, as well as fewer acres of right-of-way, are required for a d.c. line than an a.c. line of comparable capacity.

For the Fiscal Year 1979 Proposals, d.c. transmission is not considered a feasible alternative since it would not offer any environmental advantage for any of the new proposals included as part of the program, and the economic costs would be substantially greater.

2. Underground Construction of Transmission Facilities

Undergrounding of transmission lines would reduce the visual impact associated with overhead transmission lines, although a corridor would still be visible in timbered areas because of the clearing necessary to bury underground lines. Widths of right-of-way cleared for underground facilities (approximately 50 feet or 15 meters) would average less than the 50 to 165 feet (15-50 meters) required for aboveground construction, and the impact on existing land use would be reduced correspondingly.

Aside from the disadvantage of its considerable cost (which is generally in excess of 10 times that of equivalent overhead transmission lines), present technology imposes severe limitations on undergrounding with respect to maximum line length and carrying capacity. Underground lines cannot be as easily tapped or modified as overhead lines; and, while line outages are expected to be less frequent, undergrounding would likely jeopardize system reliability because underground failures are much more difficult to locate and repair.

Underground construction is an alternative to the normal aboveground techniques primarily at lower voltages where existing technology can satisfactorily overcome the problems inherent in underground cables. Undergrounding, despite its high costs and technological limitations, is frequently the only alternative in highly congested urbanized areas such as New York City, where overhead rights-of-way may simply be unobtainable.

The alternative of underground construction, therefore, would be most applicable to the lower voltage (up to 138 kV) transmission lines, and, as previously mentioned, in highly urbanized areas where overhead right-of-way cannot be acquired. The Fiscal Year 1979 Proposed Program does contain construction at these lower voltages. There exists the possibility that the final design of one proposal included in the FY 1979 Program may involve the construction of up to 1.7 miles (2.7 km) of underground cable (Study Area 79-2).

Underground transmission lines also create their own environmental impact. The trenching operations required to bury cables, and to gain access for repair of underground cables in case of failure, may disturb natural drainage systems and cause increased erosion. In rocky areas, excavation may require extensive blasting. Once the trench is backfilled, heat generated by underground cables has a drying effect on surrounding soil and will affect vegetation in the immediate cable area, and longitudinal erosion may occur in steep terrain. In addition, high-voltage underground transmission cables require installation of shunt reactors at frequent intervals which themselves create an additional impact upon land use.

A detailed description of the technological and economic constraints involved in undergrounding can be found in Appendix B of the "Role EIS" (chapter X.B.2.).

3. Combustion Turbines

One alternative method which has been used to meet limited localized peaking power needs on an interim basis is the installation of a combustion turbine in the immediate area of the load. Combustion turbines can also be used for meeting forced outage reserve capacity, thereby maintaining adequate system reliability without requiring additional transmission lines. This, of course, would eliminate the need for long distance transmission lines, although some local distribution lines would still be required.

Presently BPA markets bulk electrical energy and does not have Congressional authority to own, operate, or install generating facilities, including turbines, except in some emergency situations. A change in BPA's current mandates would be necessary before BPA could take any action toward the installation of generation facilities in the Northwest. In some instances, however, BPA's utility customers can and have considered installing their own local generation as an alternative for their power demands. One alternative plan considered for one of the Fiscal Year 1979 Proposals would involve the installation of one gas turbine combustion generator (Study Area 79-2).

Impacts resulting from the use of a combustion turbine include exhaust emissions, principally oxides of nitrogen and sulfur dioxide, in addition to sizeable consumption of increasingly scarce petroleum-based fuels. Of course, if fossil fuel oils are used as a fuel, then oil spills

are always a danger. An additional factor of increasing public concern, especially since these units would be located in or adjacent to population or load centers, is the noise levels, both audible as well as infrasonic emissions, associated with these facilities.

A limitation affecting the applicability of turbines is that all combustion turbines, though they may not be used as such, are designed and manufactured to serve peaking power requirements and therefore should not be considered a source for firm or base power requirements.

However, an advantage made obvious by past sabotage attempts on BPA's transmission facilities is that local generation facilities, including combustion turbines, can be more easily safeguarded than can long distance transmission lines. For a more complete discussion of local combustion turbine generators as a substitute for new transmission facilities, see Appendix B of the "Role EIS" (chapter X.A.1-2.).

4. Incineration of Municipal Wastes for Steam Generation

The use of municipal refuse as a source of fuel for local generation has been implemented in several communities throughout the nation. Net power output obtained from these operations is limited because of the extreme heterogeneous composition of refuse and the necessity of processing refuse in order to convert it to usable fuel. In addition to that energy required to collect and transport these wastes to processing centers, the conversion processes currently in use require relatively large amounts of electricity needed to separate combustibles from non-combustibles, and then to shred the combustible material to facilitate its handling and to reduce it to a high surface fuel. As demonstrated at the Union Electric Company's plant in St. Louis, Missouri, even after this relatively energy-intensive processing, successful incineration of municipal wastes is limited to use only as a supplemental fuel ^{23/} (usually 10 percent waste to 90 percent pulverized coal); and although it may be lower in sulfur, when compared to coal, high concentrations of nitrogen oxides and particulate emissions are associated with refuse-derived fuel. ^{24/}

^{23/} Tillman, David A., 1975. Fuels from Recycling Systems. Environmental Science & Technology. Vol. 9, No. 5, May 1975, pp. 418-422.

^{24/} Schulz, Helmut W., 1975. Cost/Benefits of Solid Waste Reuse. Environmental Science & Technology. Vol. 9, No. 5, May 1975, pp. 423-427.

As a result of these energy expenditures, the primary benefit obtained from these programs, therefore, is the disposal of municipal wastes. However, this benefit alone can be of particular value in areas where incineration can replace long distance hauling or expensive landfill areas. Accordingly, local generation derived from the incineration of municipal wastes has not been developed to the point where it could serve as an alternative to the facilities proposed in the Fiscal Year 1979 Construction Program.

5. Methods of Vegetation Control

For fiscal year 1979 a total of about 20,040 acres ^{25/} (8,110 ha) will require vegetation control at substations and on rights-of-way. Of this total, about 12,560 acres (5,080 ha) will be treated utilizing selective ground application of herbicides, about 4,580 acres (1,850 ha) will be controlled by herbicides applied by helicopter, and about 1,940 acres (780 ha) will be cleared by hand or mechanical cutting.

The only significant alternative to this control program would be to substitute either ground application of herbicides or hand and mechanical cutting for the helicopter application. In addition to reducing the total amount of herbicidal compounds introduced into the environment, this would lessen damage to nontarget vegetation and minimize the possibility of accidental damage due to drift.

The use of hand or mechanical cutting or the ground application of herbicides has the additional advantage over helicopter application in that both methods allow for a greater selectivity and result in little or no damage to nontarget or low-growing vegetation. It is usually the nontarget vegetation which provides the bulk of the forage for herbivorous wildlife.

However, hand or mechanical cutting as well as the ground application of herbicides does require the construction of and use of access roads. Where an extensive system of access roads does not already exist, the construction of these roads would have impacts, including increased disturbance to both wildlife and the physical environment which could overshadow the adverse effects associated with aerial spraying. Access roads have been shown to be a major cause of erosion and a contributing factor to increased turbidity and sediment loads in waterways, ^{26/} ^{27/}

^{25/} Includes 960 acres (390 ha) of weed control at existing substation sites.

^{26/} Lantz, Richard, 1971. Guidelines for Stream Protection in Logging Operations, A Report of the Research Division, Oregon State Game Commission.

^{27/} Dyrness, C. T., 1967. Mass Soil Movements in the H. J. Andrews Experimental Forest, Pacific Northwest Forest & Range Exp. Sta., USDA, Forest Service Res. Paper PNW-42, 12 pp., illus.

and in this regard they can result in impacts in excess of all other activities in forested areas, especially in areas of steep topography 28/. For example, sediment concentrations in runoff after the first rainstorms can be as much as 250 times that in adjacent undisturbed areas. 29/

As discussed in Section IV, Fish resources and water Quality, the introduction of suspended solid and organic debris into an aquatic environment will result in adverse impacts to these resources.

6. Alternative Methods for Disposal of Slash and Timber During Construction Operations

During fiscal year 1979, natural draft open burning will be the primary method used to dispose of slash and unmerchantable timber which must be removed from the right-of-way during construction and maintenance operations.

BPA activities during the construction and maintenance periods will result in some adverse air quality impacts from the combustion by products during burning. Open burning of vegetation introduces combustion by products including water vapor, particulates, hydrocarbons, carbon monoxide, and carbon dioxide into the atmosphere. Relatively high concentrations of these products near fire sites decreases rapidly to ambient levels in all directions. Most of the impacts from burning are short-term, and virtually all of the impacts on the atmosphere stop when the impact activity ceases because the atmosphere has the ability to regenerate or cleanse itself.

Because of the cost of alternative methods of disposal, and some environmental trade-offs, natural draft open burning remains the primary disposal method and is used where local air pollution regulations permit. However, where proximity to population centers, or when conditions including winds, dryness of vegetation, atmospheric inversions, and temperature preclude open burning, alternative methods of slash disposal are utilized.

The two techniques most frequently proposed as alternatives to natural-draft open burning are chipping and controlled or forced air burning.

The use of chipping as an alternate to open burning would eliminate the introduction of particulates and other combustion byproducts into the atmosphere. Since chipping requires the operation of large equipment, a substantial

28/ Rothacher, Jack, 1969. Managing Forest Land for Water Quality. pp. 232-244. In Proc. of Joint FAO/USSR International Symp. on Forest Influences and Watershed Mgmt., Moscow, USSR.

29/ Fredriksen, R. L. 1965. Sedimentation after Logging Road Construction in a Small Western Oregon Watershed, pp. 56-59. In. Proc. Fed. Inter-agency Sedimentation Conf., 1963, USDA Misc. Pub. 970.

amount of road would have to be built to provide access for the machinery. Operation of these chipping machines would also require fossil fuels which, in addition to being both expensive and currently in short supply, would also add characteristic pollutants associated with internal combustion engines. In addition to being a very slow process, chipping can be three to four times as costly as burning.

The overall environmental impact of burying or scattering chips has not yet been fully determined, although there appear to be some adverse environmental effects associated with the trenching necessary for burying chips, and nitrogen depletion of soils may present a problem if chips are scattered.

A variety of controlled burning techniques are currently available which offer the advantage of incineration at higher temperatures than that obtainable with natural draft open burning. The Camran burner is one device which promotes a hotter burn. Higher temperatures provide for better combustion with resultant decrease in air emissions. Combustion emissions are reduced by up to 80% utilizing this method, provided the unit operates at peak efficiency. 30/ However, observations by BPA and Oregon State Department of Environmental Quality staff indicate operational problems with the unit, including achieving optimum combustion temperature. In addition to operational problems, the method is significantly slower and more expensive than open burning. Extensive access roads are also required for the Camran burner, as its design limits it to surfaced or high grade roads with wide radius curves for transport.

The high-stacking method is used where possible and can reduce the amount of emissions by as much as 50% as compared to open burning. In this procedure, the material is stacked into a pile the height of which is greater than the diameter. This eliminates much of the dirt and other incombustible material. Greater combustion temperatures and more efficient burning is achieved, and smoldering piles of dirt and debris are reduced. Officials from the Oregon Forestry Department favorably compare this method with air curtain incineration. 31/

Pit burning methods have also been advocated and can be expected to bring corresponding reduction in particulate emissions but with some local soil disturbance associated with trenching operations.

30/ Washington State Department of Ecology, 1975. Environmental Impact Statement, Proposed Certification of the Camran Burner, pp. 18-19.

31/ Ibid. pp. 16-17.

In some cases, limited amounts of slash are left in small piles as cover for wildlife. This method is used where permitted by the landowner or land agency, and where this method will not present a fire hazard.

BPA will allow contractors to use controlled open burning to dispose of slash and unmerchantable timber where permitted by Federal, State, and local regulations. Contractors are required to obtain approval from State or local air pollution control agencies for open burning and to cooperate in State and local smoke abatement programs. Contractor burning operations are supervised by BPA to assure compliance.

As in the past, BPA contractors will consult with local air pollution control authorities and, when required, will utilize recommended disposal methods for slash associated with the Fiscal Year 1979 construction and maintenance program.

7. Construction of New Transmission Facilities on Existing Rights-of-Way Rather Than on New Rights-of-Way

In evaluating the possible alternatives to meeting the Fiscal Year 1979 system requirement, one of the first considerations is the possibility of serving the increasing loads through the greater utilization of rights-of-way currently under easement. This could be accomplished either by (1) the replacement of lower voltage lines with lines of a higher capacity, or (2) by constructing the new transmission lines alongside or parallel to existing lines.

a. Replacement of Existing Transmission Lines

The possibility of replacement or upgrading of lower-voltage lines to a higher capacity during Fiscal Year 1979 is available for a total of approximately 60 miles (97 km) of existing transmission facilities.

Although replacement would usually eliminate the need for any new right-of-way, there are constraints limiting the practical applicability of this method. In addition to technological constraints, the main limitation affecting the use of replacement is the need to remove existing lines from service to allow for rebuilding.

Impacts resulting from operations conducted during the upgrading of existing transmission lines are those associated with the movement of heavy equipment along existing rights-of-way, including the fording of streams and disturbances due to noise, dust, and increased human activity.

b. Paralleling Existing Transmission Lines

Where replacing an existing line with one of a higher capacity is not appropriate, consideration can then be given to meeting the system requirements by paralleling an existing right-of-way. Where this alternative can be used, it would result in a net reduction of up to 20 feet (6 meters) of the new right-of-way that would be required, depending upon the design of the line and the topographical conditions encountered.

In designing a plan of service to meet future system requirements, it is usually possible to parallel existing rights-of-way for at least a portion of the required distance. However, unless there already exists a route directly between the point of availability of generation and the load, a parallel route could easily result in a significantly longer line, requiring more total right-of-way with a resultant increase in adverse effects over that resulting from a more direct route or line location.

Otherwise, paralleling existing rights-of-way will result in impacts identical to the construction of new lines, except that they will not occur in previously undisturbed areas.

Conditions affecting the Fiscal Year 1979 Program allow paralleling of existing rights-of-way for approximately 15 miles (24 km) of the estimated new linear right-of-way that would normally be required to meet the Fiscal Year 1979 system requirements.

Reliability criteria are the principal restrictions limiting the implementation of paralleling. By grouping several transmission lines within a restricted area, the possibility of a simultaneous outage arising from a natural calamity such as a wind storm or snow slide, or from sabotage attempts, is greatly increased. Such an outage would result in a total loss of service to those areas where other sources of power might not be available.

8. Limiting the Consumption of Electricity

Another alternative to building new transmission facilities would be to limit the consumption of electricity. Specific proposals that have been made which are intended to reduce consumption include voluntary consumer restraint, reductions in quality of service, rationing, utility or government regulation, load management, and price mechanisms or rate structures which discourage consumption.

To the extent that a reduction in consumption could reduce the peak demand, either on the entire BPA transmission system or on its individual parts, new facilities could be deferred for an undetermined length of time, depending on the magnitude of the reduction. A large enough reduction in demand could, in theory, eliminate the need for some facilities entirely.

Prompted by the recent concern about the hydroelectric power supply situation in the region, and the national problems arising from the shortage of most types of fossil fuels, voluntary reductions in consumption of electricity have already occurred in the Pacific Northwest. Although the effect on peakloads is harder to determine, it is estimated that the peakloads are also lower than they otherwise would have been, due to voluntary conservation.

Reductions in the quality of electrical service involves such measures as reduced reliability standards with consequent increased likelihood of loss of load. Reduced reliability criteria would not necessarily result in reduced consumption of electricity, however, although it could delay the need for new transmission facilities. The general topic of transmission reliability, including alternative reliability criteria and their impacts or consequences, is covered in chapter III of Appendix B of the "Role EIS".

Another reduction in the quality of service that could be more closely correlated with reduced consumption of electricity would be a reduction in voltage levels. Estimates in the past have indicated that a 5% reduction in distribution system voltage would result in a 3% to 4% savings in regional energy consumption, and a reduction in peak demand of as much as 6% or 7%. These potential savings would allow a corresponding reduction in the need for additional facilities; however, the reduction in facilities would be achieved at the cost of a reduction in the useful life of some types of motor-operated electrical appliances. In addition, voltage reductions to industrial customers could lead to reduced production and possibly even some unemployment.

Other than appeals for voluntary customer constraint and reductions in quality of service, few of the proposals suggested for reducing consumption could be realized soon enough to have any affect on the Fiscal Year 1979 Program. The implementation of rationing, or other government imposed regulations aimed at reducing consumption of electricity, would require that a number of complicated legal and social questions be resolved legislatively, beforehand. A significant amount of leadtime would be required before any such proposals could then become operative. For this reason, rationing and other forms of direct government regulation (i.e., revised building codes, product efficiency standards, tax incentives, etc.), cannot be considered as viable alternatives to the Fiscal Year 1979 Proposed Program.

Although such measures may be applicable in developing a long range program of energy conservation, they are not, generally speaking, applicable as alternative considerations to the facilities proposed for fiscal year 1979, some of which are required to be energized as soon as 1980. In order to meet these scheduled energization dates, therefore, system plans of service must be finalized now so that alternative facility locations can then be developed and presented in subsequent facility location supplements. Any delay in these leadtime requirements would result in a subsequent delay in construction, resulting in slippages from the energization dates.

The general topic of energy conservation, including the use of various strategies, technologies, practices, and institutional arrangements is covered in some detail in chapter IV.B. of Part 1 of the "Role EIS" (Conservation and Other Potential Load Reduction Measures). This chapter was based on a study prepared under contract for BPA by Skidmore, Owings, and Merrill, ^{32/} which demonstrated the potential for conservation of electricity in the Pacific Northwest. A discussion of BPA's current policies relating to energy use and conservation is included in included in chapter II.B.6. of Appendix C (Power Marketing) of the "Role EIS." Alternative policies concerning electric energy use and conservation are discussed in chapter III.B.6. of Appendix C.

Electrical load management could also be used to bring about reductions in electrical consumption. Planned or rotating outages could obviate the need for new facilities, although at the expense of great inconvenience to users of electricity. Dual metering, off peak pricing, and

^{32/} Skidmore, Owings, and Merrill, July 1976, Bonneville Power Administration Electric Energy Conservation Study.

other mechanisms aimed at leveling off peak loads would reduce the need for new facilities intended for meeting peaking requirements. BPA's present power curtailment policies are discussed in chapter II.B.7. of Appendix C of the "Role EIS." Alternatives with respect to power curtailment, including voltage reductions and rotating blackouts, are discussed in chapter III.B.7. of Appendix C. An extended discussion of load management is included in chapter IV of Appendix A (Power Resources, Acquisitions, Planning, and Operation).

Economic incentive, utilizing rate schedules structured in such a way that the price for electricity would discourage its consumption, could possibly reduce peakloads enough to permit the deferral of some transmission facilities. The earliest date at which a new rate structure developed immediately could be implemented is December 1979. What makes this possibility even less attractive as an alternative to the proposed construction program is the fact that the full impact (on consumption) of rates designed to discourage consumption are not realized until many years after they are implemented. The only variable here is the rate at which the effects occur, i.e., a rate increase of a large magnitude may effect results sooner than a smaller increase, but the total length of time or duration required before the full impact is realized should be about the same in either case. The full impact on consumption resulting from a rate structure implemented in 1979 would not be felt until sometime after 1990, much too late to affect the need for the facilities included in the Fiscal Year 1979 Proposed Program.

The subject of alternative rate structures and their probable consequences, including effects upon the consumption of electricity, was discussed in the environmental impact statement on BPA's proposed wholesale rate increase. The final statement was filed with the Council on Environmental Quality on August 15, 1974 (FES 74-46). A detailed discussion of BPA's current policies related to the determination of wholesale and retail rates is included in Chapter II of Appendix C of the "Role EIS," sections B.3. and B.5., respectively. Alternative wholesale power rate concepts and designs, including those aimed at encouraging energy conservation, are discussed in chapter III.B.3. of Appendix C. Alternative BPA policies with respect to the determination of retail power rates, including the use of retail rate structures to foster conservation, are discussed in chapter III.B.5. of Appendix C.

X. Consultation and Coordination With Others

A. Consultation and Coordination in the Development of the Proposal

The Fiscal Year 1979 Final Program Statement covers those new facilities proposed for the first time as part of BPA's Fiscal Year 1979 Proposed Program.

These proposals are currently in the initial planning stages and represent identified system needs or requirements rather than facility locations. BPA has consulted with various Federal, regional, and local planning agencies in the development of these proposed plans of service.

Since specific facility locations have not yet been identified for the new proposals, BPA will continue to consult with Federal, State, and local agencies throughout the developmental process as part of its public and agency review process. BPA has held local public information meetings in connection with the Fiscal Year 1979 new proposals. Comments obtained as a result of this public and agency review process are utilized in identifying subsequent alternative site locations for the proposals which will be presented in subsequent facility location supplements.

b. Coordination in the Review of the Draft Program Statement

The Fiscal Year 1979 Draft Environmental Statement was sent to Federal agencies, State and regional clearinghouses, and to local and metropolitan clearinghouses where these have been established by States, or to county or metropolitan planning commissions and environmental agencies where local clearinghouses have not been established. These agencies are listed below. A notice of the availability of this final statement is placed in the Federal Register.

Agencies Requested to Comment on the Draft Program Statement

Federal Agencies

U.S. Department of the Interior
*Fish and Wildlife Service
*Bureau of Mines
*Bureau of Indian Affairs
*Bureau of Land Management
*Bureau of Outdoor Recreation
*National Park Service
*Geological Survey
Bureau of Reclamation

- U.S. Department of Agriculture
 - *Forest Service
 - *Soil Conservation Service
- *U.S. Department of Housing and Urban Development
- *U.S. Environmental Protection Agency
- Energy Research and Development Administration
- Federal Power Commission
- Federal Energy Administration
- *Federal Aviation Administration
- *Advisory Council on Historic Preservation
- *U.S. Department of the Army
 - Corps of Engineers

State Agencies

- *State of Oregon
- *State of Washington
- *State of Montana
- *State of Idaho
- State of Wyoming

Local Agencies

OREGON

- Columbia Region Association of Governments
- Mid-Columbia Economic Development
- East Central Oregon Association of Counties
- Mid-Willamette Valley Council of Governments
- District 4 Council of Governments
- Clatsop-Tillamook Intergovernmental Council
- Coos-Curry Council of Governments
- Central Oregon Intergovernmental Council
- Lane Regional Air Pollution Authority
- Umpqua Regional Council of Governments
- Klamath Lake Planning and Coordinating Council
- Lane Council of Governments

WASHINGTON

- Grant-Lincoln-Adams Conference of Governments
- Asotin County Planning Commission
- *Benton-Franklin Governmental Conference
- Chelan County Regional Planning Council
- Clallam County Governmental Conference
- Regional Planning Council of Clark County
- Walla Walla Regional Planning Commission
- Cowlitz-Wahkiakum Governmental Conference
- Douglas County Regional Planning Commission
- TRICO Economic Development District
- Grays Harbor Regional Planning Commission
- Island County Planning Department
- Jefferson-Port Townsend Regional Council
- Kittitas County Conference of Governments

Lewis Regional Planning Commission
Mason Regional Planning Council
Okanogan County Regional Planning Commission
Pacific County Regional Planning Council
San Juan County Planning Department
Skagit Regional Planning Council
Skamania Regional Planning Council
Spokane Regional Planning Conference
Thurston Regional Planning Council
Whatcom County Council of Governments
Whitman County Regional Planning Council
Puget Sound Governmental Conference

IDAHO

Teton County Commission
Panhandle Planning and Development Council
Clearwater Economic Development Association
Magic Valley Association of Governments
Ida-Ore Regional Planning and Development Association

MONTANA

Flathead County Planning Board
Deer Lodge City-County Planning Board
Granite County Commissioners
Mineral County Commission
Missoula City-County Planning Board
Butte-Silver Bow City-County Planning Board

WYOMING

Teton County Planning and Zoning Commission

Others

Oregon Environmental Council
Washington Environmental Council
Idaho Environmental Council
Western Montana Environmental Protective Association
National Wildlife Federation
Montana Wildlife Federation
Oregon Wildlife Federation
Idaho Wildlife Federation
Federation of Western Outdoor Clubs
Friends of the Earth, Northwest Coordinator
Natural Resources Defense Council (Palo Alto Office)
The Wilderness Society (Western Regional Office)
Montana Wilderness Association
Sierra Club, Northwest Representative
 Rocky Mountain Chapter
 Pacific Northwest Chapter
Idaho State Historical Society
Pacific Northwest Conservation Council

Orcas Power and Light Company
Big Bend Electric Cooperative, Inc.
Washington Water Power Company
Puget Sound Power and Light
Friday Harbor, Washington Planning Commission
East Sound, Washington Planning Commission
Ellensburg, Washington Planning Commission
Washington State Advisory Council on Historic Preservation
Washington Archaeological Research Center
Environmental Defense Fund, Rocky Mountain Office,
Washington, D.C.
Western Montana Scientists Committee for Public Information
Natural Resources Law Institute
North Cascades Conservation Council
Oregon State Historic Preservation Office
Museum of Natural History, University of Oregon
Idaho State University Museum
Montana State Historic Preservation Officer
Montana Statewide Archaeological Survey
Kootenai Tribal Council
Kalispell Business Community
Nisqually Community Council
Puyallup Tribal Council
Swinomish Indian Senate
Confederated Salis-Kootenai Tribes
Northern Idaho Agency
Spokane Agency
Western Washington Agency
Flathead Agency

XI. Right-of-way Management Appendix



1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF IDAHO

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
BONNER	Albeni Falls	.8/	.32	Pramitol 5PS		160/ 73
	Newport	.8/	.32	Pramitol 5PS		160/ 73
	Priest River	.5/	.20	Pramitol 5PS		100/ 45
	Samuels	.4/	.16	Pramitol 5PS		80/ 36
	Sandpoint	.5/	.20	Pramitol 5PS		100/ 45
BOUNDARY	Bonnors Ferry	1.0/	.40	Pramitol 5PS		200/ 91
BUTTE	Mackay	.1/	.04	Pramitol 5PS		20/ 9
CASSIA	E. Burley	.6/	.24	Pramitol 5PS		120/ 54
	Weeks	.05/	.02	Pramitol 5PS		20/ 5
CLEARWATER	Dworshak	10.0/	4.05	Pramitol 5PS		2000/907
ELMORE	Dixie	.25/	.10	Pramitol 5PS		50/ 23
	Mountain Home	.3/	.12	Pramitol 5PS		60/ 27
KOOTENAI	Athol	.3/	.12	Pramitol 5PS		60/ 27
	Prairie	.4/	.16	Pramitol 5PS		80/ 36
MINIDOKA	Minidoka	.1/	.04	Pramitol 5PS		20/ 9
NEZ PERCE	Hatwai	17.0/	6.88	Pramitol 5PS		3400/1542
	Lewiston Complex	2.0/	.81	Pramitol 5PS		400/181
TETON	Targhee	1.5/	.42	Pramitol 5PS		300/136

STATE OF MONTANA

DEER LODGE	Anaconda	4.0/	1.62	Pramitol 5PS		800/363

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF MONTANA (cont.)

<u>County</u>	<u>Station</u>	<u>Acres/Hectares</u>	<u>Herbicide</u>	<u>Gal./Liter per Station</u>	<u>Lbs./Kg per station</u>
FLATHEAD	Columbia Falls	2.0/ .81	Pramitol 5PS		400/181
	Conkelley	9.0/ 3.64	Pramitol 5PS		1800/816
	Flathead	2.8/ .72	Pramitol 5PS		360/163
	Kalispell	1.5/ .60	Pramitol 5PS		300/136
GRANITE	Sherryl	1.3/ .52	Pramitol 5PS		260/118
	Sherryl Tap	.5/ .20	Pramitol 5PS		100/ 45
LAKE	Elmo	.3/ .12	Pramitol 5PS		60/ 27
	Kerr	.8/ .32	Pramitol 5PS		160/ 73
LINCOLN	Libby	4.0/ 1.62	Pramitol 5PS		800/363
	Libby (Const.)	.4/ .16	Pramitol 5PS		80/ 36
	Trego	.5/ .20	Pramitol 5PS		100/ 45
	Troy	.4/ .16	Pramitol 5PS		80/ 36
	Yaak	.3/ .12	Pramitol 5PS		60/ 27
MINERAL	Tarkio	.3/ .12	Pramitol 5PS		120/ 54
MISSOULA	Frenchtown	.3/ .12	Pramitol 5PS		60/ 27
RAVALLI	Stevensville	.2/ .08	Pramitol 5PS		40/ 18
SANDERS	Hot Springs	13.5/ 5.46	Pramitol 5PS		2700/1225
SILVER BOW	Silver Bow	2.0/ .81	Pramitol 5PS		200/ 91
STATE OF OREGON					
BENTON	Adair	.6/ .24	Pramitol 5PS		200/ 91
	Wren	.7/ .28	Pramitol 5PS		200/ 91

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF OREGON (cont.)

County	Station	Acres/Hectares	Herbicide	Gal./Liter per Station	Lbs./Kg per station
CLATSOP	Astoria	1.0/ .40	Pramitol 5PS		400/181
	Bradley Park	.2/ .08	Pramitol 5PS		100/ 45
	Clatsop	3.5/ 1.41	Pramitol 5PS		2000/907
	Driscoll	2.5/ 1.00	Pramitol 5PS		1500/680
	Wauna	2.0/ .80	Pramitol 5PS		1000/454
CLACKAMAS	Oregon City 500 kV	7.5/ 3.83	Pramitol 5PS		3000/1361
	Ostrander	10.0/ 4.05	Pramitol 5PS		4000/1814
COLUMBIA	Allston	23.0/ 9.30	Pramitol 5PS		4000/1814
	Clatskanie	.5/ .20	Pramitol 5PS		200/ 91
	Warren	.3/ .12	Pramitol 5PS		100/ 45
COOS	Bandon	2.2/ .89	Pramitol 5PS		1000/454
	Coos	1.0/ .40	Pramitol 5PS		400/181
	Fairview	5.0/ 2.02	Pramitol 5PS		2000/907
	Hauser	.6/ .24	Pramitol 5PS		200/ 91
	Norway	.6/ .24	Pramitol 5PS		200/ 91
CROOK	Grizzly	12.0/ 4.85	Pramitol 5PS		1400/1089
CURRY	Gold Beach	.5/ .20	Pramitol 5PS		200/ 91
	Langlois	.5/ .20	Pramitol 5PS		200/ 91
	Port Orford	.8/ .33	Pramitol 5PS		300/136
DESCHUTES	Hampton	.4/ .16	Pramitol 5PS		80/ 36
	Redmond	3.0/ 1.21	Pramitol 5PS		600/272
	Sand Springs	3.3/ 1.33	Pramitol 5PS		660/299
DOUGLAS	Drain	2.0/ .81	Pramitol 5PS		600/272
	Gardiner	2.0/ .40	Pramitol 5PS		300/136
	Hanna	1.5/ .60	Pramitol 5PS		500/227
	Lookingglass	1.0/ .40	Pramitol 5PS		300/136
	Reedsport	1.2/ .48	Pramitol 5PS		500/227
	Reston	5.0/ 2.02	Pramitol 5PS		1500/680
	Tahkenitch	3.0/ 1.21	Pramitol 5PS		1000/454

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF OREGON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
HOOD RIVER	Cascade Locks	1.0/	.40	Pramitol 5PS		300/136
	Guthrie	.7/	.28	Pramitol 5PS		140/ 64
	Hood River	1.7/	.68	Pramitol 5PS		340/154
KLAMATH	Malin	15.0/	6.07	Pramitol 5PS		3000/1361
LANE	Alvey	16.0/	6.87	Pramitol 5PS		6000/2722
	Blue River	1.0/	.40	Pramitol 5PS		300/136
	Cougar	.3/	.12	Pramitol 5PS		100/ 45
	Dexter	.8/	.32	Pramitol 5PS		150/ 68
	Dorena	1.2/	.48	Pramitol 5PS		400/181
	Eugene	5.0/	2.02	Pramitol 5PS		1000/ 45
	Fern Ridge	1.6/	.64	Pramitol 5PS		500/227
	Florence	1.0/	.40	Pramitol 5PS		400/181
	Hills Creek	.1/	.04	Pramitol 5PS		50/ 23
	Junction City	2.1/	.85	Pramitol 5PS		600/272
	Lane	10.0/	4.05	Pramitol 5PS		4000/1814
	Lookout Point	1.25/	.52	Pramitol 5PS		400/181
	Mapleton	1.0/	.40	Pramitol 5PS		400/181
	Oakridge	1.0/	.40	Pramitol 5PS		300/136
	Rainbow Valley	.5/	.20	Pramitol 5PS		200/ 91
	Springfield	1.0/	.40	Pramitol 5PS		300/136
	Walton	.5/	.20	Pramitol 5PS		100/ 45
	Wendson	5.0/	2.02	Pramitol 5PS		1500/680
LINCOLN	Burnt Woods	.5/	.20	Pramitol 5PS		200/ 45
	Toledo	3.0/	1.21	Pramitol 5PS		1200/544
LINN	Albany	5.5/	2.20	Pramitol 5PS		2000/907
	Harrisburg	.5/	.20	Pramitol 5PS		100/ 45
	Lebanon	2.0/	.81	Pramitol 5PS		600/272
	Santiam	15.0/	6.06	Pramitol 5PS		4500/2041
MARION	Chemawa	11.0/	4.44	Pramitol 5PS		3000/1361
	Detroit	1.5/	.60	Pramitol 5PS		300/136

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF OREGON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
MARION (cont.)	Marion	20.0/	8.09	Pramitol 5PS		8000/3629
	Salem Alumina	1.0/	.40	Pramitol 5PS		300/136
	Tumble Creek	.5/	.20	Pramitol 5PS		500/227
MORROW	Boardman	4.2/	1.70	Pramitol 25E	21/ 80	
	Ione	.4/	.16	Telvar		15/ 7
MULTNOMAH	St. Johns	5.5/	2.22	Pramitol 5PS		1500/680
	Troutdale	10.0/	4.05	Pramitol 5PS		3000/1361
POLK	Brush College	1.5/	.60	Pramitol 5PS		300/136
	Monmouth	.5/	.20	Pramitol 5PS		100/ 45
	Salem	4.5/	1.81	Pramitol 5PS		1400/635
SHERMAN	John Day	18.0/	7.29	Pramitol 5PS		3600/1632
	John Day Dam Site	.1/	.04	Pramitol 5PS		20/ 9
TILLAMOOK	Beaver	.5/	.20	Pramitol 5PS		200/ 91
	Garibaldi	.5/	.20	Pramitol 5PS		200/ 91
	Hebo	.5/	.20	Pramitol 5PS		200/ 91
	Mohler	.5/	.20	Pramitol 5PS		200/ 91
	Tillamook	3.0/	1.21	Pramitol 5PS		1000/454
UMATILLA	Hat Rock	2.7/	1.09	Telvar		85/ 39
	McNary	7.0/	2.83	Telvar		210/ 95
WASCO	Big Eddy	12.0/	4.86	Pramitol 5PS		2400/1089
	Celilo	12.0/	4.86	Pramitol 5PS		2400/1089
	Celilo	1.5/	.60	Telvar		45/ 20
	The Dalles	1.5/	.60	Pramitol 5PS		300/136
WASHINGTON	Forest Grove	1.5/	.60	Pramitol 5PS		1000/454
	Keeler	18.5/	7.49	Pramitol 5PS		6000/2722
	Oregon City 115 kV	4.0/	1.62	Pramitol 5PS		1500/680
	Thatcher Junction	1.0/	.40	Pramitol 5PS		300/136
	Timber	.5/	.20	Pramitol 5PS		200/ 91

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF OREGON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
YAMHILL	Carlton	1.0/	.40	Pramitol 5PS		200/ 91
	McMinnville	3.0/	1.21	Pramitol 5PS		1000/454
	Walnut City	1.0/	.40	Pramitol 5PS		200/ 91
STATE OF WASHINGTON						
ADAMS	Hatton	.5/	.20	Pramitol 5PS		200/ 91
	Ritzville	.5/	.20	Pramitol 5PS		200/ 91
	Schrag	.5/	.20	Pramitol 5PS		200/ 91
BENTON	Angus	.5/	.20	Telvar		15/ 6
	Ashe	7.0/	2.83	Pramitol 5PS		1400/635
	Badger Canyon	4.5/	1.82	Pramitol 5PS		900/408
	Benton City	.5/	.20	Telvar		15/ 6
	Benton Switch	1.4/	.56	Telvar		45/ 20
	Hanford	11.6/	4.69	Pramitol 5PS		2320/1052
	Highlands	.5/	.20	Telvar		15/ 6
	Horse Heaven	3.8/	1.53	Pramitol 5PS		760/344
	Ledbeder	.7/	.28	Telvar		30/ .13
	Midway	10.0/	4.05	Pramitol 5PS		2000/907
	Prosser	.6/	.24	Telvar		25/ 6
	White Bluffs	4.0/	1.62	Pramitol 5PS		600/272
CHELAN	Valhalla	12.0/	4.85	Pramitol 5PS		2400/1089
CLALLAM	Port Angeles	6.8/	2.74	Ureabor		2040/925
	Sappho	2.1/	.85	Ureabor		600/272
CLARK	Alcoa	4.7/	1.90	Pramitol 5PS		1000/454
	Camas	.5/	.20	Pramitol 5PS		250/112
	Carborundum	1.3/	.52	Pramitol 5PS		300/136
	Chelatchie	.5/	.20	Pramitol 5PS		250/112
	Fishers Road	.5/	.20	Pramitol 5PS		200/ 91
	Mill Plain	1.0/	.40	Pramitol 5PS		250/112

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF WASHINGTON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
CLARK (cont.)	Ross	15.4/	6.23	Pramitol 5PS		3200/1452
	Sifton	3.0/	1.21	Pramitol 5PS		500/227
	Vancouver Shipyard	1.0/	.40	Pramitol 5PS		300/136
COWLITZ	Cardwell	1.1/	.44	Pramitol 5PS		400/181
	Cowlitz	1.1/	.44	Pramitol 5PS		300/136
	Lexington	1.5/	.60	Pramitol 5PS		300/136
	Longview	21.6/	8.73	Pramitol 5PS		5000/2268
DOUGLAS	Chief Joseph	12.9/	5.21	Pramitol 5PS		2580/1170
	Columbia	12.2/	4.93	Pramitol 5PS		2440/1107
	Eastmont	1.0/	.40	Pramitol 5PS		200/ 91
	Foster Creek	.3/	.12	Pramitol 5PS		60/ 27
	Keokuk	.3/	.12	Pramitol 5PS		60/ 27
	Nilles Corner	.3/	.12	Pramitol 5PS		60/ 27
	Orondo	.5/	.20	Pramitol 5PS		100/ 45
	Rocky Reach	2.5/	1.01	Pramitol 5PS		500/227
	Sickler	8.0/	3.24	Pramitol 5PS		1600/726
FERRY	Republic	.5/	.20	Pramitol 5PS		200/ 45
FRANKLIN	Baxter	.5/	.20	Telvar		15/ 6
	Connell	1.0/	.40	Telvar		30/ 13
	Eagle Lake	.5/	.20	Telvar		15/ 6
	Glade	.3/	.12	Telvar		15/ 6
	Lower Monumental	13.7/	5.54	Telvar		411/186
	Ringold	.6/	.24	Telvar		15/ 6
	Riverview	.6/	.24	Telvar		15/ 6
	Taylor Flats	.5	.20	Telvar		15/ 6
GARFIELD	Lower Granite	7.0/	2.83	Pramitol 5PS		1000/454
	Pomeroy	.7/	.28	Pramitol 5PS		240/ 64
GRANT	Potholes	3.4/	1.37	Pramitol 5PS		680/308
	Vantage	17.0/	6.88	Pramitol 5PS		3400/1542

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF WASHINGTON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
GRAYS HARBOR	Aberdeen	4.2/	1.70	Ureabor		1250/567
	Cosmopolis	2.6/	1.05	Ureabor		800/363
JEFFERSON	Duckabush	.6/	.24	Ureabor		150/ 68
	Fairmount	3.7/	1.49	Ureabor		1100/499
KING	Covington	29.7/	12.01	Ureabor		8950/4060
	Maple Valley	13.9/	5.62	Ureabor		4200/1905
	Raver	19.8/	8.01	Ureabor		5950/2699
	Microwave Stations	1.0/	.40	Ureabor		300/136
KITSAP	Bremerton	.7/	.28	Ureabor		250/113
	Kitsap	5.7/	2.30	Ureabor		1700/771
KITITITAS	Compressed Gas					
	Insulated Trans-					
	mission System	.5/	.20	Pramitol 5PS		150/ 68
	East Ellensburg	.4/	.16	Pramitol 5PS		80/ 36
	Ellensburg	1.3/	.52	Pramitol 5PS		260/118
LEWIS	Centralia	.5/	.20	Ureabor		150/ 68
	Chehalis	9.3/	3.76	Ureabor		2800/1270
	Morton	.3/	.12	Ureabor		80/ 36
	Paul, C. W.	10.8/	4.37	Ureabor		3250/113
	Pe Ell	.7/	.28	Ureabor		200/ 91
	Silver Creek	1.9/	.76	Ureabor		550/249
	Microwave Stations	.2/	.08	Ureabor		50/ 23
LINCOLN	Creston	.9/	.36	Pramitol 5PS		180/ 82
	Odessa	.5/	.20	Pramitol 5PS		100/ 45
	Wagner Lake	.4/	.16	Pramitol 5PS		80/ 36
MASON	Bayshore	.5/	.20	Ureabor		150/ 68
	Belfair	.7/	.28	Ureabor		200/ 91

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1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF WASHINGTON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
MASON (cont.)	Mason	.3/	.12	Ureabor		100/ 45
	Potlatch	.9/	.36	Ureabor		250/113
	Shelton	4.1/	1.66	Ureabor		1250/567
	Kamilche	.8/	.32	Ureabor		250/113
OKANOGAN	Brewster	.8/	.32	Pramitol 5PS		160/ 73
	Goose Lake	.4/	.16	Pramitol 5PS		80/ 36
	Lone Pine	.2/	.08	Pramitol 5PS		40/ 18
	Nespelem	.6/	.24	Pramitol 5PS		120/ 54
	Okanogan	2.3/	.93	Pramitol 5PS		460/229
	Omak	.5/	.20	Pramitol 5PS		100/ 45
	Oroville	.5/	.20	Pramitol 5PS		100/ 45
	Tonasket	.9/	.36	Pramitol 5PS		180/ 82
	Winthrop	.5/	.20	Pramitol 5PS		100/ 45
PACIFIC	Holcomb	.6/	.24	Ureabor		200/ 91
	Long Beach	.7/	.28	Ureabor		200/ 91
	Naselle	1.8/	.72	Ureabor		550/249
	Raymond	1.9/	.76	Ureabor		550/249
	Willapa River	.6/	.24	Ureabor		50/ 23
PEND OREILLE	Boundary	5.0/	2.02	Pramitol 5PS		1000/454
	Cusick	.5/	.20	Pramitol 5PS		100/ 45
	Metaline Falls	.8/	.32	Pramitol 5PS		160/ 73
	Sacheen	3.3/	1.33	Pramitol 5PS		660/299
PIERCE	South Tacoma Switch	3.0/	1.21	Ureabor		900/408
	Tacoma	9.1/	3.68	Ureabor		2750/1247
	Microwave Stations	1.0/	.40	Ureabor		300/136
SAN JUAN	Orcas Island Gen.	.2/	.08	Ureabor		50/ 23
	San Juan Diesel Plant	.3/	.12	Ureabor		100/ 45
	Lopez	.7/	.28	Ureabor		250/113
SKAGIT	Fidalgo	.6/	.24	Ureabor		150/ 68

1979

STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF WASHINGTON (cont.)

County	Station	Acres/Hectares		Herbicide	Gal./Liter per Station	Lbs./Kg per station
SKAMANIA	Cape Horn	.5/	.20	Pramitol 5PS		500/227
	Carson	.5/	.20	Pramitol 5PS		250/112
	North Bonneville	7.0/	2.80	Pramitol 5PS		2000/907
	Stevenson	.5/	.20	Pramitol 5PS		500/227
SNOHOMISH	Monroe	25.8/	.43	Ureabor		7750/3515
	Murray	2.6/	1.05	Ureabor		800/363
	Snohomish	18.3/	7.41	Ureabor		5500/2495
	Sno-King	6.7/	2.71	Ureabor		2000/907
	Microwave Stations	.3/	.12	Ureabor		200/ 45
SPOKANE	Bell	17.0/	6.88	Pramitol 5PS		3400/1542
	Bell-Storage Yard	8.0/	3.24	Pramitol 5PS		1600/726
	Bigelow	.4/	.16	Pramitol 5PS		80/ 36
	Cheney	.6/	.24	Pramitol 5PS		120/ 54
	Deer Park	.6/	.24	Pramitol 5PS		120/ 54
	Four Lakes	.5/	.20	Pramitol 5PS		100/ 45
	Green Bluff	.3/	.12	Pramitol 5PS		60/ 27
	Hangman	.4/	.16	Pramitol 5PS		160/ 73
	Springhill	1.0/	.40	Pramitol 5PS		200/ 91
	Trentwood	12.5/	5.06	Pramitol 5PS		2500/1134
	Valley Way	.5/	.20	Pramitol 5PS		100/ 45
	Vera	.6/	.24	Pramitol 5PS		120/ 54
STEVENS	Addy	4.0/	1.62	Pramitol 5PS		800/363
	Colville	2.0/	.81	Pramitol 5PS		200/ 91
THURSTON	Olympia	20.6/	8.33	Ureabor		1250/567
WAHKIAKUM	Cathlamet	.5/	.20	Pramitol 5PS		100/ 45
	Svenson	.2	.08	Ureabor		100/ 45
WHATCOM	Bellingham	4.5/	1.80	Ureabor		1350/612
	Custer	16.1/	6.72	Ureabor		4850/2200
	Intalco	10.0/	4.05	Ureabor		3000/1361

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STATION WEED CONTROL PROGRAM BY STATE, COUNTY, AND STATION

STATE OF WASHINGTON (cont.)

<u>County</u>	<u>Station</u>	<u>Acres/Hectares</u>	<u>Herbicide</u>	<u>Gal./Liter per Station</u>	<u>Lbs./Kg per station</u>
WHITMAN	Chambers	.4/ .16	Pramitol 5PS		80/ 36
	Clarkston	.4/ .16	Pramitol 5PS		80/ 36
	Colfax	.7/ .28	Pramitol 5PS		140/ 64
	Little Goose	10.0/ 4.05	Pramitol 5PS		2000/907
	Riparia	.3/ .12	Pramitol 5PS		60/ 27

STATE OF WYOMING

TETON	Teton	.2/ .08	Pramitol 5PS		40/ 18

BPA's FY 19 79 RIGHT-OF-WAY MANAGEMENT PROGRAM BY
BLM DISTRICT AND WORK UNIT

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Portland

Area

State of Oregon

Area of each Management Method			Herbicide	Application per Line	
Hand Cutting <u>1</u>	Herbicide			gal/liter	lb/kg
	Aerial	Selective			
	acres/ha.	acres/ha.			

Eugene District

Line Name

Lane-Tahkenitch No. 1

80/ 32.4

Tordon 101
2,4-D Amine
Tordon 101

160/606
40/151
22/ 83

11/ 4.5

Lane-Wendson No. 2

6/ 2.4

Tordon 101
2,4-D Amine

12/ 45
3/ 11

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Roseburg District

Line Name

Reston-Fairview No. 1

5/ 2.0

20/ 8.1

Weedone 170
Tordon 101
Tordon 10K

20/ 76
40/151

50/ 23

Salem District

Line Name

Salem-Tillamook

7/ 2.8

Banvel 720

14/ 53

Toledo-Wendson

7/ 2.8

Tordon 101
2,4-D Amine

14/ 53
3/ 11

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF IDAHO

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u> /	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Bonneville

Palisades-Goshen #1	5/ 2.0	8/ 3.2 ² / ₁	Weedone 170 Telvar	2.5/ 9	120/ 54
Palisades-Swan Valley		1/ .4 ² / ₁	Telvar		15/ 7
Swan Valley-Goshen	5/ 2.0	8/ 3.2 ² / ₁	Weedone 170 Telvar	2.5/ 9	120/ 54
Swan Valley-Teton	5/ 2.0	15/ 6.5 ² / ₂	Weedone 170 Tordon 10K Telvar	2.5/ 9	150/ 68 30/ 14
Targhee Tap to Swan Valley-Teton		2/ .8 ² / ₁	Telvar		30/ 14

Cassia

Declo-Albion		3/ 1.2 ² / ₁	Telvar		45/ 20
East Burley Tap to Heyburn- Canal 20		1/ .4 ² / ₁	Telvar		15/ 7
Heyburn-Burley		2/ .8 ² / ₁	Telvar		30/ 14
Heyburn-Canal 20		2/ .8 ² / ₁	Telvar		30/ 14
Paul Tap to Heyburn-Canal 20		1/ .4 ² / ₁	Telvar		15/ 7
Paul Tap to Rupert-Heyburn		1/ .4 ² / ₁	Telvar		15/ 7

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF IDAHO (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/ acres/ha.	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.	acres/ha.		

Cassia (cont.)

Rupert-Heyburn	2/	.8 ^{2/}	Telvar	30/	17
Second Lift-Burley	4/	1.6 ^{2/}	Telvar	60/	27
Unity Tap to Second Lift-Burley	1/	.4 ^{2/}	Telvar	15/	7

Clearwater

Dworshak-Hot Springs	50/	20.2 ^{2/}	Tordon 101	100.0/	378

Elmore

Anderson Ranch-Mountain Home	9/	3.6 ^{2/}	Telvar	135/	61

Fremont

Drummond-Macks Inn	5/	2.0	Weedone 170 Tordon 10K	2.5/	9
	15/	6.5		150/	68

Gem

Black Canyon-Emmett	1/	.4 ^{2/}	Telvar	15/	7

Nez Perce

Dworshak-Hatwai	50/	20.2 ^{2/}	Tordon 101	100.0/	378

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF IDAHO (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u> / acres/ha.	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Minidoka

First Lift Tap to Minidoka PH-Rupert	2/	.8 ² /	Telvar	30/	14
Minidoka PH-Rupert	4/	1.6 ² /	Telvar	60/	27
Minidoka PH-Second Lift No. 1	3/	1.2 ² /	Telvar	45/	20
Minidoka PH-Second Lift No. 2	3/	1.2 ² /	Telvar	45/	20
Minidoka PH-Unity No. 1	6/	2.4 ² /	Telvar	90/	41
Minidoka Sub Tap to Minidoka PH-Rupert	2/	.8 ² /	Telvar	30/	17

Shoshone

Dworshak-Hot Springs	30/	12.1

Teton

Drummond-Macks Inn	3/	1.2 ² /	Telvar	45/	20
Swan Valley-Teton	3/	1.2	Weedone 170	1.5/	4
Targhee-Drummond	9/	3.6 ² /	Telvar	135/	61
Targhee Tap	2/	.8	Weedone 170	1.0/	4

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF MONTANA

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Flathead

Columbia Falls-Trego

30/ 12.1

Flathead-Hot Springs

50/ 20.2^{2/}

Banvel 4WS
and 2,4-D
Telvar

12.0/ 45
25.0/ 95.

400/ 181

1/ .4^{2/}

Kalispell-Kerr

50/ 20.2^{2/}

Banvel 4WS
and 2,4-D
Telvar

12.0/ 45
25.0/ 95

400/ 181

1/ .4^{2/}

Libby-Conkelley

285/115.3

50/ 20.2^{2/}

Tordon 101
Tordon 101
Telvar

43.0/163
100.0/378

200/ 91

1/ .4^{2/}

Lake

Flathead-Hot Springs

26/ 10.5^{2/}

Banvel 4WS
and 2,4-D
Telvar

6.0/ 23
13.0/ 49

200/ 91

1/ .4^{2/}

Lincoln

Libby-Libby (PP&L)

65/ 26.3

Tordon 101
and Ammate X

7.0/ 26

70/ 32

Noxon-Libby #1

130/ 52.6

Tordon 101

16.0/ 61

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF MONTANA (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting ^{1/} acres/ha.	Herbicide			gal/liter	lb/kg
		Aerial	Selective			

Sanders

Bell-Noxon	4/ 1.6	Tordon 101	.5/ 2
Dworshak-Hot Springs	50/ 20.2 ^{2/}	Banvel 4WS and 2,4-D	12.0/ 45 25.0/ 95
Noxon-Hot Springs	5/ 2.0	Tordon 101	.5/ 2
Noxon-Libby #1	50/ 20.2	Tordon 101	6.0/ 23

County	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter
Transmission Line						

Salem-Albany #2

1/ .40

9/ 3.64

Weedone 170
Tordon 101

$$\begin{array}{r} 4/15 \\ 18/68 \end{array}$$

Big Eddy-Oregon City

$$100/40.46^2$$

Banvel 720

200/757

Big Eddy-Troutdale

$$100/40.46^2$$

Banvel 720

200/757

Hanford-Ostrander

21/ 8.49

Tordon 101

42/159

St. Helens-Longview

313/126.64

Banvel 720
and Tordon 101

600/2271
26/ 98

Reston-Fairview #1

45/ 18.20

120/ 48.54

Weedone 170
Tordon 101
and Tordon 10K

180/ 681
240/ 909

100/ 45

Celilo-Sylmar

3/ 1.2²/

Telvar
and 2,4-D Amine

3/ 11

45/ 20

Redmond-Yamsay

2/ .80

10/ 4.0

Tordon 1CK

100/ 45

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF OREGON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u>	Herbicide			gal/liter	lb/kg
		Aerial	Selective			

Douglas

Cottage Grove-Drain	22/ 8.90		78/ 31.56	Weedone 170	88/333	
				Tordon 101	156/591	
				and Tordon 10K		50/ 23
Lane-Tahkenitch #1	6/ 2.43		160/ 64.74	Weedone 170	12/ 35	
				Tordon 101	320/1211	
				and 2,4-D Amine	80/303	
			28/ 11.33	Tordon 101	56/212	
				and Tordon 10K		50/ 23
Reston-Fairview #1	5/ 2.02		30/ 12.14	Weedone 170	20/ 76	
				Tordon 101	60/227	
				and Tordon 10K		20/ 9
Tahkenitch-Gardiner #1		14/ 5.67		Tordon 101	28/108	
				and 2,4-D Amine	7/ 26	
			6/ 2.43	Tordon 101	12/ 45	
Tahkenitch-Reedsport		20/ 8.09		Tordon 101	40/151	
				and 2,4-D Amine	10/ 38	
			2/ .81	Tordon 101	4/ 15	
Wendson-Tahkenitch		10/ 4.05		Tordon 101	20/ 76	
				and 2,4-D Amine	5/ 19	

Gilliam

Lower Monumental-John Day			20/ 9.3 ² /	Telvar		345/ 156
				and 2,4-D Amine	23/ 87	

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF OREGON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Hood River

Big Eddy-Troutdale	140/ 56.60	280/113.3	Weedone 170 Tordon 10K	440/1666	600/ 272
Bonneville-The Dalles	40/ 16.20	90/ 36.4	Weedone 170 Tordon 10K	180/681	400/ 181
John Day-Keeler		4/ 1.6 ^{2/}	Telvar and 2,4-D Amine	4/ 15	60/ 27

Klamath

Redmond-Yamsay	10/ 4.00	20/ 8.1	Tordon 10K		200/ 91

Lake

Celilo-Sylmar		17/ 6.9 ^{2/}	Telvar and 2,4-D Amine	17/ 64	255/ 965

Lane

Alvey-Lane	6/ 2.43	88/ 35.61	Weedone 170 Weedone 170	24/ 81 176/666	
Alvey-Springfield	2/ .81	23/ 9.38	Weedone 170 Weedone 170	8/ 30 92/348	

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF OREGON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/ acres/ha.	Herbicide			gal/liter	lb/kg
		Aerial acres/ha.	Selective acres/ha.			

Lane (cont.)

Cottage Grove-Drain	8/ 3.24			Weedone 170	32/121	
			17/ 6.88	Tordon 101	34/129	
Dorena Tap	3/ 1.21			Weedone 170	12/ 45	
			35/ 14.16	Tordon 101	70/265	
				and Tordon 10K		10/ 5
Eugene-Alvey	15/ 6.07			Weedone 170	60/227	
			160/ 64.73	Weedone 170	640/2423	
Florence Tap		30/ 1214		Tordon 101	60/227	
			8/ 3.24	and 2,4-D Amine	15/ 57	
				Tordon 101	16/ 61	
Lane-Tahkenitch #1	29/ 11.73			Weedone 170	116/439	
		566/229.01		Tordon 101	1132/4285	
			127/ 51.38	and 2,4-D Amine	283/1071	
				Tordon 101	254/961	
				and Tordon 10K	150/568	
Lane-Wendson #2		95/ 38.43		Tordon 101	190/719	
			5/ 2.02	and 2,4-D Amine	48/182	
				Tordon 101	10/ 38	
Toledo-Wendson	10/ 4.05			Weedone 170	40/151	
		100/ 40.46		Tordon 101	200/757	
			25/ 10.11	and 2,4-D Amine	50/189	
				Tordon 101	50/189	
				and Tordon 10K		50/ 23

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County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Wendson-Tahkenitch #2	28/ 11.33	Tordon 101	56/212
		and 2,4-D Amine	14/ 53

Toledo-Wendson	14/ 5.67	300/121.38	Weedone 170	56/212	
			Tordon 101	600/2271	
			and 2,4-D Amine	150/568	
	60/ 24.28		Tordon 101	120/454	
			and Tordon 10K		100/ 45

Foster Tap			68/ 27.52	Banvel 720	136/515		
Green Peter Lebanon			217/ 87.80	Banvel 720	434/1643		
Santiam-Albany #1	4/	1.62		Weedone 170	16/ 61		
			67/ 27.11	Tordon 101	134/507		
				and Tordon 10K		10/	5
Santiam-Chemawa	1/	1.62		Weedone 170	4/ 15		
			15/ 6.07	Tordon 101	30/ 114		

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF OREGON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting ✓	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Multnomah (cont.)

Hanford-Ostrander	100/ 40.46		Weedone 170	400/1514	
		179/ 72.42	Tordon 10K		500/ 227
			and Tordon 101	358/1355	

Polk

Chemawa-Salem #1	2/ .81		Weedone 170	8/ 30	
		18/ 7.29	Tordon 101	36/136	
Salem-Albany #2	3/ 1.20		Weedone 170	12/ 45	
		26/ 10.5	Tordon 101	52/197	
			and Tordon 10K		20/ 9
Salem-Tillamook		85/ 34.4	Tordon 101	170/644	
			and Tordon 10K		20/ 9

Sherman

John Day-Grizzly		28/ 8.4 ^{2/}	Telvar		420/ 191
			and 2,4-D Amine	28/106	
John Day-Powerhouse		7/ 2.8 ^{2/}	Telvar		105/ 48
			and 2,4-D Amine	7/ 26	

Tillamook

Salem-Tillamook	1/ .40		Weedone 170	4/ 15	
		211/ 85.4	Banvel 720	400/1514	
			and Weedone 170	44/167	

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF OREGON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u>	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Umatilla

Roundup-LaGrande 15/ 6.1 Tordon 10K 150/ 68

Union

Roundup-LaGrande 15/ 6.1 Tordon 10K 150/ 68

Wasco

Big Eddy-Troutdale 20/ 8.10 Weedone 170 120/454
Tordon 10K 400/ 181

John Day-Big Eddy 30/ 12.1^{2/} Telvar
and 2,4-D Amine 30/114 450/ 204

John Day-Keeler 26/ 10.5^{2/} Telvar
and 2,4-D Amine 26/ 98 390/ 177

John Day-Marion 19/ 7.7^{2/} Telvar
and 2,4-D Amine 19/ 72 285/ 129

Washington

Carlton-Sherwood 2/ 8.0 Weedone 170 8/ 30
Tordon 101 60/227

Forest Grove-Carlton 2/ 8.0 Weedone 170 8/ 30
Tordon 42/159

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF OREGON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u> /	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Washington (cont.)

Keeler-Forest Grove	4/ 1.60			Weedone 170	16/ 61	
		20/ 8.1		Tordon 101	40/151	
Oregon City-Keeler	9/ 3.60			Weedone 170	36/136	
		50/ 20.2		Tordon 101 and	100/379	
				Tordon 10K		25/ 11

Yamhill

Forest Grove-Carlton	2/ .80			Weedone 170	8/ 30	
		34/ 13.8		Tordon 101	68/257	
Salem-Tillamook	1/ .40			Weedone 170	4/ 15	
		35/ 14.2		Tordon 101	70/265	
				and Tordon 10K		10/ 5

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Chelan

Chief Joseph-Monroe No. 1	4/ 1.6	40/ 16.2	Banvel 4WS 2,4-D Amine	20/ 76 40/ 151
Grand Coulee-Raver Corridor		230/ 93.1 ^{2/}	Banvel 4WS and 2,4-D	58/220 115/435
Rocky Reach-Maple Valley	15/ 6.1			
Sickler-Raver	15/ 6.1			

Clallam

Fairmount-Port Angeles No. 2	20/ 8.1	200/ 80.9	Banvel 4WS 2,4-D Amine	100/379 200/757
Olympia-Port Angeles No. 1	4/ 1.6	40/ 16.2	Banvel 4WS 2,4-D Amine	20/ 76 40/151
Port Angeles-Sappho No. 1	6/ 2.4	60/ 24.3	Banvel 4WS 2,4-D Amine	30/114 60/227

Clark

Bonneville-Alcoa #2		179/ 72.4	Banvel 720	358/1355
North Bonneville-Sifton #2		98/ 39.6	Banvel 720	196/742

Cowlitz

Cardwell-Cowlitz	3/ 1.21	43/ 17.4	Weedone 170 Banvel 720	6/ 23 86/325

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Cowlitz (cont.)

Lexington-Longview No. 1	1/ .8			Banvel 4WS	10/ 38	
		20/ 8.1		2,4-D Amine	20/ 76	
Longview-Chehalis No. 1	4/ 1.6			Banvel 4WS	20/ 76	
		116/ 46.9 ^{2/}	40/ 16.2	2,4-D Amine	40/151	
				Banvel 4WS	15/ 57	
				and 2,4-D Amine	30/114	
Paul-Allston No. 2	9/ 3.6			Banvel 4WS	45/170	
		132/ 53.4 ^{2/}	90/ 36.4	2,4-D Amine	90/341	
				Banvel 4 WS	16/ 61	
				and 2,4-D Amine	32/121	

Franklin

Lower Monumental-Hanford		45/ 18.2 ^{2/}		Telvar		675/ 306
				and 2,4-D Amine	45/170	

Grant

Grand Coulee-Hanford		200/ 80.9 ^{2/}		Banvel 4WS	50/189	
		4/ 1.6 ^{2/}		and 2,4-D	100/378	
				Telvar		800/ 363
Grand Coulee-Raver Corridor		200/ 80.9 ^{2/}		Banvel 4WS	50/189	
				and 2,4-D	100/378	

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1/</u>	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Grays Harbor

Olympia-Aberdeen No. 3	20/ 8.1			Banvel 4WS	100/379
		200/ 80.9		2,4-D Amine	200/757
Olympia-Aberdeen No. 2		264/106.8 ^{2/}		Banvel 4WS	33/125
				and 2,4-D Amine	66/250
Olympia-Cosmopolis No. 1	2/ .8			Banvel 4WS	10/ 38
		20/ 8.1		2,4-D Amine	20/ 76
Raymond-Cosmopolis	1/ 4.0			Banvel 4WS	5/ 19
		10/ 4.0		2,4-D Amine	10/ 38

Jefferson

Fairmount-Port Angeles No. 2	6/ 2.4			Banvel 4WS	30/114
		60/ 24.3		2,4-D Amine	60/227
Olympia-Port Angeles No. 1	20/ 8.1			Banvel 4WS	100/379
		200/ 80.9		2,4-D Amine	200/757

King

Chief Joseph-Monroe #1	7/ 2.8			Banvel 4WS	35/132
		70/ 28.3		2,4-D Amine	70/265
Covington-Columbia No. 3		70/ 28.3 ^{2/}		Banvel 4WS	18/ 68
				and 2,4-D Amine	36/136
Covington-Grand Coulee No. 3	6/ 2.4			Banvel 4WS	30/114
		60/ 24.3		2,4-D Amine	60/227

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COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u> /	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

King (cont.)

Covington-Duwamish	9/ 3.6			Banvel 4WS	45/170
		90/ 36.4		2,4-D Amine	90/341
Covington-Maple Valley No. 2	5/ 2.0			Banvel 4WS	25/ 95
		50/ 20.2		2,4-D Amine	50/189
Olympia-Grand Coulee No. 1	2/ .8			Banvel 4WS	10/ 38
		20/ 8.1		2,4-D Amine	20/ 76
Raver-Covington No. 1 & 2	15/ 6.1			Banvel 4WS	75/284
		150/ 60.7		2,4-D Amine	150/568
Raver-Monroe No. 1	6/ 2.4			Banvel 4WS	30/114
		60/ 24.3		2,4-D Amine	60/227
		162/ 65.6 ²		Banvel 4WS	20/ 76
				and 2,4-D Amine	40/151
Raver-Paul	4/ 1.6			Banvel 4WS	20/ 76
		40/ 16.2		2,4-D Amine	40/151
		120/ 48.6 ²		Banvel 4WS	15/ 57
				and 2,4-D Amine	30/114
Rocky Reach-Maple Valley No. 1	8/ 3.2			Banvel 4WS	40/151
		80/ 32.4		2,4-D Amine	80/303
Sickler-Raver No. 1	20/ 8.1			Banvel 4WS	100/379
		200/ 80.9		2,4-D Amine	200/757

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting ^{1/}	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

King (cont.)

Tacoma-Raver	15/ 6.1			Banvel 4WS	75/284
		150/ 60.7		2,4-D Amine	150/568
		48/ 19.42 ^{2/}		Banvel 4 WS	12/ 45
				and 2,4-D Amine	24/ 91

Kitsap

Kitsap-Bangor No. 1	2/ .8			Banvel 4WS	10/ 38
		20/ 8.1		2,4-D Amine	20/ 76
Kitsap-Bremerton No. 1	1/ .4			Banvel 4WS	6/ 23
		12/ 4.9		2,4-D Amine	12/ 45
Olympia-Kitsap No. 3	8/ 3.2			Banvel 4WS	40/151
		80/ 32.4		2,4-D Amine	80/303

Kittitas

Covington-Grand Coulee No. 3	1/ .4			Banvel 4WS	5/ 19
		10/ 4.0		2,4-D Amine	10/ 38
Grand Coulee-Raver No. 1 & 2	4/ 1.6			Banvel 4WS	20/ 76
		40/ 16.2		2,4-D Amine	40/151
Rocky Reach-Maple Valley No. 1	8/ 3.2			Banvel 4WS	40/151
		80/ 32.4		2,4-D Amine	80/303
Sickler-Raver No. 1	10/ 4.0			Banvel 4WS	50/189
		100/ 40.5		2,4-D Amine	100/379

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BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1/</u>	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Klickitat

Hanford-Ostrander Corridor	75/ 30.0			Weedone 170 Tordon 10K	450/1703	900/ 408
		290/117.0				
Hanford-John Day		7/ 2.8 ^{2/}		Telvar and 2,4-D Amine	7/ 26	105/ 48
McNary-Big Eddy		2/ .8 ^{2/}		Telvar and 2,4-D Amine	2/ 8	30/ 14
McNary-Ross	20/ 8.1			Weedone 170 Tordon 10K Telvar and 2,4-D Amine	60/227	300/ 136 30/ 14
		50/ 20.2 ^{2/} 2/ .8 ^{2/}				

Lewis

Chehalis-Centrailla No. 1	1/ .4			Banvel 4WS 2,4-D Amine	7/ 26 14/ 53	
		14/ 5.7				
Chehalis-Centralia No. 2	1/ .4			Banvel 4WS 2,4-D Amine	6/ 23 12/ 45	
		12/ 4.9				
Chehalis-Mayfield	9/ 3.6			Banvel 4WS 2,4-D Amine Banvel 4WS and 2,4-D Amine	45/170 90/341 8/ 30 15/ 57	
		90/ 36.4 ^{2/} 30/ 12.1 ^{2/}				

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u> /	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Lewis (cont.)

Chehalis-Olympia	10/ 4.0			Banvel 4WS	50/189
		100/ 40.5 ² /		2,4-D Amine	100/379
		30/ 12.1 ² /		Banvel 4WS	8/ 30
				and 2,4-D Amine	15/ 57
Chehalis-Raymond	5/ 2.0			Banvel 4WS	25/ 95
		50/ 20.2		2,4-D Amine	50/189
Mossyrock-Chehalis No. 1	1/ .4			Banvel 4WS	5/ 19
		10/ 4.0		2,4-D Amine	10/ 38
Paul-Allston No. 2	16/ 6.5			Banvel 4WS	80/303
		160/ 64.7		2,4-D Amine	160/606
		495/200.3 ² /		Banvel 4WS	62/235
				and 2,4-D Amine	124/469
		92/ 37.2 ² /		Banvel 4WS	23/ 87
				and 2,4-D Amine	46/174
Paul-Olympia No. 1		30/ 12.1 ² /		Banvel 4WS	8/ 30
				2,4-D Amine	15/ 57
Raver-Paul No. 1	5/ 2.0			Banvel 4WS	25/ 95
		50/ 20.2		2,4-D Amine	50/189

Lincoln

Grand Coulee-Bell		60/ 24.3 ² /		Banvel 4WS	15/ 57
				and 2,4-D	30/114

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COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u>	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Mason

Bayshore Tap to Shelton-Kitsap No. 2	1/ .4		14/ 5.7	Banvel 4WS and 2,4-D Amine	7/ 26 14/ 53
Olympia-Kitsap No. 3	10/ 4.0		100/ 40.5	Banvel 4WS and 2,4-D Amine	50/189 100/379
Olympia-Port Angeles No. 1	4/ 1.6		30/ 13.0 ^{2/}	Banvel 4WS and 2,4-D Amine Banvel 4WS and 2,4-D Amine	20/ 76 40/151 8/ 30 16/ 61

Okanogan

Okanogan-Oroville	10/ 4.0				

Pacific

Chehalis-Raymond	4/ 1.6		36/ 14.6 50/ 20.2 ^{2/}	Banvel 4WS and 2,4-D Amine Banvel 4WS and 2,4-D Amine	18/ 68 36/136 12/ 45 25/ 95
Holcomb-Naselle	6/ 2.4		24/ 9.7 ^{2/} 60/ 24.3	Banvel 4WS 2,4-D Amine Banvel 4WS and 2,4-D Amine	30/114 60/227 3/ 11 6/ 23
Naselle-Long Beach No. 2	18/ 7.0		180/ 72.8	Banvel 4WS 2,4-D Amine	90/341 180/681

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u>	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Pacific (cont.)

Naselle-Svenson	3/ 1.2			Weedone 170	15/ 57
Naselle Tap to Longview- Astoria No. 1	2/ .8			Banvel 4WS	10/ 38
		20/ 8.1		and 2,4-D Amine	20/ 76
Raymond-Cosmopolis	1/ .4			Banvel 4WS	5/ 19
		10/ 4.0		and 2,4-D Amine	10/ 38
Raymond-Willapa River No. 1	2/ .8			Banvel 4WS	10/ 38
		20/ 8.1		2,4-D Amine	20/ 76

Pend Orielle

Bell-Boundary No. 1 & 2	25/ 10.0

Pierce

Covington-White River	1/ .4			Banvel 4WS	5/ 19
		10/ 4.0		2,4-D Amine	10/ 38
	216/ 87.4	<u>2</u> /		Banvel 4WS	27/102
				and 2,4-D Amine	54/204
Olympia-Grand Coulee No. 1	5/ 2.0			Banvel 4WS	25/ 95
		50/ 20.2		2,4-D Amine	50/189
Olympia-White River	180/ 72.8	<u>2</u> /		Banvel 4WS	22/ 83
				2,4-D Amine	44/167

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COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1/</u>	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Pierce

Raver-Paul No. 1		753/304.7 ^{2/}		Banvel 4WS	94/356
				2,4-D Amine	188/712
Tacoma-Cowlitz Tap to Chehalis Covington	2/ .8	75/ 30.3 ^{2/}	20/ 8.1	Banvel 4WS	10/ 38
				2,4-D Amine	20/ 76
				Banvel 4WS	9/ 36
				and 2,4-D Amine	19/ 72
Tacoma-Cowlitz Tap to Olympia- White River	2/ .8	75/ 30.3 ^{2/}	20/ 8.1	Banvel 4WS	10/ 38
				2,4-D Amine	20/ 76
				Banvel 4WS	9/ 36
				and 2,4-D Amine	19/ 72
Tacoma-Raver No. 1 & 2	2/ .8		20/ 8.1	Banvel 4WS	10/ 38
				2,4-D Amine	20/ 76

Skagit

Monroe-Custer No. 1	5/ 2.0		50/ 20.2	Banvel 4WS	25/ 95
				2,4-D Amine	50/189
Monroe-Custer No. 2	5/ 2.0		50/ 20.2	Banvel 4WS	25/ 95
				2,4-D Amine	50.189
Murray-Bellingham No. 1	2/ .8		20/ 8.1	Banvel 4WS	10/ 38
				2,4-D Amine	20/ 76

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting ✓	Herbicide				
		Aerial	Selective			
	acres/ha.	acres/ha.	acres/ha.		gal/liter	lb/kg

Skamania

Bonneville-Alcoa No. 2	2/ .81		140/ 56.7	Weedone 170 Banvel 720	8/ 30 280/1060	
Hanford-Ostrander) North Bonneville-Midway)	55/ 22.3		350/141.6	Weedone 170 Tordon 10K	700/2650	600/ 272
McNary-Ross	30/ 12.0		190/ 76.9	Weedone 170 Tordon 10K	320/1211	600/272
North Bonneville-Sifton No. 2			200/ 80.9	Banvel 720 and Tordon 101	342/1295 58/220	

Snohomish

Chief Joseph-Monroe No. 1	8/ 3.2		80/ 32.4	Banvel 4WS 2,4-D Amine	40/151 80/303	
Chief Joseph-Snohomish No. 3 & 4	8/ 3.2		80/ 32.4	Banvel 4WS 2,4-D Amine	40/151 80/303	
Jim Creek Service (U. S. Navy)	5/ 2.0		50/ 20.2	Banvel 4WS 2,4-D Amine	25/ 95 50/189	
Monroe-Custer No. 1	6/ 2.4		60/ 24.3	Banvel 4WS 2,4-D Amine	30/114 60/227	
Monroe-Custer No. 2	4/ 1.6		40/ 16.2	Banvel 4WS 2,4-D Amine	20/ 76 40/151	

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COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1</u>	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Snohomish (cont.)

Monroe-Snohomish No. 1 & 2	16/ 6.5	160/ 64.7	Banvel 4WS 2,4-D Amine	80/303 160/606
Monroe-SnoKing No. 1	2/ .8	20/ 8.1	Banvel 4WS 2,4-D Amine	10/ 38 20/ 76
Murray-Bellingham No. 1	6/ 2.4	60/ 24.3	Banvel 4WS 2,4-D Amine	30/114 60/227
Raver-Monroe No. 1	14/ 5.7	140/ 56.6	Banvel 4WS 2,4-D Amine	70/265 140/530
Snohomish-Murray	18/ 7.3	180/ 72.8	Banvel 4WS 2,4-D Amine	90/341 180/681
Snohomish-Bothell	4/ 1.6	40/ 16.2	Banvel 4WS 2,4-D Amine	20/ 76 40/151

Spokane

Grand Coulee-Bell No. 1-5	5/ 2.0	150/ 60.7 ^{2/} 68/ 27.5 ^{2/} 2/ .8 ^{2/}	2,4-D Amine Tordon 101 Telvar	75/284 136/515 400/ 181

BPA's FY 1979 RIGHT OF WAY MANAGEMENT PROGRAM BY
COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting ^{1/}	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Spokane (cont.)

Bell-Boundary 1&2	100/ 40.5 ^{2/} 50/ 20.2 ^{2/} 2/ .8 ^{2/}	2,4-D Amine Tordon 101 Telvar	50/190 300/1137	300/ 136
Bell-Colville	45/ 18.2 ^{2/} 5/ 2.0 ^{2/} 1/ .4 ^{2/}	2,4-D Amine Tordon 101 Telvar	23/87 10/ 38	200/ 91
Bell-Noxon	90/ 36.4 ^{2/} 10/ 4.0 ^{2/} 2/ .8 ^{2/}	2,4-D Amine Banvel 4WS Telvar	45/171 3/ 12	300/ 136

Thurston (cont.)

Chehalis-Olympia No. 1	3/ 1.2	Banvel 4WS 2,4-D Amine	15/ 57 30/114
Olympia-Aberdeen No. 3	20/ 8.1	Banvel 4WS 2,4-D Amine	100/379 200/757
Olympia-Grand Coulee No. 1	6/ 2.4	Banvel 4WS 2,4-D Amine	30/114 60/227
Olympia-Port Angeles No. 1	6/ 2.4	Banvel 4WS 2,4-D Amine	30/114 60/227
Olympia-White River	180/ 72.8 ^{2/}	Banvel 4WS 2,4-D Amine	22/ 83 44/167

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COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting <u>1/</u>	Herbicide			gal/liter	lb/kg
		Aerial	Selective			
		acres/ha.	acres/ha.			

Thurston (cont.)

Paul-Olympia No. 1	9/ 3.6		Banvel 4WS	45/170
		180/ 72.8 ^{2/}	2,4-D Amine	90/341
		90/ 36.4	Banvel 4WS	22/ 83
			and 2,4-D Amine	44/167
Raver-Paul No. 1	7/ 2.8		Banvel 4WS	35/132
		288/116.6 ^{2/}	2,4-D Amine	70/265
		70/ 28.3	Banvel 4WS	36/250
			and 2,4-D Amine	72/273

Wahkiakum

Naselle Tap to Longview-Astoria No. 1	8/ 3.2		Banvel 4WS	36/136
		72/ 29.1	2,4-D Amine	72/273

Walla Walla

Lower Monumental-John Day		39/ 15.8 ^{2/}	Telvar	
			and 2,4-D Amine	39/148
				585/ 265

Whatcom

Custer-Ingledow No. 1 & 2	9/ 3.6		Banvel 4WS	45/170
		90/ 36.4	2,4-D Amine	90/341
Custer-Intalco No. 1	3/ 1.2		Banvel 4WS	15/ 57
		30/ 12.1	2,4-D Amine	30/114

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COUNTY AND TRANSMISSION LINE

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STATE OF WASHINGTON (continued)

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Whatcom (cont.)

Custer-Intalco No. 2	3/ 1.2	30/ 12.1	Banvel 4WS 2,4-D Amine	15/ 57 30/114
Monroe-Custer No. 1	9/ 3.6	90/ 36.4	Banvel 4WS 2,4-D Amine	45/170 90/341
Monroe-Custer No. 2	9/ 3.6	90/ 36.4	Banvel 4WS 2,4-D Amine	45/170 90/341

Whitman

Little Goose-Lower Granite No. 1	146/ 59.1 ² / _{1/ .4}	Tordon 101 Telvar	300/1136	400/ 181
Little Goose-Lower Granite No. 2	150/ 60.7 ² / _{1/ .4}	Tordon 101 Telvar	300/1136	400/ 181
Lower Monumental	150/ 60.7 ² / _{1/ .4}	Tordon 101 Telvar	300/1136	400/ 181
North Lewiston-Colfax	1/ .4 ² / _{1/ .4}	Telvar	200/ 91	

Yakima

Big Eddy-Midway	35/ 14.2 ² / _{1/ .4}	Telvar and 2,4-D Amine	35/132	525/ 238
Hanford-John Day	32/ 12.2 ² / _{1/ .4}	Telvar and 2,4-D Amine	32/121	480/ 218

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COUNTY AND TRANSMISSION LINE

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STATE OF WYOMING

County Transmission Line	Area of each Management Method			Herbicide	Application per Line	
	Hand Cutting 1/	Herbicide				
		Aerial	Selective			
		acres/ha.	acres/ha.		acres/ha.	gal/liter

Teton

Swan Valley-Teton

2/ .8

Weedone 170

1/ 4

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- 1/ Requires stump treatment of resprouting species.
2/ Weed control. This includes noxious weed control on right-of-way and weed control around structures in agricultural land.

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BY NATIONAL FOREST AND DISTRICT

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Region No. 1

Area of each Management Method			Herbicide	Application per line	
Hand Cutting 1/	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
	acres/ha.	acres/ha.			

Kaniksu Natl. Forest
Cabinet District

Line Name

Noxon-Hot Springs	.3/ .1	Tordon 101	.1/ .4
Noxon-Libby	14.0/ 5.7	Tordon 101	2.0/ 8.0

Kootenai Natl. Forest
Fisher River District

Line Name

Noxon-Libby	50.0/ 20.2	Tordon 101	6.4/ 23.0

Kootenai Natl. Forest
Libby District

Line Name

Libby-Libby PP&L	65.0/ 26.3	Tordon 101 and Ammate X	15.0/ 57.0 70/ 32

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BY NATIONAL FOREST AND DISTRICT

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Region No. 1

Area of each Management Method			Herbicide	Application per line	
Hand Cutting 1/	Herbicide				
	Aerial	Selective			
acres/ha.	acres/ha.	acres/ha.		gal./liter	lb/kg

St. Joseph Natl. Forest
St. Maries District

Line Name

Dworshak-Hot Springs

'25/ 10.0

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Region No. 4

Area of each Management Method			Herbicide	Application per line	
Hand Cutting 1/	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
	acres/ha.	acres/ha.			

Bridger-Teton Natl. Forest
Jackson District

Line Name

Swan Valley-Teton 2/ .8 Weedone 170 .5/ 2.0

Targhee Natl. Forest
Ashton District

Line Name

Drummond-Macks Inn 5/ 2.0 Weedone 170 2.5/ 9.0
15/ 6.1 Tordon 10K 150/ 68

Targhee Natl. Forest
Swan Valley District

Line Name

Swan Valley-Teton 5/ 2.0 Weedone 170 2.5/ 9.0
15/ 6.1 Tordon 10K 150/ 68

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Region No. 6

Area of each Management Method			Herbicide	Applicati per line	
Hand Cutting 1/	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
acres/ha.	acres/ha.	acres/ha.			

Deschutes Natl. Forest
Crescent District

Line Name

Redmond-Yamsay 10/ 4.0

Fort Rock District

Line Name

Redmond-Yamsay 2/ .8

10/ 4.0 Tordon 10K 100/ 45

Gifford Pinchot Natl. Forest
Wind River District

Line Name

McNary-Ross 5/ 2.0 Tordon 10K 50/ 23

Mt. Hood Natl. Forest
Columbia Gorge District

Line Name

Bonneville-The Dalles 34/ 13.7
54/ 21.9 Weedone 170 135/ 61
Tordon 10K 200/ 91

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Region No. 6

Area of each Management Method			Herbicide	Application per line	
Hand Cutting	Herbicide				
	Aerial	Selective			
acres/ha.	acres/ha.	acres/ha.		gal./liter	lb/kg

Mt. Hood Natl. Forest (cont.)
Columbia Gorge District (cont.)

Line Name

Hanford-Ostrander	100/ 40.5		Weedone 170	400/1514	
		160/ 64.7	Tordon 10K		500/227
			and Tordon 101	320/121	

Hood River District

Line Name

Big Eddy-Troutdale	30/ 12.1		Weedone 170	260/984	
		130/ 52.6	Tordon 10K		300/136
Bonneville-The Dalles	5/ 2.0		Weedone 170	20/ 76	
		8/ 3.2	Tordon 10K		30/ 14

Olympia Natl. Forest
Quilcene District

Line Name

Olympia-Port Angeles	4/ 1.6		Banvel 4WS	20/ 76	
		40/ 16.2	2,4-D Amine	40/151	

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BY NATIONAL FOREST AND DISTRICT

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Region No. 6

Area of each Management Method			Herbicide	Application per line	
Hand Cutting 1/	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
	acres/ha.	acres/ha.			

Olympia Natl. Forest (cont.)
Solduc District

Line Name

Port Angeles-Sappho 8/ 3.2 Banvel 4WS 40/151
80/ 32.4 2,4-D Amine 80/303

Siuslaw Natl. Forest
Hebo District

Line Name

Salem-Tillamook 54/ 21.9 Banvel 720 108/409

Mapleton District

Line Name

Lane-Tahkenitch No. 1 6/ 2.4 Weedone 170 24/ 91
80/ 32.4 Tordon 101 160/606
10/ 4.07 and 2,4-D Amine 40/151
Tordon 101 20/ 76
and Tordon 10K 20/ 9

Lane-Wendson No. 2 13/ 5.4 Tordon 101 26/ 98
and 2,4-D Amine 7/ 26

Wendson-Tahkenitch No. 2 15/ 6.1 Tordon 101 30/114
and 2,4-D Amine 8/ 30

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Region No. 6

Area of each Management Method			Herbicide	Application per line	
Hand Cutting	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
acres/ha.	acres/ha.	acres/ha.			

Siuslaw Natl. Forest (cont.)
Mapleton District (cont.)

Line Name

Toledo-Wendson	2/ .8	50/ 20.2	Weedone 170	8/ 30	
			Tordon 101	100/379	
			and 2,4-D Amine	25/ 95	
		10/ 4.07	Tordon 101	20/ 76	
			and Tordon 10K		25/ 11

Waldport District

Line Name

Toledo-Wendson	6/ 2.4	100/ 40.5	Weedone 170	24/ 91	
			Tordon 101	200/757	
			and 2,4-D Amine	50/189	
		17/ 6.9	Tordon 101	34/129	
			and Tordon 10K		50/ 23

Snoqualmie Natl. Forest
North Bend District

Line Name

Covington-Grand Coulee No. 3	6/ 2.4	60/ 24.3	Banvel 4WS	30/114	
			2,4-D Amine	60/227	
Olympia-Grand Coulee No. 1	2/ .8	20/ 8.1	Banvel 4WS	10/ 38	
			2,4-D Amine	20/ 76	

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Region No. 6

Area of each Management Method			Herbicide	Application per line	
Hand Cutting	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
acres/ha.	acres/ha.	acres/ha.			

Snoqualmie Natl. Forest (cont.)
North Bend District (cont.)

Line Name

Sickler-Raver No. 1	20/ 8.1		Banvel 4WS	100/379
		200/ 80.9	2,4-D Amine	200/757

Walla-Whitman Natl. Forest
LaGrande District

Line Name

Roundup-LaGrande		15/ 6.1	Tordon 10K	150/ 68

Wenatchee Natl. Forest
Cle Elum District

Line Name

Covington-Grand Coulee No. 3	1/ .4		Banvel 4WS	5/ 19
		10/ 4.0	2,4-D Amine	10/ 38
Grand Coulee-Raver No. 1 & 2	4/ 1.6		Banvel 4WS	20/ 76
		40/ 16.2	2,4-D Amine	40/151
Rocky Reach-Maple Valley No. 1	8/ 3.2		Banvel 4WS	40/151
		80/ 32.0	2,4-D Amine	80/303
Sickler-Raver No. 1	10/ 4.0		Banvel 4WS	50/189
		100/ 40.5	2,4-D Amine	100/379

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BPA's FY 1979 RIGHT-OF-WAY MANAGEMENT PROGRAM
BY NATIONAL FOREST AND DISTRICT

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Region No. 6

Area of each Management Method			Herbicide	Application per line	
Hand Cutting	Herbicide			gal./liter	lb/kg
	Aerial	Selective			
acres/ha.	acres/ha.	acres/ha.			

Wenatchee Natl. Forest (cont.)
Lake Wenatchee District

Line Name

Chief Joseph-Monroe 4/ 1.6 40/ 16.2 Banvel 4WS 20/ 76
2,4-D Amine 40/151

Winema Natl. Forest
Chemult District

Line Name

Redmond-Yamsay 20/ 8.1 Tordon 10K 200/ 91

- 1/ Requires stump treatment of resprouting species.
2/ Weed control. This includes noxious weed control on right-of-way and weed control around structures in agricultural land.

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Attachment D (Cont.)

HERBICIDE RESIDUES IN SOIL AND WATER FROM
BONNEVILLE POWER ADMINISTRATION TRANSMISSION LINE RIGHTS OF WAY

BY

Logan A. Norris

August 25, 1975

This is a report of a continuing herbicide residue monitoring program in connection with chemical brush control activities on Bonneville Power Administration transmission line rights-of-way. This program was initiated in July 1970. Introductory and background information on monitoring sites, sampling and analytical procedures are in the August 24, 1971, report which covered samples analyzed through July 1971. Other reports have covered samples analyzed between July 1, 1971, and May 1, 1972; May 1, 1972, and February 1, 1973; and February 2, 1973, and May 1, 1974.

This report covers samples analyzed between May 2, 1974 and August 1, 1975. Included are results from analysis of soil samples collected approximately 40 months post spray at two long-term sites established in 1971, and soil samples collected 28 months post-spray at one long-term study site established in 1972. Also included are results of analysis of a number of water samples from small streams crossing treated rights-of-way in the city of Seattle watershed, and on the Oregon coast. Results of analysis of a large number of special samples are also included.

LONG-TERM STUDY SITES ESTABLISHED IN 1971

The results of analysis of soil samples collected seven months and approximately sixteen months post-application at long-term study sites established in 1971 were reported previously. This report contains results of analysis of soil samples of collected 40 months post-spray at one site and 39 months post-spray at a second site.

Site 1. Snohomish-Bellingham Line, tower 24/2 opposite Monroe-Custer
47/1 - 47/2

Spray History: 2.2 gallons Tordon 101 per acre 7/21/66
2 gallons Tordon 101 per acre 7/1/71

Sampled: 5/16/71 (prespray)
2/10/72 (7 months post spray)
10/31/72 (16 months post spray)
10/10/74 (40 months post spray, data below)

<u>Sample No.</u>	<u>Location</u>	<u>Depth (inches)</u>	<u>Herbicide (ppm)</u>	
			<u>2,4-D</u>	<u>Picloram</u>
778	West	0-6	0.03	0.01
9		6-12	-0- ^{1/}	-0- ^{1/}
780		12-18	-0-	-0-
1	Center	18-24	-0-	-0-
2		0- 6	-0-	0.01
3		6-12	-0-	-0-
4		12-18	-0-	-0-
5		18-24	-0-	-0-
6	East	0- 6	-0-	0.02
7		6-12	-0-	-0-
8		12-18	-0-	-0-
9		18-24	-0-	-0-

^{1/} -0- means less than 0.01 ppm

Residue levels at the Snohomish-Bellingham study site continue to decline, although slowly with time. This is similar to the pattern observed previously where the rate of herbicide disappearance declines as residue levels approach the minimum limits of detection. The residue levels at the Snohomish-Bellingham site are far below those of biological significance and no further sampling at this site should be scheduled.

Site 3. Covington Grand-Coulee #1, opposite Sickler-Raver tower 64/4

Spray History: 2,4-D and picloram applied in various amounts by ground rig and helicopter between 7/12 and 7/22/71. See page 16, May 19, 1972 report.

Sampled: 6/2/71 (Prespray)
9/11/72 (14 months post spray)
10/11/74 (39 months post spray)

Sample No.	Location	Depth (inches)	Herbicide (ppm)	
			2,4-D	Picloram
790	North	0- 6	0.03	0.02
1		6-12	-0- <u>1</u> /	-0- <u>1</u> /
2		12-18	-0-	-0-
3	Center	No Sample		-0-
4		0-6	0.03	0.01
5		6-12	-0-	-0-
6		12-18	-0-	-0-
7	South	18-24	-0-	-0-
8		0- 6	0.01	0.01
9		6-12	-0-	-0-
800		12-18	-0-	-0-
1		18-24	-0-	-0-

1/ 0 means less than 0.01 ppm

Herbicide levels have declined considerably between the 14 months-39 month post spray sampling periods. These levels are not of biological significance, and no further sampling for this site should be scheduled.

One additional set of soil samples should be collected at the Big Cliff-Detroit study site. This site shows levels of herbicide in the litter which should be sampled approximately 40 months post-spray.

LONG TERM STUDY SITE ESTABLISHED IN 1972

Only one long-term study established in 1972 is being actively sampled. Samples collected 10.5 months post spray of the site were reported previously.

Site 1. Redmond-Yamsey, near structure 73/6

Spray History: Estimated 0.8 - 2.5 gallons Tordon 101 per acre, ground application, summer 1961.
2 gallons Tordon 101 per acre, 6/23/72

Sampled: 5/8/73 (10.5 months post-spray)
10/24/71 (28 months post-spray, data below)

<u>Sample No.</u>	<u>Location</u>	<u>Depth (inches)</u>	<u>Herbicide (ppm)</u>	
			<u>2,4-D</u>	<u>Picloram</u>
830	West	0- 6	0.01	0.03
1		6-12	-0- <u>1</u> / ₁	-0- <u>1</u> / ₁
2		12-18	-0-	-0-
3		18-24	-0-	-0-
4	Center	0- 6	0.02	0.02
5		6-12	-0-	-0-
6		12-18	-0-	-0-
7		18-24	-0-	-0-
8	East	0- 6	0.05	0.05
9		6-12	-0-	-0-
840		12-18	-0-	-0-
1		18-24	-0-	-0-

1/ 0 means less than 0.01 ppm

Herbicides which were at or near limits of detection 10.5 months post-spray are still at approximately that same level. Samples from the East location show a considerable drop in herbicide concentration in the 18 months since the last sampling. This is further illustration of the slow rate of herbicide decline as residue levels approach the minimum levels of detection. The levels of herbicide encountered at this sampling time are at or below those of biological importance. One further set of samples from the Redmond-Yamsey site collected approximately 40 months post-spray is all that should be required for this site. Sampling to depths greater than 12 inches is not required.

WATER SAMPLES

The data for water samples collected at two long-term water sampling sites are included in this report. The first site was located on the Raver-Monroe line near tower 8/2 on a small tributary of Rock Creek in section 2, township 22N range 7E, WN. This area was treated with six pounds of 2,4-D per acre in September of 1973. Water samples collected through March 20, 1974, were reported in the May 9, 1974, report. This report includes samples collected through April 17, 1974, when the sampler was removed.

RAVER-MONROE LONG TERM SAMPLING SITE

Sample No.	Date	PPM 2,4-D	Sample No.	Date	PPM 2,4-D
696	3/21/74	<0.002	711	4/5	<0.002
697	3/22		712	4/6	
698	3/23		713	4/7	
699	3/24	<0.002	714	4/8	<0.002
700	3/25		715	4/9	
701	3/26		716	4/10	
702	3/27	<0.002	717	4/11	<0.002
703	3/28		718	4/12	
704	3/29		719	4/13	
705	3/30	<0.002	720	4/14	<0.002
706	3/31		721	4/15	
707	4/1		722	4/16	
708	4/2	<0.002	723	4/17	<0.002
709	4/3				
710	4/4				

Another long-term water sampling site was established in July 1974, on the Toledo-Wendson 230 kV transmission line approximately 3 miles east of Sealrock, Oregon. The test site is located in the SE 1/4, SW 1/4, NW 1/4 Section 34, Township 12 South, range 11 West, Willamette Meridian. The transmission line crosses three small creeks between towers 15/1 and 15/2. These small creeks come together below the right-of-way to form the stream which is monitored with the Isco automatic water sampler. The area was sprayed with 2 gal. Tordon 101 and 0.5 gal. 2,4-D anime with Norbak in 17.5 gal. per acre (9 lbs., 2,4-D and 1 lb. picloram per acre). Chemicals were applied between 0915 and 0922 on July 20, 1974. The Isco automatic water sampler was set in operation at that time and continued to collect samples through April 22, 1975. Usually three, four, or five samples were composited for chemical analyses.

Sample No.	Date	Herbicide (ppm)	
		2,4-D	Picloram
724	prespray 7/16/74	<0.002	<0.002
725	prespray 7/16		
726	postspray 7/22	<0.002	<0.002
727	7/23		
728	7/24	<0.002	<0.002
729	7/25		
730	7/26	<0.002	<0.002
731	7/27		
732	7/28	<0.002	<0.002
733	7/29		
734	7/30	<0.002	<0.002
735	7/31		
736	8/1	<0.002	<0.002
737	8/2		
738	8/3	<0.002	<0.002
739	8/4		
740	8/5	<0.002	<0.002
741	8/6		
742	8/7	<0.002	<0.002
743	8/8		
744	8/9	<0.002	<0.002
745	8/10		
746	8/11		

With the exception of samples collected between November 4-7, 1974, herbicide levels did not exceed 0.002 ppm, which is the minimum quantitative level of detection. These results are most encouraging. They confirm the long-term sampling results from the Raver-Monroe line. Both of these together substantiate our belief that although picloram is reported to be both moderately persistent and mobile in the soil profile, its careful application to power line rights-of-way does not result in significant herbicide levels in stream water. This Toledo-Wendson study site was a particularly good one to look for water contamination because the transmission line crosses three small streams which come together upstream from the water sampler. Careful instructions to the applicator to avoid direct application to the stream and the high organic matter content associated with the soils on the Oregon Coast have undoubtedly combined to prevent significant entry of herbicide to this stream despite the more than 70 inches of rain which fell between the time of application and the time the sampler was removed 9 months later.

Sample No.	Date	Herbicide (ppm)	
		2,4-D	Picloram
747	8/12	<0.002	<0.002
748	8/13		
749	8/14		
750	8/15	<0.002	<0.002
751	8/16		
752	8/17		
753	8/18		
754	No Sample		
755	8/28	<0.002	<0.002
756	8/29		
757	8/30		
758	8/31	<0.002	<0.002
759	9/1		
760	9/2		
761	9/3	<0.002	<0.002
762	9/4		
763	9/5		
764	9/6	<0.002	<0.002
765	9/7		
766	9/8		
767	9/9	<0.002	<0.002
768	9/10		
769	9/11		
770	9/12	<0.002	<0.002
771	9/13		
772	9/14		
773	9/15	<0.002	<0.002
774	9/16		
775	9/17		
776	9/18	<0.002	<0.002
777	9/19		
802	9/25		
803	9/26	<0.002	<0.002
804	9/27		
805	9/28		
806	9/29	<0.002	<0.002
807	9/30		
808	10/1		
809	10/2	<0.002	<0.002
810	10/3		
811	10/4		
812	10/5	<0.002	<0.002
813	10/6		
814	10/7		
815	10/8	<0.002	<0.002
816	10/9		

Sample No.	Date	Herbicide (ppm)	
		2,4-D	Picloram
817	10/10	<0.002	<0.002
818	10/11		
819	10/12		
820	10/13		
821	10/14		
822	10/15	<0.002	<0.002
823	10/16		
824	10/17		
825	10/18		
826	10/19		
827	10/20	<0.002	<0.002
828	10/21		
829	10/22		
842	10/23		
843	10/24		
844	10/25	<0.002	<0.002
845	10/26		
846	10/27		
847	10/28		
848	10/29		
849	10/30	<0.002	<0.002
850	10/31		
851	11/1		
852	11/2		
853	11/3		
854	11/4	<0.002	<0.002
855	11/5		
856	11/6		
857	11/7		
858	11/8		
859	11/9	<0.002	<0.002
860	11/10		
861	11/11		
862	11/12		
863	11/13		
864	11/14	<0.002	<0.002
865	11/15		
866	11/16		
867	11/17		
868	11/18		
869	11/19	<0.002	<0.002
870	11/20		
871	11/21		
872	11/22		
873	11/23		
874	11/24	<0.002	<0.002
875	11/25		
876	11/26		
877	11/27		
878	11/28		
879	11/29	<0.002	<0.002
880	11/30		
881	12/1		

Sample No.	Date	Herbicide (ppm)	
		2,4-D	Picloram
882	12/2	<0.002	<0.002
883	12/3		
884	12/4		
885	12/5		
886	12/6		
887	12/7	<0.002	<0.002
888	12/8		
889	12/9		
890	12/10		
891	12/11		
892	12/12	<0.002	<0.002
893	12/13		
894	12/14		
895	12/15		
896	12/16		
897	12/17	<0.002	<0.002
898	12/18		
899	12/19		
900	12/20		
901	12/21		
902	12/22	<0.002	<0.002
903	12/23		
904	12/24		
905	12/25		
906	12/26		
907	12/27	<0.002	<0.002
908	12/28		
909	12/28		
910	12/29		
911	12/30		
912	12/31	<0.002	<0.002
913	1/1/75		
914	1/2		
915	1/3		
916	1/4		
917	1/5	<0.002	<0.002
918	1/6		
919	1/7		
920	1/8		
921	1/9		
922	1/10	<0.002	<0.002
923	1/11		
924	1/12		
925	1/13		
926	1/14		
927	1/15	<0.002	<0.002
928	1/16		
929	1/17		

Sample No.	Date	Herbicide (ppm)	
		2,4-D	Picloram
930	1/18	<0.002	<0.002
931	1/19		
932	1/20		
933	1/21		
934	1/22		
935	1/23	<0.002	<0.002
936	1/24		
937	1/25		
938	1/26		
939	1/27		
940	1/28	<0.002	<0.002
941	1/29		
942	1/30		
943	1/31		
944	2/1		
945	2/2	<0.002	<0.002
946	2/3		
947	2/4		
948	2/26		
949	2/27		
950	2/28	<0.002	<0.002
951	3/1		
952	3/2		
953	3/3		
954	3/4		
955	3/5	<0.002	<0.002
956	3/6		
957	3/7		
958	3/8		
959	3/9		
960	3/10	<0.002	<0.002
961	3/11		
962	3/12		
963	3/13		
964	3/14		
965	3/15	<0.002	<0.002
966	3/16		
967	3/17		
968	3/18		
969	3/19		
970	3/20	<0.002	<0.002
971	3/21		
972	No Sample		
973	3/22		
974	3/23		
975	3/24		
976	3/25		

Sample No.	Date	Herbicide (ppm)	
		2,4-D	Picloram
977	3/26	<0.002	<0.002
978	3/27		
979	3/28		
980	3/29		
981	3/30	<0.002	<0.002
982	3/31		
983	4/1		
984	4/2		
985	4/3	<0.002	<0.002
986	4/4		
987	4/5		
988	4/6		
989	4/7	<0.002	<0.002
990	4/8		
991	4/9		
992	4/10		
993	4/11	<0.002	<0.002
994	4/12		
995	4/13		
996	4/14		
997	4/15	<0.002	<0.002
998	4/16		
999	4/17		
1000	4/18		
1001	4/19	<0.002	<0.002
1002	4/20		
1003	4/21		
1004	4/22		

SPECIAL SAMPLES

The results of analysis of special samples 46 through 69 were reported in the May 2, 1974 report. A large number of special samples were collected and analyzed since that time.

SAMPLE NO.

DISCUSSION AND REMARKS

70-78 (and
North corrections
for 62 and 66)

Samples of duff (litter) and soil from the Bonneville-Midway line collected 4/30/74 between structures 11/1-11/2. This is follow-up sampling in connection with special samples 48-50 and 58-69. This area has a 1940 agricultural easement that has not been utilized for a long time and normal BPA vegetation management practices have been employed. In 1973, interest was expressed in using the area for agriculture and a testing program began to identify residue levels. The first samples, collected 3/29/73, (48-50) showed residues of sufficient magnitude to cause damage to sensitive crops. Highest residues were in litter. Samples collected 8/21/73 showed a decline in soil residues, but significant residues were in litter. My letter of 2/8/74 reporting these results contain errors for special samples 62 and 66. The correct values are:

<u>Sample No.</u>	<u>2,4-D</u>	<u>Picloram</u>
62	65 ug	12 ug
66	35 ug	14 ug

Calculation of lbs. of herbicide per acre are not appropriate for these samples because of the lack of uniformity in area sampled. The following data are for samples collected at the same locations on 4/30/74. The numbers in () show the number of the special sample collected at that same point on 7/25/73.

<u>Sample No.</u>	<u>Description</u>	<u>2,4-D</u>	<u>Picloram</u>
70(58)	Litter	108 ug	60 ug
71(59)	Soil, 0-6"	0.05	0.01
72(60)	Soil, 6-12"	0.02	0.01
73(62)	Litter	192 ug	60 ug
74(63)	Soil, 0-6"	0.04	0.01
75(64)	Soil, 6-12"	0.02	0.01
76(66)	Litter	252 ug	51 ug
77(67)	Soil, 0-6"	0.02	0.01
78(68)	Soil, 6-12"	0.02	0.01

These results show an apparent increase in herbicide levels in litter. Interpretation is confused by unequal area sampling, although there is no question that the herbicide is present. Levels in soil are also slightly higher than in 1973. Contamination among samples during shipment was noted in Bergman's letter of 5/27/74. If agriculture is planned for this area, or if some legal action is contemplated, a fresh collection of samples by trained and experienced personnel is needed.

79-87

These are samples of soil and vegetation from the Bonners Ferry-Troy transmission line where a property owner claims herbicide damage to conifers adjacent to the right-of-way. A confusing fact was that the right-of-way was treated nearly 3 years before the damage to the conifers was noted. Analyses of soil and vegetation showed no residues in the soil, but definite detectable levels in injured trees.

88

A sample of water from a small stream on the Lane-Tehkenitch line BOL 25/5 just off of right-of-way. This sample did not contain detectable levels of 2,4-D or picloram.

89-109,
141, 142,
153-161.

All of these samples were collected from the Tordon 101 spill site near Summit Lake, Washington. Results for special samples 34-44 and sample 51 also collected at this site, were reported previously.

89-92

Special samples 89-92 were collected 100 ft. downslope from the point where special samples 35-41 were collected. The results are in the following table.

Herbicide in Soil, Summit Lake Spill Site

<u>Special Sample No.</u>	<u>Depth (inches)</u>	<u>Herbicide (ppm)</u>	
		<u>2,4-D</u>	<u>picloram</u>
89	0-6	0.016	0.024
90	6-12	<0.01	<0.005
91	12-24	<0.01	<0.005
92	24-41	<0.01	<0.005

These results indicate considerable downslope movement of herbicide from the spill site, however, the movement is nearly totally on the surface of the soil as indicated by the lack of appreciable herbicide residues in the profile.

93, 94

Special samples 93 and 94 were collected October 9th, 1974, from Summit Lake below the Tordon spill site. No detectable residues were found in either of these two samples.

95-109

Special samples 95 through 109 were collected November 19, 1974.

141, 142

Samples 141 and 142 are water collected from a faucet on the front deck of the Iverson residence. These samples were collected by Jim Thorne to determine if the sample collected by Jack Warren (see special sample 97) was contaminated. Results of analysis showed 0.030 ppm picloram in special sample 141 and 0.028 ppm picloram in special sample 142. Neither sample contained detectable levels

of 2,4-D (0.001 ppm). These special samples 93 and 94 were collected October 9th, 1974, from Summit Lake below the Tordon spill site. No detectable residues were found in either of these two samples.

153-161

These samples were collected on July 7, 1975. They were taken to determine if herbicide residues detectable in special samples 141 and 142 were still present in the domestic water system approximately 7 months later. The following are results of analyses.

<u>Special Sample No.</u>	<u>Description</u>		<u>picloram (ppm)</u>
	<u>Location</u>	<u>Minutes After Turned on</u>	
153	Kitchen tap	0	0.019
154	Kitchen tap	5	0.025
155	Kitchen tap	10	0.024
156	Bathroom tap	0	0.025
157	Bathroom tap	5	0.024
158	Bathroom tap	10	0.024
159	Outside faucet	0	0.019
160	Outside faucet	5	0.025
161	Outside faucet	10	0.025

These results verify that picloram is still in the domestic water supply. The results are very consistent from sample to sample and show that even after running for 10 minutes, the level of herbicide coming from the tap is not diminished. A simple laboratory experiment conducted at the Forestry Sciences Laboratory showed charcoal filtration would remove picloram residues from the water system.

110-123

These samples were taken on the Timber Tap and correspond to special samples 23-33, which were collected earlier. In general, sampling on the Timber Tap shows herbicides persisting at levels which may be damaging to freshly planted conifer seedlings for several months after applications.

110-123 (cont'd)

In some areas, it would be safe to plant Douglas-fir seedlings as soon as 6 months after application, but many sites more than 15 months is required. As a general rule on most sites where soils are moderately light and abundant, rainfall is present approximately 18 months after application will insure that planted seedlings will survive with little or no herbicide damage.

124-129

These Samples were from the John Day substation. Soil sterilization treatments were suspected of causing nearby crop damage. Samples were analyzed for several herbicides. The results show sodium chlorate probably caused the damage. Some provisions to contain surface drainage water and prevent its moving into sensitive areas may be worth considering at this and similar sites.

130-140

These are samples of foliage and bark from the Bonneville-The Dalles line between structures 3/5 and 3/7. These samples include 10 samples of foliage and 1 sample of bark. The samples are from trees which are off the right-of-way, but which appeared to be suffering from herbicide damage. They were located during a joint BPA-Forest Service training session. Initially, 5 samples between 130 and 140 were analyzed, later the remaining 6 were analyzed. Results of these analyses follow.

<u>Special Sample No.</u>	<u>Description</u>	<u>Picloram (ppm)</u>
130	foliage, 20' hemlock, tip damage	0.560
131	foliage, 30' damaged Douglas-fir	0.500
132	foliage, slightly damaged Douglas-fir	0.610
133	foliage, 10' Douglas-fir, tip damage	0.630
134	bark from 24" DBH Douglas-fir, heavily damaged	<0.01
135	foliage, 6' damaged Douglas-fir	0.181
136	foliage, 6' damaged Douglas-fir	1.00
137	foliage 6', damaged Douglas-fir	3.70
138	foliage, 6' damaged Douglas-fir	0.235
139	foliage, 6' damaged Douglas-fir	6.90
140	foliage from apparently undamaged Douglas-fir, although this tree is surrounded on all sides by damaged trees.	<0.01

The residue levels in these trees leave little doubt that picloram has caused the damage noted on these trees. The source of herbicide is uncertain although some records indicate picloram has been used on the right-of-way. Picloram may have moved from the right-of-way in overland flow (as per the Summit Lake spill site) or the chemical may be translocated from tree to tree through root grafts. Sample 140 may have been from a tree not root grafted to other trees which contain significant residue levels.

These are follow-up samples from the Bonneville-The Dalles line. Other samples from this area are #130-141. The following results were obtained.

<u>Sample No.</u>	<u>Description</u>	<u>Picloram (ppm)</u>
143	foliage, scattered twisting	0.420
144	foliage, slightly chlorotic	0.287
145	foliage, severely damaged	1.133
146	foliage, severe needle loss	0.507
147	foliage, slightly chlorotic on ends	0.227

These samples verify the correlation between herbicide residues and degree of damage noted on samples 120-141. Residue levels of this magnitude are likely to result in continued damage to the trees and possibly their ultimate death. The source of herbicide and the process by which it was carried to these trees deserves careful investigation.

162-163

These are samples of cucumber and potato foliage respectively collected 7/10/75 from a garden between 60/3 and 61/1 on the Olympia-Port Angeles I line. The right-of-way was treated with 2 1/2 gallons of Banvel 4WS, 5 gallons of 2,4-D, 1 pint of Lo-Drift, and a half cup of R-11 in 2 1/2 gallons of water applied at the range of 20 gallons per acre. An insufficient amount of sample was supplied for analysis. If additional samples are received in connection with this incident, new special sample numbers will be assigned.

164 #1

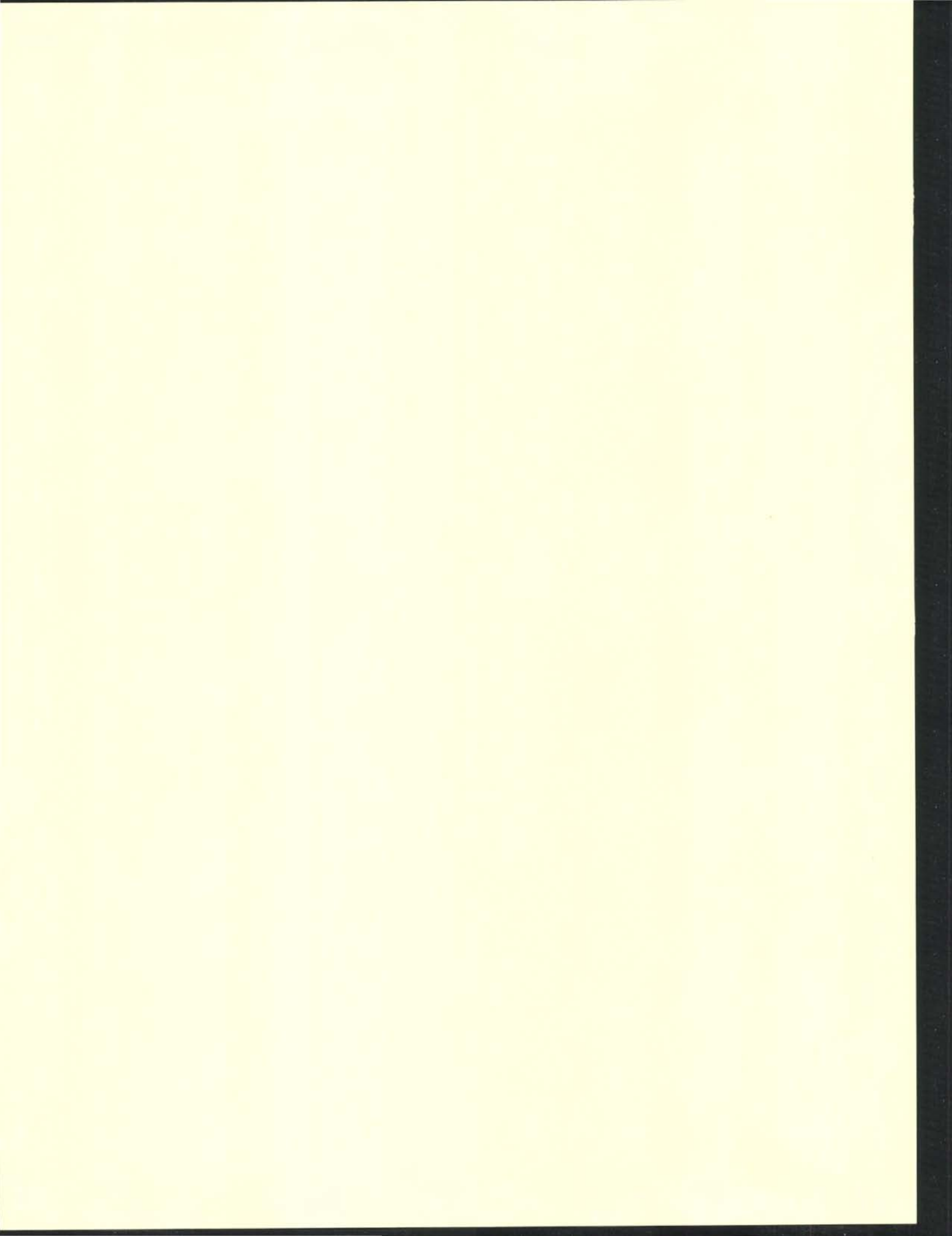
Tapwater sample collected 7/2/75 from home of Mrs. Minnie Larrew, near Raver-Paul Line tracts RT-64 and RT-66. This sample contained 0.025 ppm dicamba and 0.044 ppm 2,4-D. The domestic water supply apparently originates from an unmarked surface water source on the right-of-way. The residue

levels are consistent with levels expected on direct application to surface water. Additional sampling may be in order to determine the magnitude and duration of human exposure. I believe charcoal filtration will remove these residues.

148-152

There are no special samples with these numbers.

XII. Historical and Archeological Appendix



XII. Historic and Archeological Appendix

As mentioned in Section IV.B.1.d(4) of the preceeding, BPA will comply with both the Historic Preservation Act of 1966 and E.O. 11593 following those procedures outlined below:

The Historic Preservation Act of 1966

In compliance with those guidelines issued by the Advisory Council on Historic Preservation (36 C.F.R. Part 800) BPA has:

1. Identified all known cultural resources listed in the National Register of Historic Places and addenda through February 1977 as they pertain to the planning study areas for the Fiscal Year 1979 Proposed Program. All such sites, either listed in the National Register or nominated as eligible for inclusion, have been identified in the planning evaluation.
2. The Draft Fiscal Year 1979 Program Statement, including draft planning supplements, has been circulated to the State Historic Preservation Officers for all the states in the BPA service area. These individuals have been asked to review and comment on the statement's completeness and to provide us with any additional information on possible impacts to historical, architectural, or archeological sites of national significance that may result from the construction of these new facilities. Similar consultation will be solicited from local and regional historical and archeological organizations which have been identified in the individual planning supplements.

Further investigations will occur as facilities included in the Fiscal Year 1979 Proposed Program reach the facility location stage (see chart included in Introduction to Facility Evaluation Appendix). Measures that will be employed by BPA at the facility location stage include:

1. Continued consultation with local, state, and regional historical and archeological authorities.
2. State Historic Preservation Officers will be provided copies of the draft location supplements for their review and comment. By so doing they will be able to examine and comment upon the consequences of the various alternative facility locations, and to suggest other known or potential sites within the study areas which might be eligible for nomination to the National Register.
3. Where sites which are believed to be eligible for inclusion in the National Register are identified within the study areas, documentation regarding such sites will be forwarded to the National Park Service for a determination of eligibility.

Executive Order 11593

In compliance with Executive Order 11593 of May 13, 1971, (36 F.R. 8921 et seq.) BPA will:

1. Systematically survey all lands effected by the proposed facility site or route location as it appears in a final facility location supplement in order to locate and inventory all cultural sites not previously identified.
2. For all sites identified as a result of the survey BPA will apply the criteria of the National Park Service and the Advisory Council on Historic Preservation to determine if they are significant enough for inclusion in the National Register.
3. Information regarding any such potential sites will be forwarded to the National Park Service for a formal determination of eligibility.
4. If any site is determined eligible for inclusion in the National Register, mitigative measures will be taken in consultation with the Advisory Council and State Historic Preservation Officer.
5. During the interim period and until inventories and evaluations required by Executive Order 11593 are completed, BPA will exercise caution so as to not inadvertently transfer, sell, demolish, or substantially alter questionable sites. If questionably sensitive cultural sites are located, work crews are instructed by contract to notify their contracting officers and to suspend operations in the vicinity of such a site until told to proceed. All potentially significant sites will be referred to the National Park Service for a determination regarding the property's eligibility for inclusion in the National Register. If appropriate, BPA will enter into discussions with the Council to discuss mitigating measures for any nationally significant property affected by the proposal.

XIII. Comments Received on Fiscal Year 1979
Program Statement



COMMENTS RECEIVED DURING REVIEW PROCESS

USDI - Bureau of Outdoor Recreation (November 1, 1977)

Comment: ...more specific and quantitative information should be incorporated into the discussion on pages 48 and 49. For each proposed transmission facility alternative and sub-alternative, the FES should include a summary of mileage to follow existing vs. new corridors. Maps should show existing transmission corridors.

Response: The discussion on page 48 does indicate that approximately 60 miles (97 km) of transmission line included in the FY 1979 Program will involve the replacement of existing line with lines of higher capacity. The majority of this mileage is attributable to the South Pudget Sound Reinforcement proposal (Study Area 79-4), which is discussed in greater detail in the Facility Evaluation Appendix. The discussion on page 49 indicates that approximately 15 miles (24 km) of transmission line included in the FY 1979 Program could be built parallel to existing facilities. Most of this potential parallel construction is attributable to the San Juan Island Service proposal (Study Area 79-2), which is also discussed in greater detail in the Facility Evaluation Appendix. As projects proceed from the facility planning to the facility location phase, more precise information (including maps) can be provided regarding possibilities for replacement of existing transmission line with lines of higher capacity and parallel construction.

USDI - Bureau of Land Management

Comment: In describing impacts for the FY 1979 program, there is no mention made of the possibility of collisions of birds with the power lines and towers. Since this is a proven fact under certain conditions and in some localities, there should either be a discussion of possible impacts or a disavowal due to avoidance of waterfowl habitat or other bird concentrations.

Response: Philip Arend conducted one of the few studies which have been done on the effects of transmission lines on bird collisions (Arend, 1975). Arend concluded that transmission lines mounted on steel towers cause very minor bird losses.

Arend's studies, as well as studies by Barbara and Daniel Willard, Krapu, and Stout, indicate that lower voltage transmission lines and distribution lines can result in bird mortality through collisions. This matter is being subjected to continuing investigation by BPA.

Comment: There is also no mention of the benefits to raptors of tower construction along major lines that are used for nesting, resting, and hunting.

Response: It is now known that transmission towers and poles are used by birds of prey as hunting perches and as nest platforms in certain areas, particularly in areas devoid of trees suitable for such uses by birds of prey.

BPA is currently conducting research on the effects of transmission lines on Raptors. Initiated in 1977, the work is anticipated for completion in 1980. Early information indicates positive benefits with maintenance problems on certain towers solvable through the construction of nesting platforms.

USDI - Bureau of Land Management (Cont.)

Comment: ...there is no mention of adverse impacts of smaller feeder lines due to electrocution of large raptors, or of construction specifics that could prevent such losses.

Response: Reports have been made of large birds being killed by simultaneous contact with an energized conductor and grounded hardware on transmission lines, poles or towers. These reports are usually limited to lines where the spacing between conductors of different phases and the spacing between conductors and tower hardware is sufficiently small that it may be spanned by the wings of large birds perching on the towers. Most BPA lines are constructed at the higher voltages which require greater spacing, and no significant impacts of this type have been noted. The U.S. Bureau of Sport Fisheries and Wildlife, the U.S. Bureau of Land Management, and public utilities are conducting further research on this in the Pacific Northwest. Further information on this topic is contained in Appendix B, Chapter VII, of the BPA Role EIS.

Comment: It is mentioned that towers are used by birds of prey as ideal nesting sites and discusses power outages caused by defecation of birds or dropping of nest materials, It does not mention possible electrocution loss to raptors.

Response: The possibility of electrocution loss to raptors is discussed in Appendix B to the Roles EIS (Chapter VII.A.5.), a copy of which has been provided to all reviewers of the FY 1979 Program Environmental Statement. As indicated in the "Note to Reviewers" attached at the front of the FY 1979 Program EIS, the FY 1979 Program EIS should be used and reviewed in conjunction with Appendix B. See response to previous comment above. The possibility of electrocution loss to raptors is one of the effects to be investigated in the previously mentioned raptor study.

Comment: No long-term changes in wildlife use and productivity are mentioned as a result of impacts of opening up inaccessible habitat. As mentioned, "such longterm exposure to predation and hunting could have a long-term impact on populations and cause species to leave the area."

Response: Long-term effects upon game can result from the improved access afforded to hunters in forested areas crossed by transmission lines. However, the establishment of a cleared corridor also has a beneficial effect upon game species because of the increased browse vegetation provided by man-made clearings in forest habitat. These findings are substantiated in a study prepared for BPA by J.G. Goodwin on big game movement near transmission lines. Copies of Goodwin's report are available upon request. Also, refer to Appendix B (Chapter VII.A.5.) for more information on impacts to wildlife attributable to transmission facilities.

USDI - Bureau of Indian Affairs (October 31, 1977)

Comment: It is suggested that ground application of herbicides and hand clearing of vegetation be given additional investigation.

Comment: The alternative to aerial application of herbicides is ground application of herbicides and hand clearing of vegetation. We believe this alternative merits additional investigation, particularly on Indian lands where high unemployment exists. In addition to providing Indian employment, the effects of herbicides on nontarget vegetation and drift of herbicides would be substantially lessened.

Response: Alternatives to aerial application of herbicides are considered whenever feasible. Of the 19,100 acres (7,730 ha) of right-of-way and the 950 acres (380 ha) of substation property to be subjected to vegetation control measures during FY 1979, only 4600 acres (1,650 ha) will be treated by aerial application (about 23% of the total). Where aerial application is the only viable alternative, special measures are undertaken to avoid adverse effects to nontarget vegetation (See Chapter V. B. of the FY 1979 Program EIS and Chapters VI, VIII.C.5., and X.E. of Appendix B to the Role EIS for more information concerning BPA's vegetation management program, mitigation measures, and alternatives to the program.)

The FY 1979 program for Montana identifies approximately 570 acres (226 ha) of vegetation control by means of cutting, using minimal amounts of herbicide to stump treat, preventing resprouting. There is also a weed control program proposed for about 230 acres (93 ha). This is a cooperative effort with the landowners, and the herbicide is sprayed by ground application. No aerial application is involved. Most of the cutting is done under contract.

USDI - Bureau of Land Management (November 2, 1977)

Comment: Page 13. The last sentence is the only reference to the question of chemical effects on fish as a consequence of spraying. There is no analysis of why the proposed spray will not harm fish.

Comment: Pages 15-16. The discussion of impacts on wildlife as a consequence of spraying does not mention the effects of chemicals on animals that ingest them.

Response: As indicated in Chapter V. B. of the FY 1979 Program EIS, special measures are undertaken to minimize drift of herbicides onto nontarget areas. Aerial application does not take place when wind velocity exceeds 6 mph. Special thickeners are also used to minimize drift. To avoid drift onto bodies of water, no aerial application is made within 100 feet of any water body (ground application is not permitted within 10 feet of a water body). BPA's ongoing herbicide residue monitoring program verifies the effectiveness of such measures in preventing herbicide residues from entering water bodies. Accordingly, any potential effects to aquatic organism are effectively minimized or prevented.

There is no evidence to date indicating any harmful effect to animals and fish resulting from BPA's application of herbicides. The herbicides used, if ingested, are not stored in fatty tissues (there is no biomagnification). Because of the large quantities of herbicides that would have to be ingested

to produce toxic effects, because of the lack of biomagnification, because herbicides are spread so thinly over the areas treated, and because of the precautions exercised when applying herbicides, it is very improbable that any animal (terrestrial or aquatic) would be physically capable of ingesting sufficient quantities of herbicide residues to produce any toxic effect. For a more complete discussion of BPA's use of herbicide and the effects that these chemicals have upon living organisms, refer to Appendix B (Chapters VI.B. and VII. C. 6.).

Comment: Pages 11-16. There is no reference to the effects of oil on fish and wildlife.

Response: Except for an accidental oil spill, there has been no problem with use of oil with herbicides. The only use BPA makes of oil in the program is as a carrier in the basal application of a herbicide to individual tree stems. We have no evidence that oil from this kind of application has entered any stream courses or that it has had any adverse effects upon fish or wildlife.

Comment: Appendix XI is not site specific with regard to proposed spray areas. For example on the R/W management program for BLM lands (page XI-12), the description does not identify whether the entire named R/W is to be sprayed or only portions of the R/W or which portions, if the latter. The environmental statement should contain maps identifying all tracts proposed for spraying.

Response: More site specific information than that presently provided in the Right-of-Way Management Appendix has not previously been considered for inclusion in the herbicide information. Consideration is currently being given to effective inclusion of this data. In addition to notification by means of distributing its vegetation management program to various affected agencies (including BLM), BPA individually notifies the appropriate BLM district office prior to any application of herbicides.

Idaho State Department of Fish and Game (November 3, 1977)

Comment: Under the vegetation control section, we would like to emphasize the need for "hand-cutting" as the accepted control method where big game winter use occurs. This should apply to documented wintering areas and others that may develop as the result of the establishment of the power line clearing.

Response: It is recognized that reduction of available browse is an unavoidable consequence of aerial application of herbicides. This reduction in browse vegetation will place stress upon wildlife dependent upon the right-of-way for browse. The treated area usually recovers in about 1-3 years. In the long run, however, more browse vegetation can exist within maintained rights-of-way as the net effect of vegetation management is the encouraged growth of low growing species of vegetation which are more desirable browse for game species. Nevertheless, BPA is relying more upon hand cutting and ground application in controlling vegetation. Only 23% of the total acreage to be managed as part of FY 1979 Program will be treated aerially.

Idaho State Department of Fish and Game (November 3, 1977) (Cont.)

The FY 1979 program vegetation control to be done in the State of Idaho is all by hand cutting, using herbicides only to stump treat the resprouting species. This does leave the low-growing browse species available for wildlife.

USDI - Geological Survey

Comment: Results from two long-term stream-water sample sites given in attachment D show herbicide residues at lower than detectable levels (p. XI-55,56), while low concentrations were found in the soil and forest litter (p. XI-62,63). These results suggest that residues might be found in stream-bed sediments which should also be sampled at the long-term water sampling sites.

Response: It is known that organic materials in soil and bodies of water adsorb herbicide. Analysis of soil samples does represent the total amount of herbicide both adsorbed and in solution. Analysis of run-off water is basically intended to demonstrate safety to aquatic fauna, flora, and other domestic or agricultural uses by determining the amount of herbicide in solution which alone may cause effects. Any sediment adsorbed material will be released in time. Release levels however, were below threshold of detection. This makes them biologically insignificant, since no biomagnification or bioaccumulation has ever been demonstrated for the herbicides in use by BPA.

Comment: The persistence of picloram concentrations in soils and water below the Summit Lake spill site (D: p.XI-64, XI-65) suggests the potential for impacts on subsurface water supplies. The text should state the source of the tap waters tested; this is significant because reportedly no detectible residues were found in the waters of Summit Lake below the spill site--despite their presence in the soils and in the domestic tap water. The statement should more adequately appraise the potential for impacts of herbicides on wells and springs--particularly those tapping shallow aquifers along the rights-of-way of the transmission lines.

Response: The Summit Lake spill was a unique combination of circumstance. The quantity of herbicide spilled in a very limited area (0.1 acre) contained enough material as is normally applied to 60 acres of brush covered right-of-way. The spill area was shaped as a natural drainage or funnel which received road drainage and fed directly to the area of the well. The well is very shallow and the aquifer is also shallow. Lastly, the cleanup procedures that were followed were by specific instructions from the proper Washington State agency in charge of such matters. Should BPA have been directing the cleanup operation, a somewhat different procedure may very likely have been employed, reflecting more the suggestions of manufacturer's research personnel at the site. Any extrapolation of data gathered following this accident in relationship to normal herbicide use by BPA is not valid. Over 1000 soil samples collected over the last seven years clearly indicate that applied herbicides only rarely leach deeper than one foot.

USDI - Geological Survey (Cont.)

Comment: The Document should outline measures to be taken in the event of future spills or accidental excessive releases of chemical pollutants.

Response: Specific procedures are established to assure prompt action in case of spills. Briefly they are: 1) Notification of the proper authorities. 2) Immediate containment until arrival of proper directives. 3) Cleanup and disposal as directed.

U.S. Environmental Protection Agency (November 4, 1977)

Comment: The description of the proposed construction and maintenance program, found on pages 3-7 of the DES, would be more complete if it contained a listing of the facilities still under construction, which were described in previous program statements and facility location supplements thereto, and their project dates of completion and energization. This would give the reader a better picture of the total BPA construction activity underway during the fiscal year.

Response: Admittedly, Table 2 in the program statement contains only a limited amount of information regarding previously approved construction projects. However, as you know, those items referred to in this table as ongoing construction items were addressed in previous EISs. Accordingly, we do not feel that it is essential to include additional coverage of these facilities in the FY 1979 Program Statement. Furthermore, by circulating the program statement, it is our intention to draw attention to and receive comments on the fiscal year 1979 proposed program specifically. It is our feeling that to include more information regarding previous programs would only serve to confuse the issue from the point of view of the reviewer.

Comment: The discussion of substation noise on page 28 of the DES makes no mention of the fact that some of BPA's current substations do not meet the noise emission standards in the State of Oregon. It is our understanding, based on the recently completed OMB Circular A-106 review, that funds for correcting this problem at one of the subject substation are included in the BPA FY 1979 budget. This discussion should indicate which substations do not presently comply with State standards, how severe the violations are, and what is being done to bring the facilities into compliance with State standards pursuant to the Noise Control Act of 1972. You should note that the substation noise discussion in Appendix B of the Draft Role Environmental Impact Statement, at pages VII-55-56, does not address this subject in enough detail to eliminate the need for a discussion in the FY 79 DES.

Response:

This same information, reported to you in our semi-annual A-106 reports, has been included in the final program statement.

COMMENTS MADE AT THE PUBLIC MEETINGS
ON THE FY 1979 PROGRAM
McGregor Rhodes - Libby, Montana
October 12, 1977

Comment:

I've got a question concerning your vegetative control program. I understand that there is going to be some in the Fiscal Year 1978 Program for the area here, there is going to be some vegetative control on the Silver Butte line and the Libby Dam/Noxon line. I am just wondering why you feel a need to apply those derivatives of the 2,4-D family and those toxic chemicals in order to control the vegetation under those lines when, in reality, it seems like the only threat to those lines in the long run would be the tall trees growing up there. It seems like that kind of stuff could be controlled without any spraying of the chemicals, and I just wonder why you take this approach to destroy the small broadleaves and the shrubs when, in fact, the chemicals are sprayed on actually human and wildlife population.

Response:

All rights-of-way to be aerially sprayed are preflown prior to application to identify areas not to be sprayed (i.e. areas near residences, water bodies, recreation areas, and rangeland), so that people and livestock are not inadvertently sprayed. Attempts are made to notify all occupants along the right-of-way to be treated when herbicides are used that contain label restrictions on grazing to livestock; this is done to permit relocation of livestock sufficiently in advance of scheduled application.

A review of the FY 1978 program for Montana identifies a vegetative control program consisting of conifer cutting, spraying for weeds in agricultural areas (which is a cooperative effort with landowners and weed control districts), and weed control around wood poles to protect the pole in case of wild grass fires. Only about 30 percent of the total herbicides used in BPA programs is 2,4-D formulation. BPA's vegetation management program is directed at controlling those tall growing species which, if left alone, would jeopardize the continued operation of the transmission line. For a more complete discussion of the vegetation control measures employed by BPA in its vegetation management program, see Appendix B, Chapter VI.B.

Mike Czerwinski - Noxon, Montana
October 11, 1977

Comment:

Some timber owners along these lines have land with timber rights along the edge of the right-of-way clearing and, of course, they are going to be quite concerned with any sort of chemical that has an effect on trees. Should a number of people or even a landowner remove from this right-of-way this conifer growth that is threatening the lines, or would be in ten or fifteen years, would this enable him to be spared of this application?

Mike Czerwinski - Noxon, Montana (Cont.)
October 11, 1977

Response:

BPA does enter into agreements with landowners if they agree to keep the trees below a certain height. In such cases, BPA will not undertake vegetation control measures within the landowner's property. The right-of-way easement does give BPA the right to keep vegetation from growing into the lines. It should be kept in mind that while the emphasis has been on conifer growth, there are a number of hard wood species (broadleaf) which may also be a hazard.

Our right-of-way management goal has three main objectives in addition to maintaining the reliability of the system. These are (1) conversion to low growing species resulting in less use of herbicide or other control measures, (2) extending the control cycles to a minimum of 15 years wherever possible, and (3) development of productive multiple uses by the landowners whenever possible.

Comment:

Before a treatment like this (herbicide) is applied, will the landowner be notified . . . ?

Response:

It is a systemwide policy to attempt to notify landowners about an aerial application of herbicides. A newly established policy requires owner notification if the herbicide label has restrictions that may temporarily interrupt the landowner's use of the property, primarily grazing by dairy or meat animals. All rights-of-way to be aerially sprayed are preflown by the contractor with a BPA inspector prior to application to identify areas not to be sprayed such as residences, water course, recreation areas, and rangeland so that people and livestock are not inadvertently exposed.

D. W. Engel - Noxon, Montana October 11, 1977

Comment:

In a watershed in which an irrigation project is involved, or a part of it, you would or would not use a herbicide in such areas?

Response:

The uses that water may be put to or whether the waters originate in a legally defined watershed boundary or other area is not material to BPA's program. All waters are considered equally. We have self-imposed limitations as well as the label limitations which directly control the use of herbicides around water sources. We do make herbicide applications within watersheds. We monitor our applications by taking soil and water samples. To date, the monitoring indicates that properly applied herbicides have not moved out from the site of application. We do not apply herbicides in stream courses; we do not come any closer than ten feet when applying pellets or manual application; we do not come within one hundred feet when we are using aerial application.

COMMENTS ON BPA POWER MARKETING ACTIVITIES

Although no specific comments were raised, there did appear to be a general concern raised at the public meetings over matters pertaining to BPA's load forecasting methodologies, rate structures, allocation policies, and conservation efforts.

In response to these concerns, we refer all reviewers of the Fiscal Year 1979 Program Statement to BPA's "Role EIS" (DES 77-21). This latter document addresses these issues in some detail and is intended to serve as a basis for evaluating the project specific proposals referred to in the program statement.

XIV. Letters Received on Fiscal Year 1979
Proposed Program and Facility Supplements



INDEX OF COMMENT LETTERS
FY 1979 Proposed Program

<u>Page</u>	<u>Individual/Organization</u>	<u>EIS/Supplement Referenced in Letter*</u>
XIV-1	Oregon State Preservation Office, Salem, OR	Program
XIV-2	Daniel Rix, Sandpoint, ID	Libby
XIV-3	U.S. Dept. of Housing & Urban Development, Seattle, WA	Program
XIV-4	U.S. National Park Service, Seattle, WA	Program
XIV-5	Franklin County Planning Dept., Pasco, WA	Franklin
XIV-7	U.S. Bureau of Indian Affairs, Portland, OR	Libby
XIV-9	Cesar Hernandez, Noxon, MT	Libby
XIV-11	U.S. Dept. of Transportation, Seattle, WA	Program
XIV-16	U.S. Dept. of Agriculture, Spokane, WA	Program
XIV-17	U.S. Bureau of Outdoor Recreation, Seattle, WA	Program/San Juan
XIV-19	U.S. Bureau of Land Management, Portland, OR	Program/San Juan/ Franklin
XIV-21	Washington State Dept. of Ecology, Olympia, WA	Program
XIV-22	Northwest Citizens for Wilderness, Noxon, MT	Libby
XIV-23	U.S. Environmental Protection Agency, Seattle, WA	Program/Franklin/ San Juan/Libby/ South Puget Sound
XIV-28	Idaho State Dept. of Fish & Game, Coeur d'Alene, ID	Program
XIV-29	Michael Czerwinski, Trout Creek, MT	Libby
XIV-30	St. Regis Paper Co., Libby, MT	Libby
XIV-32	Montana Dept. of Natural Resources & Conservation, Helena, MT	Libby
XIV-35	U.S. Army Corps of Engineers, Portland, OR	Program/Franklin
XIV-36	**Oregon State Intergovernmental Relations Division, Salem, OR	Program/Franklin
XIV-45	U.S. Geological Survey, Reston, VA	Program
XIV-46	Carl Fawcett, Federal Way, WA	Libby
XIV-48	Mrs. John R. Hennessy, Libby, MT	Libby
XIV-49	Brael Black, Libby, MT	Libby
" "	Stu Swenson, Libby, MT	Libby
" "	Lynn Robson, Libby, MT	Libby
XIV-50	Glenda Marita, Libby, MT	Libby
" "	Mih Deh	Libby
" "	Gary Morton	Libby
XIV-51	Lyle Olson, Libby, MT	Libby
" "	**Ann Guhman, Libby, MT	Libby
XIV-52	** U.S. Bureau of Mines, Washington, D.C.	Program
XIV-53	** Advisory Council on Historic Preservation, Washington, D.C.	Program
XIV-54	** Barbara Ann Roy, Libby, MT	Libby
XIV-55	** U.S. Dept. of Agriculture, Washington, D.C.	Program/Libby
XIV-59	** Steven Rodgers, Libby, MT	Libby
" "	** Richard Springer, Libby, MT	Libby

INDEX OF COMMENT LETTERS

FY 1979 Proposed Program - (Con't)

<u>Page</u>	<u>Individual/Organization</u>	<u>EIS/Supplement Referenced in Letter*</u>
XIV-60	** U.S. Fish & Wildlife Service, Denver, CO	Libby
XIV-63	** Don Vance, Tucson, AZ	Libby
XIV-64	** W.B. Larson, Troy, MT	Libby
XIV-65	** Thomas Graham, Troy, MT	Libby
XIV-66	*** San Juan County Planning Dept., Friday Harbor, WA	San Juan
XIV-71	*** Sierra Club, Seattle, WA	San Juan
XIV-73	*** U.S. Environmental Protection Agency, Seattle, WA	San Juan
XIV-75	*** Washington State Parks & Recreation Commission, Olympia, WA	San Juan
XIV-77	*** San Juan County Planning Dept., Friday Harbor, WA	San Juan

COMMENT LETTERS RECEIVED ON ELLENSBURG AREA SERVICE
LOCATION SUPPLEMENT

(Fiscal Year 1978 Proposed Program)

XIV-78	Washington State Parks & Recreation Commission, Olympia, WA	Ellensburg
XIV-79	Advisory Council on Historic Preservation, Washington, D.C.	Ellensburg
XIV-80	U.S. Bureau of Land Management, Portland, OR	Ellensburg
XIV-81	U.S. Army Corps of Engineers, Seattle, WA	Ellensburg
XIV-82	U.S. Soil Conservation Service, Spokane, WA	Ellensburg
XIV-83	U.S. Forest Service, Portland, OR	Ellensburg
XIV-84	U.S. Bureau of Indian Affairs, Portland, OR	Ellensburg
XIV-85	U.S. Environmental Protection Agency, Seattle, WA	Ellensburg
XIV-86	U.S. Fish & Wildlife Service, Portland, OR	Ellensburg
XIV-88	U.S. National Park Service, Seattle, WA	Ellensburg
XIV-89	U.S. Energy Research & Development Adm., Washington, D.C.	Ellensburg
XIV-90	U.S. Dept. of Housing & Urban Develop- ment, Seattle, WA	Ellensburg
XIV-91	U.S. Bureau of Outdoor Recreation, Seattle, WA	Ellensburg
XIV-93	Washington State Office of Program Planning & Fiscal Mgt., Olympia, WA	Ellensburg

COMMENT LETTERS RECEIVED ON BONNEVILLE DAM
INTEGRATING TRANSMISSION LOCATION SUPPLEMENT

(Fiscal Year 1977 Proposed Program)

XIV-97	Washington State Parks & Recreation Commission, Olympia, WA	Bonneville Dam

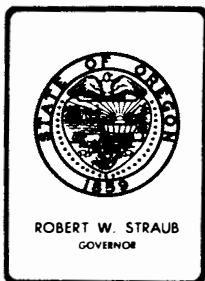
COMMENT LETTERS RECEIVED ON BONNEVILLE DAM
INTEGRATING TRANSMISSION LOCATION SUPPLEMENT
(Fiscal Year 1977 Proposed Program) -(Con't)

<u>Page</u>	<u>Individual/Organization</u>	<u>EIS/Supplement Referenced in Ltr.*</u>
XIV-98	Washington State Highway Commission, Olympia, WA	Bonneville Dam
XIV-99	U.S. Bureau of Outdoor Recreation, Seattle, WA	Bonneville Dam
XIV-100	U.S. Federal Aviation Administration, Seattle, WA	Bonneville Dam
XIV-101	U.S. Environmental Protection Agency, Seattle, WA	Bonneville Dam
XIV-102	U.S. Bureau of Land Management, Portland, OR	Bonneville Dam
XIV-103	U.S. Bureau of Indian Affairs, Portland, OR	Bonneville Dam
XIV-104	U.S. Fish & Wildlife Service, Portland, OR	Bonneville Dam
XIV-105	U.S. National Park Service, Seattle, WA	Bonneville Dam
XIV-106	Town of North Bonneville, WA	Bonneville Dam
XIV-111	U.S. Bureau of Mines, Spokane, WA	Bonneville Dam
XIV-113	Washington State Office of Program Planning & Fiscal Mgt., Olympia, WA	Bonneville Dam
XIV-115	Town of North Bonneville, WA	Bonneville Dam
XIV-117	U.S. Dept. of Housing & Urban Development, Seattle, WA	Bonneville Dam
XIV-118	U.S. Energy Research & Development Adm., Washington, D.C.	Bonneville Dam
XIV-119	** U.S. Dept. of Agriculture, Washington, D.C.	Bonneville Dam
XIV-121	** U.S. Army Corps of Engineers, Portland, OR	Bonneville Dam

*Those letters containing substantive comments are responded to at the end of the appropriate section of this environmental statement. For example, substantive comments on the FY 1979 Program are addressed at the end of the program statement itself (Section XIV). Substantive comments on the specific major new facilities are addressed at the end of the appropriate facility planning supplement in the Facility Evaluation Appendix.

**Late letter; received after end of review period.

***San Juan Area Service (SA-78-3) was deferred until Fiscal Year 1979; letters are again reproduced in this statement along with letters received on Fiscal Year 1979 San Juan Area Service (SA 79-2).



Department of Transportation

STATE HISTORIC PRESERVATION OFFICE

Parks and Recreation Branch

525 TRADE STREET S.E., SALEM, OREGON 97310

OFFICIAL FILE COPY	
No.	Date SEP 21 1977
Referred To:	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

September 19, 1977

Mr. Donald P. Hodel, Director
Bonneville Power Administration
PO Box 3621
Portland, OR 97208

Dear Mr. Hodel:

This letter is in response to our office review of the Bonneville Power Administration's Draft Environmental Statement of the Fiscal Year 1979 Proposed Program.

Cultural resources are adequately covered in this statement. The strong commitment to cultural resource preservation contained in Appendix XII insures that the various federal regulations governing cultural resource protection will be followed. If the statements in Appendix XII, together with pages 25 and 26, are followed, no effect should come to cultural resources in Oregon.

We thank you for the opportunity to comment.

Sincerely,

David G. Talbot
State Historic Preservation Officer

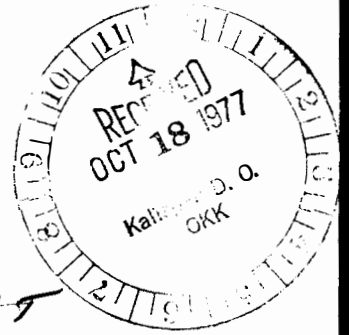
EL:ko

OCTOBER 15, 1977

BONNEVILLE POWER ADMINISTRATION

KIALISPELL MONTANA

DEAR SIR



IT IS MY UNDERSTANDING THAT
SOME CHANGES ARE BEING CONSIDERED
FOR TRANSMISSION LINES NEAR LACLEDE.

MY WIFE AND I ARE PLANNING TO
BUILD A NEW HOME ON OUR PROPERTY
NEAR LACLEDE. PRESENTLY THERE IS A
B.P.A. TRANSMISSION LINE THROUGH OUR
PROPERTY.

WE OBJECT TO AN ADDITIONAL LINE
THROUGH OUR PROPERTY. WE ALSO OBJECT
TO CHANGING THE LINE FOR A HIGHER
CAPACITY.

WHAT ARE YOUR PLANS IN
THIS AREA?

YOURS TRULY

DANIEL A. RIX
RT 2 Box 341 E
SANDPOINT, IDAHO
83864

OUR PROPERTY IS LOCATED APPROXIMATELY
1 1/2 MILES WEST OF LACLEDE ADJOINING
HIGHWAY 200



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

October 18, 1977

REGION X

IN REPLY REFER TO: 10D

Mr. Ray Foleen
Acting Administrator
United States Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Foleen:

Subject: Draft Environmental Statement
Fiscal Year 1979 Proposed Program
Bonneville Power Administration

OFFICIAL FILE COPY	
No.	Date
	OCT 21 1977
Referred To: A	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

We have reviewed the statement submitted with your September 14, 1977 letter.

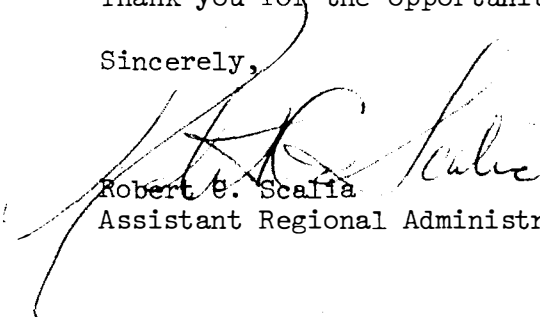
The proposed action is the construction of additional transmission lines, new substations and related facilities, the maintenance of transmission lines and access roads and vegetation control for FY 1979.

In the processing by our Department of housing subdivisions certain questions have been brought up in regards to transmission line right of ways that perhaps could be addressed in your impact statement. These questions are - can such right of ways be used for open space or parks? Are there specific limitations on right-of-way usage that would be common regardless of location? Can right of ways be used by adjacent property owners, and if so for what type of usage?

Your consideration of the above questions will be appreciated.

Thank you for the opportunity to comment.

Sincerely,


Robert E. Scalfia
Assistant Regional Administrator

XIV-3

AREA OFFICES
Portland, Oregon • Seattle, Washington • Anchorage, Alaska • Boise, Idaho
Insuring Office
Spokane, Washington



IN REPLY REFER TO:

L7619
(PNR)PCC

United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

October 25, 1977

OFFICIAL FILE COPY

No.

Date
OCT 28 1977

Referred To:

Action Taken:

☐ ANS.

☐ NO REPLY

By

Date

Mr. Donald P. Hodel
Administrator
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

We have reviewed the draft environmental statement for Fiscal Year 1979 Proposed Program (DES 77-30). The responsibilities of this agency appear to be receiving adequate consideration.

Sincerely yours,

Charles F. Bohannon
Acting Associate Regional Director,
Planning and Resource Preservation

October 31, 1977

John Kiley, Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

Dear Mr. Kiley:

Herein submitted please find the comments regarding your Draft Environmental Statement, Fiscal Year 1979 (Proposed Program). More specifically, our concerns are directed to the Franklin Area System Reinforcement, Draft Facility Planning Supplement. A thorough review of the Planning Supplement as well as meetings with the Walla Walla Office Engineers (e.g., Jerry Frick and others) preceded the synthesis of these concerns. They are as follows:

- 1) The economic base of Franklin County is agriculture. Any and all land use policies or decisions are implemented with the objective of protecting and preserving our agricultural economic foundation. Alternative Plan A proposes a direct, immediate and long term conflict with irrigated and potentially irrigable farms by suggesting a 5 mile long powerline to connect the Levey Substation with the PP & L Vantage - Walla Walla 230KV line. Current land use in this study area includes irrigated agriculture, dryland agriculture and some range land. The Irrigation systems are primarily center-pivot, solid-set wheel, and hand lines. Any powerline proposed to transect these systems will have unavoidable and long term adverse impacts. For those dryland farming operations, potentially irrigable, the impact of a powerline will severely restrict the development alternatives currently available. Based upon anticipated land use conflicts, we suggest the selection of some other alternative than Plan A. At several points throughout the Draft Facility Planning Supplement, your discussion alludes to a "BPA policy of constructing new facilities on or parallel to existing corridors". In light of this fact Alternative Plan A appears contradictory to accepted BPA policy at the outset.
- 2) The table shown on pages 20-22, graphically depicting the likelihood of occurrence and the degree of impacts, is less than complete. Agriculture and urban/residential land use impacts

have been blatantly omitted. The message reflected in this table implies that "natural resource" considerations are far more important than demographic and socioeconomic concerns. We question your presumed conclusion.

- 3) We are interested in reviewing "Location Supplements" be they for the Franklin Area System Reinforcement or other local BPA projects impacting Franklin County.

The foregoing comments, though brief in number, do encompass our most important concerns. Inherent in most EIS reviews are minor and cosmetic suggestions that become very subjective. We have intentionally skirted those in order to emphasize our more substantive points.

Sincerely,



Donald R. Neff
Assistant Planner

Robert H. Boothe, Director
Franklin County Planning Department

ld

cc: Jerry Frick
Bonneville Power Administration
P.O. Box 1518
Walla Walla, WA 99362

Board of County Commissioners
Franklin County Courthouse

Land Services



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

PORTLAND AREA OFFICE

POST OFFICE BOX 3785

PORTLAND, OREGON 97208

OCT 31 1977

Memorandum

To: Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

From: Office of the Area Director

Subject: Review of Draft Environmental Statement Bonneville Power
Administration's FY 1979 Proposed Program (DES 77/30)

The Proposed new transmission alignments and other additional land requirements for FY 1979 do not appear to directly impact either Indian trust lands or communities. A copy of our Billings Area office review of the draft is attached. There is concern about a 500 KV transmission system scheduled for 1981 that may cross lands of the Flathead Indian Reservation. It is also suggested that ground application of herbicides and hand clearing of vegetation be given additional investigation.

Indian trust land may be involved in other future additions shown on figure 1, page 2. The map is too general to be certain. As more definitive alignments are developed we will evaluate them.

Acting

James W. Hadley
Assistant Area Director
(Economic Development)

Enclosure





United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

BILLINGS AREA OFFICE
316 NORTH 26TH ST.
BILLINGS, MONTANA 59101

RECEIVED

OCT 27 8 15 AM '77
BUREAU OF INDIAN
AFFAIRS
PORTLAND AREA
OCT 25 1977

IN REPLY REFER TO:

Environmental Quality
(BES 77/30)

MEMORANDUM

To: Area Director, Portland, Area Office

From: Office of the Area Director

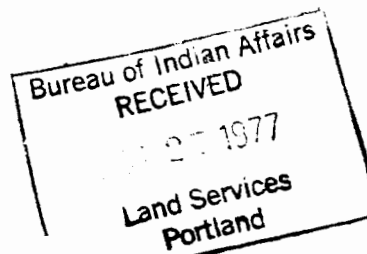
Subject: Review of Draft Environmental Statement, Bonneville Power
Administration's Fiscal Year 1979 Proposed Program (DES 77/30)

The office has, as requested by the Chief, Division of Trust Facilitation, reviewed the subject statement and wishes to submit the following comments:

- (1) The statement does not discuss any new main grid additions that would affect Indian lands within our jurisdiction. Figure 1, page 2, does, however, identify a projected 500 KV system running west out of Hot Springs, Montana and across lands of the Flathead Indian Reservation. This 500 system is tentatively scheduled for a 1981 energization date. This office would urge the early coordination and development of compatible and mutually beneficial uses of the right-of-way with the Indian landowners.
- (2) Page 45, Alternatives, discusses alternative methods of vegetation control. The alternative to aerial application of herbicides is ground application of herbicides and hand clearing of vegetation. We believe this alternative merits additional investigation, particularly on Indian lands where high unemployment exists. In addition to providing Indian employment, the effects of herbicides on nontarget vegetation and drift of herbicides would be substantially lessened.

Acting Assistant

Area Director



XIV-8



CESAR HERNANDEZ
STAR ROUTE
NOXON, MT. 59853
10/31/77

DEAR PEOPLE,

A FEW WORDS OF COMMENT ON YOUR DRAFT FACILITY PLANNING SUPPLEMENT; LIBBY INTEGRATION AND N.W. MONTANA / N. IDAHO SUPPORT STUDY. I DRAW FROM MY KNOWLEDGE AS AN AMERICAN CONSUMER! I OBSERVE THAT WE THE AMERICAN PEOPLE ARE "ENERGY ADDICTS";! YOUR 20 YEAR LOAD PROJECTIONS, TABULATION ONLY CONFIRMS SUCH. THE THREE (3) CRITERIA (PAGE 1) BY REASON OF WHICH YOU OFFER THE PROPOSAL,

1. POPULATION GROWTH
2. INDUSTRIAL EXPANSION
3. GREATER PER CAPITA USE OF ELECTRICITY,

ONLY CAUSE TO BE EXPLAINED YOUR ROLE AS THE "PUSHERS", OF THIS DREAD & DESIRED COMMODITY. HOW DO YOU EXPLAIN A NEAR NEED OF 2 1/2 TIMES OF PEAK POWER, WHEN THE POPULATION OF THE AREA SERVICED DOES'NT UNDERGOE ANYWHERE NEAR DOUBLING IN THE PROJECTED TIME SPAN? AND DOES "A GREATER PER CAPITA USE OF ELECTRICITY," MEAN AMERICANS INSTEAD OF CONSERVING OUR DWINDLING ENERGY STOCKS, ARE BEING ENCOURAGED AND GIVEN THE MORE ROPE NECESSARY TO HANG THEMSELVES? AS FOR "INDUSTRIAL EXPANSION;" WILL WE NEED THE EXTRA ELECTRICAL FORKS, TOOTHBRUSHES, COMBS & TOILET SEATS TO BE PROVIDED? I THINK NOT ENOUGH THOUGHT WAS GIVEN "NON CONSTRUCTION," (PAGE 47) AND CONSERVATION BY YOUR PEOPLE. BY THIS STUDY MAYHAPS THE BPA LIKE SO MANY OTHER GOVT. AGENCIES SEEKS ONLY TO PERPETUATE ITSELF; IT'S ONLY ASSET THE DESIRE TO SATISFY OUR ENDLESS GLUT FOR ENERGY. CONSTRUCTIVELY, I BELIEVE YOUR AGENCY IS IN A UNIQUE POSITION TO

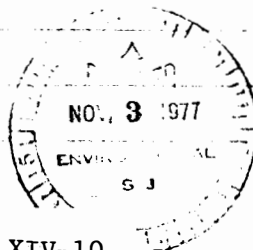
INFLUENCE THE CONSUMPTIVE EXCESSES OF OUR SOCIETY. BE THEY COMMERCIAL, INDUSTRIAL OR WHAT HAVE YOU. I GIVE THE FOLLOWING SUGGESTIONS.

(1) GET TOGETHER WITH THE ARMY CORPS OF ENGINEERS, THE BUREAU OF RECLAMATION, THE POWER CONSORTIUMS AND LAY ON AMERICANS THE "ULTIMATE STUDY", SHOW US HOW WE CAN EXPECT A DAM EVERY 20 MILES OF RIVER AND A POWER PLANT EVERY 50. HOW THE ONLY WAY WE'LL SEE THE SUN IS IN MOVIES OR AS ASTRONAUTS. AND HOW IF THE NUKES DON'T GET US FIRST WE'LL BE ABLE TO READ ABOUT BIRDS AND DEER AND FISHING.

(2) LOSE THIS STUDY, AND 99% OF ALL YOUR OTHER ONES; PULL THE PLUG ON YOUR COMPUTER, GIVE YOUR WORKING STAFF A SEMI-PERMANENT VACATION ON A FARM, IT'LL MAKE THEM HEALTHY. GET LOST AND QUIT "PUSHING."

THANK YOU FOR THIS OPPORTUNITY TO COMMENT ON YOUR DRAFT STATEMENT. FOR THE RECORD!

Sincerely,
Cesar Hernandez



DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NORTHWEST REGION
FAA BUILDING KING COUNTY INT'L AIRPORT
SEATTLE, WASHINGTON 98108



NOV 1 1977

Mr. John E. Kiley
Environmental Manager
Bonneville Power Administration
P. O. Box 3621
Portland, OR 97208

Dear Mr. Kiley:

We have received your draft environmental statement on your FY 1979 proposed program. We have no specific comment on the report. However, we offer the following comments as they relate to navigable airspace:

a. Under certain circumstances a construction notice to the Federal Aviation Administration is required under Federal Aviation Regulation (FAR) Part 77. The attached Advisory Circular 70/7460-2F explains the notice requirements.

b. The construction of a powerline near a VOR station, a ground air-navigational aid facility, can have an adverse effect on the navigation aid and would require a notice of construction to the FAA. Please refer to an attached letter.

Any notice submitted will be evaluated and recommendations made to insure safe navigable airspace.

Sincerely,

A handwritten signature in cursive script that reads "George L. Buley".

GEORGE L. BULEY
Chief, Airports Planning Branch, ANW-610

2 Enclosures ✓

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NORTHWEST REGION
FAA BUILDING KING COUNTY INT'L AIRPORT
SEATTLE, WASHINGTON 98108



NOV 7 1977

Mr. John E. Kiley
Environmental Manager
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Kiley:

Enclosed is a list of VOR station locations in reference to Item b of our letter dated November 1, 1977. The VOR stations are listed as "V" under column heading "TYP" and the coordinates given for each. We apologize for lack of more descriptive information.

Sincerely,

A handwritten signature in cursive script, reading "George L. Buley", is written over the typed name.

GEORGE L. BULEY
Chief, Airports Planning Branch, ANW-610

Enclosure

SEP 19 1977

VOR-TACAN-DF MASTER DATA SUMMARY
STATE SEQUENCE 07-12-77

RIS FS 8200-14

ST IDENT	TYP	COND	HTL	SA	LATITUDE	LONGITUDE	REG	ELEV	OWN	DECL	GN	FREQ	ARTCC	SOURCE DATE	T LOC P	TYP PRI	LOCATION
WA ALW	V	L	A	6	46-05-13.6N	118-17-29.3W	NW	1150	F	20-00E	1	111.80	ZSE	02-09-73	1		WALLA WALLA
WA BLI	D	A			48-47-31.0N	122-32-03.0W	NW	0160	F	23-00E	1		ZSE	08-04-77	VD 5		BELLINGHAM
WA BLI	T	H	A	6	48-56-43.6N	122-34-40.6W	NW	0080	F	23-00E	1	077	ZSE	05-12-72	4		BELLINGHAM
WA BLI	V	H	A	6	48-56-43.6N	122-34-40.6W	NW	0080	F	23-00E	1	113.00	ZSE	05-12-72	4		BELLINGHAM
WA BTA	V	T	A	5	48-28-56.3N	122-26-14.2W	NW	0130	F	23-00E	1	108.20	ZSE	09-09-77	1		BAYVIEW
WA CLM	V	L	A	6	48-08-28.0N	123-25-06.7W	NW	0010	F	22-00E	1	108.40	ZSE	05-12-72	1		PORT ANGELES
WA EAT	D	A			47-25-16.0N	120-08-37.0W	NW	1250	F	22-00E	1		ZSE	08-04-77	VD 5		WENATCHEE
WA EAT	V	L	A	6	47-23-59.4N	120-12-34.7W	NW	1220	F	22-00E	1	111.00	ZSE	05-12-72	1		WENATCHEE
WA ELN	T	L	A	6	47-01-28.3N	120-27-26.2W	NW	1770	F	21-00E	1	126	ZSE	05-12-72	4		ELLENSBURG
WA ELN	V	L	A	6	47-01-28.3N	120-27-26.2W	NW	1770	F	21-00E	1	117.90	ZSE	05-12-72	4		ELLENSBURG
WA EPH	T	H	A	6	47-22-41.0N	119-25-22.3W	NW	1250	F	21-00E	1	073	ZSE	05-12-72	4		EPHRATA
WA EPH	V	H	A	6	47-22-41.0N	119-25-22.3W	NW	1250	F	21-00E	1	112.60	ZSE	05-12-72	4		EPHRATA
WA GEG	T	H	A	6	47-22-54.2N	117-37-33.0W	NW	2760	F	21-00E	1	102	ZSE	05-12-72	4		SPokane
WA GEG	V	H	A	6	47-22-54.2N	117-37-33.0W	NW	2760	F	21-00E	1	115.50	ZSE	05-12-72	4		SPokane
WA HQM	T	H	A	5	46-56-50.0N	124-08-52.8W	NW	0010	F	22-00E	1	124	ZSE	08-02-74	4		HOQUIAM
WA HQM	V	H	A	5	46-56-50.0N	124-08-52.8W	NW	0010	F	22-00E	1	117.70	ZSE	08-02-74	4		HOQUIAM
WA MWH	V	H	A	5	47-12-33.0N	119-18-47.0W	NW	1150	F	21-00E	1	115.00	ZSE	08-01-75	1		MOSES LAKE
WA NOM	T	L	A	5	46-21-51.0N	122-39-38.0W	NW	0050	N	22-00E	1	085	ZSE	11-12-76	2	2	WHIDBEY ISL
WA OLM	T	H	A	6	46-58-18.5N	122-54-02.1W	NW	0200	F	22-00E	1	091	ZSE	08-09-74	4		OLYMPIA
WA OLM	V	H	A	6	46-58-18.5N	122-54-02.1W	NW	0200	F	22-00E	1	113.40	ZSE	08-09-74	4		OLYMPIA
WA PAE	D	A			47-55-01.0N	122-17-26.5W	NW	0570	F	22-00E	1		ZSE	08-04-77	VD 5		SEATTLE
WA PAE	V	L	A	6	47-54-10.7N	122-17-11.9W	NW	0570	F	22-00E	1	114.2	ZSE	02-13-76	1	2	PAINE
WA PSC	T	L	A	6	46-15-47.3N	119-06-52.5W	NW	0400	F	21-00E	1	021	ZSE	08-12-77	4		PASCO
WA PSC	V	L	A	6	46-15-47.3N	119-06-52.5W	NW	0400	F	21-00E	1	108.40	ZSE	08-12-77	4		PASCO
WA PUM	V	L	A	6	46-40-27.9N	117-13-21.0W	NW	2720	F	20-00E	1	109.00	ZSE	05-12-72	1		PULLMAN
WA SEA	D	A			47-26-22.0N	122-18-31.0W	NW	0430	F	22-00E	1		ZSE	05-12-72	V 9		SEATTLE
WA SEA	T	H	A	6	47-26-08.0N	122-18-30.2W	NW	0430	F	22-00E	1	115	ZSE	05-12-72	4		SEATTLE
WA SEA	V	H	A	6	47-26-08.0N	122-18-30.2W	NW	0430	F	22-00E	1	116.80	ZSE	05-12-72	4		SEATTLE
WA SFE	D	A			47-40-46.0N	117-19-25.0W	NW	1950	F	21-00E	1		ZSE	08-04-77	VD 5		SPokane
WA SKA	T	L	A	5	47-36-38.8N	117-39-40.6W	NW	2450	A	21-00E	1	051	ZSE	05-23-77	2	2	FAIRCHILD
WA SKA	V	L	A	6	47-38-47.9N	117-32-50.1W	NW	2330	A	21-00E	1	111.60	ZSE	02-15-74	1	2	FAIRCHILD
WA TCM	T	L	A	6	47-08-52.2N	122-28-25.7W	NW	0280	A	22-00E	1	033	ZSE	05-23-77	4	2	MC CHORD
WA TCM	V	L	A	6	47-08-52.2N	122-28-25.7W	NW	0280	A	22-00E	1	109.60	ZSE	05-23-77	4		MC CHORD
WA YKM	T	H	A	6	46-34-13.5N	120-26-36.4W	NW	0980	F	21-00E	1	107	ZSE	05-12-72	4		YAKIMA
WA YKM	V	H	A	6	46-34-13.5N	120-26-36.4W	NW	0980	F	21-00E	1	116.00	ZSE	05-12-72	4		YAKIMA

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VOR-TACAN-DF MASTER DATA SUMMARY

RIS FS 8200-14

STATE SEQUENCE

09-12-77

ST	IDENT	TYP	COND	HTL	SA	LATITUDE	LONGITUDE	REG	ELEV	OWN	DECL	GN	FREQ	ARTCC	SOURCE DATE	Y P	LOC TYP PRI	LOCATION
OR	AST	V	L	A	6	46-09-42.7N	123-52-44.8W	NW	0010	F	22-00E	1	114.00	ZSE	05-12-72		1	ASTORIA
OR	BKE	V	L	A	6	44-50-26.7N	117-48-24.6W	NW	3360	F	20-00E	1	100	ZLC	05-12-72		4	BAKER
OR	BKE	V	L	A	6	44-50-26.7N	117-48-24.6W	NW	3360	F	20-00E	1	115.30	ZLC	05-12-72		4	BAKER
OR	CVO	V	L	A	6	44-29-59.0N	123-17-32.8W	NW	0250	F	21-00E	1	108.40	ZSE	05-12-72		1	CORVALLIS
OR	DLS	V	H	A	6	45-42-50.0N	121-05-59.0W	NW	3220	F	21-00E	1	070	ZSE	01-30-76		4	THE DALLES
OR	DLS	V	H	A	6	45-42-50.0N	121-05-59.0W	NW	3220	F	21-00E	1	112.30	ZSE	01-30-76		4	THE DALLES
OR	EUG	D		A		44-07-38.0N	123-12-52.0W	NW	0370	F	20-00E	1		ZSE	08-04-77	VD	9	EUGENE
OR	EUG	V	H	A	6	44-07-15.8N	123-13-17.9W	NW	0360	F	20-00E	1	076	ZSE	08-31-73		4	EUGENE
OR	EUG	V	H	A	6	44-07-15.8N	123-13-17.9W	NW	0360	F	20-00E	1	112.90	ZSE	08-31-73		4	EUGENE
OR	GRO	V	H	A	6	45-35-58.7N	122-36-24.1W	NW	0020	A	21-00E	1	026	ZSE	03-17-76		2	COLUMBIA
OR	IMB	V	H	A	6	44-38-54.7N	119-42-37.9W	NW	5220	F	20-00E	1	103	ZSE	10-13-72		4	KIMBERLY
OR	IMB	V	H	A	6	44-38-54.7N	119-42-37.9W	NW	5220	F	20-00E	1	115.60	ZSE	10-13-72		4	KIMBERLY
OR	LKV	V	H	A	6	42-29-34.7N	120-30-21.7W	NW	7460	F	19-00E	1	057	ZSE	05-12-72		4	LAKEVIEW
OR	LKV	V	H	A	6	42-29-34.7N	120-30-21.7W	NW	7460	F	19-00E	1	112.00	ZSE	05-12-72		4	LAKEVIEW
OR	LNT	D		A		42-09-59.0N	121-43-35.1W	NW	4090	F	19-00E	1		ZSE	09-02-77	VD	6	KINGSLEY
OR	LNT	V	H	A	6	42-09-11.8N	121-43-35.1W	NW	4090	F	19-00E	1	106	ZSE	05-12-72		4	KLAMATH FALL
OR	LNT	V	H	A	6	42-09-11.8N	121-43-35.1W	NW	4090	F	19-00E	1	115.90	ZSE	05-12-72		4	KLAMATH FALL
OR	MEF	D		A		42-22-20.0N	122-52-17.0W	NW	1330	F	19-00E	1		ZSE	09-02-77	V	6	MEDFORD
OR	MEF	V	H	A	6	42-28-47.1N	122-54-42.5W	NW	2080	F	19-00E	1	083	ZSE	05-12-72		4	MEDFORD
OR	MEF	V	H	A	6	42-28-47.1N	122-54-42.5W	NW	2080	F	19-00E	1	113.60	ZSE	05-12-72		4	MEDFORD
OR	ONP	V	H	A	6	44-34-31.8N	124-03-33.8W	NW	0150	F	21-00E	1	118	ZSE	03-17-76		4	NEWPORT
OR	ONP	V	H	A	6	44-34-31.8N	124-03-33.8W	NW	0150	F	21-00E	1	117.10	ZSE	03-17-76		4	NEWPORT
OR	OTH	D		A		43-24-56.3N	124-10-02.0W	NW	0010	F	20-00E	1		ZSE	08-04-77	VD	5	NORTH BEND
OR	OTH	V	L	A	6	43-24-56.3N	124-10-02.0W	NW	0680	F	20-00E	1	058	ZSE	05-12-72		4	NORTH BEND
OR	OTH	V	L	A	6	43-24-56.3N	124-10-02.0W	NW	0680	F	20-00E	1	112.10	ZSE	05-12-72		4	NORTH BEND
OR	PDT	D		A		45-41-54.8N	118-56-15.4W	NW	1490	F	20-00E	1		ZSE	08-04-77	VD	6	PENDLETON
OR	PDT	V	H	A	6	45-41-54.8N	118-56-15.4W	NW	1560	F	20-00E	1	094	ZSE	03-12-72		4	PENDLETON
OR	PDT	V	H	A	6	45-41-54.8N	118-56-15.4W	NW	1560	F	20-00E	1	114.70	ZSE	05-12-72		4	PENDLETON
OR	PDX	D		A		45-35-15.0N	122-35-19.0W	NW	0030	F	21-00E	1		ZSE	09-19-75	V	9	PORTLAND
OR	PDX	V	H	A	6	45-44-52.7N	122-35-25.2W	NW	0250	F	21-00E	1	113	ZSE	05-12-72		4	PORTLAND
OR	PDX	V	H	A	6	45-44-52.7N	122-35-25.2W	NW	0250	F	21-00E	1	116.60	ZSE	05-12-72		4	PORTLAND
OR	RBG	V	L	A	6	43-10-57.3N	123-21-03.8W	NW	1320	F	20-00E	1	108.80	ZSE	05-12-72		1	ROSEBURG
OR	RDH	D		A		44-15-10.6N	121-18-08.6W	NW	3080	F	20-00E	1		ZSE	05-13-77	V	5	REDMOND
OR	RDH	V	H	A	6	44-15-10.6N	121-18-08.6W	NW	4100	F	20-00E	1	123	ZSE	01-30-76		4	REDMOND
OR	RDH	V	H	A	6	44-15-10.6N	121-18-08.6W	NW	4100	F	20-00E	1	117.60	ZSE	01-30-76		4	REDMOND
OR	RED	V	H	A	6	42-35-26.4N	117-52-01.8W	NW	4040	F	19-00E	1	072	ZLC	05-12-72		4	ROME
OR	RED	V	H	A	6	42-35-26.4N	117-52-01.8W	NW	4040	F	19-00E	1	112.90	ZLC	05-12-72		4	ROME
OR	UBG	V	H	A	6	45-21-12.2N	122-50-37.0W	NW	1440	F	21-00E	1	121	ZSE	08-31-73		4	NEWBERG
OR	UBG	V	H	A	6	45-21-12.2N	122-50-37.0W	NW	1440	F	21-00E	1	117.40	ZSE	08-31-73		4	NEWBERG

XIV-14

VOR-TACAN-DF MASTER DATA SUMMARY
STATE SEQUENCE 09-12-77

RIS FS 8200-14

ST	IDENT	TYP	COND	HTL	SA	LATITUDE	LONGITUDE	REG	ELEV	OWN	DECL	GN	FREQ	ARTCC	SOURCE DATE	T LOC P TYP PRI	LOCATION
ID	BOI	O	A			43-33-27.0N	116-12-19.0W	NW	2890	F	19-00E	1		ZLC	08-04-77	VO 5	BOISE
ID	BOI	T	H	A	6	43-34-05.7N	116-14-33.6W	NW	2800	F	19-00E	1	080	ZLC	05-12-72	4	BOISE
ID	BOI	V	H	A	6	43-34-05.7N	116-14-33.6W	NW	2800	F	19-00E	1	113.30	ZLC	05-12-72	4	BOISE
ID	BYI	O	A			42-32-28.0N	113-46-27.0W	NW	4150	F	18-00E	1		ZLC	08-04-77	VO 5	BURLEY
ID	BYI	T	L	A	6	42-34-49.2N	113-51-54.0W	NW	4230	F	18-00E	1	088	ZLC	05-12-72	4	BURLEY
ID	BYI	V	L	A	6	42-34-49.2N	113-51-54.0W	NW	4230	F	18-00E	1	114.10	ZLC	05-12-72	4	BURLEY
ID	COE	V	T	A	5	47-46-25.6N	116-49-10.7W	NW	2150	F	21-00E	1	108.80	ZLC	03-25-77	1	COEUR DALENE
ID	DBS	T	H	A	6	44-05-20.2N	112-12-30.7W	NW	4920	F	18-00E	1	116	ZLC	05-12-72	4	DUBOIS
ID	DBS	V	H	A	6	44-05-20.2N	112-12-30.7W	NW	4920	F	18-00E	1	116.90	ZLC	05-12-72	4	DUBOIS
ID	IDA	O	A			43-30-58.0N	112-03-50.0W	NW	4730	F	17-00E	1		ZLC	08-04-77	VO 5	IDAHO FALLS
ID	IDA	V	L	A	6	43-31-08.7N	112-03-47.2W	NW	4720	F	17-00E	1	109.00	ZLC	11-22-74	1	IDAHO FALLS
ID	LKT	T	H	A	5	45-01-17.0N	114-05-00.0W	NW	9260	F	18-00E	1	082	ZLC	09-09-77	4	SALMON
ID	LKT	V	H	A	5	45-01-17.0N	114-05-00.0W	NW	9260	F	18-00E	1	113.50	ZLC	09-09-77	4	SALMON
ID	LWS	V	L	A	6	46-22-54.0N	116-52-06.7W	NW	1720	F	20-00E	1	108.20	ZSE	05-12-72	1	LEWISTON
ID	MLD	T	H	A	6	42-11-59.9N	112-27-01.5W	NW	7330	F	17-00E	1	121	ZLC	05-12-72	4	MALAD CITY
ID	MLD	V	H	A	6	42-11-59.9N	112-27-01.5W	NW	7330	F	17-00E	1	117.40	ZLC	05-12-72	4	MALAD CITY
ID	MLP	T	H	A	6	47-27-25.1N	115-38-42.2W	NW	6100	F	20-00E	1	125	ZSE	05-12-72	4	MULLAN PASS
ID	MLP	V	H	A	6	47-27-25.1N	115-38-42.2W	NW	6100	F	20-00E	1	117.80	ZSE	05-12-72	4	MULLAN PASS
ID	MUD	T	L	A	5	43-02-26.3N	115-52-25.3W	NW	3000	A	18-00E	1	087	ZLC	01-14-77	2	MT HOME
ID	MUD	V	L	A	5	42-58-55.0N	115-46-26.0W	NW	2990	F	18-00E	1	114.90	ZLC	05-12-72	1 2	MT HOME
ID	MYL	T	H	A	6	44-46-02.0N	116-12-19.1W	NW	7300	F	19-00E	1	109	ZLC	05-12-72	4	MC CALL
ID	MYL	V	H	A	6	44-46-02.0N	116-12-19.1W	NW	7300	F	19-00E	1	116.20	ZLC	05-12-72	4	MC CALL
ID	PIH	T	H	A	6	42-52-13.7N	112-39-05.0W	NW	4430	F	17-00E	1	073	ZLC	05-12-72	4	POCATELLO
ID	PIH	V	H	A	6	42-52-13.7N	112-39-05.0W	NW	4430	F	17-00E	1	112.60	ZLC	05-12-72	4	POCATELLO
ID	TWF	T	L	A	6	42-28-47.8N	114-29-18.9W	NW	4140	F	18-00E	1	105	ZLC	05-12-72	4	TWIN FALLS
ID	TWF	V	L	A	6	42-28-47.8N	114-29-18.9W	NW	4140	F	18-00E	1	115.80	ZLC	05-12-72	4	TWIN FALLS

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UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Room 360 U.S. Courthouse, Spokane, Washington 99201

OFFICIAL FILE COPY

NOV 3 1977

November 1, 1977

Administrator
Bonneville Power Administration
U.S. Department of the Interior
P.O. Box 3621
Portland, Oregon 97208

Referred To:

Action Taken:

☒ ANS.

☐ NO REPLY

By

Date

Dear Sir:

The Soil Conservation Service has reviewed the draft environmental impact statement for the Fiscal Year 1979 Proposed Program. In general, we find the document, for the most part, adequately discusses the environmental factors with which we have concern, with the exception of prime farmlands which should be addressed in compliance with Section 102(2)(c) of NEPA and CEQ's Memorandum for Heads of Agencies dated August 30, 1976.

We would, however, appreciate the opportunity to provide you with information pertaining to rangeland classification and expected ecological response to the rangeland ecosystem resulting from the proposed projects.

In addition, we have information concerning cropland and wildlife that should be of interest to you in your planning considerations.

We appreciate the opportunity to be involved in the environmental impact statement review.

Sincerely,

Galen S. Bridge

Galen S. Bridge
State Conservationist





UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

NORTHWEST REGION
915 SECOND AVENUE, RM. 990
SEATTLE, WASHINGTON 98174

IN REPLY REFER TO:

4310.7
DES 77/30

OFFICIAL FILE COPY

No. Date
NOV 3 1977

Referred To:

Action Taken:

☐ ANS.

☐ NO REPLY

By

Date

NOV 1 1977

Memorandum

To: Regional Administrator, Bonneville Power Administration, PNW Region

From: Regional Director, Northwest Region, Bureau of Outdoor Recreation

Subject: Review of Draft Environmental Statement and Fiscal Year 1979
Proposed Program for the Bonneville Power Administration

We have reviewed the subject DES and program and are sending you our comments as requested in the September 14, 1977, letter from Acting Administrator Foleen. Because of the general nature of the DES and the absence of preferred alternatives for individual transmission projects, we will reserve most of our detailed comments for review of the draft facility location supplements for individual projects.

Because constructing new transmission corridors generally has a much greater impact on esthetics and the recreation environment than increasing transmission capacity along existing corridors, we suggest the final statement treat this alternative in considerably greater depth than has been done in the draft statement. For example, more specific and quantitative information should be incorporated into the discussion on pages 48 and 49. For each proposed transmission facility alternative and sub-alternative, the FES should include a summary of mileage to follow existing vs. new corridors. Maps should show existing transmission corridors.

We note on page 24 that transmission line rights-of-way are held in easement by BPA, making public recreational use dependent on the land owner. In the FES and in the facility location supplements, we urge that you include a statement for each alternative transmission corridor as to its potential for public ownership if public access could be provided, plus the percentages of the route that are in public and private ownerships.

With respect to the facility evaluation appendix, we feel the discussion of the effect on recreation of the four proposed transmission facilities could be strengthened by including quantitative recreation use data. Such information should be available from federal, state, local and private recreation land managers in the effected areas.

The two proposed transmission projects that appear to have the greatest potential for adversely effecting the recreation environment are the San Juan Island Area Service and the Libby Integrating Transmission projects. We would like to have the opportunity to participate in evaluating the alternatives, to the extent possible, considering available manpower and workload.

We are particularly concerned with the San Juan Island project because of the high scenic and recreation value of the area and offer a few comments on it at this time (the following page numbers are for the San Juan section of the appendix).

Page 2: The next to last paragraph mentions a totally underwater route through Lopez Pass. However, we do not find this route discussed in relation to impacts under the various environmental topics. This route would seem to be the least environmentally damaging and, therefore, the most desirable from an environmental standpoint. We, therefore, urge that it be thoroughly discussed in the final statement regarding its comparative cost and relative environmental impacts.

Pages 18-35: There is insufficient information on the proposed turbine generator to give the reader an impression of its size, appearance, and environmental impact. Size and appearance could be illustrated graphically in the final statement. The statement also should contain information on the noise levels that would be produced at various distances and the audibility range under quiet conditions. The statement should discuss the probable impact of the generator on petroleum consumption (Appendix II, CEQ Guidelines).

Pages 25-26: The discussion of Alternative A impacts on esthetic considerations is very brief considering the area's high scenic and recreation values. The final statement should contain more specific and quantitative information. For example, it is not clear how much of the proposed transmission line across Decatur Island would follow the existing corridor and how much new corridor, if any, would be required. If new corridor would be needed, probable impacts should be thoroughly discussed. Impacts of the turbine generator under Alternative B should also be treated in greater depth.

Maurice H. Lundy
Regional Director

by Richard L. Winters



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (729 N.E. Oregon Street)
Portland, Oregon 97208

IN REPLY REFER TO:

1793 (911)

NOV 2 1977

Memorandum

To: Administrator, Bonneville Power Administration

From: State Director

Subject: Review of Draft Environmental Statement for the Fiscal
Year 1979 Proposed Program, Bonneville Power Administration
(DES-77/30)

We have reviewed the subject statement from our particular jurisdiction and expertise and offer the following comments concerning it:

Herbicide Spraying

Page 13. The last sentence is the only reference to the question of chemical effects on fish as a consequence of spraying. There is no analysis of why the proposed spray will not harm fish.

Pages 15-16. The discussion of impacts on wildlife as a consequence of spraying does not mention the effects of chemicals on animals that ingest them.

Pages 11-16. There is no reference to the effects of oil on fish and wildlife.

The analysis of the above three items is needed relative to chronic as well as acute effects.

Appendix XI is not site specific with regard to proposed spray areas. For example on the R/W management program for BLM lands (page XI-12), the description does not identify whether the entire named R/W is to be sprayed or only portions of the R/W or which portions, if the latter. The environmental statement should contain maps identifying all tracts proposed for spraying.

Wildlife

Pages 14-16. In describing impacts for the FY 1979 program, there is no mention made of the possibility of collisions with birds with the power lines and towers. Since this is a proven fact under certain conditions and in some localities, there should either be a discussion of possible impacts or a disavowal due to avoidance of waterfowl habitat or other bird concentrations. There is also no mention of the benefits to raptors of tower construction along major lines that are used for nesting, resting, and hunting. Conversely, there is no mention of adverse impacts of smaller feeder lines due to electrocution of large raptors, or of construction specifics that could prevent such losses.

Routing of new rights-of-way through old growth timber may benefit some herbivores, but would be greatly detrimental to wilderness species such as cougar, grizzly bear, wolverine and the northern spotted owl.

Page 34. It is mentioned that towers are used by birds of prey as ideal nesting sites and discusses power outages caused by defecation of birds or dropping of nest materials. It does not mention possible electrocution loss to raptors.

Pages 37-38. No long-term changes in wildlife use and productivity are mentioned as a result of impacts (shown on page 14) of opening up inaccessible habitat. As mentioned, "such long-termed exposure to predation and hunting could have a long-term impact on populations and cause species to leave the area." These important impacts should be addressed in Chapter VII.

San Juan Island Area Service. No mention made of possible collision with power lines by the many varieties of birds using the islands for either alternative Plans A or B.

Franklin Area System Reinforcement. The description of the Franklin Area System Reinforcement is too general at this stage of planning to determine specific route location. It is therefore possible that some BLM land could be involved. We therefore reserve the right to comment later if BLM lands are affected and necessary R/W's are to be acquired.

We thank you for giving us the opportunity to comment on this draft statement.

Hunter R. Haglund
acting

cc:
WO-260



STATE OF
WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF ECOLOGY

Olympia, Washington 98504

206/753-2800

November 2, 1977

Mike Mills
Office of Financial
Management
House Office Building
Olympia, WA 98504

Dear Mr. Mills:

The Department of Ecology has reviewed the BPA "Fiscal Year 1979 Proposed Program" draft environmental impact statement. We have no specific comments to offer but trust that the BPA will coordinate water quality considerations with our regional offices as specifics of the individual projects develop.

Our general thought is that the most important considerations in the power supply area are under study by BPA in its "role EIS" and by the Northwest Regional Commission in its energy study.

We expect to comment on both at the appropriate time.

Sincerely,

T. L. Etwell
Environmental Review Section

TLE:bjw

cc: John Kiley, BPA

Northwest Citizens for Wilderness

STAR ROUTE

NOXON, MONTANA 59853

PHONE 406 847-2216

November 1 1977

Mr. Ronald Wilkerson
Bonneville Power Administration
District Office
E. Hiway 2
Kalispell, Mt. 59901



Dear Ron,

We have completed review of the B.P.A. Libby intergration and N.W. Montana/N. Idaho support Draft Facility Planning Supplement.

Our primary concerns were voiced at the recent Noxon meeting, however, it is felt appropriate to briefly re-iterate them herein.

Portions of Routes B/C3, B/C2 and B/C4, Plan B, and those same routes Plan C, pass through wildlands upon the Idaho Panhandle Forest's proposed for wilderness study by our organization, therefore would be unacceptable.

Portions of Routes A4, A2 & A3, A1, pass through wildlands identified during the RARE II process as potential additions to the Wilderness System. This same area, plus roadless lands within the Silver Butte drainage (i.e. Owl Peak RARE #186, Barren Peak RARE #183 and Allen Peak RARE #185) are presently being evaluated for possible recommendation to the U.S. Forest Service by this organization for inclusion into the wilderness system through the RARE II process.

Until such analysis is completed, designation of additional transmission corridors would be unacceptable.

It is hoped these factors are taken into consideration during prperation of the Draft Location Supplement.

Information available does indicate restructuring existing 230kv & 115kv facilities is indeed a viable alternative. Aside from the foregoing, the necessity of a Libby transmission intergration corridor would appear most feasible following a Libby to Bronx substation, or B/C I, thence B/C 3 route.

We regret not having a Representative attend the BPA Oct 26 Missoula Role "EIS" public worksnop. Our energy consultant does inform us however, his review of the document is coming along nicely & expects to have comments drafted by the dead-line.

Our sincere thanks for the opportunity to participate.

Respectfully,

Mike Comola
Mike Comola, Coordinator



U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE

SEATTLE, WASHINGTON 98101



REPLY TO MS 623
ATTN OF:

4 1977

Mr. John Kiley
Environmental Manager
Bonneville Power Administration
Department of Energy
P. O. Box 3621
Portland, OR 97208

Dear Mr. Kiley:

We have completed our review of BPA's draft environmental impact statement (DES) on the Fiscal Year 1979 Proposed Program for construction and maintenance of high voltage electricity transmission facilities in the Pacific Northwest. As with most of BPA's annual program statements, we are generally satisfied with the FY 79 program statement. However, we do have a few suggestions regarding areas which could benefit from a more detailed or modified discussion.

We have attached more detailed comments and suggestions with regard to each of the draft facility planning supplements to the DES. The suggestions with regard to the DES per se are detailed below.

The description of the proposed construction and maintenance program, found on pages 3-7 of the DES, would be more complete if it contained a listing of the facilities still under construction, which were described in previous program statements and facility location supplements thereto, and their projected dates of completion and energization. This would give the reader a better picture of the total BPA construction activity underway during the fiscal year.

The discussion of substation noise on page 28 of the DES makes no mention of the fact that some of BPA's current substations do not meet the noise emission standards in the State of Oregon. It is our understanding, based on the recently completed OMB Circular A-106 review, that funds for correcting this problem at one of the subject substations are included in the BPA FY 79 budget. This discussion should indicate which substations do not presently

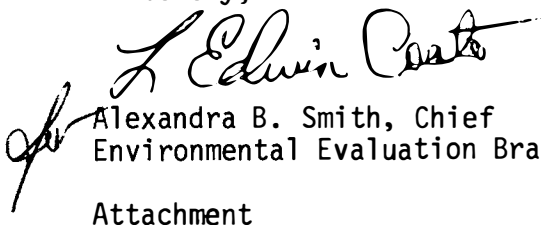
comply with State standards, how severe the violations are, and what is being done to bring the facilities into compliance with State standards pursuant to the Noise Control Act of 1972. You should note that the substation noise discussion in Appendix B of the Draft Role Environmental Impact Statement, at pages VII-55-56, does not address this subject in enough detail to eliminate the need for a discussion in the FY 79 DES.

We are still reviewing the right-of-way management appendix regarding the use of herbicides, in conjunction with the appropriate sections of Appendix B to the Role Statement, and will forward our comments, if any, within the next two weeks.

Based upon this review and our concerns about substation noise, we have rated this statement ER-2 (ER-Environmental Reservations; 2-Inadequate Information). The date of our comments and this rating will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, pursuant to the Clean Air Act, as amended.

We appreciate the opportunity to review your environmental statements and would be glad to discuss our concerns with you at your convenience.

Sincerely,


Alexandra B. Smith, Chief
Environmental Evaluation Branch
Attachment

ATTACHMENT

Detailed Comments

Franklin Area System Reinforcement
Draft Facility Planning Supplement
BPA Proposed FY 1979 Program

Page 2: The Levey Substation, in Alternative Plan A, is not shown on Figure 1 on the following page. It is not clear how the Badger Canyon Substation and associated transmission lines fit in to the plans of service described in Alternative Plans D and E. They do not seem to be in close proximity to the study area and the possible routes.

Page 7: The discussion of land use should describe the local shoreline master programs within the study area in enough detail to allow a determination as to whether utility corridors are consistent with those programs. The discussion of population should indicate why Umatilla experienced such dramatic growth and whether it is likely to continue.

Page 16: Will the substations called for by the alternative plans of service comply with the Washington Administrative Noise Code due to their distance from noise sensitive receptors or due to particular design features of these particular substations?

San Juan Island Area Service
Draft Facility Planning Supplement (revised)
BPA Proposed FY 1979 Program

Page 13: The land use discussion needs more detail to demonstrate that the local shoreline master programs environment designations and implementing regulations do not rule out all of the service alternatives. A map of the shoreline designations and a summary of the implementing regulations might be appropriate.

Page 15: The discussion of the "classes" of recreation areas should indicate what the classifications mean and what the distinguishing characteristics among classes are.

Page 18: If Alternative Plan B is selected, ambient air quality data may be needed to determine the effects of the new combustion turbines on air quality. Additionally, it should be noted that under Section 116 of the Clean Air Act Amendments of 1977 (Public Law 95-95) BPA would have to obtain approvals from the local air pollution control authority.

Page 20: In addition to the information on impacts of submarine cable construction, which you have indicated will be provided in the facility

location supplement, there should be a discussion of possible mitigation measures to reduce damages to aquatic biota and a description of the actual measures to be used.

The BPA Draft Role Statement Appendix B does not discuss mitigation measures appropriate to submarine cable installation and maintenance and we were unable to find relevant contract stipulations in Attachment A to that appendix.

If Alternative B is the selected plan of service, the facility location supplement will need to discuss the impacts of laying the fuel supply pipeline, impacts of the fuel storage facilities on air quality and the measures which will be taken to reduce the risk of fuel spills (including navigational risks involved in barging the fuel to the Island).

Libby Integrating Transmission Draft Facility Planning Supplement

We were particularly pleased with this facility planning supplement. It used tables and clear graphics to good advantage to display the potential impacts of alternative plans of service. In particular we found Table 5 (Comparison of Reference Corridors and Natural Resource Considerations), Table 7 (Resource Use Considerations), Table 8 (Summary Table) and Figures 5-14 to be a great deal of help in evaluating the alternatives.

The analysis and information therein have led us to believe that Alternative Plan A would be the most environmentally acceptable, assuming that the Hot Springs-Bell transmission line is built as planned. In that regard it would be useful if this planning supplement discussed the current status of the Hot Springs-Bell 500 KV Transmission Line, in that it has been nearly two years since its Draft Facility Location Supplement was issued and no final location supplement has yet been issued.

Page 6: The discussion of atmospheric conditions and air quality should indicate how good or bad mixing conditions are in the study area.

Page 7: The discussion of reservoir storage should indicate the total storage available in those reservoirs and the distribution among the reservoirs.

South Puget Sound Reinforcement Draft Facility Planning Supplement

Page 6: The discussion of current air quality in Tacoma should be expanded so that the reader has a better picture of Tacoma's standards non-attainment problems and their principal causes. This is significant

in that slash burning from right-of-way clearing, where necessary, could aggravate this problem.



STATE OF IDAHO

DEPARTMENT OF FISH AND GAME

REGION 1
2320 GOVERNMENT WAY
COEUR d'ALENE, IDAHO 83814

November 3, 1977

OFFICIAL FILE COPY	
No.	Date
	NOV - 7 1977
Referred To:	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

US Department of the Interior
Bonneville Power Administration
P. O. Box 3621
Portland, OR 97208

Reference: Draft EIS for FY 1979
Bonneville Power Administration

Dear Sir:

This letter will acknowledge our review of the Draft Environmental Statement for fiscal 1979.

Under the vegetation control section, we would like to emphasize the need for "hand-cutting" as the accepted control method where big game winter use occurs. This should apply to documented wintering areas and others that may develop as the result of the establishment of the power-line clearing.

Impacts on fisheries as a direct result of transmission line construction and maintenance would be minimal.

Sincerely,

DEPARTMENT OF FISH AND GAME
Joseph C. Greenley, Director

David S. Neider, Regional Supervisor
Region 1

WHG:RMR:amh

cc Bureau of Fisheries
Bureau of Program Coordination

A G E N D A



- I. BPA's Planning & Environmental Evaluation Ron Wilkerson
- II. F.Y. 1979 Program Environmental Impact Statement
- III. PERMITS Process
- A. BPA: Dan Bisenius
- B. USFS: Bill O'Brien
- IV. Libby Integration & Northwest Montans/North Idaho Support -
Draft Facility Planning Supplement Ansel Petarson
- V. Public Comments
- A. By Request
- B. From the Floor

MICHAEL H. CZERWINSKI
STAR ROUTE 2, BOX 217
TROUT CREEK, MT 59874

Note: If you wish to make written comments at this time, please use the other side of this sheet, or you may send written comments, by November 4, 1977, to:

Bonneville Power Administration
Kalispell District Office
Box 758
Kalispell, MT 59901

11-2-77

Dear Mr. Wilkerson:

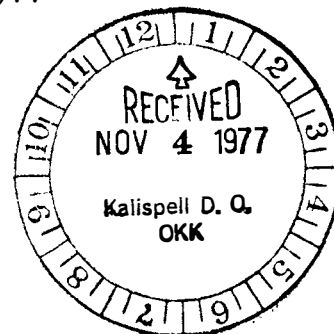
I own property which would be cleared of my Tree Farm timber if your power line corridor should come through the Noxon Area. I do not want this valley cut up into an ever increasing number of power corridors.

As I stated at your October public meeting at Noxon, I do not think that your alternatives adequately explored using higher voltage lines and/or thicker cable on EXISTING power corridors; Therefore, your E.I.S. should be rewritten. Please keep me informed of future developments.

Sincerely,
Michael H. Czerwinski

November 3, 1977

Bonneville Power Administration
Kalispell District Office
P. O. Box 758
Kalispell, Montana 59901



Gentlemen:

I wish to comment on your Draft Environmental Statement, fiscal year 1979 proposed program as it applies to the Libby Integrating Transmission system.

My major concern deals with your lack of objectivity in regards to the proposed diversion of part of Kootenai River by Canada. If this is done by the B.C. Hydro authority, I see it would reduce the yield at Libby by 400 million kilowatt hours annually. With that loss of electric generation capability, I would see no reason to proceed with either the reregulating dam or the Integrating Transmission System.

As to the alternatives presented for our consideration, I feel the most viable is to upgrade and reconductor existing facilities. This should not require any more rights of way, but is probably more expensive than the proposed plan. This is because you are not paying the entire value for your easements. Fair market value concepts do not include future social values forgone by removing the land from production. Therefore, it must be cheaper to build another new lines than to reconductor an existing route. That is probably the same reason you do not propose higher towers so that trees may be grown under the lines, like is done in Europe.

Also, I find it alarming that you are proposing to run lines from Libby to Noxon via the Fisher River. These routes were investigated in the late 60's for the Libby Loop line and abandoned because of poor geologic conditions. What has changed your thinking in this area?

In regards to your analysis of forest productivity, you have not gone into depth enough. The ownership and hence the forest management intensity and goals will have a very important influence on the yields from those lands. An example being the highly productive foothills of the Cabinet mountains. Most of these areas owned by the U.S.F.S., are becoming buffer areas for the wilderness and will not be harvested. Conversely, some of the private lands in the Fisher River on drier sites, are very

intensively managed and are producing more forest benefits than those Cabinet foothills.

In closing, I do not see any landowners listed among those who were consulted or coordinated with. These are the people most adversely affected by your actions. We would all feel better to have had an early part in expressing our concerns.

Personally, I find nothing wrong with the alternative to do nothing.

Thank you for hearing our concerns.

Sincerely yours,

A handwritten signature in cursive script that reads "Russ Hudson".

Russell H. (Russ) Hudson
Manager of Forestry

RHH:lc

Thomas L. Judge, Governor

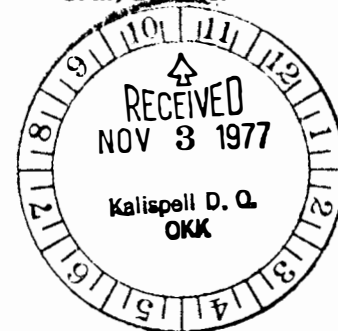
MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION

MEMBERS OF THE BOARD - CHAIRMAN CECIL WEEDING, DR. WILSON F. CLARK,
VIOLA HERAK, WILLIAM BERTSCHE, DAVID G. DRUM, ROY HUFFMAN, CHARLES HASH

DNRC

John C. Orth, Director

November 1, 1977



Bonneville Power Administration
Kalispell District Office
P.O. Box 758
Kalispell, Montana 59901

RE: Comments on the Libby Integration and Northwest Montana/North Idaho
Support-Draft Facility Planning Supplement

Dear Sirs:

The Bonneville Power Administration is to be complimented for publishing the Draft Facility Planning Supplement on the Libby Integration Project and for holding meetings to receive public comments. Some of the Energy Planning Division staff and I attended the meeting in Libby on October 12, and, based upon that meeting and the Draft Facility Planning Supplement, we offer the following comments.

Although BPA has set forth several different transmission system and routing alternatives for public review and comment at an early planning stage, an important decision concerning the need for the facility has apparently already been made, and without public input. The Draft Facility Planning Supplement explains the need for the Libby Integration Project as follows:

When the new generation is added at Libby, an outage on one of the 230 kV lines will overload the remaining 230 kV line and the 115 kV line from Libby. There is not enough transmission capacity now to carry the new generation from Libby into the grid system; for without a third 230 kV line, generators at Libby would automatically disconnect from the system during line outages. Loads on the 115 kV system could also be dropped. (p. 2)

At the public meeting when asked why additional transmission lines should be built, the BPA representative essentially repeated this explanation. He stated further that building transmission lines to satisfy a single contingency, i.e. the loss of one transmission line, is standard utility practice. Whether this utility practice should be followed in this case was not a question addressed by BPA either in the Planning Supplement or in the public meeting.

The Draft Supplement does briefly discuss the "no construction" alternative in two short paragraphs on page 47. However, these paragraphs basically describe the actions necessary to keep existing lines from overloading if the additional generation is built at Libby and a 230 kV line outage occurs. They also state that if no new lines are constructed line losses on existing transmission lines would be higher and that the money which would be spent to con-

ENERGY PLANNING DIVISION
BOB ANDERSON, ADMINISTRATOR

(406) 449-3780

32 SOUTH EWING, HELENA, MONTANA 59801

XIV-32

struct, operate, and maintain the additional lines would be saved.

This discussion is not sufficient for the public or BPA to rationally decide if applying the single contingency design standard is worth it in this case. It certainly does not constitute the cost-benefit analysis of need required by the National Environmental Policy Act. Although the BPA is only at an early stage of its consideration of the proposed line, it should begin to consider and report to the public a more detailed analysis of the benefits and costs associated with construction of the proposed facility and alternatives. Reporting in detail on impacts of alternative routings without a similarly detailed discussion of the issues surrounding need implies to the public the BPA has predecided the need issue.

Because of the difficulty of quantifying the benefits and costs associated with a projected increase in transmission system reliability, conducting a benefit-cost analysis will be a complex task. The benefits of the proposed Libby integration project would appear to include: reduced probability of loss of generation from the Libby dam; reduced probability of inconvenience, capital losses, and productivity losses to electricity consumers; and reduced transmission system line losses. The costs would include the construction, operation, and maintenance dollar costs and the adverse natural and cultural environmental impacts resulting from the construction and operation of the new lines.

The amount of the benefits which will ensue from the proposed project will depend directly upon the number, duration, and timing of outages on the existing 230 kV transmission lines and upon the amount of load on the Libby generators at the time of the outage. According to the Draft supplement the capacity of the existing transmission system will be insufficient to withstand loss of a 230 kV line when the four additional generation units are added at Libby. However, the Draft Supplement also states that the additional units will be peaking units which will not run continuously. Thus the loss of a 230 kv line even after the new Libby units are added may not always result in insufficient transmission capacity, loss of Libby generation, and loss of power to electrical consumers. The BPA should begin the benefit cost analysis by examining the historical outage statistics for the existing lines to construct a distribution of the number and duration of outages. This distribution could then be compared to the projected distribution of generation loads at Libby after the four additional units are added. This comparison would allow BPA to estimate how often loss of a 230kV line would mean insufficient transmission capacity, and the amount, duration, and timing of the electrical energy which would be lost if the proposed Libby integration project was not constructed. This information could in turn be used as a basis from which to estimate productivity and capital losses to electrical customers.

These comments are not intended as a "cookbook recipe" for a reliability benefit-cost analysis. They are intended to stimulate thought concerning some of the issues surrounding the need for this project. Although increased transmission system reliability is desirable, it carries with it very real economic

letter to BPA
November 1, 1977
Page 3

and environmental costs. Reliance upon utility industry design standards to justify need may hide these costs but does not aid the public in understanding the relative merits of the options available.

Two other concerns were raised during the public meeting and should be addressed by the BPA. The first is the absence of any cost estimates for the various alternatives. Obviously, the BPA cannot precisely estimate the costs of the proposed transmission lines before the lines are designed and before specific alternative routes are identified. However, the BPA should provide at least order of magnitude cost estimates so that the public can get some appreciation of the relative project costs. Surely BPA can estimate if the project will cost on the order of 10 or 100 million dollars. The BPA should also be able to estimate the relative costs of the transmission alternatives identified in the Draft Supplement. By estimating the line lengths of the different voltage lines and the different substation requirements, BPA should be able to at least rank and provide some idea of the cost variability among the different alternatives.

The second concern raised at the meeting was the possibility of upgrading existing transmission lines so that no new lines and separate rights-of-way would be required. The pros, cons, and technical feasibilities of upgrading should be discussed, including the need for and expense of new transformers and the timing and duration of any outages to existing electricity customers necessary to rebuild the lines.

Some more specific comments of statements in the Draft Supplement follow:

- 1) On page 1 in the footnote to Table 1 the ASARCO mining load is listed as 9.5 MW. A preliminary copy of Northern Lights, Inc. application to this Department for a 115 kV transmission line to serve the ASARCO mine projects the ASARCO load to be "...approximately 18 MW..."
- 2) Page 2 lists the capacity of the proposed Kootenai Falls project as 160 MW. The application for a preliminary permit from the Federal Power Commission filed by Northern Lights, Inc. lists the installed capacity as 140 MW. No mention is made of a third 20 MW turbine.
- 3) Page 3 states that "Alternative Plan A assumes that the proposed Hot Springs-Bell line is built on one of the alternative routes that pass by the Noxon area." Will the Libby Integration Project influence the choice of routes for the Bell-Hot Springs line? Since Plan A will be the least costly alternative to construct, will this plan be listed as a justification for routes in the Noxon area?

I again commend the BPA for interacting with the public at an early stage in the Libby interconnection project and appreciate this opportunity to comment on it.

Sincerely,

Bob Anderson

Bob Anderson, Administrator
Energy Planning Division, DNRC

BA/psg



DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION, CORPS OF ENGINEERS
P.O. BOX 2870
PORTLAND, OREGON 97208

OFFICIAL FILE COPY	
No.	Date
	NOV - 7 1977
Referred To:	A
Action Taken:	
☐ ANS.	☐ NO REPLY
4 November 1977	Date

NPDPL-ER

Mr. Donald Hodel
Administrator
Bonneville Power Administration
Department of Energy
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

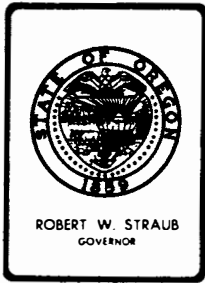
This is in response to your letter of 14 September 1977 requesting our review of your Draft Environmental Impact Statement on your Fiscal Year 1979 Proposed Program.

The Bonneville Power Administration will be required to obtain a permit from the Corps of Engineers for the location of any transmission lines on project lands, as would be the case for the Franklin Area System Reinforcement. Also a Section 10 permit would be required for any transmission lines crossing any navigable waterway. A Section 404 permit would also be required for any work which would involve the discharge of fill material in the waters of the United States including adjacent wetlands.

We appreciate the opportunity to review and comment on the Draft EIS. If you have any questions regarding any required permits please contact Mr. Rudy Arnold, 503-221-3780 or FTS 423-3780.

Sincerely yours,


EDWIN S. TOWNSLEY
Colonel, Corps of Engineers
Acting Division Engineer



Executive Department

INTERGOVERNMENTAL RELATIONS DIVISION

ROOM 306, STATE LIBRARY BLDG., SALEM, OREGON 97310

November 4, 1977

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No.	Date
	NOV - 7 1977
Referred To: <i>A</i>	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

Donald Paul Hodel
Administrator
U. S. Department of the
Interior
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

Re: 1979 Proposed Program
PNRS 7710 4 120

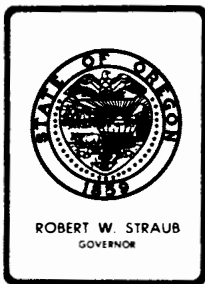
This is to notify you that the Department of Fish and Wildlife has requested a 15-day extension of review time as allowed by Council of Environmental Quality Guidelines of August, 1973.

The State will make every effort to respond to your draft Environmental Impact Statement by November 18, 1977.

Sincerely,

Norm Boice, Manager
Grants Coordination
& Management Section

NB:ts



Executive Department

INTERGOVERNMENTAL RELATIONS DIVISION

ROOM 306, STATE LIBRARY BLDG., SALEM, OREGON 97310

December 5, 1977

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Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

Donald Paul Hodel
Administrator
U.S. Department of the
Interior
Bonneville Power Administration
P.O. Box 3621
Portland, OR. 97208

Dear Mr. Hodel:

RE: 1979 Proposed Program
PNRS 7710 4 120

Thank you for submitting your draft Environmental Impact Statement for State of Oregon review and comment.

Your draft was referred to the appropriate state agencies. The Department of Fish & Wildlife and Department of Forestry offered the enclosed comments which should be addressed in preparation of your final Environmental Impact Statement.

We will expect to receive copies of the final statement as required by Council of Environmental Quality Guidelines.

Sincerely,

Donald L. Jones
Administrator

DLJ:cb
enclosure



OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

LATE Letter

Intergovernmental Relations Division
240 Cottage Street S.E., Salem, Oregon 97310
Phone: 378-3732

STATE A-95 REVIEW ADDENDUM

APPLICANT: Bonneville Power Administration

PROJECT TITLE: 1979 Proposed Program

PNRS #: 7710 4 120

DATE : December 7, 1977

The State Clearinghouse has received additional comments from Department of Land Conservation and Development subsequent to our conclusion letter of December 5, 1977, please see copy(ies) attached for your attention.

Additional Clearinghouse comments:

- ☒ Please consider this letter and enclosure(s) an addendum to our previous letter.
- ☒ A copy of this letter and enclosure(s) should be forwarded to the federal funding agency as required by OMB A-95.

If you have questions please contact the State Clearinghouse at the above address and telephone number.



OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

Intergovernmental Relations Division
240 Cottage Street S.E., Salem, Oregon 97310
Ph: 378-3732

P N R S S T A T E R E V I E W

Project #: 7710 4 120

Return Date: OCT 28 1977

ENVIRONMENTAL IMPACT REVIEW PROCEDURES

1. A response is required to all notices requesting environmental review.
2. OMB A-95 (Revised) provides for a 30-day extension of time, if necessary. If you cannot respond by the above return date, please call the State Clearinghouse to arrange for an extension.

ENVIRONMENTAL IMPACT REVIEW DRAFT STATEMENT

- () This project does not have significant environmental impact.
- () The environmental impact is adequately described.
- () We suggest that the following points be considered in the preparation of a Final Environmental Impact Statement regarding this project.
- () No comment.

REMARKS

DEPARTMENT OF
LAND CONSERVATION
AND FOREST MANAGEMENT

SALEM

I. Area Has a Plan and Approved Compliance Schedule

This project and its related land use implications must be coordinated and consistent with the Columbia River County's comprehensive plan and efforts to update the plan (i.e. the County's compliance schedule and work program for reaching compliance with the statewide land use goals). Consideration of the relationship between the statewide land use goals #5 Open Spaces, Scenic and Historic Areas, and Natural Resources and the project should receive special attention. In addition, the applicant should make every effort to insure that the project makes use of recognized citizen and agency involvement programs established by the local jurisdiction in accordance with the statewide land use goals.

12/5/77
lo



OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

Intergovernmental Relations Division
240 Cottage Street S.E., Salem, Oregon 97310
Ph: 378-3732

PNRS STATE REVIEW

EXTENDED TO 10/26

OCT 28 1977

Project #: 7710 4 120

Return Date: _____

ENVIRONMENTAL IMPACT REVIEW PROCEDURES

1. A response is required to all notices requesting environmental review.
2. OMB A-95 (Revised) provides for a 30-day extension of time, if necessary. If you cannot respond by the above return date, please call the State Clearinghouse to arrange for an extension.

ENVIRONMENTAL IMPACT REVIEW DRAFT STATEMENT

- () This project does not have significant environmental impact.
- () The environmental impact is adequately described.
- (X) We suggest that the following points be considered in the preparation of a Final Environmental Impact Statement regarding this project.
- () No comment.

REMARKS

See attached.

XIV-41

Agency

Fish & Wildlife

By

William E. Pitney

ENVIRONMENTAL MANAGEMENT SECTION 11/25/77

OREGON DEPARTMENT OF FISH AND WILDLIFE
comments on
Draft Environmental Impact Statement
BONNEVILLE POWER ADMINISTRATION
Fiscal Year 1979 Proposed Program

The 1979 plan includes only one new project that could involve the State of Oregon.

Alternatives D and E for the Franklin Area System Reinforcement would require installation of a 230 KV transmission line across the Columbia River near McNary Dam. Since two 230 KV and one 500 KV transmission systems currently cross the river in the McNary area and another 500 KV line crossing is proposed, we must oppose any additional crossings because of the hazard to the heavy waterfowl use in the area. If implementation of Alternatives D and E is unavoidable, serious consideration must be given to increasing the existing line capacity to accommodate the heavier demand.

There are a number of comments relative to the powerline right of way management program. In previous years a number of suggestions have been made to minimize the impact of chemical vegetative control on fish and wildlife habitat. Some of these suggestions have been incorporated in the draft EIS; however, the following additional comments will further protect and enhance wildlife habitat without significantly limiting vegetation control.

1. Time intervals between herbicide applications should be a minimum of ten years where possible to allow maximum utilization of key forage plants by wildlife.
2. Spray all rights of way on a one-half mile rotation basis. This practice would preserve adequate forage for wildlife at all times.
3. Leave all snag trees intact wherever they do not pose an imminent danger to the lines to retain as much wildlife habitat as possible.
4. Manual vegetation control should be employed wherever possible to minimize the use of pesticides.
5. Grass seed all maintenance roads and other disturbed areas to reduce erosion and provide additional forage for wildlife.

6. Do not use herbicides in autumn to prevent the destruction of wildlife forage just prior to winter.
7. The section on probable impacts to wildlife on page 14 should include a discussion of the risk of bird collisions with transmission lines.
8. Maintenance projects should be coordinated with this Department's local fish and wildlife biologists. A pre-project discussion of fish and wildlife habitat protection measures, including timing of the work, would reduce environmental impacts and interagency conflicts.



OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

Intergovernmental Relations Division
240 Cottage Street S.E., Salem, Oregon 97310
Ph: 378-3732

PNRS STATE REVIEW

Project #: 7710 4 120

Return Date: OCT 28 1977 *W*

ENVIRONMENTAL IMPACT REVIEW PROCEDURES

1. A response is required to all notices requesting environmental review
2. OMB A-95 (Revised) provides for a 30-day extension of time, if necessary. If you cannot respond by the above return date, please call the State Clearinghouse to arrange for an extension.

ENVIRONMENTAL IMPACT REVIEW DRAFT STATEMENT

- () This project does not have significant environmental impact.
- (x) The environmental impact is adequately described.
- () We suggest that the following points be considered in the preparation of a Final Environmental Impact Statement regarding this project.
- () No comment.
- - - - -

REMARKS

1. The major impact within Oregon will be the right-of-way management program (pages XI-18 through XI-25). As a result of our meeting last July with BPA representatives, we are satisfied that their program will equal or exceed minimum requirements of the Forest Practices Act, particularly with regard to use of chemicals for vegetation managements.
2. No new transmission lines or new substations are scheduled in FY 1979 within Oregon. It is encouraging to read (pp. 32-33) that future expansion of transmission lines will be minimized by replacing existing lower voltage lines with lines of higher capacity. They project a doubling of peak loads in the next 20 years.



United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

In Reply Refer To:
EGS-DES-77/30
Mail Stop 760

OCT 31 1977

Memorandum

To: Administrator, Bonneville Power Administration

Through: ~~Deputy~~ Assistant Secretary--Energy and Minerals *[Signature]*
NOV 3 1977

From: Director, Geological Survey

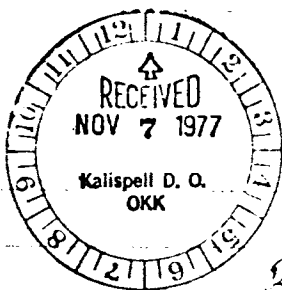
Subject: Review of draft environmental statement for Bonneville
Power Administration's proposed program for Fiscal
Year 1979

Results from two long-term stream-water sample sites given in attachment D show herbicide residues at lower than detectable levels (p. XI-55, 56) while low concentrations were found in the soil and forest litter (p. XI-62, 63). These results suggest that residues might be found in stream-bed sediments, which should also be sampled at the long-term water sampling sites.

The persistence of picloram concentrations in soils and water below the Summit Lake spill site (D: p. XI-64, XI-65) suggests the potential for impacts on subsurface water supplies. The text should state the source of the tap waters tested; this is significant because reportedly no detectible residues were found in the waters of Summit Lake below the spill site--despite their presence in the soils and in the domestic tap water. The statement should more adequately appraise the potential for impacts of herbicides on wells and springs--particularly those tapping shallow aquifers along the rights-of-way of the transmission lines. The document should outline measures to be taken in the event of future spills or accidental excessive releases of chemical pollutants.

Henry W. Culler
Acting Director





5112 SW. 311th pl
Federal Way, Washington
98002
November 2, 1977

Bonneville Power Administration
Comments for the Libby, Montana public meeting

I wanted to thank you for going around the northwest area getting public comments on your proposals. You all did a good job presenting them.

First off my name is Carl Hilbert Hawrett and I attended the public meeting in Libby, Montana last month. I have since looked over the 4 proposals of the new transmission lines and find none of them completely satisfactory.

The only positive alternative is to reconduct the existing transmission lines to carry the expanded load. I feel it is very unsatisfactory to ruin any more land for just for the sake of comfort and more energy. The never ending energy growth in the United States has to stop and we have to stop and plan our future.

It's a well known fact that consumers will always burn up as much energy that is available to them. The idea is to conserve our energy, not ~~never~~

To restate my firm commitment is for no new power line corridors to be constructed (evening the long distance ones 10+ miles). But instead reconduct the present ones to carry the load.

All the alternatives are not acceptable
because they inell building new line
across new land.

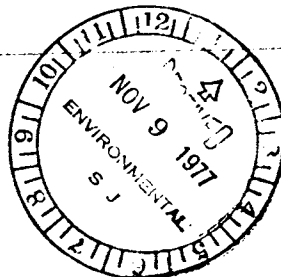
thank you for your time

Sincerely Yours

Carl Hilbert Fawcett

5112 S.W. 311th Pl.

Federal Hwy, W.H. 95002



LATE Letter

1103 Dakota Ave.
Libby, Montana 59923
November 11, 1977

Mr. John Kiley
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Sir:

I wish to protest proposals for moving power from Libby Dam and the re-reg dam, since new transmission lines have been proposed with no consideration given to utilizing present corridors.

Further, I would like to know the total cost estimated for each of these proposed new routes, along with an estimate of what it would cost to re-structure current lines to carry the additional load.

If it is maintained that it is cheaper to build new lines than modify existing ones, I would like to know why.

Along with the question of economy in BPA planning is the fact that the Kootenai National Forest has been lowering its annual allowable cut of timber for some time, which adversely affects employment. The Kootenai N.F. should not be required to give up acreage for new rights-of-way if present rights-of-way can be used.

Yours very truly,

Mrs. J. R. Hennessy
Mrs. John R. Hennessy

Return addresses:

The Book Cabinet
513 Mineral Avenue
Libby, MT 59923

Mr. Kiley =

I am very much against an additional corridor - after attending the BPA meeting at the 1st National Bank of Libby and reading the literature provided. I would support usage of the present pathway with reconductoring.

Broel Black, M.D.

Dear Mr. Kiley:

I am opposed to any new corridors - Land is not cheap. The initial cost for using existing lines may be more. But the long run costs of land and loss of tree growing land base has to be considered.

John Swenson

11/9/77

Dear Mr. Kiley,

I want to register my strongest objection to construction of ⁸any new power line corridors for high voltage lines from the Libby dam & ~~near~~ ^{near} dams into the BPA grid & urge with the Kootenai Nat. Forest to consider re-conductoring the existing line using current right of way.

Thank you!

John Robson

Return address:
The Book Cabinet
513 Mineral Avenue
Libby, MT 59923

The need no new power
corridors thru Lincoln County;
we should use existing
corridors to transmit power
from the Libby Dam and the
~~future transmission~~ from the
~~Reg. Dam~~
Elmer Tharita
Libby, Mt.

MR. Kiley.

I support using the existing power
corridors to integrate new power
into the BPA electrical grid system
from the Libby Dam and the Reg. Dam

With Love

Dear Sirs;

I support using the existing power
corridors to integrate new power
into the B.P.A. electrical grid system
from the Libby Dam & Reg. Dam. I
oppose the B.P.A. plans for High Voltage
Lines into Pipe Creek, 17 miles of Yook, Fisher's
Gary Morton

No return address

No return address

Return address:
Lyle Olson
Box 525
Libby, MT 59923

Sir:

CC

THE THOUGHT OF ANOTHER
POWER LINE CORRIDOR IN LINCOLN
COUNTY IS INTOLERABLE. CAN IT
BE IN THE SAME CORRIDOR - COME
HELL OR HIGH WATER. WE'VE HAD
ENOUGH!

Lyle Olson

Ann Guhman
Box 547
Libby, MT 59923

LATE
Mr. Lyle

11/10/77

I ⁹³strongly opposed the construction
of any new power corridors in
Lincoln county. I urge
reconstruction of current
lines and corridors.

Thank-you
Ann Guhman, Libby



United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

OFFICIAL FILE COPY	
No.	Date NOV 14 1977
Referred To:	<i>[Handwritten: H]</i>
Action Taken:	
☐ ANS.	☐ NO REPLY
Date	

November 4, 1977

DES-77/30

Memorandum

To: Administrator, Bonneville Power Administration, Portland Oregon
 Through *Deputy* Assistant Secretary--Energy and Minerals *[Handwritten: DES-77/30 NOV 10 1977]*
 From: Director, Bureau of Mines
 Subject: Draft environmental statement for the Fiscal Year 1979 proposed program, Bonneville Power Administration

We appreciate the opportunity to review this statement dealing with your FY 1979 program for construction and modifications to BPA's power transmission system.

As you well know, electric power developed by BPA is important to a significant part of our domestic light metals industries (aluminum, magnesium, titanium, and zirconium) that originally located in Washington because of low-cost power availability. However, these industries have interruptible contracts with BPA, and as nonindustrial demand continues to increase interruptible power becomes less available. Considering that the Columbia River is virtually dammed to capacity and that precipitation shortfall has already caused power shortages in the region, the improvements planned for the system cannot but have a positive impact on mineral industry power needs.

Your report adequately considers mineral resources recognizing that transmission lines can have an impact on low-unit-value, large-volume minerals, such as sand and gravel, and proposing that line or route selections will avoid mineral deposits where possible. Although a systematic resource evaluation has not been made for transmission line rights-of-way or other BPA land use requirements, records and information available to the Bureau of Mines indicate that quarries and borrow pits for construction materials are the only mineral properties in the routing areas. We would suggest deletion of the last part of the last sentence, first paragraph, under Mineral Resources (page 10) reading that sand and gravel "exists in some quantity around virtually every city of note."

[Handwritten Signature]
Acting Director

XIV-52



LATE

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

OFFICIAL FILE COPY	
No.	Date NOV 14 1977
Referred To:	
Action Taken:	
☒ ANS.	☐ NO REPLY
By	Date

November 8, 1977

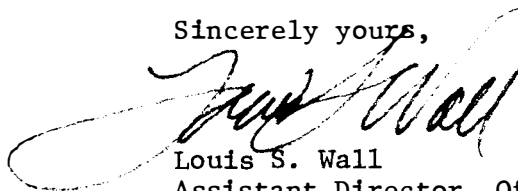
Mr. Ray Folern
Acting Administrator
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Folern:

This is in response to your request of September 14, 1977, for comments on the draft environmental statement (DES) for the Fiscal Year 1979 Proposed Program for the Bonneville Power Administration in Oregon, Washington, Idaho, Montana, and Wyoming. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Council has determined that this DES does not demonstrate compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) with regard to this proposal. However, it appears that the BPA recognizes its responsibilities pursuant to Section 106 and will carry them out in the future. Should this proposal be approved, the Council looks forward to working with the BPA in accordance with the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800) as appropriate.

Should you have any questions or require any additional assistance, please contact Brit Allan Storey of the Council's Denver staff at P. O. Box 25085, Denver, Colorado 80225, or (303) 234-4946, an FTS number.

Sincerely yours,



Louis S. Wall
Assistant Director, Office of
Review and Compliance, Denver

LATE

Nov. 11, 1977

Barbara Ann Roy
621 Dakota Ave.
Libby, Montana
59923

BPA
c/o John Kiley
P. O. Box 3621
Portland, Oregon
97208

Dear Sir(s),

This letter is in response to BPA's proposal to construct several new corridors in Lincoln County. I am totaly against said project. The construction would mean that another roadless area would have a road, meaning the displacement of yet more wildlife (Elk especially don't like the intrusion of man, I watched a herd of over 300 Elk leave the valley I grew up in (in Colorado) because of the encroachment of roads and therefore people and dogs). More and more land in the U. S. is becoming roads, which means there is less viable land, I am certain that the forest that is where you propose to send your line is more productive than an unnecessary line would be.

Why have you not considered re-conductoring the existing lines? Why not, if a new line must be built, run it through existing corridors or roadways? Our forest land is too important to waste by new corridors. The power that is to be conducted is not so great that it couldn't be handled in these ways. People should be instructed in ways to use less power as it isn't right to destroy the world we live in for our selfish desires, in fact it is foolishness, since we really only need a fraction of what is used.

Sincerely,
XIV-54

Barbara A. Roy



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

OFFICIAL FILE COPY	
No.	Date
	DEC 5 1977
Referred To:	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

November 29, 1977

Mr. Ray Foleen
Acting Administrator
Bonneville Power Administration
U.S. Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Foleen:

We have had the draft environmental statement for the BPA Fiscal Year 1979 Proposed Program reviewed in the relevant agencies of the Department of Agriculture, and comments from the Forest Service, an agency of the Department, are enclosed.

The Soil Conservation Service, also an agency of the Department, will communicate with you directly if it has any comments.

Sincerely,

ERRETT DECK
Coordinator
Office of Environmental Quality Activities

Enclosure

FOREST SERVICE COMMENTS

Re: Draft Environmental Statement -
BPA FY 1979 Proposed Program

The Draft EIS appears to be quite thorough and comprehensive. The Libby Integration portion is particularly well prepared. However, following are some comments which we feel will assist in the evaluations:

1. General

Vegetative control, especially the use of herbicides, must be performed in accordance with the June 1974 Transmission Line Rights-of-Way Management Plan jointly approved by FS and BPA. This should be the guide for herbicide use in the particular areas covered by the plan. We suggest some reference to the plan in the EIS section dealing with right-of-way management.

2. Libby Integration Project

a. System Requirements (page 2) should include figures for Wallace, Kellogg, and Coeur d'Alene, Idaho, in the peak loads table. These are necessary to get the overall picture of loads in the Study Area. This is especially true in view of Washington Water Power Company's (WWPC) request for an additional 230 KV line from the Clark Fork Valley to Pinehurst, Idaho.

b. The basic assumption of Alternative Plan A is a tie with the proposed 500 KV line from Hot Springs to Bell and that construction and energization of this line will be complete by 1983. In view of the litigation and delays on Colstrip 3 and 4 generation plants, this does not appear to be a valid alternative. Decisions on corridors for the Hot Springs-Bell and Libby Integration will have to be made simultaneously or one decision will dictate the other decision. Presently, both decisions are expected to be made in February-March of 1978. Alternative A should speak to the decision date on the proposed Hot Springs-Bell 500 KV line.

Items 2 and 3 of Alternative Plan A are common to all alternatives. We feel they should be pulled out and shown as separate items of work required by the electrical system. The impacts could be shown in the discussion of the alternatives for the proposed 230 KV line (Alternative B3).

c. We feel that Alternative Plan D does not show all possible route alternatives. The last Bell-Hot Springs route proposal indicated a route alternative in the Prospect Creek drainage. This parallels the new WWPC 230 KV proposal. If the route is feasible for a 500 KV line and the WWPC 230 KV line, it should be evaluated as a potential Libby Integration alternative.

d. We feel that the following alternative should be included in the evaluation:

(1) Reconductoring existing 230 KV lines to higher capacity to handle new generation.

(2) Rebuilding existing 230 KV lines to higher voltage to handle the new generation. Both alternatives make use of the existing right-of-way.

(3) Stacking the existing 115 KV line along the Kootenai River with a new 230 KV line on the existing right-of-way.

e. The section dealing with description of the existing environment is well prepared. The potential impacts section is also very adequate for the project. Especially good are the tables showing resource acres impacted by the various alternatives and the number of cells per alternative in which the resources occur.

f. Table 8 is hard to use and understand. Horizontal comparisons are easy but the vertical comparisons are difficult. The averages are not understandable without knowing the weighting used.

g. RARE II studies impose some severe restrictions on Alternative Plan A in the Upper Fisher River-Silver Butte portion of the corridor. Until these studies are completed and the land status resolved, work other than on the existing right-of-way or immediately adjacent to the right-of-way, cannot be undertaken.

h. Alternative Plan B also conflicts with the RARE II studies. Corridors B1 and B2 in this alternative cross a roadless area at the headwaters of Callahan Creek in the vicinity of Purdy Mountain. In addition to being an uninventoried roadless area, the same area is under an appeal by the Sierra Club and Northwest Citizens for an expanded Scotchman Peak. We believe the studies and appeals will not be settled soon enough for BPA to meet their energization schedule in these two corridor variations and recommend they be dropped by BPA.

i. The EIS needs to speak to the interrelationship between the proposed 500 KV Hot Springs-Bell transmission line, Washington Water Power proposed 230 KV line from the Clark Fork Valley to Pinehurst, Idaho, and the additional Libby Dam generation in this proposal. This discussion should include the economic feasibility, relationship to the northwest power grid, and reliability criteria.

j. A discussion on reliability standards and the tradeoffs for less reliability is also needed for the reader's understanding.

k. The original plan of work agreement between the Forest Service and BPA called for a step 5 involving the weighting of the models within the permite system. Under the optimization routine, this would give the decisionmaker a ranking of the alternatives to choose from. A satisfactory method of weighting was not found and this step was eliminated from the process. The resulting corridor alternatives are with all the models having equal weight. This is a less than finished product as originally envisioned. It places a heavy burden on the decisionmaker that could have been lightened if the weighting step could have been completed.

Dear Sir:

LATE

11-18-77

I support using existing power corridors ~~for~~ for new power generated from the Libby Dam. Please, no new power corridors and accompanying roads to reduce our forest size and yield.

Sincerely,

Stewart J. Rodgers
1021 Mineral Ave
Libby, Mt. 59923

Dear Mr. Libby,

I understand what you are
to find an alternative
to the 14 mile road,
Vipe Creek, Yak
Hopper line, route from
the Libby Dam.

Thank you.

LATE

Richard Springer
Rt 4 Box 152
Libby, MT. 59923



LATE

United States Department of the Interior FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

FA/SE/Coop.--Bonneville Power
Adm.--Libby Integration

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
10597 West Sixth Avenue
Lakewood, Colorado
Across From Federal Center

NOV 29 1977

MEMORANDUM

To: Environmental Coordinator, Engineering and Construction
Division, Bonneville Power Administration, Portland, Oregon

From: ^{Acting} Regional Director, Region 6
U.S. Fish and Wildlife Service, Denver, Colorado

Subject: Section 7 Formal Consultation--Libby Integration and Northwest
Montana/North Idaho Support Project (Your October 12, 1977 memo)

This memorandum amplifies our threshold response of September 17, 1977. Our threshold response was meant to include all four of the alternative plans. After examining these alternative plans we concluded all of them contain at least one corridor that may jeopardize the continued existence of the grizzly bear or result in the destruction or adverse modification of its critical habitat. The potential impact of each alternative plan and their corridors is discussed below:

Plan A

All four corridors cross Silver Butte just below the Cabinet Mountain Wilderness area which is an important area of occupied grizzly bear habitat. The last legal grizzly kill in the Cabinets occurred off the existing power line corridor. The hunter used the access road to gain access into the area and shot the bear just adjacent to the corridor. There are already problems with illegal bear kills in the Cabinet Mountain area and more access roads would worsen the problem.

Road closures and restrictions on human access are necessary to eliminate adverse impacts on the grizzly. Corridor 2 which would require new access roads appears least desirable of the four corridors in terms of increasing potential human-bear conflicts.



XIV-60

Save Energy and You Serve America!

Plan B

The grizzly bear could be affected adversely if alternative Corridor 4 from Libby up Pipe Creek and down 17 Mile in the Yaak was chosen. This proposal would create access and result in increased human activity in identified grizzly habitat. This area supports a small but viable grizzly population.

Any of the proposals (Corridors 2, 3 and 4) that cross near Calder Mountain and the north fork of Callahan Creek would have an impact on an area that is currently suitable habitat for grizzly. There is currently no access through the area. Any access into the area could affect future grizzly bear management. This area is proposed as critical habitat by both the Forest Service and the Fish and Wildlife Service.

Corridor 1 from Troy, Montana, down the Kootenai River bottom following an existing line through the area does not run through grizzly habitat. It does pass along the edge of the proposed grizzly critical habitat.

Plan C

The effects of this plan and its corridors are the same as those of Plan B and its corridors, since they follow the same route to the Bronx Substation as in Plan B.

Plan D

This plan has the same effects as Plan A, since all four of its corridor alternatives follow the same route through occupied grizzly habitat.

To summarize, only Plan B, Corridor 1, does not cross occupied grizzly habitat, although it does pass along the edge of the proposed critical habitat area. If we assume the transmission line right-of-way will be the only intrusion, then Plan B, Corridor 1, which parallels an existing line and does not cross occupied habitat, may be preferable to the other plans and corridors depending on how large a right-of-way is required and exactly where it would run. Using an existing corridor for the new line would not have the adverse effects of building a completely new corridor or a new parallel corridor. If there are access roads planned for Plan B, Corridor 1, then we need information on them and on whether and where access roads would be for the other corridors to allow evaluation of their relative potential effects.

We would also need to know your plans for access road closures and other means of restricting public access. To evaluate the relative impact of the plans and corridors on the Northern Rocky Mountain wolf we also need this information on access roads for each of the plans and corridors.

You do not need to make a separate request for a biological opinion. Your initial request for consultation covers both the threshold response and biological opinion. Upon receipt of the information requested in the threshold response, we will give you a biological opinion.

Thank you for your cooperation and interest in assuring the future of endangered species.

A handwritten signature in black ink, appearing to read "Marvin F. Quinn". The signature is fluid and cursive, with a long horizontal stroke at the end.

LATE

28 Dec., '77

P. Vance
c/o Eddie Tijerino
1026 Syndall Ave.
Tucson, Ariz.
85719

BPA

John Kiley

Rx 3621

Portland, Ore. 97208

Gentlemen:

I am a resident of the Yaak valley in Montana temporarily residing in Tucson, Arizona. I am greatly dismayed to hear that the BPA plans to build a new transmission line through the Yaak, especially as it's entirely feasible to use existing corridors to carry the load.

That fact makes me wonder what other goodies BPA has in store for Lincoln county. Please inform me what you want to build a new corridor. Also, please send me your Draft Facility Planning Supplement regarding the Libby area.

photocopies:

Manasfield

Baucus

Thank you,

Don Vance

on behalf of

Protect the Yaak Committee

DATE Letter

1/4/78
Troy, Vt.

John Kiley,
BPA
Portland

Dear Mr. Kiley,

I have recently become aware of plans to construct new power line right of ways in Lincoln Cty. Mt., leading from Libby Dam. I'd like to go on record as being generally opposed to all of them. As a Yaak resident I would specifically discourage the 17 mile ~~rt.~~ Such a project would increase hunting pressure, encourage snowmobile traffic (which can be hard on wildlife as well as human life), waste natural resources (when compared to the expense of following existing rts.) and make an ugly straight line through a beautiful valley.

These comments submitted respectfully

bvs

Yours truly,

XIV-64 !/ B Larson

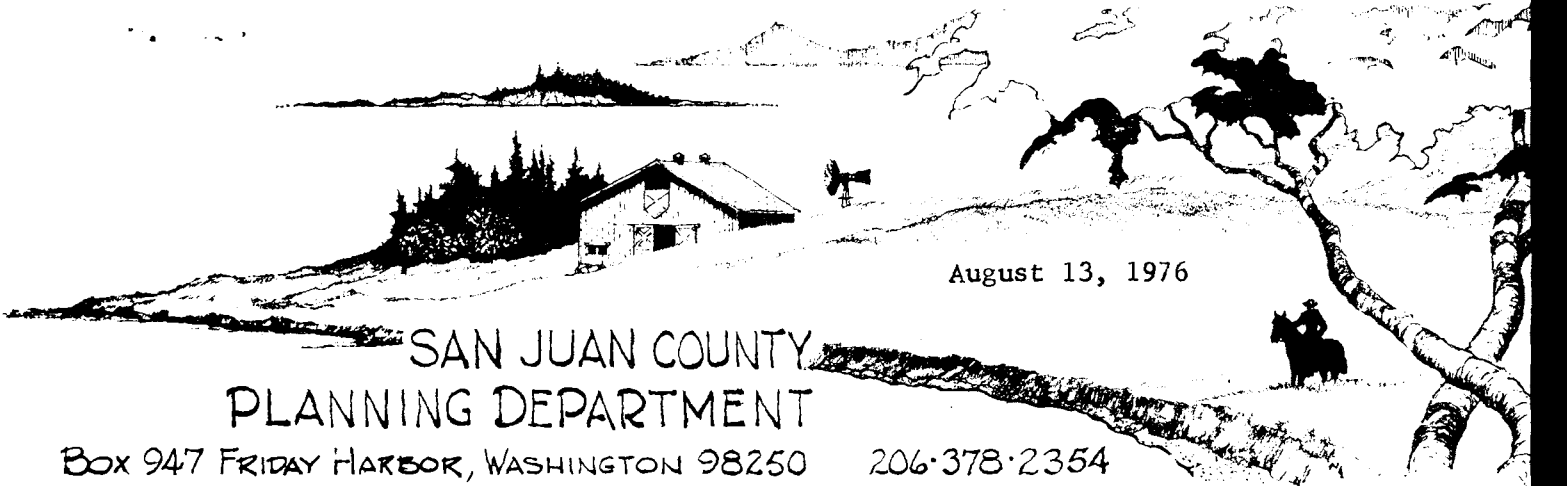
11/16/77

Dear Mr. Kiley,

I would appreciate information
on plans to run a power grid
corridor from Pipe Cr. down through
17 Mile Valley from the Libby Dam.
Thank you.

Sincerely, Thomas P. Graham
D-1

Troy, MT. 59935



August 13, 1976

SAN JUAN COUNTY
PLANNING DEPARTMENT

Box 947 Friday Harbor, Washington 98250 206-378-2354

Ronald H. Wilkerson
Acting Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Re: Review of BPA Draft Environmental Impact Statement regarding Fiscal Year 1978
Proposed Program for San Juan County

Dear Mr. Wilkerson:

The San Juan County Planning Department, in conjunction with the Planning Commission, has completed its review of BPA's EIS as it relates to the proposed 1978 Fiscal Year Program for San Juan County. We agree with BPA's general assessment of the relative environmental impacts of alternative plans A and B and we prefer alternative A (the proposed submarine cable) over alternative B on the basis of its lesser potential for adverse environmental impacts. However, we wish to raise questions regarding several specific points. These are discussed below.

Load Estimates

As stated in the EIS, BPA's peak load-estimates are based on an assumption of a future annual growth rate of 8 per cent. To the extent that this predicted growth rate is related to the county's future rate of population growth (and we recognize that this may not be a one-to-one relationship), we feel that BPA should consider the findings and conclusions of a recent population and economic baseline study prepared for the county by Bernard H. Frerichs. In particular, we feel that BPA should consider the Frerichs' assertion that the extraordinarily high rate of population growth (7.7%) which the county has been experiencing for the last five years will not continue indefinitely into the future. According to Frerichs, increased population density will likely decrease the attractiveness of the islands, and as a result our population growth rate may level off. Other factors to be considered which will affect our future growth rate are the land use decisions made by local residents and the physical characteristics and limitations of the land (the extent of groundwater supplies, soil suitability for sewage disposal by septic tank and drainfield, etc.).

We understand that BPA's load estimates and projected 8% growth rate are based to a large extent on increasing average use (including peak use) per consumer. However, San Juan County is in the process of developing a draft Land Use Plan which will include an Open Space and Recreation Element and a Circulation Element. The preliminary draft includes policies which would encourage and foster development that will conserve and minimize the consumption of electricity. Thus, the proposed land use plan upon implementation would affect our increasing rate of energy consumption and therefore is a factor that should be considered in making future load estimates.

Ronald H. Wilkerson
BPA Draft EIS
August 13, 1976
Page 2

During the August 4, 1976 meeting which was held between BPA representatives and the Planning Department staff, BPA indicated that the load estimates ~~are~~ reviewed yearly and that construction of additional electrical transmission facilities would be based on actual need. Thus, if existing trends change, the timing of new facilities would be adjusted appropriately. In light of BPA's expressed willingness to adjust the timing of new facilities to changes in the county's rate of growth and demand for electricity, we accept BPA's peak load estimates, recognizing that factors not considered by BPA may alter demand in the future. Finally, we would point out to BPA the policy statement in the Shoreline Master Program which requires coordinated planning of new utilities installation with county planning efforts.

Urbanized Land Use

This section of the EIS discusses the shoreline environment designation under the San Juan County Shoreline Master Program (which has now been approved by DOE) as they relate to BPA alternatives A and B. The locations being considered for proposals A and B are designated as follows:

Alternative A (cable)

Decatur, east side: Conservancy
Decatur, west side: Rural
Lopez, west side: Rural

Alternative B (turbine)

Friday Harbor and Eastsound
Siting Areas: both include all designations

We understand that during the fall of 1977 BPA will be placing all cables, except the oldest, underground for a distance of 850 feet back from the shoreline on the east side of Decatur. Consistent with this plan, we understand that BPA would place 850 feet of the 1978 proposed cable underground also. From the standpoint of ensuring consistency with the shoreline policies applicable in this conservancy environment, we strongly recommend this alternative to overhead transmission lines in the shoreline.

In light of the full range of designations which the siting areas for Friday Harbor and Eastsound take in turbine site selection planning for alternative B will need to carefully consider the relevant designation and applicable shoreline policies. Not only must the turbine site chosen be in an area with a designation permitting a dock for a port-related activity (the barging and unloading of fuel oil), but also a site must be chosen that will minimize adverse impacts on any nearby natural and conservancy areas. Taking the Eastsound study area as an example, it would appear that the potential for adverse impacts on water quality and marine life would considerably differ in East Sound as opposed to President Channel.

Lacking specific proposals for implementation of alternative plans A and B at this time, we are not able to evaluate consistency with the provisions of the Shoreline Master Program. However, BPA has indicated a willingness to comply with the County's Master Program. Depending on which alternative plan is chosen, BPA will need to comply with the following sections of the Master Program:

- Section 6.04 - Archeological Areas and Historic Sites
- " 6.08 - Docks and Piers
- " 6.15 - Ports and Water - related Industry
- " 6.18 - Signs
- " 6.20 - Utilities

If the submarine cable plan is chosen, BPA should 1) restore disturbed areas and replant with local vegetation and 2) install cables underground from the water line to the treeline in all shoreline areas.

Impact on Wildlife

San Juan County has not only the highest number of bald eagle nests in the State of Washington but also the highest density of nests (see a recent article by Teryl G. Grubb in The Murrelet, Vol. 56, No. 3, 1975, pp. 2-6 and the San Juan County Inventory of Natural Areas written by the Nature Conservancy). Although the bald eagle is not threatened nationally or internationally, its status in Washington is listed as potentially threatened in the 1975 Department of Game report entitled Marine Shoreline Fauna of Washington. A Status Survey.

Other rare birds of prey in the county include the golden eagle (listed by Game as "threatened with extinction in Washington") and the osprey (listed as "probably threatened in coastal Washington").

Considering the extensive habitat which San Juan County provides for these rare birds and the potential for bird electrocution problems associated with 34.5 - kV transmission lines, we recommend that all applicable mitigating measures recommended by the Department of Game be incorporated into the BPA proposal for San Juan County. These mitigating measures are:

- 1) Transmission towers should be designed to discourage eagles from perching on them, for example by placing wooden roosts atop poles to prevent the birds from touching the wires on take-off.
- 2) The middle wire should be raised 38 inches or more, so that the birds will not touch the two wires simultaneously.

Impact on Other Natural Resources

We do not agree with BPA's statement in the EIS that Alternative Plan B is not expected to impact the University of Washington Friday Harbor Laboratories' research areas. We find that the potential for oil spills associated with shoreside facilities for unloading and storing fuel oil under Plan B has a potential for adversely impacting three research areas of the Labs located in the Friday Harbor siting area (Argyle Lagoon, Minnesota Reef, and Turn Island) as well as one other nearby area off Griffin Bay (Jakle's Lagoon). One research area in the Eastsound siting area could also be adversely affected, namely **Crescent Beach**, an important sand dollar area.

Since these areas have natural and conservancy designations under the Shoreline Master Program, new development must be designed and located so as to minimize adverse impacts on the valuable marine life of these areas. Furthermore, insofar as any docking facilities necessary under Alternative B would extend beyond the line of extreme low tide and thus into waters of statewide significance, the Shoreline Management Act guidelines for preferred uses of such waters would call for the protection of these highly valuable natural areas. Finally, under RCW 28.77.230 which created a marine-biological preserve useful for scientific purposes in the salt water, beds, and shores of San Juan County, these areas are further protected.

Impact on Opalco and Need for Expanded Transmission Facilities

The EIS gives no information on whether Opalco will need to install additional lines, poles, or inter-island cable crossings as a result of the BPA project. Considering that the BPA and Opalco transmission systems are integrally related, we feel that

Ronald H. Wilkerson
BPA Draft EIS
August 13, 1976
Page 4

the EIS should address the impact that plans A and B would have on Opalco's transmission system.

We have raised this question in meetings with BPA and Opalco representatives, and Opalco has indicated that no additional right of way acquisition would be necessary with the exception of one new right of way on Lopez. Nevertheless, we do think that this point should be discussed and confirmed in the EIS.

Conclusions

In sum, we agree with BPA's general assessment of the relative environmental impacts of alternative plans A and B. However, we have raised questions on the following specific points:

- 1) The potential environmental impact that oil handling facilities (alternative plan B) would have on shoreline marine life and water quality will depend on proper location and design of the facilities such that adverse impacts on natural and conservancy areas and existing research areas would be minimized. In order to ensure consistency with the county's Shoreline Master Program, these factors will have to be given careful consideration.
- 2) The environmental impact that a new cable (plan A) would have on bald and golden eagle and osprey populations in the county will depend on proper design of the transmission facilities to minimize bird electrocution problems.
- 3) Considering that the BPA and Opalco transmission systems are integrally related, we feel that the EIS should address the impact that plans A and B would have on Opalco's transmission system.

As to the consistency of BPA's proposed plans with county plans and regulations, it appears that they are generally consistent. However, we have pointed out that:

- 1) Consistency with the Shoreline Master Program cannot be determined until more detailed, site-specific proposals are developed.
- 2) San Juan County may adopt and implement a Land Use Plan in the near future. The plan may contain policies which will promote energy conservation and thus be a factor which would reduce peak energy demands. In this event BPA may need to revise its peak load estimates and adjust the timing of new facilities in order to ensure consistency with the Land Use Plan.

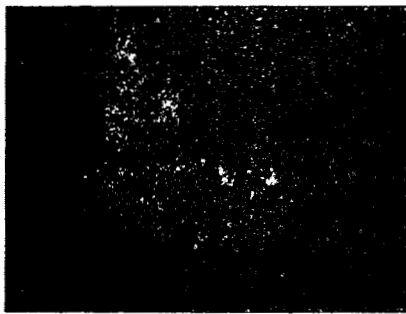
Finally, we prefer alternative plan A - submarine cable - because of its lesser adverse environmental impact, provided that, as discussed above, it will be consistent with the Shoreline Master Program and that potential adverse effects on eagles and osprey will be mitigated wherever possible.

Sincerely,

Robert R. McAbee by AS
Robert R. McAbee
Planning Director

Ronald H. Wilkerson
BPA Draft EIS
August 13, 1976
Page 5

cc: Coleman Hill)
Tom Noguchi) BPA
Nick Lewis) OPPM
Eleanor Howard
Board of County Commissioners



by Ansel Adams in *This Is the American Earth*

SIERRA CLUB

OFFICE OF THE NORTHWEST REPRESENTATIVE

4534½ University Way, N. E.
Seattle, Washington 98105
(206) 632-6157

July 29, 1976

OFFICIAL FILE COPY	
No.	Date
	AUG - 2 1976
Referred To	A
Action Taken	
☐ ANS.	☐ NO REPLY
By	Date

Mr. Donald Hodel, Administrator
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208

Dear Sir,

We have the following comments on your Fiscal Year 1978
Proposed Program Draft Environmental Impact Statement:

SA-78-1 Schrag Area Service

The section on alternatives is deficient in two areas. There is no discussion of the possibility of an energy conservation program eliminating the need for construction of the facilities. There is not an adequate discussion of Big Bends plan to reconductor existing circuits. This may be the best of the proposals but since it is so briefly discussed it can not be considered. Bonneville should view its role in a broad manner and discuss alternatives even if they don't require BPA action. There is a possibility that the best alternative would not be chosen because of BPA reluctance to discuss alternatives outside of its assumed role. For the above reasons, we do not believe that an informed decision can be made on this service proposal.

SA-78-2 Ellensburg Area Service

In this section conservation is not discussed as an alternative to the action.

Alternative C does not discuss the impact of Ellensburg's building of "several additional 12.5 kV" lines. NEPA requires a discussion of secondary impacts of the proposed action. Clearly if BPA were to construct alternative C the secondary impacts would include the construction of the 12.5 kV lines. Because of the above reasons we do not believe that an informed decision can be made on this proposal.

SA-78-3 San Juan Island Area Service

In the alternatives to the proposed action there is no discussion of a conservation program that might eliminate the need for construction.

The proposed alternative B involves the construction of a thermal generation facility by the Bonneville Power Administration. As stated on page 77 of BPA's GCMP, "BPA does not have congressional authorization to own or operate combustion turbines". There does not appear to be any authorization for such activities in any of the most recent legislation on BPA. It also appears that BPA is presently in a curious situation. On page 1 of this service proposal it states "other BPA facilities used to serve OPALCO include diesel generators on Orcas Island". However, BPA has no authorization to own such generators.

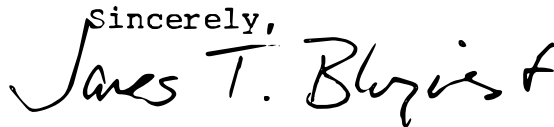
We do not believe that discussion of this proposal is fruitful until this matter of ownership is cleared up.

SA-78-4 Hatton Area Service

There is no discussion of a conservation program that might be a feasible alternative to the proposed action. There is no discussion of the secondary impacts of alternative B. These impacts include the rebuilding of several transmission lines. The impacts of this might be minor but they should be considered in the EIS. We do not think that an intelligent decision can be based on this information included in the EIS.

We urge that the Draft EIS be re-written and re-submitted clarifying all of the above points. Any decisions based on this document as it now stands would be premature. Thank you for giving us the opportunity to comment on this Draft EIS.

Sincerely,

A handwritten signature in cursive script that reads "James T. Blomquist". The signature is written in dark ink and is positioned above the printed name.

James T. Blomquist



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X

1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

REPLY TO
ATTN OF:

10FA - M/S 623

JUL 27 1976

OFFICIAL FILE COPY	
No.	Date
	JUL 29 1976
Referred To:	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

Mr. Ronald H. Wilkerson
Acting Environmental Manager
Bonneville Power Administration
U. S. Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Wilkerson:

The Environmental Protection Agency has completed its review of the Draft Environmental Statement on the Fiscal Year 1978 Proposed Program of the Bonneville Power Administration. We consider the statement to be adequate in those areas where EPA has a special interest or responsibility. We recognize that you have not had time, yet, to incorporate the suggestions we made in our comments on the Fiscal Year 1977 Environmental Statement, which were transmitted to John McLeod in February, 1976.

There are two additional topics which we believe should be addressed in the Final Environmental Statement on the FY '78 Proposed Program and the facility location supplements, where appropriate.

First, the preliminary transmission system expansion plans through 1996 appear to conflict with similar information in the preliminary draft section of the Role Statement, which deals with alternative transmission system expansion scenarios. Given that both environmental statements are targeted upon the same audience, it would seem wise to resolve this apparent discrepancy in either the final environmental statement or the draft Role Statement.

Second, we believe that the facility location supplement for the San Juan Island Area Service should contain a more extensive discussion of the potential and probable impacts on fish and shellfish of the undersea trenching operation for the new transmission cables.

Page Two

This could be based on the experience with the original cables or on experience with other undersea cable laying operations in Puget Sound or similar marine ecosystems. The discussion should indicate the probable magnitude and duration of the impacts and fisheries resource losses.

We have rated this environmental statement LO-1, LO (Lack of Objections) 1 (Adequate Information). This classification of the Environmental Protection Agency's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act, as amended.

If you have any questions regarding our comments and suggestions, we will be glad to discuss them with you, at your convenience.

Sincerely,

A handwritten signature in cursive script that reads "Walter D. Jaspers".

Walter D. Jaspers, Director
Office of Federal Affairs

GOVERNOR
DANIEL J. EVANS

COMMISSIONERS:
JEFF D. DOMASKIN
THOMAS C. GARRETT
KAY GREEN
BEN HAYES
RALPH E. MACKEY
EUSTACE VYNNE
WILFRED R. WOODS

DIRECTOR:
CHARLES H. ODEGAARD



WASHINGTON STATE
PARKS & RECREATION COMMISSION

LOCATION: THURSTON AIRINDUSTRIAL CENTER

P. O. BOX 1128

PHONE 753-5755

OLYMPIA, WASHINGTON 98504

July 1, 1976

IN REPLY REFER TO:

35-2650-1820

Draft EIS -
Fiscal Year
1978 Proposed
Program

(E-623)

Mr. Donald P. Hodel
Administrator
U.S. Department of the Interior
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

The Washington State Parks and Recreation Commission has reviewed the above-noted document and has the following comments about the San Juan Island Area Service, Alternative B.

The Washington State Parks and Recreation Commission owns and manages three marine state park properties near Eastsound (Sucia Island State Park, Matia Island State Park, Clark Island State Park). The Commission also owns and manages Turn Island State Park (marine) near Friday Harbor.

All of the parks have as one of their prime attractions marine shorelines with excellent water quality.

Therefore, the Washington State Parks and Recreation Commission is vitally interested that the water quality and beach quality is not impaired by oil spills. It would seem reasonable for the project sponsor* to address the issue of potential oil spills if Alternative B of the San Juan Island Area Service proposal is chosen. Alternative B indicates that fuel will be delivered by barge. With a fuel consumption rate of 2,000 gallons per hour, it seems reasonable to assume that a sharp increase of oil barge traffic will result if Alternative B is implemented.

July 1, 1976

*Project Sponsor - We are confused as to who exactly will be the project sponsor (and therefore, who will be responsible for environmental documents) if Alternative B (gas turbine generation) is implemented. The Fiscal Year 1978 proposed program indicates on Page 3: *The two alternative plans of service considered by BPA are described in this section. . .* This sentence seems to state that Bonneville Power Administration will be responsible for gas turbine generation facilities and the environmental impacts of them. However, the Environmental Statement for General Construction and Maintenance Program states on page 84: *BPA does not have congressional authorization to own or operate combustion turbines.* On page 86 of the same document it is stated that: *Because BPA is a marketing agency, it is not directly involved in the location and construction of generating facilities. Thus the location of generating plant sites as an alternative to BPA's transmission construction program is influenced by the coordinated efforts of numerous federal and state agencies, public and private utilities, groups such as the Western Systems Coordinating Council and local planning agencies.*

The Washington State Parks and Recreation Commission would appreciate receiving a definite answer as to who is to be responsible for the gas turbines so that we may deal with them concerning potential impacts on our marine state parks.

Please be advised that these comments do not address any possible concerns of the State Historic Preservation Officer. Formerly, the Washington State Parks and Recreation Commission conducted a joint review and issued a joint response; however, that is not presently the case. You may expect to receive a separate response from the State Historic Preservation Officer who presently reports to the Governor.

Please continue to send us all environmental documents concern BPA activities in Washington.

Thank you for the opportunity to comment.

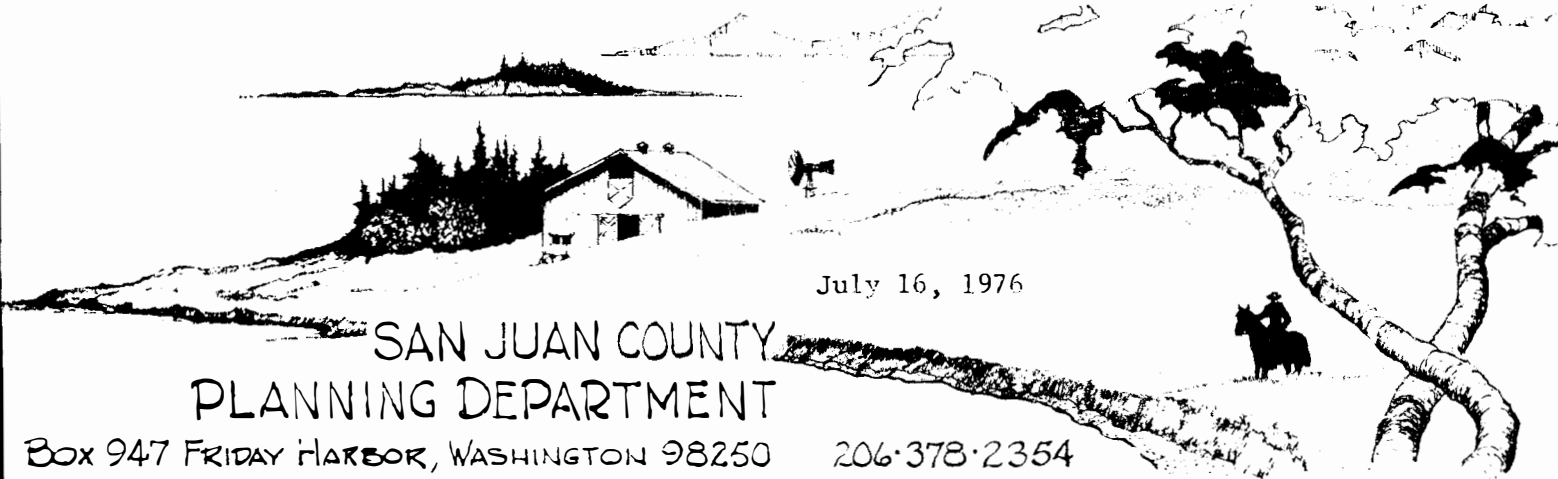
Sincerely,



David W. Heiser, Chief
Environmental Coordination

sg

cc: Arthur M. Skolnik, State Historic Preservation Officer
Mike Mills, Office of Program Planning and Fiscal Management



July 16, 1976

SAN JUAN COUNTY
PLANNING DEPARTMENT

Box 947 FRIDAY HARBOR, WASHINGTON 98250 206-378-2354

Ronald H. Wilkerson, Acting Environmental Manager
BPA
P.O. Box 3621
Portland, Oregon 97208

OFFICIAL FILE COPY

No. Date
JUL 19 1976

Referred To:

Re: BPA Draft Environmental Impact Statement regarding Fiscal Year 1978 Proposed Program

Action Taken:

☐ ANS. ☐ NO REPLY
By Date

Dear Mr. Wilkerson:

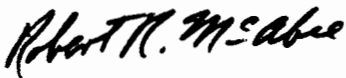
At its regular meeting of July 15, 1976 the San Juan County Planning Commission reviewed the draft EIS for BPA's proposed 1978 construction program for San Juan County. Discussion centered on BPA's peak load estimates and projected 8% annual growth rate for San Juan County. Information available to the county on our expected future population growth rate suggest that this 8% project growth rate maybbe excessively high.

We recognize that growth projections are basic to planning for public services and facilities. Furthermore, we recognize that increased power supplies facilitate growth and that population growth has extensive and diverse impacts on communities. Therefore, we find that evaluation of BPA's projections of demand for electricity is basic to evaluation of the draft EIS.

In light of the limited information available in the draft EIS on projections of demand for electricity, the county finds that it lacks adequate information to intelligently comment upon BPA's draft impact statement. Accordingly, the Planning Commission has directed the Planning Department to request a meeting with representatives of BPA and OPALCO to discuss growth rate projections for San Juan County as these relate to the increased need for electricity. Therefore, in response to the Notice of Direct Federal Development Project received June 16, 1976, we would like to initiate discussion with BPA on this matter. In addition, we would like to request a 15-day extension of the period for comment on the draft EIS (in accordance with CEQ guidelines) to allow time for discussion with BPA before we submit our final comments on the draft EIS.

We look forward to hearing from you at your earliest convenience for the purpose of setting a time and place for us to meet.

Sincerely,



Robert R. McAbee
Planning Director

RRM/vls

cc: Don Whitmill
Eleanor Howard

XIV-77

GOVERNOR
DIXY LEE RAY
COMMISSIONERS
JEFF D. DOMASKIN
ROBERT W. DOWNING
KAY GREEN
JOE D. HAUSSLER
DON E. HODGES
RALPH E. MACKEY
EUSTACE VYNNE
DIRECTOR
CHARLES H. ODEGAARD



WASHINGTON STATE
PARKS & RECREATION COMMISSION

LOCATION: THURSTON AIRDUSTRIAL CENTER

PHONE 753-5755

P. O. BOX 1128

OLYMPIA, WASHINGTON 98504

April 5, 1977

IN REPLY REFER TO:

35-2650-1820

Draft Environmental
Supplement - Fiscal
Year 1978 Proposed
Program --
Facility Location
Evaluation for
Ellensburg Service
Study Area 78-2

(E-823)

Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Sir:

The Washington State Parks and Recreation Commission has reviewed the above-noted document and does not wish to make any comment.

Thank you for the opportunity to review and comment.

Sincerely,

David W. Heiser, E.P., Chief
Environmental Coordination

sg

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

OFFICIAL FILE COPY	
No.	Date APR 11 1977
Referred To:	H
Action Taken:	
ANS.	☐ NO REPLY
By	Date

April 8, 1977

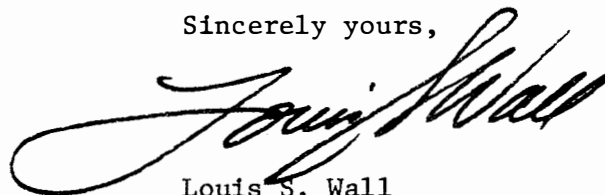
Mr. Donald Paul Hodel
Administrator
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

This is in response to your request of March 23, 1977, for comments on the draft environmental supplement for the Ellensburg Service Study Area 78-2, Facility Location Evaluation. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that this supplement does not demonstrate compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320). However, it appears that the Bonneville Power Administration (BPA) recognizes its responsibilities pursuant to Section 106 and will carry them out in the future. Should this proposal be approved, the Council looks forward to working with the BPA in accordance with the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), as appropriate.

Should you have any questions or require any additional assistance, please contact Brit Allan Storey of the Council's Denver staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4946, an FTS number.

Sincerely yours,



Louis S. Wall
Assistant Director, Office
of Review and Compliance

XIV-79



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (729 N.E. Oregon Street)
Portland, Oregon 97208

IN REPLY REFER TO:
1793 (911)

OFFICIAL FILE COPY	
No.	Date
	APR 12 1977
Referred To:	<i>A</i>
Action Taken:	
☒ TRANS.	☐ NO REPLY
	Date

APR 12 1977

Memorandum

To: Administrator, BPA, Portland, Oregon

From: State Director

Subject: Draft Environmental Supplement Fiscal Year 1978
Proposed Program Facility Location Evaluation
for Ellensburg Service Study Area 78-2 (DES-77/12)

We have reviewed the draft environmental supplement on the above subject. We offer no input or comment since the project neither involves BLM administered lands or programs. Also this office has no special expertise in urban/suburban land use matters as described in the draft statement.



NPSN-PL-ER

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
PO BOX C-3755
SEATTLE, WASHINGTON 98124

OFFICIAL FILE COPY	
No.	Date
	APR 29 1977
Referred To:	
Action Taken:	
ANS.	☐ NO REPLY
By	Date

27 APR 1977

Environmental Manager
Bonneville Power Administration
Post Office Box 3621
Portland, Oregon 97208

Dear Sir:

We have reviewed the draft environmental supplement on the Facility Location Evaluation for Ellensburg Service Study Area 78-2 with respect to the U.S. Army Corps of Engineers' areas of responsibility for flood control, navigation, hydropower and the activity which is subject to Corps of Engineers permit authority. We have no comments.

Thank you for the opportunity to review this supplement.

Sincerely yours,

SIDNEY KNUTSON
Asst. Chief, Engineering Division

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Room 360, U.S. Courthouse, Spokane, Washington 99201

April 29, 1977

Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

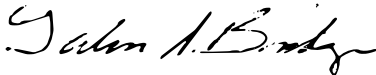
Dear Sir:

Thank you for the opportunity to review the draft environmental supplement for the proposed Ellensburg Facility Location (Study Area 78-2).

Our only comment has to do with the proposed East Ellensburg Substation site, Figure 7. The general area in the vicinity of the proposed site is influenced by high water tables. Depending upon the exact location, consideration needs to be taken concerning the provision for adequate drainage of the site and access road in your final plans.

Additional information on potential soil problems may be obtained by contacting Mr. L. T. (Bud) Dunning, P.O. Box 679, 401 Kittitas Cutoff, Ellensburg, Washington 98926.

Sincerely,



Galen S. Bridge
State Conservationist



UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Region 6
P.O. Box 3623, Portland, Oregon 97208

8430

April 29, 1977



Mr. Donald P. Hodel, Administrator
USDI, Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

Thank you for the opportunity to review and comment on the Draft Environmental Statement of the Facility Location Evaluation for Ellensburg Service Study Area 78-2 (DES 77-12).

We have no specific comments on your proposed plan, Alternative A. However, if you make any changes in your proposal, please keep us involved.

A handwritten signature in dark ink, reading 'Robert R. Tyrrel', is written over the typed name.

ROBERT R. TYRREL
Director
Planning, Programing and Budgeting



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

PORTLAND AREA OFFICE
POST OFFICE BOX 3785
PORTLAND, OREGON 97208

MAY - 2 1977

Memorandum

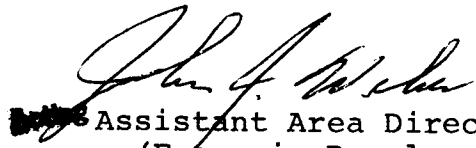
To: Bonneville Power Administration
Environmental Manager

From: Office of the Area Director

Subject: Draft Supplement to the Environmental Statement,
Fiscal Year 1978 Proposed Program, Facility Location
Evaluation for Ellensburg Service Study Area 78-2
(DES 77/12)

Indian trust lands or Communities will not be directly impacted by implementation of the proposed additional substation and transmission line.

We have no objections and no comments on the proposal.


Assistant Area Director
(Economic Development)

XIV-84



U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101



REPLY TO
ATTN OF: M/S 623

MAY 9 1977

Mr. Ronald Iverson
Acting Environmental Manager
Bonneville Power Administration
Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Iverson:

We have completed reviewing BPA's Draft Facility Location Evaluation Supplement for Ellensburg Area Service (DES-77-12) and have found that it provides a relatively complete discussion of the environmental impacts of the alternative transmission line routes and of the construction and operation of the East Ellensburg Substation.

As an editorial suggestion we would like to note that the discussion of impacts on vegetation and wetlands would be more useful if the supplement indicated what proportion of the available habitat would be affected by the proposed action and its alternatives.

The analysis in the supplement indicates that Route 2, in addition to having substantially higher economic costs than the other alternatives, is the only route which would impact upon wetlands. Given that wetlands are a rather rare habitat type in the Ellensburg area, and in accordance with EPA's Wetlands Preservation Policy, we believe that Route 1 or Route 3 would be preferable.

We have rated this statement LO (Lack of Objections) 1 (Adequate Information). The classification of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act.

We appreciate the opportunity to review this draft supplement and would be glad to discuss our comments with you, if you desire.

Sincerely,

Alexandra B. Smith

Alexandra B. Smith
Director
Office of Federal Affairs

XIV-85



United States Department of the Interior

FISH AND WILDLIFE SERVICE

1500 N.E. IRVING STREET

P.O. BOX 3737

PORTLAND, OREGON 97208

Reference: EC

To: Administrator, Bonneville Power Administration, Portland, Oregon

From: Assistant Regional Director, Environment, FWS, Portland, Oregon

Subject: DES-77/12--Draft Environmental Supplement, Facility Location
Evaluation for Ellensburg Service Study Area 78-2

We have reviewed the subject document and offer the following for your consideration.

Specific Comments

Page 53, Wildlife. We suggested revising this paragraph to more accurately reflect project impacts somewhat in the following manner:

A substation and associated access road located at the proposed site would remove up to 2.3 acres of shrub/grass wildlife habitat. This habitat supports many small mammals which are an important food source for raptors. Ground-nesting birds, including the ring-necked pheasant would also be impacted.

The preproject wildlife populations are spatially distributed in relation to the type, location, configuration, and juxtapositioning of existing vegetative communities. Since every unit of habitat is assumed to be at its carrying capacity, any displaced animals would cause stress and ultimate mortalities in adjacent habitat areas.

With the planting of trees and shrubs for substation landscaping purposes it is anticipated that partial mitigation for these wildlife losses may be made. This new habitat type has the potential to support songbird populations.



XIV-86

Save Energy and You Serve America!

During construction, noise, dust, and human activity would disturb wildlife in the immediate area. With project completion this impact would be eliminated and no long term effects are anticipated.

Carl T. Walke

 James W. Teeter



United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

IN REPLY REFER TO:

L7619
(PNR)PCC

May 10, 1977

Environmental Manager
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Sir:

We have reviewed the draft supplement to the environmental statement for the Fiscal Year 1978 Proposed Program, Facility Location Evaluation for Ellensburg Service (DES 77-12). The services and responsibilities of this agency appear to be receiving adequate consideration in the planning for this project.

Sincerely yours,

Charles F. Bohannon
Acting Associate Regional Director,
Planning and Resource Preservation



XIV-88



UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

OFFICIAL FILE COPY	
No.	Date MAV 13 1977
Referred To:	H
Action Taken:	
TRANS.	NO REPLY
By	Date

Mr. Donald Paul Hodel
Administrator
Bonneville Power Administration
U.S. Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

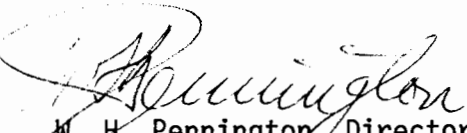
Dear Mr. Hodel:

This is in response to your letter of March 23, 1977, requesting review and comment on the draft supplement to the environmental statement on the Fiscal Year 1978 proposed program on the facility location evaluation for Ellensburg Service Area 78-2.

We have reviewed the draft supplement and have determined that the proposed action will not conflict with known current or future Energy Research and Development Administration programs. We have no comments to offer on the draft supplement.

Thank you for providing us the opportunity to review this supplement.

Sincerely,


W. H. Pennington, Director
Office of NEPA Coordination

cc: Council on Environmental
Quality (5)



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

May 17, 1977

REGION X
Office of Community
Planning & Development

OFFICIAL FILE COPY	
No.	Date
	MAY 19 1977
Referred To: <i>A</i>	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date
IN REPLY REFER TO:	
10D	M/S 317

LATE

Mr. Donald Paul Hodel
Administrator
U. S. Dept. of the Interior
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

Subject: Draft Environmental Supplement - Facility Location
Evaluation for Ellensburg Service - Study Area 78-2

We have reviewed the statement submitted with your March 23, 1977 letter.

The proposed action is the construction of transmission facilities to provide for increasing electrical loads in the Ellensburg, Washington service.

Although your statement indicates moderate adverse impacts on urban lands we do not have any constructive comments to assist you in identifying any additional environmental factors. We assume you will be following the Environmental Criteria for Electric Transmission Systems prepared by the Department of Interior and the Department of Agriculture.

Thank you for the opportunity to comment.

Sincerely,

Robert C. Scalia
Assistant Regional Administrator

XIV-90

AREA OFFICES
Portland, Oregon • Seattle, Washington • Anchorage, Alaska • Boise, Idaho
Insuring Office
Spokane, Washington



IN REPLY REFER TO:

4310.7
DES 77-12

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

NORTHWEST REGION
915 SECOND AVENUE, RM. 990
SEATTLE, WASHINGTON 98174

OFFICIAL FILE COPY	
No.	Date
	MAY 19 1977
Action Taken:	
TRANS.	☐ NO REPLY
Y	Date

MAY 17 1977

Memorandum

To: Administrator, Bonneville Power Administration

From: Regional Director, Northwest Region, Bureau of Outdoor Recreation

Subject: Draft Environmental Supplement - Ellensburg Service Study Area
Fiscal Year 1978 Proposed Program

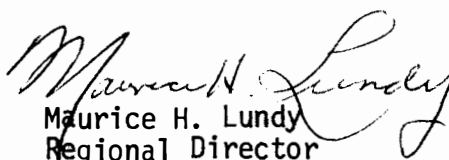
We believe the adverse effects of the proposed action have been adequately identified but more attention needs to be given to possible beneficial effects. There may exist an opportunity for Bonneville's transmission corridor to enhance the recreation activities of walking, hiking, and bicycling.

When public planning and construction agencies are involved with urban projects near recreation centers, we encourage them to discuss with local recreation planners the possibility of enhancing existing or potential recreation resources. In Ellensburg, there exists a fairground, park and college near the transmission corridors. These are the types of resources which a corridor may complement by permitting access through previously unsafe or restricted right-of-way or planning transmission facilities which could easily incorporate future recreation provisions.

The possible reconstruction of the Town Canal bridge is an example of how a local recreation agency may benefit from Bonneville's activity. The city may wish to include some design features in the bridge to safely accommodate bicycling over the bridge. If the city is able to work with Bonneville now, before bridge reconstruction, a considerable savings of time and money may be realized.

A transmission corridor may also be used to enhance existing recreation programs. If the city has a bike plan, the fairground, park and college near the corridor are logical elements of such a plan. Public access through the corridor may allow connection between these areas and the existing trail system.

It appears that the data used to describe the recreation setting was derived from the Columbia-North Pacific Region Comprehensive Framework Study (CNP). The objective of the CNP was to provide a very general analysis of water and related land resource problems and needs. Much of the recreation data contained in the study is at least 11 years old. We recommend that you use more localized and current information to discuss the recreation conditions in future facility location evaluations. Review of the pertinent Statewide Comprehensive Outdoor Recreation Plan may be helpful but more specific data is available in individual river basin plans, such as the current Yakima Level B Study. City and county recreation plans and computer printouts are obtainable from the Recreation Data Subcommittee of the Pacific Northwest River Basins Commission.


Maurice H. Lundy
Regional Director



LATE

STATE OF WASHINGTON

OFFICE OF THE GOVERNOR

OFFICE OF PROGRAM PLANNING AND FISCAL MANAGEMENT

HOUSE OFFICE BUILDING

OLYMPIA, WASHINGTON 98504

Dixy Lee Ray
GOVERNOR

May 20, 1977

Orin Smith
DIRECTOR
206-753-5450

Mr. Donald P. Hodel
Administrator
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Hodel:

Review of the draft facility location supplement to the Fiscal Year 1978 Program Environmental Statement for the Ellensburg Service Study Area has been completed by agencies of the State of Washington. The review process was coordinated by the Office of Program Planning and Fiscal Management, as the state clearinghouse.

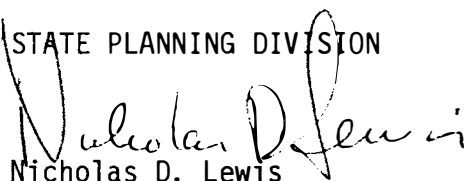
Comments received from the Department of Ecology would indicate that the document adequately addresses its respective area of jurisdiction at this time and no substantive comments were provided. Response from the Department of Game include detailed comments on the draft supplement. While it is understood that Bonneville Power Administration will respond directly to their comments relating to the content of the supplement, several points are highlighted here for your consideration.

The Department of Game notes that it is unclear from the statement whether a hydraulics permit would be required. Contact should be made with Mr. Jay Hunter of the Game Department regarding the construction of power line routes alongside and over highways. A route which is either an expansion of an existing route or one which disturbs as little vegetation as possible, especially riparian, is preferred. It is also noted that the displacement of faunal populations into surrounding habitats could decrease the carrying capacity of these habitats, and result in the loss of some wildlife during the first year.

Thank you for the opportunity to review the document. I hope our comments will be helpful in developing your project.

Sincerely,

STATE PLANNING DIVISION


Nicholas D. Lewis
Assistant Director

NDL:mp

April 20, 1977

RECEIVED
APR 20 1977
STATE PLANNING

State of
Washington
Department
of Ecology



Mike Mills
Office of Program Planning
and Fiscal Management
State Planning Division
House Office Building
Olympia, Washington 98504

RE: Draft Environmental Impact Statement --
BPA - Facility Location Evaluation

Dear Mr. Mills:

Thank you for the opportunity to review your document. The coverage on most areas of the statement appears quite complete and thorough. Since an EIS is a decision making tool, it should assist those ultimately deciding on a project.

We have reviewed the document but have no specific comments to offer at this time. However, the information contained in your statement will definitely be used in our decision-making process if the Department's jurisdiction enters into any future aspects of the proposed action.

We appreciate the opportunity to have reviewed your document. If we can be of further service to you, please feel free to contact me at 753-6892.

Sincerely,

A handwritten signature in black ink, appearing to read "D. R. Thompson", with a stylized flourish extending from the end.

D. R. Thompson, P.E.
Environmental Review Section

DRT:bjw

cc: Environmental Manager, BPA
Portland, Oregon

DEPARTMENT OF GAME



Game Commission
Claude Beckins, Seattle, Chairman
Glenn Galbraith, Wellpinit
Frank L. Cassidy, Jr., Vancouver
Arthur S. Coffin, Yakima
Elizabeth W. Meadowcroft, Tacoma
Archie P. Mills, Wenatchee

Director - Ralph W. Larson
Assistant Directors - Jack S. Wayland
John Douglas

600 North Capitol Way / Olympia, Washington 98504

May 5, 1977

RECEIVED

MAY 9 - 1977

STATE PLANNING

Mr. Mike Mills
State Planning Department
Office of Program Planning &
Fiscal Management
House Office Building
Olympia, Washington 98504

Mr. Mills,

The Bonneville Power Administration's draft supplement to the Environmental Statement, Fiscal Year 1978 Proposed Program -- Facility Location Evaluation for Ellensburg Service, Study Area 78-2 -- has been reviewed by our staff as requested. Comments follow.

It would be more accurate to state that faunal populations currently existing would be lost, not "displaced" (page 53, Wildlife). Although the existing small animal population on the project site may be "displaced" into surrounding habitats, the carrying capacity of adjacent habitats is not increased by the introduction of additional animals but may actually decrease from overuse. The result is that some wildlife is usually lost during the first season. Also, landscaping generally attracts only those species of animals which are able to live in these artificial environments. They do not adapt after arrival.

It is unclear from the DEIS whether a hydraulics permit (issued by Department of Game and Department of Fisheries) would be required. Contact should be made with Mr. Jay Hunter of this office regarding construction of power line routes alongside and over waterways. We prefer, of course, selection of a route which is either an expansion of an existing route or one which disturbs as little vegetation, particularly riparian, as possible. It is highly improbable that any streambank disturbance has occurred in eastern Washington without harming one or more species of upland birds; perhaps BPA would wish to reconsider this in the evaluation of impacts in tables presented on pages 24-26.

The statement, "...Yakima River...(has) a medium quality aquatic wildlife diversity..." (page 10) is inaccurate. Our studies indicate the resident trout fisheries on streams of the Yakima Basin, supported

Mr. Mike Mills
May 5, 1977
Page Two

by significant hatchery releases, attract heavy weekend and vacation campers from both sides of the state. Spiny-rayed fishing on lower Yakima River has gained in popularity in recent years, and Basin waters support some of the finest whitefish angling in the state. The winter steelhead fishery sustains an avid, hearty clientele. In short, the streams of Yakima Basin are among the more popular and heavily fished of any in the state.

Load figures (page 1) may be somewhat misleading. A 32% increase in load over nine winters yields an average annual increase of approximately 3.55%, as opposed to your reported 3%. This .55% difference annually represents a significant amount of energy. Our figures indicate a projected national average of "nearly 3%" (U.S. government), which suggests BPA is preparing for a greater growth rate in the Ellensburg area. In addition, both of these percentages are in excess of the President's goal to cut growth on U.S. energy demand to less than 2% a year. Our concerns on these figures are based on the real fact that increased energy demands result in habitat degradation in a number of ways:

- 1) more dams are necessary, further restraining free river flows;
- 2) peaking programs inundate valuable riparian habitat;
- 3) alternate sources of energy, most likely atomic, will be necessary to meet demands if growth is not slowed;
- 4) each new power transmission line requires acres of vegetative clearing;
- 5) unrestricted industrial, commercial, and residential growths contribute to declines in the quality of life as we now know it.

Thank you for the opportunity to review the draft.

Sincerely,

THE DEPARTMENT OF GAME



Chris Drivdahl, Applied Ecologist
Environmental Management Division

CD:cv
cc: Agencies
Regional Manager



STATE OF
WASHINGTON

Dixy Lee Ray
Governor

WASHINGTON STATE PARKS AND RECREATION COMMISSION

7150 Cleanwater Lane, Olympia, Washington 98504

206/753-5755

June 1, 1977

35-2650-1820

Draft Facility
Location Supplement
to Fiscal Year 1978
Program EIS

(E-898)

Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Sir:

The Washington State Parks and Recreation Commission has reviewed the above-noted document and does not wish to make any comment.

Thank you for the opportunity to review and comment.

Sincerely,

David W. Heiser, E.P., Chief
Environmental Coordination

sg

HIGHWAY COMMISSION

DEPARTMENT OF HIGHWAYS

Highway Administration Building
Olympia, Washington 98504 (206) 753-6005



June 2, 1977

Dixy Lee Ray - Governor
W. A. Bulley - Director

OFFICIAL FILE COPY	
No.	Date
	JUN - 6 1977
Referred To:	
Action Taken:	
☐ ANS.	☐ NO REPLY
By	Date

Environmental Manager
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Bonneville Power Administration
Bonneville Dam Integrating Trans-
mission Study Area
FY 1978 Proposed Program
Draft Environmental Supplement

Dear Sir:

We have completed our review of the Draft Environmental Supplement for the above project.

The proposal does not appear to conflict with existing or planned highway facilities in the area.

Thank you for the opportunity to review this information.

Sincerely,

RUSSELL ALBERT
Assistant Director for
Planning and Research

By: WM. P. ALBOHN
Environmental Planner

RA:ds
WPA/WBH

cc: Carroll
Ashford

XIV-98



IN REPLY REFER TO:

4310.7
DES-77/16

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

NORTHWEST REGION
915 SECOND AVENUE, RM. 990
SEATTLE, WASHINGTON 98174

File No. _____ Date _____
JUN 10 1977
By _____ Date _____
JUN 8 1977

Memorandum

To: Administrator, Bonneville Power Administration
Special attention of: Environmental Manager

From: Regional Director, Northwest Region, Bureau of Outdoor Recreation

Subject: Draft Environmental Supplement - Bonneville Dam Integrating
Transmission Study Area 76-4

We believe the environmental impacts of the proposed action have been adequately identified and we have no comments for inclusion in the final environmental supplement for this project.

Maurice H. Lundy
Maurice H. Lundy
Regional Director

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

June 10, 1977

NORTHWEST REGION
FAA BUILDING KING COUNTY INT'L AIRPORT
SEATTLE, WASHINGTON 98108

OFFICIAL FILE COPY

No. _____ Date **JUN 13 1977**

Referred To _____

Action Taken:
☐ ANSW. ☐ NO REPLY

By _____ Date _____



Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

Dear Sir:

We have reviewed the draft facility location supplement to your Fiscal Year 1978 Program Environmental Statement. We have no specific comments on the above draft. Keep in mind the requirements to review specific projects for Part 77, Airspace Obstruction.

In 
DALE F. BACKMAN
Chief, Appraisal and Planning Staff

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE

SEATTLE, WASHINGTON 98101



REPLY TO
ATTN OF: M/S 623

JUN 15 1977

Jack Kiley, Environmental Manager
Bonneville Power Administration
Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Kiley:

We have completed our review of the draft environmental supplement for the Bonneville Dam (second power house) Integrating Transmission System. As we noted in our comments on the original draft supplement, in a letter to your office dated February 25, 1976, it appears that the integrating transmission project will have no significant direct environmental effects and that the major environmental effects of expanding the Bonneville Project are associated with the power house expansion per se.

However, we would like to note one omission from the facility planning supplement portion of the environmental supplement. On page three, the discussion of alternative plans of service omits the description of the proposed plan of service (Alternative Plan B), and we were unable to find a concise description elsewhere in this portion of the statement. The only way the reader can gain an understanding of the proposed alternative is to skip forward to the facility location evaluation and examine the route alternatives presented therein.

Based upon our review we have classified this draft supplement as LO-1, LO (Lack of Objections) 1 (Adequate Information). This classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, pursuant to Section 309 of the Clean Air Act, as amended.

Thank you for providing us with the opportunity to review this revised facility location analysis.

Sincerely,

Francine Duncan

for

Alexandra B. Smith
Chief, Environmental
Evaluation Branch

XIV-101



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (729 N.E. Oregon Street)
Portland, Oregon 97208

IN REPLY REFER TO:

1793 (911)

JUN 14 1977

Memorandum

To: Environmental Manager, BPA, Portland, Oregon

From: State Director

Subject: Draft Supplement to the Environmental Statement
for Fiscal Year 1978 Proposed Program Facility
Location Evaluation for Bonneville Dam Inte-
grating Transmission Study Area

We have reviewed the environmental statement on the above subject. We offer no input or comment since the project neither involves BLM administered lands or programs nor does this office have any special expertise in proposed construction of transmission facilities.

E. J. Petersen
Acting



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

PORTLAND AREA OFFICE

POST OFFICE BOX 3785

PORTLAND, OREGON 97208

JUN 16 1977

IN REPLY REFER TO:

Land Services

OFFICIAL FILE COPY

No. Date

JUN 20 1977

Referred To:

Action Taken:

☐ ANS.

☐ NO REPLY

By

Date

Memorandum

To: Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

From: Office of the Area Director

Subject: Draft EIS Fiscal Year 1978 Facility Location Evaluation for
Bonneville Dam Integrating Transmission.

There are no Indian trust lands or communities that will be directly impacted by the proposal. The one item which should be mentioned, the Greenleaf Indian Cemetery, is adequately described.

We have no comments and no objections to the proposal.


Assistant Area Director
(economic Development)



XIV-103



United States Department of the Interior

FISH AND WILDLIFE SERVICE

1500 N.E. IRVING STREET
P.O. BOX 3737
PORTLAND, OREGON 97208

MEMORANDUM

JUN 17 1977

To : Administrator, Bonneville Power Administration,
Portland, Oregon

From : Assistant Regional Director--Environment, Fish and
Wildlife Service, Portland, Oregon

Subject: Draft Environmental Supplement, Fiscal Year 1978 Proposed
Program, Bonneville Dam Integrating Transmission Study
Area 76-4 (DES-77/16)

This is in response to your letter of May 19, 1977 for review and comment on subject draft environmental supplement.

In general, the statement adequately discusses the effects of the proposed project and the alternatives on fish and wildlife resources.

James W. Teeter
Assistant Regional Director
Environment



XIV-104

Save Energy and You Serve America!



United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

IN REPLY REFER TO:

L7619
(PNR)PCC

June 21, 1977

Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Sir:

We have reviewed the draft environmental supplement for Fiscal Year 1978 Proposed Program, Facility Location Evaluation for Bonneville Dam Integrating Transmission.

It is unclear from the statement whether or not an archeological survey of the proposed transmission lines will be conducted prior to ground-disturbing activities. We are hopeful that the intent is to do so since adequate mitigating measures can be applied only if the presence of archeological resources is known in advance.

The latest "National Register of Historic Places" appeared in the Federal Register on February 1, 1977, and periodic updates have appeared since then. Since the National Register undergoes constant revision, the latest publications, rather than those of 1975, should be consulted.

Sincerely yours,

Charles F. Bohannon
Acting Associate Regional Director,
Planning and Resource Preservation



TOWN OF NORTH BONNEVILLE

NORTH BONNEVILLE, WASHINGTON 98639

P. O. Box 333 - Tel. (509) 427-8182

June 22, 1977

Mr. John Mc Leod
Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

re: Transmission Lines
Bonneville Second Powerhouse

Dear Mr. Mc Leod:

The City of North Bonneville is disappointed to learn that the Bonneville Power Administration is proposing an overhead routing of power transmission lines from the Bonneville Second Powerhouse to the existing North Bonneville substation. The abundance of powerlines in our area is an established fact, yet not a preferable neighbor.

With technological advances allowing the distribution of electrical power on an underground system, and in view of the short distance between the powerhouse and substation, we must stand apposed to any additional overhead transmission lines. However, we are pleased that the proposed route does take into account the environmentally sensitive areas that still flourish in and around the City of North Bonneville.

Letters of March 25, 1975 from myself and North Bonneville Planning Commission Chairman Joseph Berberich outline the City position in further detail. I have attached a copy of those letters for your further consideration.

Thank you for your time in reviewing our letter of objection.

Sincerely,
CITY OF NORTH
BONNEVILLE

Attachments:

- March 25, 1975 letter from
the North Bonneville Planning
Commission
- March 25, 1975 letter from
Mayor Skala of North Bonneville


Ernest J. Skala, Mayor

EJS/jw

TOWN OF NORTH BONNEVILLE

NORTH BONNEVILLE, WASHINGTON 98639

P. O. Box 333 - Tel. (509) 427-8182

March 25, 1976

Mr. John Mc Leod
Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

re: Facility Location Supplement
Bonneville Dam Integrating
Transmission

Dear Mr. Mc Leod:

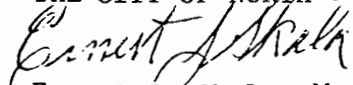
Upon review of your environmental statement, the North Bonneville City Council recommends construction of the proposed Route 2 alternative underground line running adjacent to the relocated highway. Our primary reason for selecting this alternative is to avoid the adverse impact the overhead route would have on the Hot Springs recreational area as well as the forested area north of the existing town. Route 2 appears to be the more direct and sensible route.

The City Planning Commission has thoroughly reviewed your proposal and we support their recommendation. In our discussions, the Council felt that three areas must be addressed, should the underground route be constructed:

- 1) A reasonable measure of safety.
- 2) Prevention of electrolysis in the earth corroding other utility lines which might someday be laid in the vicinity outside the 50 foot corridor.
- 3) Fishing access to the river bank be maintained across the corridor.

The construction of underground transmission lines would certainly be a welcome venture in this area where electrical generating and transmission facilities are plentiful.

Sincerely,
THE CITY OF NORTH BONNEVILLE


Ernest J. Skala, Mayor

EJS/jw

TOWN OF NORTH BONNEVILLE

NORTH BONNEVILLE, WASHINGTON 98639

P. O. Box 333 - Tel. (509) 427-8182

March 25, 1976

John Mc Leod
Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Mc Leod:

The North Bonneville Planning Commission has carefully reviewed your environmental statement for facility location for Bonneville Dam integrating transmission lines. It is our recommendation that Route 2 underground transmission lines be constructed. This recommendation has been arrived at by thorough review of our Draft Comprehensive Plan for the New Town. Our recommendation is based on the following:

1) Route 2 would have a lesser impact on the natural environment being in an already dense construction corridor of highway, railroad, and tailrace channel. Route 1, on the otherhand, would bisect an environmentally sensitive area between the future powerhouse and Greenleaf Creek (Dames & Moore, Environmental Assessment Report, North Bonneville Relocation, U.S. Army Corps of Engineers, 1975). This area is also considered a natural slide area and consequently undevelopable, due in part to the additional burden the excavation of the tailrace channel would create (Dames & Moore, 1975). This route would also mean a significant loss of trees and a consequent impact on natural habitat.

2) Route 2 presents no apparent conflict with land use designations in the plan.

Route 1 would have a detrimental effect on the development potential for the Hot Springs commercial recreation area. The potential for

expansion of recreational facilities in this area is important to the long term economic health of the New Town. This route would also conflict with natural open space designations in the same area.

3) Route 1 would create a detrimental impact on the overall recreational and open space development which the Town seeks to provide. Route 2 would have no impact as long as access to the river shore were not obstructed.

4) A primary concern in our planning efforts is to provide for the health and safety of our citizens. Studies have been made which indicate that harmful effects on humans have been observed from exposure to overhead powerlines (Louise B. Young and H. Peyton Young, "Pollution by Electrical Transmission, The Environmental Impact of High Voltage Lines," Bulletin of the Atomic Scientists, December 1974).

Route 1 runs adjacent to the Hot Springs area which houses permanent residents and short term visitors.

We know of no studies made on the potential health hazards of underground lines. However, Route 2 would be distant from residences and public use areas. The underground lines would also be encased in a concrete box.

5) Route 1, if constructed, would have a significant visual impact when viewed from State Route 14, a scenic highway, the Moffets-Bonneville Hot Springs recreational area, and wilderness areas. Route 2 being an underground line would have a minimal visual impact.

It is of some concern to the Planning Commission that this Environmental Statement has not addressed the Optimum New Town plan

March 25, 1976

which has been developed by the City of North Bonneville and the U.S. Army Corps of Engineers to implement the relocation of our town. The illustrations in your document suggest that the New Town might be confined to the Hamilton Island area, when in fact, it includes both existing residences on the east end of Greenleaf Lake and the Hot Springs recreational area. It is our suggestion that a revised map be included in your final environmental statement. We feel that construction of underground lines will be an asset to the development of our model community.

Sincerely,

NORTH BONNEVILLE PLANNING COMMISSION

A handwritten signature in cursive script, reading "Joseph A. Berberich".

Joseph A. Berberich, Chairman

JAB/jw



United States Department of the Interior

BUREAU OF MINES

EAST 315 MONTGOMERY AVENUE

SPOKANE, WASHINGTON 99207

Western Field Operation Center

June 29, 1977

Memorandum

To: Environmental Manager, Bonneville Power Administration, Portland, Oregon

From: Acting Chief, Western Field Operation Center

Subject: Review and Comments, Draft Environmental Supplement, Fiscal Year 1978 Proposed Program, Facility Location Evaluation for Bonneville Dam Integrating Transmission Study Area 76-4, May 1977 (DES-77/16)

The Draft Environmental Supplement, although more specific in site selections, contains no new information which would substantially modify our earlier comments on the related Draft Environmental Statement (our memorandum to the Chief, Office of Environmental Coordination, Bureau of Mines, dated July 9, 1976). These comments were, we presume, subsequently incorporated into a coordinated Department of the Interior review. Our comments do not appear to be among those acknowledged in the Final Environmental Statement, however. In brief, we consider that implementation of the proposed program will cause no significant adverse impacts on mineral development. Our records show no mineral properties in the area other than quarries and borrow pits for construction materials. An indirect beneficial impact on mineral-related industries should result through the proposed improvements in generating and transmission facilities.

The concise descriptions of geology and geologic hazards along proposed alternative transmission line routes would be adequate if accompanied by more detailed maps or strip-logs. The small-scale map in Figure 4 affords only a generalized evaluation of hazardous geologic conditions along the proposed transmission routes. Methods of mitigating the hazards of slope instability should be discussed in more detail.

The brief discussion of "Irreversible and Irretrievable Commitments of Resources" (page 50) should be supported by quantitative information. A table of the estimated quantities of metals and other construction materials would be appropriate.

A handwritten signature in cursive script, reading "E. C. Pattee".

E. C. Pattee



STATE OF WASHINGTON

OFFICE OF THE GOVERNOR

OFFICE OF PROGRAM PLANNING AND FISCAL MANAGEMENT

Dixy Lee Ray
GOVERNOR

HOUSE OFFICE BUILDING
OLYMPIA, WASHINGTON 98504

July 6, 1977

Orin Smith
DIRECTOR
206-753-5450

Mr. Ron Iverson, Environmental Manager
U. S. Department of the Interior
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Iverson:

Review of the draft environmental supplement for the Facility Location Evaluation for Bonneville Dam Integrating Transmission Study Area has been completed by agencies of the State of Washington. The review process was coordinated by the Office of Program Planning and Fiscal Management.

Comments were received from the Department of Fisheries. While it is understood that BPA will respond directly to the Department's comments relating to the content of the statement, several points are highlighted here for your consideration.

Several examples of construction procedures and erosion control measures are cited by the Department of Fisheries which would reduce the long-term impact on fishery resource. In addition, Hydraulic Project Approvals will be required by the Departments of Fisheries and Game for any stream crossings.

Thank you for the opportunity to review this document. I hope you will find these comments useful in preparing the final document.

Sincerely,

NICHOLAS D. LEWIS
Assistant Director

by: Michael E. Mills
Administrative Assistant



STATE OF
WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF FISHERIES

115 General Administration Building, Olympia, Washington 98504

206/753-6600

June 30, 1977

RECEIVED

JUN 30 1977

STATE PLANNING

Office of Program Planning
and Fiscal Management
House Office Building
Olympia, Washington 98504

Attention Mike Mills

Gentlemen:

Draft Environmental Supplement: BPA Facility
Location Evaluation For Bonneville Dam
Intergrating Transmission Study Area

This letter is in response to your request for us to review and comment on the above referenced document. Following are our comments on several items:

Page 7, Wildlife To our knowledge, little if any fall chinook spawning occurs in the Little Washougal, West Fork Washougal, Woodard Creek or Greenleaf Creek. These streams are utilized by coho salmon, however.

Page 12, Wildlife Long-term impacts on the fishery resource can be avoided if proper construction procedures are followed. On Page 33 paragraph 2 you indicate small streams, such as Texas Creek, will be forded at bedrock areas. Where and how will important salmon producing streams such as Hamilton, Hardy, Woodard, Washougal, and the West Fork Washougal be crossed? Are temporary bridges going to be constructed? These streams should not be forded by heavy equipment, especially during the spawning and incubation period (October through May). Hydraulic Project Approvals will be required by the Departments of Fisheries and Game for any stream crossings.

Access road construction, right-of-way clearing, excavation of tower footings, and other construction activities which disturb the soil and create potential spawning gravel contaminants should be during the dry season. Proper long-term erosion control measures (seeding, ditching, etc) should be implemented.

Thank you for the opportunity to comment on this matter.

Sincerely,

Gene Deschamps, Environmental Coordinator
Fisheries Natural Production

jh

cc: WDG
DOE

XIV-114

TOWN OF NORTH BONNEVILLE

NORTH BONNEVILLE, WASHINGTON 98639

P. O. Box 333 - Tel. (509) 427-8182

July 11, 1977

Jack Kiley
Environmental Manager
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Mr. Kiley:

We are pleased with the selection of the final route for proposed integrating transmission facilities at Bonneville second powerhouse. Locating the new line between the edge of the future tailrace channel and the relocated highway is appropriate. However, it appears that the decision yet to be made is whether to run the new line underground or overhead.

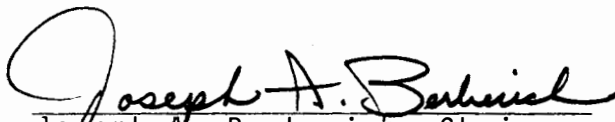
We understand that the critical requirement in making a decision in favor of the underground option is that the delivery point for the lines coming from the powerhouse itself must be at the north end of the powerhouse, in order to allow adequate room to make the transfer from overhead to underground lines on shore. If the lines were to originate from the face of the powerhouse they would cross the river channel to a point downstream where there is inadequate space to make the overhead/underground transition. Therefore, it is strongly recommended that the integration of facilities be coordinated with the Corps of Engineers in such a fashion that the lines come directly off the north end of the powerhouse.

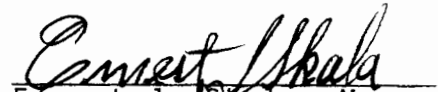
After more than a year of extensive reviews and public discussions on the matter of underground versus overhead lines, the citizens of North Bonneville are firmly resolved that the potential visual benefit of an underground line fully warrants the resolution of the conflict in the point of delivery from the new powerhouse. Because the new transmission corridor will form a key element in the entrance to the new town of North Bonneville, run adjacent to a scenic highway and the Columbia River, and integrate a new powerhouse project the line should be placed underground. The feasibility has been demonstrated; the initiative should be taken to preserve the scenic qualities of the area.

July 11, 1977

Additionally, we would recommend that the addition to be made to the east side of the North Bonneville substation allow for a substantial buffer of existing trees to remain along the bank of Greenleaf Lake to serve as visual screening and a windbreak for homes across the lake.

Sincerely Yours,
CITY OF NORTH BONNEVILLE


Joseph A. Berberich, Chairman
North Bonneville Planning
Commission


Ernest J. Skala, Mayor



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

July 11, 1977

REGION X

IN REPLY REFER TO: 10D

Mr. Ray Foleen
Administrator
U. S. Department of the Interior
Bonneville Power Administration
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Foleen:

Subject: Draft Environmental Supplement
Fiscal Year 1978
Bonneville Dam Integrating Transmission
Study Area 76-4

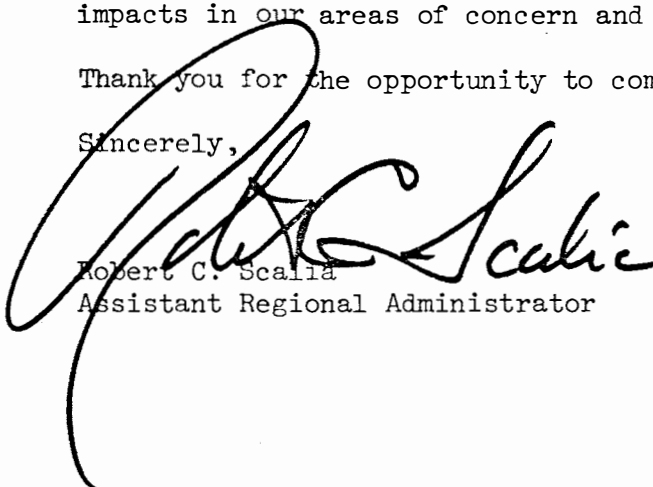
We have reviewed the supplement submitted with your May 19, 1977 letter.

The proposed action is the construction of approximately 1.3 miles of new 230-kv line and the addition of 21 miles of conductor to the vacant side of existing towers.

As you have indicated in your supplement, the proposed construction is principally in a sparsely populated area. Thus, we find no significant impacts in our areas of concern and have no objections to the project.

Thank you for the opportunity to comment.

Sincerely,



Robert C. Scalia
Assistant Regional Administrator

XIV-117

AREA OFFICES
Portland, Oregon • Seattle, Washington • Anchorage, Alaska • Boise, Idaho
Insuring Office
Spokane, Washington



UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

JUL 14 1977

Environmental Manager
Bonneville Power Administration
U. S. Department of the Interior
P. O. Box 3621
Portland, OR 97208

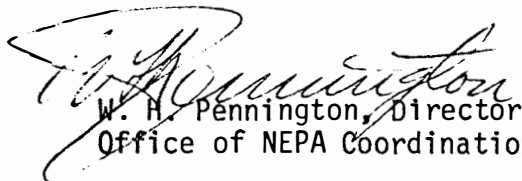
Dear Sir:

This is in response to your transmittal dated May 19, 1977, in which you invited the Energy Research and Development Administration (ERDA) to review and comment on the USDI/BPA's draft environmental impact supplement, Facility Location Evaluation for Bonneville Dam Integrating Transmission Study Area 76-4.

We have reviewed the supplement and have determined that the proposed action will not conflict with current or known future ERDA programs. We have no comments to offer on the statement itself.

Thank you for the opportunity to review and comment on the draft supplement.

Sincerely,


W. H. Pennington, Director
Office of NEPA Coordination

cc: Council on Environmental
Quality (5)



LATE

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

OFFICIAL FILE COPY	
No.	Date
	JUL 21 1977
Referred To	
Action Taken	
☐ YES	☐ NO REPLY
By	Date

July 18, 1977

Mr. Ray Foleen
Acting Administrator
Bonneville Power Administration
U.S. Department of the Interior
P. O. Box 3621
Portland, Oregon 97208

Dear Mr. Foleen:

We have had the draft environmental statement for BPA's draft facility location supplement covering Bonneville Dam inter-grating transmission reviewed in the relevant agencies of the Department of Agriculture, and comments from Soil Conservation Service, an agency of the Department, are enclosed.

Sincerely,

ERRETT DECK
Coordinator
Office of Environmental Quality Activities

Enclosure

SOIL CONSERVATION SERVICE COMMENTS ON FY-1978
DEIS FOR FACILITIES LOCATION EVALUATION
FOR BONNEVILLE DAM INTEGRATING TRANSMISSION STUDY

The Soil Conservation Service has reviewed the FY-1978 draft supplement concerning the Facilities Location Evaluation for Bonneville Dam Integrating Transmission Study Area 76-4. The draft supplement appears to have adequately covered the natural resource base except as follows:

Page 5 - There is no discussion of prime and unique farmlands as called for in Washington Notice EQ-18 issued by the Council of Environmental Quality, August 30, 1976. Although there are no known prime or unique lands located within the study area, a discussion of prime and unique farmlands should be included in this section.

Pages 6 & 7 - There is no discussion of threatened plant or animal species in the sections on natural vegetation or wildlife. This area of concern needs the same treatment relative to the overall programmatic environmental statement issued in 1974 as do the other resource values.

LATE Letter



DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2946
PORTLAND, OREGON 97208

NPPEN-ER

19 July 1977

Dr. Ronald A. Iverson
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

Dear Dr. Iverson:

The Draft Supplement to the Environmental Statement Fiscal Year 1978 Proposed Program, Facility Location Evaluation for Bonneville Dam Integrating Transmission Study Area 76-4 has been forwarded to our office for review and comments. We have reviewed the statement with respect to the Corps of Engineers area of responsibility for flood control, navigation, and hydro-power and offer the following comments.

Page 1: Excavation of the tailrace is currently scheduled to start in May 1978. Also, we understand that the underground cables between the existing powerhouse and BPA's substation have been abandoned and that consequently, relocation will not be required.

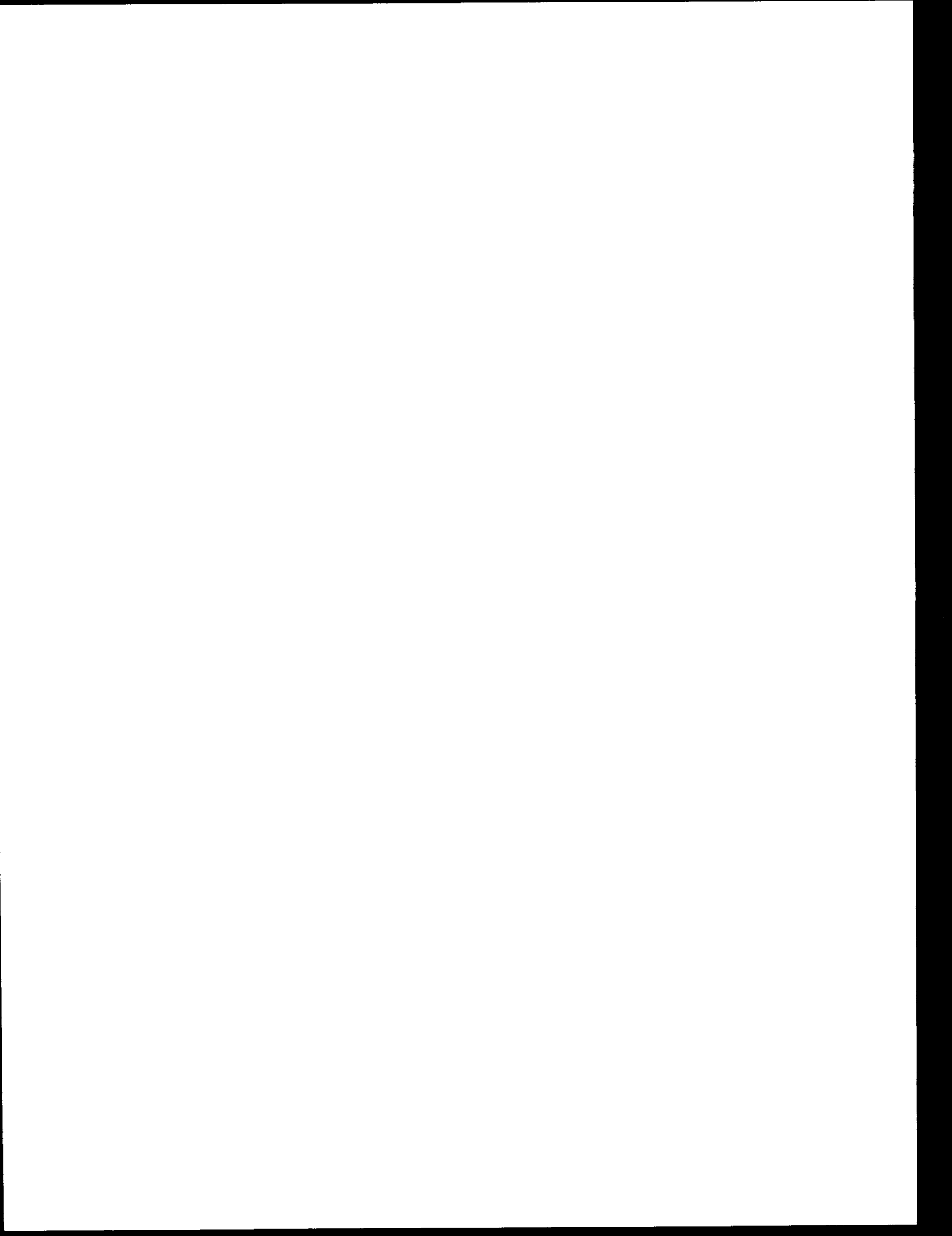
Page 2: The current plan is to retain the existing microwave terminal at Bradford Island. An additional structure will be added at the North Bonneville Substation. Communications between Powerhouse No. 1 and No. 2 and between both Powerhouses and the Bradford Island microwave structure will be by cable.

We appreciate the opportunity to provide input to your environmental statement.

Sincerely yours,

A handwritten signature in cursive script, reading "L. J. Stein".

L. J. STEIN
Chief, Engineering Division



XV. Summaries of Public Meetings



SUMMARY OF PUBLIC MEETING
Held in Pasco, Washington
on October 25, 1977

Facilities Covered: Franklin Area System Reinforcement (S.A. 79-1)

A public information meeting was held at the Franklin County PUD Auditorium in Pasco, Washington, on October 25, 1977, at 7:30 p.m. Bonneville's proposed Construction and Maintenance Program for FY 1979 was presented to an audience of 13 people including 4 representatives each, from BPA and Franklin County. Emphasis was given to alternative plans for the Franklin Area System Reinforcement and their environmental impacts. Comments made during the meeting include:

Representative Comments:

1. If it's possible to accomplish the Franklin Area System Reinforcement with plans that use existing transmission line corridors, why does Bonneville consider additional plans that involve new rights-of-way?
2. New irrigation circles are developing both north and south of the Ice Harbor Dam vicinity which could be impacted by plans A, B, and C.
3. Why was the category of Agriculture omitted in "Figure 4. --- Potential Adverse Impacts on Important Resources and Uses within the Planning Study Area"?

SUMMARY of PUBLIC MEETING HELD AT
FRIDAY HARBOR, WASHINGTON on
JULY 21, 1976

Facilities Covered: San Juan Island Area Service (SA 79-2)

The public information meeting on the Draft Facility Planning Supplement for the San Juan Island Area Service was held in Friday Harbor, Washington, on July 21, 1976 at 11:00 a.m. Nineteen people attended the public meeting. These included five representatives from BPA, the court reporter, four staff members and two directors of Orcas Power and Light, four residents of Decatur Island, Editors of the Friday Harbor Journal and the Island Record, and a staff member of the San Juan County Planning Commission.

Comments made at the meeting relative to Plan A (submarine cable system) of locating the Decatur Island transmission line underground; whether or not undergrounding would decrease property values as much as an overhead line; and if a new ROW easement is required, whether or not this land would be taken off the tax rolls. One comment was made relative to Plan B (combustion turbine installation). It addressed whether or not the gas turbine would be installed strictly for emergency backup or would it be used for serving peak load conditions. Other comments were made relative to the San Juan Island Service project and BPA's program in general. These included anticipated need and timing for the project, growth rate for San Juan County, impact on OPALCO's system, cost ratio between the two plans, energy conservation, nuclear power, and reliability.

Representative Comments:

The gas turbine alternative, would that be installed strictly as backup capability?

I wonder if you have looked at all the economic impacts to San Juan County regarding the Plan A proposal taking land off the tax roll by condemnation (across Decatur)?

You're investigating going underground, also?

I wonder, would it destroy the value of the land as much? I think it would be worth investigating in an appraisal of the property.

Do you have any ratio of cost in building Plan A versus Plan B?

Are we now in San Juan County, being supplied with nuclear power and if not, how should we expect to see our rates go up?

LIBBY INTEGRATION AND NORTHWEST MONTANA/NORTH IDAHO SUPPORT

PUBLIC MEETING SUMMARY

The Facility Planning Supplement for the Libby Integration and Northwest Montana/North Idaho Support Project was filed with the President's Council on Environmental Quality, September 1, 1977. Public information meetings were conducted at Noxon, Montana, on October 11, 1977; Libby, Montana, on October 12, 1977; and Sandpoint, Idaho, on October 13, 1977. An information center was held October 13, 1977 at Bonners Ferry, Idaho. A court reporter was present at the three public meetings in Noxon, Libby, and Sandpoint to record questions and statements by the public.

Three topics came up in each of the meetings. In each session, someone asked about the effect of the proposed Canadian diversion of the Kootenai River on this project. People also inquired about the relationship of Libby Integration to the proposed Kootenai Falls Dam in regard to additional transmission requirements. The third subject discussed at each meeting was the Roadless Area Review and Evaluation (RARE II) study by the U.S. Forest Service; questions were asked regarding how BPA plans to incorporate consideration of RARE II lands in the final corridor selection, and whether corridor location would affect the disposition of those areas.

Noxon, Montana - October 11, 1977

Twenty-four members of the public were present. A number of issues were raised. Questions that related directly to the project asked for clarification on the location of specific corridor options within various plans. One person also had questions on how the analysis method came up with the corridors and whether the process identified a preferred route. In addition, much concern was expressed about the relationship of the Libby project to Hot Springs-Bell, Colstrip, and other proposed projects in that area, and whether their impacts had been evaluated in conjunction with this study.

Questions addressed the reliability standard and its relationship to the possibility of upgrading existing lines rather than building a new one. The opinion was expressed that BPA's discussion of upgrading versus a new corridor was inadequate.

Other topics discussed at the meeting were: the assumptions behind BPA's projections of electrical consumption; the agency's role in promoting conservation; Montana's status as a net importer or exporter of electrical energy; and BPA's use of herbicides.

Libby, Montana - October 12, 1977

Twenty-four members of the public were present. Comments were shared by a large portion of the group. Several issues that were raised at Noxon also were raised at Libby, including BPA's use of herbicides, how the EIS was prepared (including questions on the weighting system used for the analysis), and whether Montana is a net exporter or importer of electrical energy.

People expressed the opinion that Montana is paying more than its share, in terms of environmental degradation, to provide energy to non-Montanans, particularly urban Washingtonians. People felt that BPA is not adequately evaluating the environmental costs of building a new line in Western Montana. They wish that the agency would do more to encourage conservation and perhaps accept lower reliability standards in order to prevent more new transmission corridors in their area. The opinion also was expressed that higher power costs, which could help pay for an environmentally acceptable solution to the region's power needs, might also force some conservation. There was considerable support for upgrading existing lines as opposed to opening up new corridors; it was felt that cost should be less of a concern than staying within areas now dedicated to utility use. Several people asked about the availability of cost data for the alternative plans. One person stated that the non-construction alternative should be given equal treatment with the other four plans.

In relation to specific plans, BPA was asked why it has identified an alternative corridor up the Fisher River when that alternative was considered on the previous Libby-Noxon circuit and rejected. This question prompted some discussion on the adequacy of BPA's route selection process.

Other questions raised addressed the future of Libby Dam and of the light metals industry contracts.

Sandpoint, Idaho - October 13, 1977

Twelve members of the public were present. In addition to questions that were common to all three meetings, the subject of the need for a new line and its relationship to existing lines was raised. One person stated that the proposed additions to the transmission system were needed because of increasing consumption and population combined with a transmission system that is barely adequate to serve current demands. Again, questions also were asked regarding the project's relationship to other proposed lines, including Hot Springs-Bell and The Washington Water Power Company's (TWWPCO) plans for the Pine Creek circuit. It was stated that consideration of these other proposals should be part of the decision on future transmission in the area.

Other comments included: the statement that the portion of the original study plan calling for weighting between the analysis models apparently has been declared invalid; questions regarding a possible increase in noise levels at the Sacheen Substation if a transmission line should be routed there; and a suggestion to build a line through Canada to provide the Canadians with the portion of Libby Dam's power to which they are entitled by treaty, instead of building through this country.

SUMMARY OF PUBLIC MEETING
HELD IN ELLENSBURG, WASHINGTON
ON MAY 5, 1977

Facilities Covered: Ellensburg Service (SA 78-2)

A public information meeting was held at the City-County Silver Circle Community Center in Ellensburg, Washington on the evening of May 5, 1977. Six people were in attendance. These included Tom Chini and Paul Rogers, Jr. representing the City of Ellensburg Light Department; Charles Gruhl representing Central Washington State College; Earl Clark, the City Mayor; and Marvin and Carol Schroeder, property owners.

The meeting was chaired by Joe Anderson, Wenatchee District Manager for the Bonneville Power Administration (BPA). Other BPA representatives present included Ansel Peterson, Spokane Area Engineer; Dean Turpin, Wenatchee District Engineer; Laurens Driessen, Transmission Design Reconnaissance Engineer; and Michael Berg of the Environmental Manager's Office.

The meeting was called to order at 8 p.m.

Representative Comments:

1. Tom Chini, Acting Light Superintendent for the City of Ellensburg, expressed the City's concurrence with BPA's proposed plan of service. He endorsed the selection of the substation site proposed by BPA. Mr. Chini said that all the City's comprehensive planning to date has evolved around a future substation at this location. Also, he went on record in favor of Route 1, as the proposed transmission line route.
2. Marvin Schroeder identified himself as a property owner. He said that he owns land in the area where BPA proposes to locate its substation. Mr. Schoeder requested clarification of this site location.
3. Charles Gruhl of Central Washington State College expressed concern over alternative transmission line Route 2 which would use the railroad right-of-way. As the college has been petitioning to have the railroad facilities removed, he indicated that they would prefer the BPA facilities installed underground if this route were to be selected.

The meeting was adjourned at 8:50 p.m.

SUMMARY OF PUBLIC MEETING
HELD IN STEVENSON, WASHINGTON

ON JUNE 22, 1977

Facilities Covered: Bonneville Dam Integrating Transmission (S.A. 77-2)

A public information meeting was held at the Stevenson High School in Stevenson, Washington, during the evening of June 22, 1977. Bonneville's proposed construction of transmission facilities to integrate the output of the second powerhouse at Bonneville Dam was the subject of the meeting. The draft facility location supplement on this proposal was discussed. Eleven people from the public were present in addition to five BPA personnel, the local utility manager, the recorder, and his wife.

Representative Comments:

The main comment or verbal statement was from Mr. Kelley representing the City of North Bonneville Planning Commission who requested that the transmission from the dam to North Bonneville Substation be underground rather than overhead as proposed by BPA. He indicated they would send a written statement on this item.

A second comment was from a lady who lives on the east side of Greenleaf Slough across from North Bonneville Substation. She expressed concern that in extending the east end of BPA substation that we not destroy all of the trees and shrubs down to the water line. She also was concerned that we save as many trees and shrubs as possible along the new line.

Other comments or questions were made concerning the relative cost of construction and/or maintenance of underground vs. overhead transmission.

FACILITY EVALUATION APPENDIX

FACILITY EVALUATION APPENDIX

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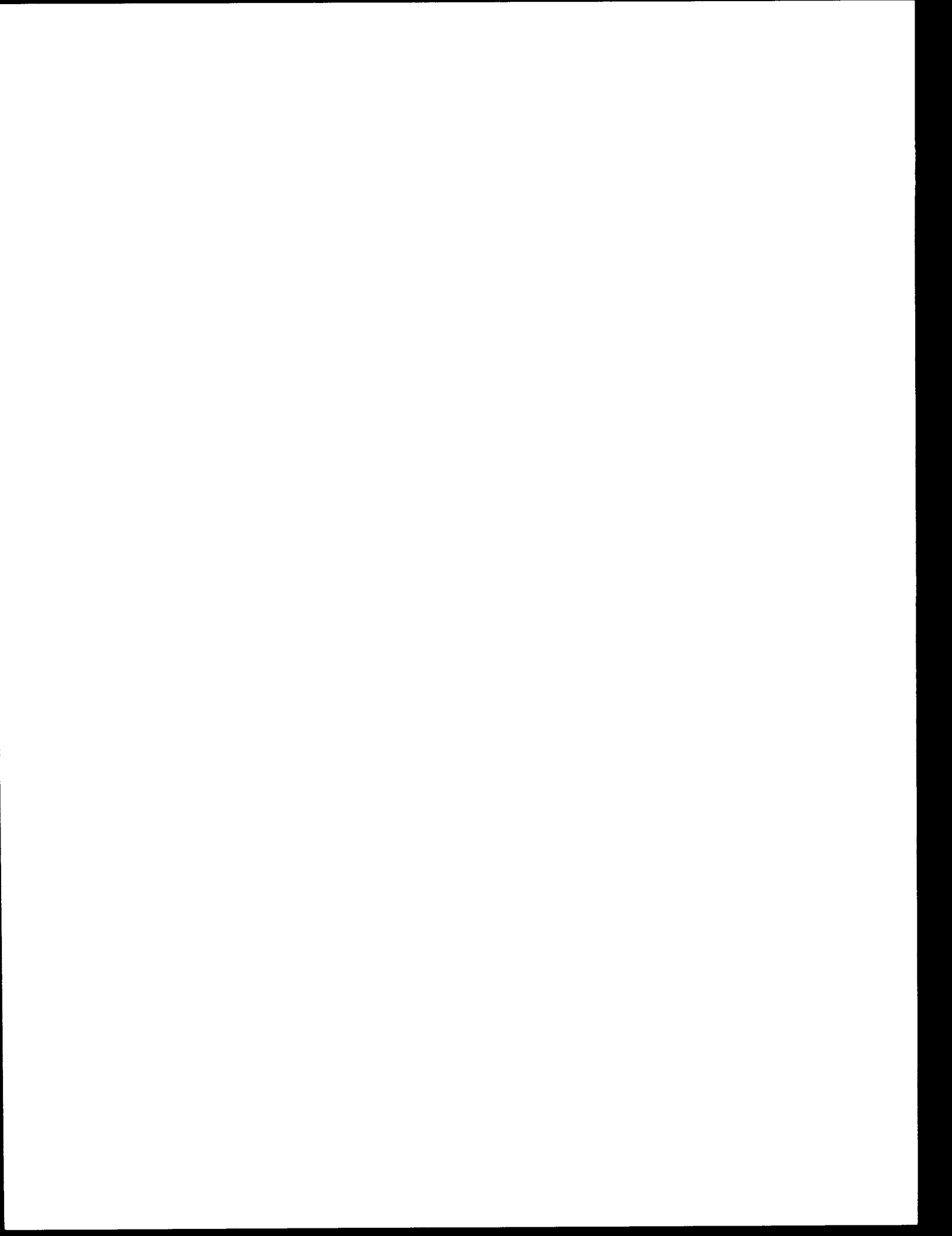
Final Facility Planning Supplements (Fiscal Year 1979 Proposals)

<u>Facility</u>	<u>Appendix Designation</u>
Franklin Area Service	S.A. 79-1
San Juan Area Service	S.A. 79-2
* Libby Integrating Transmission	S.A. 79-3
South Puget Sound Reinforcement	S.A. 79-4

Final Facility Location Supplements

<u>Facility</u>	<u>Study Area No.</u>
Bonneville Dam Integrating Transmission	S.A. 77-2
Ellensburg Service	S.A. 78-2
VII Glossary	VII-1
VIII Bibliography	VIII-1

*Deferred



I. I N T R O D U C T I O N

This "Facility Evaluation Appendix" contains final facility planning supplements on major projects included as part of BPA's Fiscal Year 1979 Proposed Program. Also included are two final facility location supplements on projects programmed for in prior fiscal years.

Three key points must be kept in mind in using this Appendix:

1. The map and narrative material included in the Appendix must be used in conjunction with Appendix B of the Role EIS and the attached Fiscal Year 1979 Final Program Statement to obtain a complete view of the environmental impacts of the proposed major facilities.
2. As indicated in the Note to Reviewers, those facilities included in this Appendix are in a preliminary planning stage. These facilities discussed as final planning supplements will be presented in subsequent facility location supplements as they progress through the planning and design process until the full scope of design and impact information has been presented in a final environmental statement.
3. It must be emphasized that material presented in the attached final facility planning supplements on these fiscal year 1979 projects is not intended to be complete. Rather, it is designed to give the earliest possible notice of system plans for major new facilities, and to provide a vehicle for comments at a preliminary stage by other agencies and the public. As mentioned above, these proposals will be presented in subsequent more detailed facility location supplements for further public and agency review and comment.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for ensuring the integrity of the financial system and for providing a clear audit trail. The document also highlights the need for transparency and accountability in all financial dealings.

In the second part, the document outlines the various methods used to collect and analyze data. It describes the process of gathering information from different sources and how this data is then used to identify trends and patterns. The document also discusses the challenges associated with data collection and analysis, such as ensuring the accuracy and reliability of the data.

The third part of the document focuses on the development of effective communication strategies. It discusses the importance of clear and concise communication in all aspects of the organization's operations. The document also provides guidance on how to tailor communication efforts to different audiences and how to use various communication channels effectively.

Finally, the document concludes by emphasizing the need for continuous improvement and innovation. It encourages the organization to regularly review its processes and procedures to identify areas for improvement and to implement new technologies and practices as they become available. The document also stresses the importance of fostering a culture of innovation and creativity within the organization.

II. PLANNING AND DESIGN PROCESS

Bonneville Power Administration's Fiscal Year 1979 Proposed Program includes recommendations for construction of transmission lines, substations, and other electrical facilities necessary to maintain service to areas in the Pacific Northwest.

These recommendations are based on load growth and generation addition forecasts developed in conjunction with public and private utilities in the Pacific Northwest through the Pacific Northwest Utilities Coordinating Council. The steps involved in the identification of need, system planning, and location and design for a typical facility are briefly summarized below.

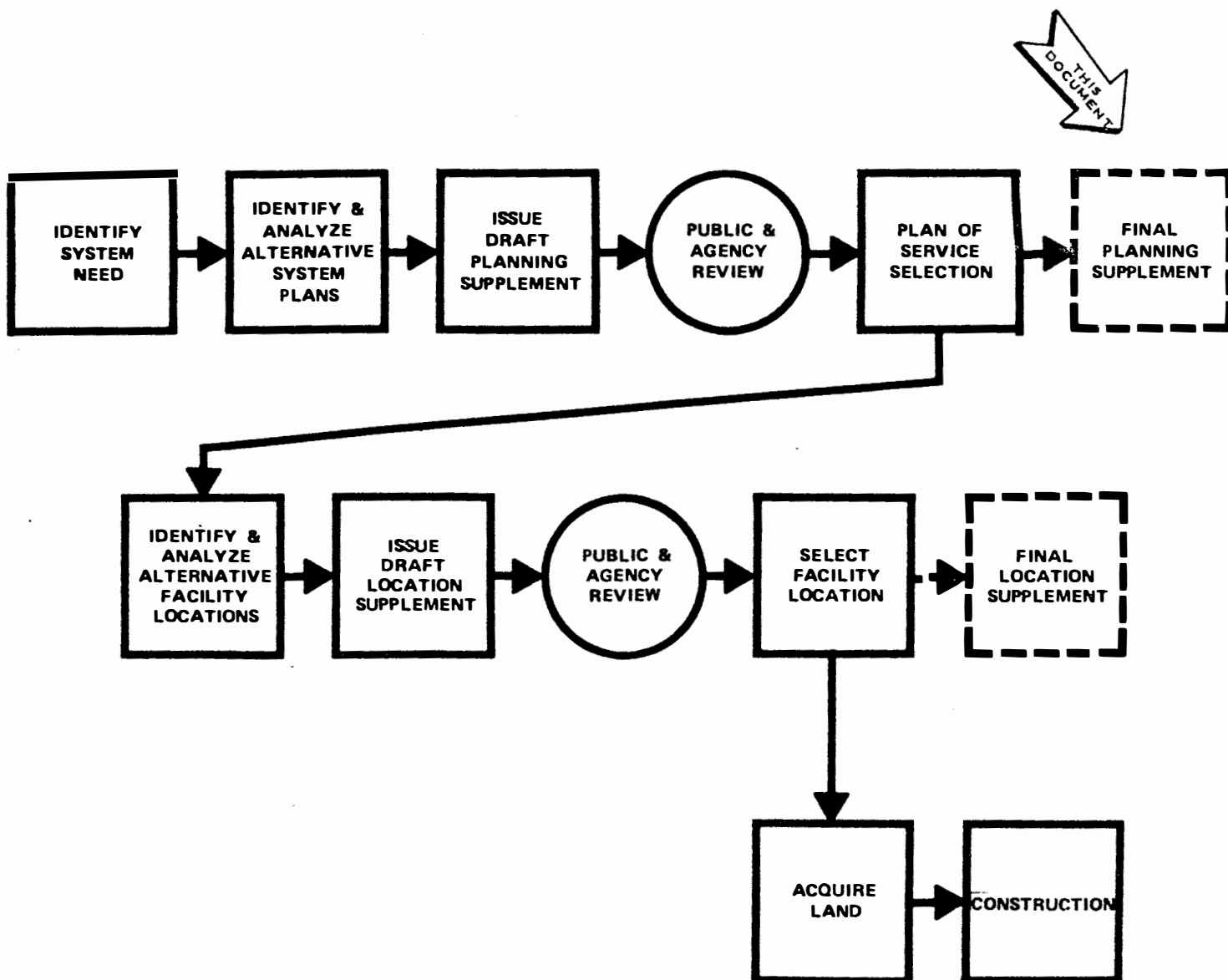
1. In conjunction with utilities and industries served by BPA the Division of Power Management and the Area Power Managers identify regional power needs. See BPA's General Construction and Maintenance Program on detailed procedures for load estimating.
2. BPA systems engineers perform electrical load flow studies to identify new transmission system needs or requirements essential to meet BPA's contractual requirements with its customers and maintain transmission system reliability and stability.
3. BPA systems engineers develop plans of service which require the upgrading of existing lines to higher voltage or capacity, a new transmission line between two points on the system, or a new substation or new substation and transmission line--to meet identified system needs. At this time the gathering of resource information for regional system plan and detailed location evaluation are commenced.
4. A draft planning supplement is issued on each major new facility covering the alternative system plans and based on a regional resource evaluation. Public meetings are scheduled to solicit public comments and gather additional resource data for the plans of service. Meetings are also held with planning commissions to obtain local planning information.
5. Subsequent to the receipt and consideration of all comments obtained as part of the public and agency review process for the draft planning supplement, a decision is made selecting one of the alternative plans as the proposed.
6. Having obtained a decision on a proposed plan of service for a given project, Environmental Specialists and location and design engineers perform reconnaissance and environmental evaluations to identify feasible location alternatives for transmission lines. For substations a preliminary site analysis and investigation by a team of transmission and substation design engineers, and landscape architects and other staff identify possible substation sites and their environmental impacts.

7. Cost estimates are prepared for each alternative location.
8. A draft facility location supplement is prepared and issued covering each alternate facility location. A second public meeting is then held on the alternative route routes identified.
9. The facility location is selected after the evaluation of the statement and public and agency comments and review of cost, engineering, environmental, and construction factors.
10. A final facility location supplement is prepared, circulated, and filed with the Council on Environmental Quality.

The scheduling of projects varies considerably with the urgency of need, size and complexity of project, roughness and remoteness of terrain crossed, availability of material, length of construction season, environmental sensitivity, and public reaction or opposition. These factors create many variations in the length and sequence of the planning, location, design, and construction processes.

III. BPA'S EIS/DECISIONMAKING PROCESS

The chart below depicts the basic relationship between BPA's decisionmaking process and the EIS process for a typical facility proposal. Generally speaking, as indicated, following the receipt of comments obtained as part of the public and agency review process on the draft planning supplements, a decision is made to select a proposed plan of service. Following this decision, alternative facility locations are identified and presented in a draft location supplement which is also circulated for public and agency review. Following this second comment process, a decision is made selecting a specific proposed facility location.





IV. FACILITY LISTING

Planning study areas have been selected for each of the major facilities included in Bonneville's 1979 proposed transmission program. The geographical limits of these areas were selected based on the following considerations:

1. Boundaries should encompass all feasible alternative plans (plans of service).
2. Selection of boundaries should reflect physical or natural barriers such as large waterbodies, mountain ranges, or topographical regions, as well as population centers and regionally important resources.
3. Consideration should be given to important regional resources which affect environment exposure and sensitivity. These consist of both important cultural and natural resources.

The following is a list of those final facility planning supplements included in the attached Facility Evaluation Appendix.

Fiscal Year 1979 Major Facility Proposal

<u>Facility</u>	<u>Appendix Designation</u>
Franklin Area Service	S.A. 79-1
San Juan Area Service	S.A. 79-2
* Libby Integrating Transmission	S.A. 79-3
South Puget Sound Reinforcement	S.A. 79-4

The following is a listing of those prior fiscal year proposals presented as final facility location supplements, which have been attached to the appendix.

Final Facility Location Supplements

<u>Facility</u>	<u>Study Area No.</u>
Bonneville Dam Integrating Transmission	S.A. 77-2
Ellensburg Service	S.A. 78-2

* Deferred



V. GRAPHIC AND NARRATIVE EVALUATIONS PURPOSE AND OBJECTIVES

Material contained in each of the facility planning supplements consists of the regional preliminary planning evaluations for major facilities included in Bonneville's Fiscal Year 1979 Program. These narrative and graphic evaluations were prepared with five specific objectives:

1. To present in graphic form the geographical location associated with specific facilities in the proposed Fiscal Year 1979 Program.
2. To help identify important natural and cultural resources in each study area and to indicate where projected development may alter associated environmental quality. Such knowledge will be used in directing resource-analysis surveys in the selection of final locations and the mitigation of impacts.
3. To provide a vehicle which can be used by Federal, State, and local agencies and the public that portrays essential resource and other environmental information utilized in the location and design processes.
4. To provide a planning tool which will incorporate interdisciplinary environmental inputs into the planning process from sources both within and outside the organization.
5. To provide a systematic method of incorporating environmental and esthetic considerations into the planning and decisionmaking process.

A description or interpretation of the resource information and concepts utilized in the preparation of the graphic and narrative evaluations is presented in the following chapter. For a description of technical terms used in the narratives, see the "Glossary" section.

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VI. INTERPRETATION OF RESOURCE EVALUATIONS

PURPOSE AND OBJECTIVES

The following text is an interpretation or description of the resource information compiled for each facility.

The narrative and graphic evaluation material used is the first stage in the development of a new resource-based systems analysis approach to facility siting which will take advantage of modern land-use planning concepts as well as the traditional concerns of economic and reliable operation and maintenance.

INTERPRETATION

Historically the major, if not the determining, factors in transmission facility location have been economics and service reliability. Factors considered included accessibility for construction and maintenance and ground stability, adequate clearing, and climatic conditions for electrical reliability. Consideration was also given to cultural land-use variables, such as historic, archeological, and recreation resources, as well as social and land-use factors like population density, land values, land management practices, and public acceptance. As a result, the final location of the facility is not necessarily a direct transmission line route between two points or the least costly substation site. Efforts to consider these other factors, however, have been handicapped by the lack of a systematic regional framework within which these factors can be evaluated against other environmental and economic considerations.

The material described in this chapter and utilized in the preliminary planning evaluations is intended to help fill this need for the fiscal year 1979 proposed program by providing a broad regional overview of the important land use, natural and cultural resources, and physical sensitivities which act as determinants within each study area and which are presented for each facility. The following are working definitions of important resources which have been used in the identification and evaluation of natural and cultural resources in the draft facility planning supplements.

Important Resources

An important natural or cultural resource has been considered as one that:

1. Is recognized as being valuable by a substantial proportion of the regional, state, or national population in terms of one or more of the following values:
 - a. Economic (monetary value) - example, commercial forests, high productive agricultural lands
 - b. Physical health value - example, uncontaminated ground water for drinking

- c. Safety value - example, flood storage provided by wetlands
 - d. Recreation value - example, lakes
 - e. Esthetic value - example, architecturally significant structures or unique vista (Crown Point)
 - f. Psychological/philosophical value - example, the prevention of extinction of endangered animal species or the protection of largest Douglas-fir specimen
 - g. Research value - examples, the study of ecological relationships in wetlands or virgin forests
 - h. Educational value - examples, historical events as reflected by historical buildings and unique geologic formations
2. The supply of that important natural or cultural resource is or will be scarce relative to the regional, state, or national demand due to either inherent scarcity or to degradation or depletion by the action of man; or
 3. Is not necessarily recognized as being valuable by a substantial proportion of the population, but does appear to be an integral component of the life support system of man based upon expert analysis of existing evidence.

Statement Organization

The fiscal year 1979 facility planning supplements have been organized into two major sections: (1) a description of the natural and cultural resources of the study area; and (2) the potential impacts on these resources.

The fiscal year 1979 facility location supplements which will be issued individually on completion of location and environmental evaluations, will include local detailed impact evaluations and information on: (1) unavoidable adverse impacts; (2) relationship between local short-term uses of the environment and long-term productivity; (3) irreversible and irretrievable commitments of resources; and (4) location alternatives. To obtain a full understanding of the many variations in resource planning information and associated environmental impacts presented in these evaluations, data interpretations found the Columbia-North Pacific Comprehensive Frame Study provide an excellent reference. The following is a brief synopsis of the resource definitions and logic of use in the planning and location supplements.

DESCRIPTION OF THE ENVIRONMENT PLANNING STUDY AREA

Geography

The geographic description provides a framework for the resource evaluation that follow. Cultural and physical features are narrated in order to fix the planning study areas in a spatial context.

Climate

Climatic patterns are emphasized as they affect transmission line reliability, construction, and maintenance impacts on the ecological relationships found in the study region. Seasonal data is contrasted showing variations in temperature, precipitation of climatic characteristics and its relationship to the impacts of transmission development in the region.

Geology

Geologic formations and processes are fundamental elements of our physical environment. Literally, they are the foundation that supports the complex ecosystems and landscape of which man and his world are an integral part. Accordingly, an understanding of the geologic environment and its use is essential to the evaluation of potential physical impacts due to transmission facilities. Such aspects as seismic activity, slope stability, drainage, and the engineering properties of geologic materials must be thoroughly evaluated. In addition, many geologic factors are of economic and esthetic importance. Ground water is an important resource in many localities. Agriculture, industry, and commerce are dependent on a wide variety of geologic commodities, ranging from such basic construction materials as sand and gravel to special metals and ceramics having sophisticated uses in the aerospace program. Many geologic features within the landscape are of special value because of their scientific or scenic qualities. In addition, they are the point of origin of many organic and inorganic chemicals and the only source of fossil fuels. Thus, these many and varied aspects of the geologic setting make it a very significant element in environmental analysis.

NATURAL RESOURCES

Soils

Because of the important role soils play in both natural and man-made systems, a general soils evaluation has been included in the following narrative impact evaluations. The information included was derived in part from published soil survey work of the Soil Conservation Service, field observation, and from the land mineral resource appendix of the Pacific Northwest River Basins Commission, Columbia-North Pacific Region Comprehensive Framework Study.

Soils with almost the same profiles and essentially alike in their behavior in the undisturbed landscape make up a soil series. A soil association is a landscape with a distinctive proportional pattern of soils consisting of one or more major soils and at least one minor soil and is named for the major soil.

These soils series in their regional context reflect major drainage, soil problems or limitations, and land-use capabilities, based on the soils' physical, chemical, and engineering characteristics. These dominant soil series also define zones that can be (1) associated by type and characteristic landscape patterns; (2) related to detailed soil units (mapped by Soil Conservation Service) when more information is required; and (3) related directly to the land's capability and suitability for most land use.

Some of the relationships or roles played by soils include important items such as providing nutrients, moisture, and support for cultivated crops; pasture and game browse, trees, and other vegetative associations. They act as natural filters and provide habitat for many invertebrates, reptiles and small animals. Soils also provide the support and raw material for roads, dams, and terraces, as well as filtering material for sewage filter or drainage fields. Soils play an important role in water storage, natural water purification and aquifer recharge and other forms of water movement after precipitation reaches the ground. Unconsolidated material may form various types of landscape features with varying topography. These landforms may be considered "unique features of the landscape" due to inherent uniqueness, geologic importance, or scenic qualities.

The general land capability of the dominant soils associations can be broken into two divisions, (1) Classes I through IV are suitable for cultivation and other use, while (2) Classes V through VIII have limitations that make them unsuited to cultivation and either limit and/or restrict their use to pasture, range, forest, recreation, wildlife habitat and/or water supply.

Information on capability classification and soil characteristics was obtained from the U.S. Soil Conservation Service Soil Surveys and from the Columbia-North Pacific Region Comprehensive Framework Study, Appendix IV, Land and Mineral Resources, submitted by the Pacific Northwest River Basins Commission. This information is generalized in context.

Land Capability Classes

Class I. Soils in Class I have no limitations or hazards. They are adapted to all uses with a minimum of conservation treatment other than standard conditioning ones.

Class II. Soils in Class II have few limitations or hazards. Simple conservation practices are needed when cultivated. They are suited to cultivated crops, pasture, range, woodland, or wildlife.

Class III. Soils in Class III have more limitations and hazards than those in Class II. They require more difficult or complex conservation practices when cultivated. They are suited to cultivated crops, pasture, range, woodland, or wildlife.

Class IV. Soils in Class IV have greater limitations and hazards than Class III. Still more difficult or complex measures are needed when cultivated. They are suited to cultivated crops, pasture, range, woodland, or wildlife.

Class V. Soils in Class V have more limitations than Class IV. They are generally unsuited for cultivation, but are well suited for grazing and forestry use. They require good management practices.

Class VI. Soils in Class VI have severe limitations or hazards making them generally unsuited for cultivation. They are suited largely to pasture, range, woodland, or wildlife.

Class VII. Soils and landforms in Class VII have severe limitations and hazards making them generally unsuited for cultivation. They are suited to grazing, noncommercial, woodland, or wildlife.

Class VIII. Soils and landforms in Class VIII have limitations and hazards that prevent their use for cultivated crops, range, or woodland. They may be used for recreation, wildlife, or water supply. An analysis of the above-mentioned limitations provides an indication of physical soil sensitivity and a base from which right-of-way construction and management practices can be developed which best respect the physical sensitivity (erosion potential), engineering limitations, and land-use capabilities and suitabilities.

Erosion Potential

In evaluating the physical sensitivity of land for transmission location, it is generally important that the locating and degree of potential erosion can be determined. This erosion potential is an important factor in the selection of suitable site locations from the standpoint of the site's physical compatibility. Existing erosion patterns do not always act as indicators of the potential erosion in an area, since with adequate cover and limited use, existing erosion may be negligible even on highly erodible soils. Land stabilization measures and proper clearing and construction practices must be applied to minimize erosion impacts. Erosion potential in each study area was evaluated utilizing the classification system used by the U.S. Department of Agriculture.

Hydrology

Hydrologic resources are among the more important physical characteristics to be considered in evaluating the existing and potential environmental impact of transmission facilities on the physical environment. It is essential to realize that the availability and quality of water resources play a major role in determining the maximum productivity that can be derived from the natural resources in an area. In general, the ecology

of the area as well as the land use and the natural and cultural resources which exist or can be developed in an area can be maintained only through proper management and conservation of existing water resources. Reducing the impact of transmission facility location and of clearing and construction practices on the quality and use of the water resources, helps optimize the benefits available from natural resources in an area and benefits the region. The water and wetlands in an area have been broadly classified to include: intermittent streams, streams, rivers, bays, lakes, reservoirs, marshes, and swamps. These water resources have been classified for quality and use by state water quality regulations. Level of turbidity is one means utilized in testing and measuring environmental impact influences on these resources.

Because of the complex nature of these resources and the incremental contributions that intermittent streams, streams, rivers, and wetlands make to the water quality of larger water systems and ground water resources, they are an important consideration in facility siting.

Streams

This class of water resource includes all the small tributaries that serve to renew the larger water resources such as river networks or lakes on a year-round basis. These resources substantially vary in their levels of quality and sensitivity.

Intermittent Streams

This class of water resource includes all the tributaries that serve to renew the larger water resources such as stream and river networks or lakes on an intermittent basis. These streams are often important in handling heavy water concentrations during seasonal runoffs. In addition, they support localized or climatic ecosystems and are also important contributors to aquifers in the renewal of valuable ground-water resources.

Rivers

This class of water resource generally includes all the main tributaries that serve to renew the water resources in the larger order--rivers, reservoirs, lakes, or oceans on a year-round basis.

Lakes and Reservoirs

This class of water resource generally includes all natural or artificial inland bodies of water that store water obtained from tributaries.

Wetlands

The wetlands classification generally consist of springs, sedge marshes, swamps, and estuaries normally found in areas adjacent to other water sources such as rivers, lakes, and bays. These areas provide an important natural transition zone between water and land resources. They act as valuable open space and serve as aquifer recharge or discharge areas, filter beds, wildlife habitat, and water storage.

Wetland areas play an important environmental role which is considered in transmission location and construction.

Natural Vegetation

The Pacific Northwest is a diverse region in terms of environment. To a great extent, plant communities reflect the environmental conditions on a regional and local scale. Information on vegetation becomes a tool for impact evaluation.

Forests or vegetative communities provide habitat for a wide variety of wildlife.

The forest ecosystem provides watershed functions including erosion control, flood control, and water quality maintenance. Important factors related to these functions are soil conditions, vegetative characteristics, and topography. Some degree of disturbance is compatible with maintaining the integrity of the land for watershed protection.

Forest land functions represent a concern for large-scale environmental maintenance. The forests are an integral part of many natural systems at every level--local, state, national, and international. Forest vegetation has a significant role in mineral cycling, atmospheric oxygen replenishment, removal of pollutants, climatic modification (micro and macro), and soil genesis.

Forest lands and other vegetative communities can serve as laboratories for research on silvicultural and basic ecological studies on subjects such as reproduction, succession, biological production, and nutrient cycling. For research that is highly sensitive to human disturbance, the forest vegetation community concerned must be carefully protected. However, considerably more impact can be allowed if the community is to be used for general educational purposes. National forest lands and vegetative communities also provide for many leisure time activities and recreation development.

The major botanical communities found within each region are identified and described giving the breakdown by vegetative patterns with their regional and local distribution. The dominant plant species of the communities are listed by common name.

Wildlife

Wildlife populations are integral components of all ecosystems and many species provide food and clothing, as well as esthetic or recreational benefits to man. Wildlife will be viewed in its broadest sense and will include the following classifications:

<u>Classification</u>	<u>Examples</u>
Invertebrates	Crabs, insects, spiders, clams, snails, crawfish
Reptiles & Amphibians	Snakes, lizards, frogs, turtles
Bats	Myotis bats, pipistrel bats
Anadromous Fish	Salmonids (salmon, sea-run trout), nonsalmonids (lamprey, shad, sturgeon)
Resident Fish	Salmonids (trout, whitefish), nonsalmonids (suckers, minnows, bass, etc.)
Marine Fish	Fish spending entire life in saltwater (lingcod, ocean perch, tuna)
Waterfowl	Ducks, geese, swans, waterbirds, shorebirds
Upland Birds	Turkeys, grouse, quail, pheasant, pigeons, doves
Birds of Prey	Hawks, owls, eagles, vulture, falcons
Songbirds	All birds not covered under above classifications
Carnivores	Bears, cats, weasels, raccoons, skunks, coyote, foxes
Rodents	Squirrels, gophers, rats, mice, beaver, muskrat, nutria
Rabbits & Hares	Cottontails, jackrabbits, snowshoe hare
Large Herbivores	Deer, elk, moose, sheep, goats, pronghorn antelope

Ideally a discussion of wildlife in an area that may be affected by a proposed transmission facility should mention all species known to be present in the foregoing classifications. One of the basic laws of ecology is the existing interrelationship among all living organisms and their environment. A man-caused change in an ecosystem could in theory affect, to varying degrees, all organisms within the system. A basic problem, however, is that at present, man's ability to measure, comprehend, and predict changes occurring in even simple ecosystems is limited.

While we realize the "natural importance" inherent in all animals, the bulk of the data available to use is mainly on those species that have some degree of "human importance" attached to them. For example, information from State and Federal conservation agencies is largely related to those species having significant economic or recreational importance. While we realize the variety of animal life that exists, sections dealing with wildlife will generally reflect the main content of our available information. For the most part, the practice of classifying animals as "game" vs. "nongame," or "beneficial" vs. "detrimental" will be reserved for those sections dealing with recreation and economics.

As a result of the relatively limited information available to us on invertebrates, reptiles and amphibians, and bats, references to these species will be limited in most sections. References to these classifications will largely be in connection with their status as "rare" or "endangered."

Another criteria in addition to recreation or economics for identifying important wildlife species or groups is their status as possibly rare or endangered. When a species is facing rapid extinction--as a result of man--we assume that this may represent an "unnatural" change in the system. The fact a species is being driven toward extinction is an indication that something may be "wrong" with the system. Since we cannot accurately predict the effects such extinctions may have upon the system (and upon man) we would prefer that such man-induced extinctions be avoided.

Special attention will be given to species and subspecies considered to be endangered. The Federal Government and growing number of states are identifying animals determined to be threatened. The Federal Government in the 1973 edition of Threatened Wildlife of the United States, by the Bureau of Sport Fisheries and Wildlife, recognizes the following status classifications:

Threatened: (Replaced terms "rare" or "endangered") Species or subspecies that are so few in numbers or so threatened by present circumstances, as to be in danger of extinction.

Peripheral: A peripheral species or subspecies is one which occurs in the United States, although not in its range as a whole. Special attention is necessary to assure retention of our Nation's fauna.

Status-Undetermined: A species or subspecies that has been suggested as possibly threatened with extinction, but about which there is not enough information to determine its status. More information is needed.

In addition, the term "endangered" species is reserved for those animals on the official list of endangered species as amended and published in the Federal Register.

Habitat: - Impacts to wildlife from transmission facilities usually occur as a result of modifications to habitat. Wildlife habitat in general refers to any land or water area capable of supporting some type of wildlife species. These areas vary considerably in type and quality and are found in many water, forest, and cropland areas. Wildlife and fish populations are highly dependent on the quantity and quality of these habitats and proper management has done much to preserve their existence. The increasing pressures of development, however, threaten many of these areas.

Habitat for wildlife includes natural, artificial, or man-made facilities. Habitat is generally classified by use as summer, winter, or production. Typical areas covered by these classes are winter and general ranges, fish production areas, waterfowl winter nesting and production areas, and upland bird production areas. Some of the common land and water resources that provide wintering, nesting, or resting grounds are any land supporting vegetation--forest, farm and rangeland, bays, estuaries, marshes, shallow lakes, reservoirs, and streams. Wildlife facilities and fish hatcheries have been provided to supplement natural habitats in an effort to conserve wildlife resources. Federal, state, and local agencies provide management policies. These dwindling habitat resources are an important national resource and must be protected.

Wildlife Facilities - These facilities, which serve several functions, include state and Federal wildlife facilities, such as refuges, game ranges under agency control, game farms, game management areas, wildlife recreation areas, and public shooting areas. These facilities aid in the reproduction survival of wildlife, and are designed to maximize the amount of productive uses we have available for wildlife resources.

Other Natural Resources

This category will include natural resources which do not fall into the categories previously described. Included are metallic and nonmetallic mineral deposits. Another example of resources in this category would be a land form such as Hells Canyon on the Snake River.

RESOURCE USE AND CULTURAL RESOURCES

Agriculture

Pacific Northwest agriculture has both a background and future potential of great diversity, based upon variable topography, climate, soils, and markets. Possible impact from transmission facilities on man's use of the land can be better appreciated by having an understanding of such use. These agriculture resource uses will be considered very broadly as cropland and rangeland.

The agricultural cropland category utilized in the narrative evaluations include lands devoted to dryland and irrigated farming. These are lands which generally exhibit favorable land capabilities and suitabilities for crop production such as (1) good soil, (2) more gentle slopes, (3) adequate climate and growing season, and (4) sufficient water supply.

An indication of the types of land use cropping, general cultivation practices, irrigation needs and practices, and geographic distribution of cropland form a tool for environmental evaluation and impact assessment.

The rangeland category utilized as an agriculture land use includes open, nonforested grazing land. Climate, soil, bedrock, slope, and elevation factors through the process of succession have resulted in vegetative associations which are characterized by cover types such as grasses, land in perennial forbs, perennial weeds, sedges, sagebrush, and numerous species of shrubs. It may contain shade trees or scattered timber trees with less than 10 percent canopy. Rangeland consists of a mixture of those cover types which are categorized into two classifications:

Sage, other brushland, grass and meadowland and other classifications of rangeland are normally of low productivity but in many areas they must be evaluated for potential reclamation, as well as open space and natural and cultural values. Their significance is generally not modified by transmission construction. The sage and other brushland classification includes those rangelands where sagebrush or other brush is the predominant cover. Brushlands other than sage principally consist of nonforest brush types such as bitterbrush bluebunch wheatgrass in the more rocky or shallow soil areas, and the rabbitbrush, bitterbrush, and mixed grass ranges on sandy sites.

Grass and meadowlands are characterized at higher elevations by open grasslands in which bunchgrasses are dominant and perennial forbs and shrubs are common. Meadow-type grasses and forbs and grass-like plants are prevalent in areas adjacent to streams and in mountain meadows. At intermediate elevations just below the fringes of timberland are found more intensive grasslands. Meadows are quite prevalent along creeks and rivers. On more gently sloping range or lower elevations are found grasslands characterized by bunchgrasses, sagebrush, and perennial forbs.

Range condition is the present state of the vegetation of a range-soil group in relation to its climax vegetation. A range is in excellent condition if 76 to 100 percent of the plant cover, by weight, is similar to the original or climax plant community; is in good condition if 51 to 75 percent of the vegetation is similar to the original; in fair condition if 25 to 50 percent of the plants are similar to the original; and in poor condition if less than 25 percent of the present vegetation is the original kind.

Forestry

The forestry category utilized in the narrative evaluations includes all commercial and noncommercial forest lands, private and public, which in general have more than 10 percent forest cover. These lands are used for timber production, recreation, wildlife habitat, and occasionally, livestock range. In addition, they serve as valuable watersheds for domestic water storage and purification. Forest land suitability is important in determining the degree of impact of transmission facility construction on forest

resources. This associated degree of facility impact varies substantially throughout the Northwest with the many variations in land suitability resulting from variations in climate, slope, exposure, altitude, and other factors. As forest lands are highly incompatible with transmission development, the removal of trees from the right-of-way is required in most instances and a complete loss of future production results.

Forest range consists of those lands which may be of either commercial or noncommercial character which have sufficient low-growing vegetation to support livestock grazing. Forest range areas generally occupy the lower fringes of the forest zone adjacent to rangeland or agricultural areas. These lands are normally characterized by marginal soils and climatic extremes.

Noncommercial forest land consists of forested lands characterized and designated as either nonproductive timber with no commercial market value, or productive timber lands of commercial character which have been reserved from timber harvest. A high percentage of these lands is unsuitable for raising commercial timber crops because of their low productivity due to high altitude, low rainfall, steep terrain and other factors. Many of these areas have been designated as national parks, wild and scenic areas, wilderness areas and similar uses.

Commercial forest land is land which is producing, or is capable of producing, crops of industrial wood and is not withdrawn by statute or administrative regulation. Commercial forest lands include areas suitable for management and capable of producing 20 cubic feet annual growth per acre. This may include both accessible and inaccessible areas.

Forest land reserved from timber harvest consists of commercial or noncommercial timber lands which through legislation have been designated for use as: national parks, wild, wilderness and primitive areas; and primitive areas; and state, county and municipal parks. These lands have recreational potential and scenic values.

Urbanized Land Uses

Resources discussed in this section range from farm and rural residences, where development may be minimal, to suburban and urban land where residential land use is highly concentrated along with other associated land uses.

Basic population data such as size, location and distribution, and change through time are fundamental in the planning process. Analysis of the settlement pattern and current trends form an integral part of evaluating the cultural and socioeconomic resources and potential impacts. The 1970 census of population data and such supplemental inputs as recent state or local population statistics, aerial photomaps, and U.S. Geological Survey mapping are utilized in developing a review understanding of the population.

Economic base information provided is used to characterize local economies and to allow an assessment of adverse impacts as a result of BPA construction activities.

Recreation

Recreation resources represent a principal resource and industry in the Pacific Northwest. Because of the often unique character of these resources, special attention must be given to preserving the quality of existing and potential areas.

Typical existing and potential recreation areas are: general outdoor recreation, national environmental, outstanding natural, primitive and wilderness, high density recreation, and national rivers. These, defined below, are affected to some degree by the construction of transmission facilities through or near them.

Existing Recreation Areas

General Outdoor Recreation Areas are generally nonurban and may or may not be developed. Examples include: summer and winter sports, resort, boat launching, swimming, hiking and campground areas, and nonurban parks.

National and Environmental Areas include the national forests, parks and other public lands of national significance. These areas are characterized by the absence of man-made developments in the presence of natural qualities of national significance.

Outstanding Natural Areas include those exceptional scenic, geologic and natural resources, such as mountain ranges, canyons, waterfalls, lava caves, and other natural phenomena of exceptional character. Developments in these areas consist of only those utilized in the preservation of the natural resources.

Primitive and Wilderness Areas include wilderness and primitive land designated by Congress through legislation. Man-Made developments are limited mainly to foot and horseback trails.

High-Density Recreation Areas include those which are often associated with urban populations and which are in high demand. They include such areas as urban parks and play fields.

State and National Rivers include those which have been nationally accepted as having exceptional environmental quality or which are being studied for future designation. They are or may become an integral part of the state or national system of wild, scenic, and outdoor recreation rivers. Conservation policies control the use of these important water resources and development is restricted or tightly controlled.

Potential Recreation Areas

Development Zones include those which have been designated by Federal or state recreation authorities as having sufficient site amenities to have potential for development into useful recreation areas.

Roadless Areas include those designated by Federal and state agencies as having sufficient exceptional natural qualities to be considered for future classification. Their status is preserved by restricting access roads to trails, such as foot and horseback. This access limits development to assure the preservation of the areas' ecology and visual amenities.

Recreation Rivers include those selected by Federal and state agencies as having the resource qualities deemed necessary to justify their possible future use as recreation rivers. They are capable of providing a valuable source of recreational diversity. Development is restricted and selective.

Visual

The description of the scenic character of the study areas is largely based on the diversity of physiography, vegetation and water forms which are apparent to the viewer. Often cultural features such as farmland or rustic appearing buildings will add to the scenic value of an area. These features may be further enhanced by the time of day, season, weather or lighting conditions at a particular time. Any judgements of scenic quality are also variable depending on the personal characteristics of the viewer.

Scenic Routes include those which have been designated by Federal and State agencies as having exceptional scenic character. Included are highways, roads and trails, both foot and horseback, which pass through or alongside areas of exceptional natural and cultural diversity.

Scenic Roads include those considered by State and Federal agencies as having sufficient environmental qualities to warrant designation. They would be treated in the same manner in facility location as would existing scenic routes previously described.

State and National Rivers include those which have been nationally accepted as having exceptional environmental quality or which are being studied for future designation. They are or may become an integral part of the state or national system of wild, scenic and outdoor recreation rivers. Conservation policies control the use of these important water resources and development is restricted or tightly controlled.

Historic Archeologic

Historic and archeologic resource areas are included in this category since they include unique sites which are associated with our history, tradition, and cultural heritage. Sites listed in the National Register of Historic Places, up to and including November 1977, were identified and analyzed for potential impact for each of the study areas listed in accordance with "National Historic Preservation Act" (Public Law 89-665) and Executive Order 11593. Additionally, archeological review is undertaken on a contract basis for site locations that could be affected by BPA's program activities. (Refer to the Historic and Archeologic Appendix, Section XII, page XII-1, of the Program Statement for additional details.)

**FINAL FACILITY
PLANNING SUPPLEMENTS**



SA-79-1

Franklin Area
System Reinforcement



FRANKLIN AREA SYSTEM REINFORCEMENT

FINAL FACILITY PLANNING SUPPLEMENT

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FRANKLIN AREA
SYSTEM REINFORCEMENT
STUDY AREA 79-1

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STATUS

FRANKLIN AREA SYSTEM REINFORCEMENT

The Draft Facility Planning Supplement (Study Area 79-1) was filed with the President's Council on Environmental Quality (CEQ) on September 1, 1977. Comments received during the public and agency review period which closed on November 18, 1977 were considered in the development of the Final Planning Supplement. A public meeting was held on October 25, 1977 at Pasco, Washington.

After evaluating the principal economic, technical and environmental factors associated with this project, and review of public and agency comments received on the Draft Planning Supplement, Alternative Plan B was selected as the Proposed Plan of Service. A "Plan of Service Decision" section has been included in the Final Planning Supplement under the Description of the Proposal. This Final Planning Supplement identifies the need for the facility, the Proposed Plan, Alternative Plans considered, factors leading to the plan of service selection, and the predicted environmental impacts. A Facility Location Supplement will now be prepared which will evaluate the design and location needs associated with the Proposed Plan of Service.

The following tentative schedule dates for this project are;

Location Surveys	Fall 1978
Land Acquisition	Spring 1979-Spring 1980
Construction	Summer 1980-Spring 1981
Energization	May 1981



DESCRIPTION OF THE PROPOSAL

SYSTEM REQUIREMENTS

Overloads occur on the 230-kV and 115-kV lines in the vicinity of Franklin and McNary during outage conditions when Ice Harbor and McNary generators are peaking and local load is low. If one of the transmission lines serving the area is removed from service the area power requirements must be carried on the remaining lines. These remaining lines will open if overloaded and a large area would be without electric service.

When line loading limits are exceeded, Ice Harbor generation must be reduced to relieve the line overloads and avoid power outages. This means that when streamflows are high, water will have to be spilled. The situation is particularly severe for an outage of the McNary-Franklin 230-kV line or one of the two Franklin-Benton 115-kV lines. If such an outage occurs during light load periods, especially during the seasons when irrigation pumps are off, sizable amounts of Ice Harbor generation must be cut back to control line loadings.

A different condition occurs during the late summer peakload period. The area loads are high due to irrigation and the Ice Harbor generation is low. The 115-kV lines from Benton to Franklin will overload for outages between Midway and White Bluffs. Some lines may be opened to relieve the line overloads.

With increased capacity on the Pacific Interties, energy in the Northwest which is now wasted can be exported. The increased probability of energy shortages resulting from delays in thermal plant construction and the need to maximize the use of hydro generation, both to make up energy shortages and conserve fuel oil, makes it desirable to provide additional Ice Harbor transmission support and eliminate the waste of hydro energy. Several alternate plans for accomplishing this have been considered.

THE PROPOSED PLAN OF SERVICE

Alternative Plan B has been selected as the Proposed Plan of Service.

The BPA Lower Monumental-John Day 500-kV line would be connected to the Sacajawea Substation by an approximate 6-mile (10 km) 500-kV tap line. The Sacajawea Substation is near Ice Harbor Dam on the south side of the river. A 500/115-kV transformer and substation terminal facilities would be installed at Sacajawea. This would require an additional 6 acres (2.4 ha) at Sacajawea Substation. The tap point would require 3 acres (1.2 ha) of land (see Figures 1 and 2).

ALTERNATIVE PLANS CONSIDERED

ALTERNATIVE PLAN A

The PP&L Vantage-Walla Walla 230-kV line would be connected to the Levey Substation by an approximate 5-mile (8 km) tap on the north side of the Snake River. The Levey Substation site is near Ice Harbor Dam on the north side of the river. A 230/115-kV transformer and substation terminal facilities would be installed at Levey. The substation would increase in size by about 2 acres (0.8 ha). (Figs. 1 and 2)

ALTERNATIVE PLAN C

A 6-mile (10 km) 115-kV double circuit line would connect the Sacajawea Substation to a new substation at a tap point on the BPA Lower Monumental-John Day 500-kV line. Substation facilities would require an additional 2 acres (0.8 ha) at the Sacajawea Substation and 11 acres (4.5 ha) at the Lower Monumental-John Day tap point.

ALTERNATIVE PLAN D

A new 27-mile (43 km), 230-kV, single-circuit line would be constructed between McNary and Franklin Substations, adjacent to the existing McNary-Franklin 230-kV transmission line. Part of the existing McNary-Badger Canyon 115-kV transmission line could be removed to allow the construction of a portion of the new line on existing right-of-way. No substation land enlargement would be required.

ALTERNATIVE PLAN E

A new 20-mile (32 km), 230-kV, single-circuit line would be constructed between the McNary Substation and the Badger Canyon tap point. This line may replace part of the existing 115-kV line. No substation land enlargement would be required. However, 230/115-kV transformer additions will be required within existing BPA-owned land, at the Badger Canyon and Franklin Substations.

P L A N O F S E R V I C E D E C I S I O N

Alternative Plan B, 6-mile (10 km) 500-kV tap line with 6 acre (2.4 ha) Sacajawea Substation expansion, has been selected as the proposed Plan of Service. The following is a summary of the principal factors used in the selection of the Proposed Plan.

Economic and Engineering Factors

The alternatives were modeled on the BPA digital computer to simulate the actual operating conditions. Various conditions of possible

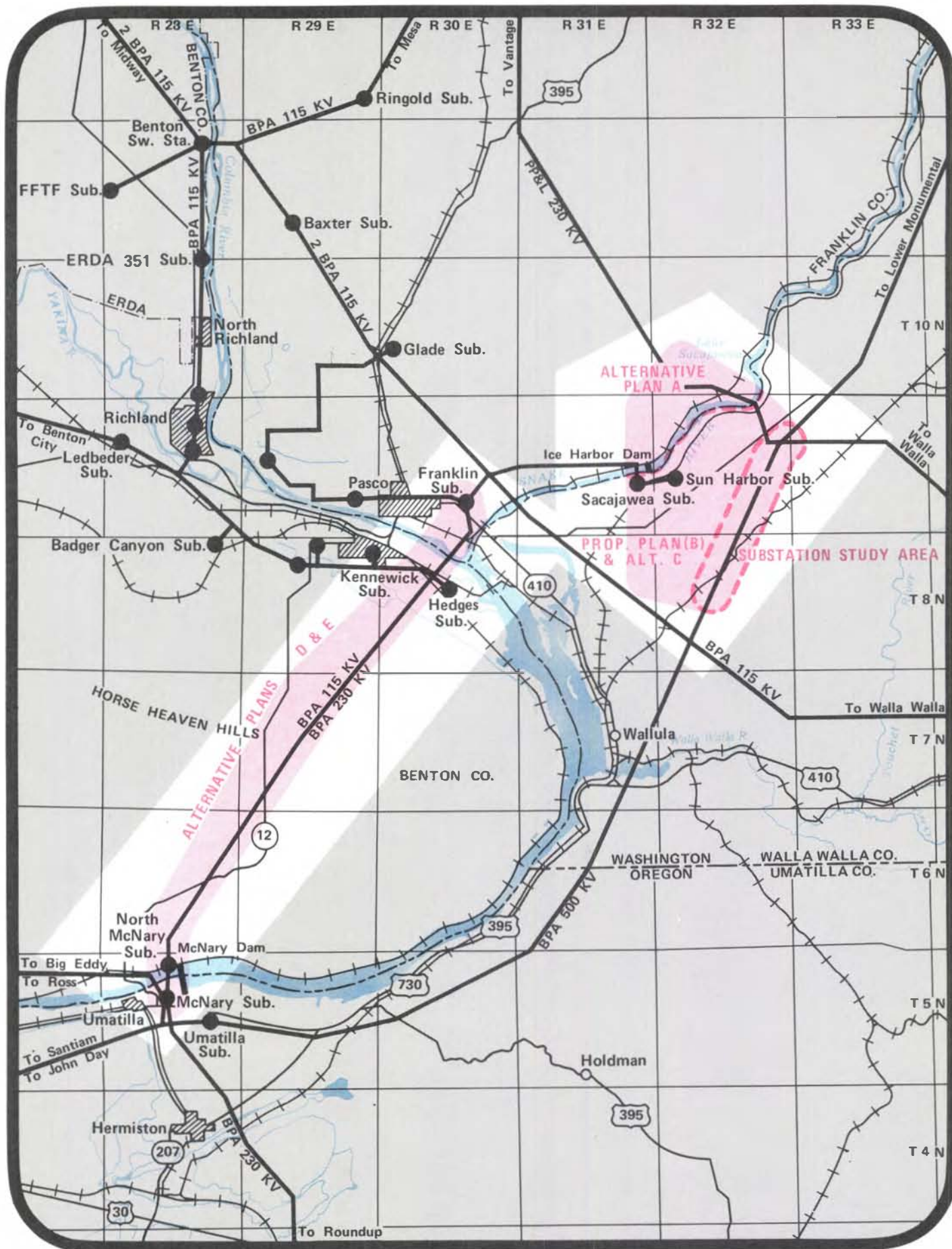
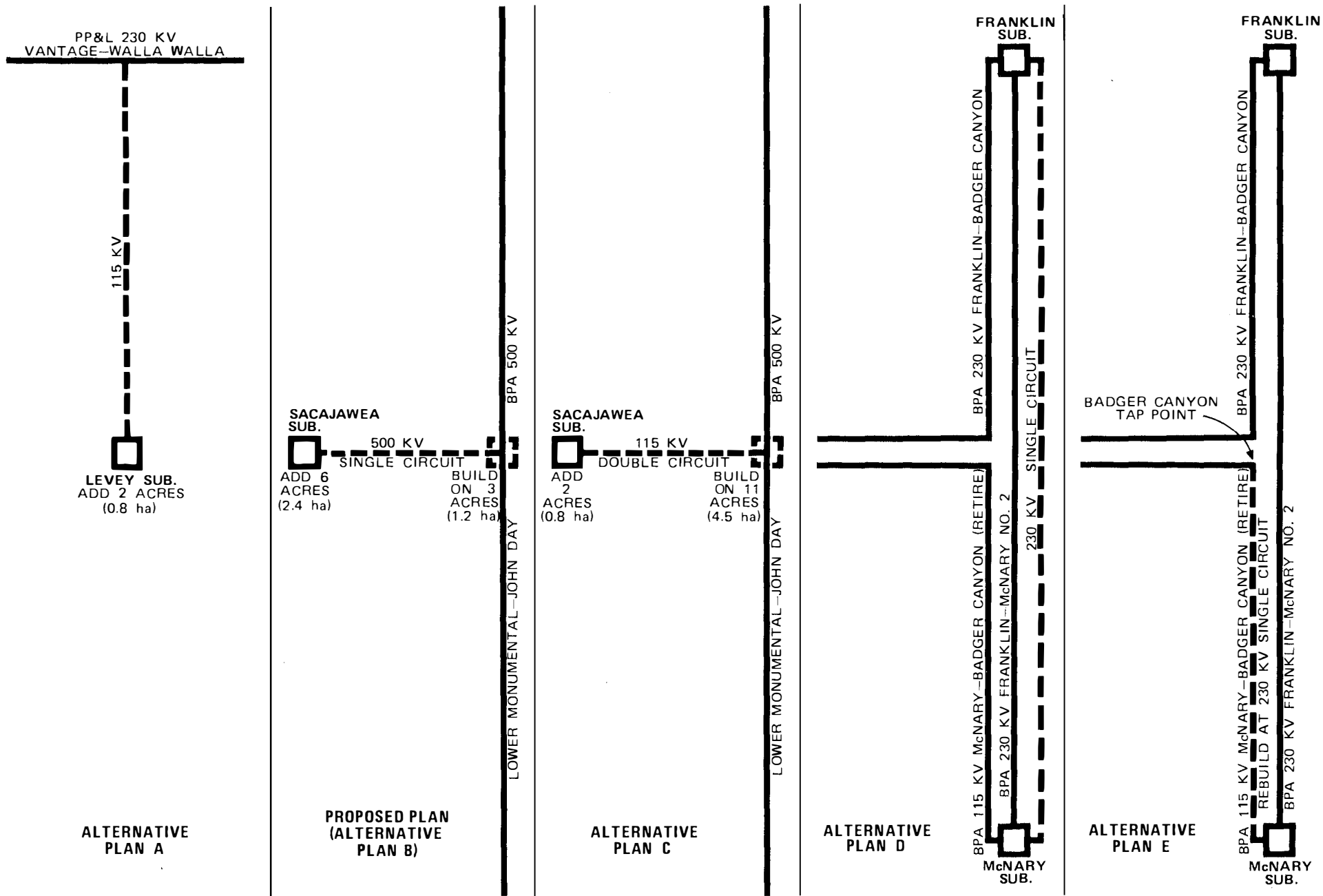


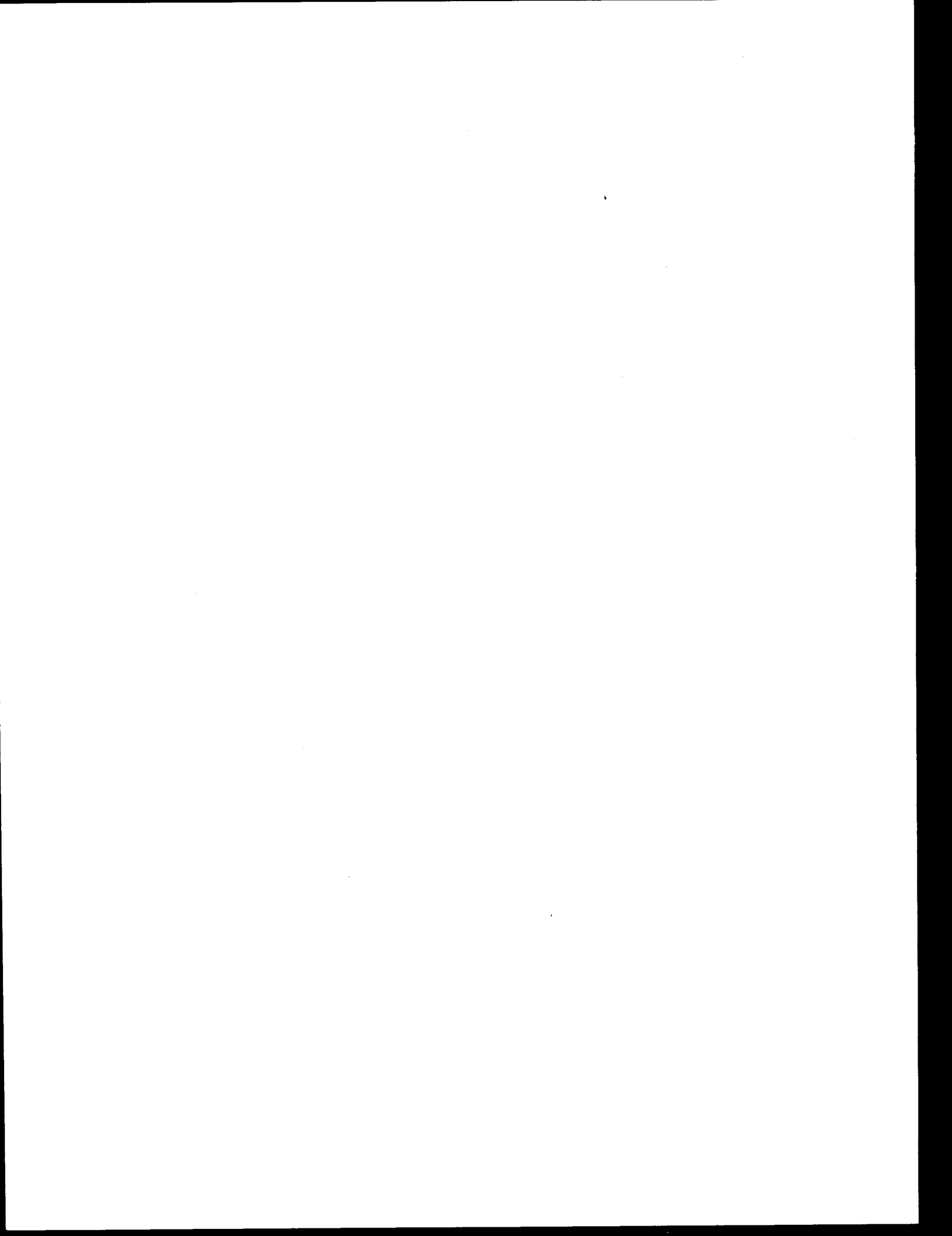
FIGURE 1
PLANNING STUDY AREA
FRANKLIN AREA SYSTEM REINFOR.
79-1





———— EXISTING
- - - - - CONSTRUCT

FIGURE 2
PLANS CONSIDERED
FRANKLIN AREA SYSTEM REINFORCEMENT



loadings and outages were investigated to study the adequacy of service to the loads in the area. Plan A, tap of the PP&L Vantage-Walla Walla 230-kV line to Levey would not provide sufficient support to the area. However, the Proposed Plan and Alternatives C, D, and E with connections to the BPA 500-kV grid at Sacajawea or McNary would provide adequate support to the area. Plans D and E with 20 or 27 miles of 230-kV line construction are one and one-half to two times more costly than Plans B or C with 6 miles of 500-kV or 115-kV construction. Also, since it is more efficient to transmit power at higher voltages than lower voltages, Plan B has approximately 5,000 kilowatts lower losses. Losses are currently valued in excess of \$100 per kilowatt-year for a total loss of \$500,000 per year. The Proposed Plan is preferred over Plan C as the 6 mile 500-kV tap line can carry several times as much power as the double circuit 115-kV line, and will eliminate the need for some future line construction as the load increases in the area. The Proposed Plan also avoids the development of a new substation at the tap point and associated development and equipment costs. The 3 acres (1.2 ha) of land required at the tap point is for less costly transmission structures. It is less costly to expand the existing Sacajawea Substation than to develop a new substation.

Environmental Factors

A public meeting was held at the Franklin Co. PUD Auditorium, Pasco, Washington, on October 25, 1977 to present the 5 Alternative Plans to the public. Responses to comments from two federal agencies, one county planning department, and two attendees of the public meeting are found on pages 31 through 34, and were used in the plan of service selection.

A new transmission line corridor will be required for the Proposed Plan, 6 miles (10 km) total length, Alternative A, 5 miles (8 km) and Alternative C, 6 miles (10 km). Alternative Plans D and E may parallel existing transmission lines for 27 miles (43 km) and 20 miles (32 km) respectively (see Figures 1 and 2). Existing land uses in the Planning Study Areas of the Proposed Plan and Alternatives A and C are related to the use of sprinkler irrigation systems in the production of grapes, potatoes, sugar beets, alfalfa hay and cereal grains. The above plans do impact sprinkler systems, but do not impact recreational areas. Alternative Plans D and E generally do not impact sprinkler systems, but do moderately impact recreational areas (see Figure 3). Refer to Figure 4 for the degree and likelihood of a plan-by-plan comparison of the environmental impacts in detail. The Proposed Plan and Alternatives A and C do not cross the Columbia River. Alternative Plan D has two crossings and Alternative E one (see Figure 1). BPA has carefully considered the relevant shoreline designations, policies, and regulations of Benton and Franklin Counties Final Shoreline Master Programs in selecting a Proposed Plan. Substation and terminal facilities construction or expansion will require 9 acres (3.6 ha) for the Proposed Plan. Alternatives A, C, D and E will require 2 acres (0.8 ha), 13 acres (5.3 ha), 0, and 0, acres respectively.

Energy conservation is accomplished in two ways: First without additional

Ice Harbor transmission support, water will have to be spilled and hydro energy wasted during periods of high Columbia River stream flow (see System Requirements p. 1 and Nonconstruction p. 21). Second it is more efficient (cost of construction vs return on investment and eventual savings to the consuming public) to transmit power at higher voltages than at lower voltages. The Proposed Plan at 500-kV is the most efficient. Alternatives A, C, D, and E are 115-kV, 115-kV double circuit, 230-kV, and 230-kV respectively (see Figure 2).

DESCRIPTION OF THE ENVIRONMENT

PLANNING STUDY AREA

GEOGRAPHY

The planning study area occupies approximately 350 square miles (906 sq km) in southcentral Washington near the confluence of the Snake and Columbia Rivers (Fig. 1). Portions of Benton, Franklin, and Walla Walla Counties in Washington State and a very small section of Umatilla County in the State of Oregon are located in the planning study area. The Pasco-Kennewick urban complex is adjacent to the study area boundary, however, only portions of the cities are included within the study area. The planning study area extends for approximately 40 miles (64 km) in the northeast/southwest direction with the southwestern corner encompassing McNary Dam on the Columbia River while the northeastern portion takes in Ice Harbor Dam on the Snake. The Horse Heaven Hills are the principal topographic unit located within the planning study area (Fig. 1).

CLIMATE

The planning study area has a semi-arid climate which is characterized by low annual precipitation, large daily temperature variations, and substantial interseasonal temperature fluctuations. A summary of principal meteorological observations at Umatilla, Kennewick and Ice Harbor Dam is provided in Table 1.

Summers are generally hot and dry. The cold winters are moderated by relatively warm air masses. However, extremely cold temperatures are occasionally produced by intrusions of arctic air. Recorded temperature extremes for Kennewick are a maximum of 115°F (45°C) and a minimum of -23°F (-31°C). The frost-free period in the study area varies from around 140 to 160 days per year.

Annual precipitation is less than 10 inches (254 mm) near the Snake and Columbia Rivers and increases to around 15 inches (381 mm) in the higher elevations of the planning study area. Two-thirds of the annual precipitation normally falls from October through March. On the average, the study area receives about 10 inches (254 mm) of snow annually. This represents roughly 10 to 15 percent of the mean annual precipitation total. The prevailing direction of the wind is influenced by topography and varies with the change of seasons. In general, the direction varies from south to west, with the higher velocities from the southwest or west. During spring and fall, rapidly moving weather systems result in dust storms.

Franklin Area System Reinforcement
Study Area 79-1

Table 1. - Representative Climatological Data

Characteristic (Mean)	Station		
	Umatilla (1931-60)	Kennewick (1931-60)	Ice Harbor Dam (1957-65)
Annual Temp. (°F)	53.4	53.6	54.4
(°C)	(11.9)	(12.0)	(12.4)
Max/Min Jan. Temp. °F	39.8/24.1	38.3/25.0	40.8/25.9
(°C)	(4.3/-4.4)	(3.5/-3.9)	(4.9/-3.4)
Max/Min July Temp. °F	91.1/58.7	91.5/58.9	92.3/60.6
(°C)	(32.8/14.8)	(33.1/14.9)	(33.5/15.9)
Annual Precip. (inches)	8.13	7.49	9.76
(mm)	(207)	(190)	(248)
Jan. Precip. (inches)	1.08	1.05	1.08
(mm)	(27)	(27)	(27)
July Precip. (inches)	0.18	0.17	0.16
(mm)	(5)	(4)	(4)
Annual Snowfall (inches)	8.4	10.7	--
(mm)	(213)	(272)	

Source: PNRBC 1969, Climatological Handbook, Vols. I and II

NATURAL RESOURCES

The natural resources of the planning study area are characterized in this section. Their geographic location and distribution within the study area are shown and described. Man's use of the natural resources will be discussed in the section, "Resource Use and Socioeconomic Resources."

ATMOSPHERE

Air quality throughout the planning study area is generally quite good. Pollutants associated with agricultural, urban, and industrial development are normally localized. The Kennewick/Pasco urban complex, with the many air pollution-producing activities that are related to it, is a major year-round source of air contamination adjacent to the study area. Agricultural activities contribute significantly to the deterioration of air quality during spring and fall.

The study area is subject to frequent, often strong winds which tend to parallel the Columbia River. Although this wind is beneficial for dispersing much of the urban and industrial types of pollution, it results in dust clouds in recently cultivated areas, disturbed areas, and along unsurfaced roads. Microscopic evaluation of samples obtained at the

Umatilla background sampling station^{1/} indicates that about 80 percent by weight of the particulate samples are the result of windblown dust (DEQ 1975). Pollen is another primary source of particulate matter in the atmosphere.

An additional atmospheric factor influencing the quality of the ambient air in the study area is the amount of mixing that takes place. Low mixing or inversion heights tend to result in higher ambient concentrations, as do low wind speeds. These parameters usually undergo daytime variations, tending to be highest in midafternoon and lower in early morning. From a seasonal standpoint, average mixing heights are lowest in winter.

GEOLOGY, SOILS, AND MINERALS

The planning study area is located in the Columbia Basin Physiographic Province (Highsmith 1973). This province is characterized by extensive basalt flows of middle to late Tertiary age. These make up the vast Columbia River Basalt formation which underlies the entire region to great depths. The boundary between the Central Plains and the Yakima Folds subdivisions of the Columbia Basin Physiographic Province cuts across the planning study area in a northwestern to southeastern direction which roughly parallels the Columbia River below Kennewick. The northeastern portion of the study area falls in the Central Plains Subdivision which is a region of vast outwash plains and terraces which have moderate to very deep soils of high fertility. The southwestern portion of the planning study area crosses the east-west anticline known as the Horse Heaven Hills. These hills are part of the Yakima Folds subdivision and rise to elevations of over 2,000 feet (600 m) in the study area.

Earthquake epicenters with Richter magnitudes of 6.3 or less have been recorded within a 50-mile (80 km) radius. Seismic intensities anticipated from earthquakes of the magnitudes experienced near the planning study area do not exceed IX on the Modified Mercalli Scale (Shannon and Wilson 1972).

In general, all the soils were formed under a grassland or shrub-grassland vegetative complex from Plio-Pleistocene glacio-fluvial, lacustrine and/or wind-deposited materials (Franklin and Dyrness 1973). This has resulted in soils of fine sandy loam to silt loam texture of variable depth (CNP Staff 1971). The soils have developed under scant rainfall and are relatively fertile due to the high mineral content. Generally, they are suitable for agricultural production with dryland farming techniques or irrigation, if water is available. The loose, crumbly nature of the soil in combination with its tendency for droughtiness makes for erosion

^{1/} The Oregon Department of Environmental Quality operates a suspended particulate ambient air monitoring station at Umatilla.

problems, especially from wind, in areas where the soil is exposed through cultivation or other disturbance.

HYDROLOGY

The Columbia and Snake Rivers dominate the surface hydrology of the planning study area (Fig. 1). The southwestern corner of the study area encompasses McNary Dam on the Columbia and a portion of its reservoir, Lake Wallula. The Snake River passes through the northeastern section of the study area on the way to its confluence with the Columbia. A portion of Lake Sacajawea, which is a result of the backwater from Ice Harbor Dam on the Snake River, is also included.

Other hydrological features include Dalton Lake which is adjacent to Lake Sacajawea, Columbia Canals, No. 1, 2, and 3 situated southeast of Kennewick, and Smith Canyon Waterway. The Burbank Slough, a significant wetland area partially located in the study area, is administered as part of the McNary National Wildlife Refuge. See the "Wildlife" and "Recreation" sections for further discussions of this resource. In addition, a few intermittent streams and wet areas are located throughout the other portions of the planning study area.

VEGETATION

Major vegetation types are rangeland and riparian. Principal rangeland plant species include sagebrush, rabbitbrush, bluebunch wheatgrass, fescue, and cheatgrass. Cheatgrass, an annual that dominates overgrazed rangelands, has good initial holding ability against wind erosion but has little forage value for livestock.

Potholes, irrigation ditches, and the banks of the Columbia River support patches of riparian vegetation such as black cottonwood, willow, Russian olive, cattail, bullbrush, and sedges. These species are common where water is available. Although sage and rabbitbrush are the most evident perennial species on the rangeland, spring brings an array of buttercups, balsam root, lupines, larkspur, and phlox.

There are no officially listed threatened and endangered plants in the study area. At the time that a Federal list is adopted and officially published in the Federal Register by the U.S. Fish and Wildlife Service, BPA will work with them to explore appropriate mitigation measures.

WILDLIFE

Aquatic habitat consists primarily of segments of the Columbia and Snake Rivers (Fig. 3). These rivers support large runs of anadromous fish including chinook, sockeye, and coho salmon and steelhead trout. The anadromous nonsalmonids, American shad and Pacific lamprey are also present. Several resident species, including bass and crappie are

found, especially in backwater areas. These rivers, associated riparian habitat and adjoining agricultural lands attract large numbers of waterfowl during migration and wintering periods. Other concentration areas include McNary National Wildlife Refuge, McNary Wildlife Recreation Area, and the Smith Canyon canal. Common species include mallard, pintail, green-wing teal, widgeon, coot and Canada goose. A variety of shore and songbirds also inhabit these same areas. Mammals found in or near watercourses include beaver, muskrat, otter, and mink.

Other wildlife habitat within the area consists primarily of shrubs/grass and irrigated and dryland crops. Extensive areas of cover are scarce and deer populations are generally low and uniform throughout the area. Birds found in these areas include large populations of ring-necked pheasant, valley quail, and mourning dove. Other birds characteristic of the area include, horned lark, magpie, and several species of birds-of-prey. The Northern long-billed curlew occurs in the area, however, habitat of this bird is being lost to agricultural development. The Federally endangered American peregrine falcon may also be present at times. Small mammals characteristic of the area include black-tailed jackrabbit, Townsend ground squirrel, badger, deer mouse, kangaroo rat, and pocket gopher.

RESOURCE USE AND SOCIOECONOMIC RESOURCES

The following sections relate man's use of the natural resources previously described.

DEMOGRAPHIC AND ECONOMIC CONSIDERATIONS

Table 2 provides some basic demographic information on the three incorporated cities located adjacent to the planning study area boundaries. Although all three cities experienced growth from 1970 to 1975, the population of Umatilla more than doubled. The study area has an agricultural economic base, however, the urban areas provide a diverse range of other job opportunities.

Table 2. - Population Statistics

Location	Number of People			Percent Change		
	1960	1970	1975	1960-70	1960-75	1970-75
Kennewick	14,244	15,212	18,253	6.8	28.1	20.0
Pasco	14,522	13,920	14,450	-4.1	-0.5	3.8
Umatilla	617	679	1,620	10.0	162.6	138.6

Source: U.S. Bureau of Census, 1973. Census of Population, 1970, Vol. 1. Characteristics of the Population; Center for Population Research and Census (PSU); Population Studies Division (State of Washington).

- ① SACAJAWEA STATE PARK
- ② TWO RIVERS PARK
- ③ HOOD PARK
- ④ McNARY RECREATIONAL AREAS
- ⑤ McNARY NATIONAL WILDLIFE REFUGE
- ⑥ McNARY WILDLIFE RECREATION AREA

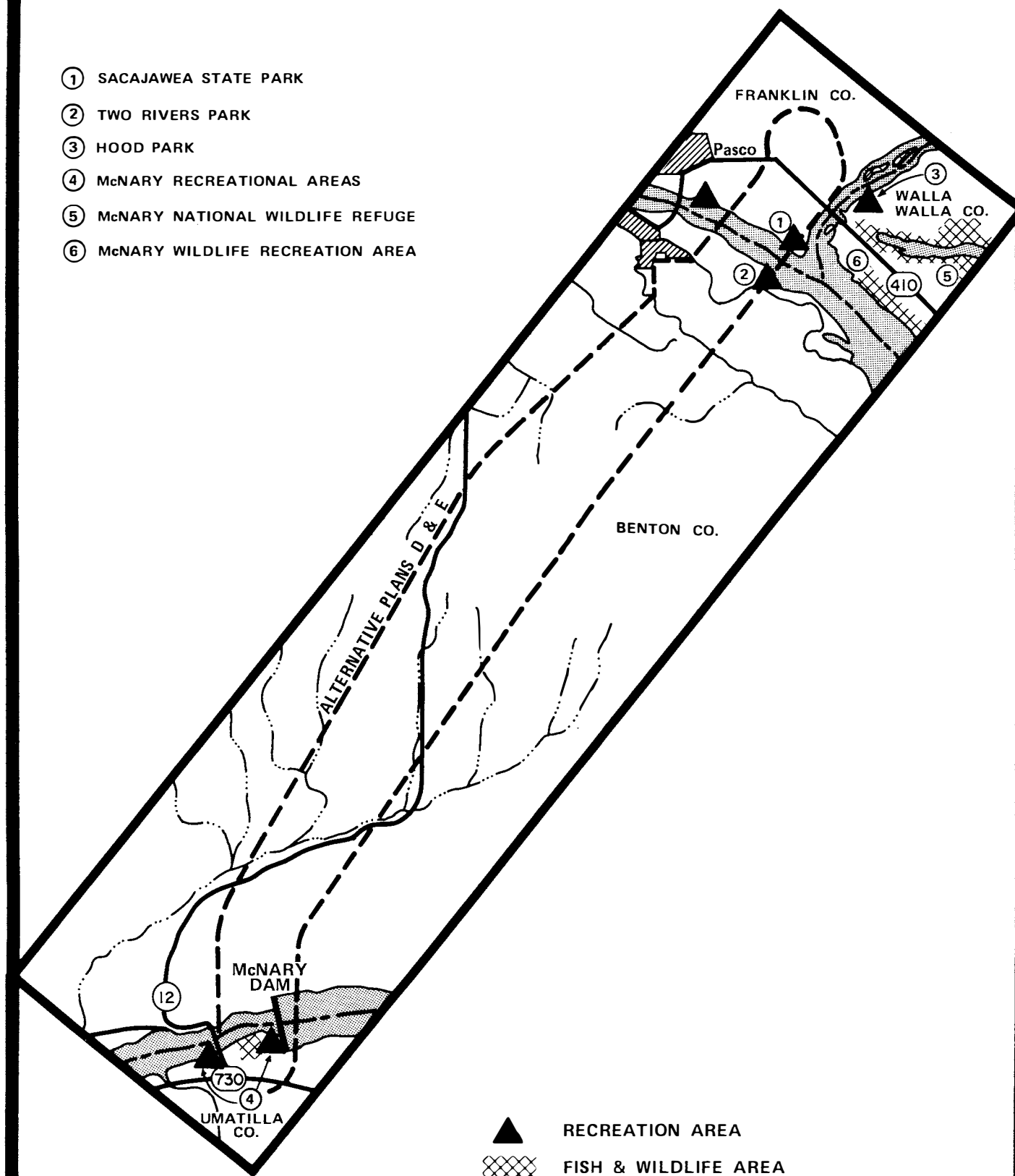


FIGURE 3
 IMPORTANT RESOURCES
 FRANKLIN AREA SYSTEM REINFORCEMENT
 79-1



Between 1970 and 1975 the population for the City of Umatilla changed from 679 to 1,620. (See Table 2). Part of the population increase resulted from the October 1973 annexation of the McNary townsite. The population of the McNary townsite at the time of annexation was approximately 250. In the 6 months following annexation the townsite had grown by an additional 100 persons. A gradual population growth is likely to continue.

LAND USE

As part of the Environmental Analysis and Preliminary Planning, the Walla Walla, Franklin, Benton, and Umatilla County Planning agencies were contacted for information on existing zoning and land use plans. Although all plans will impact to varying degrees land use in the affected counties, there was no expression of incompatibility in the A-95 review except from Franklin County. Franklin County felt that Plan A would have an exceptionally high impact or conflict with agricultural land. The compatibility of the proposed facilities with state and local land use plans will be presented further in the draft facility location supplement.

Agriculture

Soils are sandy and require irrigation water for production, water must be applied by a sprinkler irrigation system. Side roll, central pivot and solid set systems are the predominant types used. Irrigation water is pumped from the Snake and Columbia Rivers. Typical irrigated crops such as grapes, early potatoes, late potatoes, sugar beets, alfalfa hay, and cereal grains are grown. Per acre yields range, for grapes from 3-1/2 to 5 tons (3 to 5 MT), early potatoes 22 to 25 tons (20 to 23 MT), late potatoes 23 to 27 tons (21 to 24 MT), sugar beets 25 to 30 tons (23 to 27 MT), alfalfa hay 6 to 9 tons (5 to 7 MT), and wheat 80 to 100 bushels (28 to 35 hl). (Bill Ford, 1976, Franklin County, Extension Agent). These yields compare favorably with the Lower Yakima Valley and exceed the production for the main Columbia Basin. The study area is at a lower elevation and has a longer growing season.

Additional irrigation development is continuing. The area was used for dryland grazing prior to the present irrigation development. Evidence indicates it was over-grazed. Areas with very shallow soils, and steep or odd shaped parcels are still in rangeland vegetation. These areas are not fenced and are not being utilized for grazing. In the Study Area much of the farmland is Class 3 (U.S. Soil Conservation Service Classification); with the application of irrigation water most of the land, not presently being irrigated, may become Class 1.

Forestry

There are no forest-related lands or activities located within the study area.

Urban and Residential

Urbanized land uses do not constitute a significant portion of the study area except for several locations near the Snake and Columbia Rivers. In Walla Walla County there has been a recent increase in residential development near the community of Burbank and in the vicinity of Ice Harbor Dam. Near Burbank there is some concentration of industrial land use. Otherwise, the Walla Walla County land in the study area is used and zoned for agriculture.

In Franklin County there is a similar pattern of residential and urban land use near the confluence of the Snake and Columbia Rivers. The area within 1.5 miles (2.4 km) of the Snake River upstream to Ice Harbor Dam is zoned for industry. The remaining portion of Franklin County in the study area is zoned for agriculture.

In Benton County, just southeast of Kennewick, there has been a considerable amount of residential development. This area, with a zoning designation of "unclassified," is expected to continue a process of conversion of agricultural land to residential uses. There is also a small area of residential land use near the town of Plymouth one mile northwest of McNary Dam.

Only a very small portion of Oregon's Umatilla County is in the study area. Along the Columbia River the zoning designation is for "Open Space" and "Farm Zone". Residential development located nearby is on the fringe of the town of Umatilla.

Other

The major highway transportation routes through the study area are Oregon State Highways 14 and 124 and U.S. Highways 12, 395, and 410, (see Figure 1). The two railroads with routes within the study area are the Burlington Northern and the Union Pacific. The Burlington Northern follows the Columbia River to Pasco where it turns and parallels the Snake River. The Union Pacific has tracks on the south side of the Columbia River in the central portion of the study area and on the south side of the Snake River in the north portion.

Scattered throughout the study area are canals and water tanks. There are several utility pole lines and an aquaduct. There are many sand and gravel pits in the study area. These constitute the only mining operations within the study area.

ESTHETIC

The landscape in the study area is primarily one of rolling hills with a cover of grasses, sagebrush, and similar vegetation typical of a dry climate. The Snake and Columbia Rivers are major visual features, but when out of view their positive influence on the landscape is lost.

Franklin Area System Reinforcement
Study Area 79-1

Form, color, and texture, created by diverse topography, waterforms and vegetation are major determinants of many methodologies for the evaluation of visual quality. Using these criteria for judgment, the scenic quality of the study area is generally low. We recognize, however, that esthetics is an area of great subjectivity. Therefore, individual reactions to this or any other landscape can vary widely.

A new and growing element in this landscape is irrigation development. The color and texture contrast afforded by these changes are modifying the appearance of the land. In time they may change the visual character of the landscape from "rangeland" to "rolling farmland."

RECREATION

Much of the recreation within the planning study area is related to the Columbia and Snake Rivers. Both of these rivers are of Statewide significance as defined by the "Shorelines Management Act of 1971." In the southern end of the area, the Corps of Engineers maintains McNary Wildlife Park, McNary Beach, boat ramps, picnic areas, viewpoints, and fish viewing facilities (Fig. 3). Water-oriented recreation developments in the north include Sacajawea State Park, Hood Park, and Two Rivers Park. Fishing, boating, swimming, and camping opportunities are available. The study area contains high-quality waterfowl habitat and opportunities for viewing, photographing and hunting waterfowl exist throughout. Particularly important areas for waterfowl and other wildlife are McNary National Wildlife Refuge and McNary Wildlife Recreation Area. Ring-necked pheasant, quail, and mourning dove are hunted in and near the agricultural areas. Water, bicycle, and foot trail corridors have been identified in the area by the Interagency Committee for Outdoor Recreation for planning purposes (IAC 1974).

HISTORICAL, ARCHITECTURAL, AND ARCHEOLOGICAL

In the planning study area of Benton County the following properties are eligible for inclusion in the National Register of Historic Places: Paris archeological site, Wooded Island archeological district, Rattle Snake Springs sites, Ryegrass archeological district, Hanford Island archeological site, Hanford north archeological district, Locke Island archeological district, Snively Canyon archeological district, and Benton County Courthouse. Glade Creek site has been nominated for listing in the National Register. In Franklin County, Strawberry Island Village archeological site has been nominated for listing in the National Register. Savage Island archeological district, and Franklin County Courthouse are eligible for inclusion in the National Register.

The Oregon Historic Preservation Officer reports the Umatilla Landing Site, the Cold Springs Landing Site, and the Umatilla River Arch as historical properties on the Statewide Inventory of Historic Places. He has also reported several archeological sites in the Oregon portion of the study area, mapped by the Smithsonian Institution in 1974.

Franklin Area System Reinforcement
Study Area 79-1

Nominations to the Washington Statewide inventory include the James Moore House, the B. B. Horrigan House, Pentecostal Church of God, Franklin County Courthouse, and the Pasco-Kennewick Highway Bridge, all located at Pasco; the Pasco Reclamation Company Pumping Plant, British Imperial Claim Site at Sacajawea State Park, and the Burlington Northern Railroad Bridge, are also in the study area, east of Pasco.

BPA will comply with the requirements of the "National Historic Preservation Act of 1966" (P.L. 89-665), as well as Executive Order 11593. Procedures applicable to these laws are described in Section XII, Historic and Archeological Appendix to the Fiscal Year 1979 Program Statement.

P L A N O F S E R V I C E A N A L Y S I S

POTENTIAL IMPACT OF THE PROPOSAL

The Draft Facility Planning Supplement was submitted for public and agency review on September 1, 1977. BPA has identified Alternative Plan B as the Proposed Plan. The following discussion of impacts relate to that plan. Alternative Plans A, C, D, and E retain this original letter designation and are discussed as well.

The range and duration of potential impacts from the Proposed Plan (Alternative B) would be limited primarily to Agriculture. Grape vineyards and sprinkler irrigation systems may entail a high degree of impact and a high likelihood of impact occurrence (see Figure 4).

A more complete discussion of impacts typically associated with transmission facility construction and maintenance can be found in Appendix B, Chapters V, VI, and VII of the Role EIS.

NATURAL RESOURCES

Atmosphere

Construction, operation, and maintenance activities related to the Proposed Plan would contribute small amounts of air pollutants. Primary pollutants would be fugitive dust raised by moving equipment and vehicles and exhaust from construction equipment and motor vehicles. Substation expansion and the establishment of access roads will result in some windblown dust. These pollutants would be concentrated in the immediate vicinity of construction activities and would occur at intermittent intervals. The new access roads could result in some long-term impacts if the roads remain unsurfaced. Besides the impact on air quality, such pollution could have an esthetic impact because of dust and exhaust visibility. However, the pollutants would be quickly dispersed and the impact short-lived. The mitigating measures normally taken by BPA or the contractors they engage to lessen these impacts are discussed in

BPA's Role EIS, Appendix B.

The atmospheric impacts related to the construction, operation and maintenance activities associated with Alternative Plans A and C would be essentially the same as those described for the Proposed Plan. Atmospheric impacts for Alternative Plans D and E would be similar to those discussed for the Proposed Plan, however, the accumulative impacts would be greater due to the additional line length.

Geology, Soils, and Minerals

The anticipated impacts to the geologic and soil resources in the planning study area for the activities required in the Proposed Plan are similar to those described for Alternative Plan A below. However, the transmission line in the Proposed Plan is 6 miles (10 km) and the expansion at Sacajawea Substation will require 6 acres (2.4 ha).

No impact to the geology of the study area is expected from the construction of the facilities in Alternative Plan A. The impacts to the soil environment resulting from the facilities required in Alternative Plan A are expected to be short-term and relatively minor. One of the principal disturbances will occur in the expansion of the Levey Substation. Approximately 2 acres (0.8 ha) of land will be altered at that location for adding the necessary facilities. Another impact could occur if access roads for the 5 miles (8 km) of new transmission line are needed. The dry, light weight soils in the study area are relatively stable, provided the vegetative cover is not disturbed or removed. Once the soil is exposed, it is subject to erosion especially from wind. Spring and fall can be critical times because frost action causes some soil disturbance, especially where the soil is bare. In winter, frozen soils prevent water from percolating downward and erosion in exposed areas can be a problem. Compaction would be a consideration where heavy construction equipment crosses agricultural land. Transmission line impacts to the soil environment should be minor and related primarily to the placement of structures. The mitigating measures normally taken by BPA to keep impacts to a minimum while constructing these facilities are discussed in the Role EIS.

Alternative Plan C will require an additional 11 acres (4.5 ha) for a tap point at the Lower Monumental-John Day line.

No substation expansions are required in Alternative Plan D, however the transmission line is 27 miles (43 km) long. Consequently, the cumulative impacts could be significant even though the anticipated impacts will be similar to those described for the previous plans. Alternative Plan E, will require 20 miles (32 km) of transmission line. Access road impacts for both Alternative Plans D and E, should be reduced if existing rights-of-way and roads are used.

Hydrology

The Proposed Plan and Alternative Plan C are not expected to impact the hydrological resources of the study area in any way different than described for Alternative Plan A below.

No significant impact to the hydrologic resources in the planning study area are anticipated from Alternative Plan A. Construction and maintenance activities and vehicular movement may cause some minor soil erosion which could result in turbidity and sedimentation to local water bodies. For a discussion of the standard mitigating measures taken by BPA to keep hydrological impacts to a minimum, see BPA's Role EIS.

Alternative Plans D and E will have similar impacts to those described for Alternative Plan A. However, the transmission line required in Alternative Plan D will cross the Columbia River twice--once below McNary Dam and once just above the confluence of the Snake and Columbia Rivers. In addition, this line will have to cross the Columbia Canals Nos. 1, 2, and 3 southeast of Kennewick. Alternative Plan E will only cross the Columbia River once below McNary Dam. No significant impacts to these resources are anticipated with proper location and installation of the structures.

Vegetation

Although the approximate 6 mile (10 km) transmission line required for both the Proposed Plan and Alternative Plan C is slightly longer than Plan A, overall impacts to vegetation would be similar to those described for Plan A. An additional 2 acres (0.8 ha) of grassland habitat will be removed at the existing Sacajawea Substation, and 11 acres (4.5 ha) at the Lower Monutental-John Day tap point for Plan C. Similar habitat to that being removed is abundant nearby.

Approximately 5 miles (8 km) of transmission line required for Alternative Plan A would cross some grassland habitat. Minimal habitat type modification would occur and impacts on natural vegetation are expected to be low. An approximate 2 acre (0.8 ha) additional increase in the Levey Substation required for Plan A would remove some grassland.

Twenty-seven miles (43 km) of 230-kV line for Alternative D and 20 miles (32 km) of 230-kV line for Alternative E would also result in minimal impact on the natural grassland vegetation. If, however, the existing lines are not paralleled or replaced, new access roads may be required with increased vegetation disturbance. Riparian vegetation on the wetlands of the two Columbia River crossings for Plan D will be left if at all possible. Plan E would require only one river crossing near McNary Dam, where riparian vegetation is relatively low growing and probably would not have to be disturbed.

Wildlife

Although the approximately 6 mile (10 km) long transmission line required for the Proposed Plan is slightly longer and of higher voltage than Plan A, overall impacts to wildlife would be similar to those described for Plan A. Relatively little habitat modification would be required for construction of the line. The plan would require removing an additional 6 acres (2.4 ha) of habitat at the existing Sacajawea Substation. Similar habitat to that being removed is abundant nearby and no significant impact on wildlife is expected.

The approximately 5 mile (8 km) long transmission line required for Alternative Plan A would cross primarily crop and grassland habitat. Minimal habitat modification would occur in such areas and impacts on wildlife are expected to be low. Construction activities could cause short-term disturbances to wildlife, however, most species would probably adapt to this temporary intrusion. If construction occurred during the spring, localized disturbance of ground nesting birds could result. No noticeable impacts on such populations are expected. The construction of access roads could result in removal or modification of habitat. In addition, new roads could result in increased human access to wildlife habitat with possible long-term disturbances to wildlife. The line would cross the Smith Canyon Canal, and could result in a slight potential for waterfowl collision mortality. The approximate 2 acre (0.8 ha) increase in Levey Substation required for Plan A would remove some grassland habitat. Such habitat is abundant and no noticeable impact on wildlife is expected. Plan A should result in no impacts to endangered or threatened species.

The transmission line and substation enlargement required for Alternative Plan C, would result in impacts to wildlife not significantly different from those of the Proposed Plan. Plan C, however, would require approximately 11 acres (4.5 ha) for a tap point at the Lower Monumental-John Day line. Some habitat would be removed, however, because of the relatively small amount and the abundance of similar habitat in the surrounding area, no significant impact on wildlife is expected.

As with the above plans, the transmission line required for Alternative Plan D would cross primarily grass and cropland where relatively little habitat modification would occur. Because of its longer length, approximately 27 miles (43 km), cumulative modification would be greater. If the line were located parallel to existing lines existing access roads could probably be used. If, however, the line were not parallel, new roads required would increase habitat modification and result in increased human access into the area. Such access, both authorized and unauthorized could result in increased disturbance to wildlife. The transmission line would cross the Columbia River at McNary and at Pasco. The crossings would be in areas of high waterfowl concentrations and could result in some collision mortality. This potential would be somewhat reduced if the crossings were near existing lines. There is no indication that any

significant collision mortality has resulted from existing line crossings in the area. No significant increase in sedimentation should result from the river crossings and no noticeable fishery impacts are expected.

Although 7 miles (12 km) shorter, the transmission line required for Alternative Plan E would potentially be located in the same area and result in similar wildlife impacts as the line in Plan D. Plan E, would require only one Columbia River crossing and would have a lower potential for waterfowl collisions than Plan D.

RESOURCE USE AND SOCIOECONOMIC RESOURCES

Demographic and Economic Considerations

The Proposed Plan would have socioeconomic implications similar to those described for Alternative Plan A below.

The temporary population increase expected from the construction of the facilities proposed in Alternative Plan A is estimated to be between 10 and 20 people (Table 3). These individuals will require room and board for a 2 to 3-month period. Motels are normally used by construction crews if they are available. It is also estimated that some 5 to 11 temporary jobs would be available to local residents for the duration of the construction projects required in Alternative Plan A. If these people are not available locally, they will have to be recruited elsewhere. The potential income from these jobs to the planning study area is estimated to be about \$45,000.

BPA and the contractors they engage make an effort to use local facilities and equipment whenever it is convenient. Although the multiplier effect of providing services and supplies for these construction projects and their personnel has not been taken into consideration in Table 3, it could be significant.

Alternative Plan C would require 4 to 6-months for completion of the work and the potential income to the local area would be approximately \$68,000 (Table 3).

Alternative Plan D would require 6 to 8-months to complete the job and the potential income to the local area would be about \$58,000. Alternative Plan E would require 4 to 6-months to complete the work and the potential income to the local area would be around \$43,000 (Table 3). Otherwise, the socioeconomic implications from both aspects of Alternative Plans D and E would be similar to those described for Alternative Plan A.

Land Use

Agriculture

Grapes are a perennial crop grown in the study areas of the Proposed Plan,

Table 3. Socio-Economic Considerations Related to Construction *

Considerations	Alternative Plan A		Proposed Plan (Alternative Plan B)		Alternative Plan C		Alternative Plan D	Alternative Plan E
	Substation Expansion	Line Construction	Substation Expansion	Line Construction	Substation Tap Point Expansion	Line Construction	Line Construction	Line Construction
Total Number Employed	10-12	10-20	10-12	10-20	10-12	10-20	10-20	10-20
Number Hired From Local Area	3-6	2-5	3-6	2-5	3-6	2-5	4-5	4-5
Length of Job (months)	2-3	2-3	2-3	2-3	4-6	2-3	6-8	4-6
Average Wage (\$ per hour)	8.00	9.00	8.00	9.00	8.00	9.00	9.00	9.00
Est. Potential Increase to Local Area (\$)	23,000	21,600	23,000	21,600	46,000	21,600	57,600	43,200

* Although this information is very general in nature, it is intended to provide some indication of the potential socio-economic impacts associated with substation and line construction.

** This does not take into consideration the income derived from services (i.e., food, entertainment, etc.) provided to construction crews by local businesses.

Source: Line and Substation Construction Sections, Branch of Construction, BPA.

as well as Alternatives A and C. A permanent solid set irrigation system provides the water. Mains and laterals are buried with risers extending above the grapes. The grapes are harvested with a mechanical harvester requiring a radius of 30 feet to turn. A tower in the vineyard would not only require irrigation modification but may eliminate 4 rows of grapes for a distance of 80 feet per tower site.

Agriculture would have a short term impact in the construction phase as the Proposed Plan and each of the alternatives will cross over cultivated farmlands and native grassland. Some farming operations may have long term impacts from the transmission line corridor and substation projects. Alternative Plan A may require about 5 miles (8 km) of 230-kV transmission line and 2 acres (0.8 ha) of additional land at Levey Substation. Alternative Plan C includes 6 miles (10 km) of 115-kV line and will require 2 acres (0.8 ha) at Sacajawea Substation and 11 acres (4.5 ha) of land at Lower Monumental-John Day tap line. Alternative Plan D will include 27 miles (43 km) of 230-kV and Alternative Plan E is planned for 20 miles (32 km) of 230-kV line. Each of these alternatives have similar relationships in that they cross agricultural farmlands and/or native sagebrush-grasslands consisting primarily of Big Sagebrush, rabbitbrush, needle and thread grass, and Indian ricegrass. The length of the line and more towers increases the impact effect.

All of the agricultural lands are irrigated because of the low precipitation of about 7 inches (179 mm). Irrigation provides for high yields and checks wind erosion. The principal irrigation systems are center pivot, side roll, solid-set and rill (gravity). The proposed transmission line could have long-term effect on layout and design and operation of irrigation systems in the vicinity of the towers.

The transmission lines could effect safety in aerial application of herbicides, insecticides, fungicides, and fertilizer. Extreme precaution must always be practiced in handling and upending irrigation pipe to avoid contact with the conductor.

Some soil erosion could occur in the disturbed construction areas but can be eliminated in a short period of time by grading, diversion ditches and seeding. Much of the grape acreage is irrigated by solid-set systems, which can be affected by transmission line tower location. The effects are greater with high value cash crops.

Annual and perennial weeds in the transmission line right-of-way are of great concern, however, they would be of short-term impact because of control by herbicides.

Urban and Residential

Construction of facilities under the Proposed Plan is not expected to

have any impact on urbanized land uses.

Construction of facilities under Plan A would not have any direct impact on urbanized land uses. The expansion of Levey Substation would be visible from several nearby rural residences. Depending on final location the transmission line may be seen from a limited number of rural residences.

Impacts from Plan C would be similar to the Proposed Plan.

Construction of facilities under Plan D would result in the intrusion of new transmission facilities near the confluence of the Snake and Columbia Rivers. Because this area is undergoing residential development it is likely that there would be visual, noise, and dust impacts on nearby residents. Near McNary Dam the transmission line could have similar impacts on residential land in the vicinity of Plymouth, Washington.

Under Plan E the impacts to urbanized land uses would be limited to the vicinity of Plymouth, Washington, as described above. If the existing 115-kV line were replaced there would be no reduction in the amount of land available for residential development.

Audible noise levels for a 500/115-kV or 500/230-kV transformer at the proposed substation, when energized would be about 76 dB(A) measured at a distance of 100 feet from the noise source, 70 dB(A) at 200 feet, 64 dB(A) at 400 feet, and 58 dB(A) at 800 feet. Because the substation would be located at a considerable distance from any residences, commercial businesses or offices, recreational facilities (camps, parks, or resorts), or other noise-sensitive property, exposure to the transformer noise emissions would not be a source of annoyance. Operational noise levels specified in the Washington Administrative Noise Code (WAC-173-60-040). The maximum permissible noise level for a substation (industrial noise source) is 70 dB(A) measured at the property boundary of the agricultural land.

Other

Other land uses are not expected to be impacted as a result of the construction or operation of the proposed facilities.

Esthetic

Under the Proposed Plan the transmission line would cross State Highway 124 where, due to the terrain and lack of vegetative cover, it could be visible for several miles. There are a few farm residences in the area from which the line could be seen. The additions to Sacajawea Substation would be visible from the south access road to Ice Harbor Dam. The changes, however, would not be apparent to the casual viewer.

Under Plan A the transmission line would likely cross the Pasco-Kahlotus Road where, due to the terrain and lack of vegetative cover, it would be visible for several miles. The line could also be visible from some

of the limited number of residences in this portion of the study area. Depending upon final location, portions of the line could be seen from the Snake River. The additions at Levey Substation would be visible from the north access road to Ice Harbor Dam and several nearby residences. Because of the existing visual impacts created by the substation and transmission facilities the additions would not be readily apparent. Portions of the transmission line may parallel an existing line with a reduction in the overall visual impact of the new line.

Under Plan C the impacts would be similar to the Proposed Plan except for the additional impact of the substation facilities at the Lower Monumental-John Day tap point. The substation might be visible from a farm residence near the existing line.

Under Plan D, the transmission line would cross the Columbia River twice and would be situated in growing residential areas southeast of Kennewick. Although there are existing transmission facilities in this area the close proximity to residents and users of the Columbia River would cause the addition of new facilities to be readily apparent. In other portions of the study area the additional transmission line would not significantly increase existing visual impacts. If the new line were not parallel to an existing line, visual impacts could increase because of the intrusion of a transmission line into a new area. It is unlikely that a new corridor could entirely avoid the congestion of residential development southeast of Kennewick and near the confluence of the Snake and Columbia Rivers.

Under Plan E the visual impacts on residential areas southeast of Kennewick could be avoided. If the 20 miles (32 km) of new line replaced an existing transmission line there would likely be no change in existing conditions. A route parallel to the existing line would add to the visual complexity of the corridor but should not significantly alter existing conditions. If the new line were not parallel to existing lines the visual impact would be greater because of the intrusion of a transmission facility into a previously undisturbed area.

Recreation

The facilities required for the Proposed Plan and Alternative C could result in some visual impact on hunters as described below for Plan A, but would be less likely to affect recreationists using the Snake River. The transmission line would cross Highway 124 which is used by recreationists, possibly resulting in additional visual impact.

Alternative Plan A is not expected to have any direct impact on developed recreational areas. The facilities would be located in an area used by upland bird and waterfowl hunters. The facilities could interfere with hunting activities in localized areas. This interference would involve the effect of the facilities on the visual component of the recreational experience. Depending on the final alignment there also could be visual

impacts to recreationists on and near the Snake River. Visual impacts are covered in the section, "Esthetics".

Alternative Plans D and E would have impacts similar to those described for Plan A. The potential for both short and long term visual impacts to recreationists using the Columbia and associated recreation areas is greatest for Plan D as this would require two river crossings. Such impacts, for both D and E, would probably be less if the crossings were adjacent to existing lines. The transmission line in Plan D would probably cross Sacajawea State Park in a corridor with existing transmission lines. The line would add to the long-term visual impact created by the existing lines. Short-term impacts resulting from noise and dust would occur in the park during construction.

Historical, Architectural, and Archeological

At this stage in the planning process no effect is expected on the Strawberry Island Village Archeological Site, now pending nomination to the National Register. Historic sites identified in the Washington Statewide Inventory of Historic Places are not expected to be affected by the Proposed Plan or Alternatives A or C. There is a low likelihood that Alternatives D and E may be viewed from the three historical properties on the Oregon Statewide Inventory of Historic Places, depending on ultimate line location.

An archeologic and historic evaluation will occur at the Facility Location stage. Should any additional properties be discovered during this process, procedural steps and protective measures as described in BPA's Role EIS would be taken. Additionally, contract specifications require that if a site is discovered during construction, work would be halted until the site has been evaluated.

NONCONSTRUCTION

Nonconstruction of the above described facilities will result in overloads on Ice Harbor transmission lines during outage conditions and when Ice Harbor generators are peaking and local load is low. Overloading will also occur when stream flow and Ice Harbor generators are low but irrigation demand is high. Without additional Ice Harbor transmission support, water will have to be spilled and hydro energy wasted during these periods of high stream flows especially during periods of non-irrigation or outages on other nearby lines. With additional transmission support it would be possible to utilize all of the energy from the area which is now wasted.

SUMMARY OF PLAN OF SERVICE ANALYSIS

INTRODUCTION

Resources and uses previously identified as highly important, critical,

or unique are given special attention in planning and construction of transmission facilities. Predictions of potential impacts to these important features (Fig. 4) are based upon past BPA experience, information from numerous agencies and individuals, and on the expertise from environmental specialists within BPA. Predictions of possible impacts are meant to facilitate comparisons of the environmental aspects of system alternatives which at this planning stage are represented by broad corridors. More precise quantification must necessarily be deferred until the actual alternative line locations become known and are then proposed in a BPA Facility Location Supplement. The impacts of conservation measures taken to save energy will be considered.

In Figure 4, two factors are considered in evaluating impacts (1) the likelihood of an impact occurrence, and (2) the expected degree of impact.

LIKELIHOOD OF IMPACT OCCURRENCE

The following designations are used to evaluate the likelihood of an impact:

- Low - Resources or use is a point source or occupies a small portion of the study area and could be avoided in final alinement. "Low" includes those resources and uses in degree of impact category "none".
- Medium - Resource or use partially occupies a corridor and may be impacted in final alinement.
- High - Resource or use entirely transverses a corridor and would be impacted if final alinement were within the presently defined corridors.

DEGREE OF IMPACT

These designations are used to evaluate the degree of impact:

- Slight - Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.
- Moderate - Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.
- High - Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.

Franklin Area System Reinforcement
Study Area 79-1

- None - Due to the compatibility of the resource with transmission facilities, or the low likelihood of an interaction between the resource and the transmission facility, we expect no significant measureable adverse impacts.
- Unknown - Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

Alternative Plan A

Impact
Adverse

Proposed Plan
(Alternative Plan B)

Impact
Adverse

	High	Mod	Sli	None	Unknown	High	Mod	Sli	None	Unknown
<u>Agriculture:</u>										
Grape Vineyards	●					●				
Soils			●					●		
Sprinkler Irrigation Systems	●					●				
Hydrology			◐					◐		
<u>Recreation:</u>										
Sacajawea State Park				○					○	
Two Rivers Park				○					○	
Hood Park				○					○	
McNary Recreational Areas				○					○	
McNary National Wildlife Refuge				○					○	
McNary Wildlife Recreation Area				○					○	
Urbanized Land Uses				○					○	
<u>Wildlife:</u>										
Anadromous fishery				○					○	
Waterfowl			◐					○		
Upland birds			○					○		
Endangered Peregrine falcon				○					○	

Likelihood of Impact Occurrence:

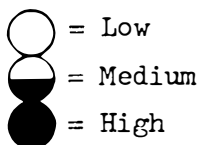


Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

Alternative Plan C
Impact
Adverse

Alternative Plan D
Impact
Adverse

	High	Mod	Sli	None	Unknown	High	Mod	Sli	None	Unknown
<u>Agriculture:</u>										
Grape Vineyards	●								○	
Soils			●					●		
Sprinkler Irrigation Systems	●							○		
Hydrology			◐					◐		
<u>Recreation:</u>										
Sacajawea State Park				○			●			
Two Rivers Park				○			●			
Hood Park				○				○		
McNary Recreational Areas				○			◐			
McNary National Wildlife Refuge				○					○	
McNary Wildlife Recreation Areas				○					○	
Urbanized Land Uses				○			◐			
<u>Wildlife:</u>										
Anadromous fishery			○						○	
Waterfowl			○				◐			
Upland birds			◐					◐		
Endangered Peregrine falcon				○					○	

Likelihood of Impact Occurrence:

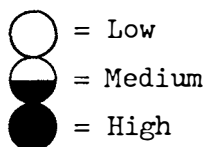


Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

Alternative Plan E

Impact
Adverse

	High	Mod	Sli	None	Unknown
<u>Agriculture:</u>					
Grape Vineyards				○	
Soils			●		
Sprinkler Irrigation Systems			○		
Hydrology			◐		
<u>Recreation:</u>					
Sacajawea State Park				○	
Two Rivers Park				○	
Hood Park				○	
McNary Recreational Areas		◐			
McNary National Wildlife Refuge				○	
McNary Wildlife Recreation Area				○	
Urbanized Land Uses		○			
<u>Wildlife:</u>					
Anadromous fishery			○		
Waterfowl		○			
Upland birds			◐		
Endangered Peregrine falcon				○	

Likelihood of Impact Occurrence:

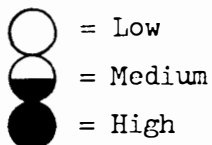


Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative)

DESCRIPTION OF THE TRANSMISSION
LINE ROUTES, THEIR POTENTIAL IMPACT
AND MITIGATION

Proposed and/or alternative route locations for transmission line facilities will be presented in the Draft and Final Facility Location Supplements. Proposed locations will be identified on the basis of comments received on previous facility supplements, field reconnaissance, and additional environmental and engineering analysis.

DESCRIPTION OF THE SUBSTATION
AND/OR PROJECT-RELATED FACILITY
SITES, THEIR POTENTIAL IMPACT AND
MITIGATION

Alternative locations for facilities will be presented in a Draft Facility Location Supplement. The locations will be identified based on comments received on the Facility Planning Supplement, field reconnaissance, and on further environmental and engineering analysis.

POTENTIAL UNAVOIDABLE
ADVERSE IMPACTS

At this time the proposal (Alternative Plan B) and Alternatives A, C, D, and E have been identified. Certain limitations on land use and productivity could be an unavoidable result of the construction of any of these alternatives. For example, farm use involving sprinkler irrigation systems adjacent to the tower sites may be affected. BPA will work with landowners to explore appropriate mitigation measures. They will also be compensated for the loss of crops during construction. Loss of soil by erosion, limits to changes in present irrigation practices, and elimination of some wildlife habitat could occur within the planning study area. The addition of new structures and conductors will add to the visual impact of the area.

Temporary, unavoidable impacts include the noise, dust, and visual impacts associated with construction activities. These are often considered to be a physiological annoyance to nearby residents.

THE RELATIONSHIP BETWEEN
LOCAL SHORT-TERM USES OF MAN'S
ENVIRONMENT AND THE MAINTENANCE
AND ENHANCEMENT OF LONG-TERM
PRODUCTIVITY

Based on present technology, the line and associated facilities needed for the alternatives will have an expected useful life of 50 years. Experience in the past years has shown that, in most cases, transmission corridors are upgraded to higher capacity in response to technological advancements and energy demands. This, along with BPA's policy of constructing new facilities on or parallel to existing corridors, will likely result in a long-term use of this corridor. However, if required, complete removal of these transmission facilities, including the tower footings, would be possible in order to make the land available for other uses.

THE IRREVERSIBLE AND IRRETRIEVABLE
COMMITMENTS OF RESOURCES

Unreclaimable steel, aluminum, and other materials used for conductors and other facilities would be irretrievably committed. Manpower and fuel for construction equipment would be irretrievably expended.

Although it would be possible to remove the entire facility at a future time, it is likely that the land used for transmission corridor would be irreversibly committed. The land used for tower sites and access roads would be unavailable or limited for any other land use.

The vegetation removed during construction, the wildlife eliminated, and the soil lost by erosion would be irretrievably committed.

CONSULTATION AND COORDINATION
WITH OTHERS

PLANNING COORDINATION

The following agencies and organizations were contacted by BPA economists, engineers, and environmentalists during the planning phase of this project. Information on land use plans, resource data and engineering concerns were exchanged. Additional meetings to review locations during the location phase of the project will be held to determine their compatibility with local land use plans and zoning.

Franklin Area System Reinforcement
Study Area 79-1

Federal

U.S. Army Corps of Engineers	Walla Walla, WA
Federal Aviation Administration	Seattle, WA
Department of Agriculture	
Soil Conservation Service	Walla Walla County, WA
Soil Conservation Service	Franklin County, WA

State

Department of Highways	Yakima, WA
Advisory Council on Historic Preservation	Olympia, WA
Washington Archeological Research Center	Pullman, WA

County

County Engineer	Walla Walla, WA
County Planner	Walla Walla, WA
County Extension Agent	Franklin County, WA
*County Planning Department	Franklin County, WA
County Planning Commission	Benton County, WA
County Planning Commission	Umatilla County, OR

COORDINATION IN THE REVIEW OF THE DRAFT FACILITY PLANNING SUPPLEMENT

The FY 1979 Draft Facility Planning Supplement was sent to Federal agencies, State clearinghouses, and to local clearinghouses where these have been established by States, or to County or metropolitan planning commissions and environmental agencies where local clearinghouses have not been established. These agencies are listed below. A notice of availability of the draft facility planning supplement was placed in the Federal Register.

AGENCIES REQUESTED TO COMMENT ON THE DRAFT FACILITY PLANNING SUPPLEMENT

Federal Agencies

U.S. Department of the Interior
 Fish & Wildlife Service
 Bureau of Mines
 Bureau of Indian Affairs
 Bureau of Land Management
 Bureau of Outdoor Recreation
 National Park Service
 Geological Survey
 Bureau of Reclamation
U.S. Department of Agriculture
 Forest Service
 * Soil Conservation Service

(An asterick * indicates that written comments were received)

Franklin Area System Reinforcement
Study Area 79-1

U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
* U.S. Environmental Protection Agency
Energy Research and Development Administration
Federal Energy Administration
Federal Power Commission
Federal Aviation Administration
Advisory Council on Historic Preservation
U.S. Department of the Army
Army Corps of Engineers
U.S. Department of Transportation

State Agencies

Washington State
Office of Program Planning and Fiscal Management
Office of Community Development
Department of Ecology
Historic Preservation Officer
Parks and Recreation Commission
Archeological Research Center
Oregon State
Historic Preservation Officer
Intergovernmental Relations Division
Department of Energy

Local Agencies

Benton-Franklin Governmental Conference
Walla Walla Regional Planning Commission
East Central Oregon Association of Counties

Other

Washington Environmental Council
Environmental Defense Fund
Pacific Northwest Conservation Council
Sierra Club, Pacific Northwest Chapter
National Wildlife Federation
Federation of Western Outdoor Clubs
Friends of Earth
Natural Resources Defense Council
The Wilderness Society
Natural Resources Law Institute
Oregon Environmental Council

(An asterick * indicates that written comments were received)

COMMENTS RECEIVED DURING REVIEW PROCESS

Franklin Co. Planning Dept. (October 31, 1977)

Comment: The economic base of Franklin County is agriculture. Any and all land use policies or decisions are implemented with the objective of protecting and preserving our agricultural economic foundation. Alternative Plan A proposes a direct, immediate and long term conflict with irrigated and potentially irrigable farms by suggesting a 5 mile long powerline to connect the Levey Substation with the PP&L Vantage-Walla Walla 230-kV line. Current land use in this study area includes irrigated agriculture, dryland agriculture and some range land. The irrigation systems are primarily center-pivot, solid-set wheel, and hand lines. Any powerline proposed to transect these systems will have unavoidable and long term adverse impacts. For those dryland farming operations, potentially irrigable, the impact of a powerline will severely restrict the development alternatives currently available.

Response: It is not Bonneville Power policy to disrupt existing irrigation systems or potential systems if they can be avoided. This is accomplished by following roads, property lines and section lines. Often, Bonneville Power has contributed greatly to the growth and development of Franklin County agriculture by providing a reliable source of power to the area's distributors of electricity. Without water and electricity modern sprinkler irrigation farming would be impossible.

Franklin Co. Planning Dept. (October 31, 1977)

Comment: At several points throughout the Draft Facility Planning Supplement, your discussion alludes to a "BPA policy of constructing new facilities on or parallel to existing corridors." In light of this fact Alternative Plan B appears contradictory to accepted BPA policy at the outset.

Response: BPA has a policy of paralleling existing lines (corridor) whenever possible. In the study areas of Alternatives A, B, and C there are no existing transmission lines that we can parallel. In view of BPA's policy a number of other factors need to be considered in selecting one of the five alternatives. These include such things as overall adverse environmental impact, existing land use patterns, economic cost, engineering factors, and reliability.

The fact that we have to establish a new corridor will be taken into consideration for Alternatives A, B, or C.

Franklin Area System Reinforcement
Study Area 79-1

Franklin Co. Planning Dept. (October 31, 1977)

Comment: The table shown on pages 20-22, graphically depicting the likelihood of occurrence and the degree of impacts, is less than complete. Agriculture and urban/residential land use impacts have been blatantly omitted. The message reflected in this table implies that "natural resource" considerations are far more important than demographic and socioeconomic concerns. We question your presumed conclusion.

Response: Sprinkler irrigation systems and grape vineyards have been added to the summary of plan of service analysis matrix, under the major heading of Agriculture. Urbanized land uses have also been added as a major heading to the summary of plan of service analysis matrix.

Soil Conservation Service (November 1, 1977)

Comment: In general, we find the document, for the most part, adequately discusses the environmental factors with which we have concern, with the exception of prime farmlands which should be addressed in compliance with Section 102(2)(c) of NEPA and CEQ's Memorandum for Heads of Agencies dated August 30, 1976.

We would, however, appreciate the opportunity to provide you with information pertaining to rangeland classification and expected ecological response to the rangeland ecosystem resulting from the proposed projects.

In addition, we have information concerning cropland and wildlife that should be of interest to you in your planning considerations.

Response: BPA has reviewed the Prime and Unique Farmland Proposed Rules as published in the Federal Register, Volume 42, No. 163--Tuesday, August 23, 1977. At the present time the Department of Agriculture (USDA) has not established an inventory of prime and unique farmland in the study area, in compliance with the above memorandum. We appreciate the information provided on rangeland classification, cropland, and wildlife. It will be used in our impact analysis.

U.S. Environmental Protection Agency (November 4, 1977)

Comment: Page 7: The discussion of land use should describe the local shoreline master programs within the study area in enough detail to allow a determination as to whether utility corridors are consistent with those programs.

Response: We have reviewed the Shoreline Master Programs for Benton and Franklin Counties. BPA's policy is to be consistent with such programs. Exceptions to this policy are made only where there is a clear justification. It is highly unlikely that the final location would affect the Shoreline Master Programs. If it does it will be discussed in the Facility Location Supplement.

U.S. Environmental Protection Agency (November 4, 1977)

Comment: The discussion of population should indicate why Umatilla experienced such dramatic growth and whether it is likely to continue.

Response: Between 1970 and 1975 the population for the City of Umatilla changed from 679 to 1,620. Part of the population increase resulted from the October 1973 annexation of the McNary townsite. The population of the McNary townsite at the time of annexation was approximately 250. In the 6 months following annexation the townsite had grown by an additional 100 persons. A gradual population growth is likely to continue. This information has been added to the supplement.

U.S. Environmental Protection Agency (November 4, 1977)

Comment: Page 16: Will the substations called for by the alternative plans of service comply with the Washington Administrative Noise Code due to their distance from noise sensitive receptors or due to particular design features of these particular substation?

Response: The operational noise from the completed facility will comply with the permissible noise levels specified in the Washington Administrative Noise Code (WAC-174-60-040). Noise compliance will be achieved primarily through the control of transformer purchase specifications and proper location of the substation noise components relative to noise sensitive receptors. Retrofit design mitigation such as the use of acoustical barriers will be used only if necessary. Presently, use of acoustical barriers are not anticipated for this project.

PUBLIC MEETING COMMENTS

Franklin Co. PUD Auditorium, Pasco, Washington
(Oct. 25, 1977)

Comment: MR. BRUCE WHITEMARSH: "Just being a simple layman of limited knowledge in this business, it just seems natural that you have some advantage in pursuing a routing that would take you along existing right-of-ways. Why do you consider, as an example, a whole new line?"

Response: BPA has a policy of paralleling existing lines (corridor) whenever possible. In the study areas of Alternatives A, B, and C there are no existing transmission lines that we can parallel. In view of BPA's policy, a number of other factors need to be considered in selecting one of the five alternatives. These include such things as overall adverse environmental impact, existing land use patterns, economic cost, engineering factors, and reliability. The fact that we have to establish a new corridor will be taken into consideration if either alternatives A, B, or C are selected.

Franklin Area System Reinforcement
Study Area 79-1

Franklin Co. PUD Auditorium, Pasco, Washington
(Oct. 25, 1977)

Comment: MR. BILL OWENS: "If you replace an existing line, you'll be replacing with steel poles versus wood poles."

Response: The wood poles from the existing 115-kV McNary-Badger Canyon line would be retained in Alternatives D and E.

SA-79-2

San Juan Island
Area Service



SAN JUAN ISLAND AREA SERVICE
FINAL FACILITY PLANNING SUPPLEMENT



SAN JUAN ISLAND AREA SERVICE
STUDY AREA 79-2

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The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The methodology section describes the research design and the data collection process. The results section presents the findings of the study, and the conclusion section summarizes the main findings and provides recommendations for future research.

The study was conducted in a laboratory setting, and the data were collected using a series of experiments. The results of the experiments were analyzed using statistical methods, and the findings were compared with the results of previous studies. The study found that the research objectives were achieved, and the results were consistent with the findings of previous research.

The study has several limitations, and there are some areas that need further research. The study was conducted in a laboratory setting, and the results may not be generalizable to real-world situations. The study also had a small sample size, and the results may be affected by sampling error.

In conclusion, the study found that the research objectives were achieved, and the results were consistent with the findings of previous research. The study has several limitations, and there are some areas that need further research.

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STATUS

SAN JUAN ISLAND AREA SERVICE

This facility was first described as a draft facility planning supplement Study Area 78-3, in BPA's Fiscal Year 1978 Program Statement which was filed with the President's Council on Environmental Quality (CEQ) on June 1, 1976. A public information meeting on the draft planning supplement was held at Friday Harbor, Washington on July 21, 1976. However, due to the lack of budgeted funds, BPA deferred the funding for this project from the FY 1978 Construction Program to the FY 1979 Construction Program. As a consequence, San Juan Island Area Service was updated and reissued in the FY 1979 Program Statement as Study Area 79-2. The new draft facility planning supplement (Study Area 79-2) was filed with CEQ on September 1, 1977. Comments received during the public and agency review period which closed on November 18, 1977 were considered in the development of the final planning supplement.

After evaluating the principal economic, technical and environmental factors associated with this project, and review of public and agency comments received on the draft planning supplement, Alternative Plan A (submarine cable system) was selected as the Proposed Plan of Service. A "Plan of Service Decision" section has been included in the final planning supplement under the Description of the Proposal. This final planning supplement identifies the need for the facility, the proposed plan, alternative plans considered, factors leading to the plan of service selection, and the predicted environmental impacts. A facility location supplement will now be prepared which will evaluate the design and location needs associated with the proposed plan of service.

The following tentative schedule dates for this project are:

Location Surveys	Fall 1978
Land Acquisition	1979
Construction	Summer 1981-Fall 1981
Energization	October 1981



DESCRIPTION OF THE PROPOSAL

SYSTEM REQUIREMENTS

The San Juan Islands are served by Orcas Power & Light Company (OPALCO) by an overhead distribution system interconnected between islands by low-voltage submarine cables. Projected increases in residential development, especially retirement and recreation homes, has created an anticipated need for additional transmission capacity to the San Juan Islands.

OPALCO is served by BPA at a 25-kV point of delivery on Lopez Island. Facilities owned by BPA consist of two 35-kV-rated cable circuits extending from Fidalgo to Decatur and from Decatur to Lopez. These separate cable circuits are connected together on Decatur Island by a 35-kV single-pole double-circuit overhead line. This system is fed from BPA's Fidalgo Substation near Anacortes, Washington.

The two-cable and overhead transmission system designed for 35-kV operation was operating at 25-kV. In 1977 its operating voltage level was raised to 35-kV to serve increasing loads and relieve low-voltage conditions on the islands during peakload conditions. Part of the project completed in 1977 included the replacement of transformers at Fidalgo Substation and the addition of a new substation on Lopez Island.

Other BPA facilities used to serve OPALCO include the existing diesel generators on Orcas and San Juan Islands rated at 3,500 kVA, a 1.6 mile (2.5 km), 25-kV overhead line on Lopez Island, and a 25-kV submarine cable in Lopez Sound and associated 25-kV overhead line on Decatur Island.

A load increase of about 4-1/2 times is expected between the winter of 1975 and 1995. This represents an average annual growth rate of about 8 percent per year.

In October 1977, there was about 36-MW reliable capacity for the islands supplied by the two existing submarine cables and local diesel generation. Reliable capacity means that one cable must be able to carry all load with the other cable out of service. A system built to this criteria allows for unscheduled and maintenance outages to occur without unduly jeopardizing service reliability to its customers.

These facilities will supply the load requirements until the winter of 1979-80 when the reliable capacity of the cables will be exceeded by a 36.4-MW peakload condition. New facilities will then be required to (1) permit increasing the capacity of the installed cables to meet anticipated load growth, and (2) maintain reliability of power supply in the event of a power outage of one of the existing cables. However, the earliest that new facilities can be constructed is October 1981. There exists a slight probability that the loss of one cable during the winters of 1979-80 and 1980-81 will require dropping some load to relieve the overload condition.

THE PROPOSED PLAN OF SERVICE

Alternative Plan A has been selected as the proposed plan of service.

The Proposed Plan of Service (Alternative Plan A) consists of a new submarine cable system between Fidalgo Substation and Lopez Island. The electrical parameters would be similar to the other cables in that it would be rated about 35-MW at 34.5-kV. If a routing across Decatur Island is taken, the cable would most likely be laid within 500 feet (152 m) of the existing submarine cables on existing underwater right-of-way. Cable systems Nos. 2 and 3 consist of two cable crossings with inter-connecting overhead lines across Decatur Island; the Rosario Strait crossing is 4.8 miles (7.7 km), the Decatur Island overland section 1.7 miles (2.7 km), and the Lopez Sound crossing 2.1 miles (3.4 km). An overhead transmission line, an underground cable, or a combination of a partial overhead transmission line and underground cable would be required across Decatur Island. Undergrounding of this circuit is being considered by BPA as a design alternative and will be more thoroughly examined in the facility location supplement. The cable section terminating on the east shore of Lopez Island would be terminated directly into the new Lopez Island Substation. Refer to Figures 1 and 2.

If a routing through Lopez Pass south of Decatur Island is taken, the cable would be laid on new underwater right-of-way for nearly its entire length. The total length of the submarine cable by this route is estimated 9.2 miles (14.8 km). The practicality of this location alternative will be thoroughly investigated in the facility location supplement.

The Proposed Plan would require additional facilities at Fidalgo and Lopez Substations. Additions to Fidalgo Substation would consist of one 34.5-kV power circuit breaker and associated terminal equipment. Additions to Lopez Substation would consist of a new 33,000-kVA, 34.5/69-kV transformer, one 34.5-kV and one 69-kV power circuit breaker and associated electrical equipment. These substation expansions would be constructed on land owned by BPA. Substation equipment would be accommodated within the fenceline boundaries of the existing substations.

Construction of facilities required for the Proposed Plan (across Decatur Island) would include clearing trees that would interfere with the construction, operation, and maintenance of the overhead line or underground cable. An overhead line would require the excavation of footing holes and guy anchor placement; erection of some structures; and stringing approximately 7 tons (6,350 kg) of conductor. Existing 50 to 55 feet (15 to 17 m) high wood-pole structures would be utilized, where possible. Undergrounding all or a portion of line would require excavating a cable trench approximately 4.5 feet (1.4 m) deep x 3 feet (1 m) wide, installation of the electrical cable in the trench, and backfilling the trench with soil. Existing transmission line right-of-way would be used where possible, however, up to 1 mile of new right-of-way or utility line franchise may be required. Existing access roads would be used to the maximum extent possible. A few new spur roads, however, may be required.

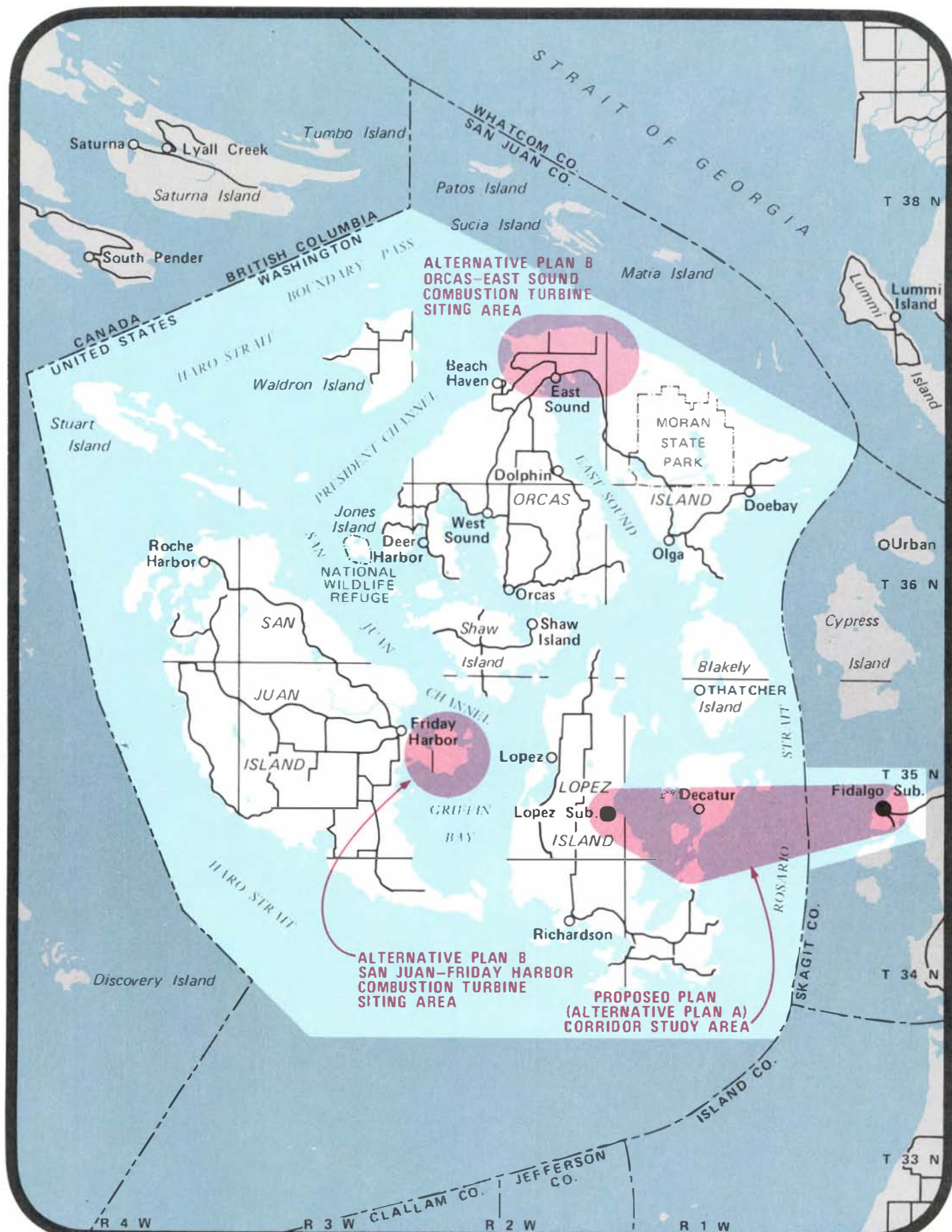


FIGURE 1
PLANNING STUDY AREA
SAN JUAN
79-2



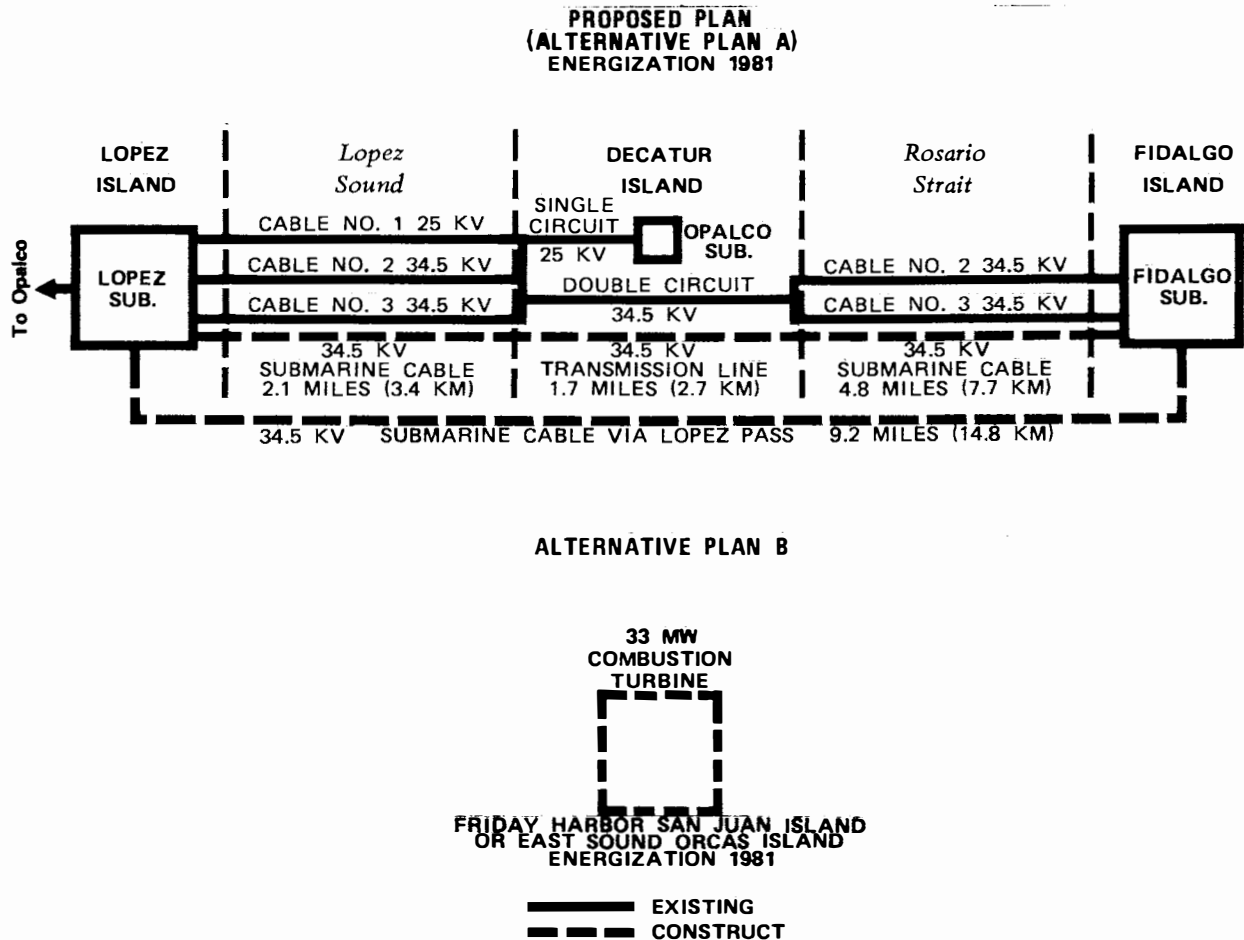


Figure 2 - Plans Considered

Shoreline cable installations would be required on Fidalgo, Decatur, and Lopez Islands. Each installation would require excavating a cable trench from the -10 ft. (3 m) mean lower low water to the shoreline cable terminus (potheads). Approximately 400 feet (122 m) of this trench would be excavated underwater by means of a barge-mounted clamshell. The cable would be placed in this trench and backfilled with sandy-gravel soil. The dry land portion of the cable installation would be backfilled with thermal sand, covered with protective concrete slabs, and backfilled with soil.

Audible noise levels for a 34.5-kV overhead transmission line when energized would be below ambient and for all practical purposes are not detectable above the natural background noise.

ALTERNATIVE PLANS CONSIDERED

ALTERNATIVE PLAN B

Alternative Plan B consists of installing "Combustion Generation" on the islands. The San Juan Islands offer an ideal application for the use of combustion-turbine generation. Combustion-turbine generation would provide reliability of power supply similar to Cable No. 3. "Reliability of power supply" is defined in Chapter III, Appendix B of The Role EIS. The primary purpose of planning for reliability of power supply is to protect the customer against the loss of electrical service in the event of a power failure.

In lieu of installing the cable system in 1981, a 33-MW combustion turbine would be required in the vicinity of Friday Harbor on San Juan Island or the East Sound area of Orcas Island in 1981. The turbine site would include a turbine-generator (stationary or portable), a diesel start-up engine, a fuel storage tank (aboveground or underground), a transformer and other substation equipment, and possibly a shore-to-turbine fuel pipeline. The pipeline would be approximately 2-4 inches (5-10 cm) in diameter and installed to accommodate barge delivery of fuel oil. Fuel oil consumption for a 33-MW combustion turbine is about 3,500 gallons/hour (13,250 l/hr) at rated capacity.

Other turbine sizes were investigated, but engineering-economic studies favored a 33-MW as the preferred turbine size. A 33-MW generator has a rated capacity equivalent to that of the submarine cable. Planning assumptions indicate that the turbine could potentially be placed in operation for a period of one to two weeks if one of the existing cables failed during peakload conditions.

Both stationary and portable turbine-generators were investigated. A portable turbine would probably be mounted on two semi-trailers. It is advantageous in that it could be easily transported to other parts of the BPA system as a temporary measure to defer construction of new facilities. Site requirements for a portable turbine would be very similar to a stationary unit. A stationary turbine unit would include clearing, grading, and surfacing a 2-acre (1 ha) site at one of the two designated locations (see Figs. 1 and 2). Depending upon final site location, additional land may be needed for a land use buffer zone. The buffer zone would be used for vegetative screening as well as attenuating audible noise. BPA would either construct new substation facilities where the turbine generator is installed or connect to OPALCO's existing substation facilities. Our studies have not yet been completed to make this determination.

Topography is an important consideration in the selection of combustion turbine sites. Not only will local relief influence the accessibility for supplying fuel, but it will have effects on the drainage patterns around the sites, the balancing of cut and fill slopes, the degree of

visual exposure, and the air quality through its affects on local wind patterns and other climatic factors. The rugged topography of the San Juan Islands makes many sites unsuitable for both turbines and transmission lines.

Additional details on turbine generators are described in the Role EIS (Chapter V, Section B.4.c. of Part 1, and Chapter X, Section A.1.a. of Appendix B).

PLAN OF SERVICE DECISION

Alternative Plan A (interisland submarine cable system) has been selected as the proposed plan of service. The following is a summary of the principal factors used in the selection of the Proposed Plan:

Cost and Engineering Factors

Results of the engineering-economic analysis has determined that the combustion turbine alternate is not economically justified, if it is used solely to back up the transmission system for loss of one cable. The Proposed Plan (Plan A) requires an investment cost about one-half that of the turbine plan (Plan B). Investment cost of the turbine is estimated at \$7.8 million; FY 1979 budget estimate for the submarine cable is approximately \$4.2 million, resulting in a difference of \$3.6 million. Also, Plan B has the highest system losses.^{1/}

Environmental Factors

The degree and likelihood of environmental impact associated with the construction of facilities in the Proposed Plan are relatively similar to Alternative Plan B at this stage of the environmental statement process. Refer to Figure 4 (page 36) of this Final Planning Supplement for a plan-by-plan comparison of potential impacts to resources of the area. Detailed site location impacts will be addressed in the Facility Location Supplement.

The Proposed Plan would create unavoidable adverse impacts to the natural shoreline environment, primarily from the trenching operations associated with the submarine cable installation. Plan B, however, could have similar impacts because of possible requirements for a shore-to-turbine fuel pipeline. Refer to page 37 for a detailed discussion of unavoidable adverse impacts.

The Proposed Plan would be constructed along an existing transmission corridor resulting in short-term soil erosion, clearing of merchantable timber, further disruption to existing archeological sites, and temporary disturbance to island residents and recreationists from the noise and dust associated with construction operations. Disturbance to

^{1/} These costs are based on an engineering-economic study conducted by the Branch of System Engineering dated November 21, 1977.

shoreline ecosystems would most likely be the major impact of the Proposed Plan.

Plan B could be sited either directly adjacent to existing electrical facilities or at some distance from them. A proposed location for the turbine-generator has not been determined. BPA believes it could select a turbine-generator site which would avoid the historical/archeological sites; designated recreational areas such as Turn Island Marine State Park, San Juan Island Wildlife Refuge; "natural" shoreline areas identified in the San Juan County Final Shoreline Master Program; Bald Eagle nesting areas; and other significant resources identified in the planning study area. Accidental oil spills and operational noise would most likely be the major impacts associated with Plan B.

Impact differences between plans are not significant enough to affect the plan selection.

Public and Agency Comments and Compatibility with State and Local Planning

A public meeting was held at Friday Harbor, Washington on July 21, 1976 to present these plans to the public. Comments were made relative to anticipated need and timing for the project; growth rate for San Juan County; impact on OPALCO's system; cost ratio between the two plans; energy conservation; nuclear power; system reliability; the possibility of locating the Decatur Island transmission underground; effect on property values; and if a new right-of-way easement is required, the effect of this land on tax rolls.

Comments were received from Federal, state, and local agencies. Their concerns varied, ranging from degree of impact of fish, shellfish and birds of prey to impact on scenic and recreational values. The only State Agency commenting was the Washington State Parks and Recreation Commission (WSP&RC). The WSP&RC was particularly concerned about the effects of accidental oil spills on their marine state parks if Plan B was chosen. The only local agency commenting was the San Juan County Planning Department (SJCPD). The SJCPD indicated that BPA should carefully consider the relevant shoreline designations, policies, and regulations of their final Shoreline Master Program in selecting a facility location. "Natural" shoreline designations specifically exclude all types of utility construction.

Sierra Club is the only privately-sponsored environmental organization that submitted comments. Sierra Club questioned whether or not BPA has congressional authority to own or operate combustion turbines under Plan B.

These comments were responded to at the end of this Final Facility Planning Supplement (pages 41 to 56).

Consideration of the above factors indicate that the Proposed Plan (Alternative Plan A) demonstrates long term usefulness and requires lower initial capital investment. The environmental differences between plans, including public and agency comments were not significant enough to affect the plan of service selection.

DESCRIPTION OF THE ENVIRONMENT

PLANNING STUDY AREA

The planning study area (Fig. 1) describes the area which encompasses all resources of significance which could influence the planning and location of facilities. Included within the planning study area are three smaller regions referred to as the corridor study area and San Juan and Orcas combustion turbine siting areas.

The corridor study area is the area which encompasses the feasible route locations required for the submarine cable system. It is determined based on an analysis of the planning study area resources and a first approximation evaluation of routes between the Lopez Substation and the mainland energy supply center at Fidalgo Substation. The San Juan and Orcas combustion turbine siting areas encompass all potential turbine-generator sites, as well as affected resources and resource uses.

GEOGRAPHY

The planning study area incorporates most of San Juan County, Washington, which is located in the northwest section of the State (Fig. 1). The county lies between the Strait of Juan de Fuca on the south and the Strait of Georgia on the north. It is separated from the northwest mainland of Washington by Rosario Strait on its eastern boundary, although a projection of the planning study area includes the land between Green and Shannon Points on Fidalgo Island. The western portion of the study area is separated from Vancouver Island by Haro Strait. Seattle is approximately 70 air miles (113 km) to the southeast; Victoria, B.C., is nearly 20 miles (32 km) to the southwest; and Vancouver, B.C., is about 30 air miles (80 km) to the north.

San Juan County claims 172 islands in a chain of 178 named islands that comprise the San Juan archipelago. The total land area of the county is 179 square miles (464 km²). Most of the larger islands are dominated by at least one hill or peak. Mount Constitution, rising to an elevation of 2,454 feet (748 m) on Orcas Island, is the highest point in the study area. The largest island in the group is Orcas, which encompasses 57 square miles (148 km²). The second largest island is San Juan at about 55 square miles (142 km²). The islands are serviced by the Washington State Ferry System from Anacortes, and County roads on the major islands provide adequate transportation for island residents and visitors. Friday Harbor on San Juan Island is the County seat and the largest town in the study area.

CLIMATE

The San Juan archipelago is characterized by a mid-latitude, West Coast,

marine climate. Most of the air masses that reach the study area originate over the Pacific Ocean. This maritime air has a moderating influence which results in cool, relatively dry summers and mild, moist winters (Table 1). However, the San Juans receive less precipitation than most other areas in Puget Sound because the Olympic Mountains and Vancouver Island create a rainshadow for the archipelago. Annual precipitation totals in the study area approximate 28 inches (711 mm), with over 72 percent occurring in the 6-month period from October through March. In a typical year, only 5 to 6 inches (127-152 mm) of snow falls, with January and February receiving the largest portion. Although temperature extremes of 92° F (33° C) and -8° F (-22° C) have been recorded, the study area normally does not have great seasonal or daily temperature fluctuations (Table 1). In general, the prevailing direction of the wind is from the east or southeast in winter and from the west or southwest in summer.

Table 1. - Representative Climatological Data (1931-1960)

<u>Characteristic</u> (Average)	<u>Station</u>		
	<u>Friday Harbor</u>	<u>Olga</u>	<u>Anacortes</u>
Annual Temp. °F (°C)	50.1 (10.1)	49.5 (9.7)	51.4 (10.8)
Max/Min Jan. Temp °F (°C)	45.4/34.7 (7.4/1.5)	43.6/33.6 (6.4/0.9)	45.0/35.3 (7.2/1.8)
Max/Min July Temp °F (°C)	72.1/49.4 (22.3/9.7)	70.1/48.9 (21.2/9.4)	72.5/52.2 (22.5/11.2)
Annual Precip. In. (mm)	27.4 (696)	28.8 (732)	25.7 (653)
Jan. Precip. In. (mm)	4.3 (109)	4.0 (102)	3.4 (86)
July Precip. In. (mm)	0.8 (20)	0.9 (23)	0.8 (20)
Annual Snowfall In. (mm)	--	5.7 (145)	5.6 (142)

Source: PNRBC 1969. Climatological Handbook, Vol. I & II

NATURAL RESOURCES

The following sections describe natural resources present, and their geographic location and distribution within the planning study area. Man's use of natural resources will be presented under the section, "Resource Use and Social/Economic Resources."

ATMOSPHERE

Air quality throughout the planning study area is generally very good. Some pollutant drift may occur as a result of wind currents circulating along the west coast of Washington, primarily the Puget Sound industrial centers of Bellingham, Everett, Seattle, and Tacoma. Emissions from commercial steamship vessels traveling through the many channels and straits of the San Juan Islands may also cause some atmospheric deterioration. However, due to the meteorological cycles of weather, strong prevailing winds off the Pacific Ocean, and moderate rainfall, most atmospheric pollutants will be diluted and washed away. Thermal inversion is not predominate in the San Juan Islands; however, it does occur occasionally.

GEOLOGY, SOILS AND MINERALS

The San Juan study area is located in the northern portion of the Willamette-Puget Lowland Physiographic Province (Highsmith 1973).^{1/} The archipelago results from the partial submergence of the seaward extension of the Puget Lowlands. These islands are part of a structural arch which transects the Lowland depression. The variety of rock types and structures seen in this region is quite astonishing (McKee 1972). Here, old crystalline and sedimentary "basement" rocks are exposed; whereas, in locations outside the study area, they are normally buried at considerable depth. Except where modified by shoreline processes and the growth of vegetation, the archipelago's smoothed and rounded landscape appears much as it did at the end of the ice age.

All land masses encountered in the study area are islands. They are characterized by rocky, abrupt shorelines which typically rise to a central peak or summit. Wave and tidal action, along with other coastal processes, are the principal erosional forces in operation throughout the study area. The shorelines are indented by many small bays and coves. The terrain varies from island to island with some, such as Lopez, relatively flat. Other islands, such as Orcas and sections of San Juans, have rolling hills, a few rather deep valleys, and mountains with outcroppings of rock which become headlands near some of the coastal areas. There are many sheltered channels and passages between the hundreds of islands and innumerable beaches along the shoreline which make the entire region a favorite of recreationists.

In the Puget Lowlands, seismic risks are higher than in other areas within the BPA service region. Several earthquake epicenters with Richter magnitudes of 5.0 or less have been recorded within the planning study area (Shannon and Wilson 1972). A few epicenters with magnitudes

^{1/} References are cited using the author-date system. Refer to the "References" section for the complete citation.

higher than 5.0 have been recorded within a 100-mile (161 km) radius of the planning study area. In addition, the Geologic Map of Washington indicates that there are several faults on Orcas Island. Seismic intensities anticipated from earthquakes with magnitude experiences in the study area may exceed VI on the Modified Mercalli Scale (Shannon and Wilson 1972). Estimated recurrence intervals for earthquakes of the magnitude experienced in the study area are from 2 to 5 years (Artim 1973).

In general, all of the soils are products of glacial and/or glacio-fluvial action. Two associations, Roche-San Juan and San Juan-Everett predominate. They are moderately to excessively drained, have slight to moderate erosion potential, medium to coarse texture, and characterized by low fertility. The soils of a third association, Bellingham-Coveland-Bow, are poorly drained organic soils. Their erosion potential is slight. They must be drained for use in agriculture. Most of the cash crops in the study area are grown on soils of this association. Soils of the Pickett-Rockland association are well drained and have a slight to moderate erosion potential. These soils are medium to coarse textured with rocky outcrops common. Only small areas of this association are farmed.

Sand and gravel deposits are found scattered throughout the study area and support a concrete plant and sand and gravel extraction operations.

HYDROLOGY

Freshwater resources are extremely limited throughout the San Juan Archipelago. Only a few of the larger islands are able to support well-defined perennial stream systems. These occur where the soil mantle and subsurface structure allows groundwater flow to supplement the surface runoff. The summer baseflows of these streams depends almost entirely on groundwater contributions. Most of the drainages in the study area are characterized by ephemeral or, at best, intermittent flows. These drainages carry direct runoff from precipitation, which occurs primarily during the winter season. They are generally dry at other times. Forty-five lakes and reservoirs are listed for San Juan County, totaling 880 acres (356.4 ha). The largest body of freshwater in the County is Mountain Lake on Orcas Island at 198 acres (80.2 ha). Sediment problems are minor and occur in localized areas of construction or farming. In some places, soils are eroded by rapid runoff from higher rocky areas.

Groundwater resources in the San Juans are barely adequate for individual household requirements (PSTF-PNRBC 1970). The better aquifers are in coarse Quaternary sediments. Wells are drilled to depths of up to 500 feet (150 m) before suitable aquifers are located. Yields can be expected to be between 10 and 20 gallons per minute (45 to 90 l/min.).

The San Juan Islands have about 380 miles (610 km) of saltwater shoreline. The mean diurnal range of the tide in the archipelago varies from 7.3 feet (2.2 m) at Richardson on Lopez Island to 8.6 feet (2.6 m) at the Patos Island Wharf (NOAA 1975). The average tidal current velocity for Rosario Strait, off Green Point, is 2.0 knots (3.7 km/hr).

VEGETATION

The San Juan Islands include some of the driest sites encountered in western Washington. However, because of highly variable topography and aspect, most islands possess a surprisingly diverse assemblage of plant communities, ranging from very dry to moist types (Franklin and Dyrness 1973). The vegetation in the planning study area consists predominantly of conifers, but deciduous trees grow on some of the more poorly drained or disturbed areas. Grasses occupy the drier sites, and various kinds of cactuses are located in the driest areas.

The principal tree cover throughout the islands is Douglas-fir. Western red cedar, western hemlock and grand fir are also found within the forest stands. Open woodlands are common in the drier locations and tree species which can normally be found in these areas include Pacific madrone, lodgepole pine, Oregon white oak, along with Douglas-fir. Where moist conditions exist, red alder and various species of willow are present. Bigleaf maple is also found on the margins of the forest communities. Areas disturbed by logging typically support a red alder-bigleaf maple/salmonberry community.

The understory is very dense, consisting of a great variety of shrubs and low-growing plants. The most common species found are Oregon grape, salal, snowberry, red huckleberry, and varieties of wild roses. Salmonberry, thimbleberry and red elderberry have also been identified. The open grasslands are dominated by Idaho fescue and include smaller amounts of thickspike wheatgrass and Kentucky bluegrass. Abandoned cultivated fields are now being encroached upon by both Canada and bull thistle, vetch, and scotchbroom. Sword and bracken fern are found along the road edges. Forbs encountered included storksbill, pussytoes, and yarrow. Various mosses and lichens are common on the exposed rock outcrops.

WILDLIFE

The Planning Study Area contains a wide diversity of high quality wildlife habitat. This habitat supports wildlife resources having significant recreational and economic importance. Aquatic habitat, primarily marine and estuarine, is used year round by anadromous and marine fish and shellfish. Large runs of anadromous fish pass through the marine waters of the study area during migration between the ocean and rivers in British Columbia and Washington. Species present include steelhead and five species of Pacific salmon. In addition, the numerous bays and coves provide good rearing habitat for juvenile salmon.

Freshwater streams within the study area are mostly small and intermittent and are of little value as production areas for anadromous species. Only four streams are known to be used by anadromous fish (Fig. 3). Streams on the islands support small to moderate populations of resident species including rainbow and cutthroat trout, and the larger lakes support both trout and warmwater species including bass and crappie.

The irregular coastline and numerous bays having sandy or mud bottoms provide some of the best shellfish producing areas on the West Coast. Littleneck and cockle clams inhabit the tidal zone, and butter and horse clams and geoduck are found below the tidal zone. Figure 3 shows some of the more productive shellfish producing areas.

Small and scattered private oyster beds are located in protected bays. Blue mussel and rock scallops cling to the boulders along the San Juan coastline. Dungeness crab and shrimp are abundant throughout the area from the tidal zone to more than 50 fathoms (90 m). A wide variety of other marine invertebrates, including sea cucumbers and sea urchins, are also common.

Several species of marine fish are present including lingcod, herring, flounder, surfperch and a variety of rockfish and sole.

Waterfowl make use of the area, particularly West Sound of Orcas Island, primarily for wintering and resting. There is relatively little breeding habitat available with the bulk of production occurring on the shallow lakes (PSTF 1970). Typical species that winter in the area include eider, scoter, bufflehead, scaup, mallard, and goldeneye. The endangered Aleutian Canada goose may pass through the area during migration (FWS 1974).

Islands and groups of rocks provide habitat for large numbers of colonial nesting and oceanic birds. Glaucous-winged gulls are most abundant, and other species include pigeon guillemots, black oystercatchers, black turnstones, and three species of cormorants.

The only known continental United States nesting population of the introduced European skylark occurs on the south end of San Juan Island (U.S. Army Corps of Engineers, 1975). This species is not presently Federally classified as threatened or endangered.

Other birds inhabiting the area include the golden eagle, bald eagle, osprey, and possibly the endangered American peregrine falcon (FWS 1974). The golden eagle is listed by the Washington Department of Game as threatened. The Osprey is listed as probably threatened in coastal Washington. Bald eagles nest throughout the islands (Salo, 1975), where they reportedly feed heavily on feral domestic rabbit carrion. Especially high eagle populations occur on the south end of San Juan Island. It

has been estimated that a high percentage of the annual San Juan Island eagle population gain is lost through shooting mortality (Retfalvi 1965). The U.S. Fish and Wildlife Service has proposed that the bald eagle be designated a threatened species in Washington (Federal Register, July 12, 1976).

Medium to high ring-necked pheasant populations occur on San Juan, Lopez, and Orcas Islands (PSTF 1970). Other upland bird species of lesser importance inhabiting the islands include quail, chukar, red-legged, gray and bamboo partridge. All of these species have been introduced. The upland birds are associated with edge and fence-row cover.

This same habitat is also important to the "San Juan" rabbit, also called European hare. This animal, which originated from domestic varieties, in some years can reach phenomenal population densities. The most numerous furbearing animals present are species which can utilize salt-water shoreline habitat. These species include mink, otter, weasel, raccoon, and red fox. The largest mammal inhabiting the islands is the blacktail deer. Deer population densities on San Juan, Lopez, Shaw and Orcas Islands are among the highest in Washington (WDG 1975). Food is a limiting factor for deer on the islands and agricultural damage by these animals has been a serious problem.

The marine environment supports several species of marine mammals. Among the more common species are killer whale, harbor porpoise, harbor seal, and dolphins.

RESOURCE USE AND SOCIAL/ECONOMIC RESOURCES

The following sections relate man's use of the natural resources previously described.

DEMOGRAPHIC AND ECONOMIC CONSIDERATIONS

The population of San Juan County was 3,856 in 1970. As revealed in Table 2, this represents a 34.3 percent increase since 1960. Since deaths outnumbered births during this 10-year period in San Juan County, the increase resulted from the immigration of 1,089 people. The population density is 21.5 people per square mile of land area. Nearly 21 percent of the County's population live in the town of Friday Harbor. The average number of people comprising a household is 2.52:1, which is attributed to increasing numbers of retirement age people settling in the County. The industries showing the greatest gain in employment are personal services, along with wholesale and retail trade. This reflects the increasing demands for goods and services from the growing permanent population and seasonal visitors who come for recreation purposes.

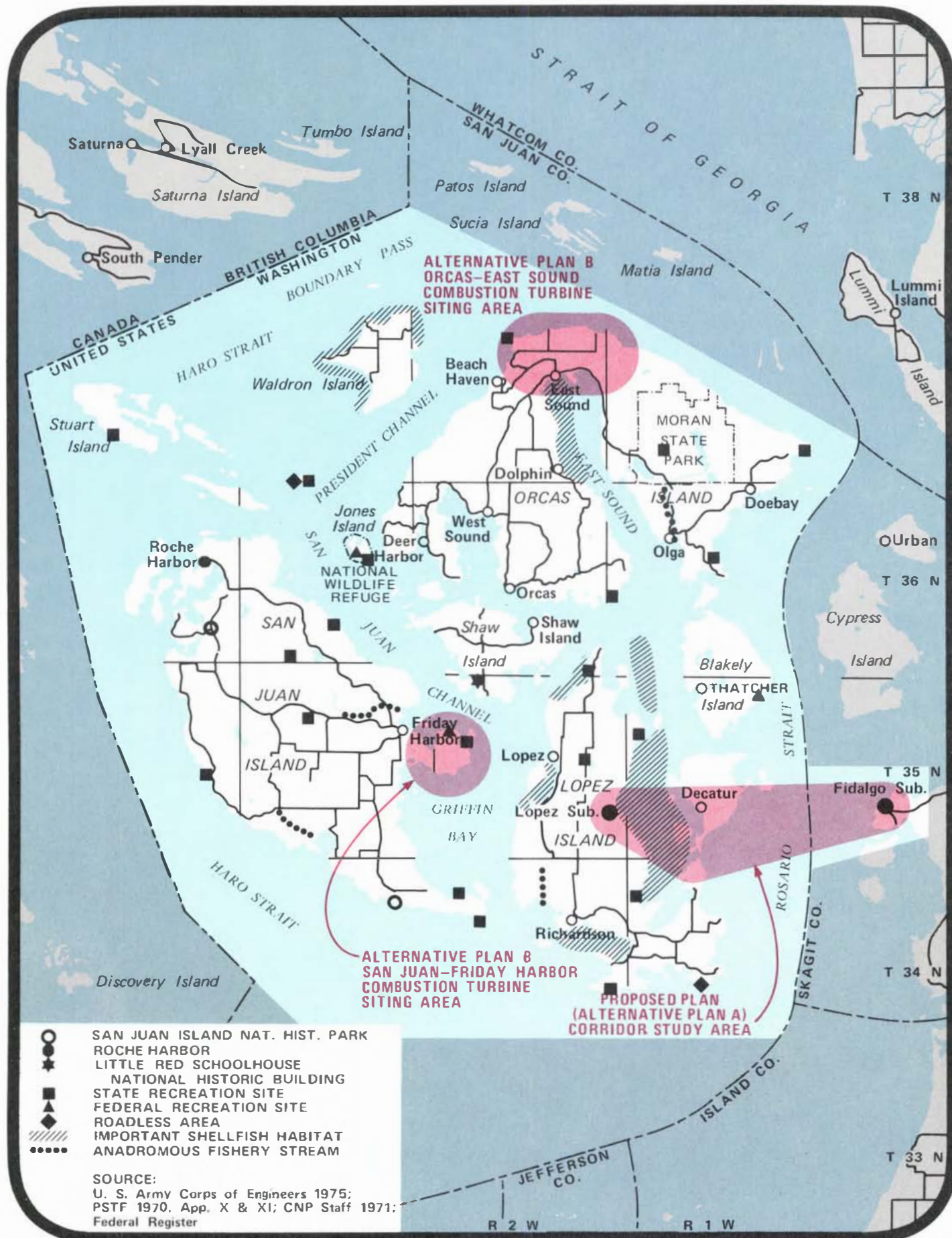


FIGURE 3
 RESOURCE MAP
 SAN JUAN
 79-2



Table 2. - Population Statistics

Location	1970	1960	Percent Change
San Juan County	3,856	2,872	34.3
Friday Harbor	803	706	13.7

Source: U.S. Bureau of Census, 1970, Vol. 1, Characteristics of the Population, Part 49, Washington, 910 pages.

LAND USE

The San Juan County Planning Department has adopted a Final Shoreline Master Program on October 18, 1976 in accordance with the Washington Shoreline Management Act of 1971 (RCW 90.58) and the Coastal Zone Management Act of 1972 as amended (16 U.S.C. 1451-1464). In addition, a map of the shoreline environments was prepared. The shoreline areas of Decatur Island, where the existing cables are located, are given a "rural" and "conservance" designation. The east shore of Lopez Island where our substation is located is designated "rural". Near the towns of Friday Harbor and East Sound, a combination of "urban", "suburban", or "conservance" designation is given. However, these zoning classifications do not preclude the construction of power generation or transmission facilities. BPA's proposal will be consistent with the Final Shoreline Master Plan and other requirements of the Coastal Zone Management Program and the Washington Shoreline Management Act.

Agriculture

Agriculture activity in the county is limited and is pursued mainly on the islands of Lopez, Orcas and San Juan. Farming on these islands is confined to small valleys, the less precipitous slopes, and the level areas. Decatur Island has only pasture and Fidalgo Island has no identified agriculture use areas. Of the 110,080 acres (44,582 ha) of land area in the county, 34.4 percent or 37,912 acres (15,354 ha) was classed as farmland in the 1964 agriculture census. Farmland acreage continues to decline and represents only 22.5 percent of the total acreage in the 1969 agricultural census.

The crops grown are primarily small grain (winter wheat, oats, barley) and hay. Clover and alfalfa with a grass mixture are the most important hay and pasture crops. Typical yields are winter wheat, 30 to 35 bushels (10 to 12 hl); oats, 50 to 55 bushels (18 to 20 hl); barley, 50 to 55 bushels (18 to 20 hl); hay, 2 to 5 tons (1,800 to 4,500 kg); and pasture, 5 to 10 animal unit months per acre. The yields are lower than comparable lands in the Puget Sound Basin due to lower precipitation.

The number of farms and farm acreage in San Juan County continues to decline and will be of even less importance in the future. Conversion of farmland to other uses such as residential and commercial development contributed to the decrease in farm acreage.

In the census years of 1959, 1964, and 1969, livestock and livestock products accounted for more than 75 percent of the total value of farm products sold of \$687,097, \$510,905, and \$415,357, respectively. Live-stock consists mainly of chickens, sheep, cattle, and hogs. The decrease of \$271,240 in total value of products sold represents a decrease of about 40 percent, unadjusted for inflation (USDA 1969). The decrease in value of products sold is also indicative of the general decline in the importance of agriculture to the economy of the County.

Forestry

Commercially important Douglas-fir forests predominate on most of the islands. Other important timber species are scattered among the fir stands, including Western red cedar and Western hemlock. Lodgepole pine, of secondary commercial importance, grows on Decatur Island, usually establishing itself on sites disturbed naturally or by man, such as after lightening caused wild fires, along utility rights-of-way and roads. Red alder, willow and bigleaf maple, all of low commercial value, also establish on disturbed sites.

Growth in existing Douglas-fir stands indicates that most timber sites are commercially highly productive. Access to the forests for timber harvesting is limited due to their island location, but as log prices continue to rise, these forests could become more commercially valuable. Several permits for timber harvesting presently exist on Decatur Island, and about 158 acres (63.9 ha) are currently taxed as commercial forest land.

Urban and Residential

Urban and residential land uses are primarily concentrated along the shorelines. Low density rural and recreational home development is the major pattern, although there are approximately 13 small communities with populations well under 1,000 persons. In inland areas, homes are generally associated with agricultural activity.

Subdivision of island property by developers in San Juan County in the last 10 years has exceeded the total number of such developments during the previous 60 years. As an example, major home developments have occurred at Roche Harbor and Eagle Cove on San Juan Island. It is expected that these two developments will ultimately contain some 3,000 lots (BPA, 1972).

Major transportation systems are limited to either water or air service between islands. From Anacortes, the Washington State Ferry System

provides regular and frequent service to San Juan, Orcas, Lopez, and Shaw Islands. Access to other islands is either by private or freight boats and barges. Regular air service is available between Friday Harbor and the mainland. Many of the smaller islands have landing strips for private planes.

Numerous County and State roads are on all the larger islands and provide adequate transportation for island residents and visitors.

The Rosario Strait is the major north-south traffic zone for commercial vessels in the Puget Sound area.

Other

A few areas listed as Research or Education areas in the Washington Environmental Atlas are located in the vicinity of the Friday Harbor and East Sound Turbine Siting Areas. These include: Friday Harbor Laboratories, (Argyle Lagoon, Minnesota Reef, and Turn Island); Jakle's Lagoon near Griffin Bay; and Crescent Beach, an important sand dollar area in the vicinity of East Sound.

ESTHETIC

The San Juan Islands display some of the most valuable scenic resources in the Pacific Northwest. The greatest single factor influencing the visual quality of the area is the joining of land and water. The islands have irregular shorelines that create many small harbors and narrow channels. These contrast with rocky headlands and beaches with forests directly behind. Even the manmade elements are generally pleasant with many well sited shoreline dwellings, picturesque cottages and farms. The scenic beauty is enjoyed from land, water and air. Therefore, scenic features as well as intruding features such as transmission facilities may be visible from almost any location or direction. Many of the residents and visitors on the islands are retired persons or recreationists and are quite sensitive to the visual resources.

RECREATION

The San Juan Islands offer an outstanding variety of high quality environment for leisure time enjoyment. Recreation and tourism are becoming the islands' most important asset. The region attracts people from the nearby population centers as well as great numbers of out-of-state residents.

Puget Sound is considered the boating capital of the Northwest and is one of the most heavily used boating areas in the United States. Island facilities such as marinas, moorages and boat launches are predominantly privately owned and operated; however, public areas are available. Other popular water-oriented sports are fishing, primarily for anadromous and marine species; swimming, scuba diving, crabbing, and clamming.

Many opportunities exist for camping, hiking, photography, rockhounding, and opportunities also exist for deer, upland bird, waterfowl, and rabbit hunting, although much of the land is private and posted against hunting. Scenic country roads offer enjoyment for those walking, riding bicycles and motorbikes, or driving. Many historical and archeological sites (see Cultural Resources Section), as well as nonactivity relaxation in a pleasant island environment, are afforded the recreationist.

Eighteen of the area's 20 State recreation sites and 1 of the 5 Federal sites are Class II, General Outdoor Recreation Areas. Two State and two Federal sites are listed as Class III, Natural Environment Areas and San Juan Island has two Federal Class VI, Historic and Cultural Sites (CNP, 1971). Two designated roadless areas have been identified (Fig. 3). The area includes approximately 40 resorts, motels and hotels, and innumerable private vacation homes and cottages.

An increasing demand for recreation in this area indicates that the potential will be developed further. The focus is shifting from a seasonal to a year-round tourist trade. The CNP has designated 13 development zones in the region. However, several factors have been identified as deterrents to rapid growth of the tourist industry. These include distance from mainland, inconvenient access, and use of much of the water frontage for vacation homes instead of public recreation. Also listed as an out-of-character environmental intrusion are existing transmission lines and their corridors (PSTF 1970).

HISTORICAL, ARCHITECTURAL, AND ARCHEOLOGICAL

The National Register of Historic Places and subsequent monthly addenda through November 29, 1977, have been reviewed. The planning study area contains three Federal Register properties, one property that is eligible for inclusion in the National Register, and two properties that nominations are being considered for listing in the National Register. The Federal Register sites include: (1) The San Juan Island National Historic Park (British and American Camps) in the vicinity of Friday Harbor; (2) the Little Red Schoolhouse on Shaw Island; and (3) Roche Harbor in Northern San Juan Island. See Figure 3. Patos Island Light Station, Patos Island is the only historic site listed as eligible for inclusion in the National Register. Rosario, South of East Sound on Orcas Island and Turn Point Light Station, Prevost vicinity on Stuart Island are the two properties for which nominations are pending.

Consultation with the Washington State Office of Archeology and Historic Preservation has confirmed that there are no registered State historic properties within the study area. The Statewide Inventory of Historic Places lists 49 historic buildings and sites in the study area. A large portion of these properties are located in or near East Sound on Orcas Island, with other concentrations at Roche and Friday Harbors on San Juan Island. They include four hotels and three churches erected during

the nineteenth century, several historical society museums, the University of Washington Laboratories at Pt. Caution, and pioneer homes and general stores erected near the turn of the century. Other inventory sites are scattered throughout the planning study area. Site type is divergent, but commonly history predominates within this resource category.

Several hundred archeological sites have been identified in the San Juan area (Hartman, 1976). Recent investigations conducted on Decatur Island confirm the existence and document the significance of several archeological sites (Logsdon 1975, Munsell 1975). A previous archeological survey was completed of the transmission line corridor across Decatur Island by David A. Munsell in January 1975. The survey revealed the existence of two areas of site concentration within the limits of the powerline corridor. Because one of the sites located on the west shore of Decatur Island was so badly disturbed by a multitude of factors including early logging operations, natural beach erosion, and previous BPA transmission line construction, Munsell determined it to be of very little value and recovery efforts were not necessary. However, he determined that recovery efforts were warranted for the other site on the east shore of Decatur. In September 1975, small test pits were hand-excavated by a team of archeologists from Western Washington State College. The test pits yielded information on the early inhabitants subsistence economy and the site's relationship to others in the San Juan Islands. BPA is continuing consultation with the Washington Archeological Research Center and the Washington State Historic Preservation Officer with respect to these sites. A professional archeological review will be made at the facility location stage.

BPA will comply with the requirements of the National Historic Preservation Act of 1966 (P.L. 89-665), as well as Executive Order 11593. Procedures applicable to these laws are described in the Historic and Archeologic Appendix to the Fiscal Year 1979 Program Statement.

P L A N O F S E R V I C E A N A L Y S I S

POTENTIAL IMPACT OF THE PROPOSAL

The draft facility planning supplement was submitted for public and agency review on June 1, 1976 and again on September 1, 1977. During this time, a plan of service had not been decided upon. Subsequent to the last review, BPA has identified Alternative Plan A (interisland submarine cable system) as the Proposed Plan. The following discussion of impacts relate to that plan. Alternative Plan B retains its original letter designation and is discussed as well.

The range and duration of potential impacts from the Proposed Plan (submarine cable system) would be limited primarily to the trenching structure

placement, and other construction work associated with the 1.7 mile (2.7 km) transmission line across Decatur Island. These include possible short-term impacts to natural resources such as shoreline and interior soil erosion; effects to freshwater and saltwater hydrological resources (discoloration and murkiness of shoreline water); and disruption to shellfish producing areas.

Cultural resources affected include the clearing of merchantable timber, temporary disturbance to island residents and recreationists from noise and dust associated with construction operations, and further disruption to existing archeological sites on Decatur Island. Disturbance to shoreline ecosystems would most likely be the major impact of the Proposed Plan.

The range and duration of potential impacts from Alternative Plan B (combustion turbine installation) would vary depending on the type of turbine generator used, and final site location. Air quality due to exhaust emissions would not be noticeably decreased during the short time intervals the turbine would be required to operate. Other natural resources which could be affected include: short-term soil erosion, possible discoloration and murkiness of shoreline water, and disruption to shellfish producing areas from oil pipeline trenching procedures, if required; possible disruption to a small amount of bald eagle and black-tailed deer habitat depending upon final turbine location; and possible accidental oil spillage impacts if a shoreline-to-turbine pipeline is installed.

Cultural resources affected include the clearing of up to 2 acres (1 ha) of merchantable timber; visual intrusion of the completed facility; pre-emption of up to 2 acres (1 ha) of land from other uses for the life of the facility; possible operational noise impacts; and temporary disturbance to island residents and recreationists from noise and dust associated with construction operations. BPA believes it could select a turbine-generator site which would avoid the historical/archeological sites; designated recreational areas such as Turn Island Marine State Park, San Juan Island Wildlife Refuge; "natural" shoreline areas identified in the San Juan County Final Shoreline Master Program; Bald Eagle nesting areas; and other significant resources identified in the planning study area. Accidental oil spills and operational noise would most likely be the major impacts associated with Plan B.

A more complete discussion of impacts typically associated with transmission facility construction and maintenance can be found in Appendix B, Chapters V, VI, and VII of the Role EIS. In addition, impacts to resources and resource use which have been identified as highly important will be summarized graphically in the section "Summary of Plan of Service Analysis." (See pages 34 to 36 of this document.)

NATURAL RESOURCES

Atmosphere

Proposed Plan

Construction, operation, and maintenance activities related to Proposed Plan would create relatively insignificant amounts of air pollutants. Primary pollutants would be dust and exhaust emissions from construction equipment used in the building of the 1.7 mile (2.7 km) transmission circuit across Decatur Island, as well as the substation expansions at Fidalgo and Lopez Substations. Some slash from the harvesting of merchantable timber will undoubtedly result from right-of-way substation site preparation and construction operations. BPA will allow contractors to use controlled open burning to dispose of these materials where and when permitted by local, State, and Federal air pollution regulations. The impacts to ambient air quality from these pollutant sources are normally localized and short-lived. The mitigating measures employed by BPA and/or our contractors in the performance of routine construction work are discussed in BPA's Role EIS, Appendix B, Chapter VIII, Section A.1.

If an underwater routing through Lopez Pass, south of Decatur Island is taken atmospheric impacts would be confined to the construction operations for the expansions at Fidalgo and Lopez Substations.

Alternative Plan B

The atmospheric impacts related to the construction of the turbine generator installation associated with Alternative Plan B would be similar to those discussed for the Proposed Plan, with the exception of operational exhaust emissions.

The San Juan Islands are under the jurisdiction of the Northwest Air Pollution Authority (NWAPA) in Mt. Vernon, Washington. NWAPA has published ambient and emission air quality standards covering most major air pollutants, and has adopted other standards developed by the State and Federal Government. No regular air quality monitoring is currently conducted in the vicinity of the proposed combustion turbine siting areas for Alternative Plan B. In addition, no Federal, State, or local emission standards exist specifically for turbine power generating plants.

The major air pollution emissions are particulates, SO₂, NO₂, CO and photo chemical oxidants (hydrocarbons).

Because total anticipated usage of the turbine-generator unit would be minimal (50 to 100 hours per year) and the expected overall air pollution emissions will generally be low, it is not believed that an adverse

impact on air quality will result from the proposed installation. BPA will take whatever measures necessary to comply with all Federal, State, and local statutes related to air quality.

Geology, Soils, and Minerals

No geologic impact is expected from the proposed alternatives. However, since this area has relatively high seismic risk, all structures and equipment will be analyzed dynamically to meet seismic criteria for the region.

Proposed Plan

Impacts on the surface mantle resulting from the submarine cable required in the Proposed Plan are expected to be mostly short term and related to the underground and underwater construction trenching operations required from the -10 feet (3 m) elevation (below water) to the shoreline cable terminus above the beach zone - a distance of approximately 700-800 feet (213-244 m). For the Decatur Island route, these construction operations would be required on both sides of Decatur, the west shore of Fidalgo, and the east shore of Lopez Island. If an underwater routing through Lopez Pass, south of Decatur Island is taken these impacts would occur only at the shoreline cable terminuses on Fidalgo and Lopez Islands.

Substantial localized disturbance can be anticipated in these areas because erosional processes are extremely active. Currents and tidal fluctuations will distribute sediment for a distance around the trenching sites. Turbidity may remain a problem until the particles settle out or are dispersed. Normally, the murkiness and turbidity of the water would clear within a few hours. Further discussion of the effects of turbidity on marine life may be found in the "Wildlife" Section. Erosion will undoubtedly occur in the zone above the water. These coastal erosional processes should restore the trenching sites to their original conditions in a very short time. It may take longer for the zone above the high tide mark to re-establish its stability. No significant long-term effects of the surface mantle are expected to result from the operation and maintenance of the cable system.

The impacts to the soil environment associated with the construction of an overhead and/or underground transmission line across Decatur Island as proposed for the Proposed Plan are expected to be minor. The placement of single-pole structures would not necessitate much disturbance and erosion would be minimal. Compaction would be a problem where heavy construction equipment crosses exposed soil. The mitigating measures normally taken by BPA to keep impacts to a minimum while constructing these facilities are discussed in the Role EIS, Appendix B, Chapter VIII, Section A.2.

Alternative Plan B

The principal soil impacts resulting from the location of the stationary or portable type turbine required in Alternative Plan B are related to site preparation for construction of the facilities and the possible fuel pipeline to supply the turbine generators. Approximately 2 acres (1 ha) of soil would be graded and surfaced for the turbine site and a shore-to-turbine trench would be excavated for a fuel pipeline. The soil impacts for a portable (mobile) turbine could be slightly less depending upon the extent of grading and other site development requirements. Vegetation removal and other ground disturbances would temporarily expose the soil to wind and water erosion. However, these impacts should be relatively short term and no significant long-term impacts are expected.

Hydrology

Proposed Plan

Impacts to the hydrological resources resulting from the placement of the submarine cable required in the Proposed Plan are expected to be predominantly short-term with possible long-term effects. These are related to trenching functions as described in the "Geology, Soils, and Minerals" Section. Sedimentation and turbidity problems will undoubtedly occur for some distance around the trenching sites. However, currents and tidal action would dissipate the turbidity (discoloration and murkiness) of the shoreline water within a few hours. Impacts to aquatic organisms will occur. These are described in the "Wildlife" section. Above the high-tide mark few hydrological impacts are expected.

No significant hydrological resource impacts are expected from the construction of an overhead and/or underground transmission line across Decatur Island. Mitigation measures used by BPA to limit impacts of this kind are discussed in Appendix B, Chapter VIII, Section A.3. of BPA's Role EIS.

Alternative Plan B

Only a few direct impacts to the hydrological resources are expected from the construction and maintenance of the turbine required in Alternative Plan B. These will most likely result from the sedimentation and turbidity which could occur from trenching operations involved in installing a shore-to-turbine fuel pipeline. These would be similar to those described for the submarine cable installation in the Proposed Plan.

An indirect impact which may be harmful to the marine environment could result from oil and/or gas spills. Since the turbine will require fuel, accidents during loading, unloading, or transportation could

result in leaks or spills. The necessary precautions will have to be taken to ensure these types of impacts do not happen. These include properly drained sumps, tight fuel line connectors, proper vents, accurate level indicators, and other design practices used to avoid waste and prevent hazardous conditions.

The oil in storage poses a threat only if the storage facility is breached in some manner. A common measure to be taken is to enclose the base of the tank with dikes high enough to contain the contents of the tanks. In areas of high soil permeability some form of membrane can be used to make the dike and basin impervious to oil seepage.

Vegetation

Proposed Plan

If a transmission routing across Decatur Island is taken, the principal impact to the vegetative community would result from the 1.7 mile (2.7 km) overhead and/or underground transmission line. Rebuilding of the existing 25-kV line would occur if possible. This line is owned by OPALCO. Even though existing right-of-way associated with OPALCO's line could possibly be available for about half the distance across Decatur Island, about 1 mile (1.6 km) of new right-of-way or utility line franchise would be required. A small amount of vegetative cover would have to be cut to provide for construction, operation, and maintenance of the facility. The overall impact would be slight with a medium likelihood that the resource would be impacted by final alignment. Undergrounding would temporarily remove all vegetation for the length of the trench. The understory vegetation should, however, re-establish itself within a few weeks. The use of existing access roads with the exception of a few spur roads will minimize the disturbance of any further vegetation. Vegetative impacts from construction work at the cable terminals of Fidalgo and Lopez would be minor and should re-establish itself quite quickly.

The measures taken to mitigate vegetative impacts during construction and maintenance activities are outlined in BPA's Role EIS, Appendix B, Chapter VIII, Section A.4.

If an underwater routing through Lopez Pass, south of Decatur Island is taken vegetative impacts would be confined to the trenching and construction operations required at the cable terminals on Fidalgo and Lopez Islands. These impacts would be very minor.

Alternative Plan B

Vegetation impacts associated with the construction of the turbine-generator proposed in Alternative Plan B would be limited to the 2 acre (1 ha)

construction site needed for the facility. In the initial preparation of the site, the existing vegetation would have to be removed. Natural vegetation adjacent to the site would be retained to the extent possible for screening and possible noise attenuation. Further impacts to vegetative communities could result if a pipeline for fuel supply was constructed from the shore to the turbine site. Since the exact location of a proposed turbine site is not known at this time, it is difficult to ascertain what types of vegetative communities may be disturbed.

Wildlife

Proposed Plan

Impacts on wildlife resulting from the submarine cable required in the Proposed Plan are expected to be primarily short term and related to trenching activities. Excavation of trenches between shore and tidal zones for cable terminals is expected to cause considerable localized disturbance. Slow-moving aquatic organisms inhabiting the excavation area could experience moderate to high mortality. This would probably be most noticeable on Lopez Island and on the west side of Decatur Island where large shellfish populations exist. Adult shellfish including clams and oysters and other adult bottom-dwelling organisms, and the larval and juvenile stages of marine organisms, could be affected by increased sedimentation. Depending on current and tide conditions, sedimentation from trenching could affect organisms at some distance from the trenching site. Sedimentation could affect marine organisms by clogging feeding and respiratory mechanisms resulting in mortality to some individual organisms. Noise associated with the trenching activities may cause some marine organisms to move out of the construction area. Once the cable has been installed and the trench filled, tidal action would restore the area to conditions similar to those existing before construction. No significant long-term effects on wildlife inhabiting the intertidal, tidal and ocean areas are expected to result from electrical operation of the cable.

If a transmission line routing across Decatur Island is taken, clearing of up to 6 acres (2.4 ha) of forest habitat would be required. A regrowth of shrub/grass habitat would occur in the cleared areas resulting in a slight increase in forage for deer. The clearing would remove a small amount of cover habitat; however, this type is abundant nearby. Construction activities would cause some short-term disturbance impacts on wildlife. There is a potential for bird electrocution problems with overhead transmission lines of 34.5-kV. With proper design, however, the conductors can be spaced far enough apart to eliminate this potential. The electrocution potential would be eliminated if the line was placed underground. The overhead line associated with the Decatur Island route could represent an additional obstacle to bird flights in the area. However, because it would be located adjacent to existing power lines and because the overhead conductors would be at or below the level of nearby trees, no significant bird collision mortality is expected. Construction and operation of the transmission line is not expected

to result in noticeable long-term impacts on wildlife populations in the area. No significant impacts are expected to any threatened or endangered wildlife species.

Alternative Plan B

The combustion turbine in Alternative Plan B would require the removal of up to 2 acres (1 ha) of wildlife habitat. Small birds and mammals inhabiting the turbine site would be displaced and some mortality would result. Construction activities and noise would cause some species to leave the area. Noise from operation of the turbine could also cause wildlife to leave the immediate area. Bald eagle nesting areas are located in the vicinity of the San Juan Island-Friday Harbor and Orcas Island-East Sound combustion turbine siting areas. BPA believes it could select a turbine-generator site which would avoid these areas. However, because their habitat exists over the full range of the study area, there is a slight potential for impact. BPA would not be constructing any transmission lines in conjunction with Plan B, therefore, bird collisions would not be a problem. The above potential impacts on wildlife could be reduced if the turbine generator was located in a place already developed as an industrial-type area. The turbine generator siting area is located near shellfish producing habitat. There is a slight potential for oil spills which could adversely affect shellfish and other marine organisms.

RESOURCE USE AND SOCIAL/ECONOMIC RESOURCES

The following sections relate man's use of the natural resources previously described.

Demographic and Economic Considerations

Proposed Plan

The temporary population increase expected from the construction of the proposed facilities required in the Proposed Plan is estimated to be between 10 to 20 people. These individuals will require room and board for approximately 2 months. Motels are normally used by construction crews if they are available. Anacortes would probably provide the best accommodations during most of the workload. If facilities are available on Lopez Island, some of the construction workers may stay there when the work shifts to that location. Decatur Island does not have any overnight facilities, so the workmen will have to commute from Anacortes when work centers on that island.

BPA and the contractors they engage make an effort to use local facilities and equipment whenever it is convenient. In addition to the transportation facilities and equipment for excavating the trenches, work

boats and barges, ferry service, and aircraft will be required throughout the project. The multiplier effect of providing services and supplies to the construction project and its personnel could be significant.

Alternative Plan B

The socioeconomic impacts related to the construction of a turbine generator and associated electrical substation facilities at Friday Harbor on San Juan Island and/or East Sound on Orcas Island as required in Alternative Plan B could be substantial. The 10 to 20 individuals involved in the various aspects of the turbine project would have to find accommodations in these communities. The length of time needed for delivery and construction for the turbine generator unit including substation facilities would probably approach 12 to 18 months. The provision for services and supplies to the projects and the people working on them could stimulate the local economy, especially if it came during the offseason for tourists.

Land Use

BPA's proposal will be consistent with the applicable provisions of the San Juan County Final Shoreline Master Plan as well as other requirements of the Coastal Zone Management Program and the Washington Shoreline Management Act. A more detailed discussion of the effects on shoreline environments will be provided in the facility location supplement.

Agriculture

Proposed Plan - If a transmission line routing across Decatur Island is taken, the right-of-way alignment for the 1.7 mile (2.7 km) overhead line or underground cable would parallel the existing 34.5-kV double-circuit line across Decatur Island, in which case it is not expected to impact any agricultural resources.

If an underwater routing through Lopez Pass, south of Decatur Island is taken, agricultural impacts would be nonexistent.

Alternative Plan B - The site preparation required for the combustion turbine site in Alternative Plan B could preempt up to 2 acres (1 ha) of land from agricultural use for the life of the facility, depending upon final site location.

Forestry

Proposed Plan - If a transmission line routing across Decatur Island is taken, it would most likely parallel BPA's existing 34.5-kV double-circuit line. As indicated in the "Vegetation" section about 1 mile (1.6 km) of new right-of-way easement would be required for construction, operation,

and maintenance of a new line. Commercially important timber species grow on much of this highly productive timberland. Existing forestry operations on the island suggest that much of this land is a potential source for commercial timber. Therefore, overhead and/or underground transmission across the entire island could permanently remove up to 6 acres (2.4 ha) of timberland from future production.

If an underwater routing through Lopez Pass, south of Decatur Island is taken, impacts to forestry resources would be negligible to non-existent.

Alternative Plan B - The combustion turbine site in Alternative Plan B could remove up to 2 acres (1 ha) of timber from production, depending upon final site location.

Urban and Residential

Proposed Plan - The underwater cables under the Proposed Plan will have no impact on urbanized land uses. The shoreline terminals for the existing cables are readily visible from nearby residences on Decatur Island. The transmission line or underground cable across Decatur Island would likely parallel the existing lines and would have little, if any, effect on urban or residential land uses. Construction activities at the cable terminals and further inland will cause noise and congestion from construction operations and may disturb inhabitants on the normally quiet island. The addition of electrical equipment to Fidalgo and Lopez Substations in the Proposed Plan would probably not be noticeable after installation. Site preparation has already been completed to accommodate future facilities.

Alternative Plan B - Installation of a gas turbine generator near either Friday Harbor or East Sound could potentially have a significant effect on the small communities. Visually, the generator would have the appearance of a small substation. It would be relatively easy to properly site the facility and minimize its visual intrusion.

The potential impacts from operational noise of the turbine could be relatively high. Maximum noise level for a 33-MW combustion turbine at baseload with no suppression equipment is about 75 dB(A) measured at a distance of 400 feet (120 m) from the noise source (Johnson 1972). Operation of the turbines during peak hours of electrical usage could disturb residents unless noise attenuation measures are applied. Manufacturers of gas turbines offer standard levels of silencing which will meet the most current standards. Noise impacts can be further reduced if the units are located away from residences or if topography and vegetation can be used to attenuate noise levels. Vegetation will not normally provide satisfactory attenuation. Through appropriate siting and mitigating measures, BPA will ensure that the Washington Maximum Environmental Noise Level Regulations are met.

Construction and operation of fuel transfer and/or storage facilities associated with the turbine could cause additional noise and visual disturbance to local residents due to fuel loading, unloading, and transport operations. At this time there has been no conclusive planning for these functions.

If the turbine generator is connected to OPALCO's existing substation facilities at Friday Harbor, it would be located near a growing community and in an exposed location. The potential for residential impacts would be much greater than if it was sited in an isolated area. There is no existing substation (on Orcas Island) where the generation could efficiently be integrated into OPALCO's system. The customer is, however, considering the construction of a substation in the vicinity of East Sound. This is also a possible location for BPA's generating facilities. Although an actual site has not been selected yet by OPALCO, it appears that it could be in the vicinity of residential land use. Impacts on the residents would be as described above.

Other

Proposed Plan - The Proposed Plan is not expected to impact the research or educational areas identified previously under "Other", Description of Existing Environment Section.

Alternative Plan B - Accidental oil spills pose a potential problem with respect to the water environment. Therefore, a slight probability exists that oil handling operations in Plan B could potentially affect the research areas of Friday Harbor Laboratories (Argyle Lagoon, Minnesota Reef, and Turn Island), Jakle's Lagoon (off Griffin Bay) and Crescent Beach (an important sand dollar area).

Should Alternative Plan B (combustion turbine installation) be selected as the proposed plan of service, BPA will employ protective measures to prevent waste and spillage of fuel oil. These are listed under the "Hydrology" impact section.

Esthetic

Proposed Plan

The most significant visual impact of a submarine cable crossing would be the large "cable crossing" signs that appear on the shorelines. The other major intrusive element is the cable terminals or "potheads" where the cable is connected to above-ground electrical facilities.

The new cables under the Proposed Plan would not require additional signs at the terminals. BPA is investigating the possibility of relocating its terminals on the east side of Decatur Island approximately 1,000 feet (300 m) west of the existing location. If implemented, this would

reduce the visual impact of these facilities. Termination inside the fence at Fidalgo and Lopez Substations will minimize the additional impact at these locations.

The visual impact of a parallel line across Decatur Island would be relatively insignificant because of the presence of the existing line. Undergrounding would further reduce or even eliminate additional impacts.

Alternative Plan B

Under Plan B, the turbine generator could be visible from land and water depending upon their actual location. Fuel transfer or storage facilities may also be visible from land and water depending upon their operational requirements for proximity to water and land transportation. If site conditions permit, the storage facilities could be built underground.

In the "Urban and Residential" section above, the increased impact from locating a turbine generating unit near Friday Harbor and/or East Sound was discussed. The proximity to population centers and ferry landings would create a high potential for visual impact from the generating unit. The unit would not be visually compatible with the existing substations and would be readily noticeable.

Recreation

Proposed Plan

Temporary impacts upon recreationists from the Proposed Plan would include general disturbances from construction activities and interference to water-oriented pastimes during installation of the submarine cable and/or Decatur Island transmission line. A CNP-designated development zone on Fidalgo Island lies within the corridor study area and two development zones on the east side of Decatur Island are north and south of it.^{1/}

Alternative Plan B

Construction disturbances from Alternative Plan B would temporarily impact recreationists in the vicinity of Friday Harbor and/or East Sound. Permanent effects to the recreational environment would include visual intrusion of the combustion turbine facilities. Short-term effects would include audible noise from the diesel startup engine, if used. This would operate about 5 to 10 minutes until the turbine generator could begin operating under its own power. As previously described

^{1/} Columbia-North Pacific Region (CNP) recreational development zones have been established by the Northwest River Basins Commission, Vancouver, Washington. This is part of a comprehensive framework study of water-related recreational resources for the 4-State region or Washington, Oregon, Idaho, and Montana. The study identifies potential recreational areas which may be developed for recreational uses (camping, boating, picnicking, hiking, sightseeing, etc.).

in the "Urban and Residential" land use section, the turbine unit would most likely be purchased with intake and exhaust noise suppressors, reducing operational noise levels to well within acceptable standards. Visible exhaust heat waves may be seen during the period when the turbine is in operation (50 to 100 hours per year). Accidental oil spills should not be a problem, as BPA would employ measures to prevent waste and spillage of fuel. These were previously listed under the "Hydrology" impact section.

Two recreational sites exist within the Orcas-East Sound combustion turbine siting area. These sites include a CNP-designated development zone and Pt. Doughty, a 57-acre (23 ha) State recreational area (Fig. 3). Three recreational sites exist within the San Juan-Friday Harbor turbine siting area. Within this area is the San Juan National Wildlife Refuge, a 35-acre (14 ha) Federal site; and Turn Island Marine State Park, a 35-acre (14 ha) site which provides four camp units and a swimming beach (Fig. 3). A CNP development zone is just south of the area boundary. A turbine-generator site could be selected which would avoid these designated recreational areas.

Historical, Architectural, and Archeological Resources Proposed Plan

Under the Proposed Plan no national or State register historic properties will be affected. Although there are numerous historical sites within the San Juan Island study area, none occur within the corridor study area. Termination of the submarine cable on Decatur Island, if built parallel to existing facilities, however, will impact an identified archeological site. This site was previously disturbed by earlier submarine cable installation. Archeological test pits were hand-excavated in September 1975, yielding a clearer picture of the early culture and subsistence activities of prehistoric inhabitants, in spite of the relative lack of artifactual and other archeological information (Logsdon 1975). BPA is currently consulting with the Washington Archeological Research Center and the Washington State Historic Preservation Officer regarding the significance of the site and its possible eligibility for nomination to the National Register of Historic Places. Care will be exercised during future construction to minimize further damage to this site. Further test pits will be excavated by professional archeologists prior to construction.

Another archeological site was found in the corridor area on the west shore of Decatur Island. This site has been seriously disturbed by a multitude of factors including early logging operations on the island, natural beach erosion, and previous BPA transmission line construction activities. Refer to the Description of Environment (page 18) for a more extensive discussion of these existing archeological sites.

If an underwater routing through Lopez Pass, south of Decatur Island is taken, impacts to existing archeological sites on Decatur Island would

be avoided.

A professional archeological review will be made at the facility location stage. BPA will comply with the requirements of the National Historic Preservation Act of 1966 (P.L. 89-665), as well as Executive Order 11593. Procedures applicable to these laws are described in the Historic and Archeologic Appendix to the Fiscal Year 1979 Program Statement.

Alternative Plan B

Alternative Plan B will have no effect on those historic properties listed, eligible, or pending nomination to the National Register of Historic Places listed in the Description of Environment (page 18). Seven properties included in the Washington Statewide Inventory of Historic Places are within the San Juan-Friday Harbor combustion turbine siting area (Fig. 3). From certain vantage points in the vicinity of these historic sites, the turbine generator could be visible. BPA believes it could select a turbine site which would avoid these historical sites.

The nine historical resource properties within the Orcas-East Sound combustion siting area could be avoided by final site location.

Contract specifications require that if a site is discovered during construction, work would be halted until the site has been evaluated. Should any previously unidentified properties be discovered during the facility location stage, procedural steps and protective measures as described in the Historical and Archeological Appendix to the Fiscal Year 1979 Program Statement would be taken.

NONCONSTRUCTION

The proposed new facilities will serve a growing population of approximately 3,800 in the San Juan Island region of Washington State, northeast of the Olympic Peninsula. Any appreciable increase in population is derived from recreational residential development. If the new transmission and substation facilities are not built, mandatory curtailment of use of electricity will be required during winter peakload periods to avoid overloading of existing facilities and resulting brownouts or extended outages. Curtailment of approximately 35 percent of January peakloads would be required by 1985.

Mandatory curtailments would have varying effects, depending on the intensity of the curtailment and the way in which it was imposed. Probably the most significant of these are the social and economic impacts.

Reduced electric power to the few commercial customers would result in decreased business activity and would have economic and social impacts

through layoff of workers and decline of economic activity. With the Islands' remote location, loss of power due to overloads of the existing system could adversely affect the health of Island inhabitants who rely on electric power for heat and other essential services.

If the mandatory reduction of consumption were imposed by rotating power outages which included residences, the effect, other than those mentioned, would be loss from food spoilage and other damage from lack of electric service and hazards from lack of adequate lighting. This assumes adequate backup generation can be obtained for firefighting (which in some areas is dependent on electric pumps for water supplies), hospitals and other emergency services. This assumption may not be true in every case.

OTHER ALTERNATIVES CONSIDERED

One long-range alternative considered for providing service to the San Juan Islands was to tap the Bellingham-Custer 230-kV line and construct a transmission line to a point where an underwater cable could be constructed which would tie into the OP&L Company's system at Orcas Island. This crossing would require a 3 mile (5 km) overhead section across Lummi Island. Also about 12 miles (20 km) of overhead line would be required from Custer Substation through the Lummi Indian Reservation on the mainland. The cable would be laid in two sections, one 1 mile (1.6 km) section between the mainland and Lummi Island, and one 4 mile (6.4 km) section between Lummi Island and Orcas Island (Fig. 1). This alternative would require new substation facilities on the mainland and also on Orcas Island.

This alternative is approximately 50 percent more costly than either Plan A or B; therefore, it could not be considered a viable alternative for the FY 1979 Construction Program. It could, however, be considered a long-range alternative for the mid-1990's. It has generally been assumed that a cable similar to cables No. 2 and 3, or a combustion-turbine would be the next logical step, because existing substation and transmission facilities are better utilized.

Although BPA is aware of current developments in the solar/tidal/wind generation field, it is not felt that these alternatives are feasible in the immediate future. As research and development continue, one or more of these alternative forms of generation may alter the long-range plan for electric service to the San Juan Islands. The practicality of alternative energy sources are discussed in BPA's Role EIS (Chapter V, Section B).

ENERGY CONSERVATION

BPA and OPALCO review their joint load forecasts every year to determine whether they should be raised or lowered. Should the annual review reveal a significant deviation in base data, a revised estimate will be made. These load forecasts take into consideration the physical characteristics and limitations of the geography of the area as well as population

increases or decreases which may result from land use decisions. Considerable effort has been expended by BPA to encourage energy conservation through Land Use Planning. If the San Juan County Comprehensive and Land Use Plan succeeds in encouraging and fostering development which conserves and minimizes the consumption of electricity, our load estimates could defer the energization date but not the eventual need for this project.

It should be emphasized that considerable effort was expended by BPA's Seattle Area Office in the San Juan Islands talking to the Planning Staff, the County Planning Commission and the County Commissioners to encourage energy conservation through adoption of a Comprehensive Plan, Land Use Plan, zoning ordinance, and thermal insulation ordinance.

SUMMARY OF PLAN OF SERVICE ANALYSIS

INTRODUCTION

Resources and uses previously identified as highly important, critical or unique are given special attention in planning and construction of transmission facilities. Predictions or potential impacts to these important features (Fig. 4) are based upon past BPA experience, information from numerous agencies and individuals, and on the expertise of interdisciplinary environmental specialists within BPA. Predictions of possible impacts are meant to facilitate comparisons of the environmental aspects of system alternatives which, at this planning stage, are represented by broad corridors. More precise quantification must necessarily be deferred until the actual alternative line locations become known and are then proposed in BPA facility location supplements to the environmental statement.

In Figure 4, two factors are considered in evaluation impacts: (1) the likelihood of an impact occurrence; and (2) the expected degree of impact.

LIKELIHOOD OF IMPACT OCCURRENCES

The following designations are used to evaluate the likelihood of an impact:

- Low - Resource or use occupies only a small portion of the corridor and could be avoided in final alignments. "Low" is used where the degree of impact is "none".
- Medium - Resource or use partially occupies the corridor and may be impacted in final alignment.
- High - Resource or use entirely transverses the corridor and would be impacted if final alignment were within the presently defined corridor.

DEGREE OF IMPACT

These designations are used to evaluate the degree of impact:

- None (N) - Because of the compatibility of the resource or use with transmission facilities, or because the resource or use is outside of the defined corridors, we expect no significant measurable adverse impact.
- Slight (S) - Modifications as a result of construction and/or maintenance activities with no noticeable long-term changes in conditions expected.
- Moderate (M) - Modifications as a result of construction and/or maintenance activities with noticeable long-term changes in conditions possible.
- High (H) - Modifications as a result of construction and/or maintenance activities with highly noticeable long-term changes in conditions possible.

	PROPOSED PLAN (Alternative Plan A)					Alternative Plan B				
	Impact Adverse					Impact Adverse				
	High	Mod	Sl	None	Unknown	High	Mod	Sl	None	Unknown
<u>Natural Resources</u>										
Atmosphere			○					●		
<u>Geology and Soils</u>										
Shoreline Erosion		●					●			
Interior Erosion			◐					◐		
<u>Hydrology</u>										
Saltwater		◐					◐			
Freshwater		◐					◐			
<u>Wildlife</u>										
Anadromous Fishery Streams				○					○	
Shellfish Producing Areas		●					◐			
Threatened and Endangered Species				○					○	
Bald Eagles				○				○		
Black-tailed Deer			◐					◐		
<u>Resource Use and Social/Economic Resources</u>										
Agriculture				○				○		
Forestry		◐					○			
Urbanized			○					◐		
Esthetic			●				◐			
Recreation			◐					○		
<u>Historic-Archeologic</u>										
Archeologic Sites		●								○
Historic Sites				○					○	
<u>Other Resource Uses</u>										
Research and Educational Areas				○				○		

Likelihood of Impact Occurrence:

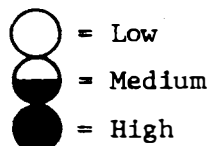


Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative)

DESCRIPTION OF THE
TRANSMISSION LINE ROUTES,
THEIR POTENTIAL IMPACT
AND MITIGATION

Proposed and/or alternative locations for transmission line facilities will be presented in the draft and final facility location supplements. Proposed locations will be identified on the basis of comments received on previous facility supplements, field reconnaissance, and additional environmental and engineering analysis.

DESCRIPTION OF THE
SUBSTATION AND/OR PROJECT-RELATED
FACILITY SITES, THEIR POTENTIAL
IMPACT AND MITIGATION

The Proposed Plan would require additional facilities at Fidalgo and Lopez Substations. Additions to Fidalgo Substation would consist of one 34.5-kV power circuit breaker and associated terminal equipment. Additions to Lopez Substation would consist of a new 33,000-kVA, 34.5/69-kV transformer, one 34.5-kV and one 69-kV power circuit breaker and associated electrical equipment. These substation expansions would be constructed on land owned by BPA. Because future development was provided for in the design of these substations, new equipment can be accommodated within the existing fenceline boundaries.

UNAVOIDABLE
ADVERSE IMPACTS

The Proposed Plan would create unavoidable adverse impacts to the natural shoreline environment, primarily from the trenching operations associated with the submarine cable installation. Slow moving aquatic organisms inhabiting the excavated areas could experience moderate to high mortality. Adult shellfish including clams and oysters, other ocean bottom-dwelling organisms, larval and juvenile stages of marine organisms could be affected by the resulting sedimentation which clogs their feeding and respiratory mechanisms.

Up to 6 acres (2.4 ha) of merchantable timber and understory vegetation growing within the proposed Decatur Island transmission line right-of-way would be permanently affected during this state of development. It would be removed to allow for construction, maintenance, and proper operational safety clearances. Tall trees, adjacent to the right-of-way, which could fall across the line, will also be felled. Individual

animals dependent on this vegetation for food and cover will be affected.

The Proposed Plan would unavoidably cause further disturbance to existing archeological sites on Decatur Island as well as noise, dust, and visual impacts to island residents and recreationists.

RELATIONSHIP BETWEEN
SHORT-TERM USE OF THE ENVIRONMENT
AND LONG-TERM PRODUCTIVITY

Based on present technology the submarine cable, transmission line, and associated facilities needed for Alternative Plan A will have a service life of 25 years. Combustion turbines and related facilities for Alternative Plan B are also estimated to have a service life of approximately 25 years.

The electric industry is one of considerable change. There is the potential in the near future that technological advances may alter the need for this facility. However, none are apparent at this time.

IRREVERSIBLE AND IRRETRIEVABLE
COMMITMENTS OF RESOURCES

The steel, aluminum, copper, and other materials used directly in construction of the facilities will be committed to transmission uses. If any of the equipment should later be retired, materials used in their construction can generally be reused elsewhere or recycled. Manpower and fuel for construction equipment will be irretrievably committed.

CONSULTATION AND COORDINATION
WITH OTHERS

PLANNING COORDINATION

The following agencies and organizations were contacted by BPA economists, engineers, and environmental personnel during the planning phase of this project.

State of Washington

Washington State Historical Society (State
Historic Preservation Officer)

Olympia, Washington

Washington State University (Archeological
Research Center)

Pullman, Washington

Department of Ecology

Olympia, Washington

Northwest Air Pollution Authority

Mt. Vernon, Washington

Other Individuals and Organizations

San Juan County Planning Department

Friday Harbor, Washington

Orcas Power and Light Company

East Sound, Washington

The facility planning supplement for San Juan Island Area Service (79-2) discusses the proposed and alternate plans for the new facility and the environmental impact associated with each plan. This project was proposed for the first time in BPA's Fiscal Year 1978 Environmental Statement filed with the Council on Environmental Quality (CEQ) on June 1, 1976. It was dropped from the FY 1978 Program and reissued in BPA's Fiscal Year 1979 EIS filed with CEQ on September 1, 1977.

In preparing the final planning supplement for Fiscal Years 1978 and 1979, BPA consulted with various Federal, regional, and local planning agencies. In FY 1978, draft planning supplements for this facility were sent to numerous Federal, State, and local agencies, environmental groups, and the public for review and comment. A public information meeting was held at Friday Harbor, Washington on July 21, 1976 to solicit comments on the various alternatives. These were considered in the preparation of a final planning supplement. A compilation of all correspondence received during the comment period has been enclosed at the end of this supplement for your review.

COORDINATION IN THE REVIEW OF THE DRAFT FACILITY PLANNING SUPPLEMENT

The FY 1979 draft facility planning supplement was sent to Federal agencies, State clearinghouses, and to local clearinghouses where these have been established by States, or to County or metropolitan planning commissions and environmental agencies where local clearinghouses have not been established. These agencies are listed below. A notice of availability of the draft facility planning supplement was placed in the Federal Register.

AGENCIES REQUESTED TO COMMENT ON THE DRAFT PLANNING SUPPLEMENT
(An asterisk * indicates that comments were received)

Federal Agencies

U.S. Department of the Interior
*Fish & Wildlife Service
Bureau of Mines
*Bureau of Indian Affairs
*Bureau of Land Management
*Bureau of Outdoor Recreation

San Juan Island Area Service
Study Area 79-2

- *National Park Service
- *Geological Survey
- Bureau of Reclamation
- U.S. Department of Agriculture
- *Forest Service
- Soil Conservation Service U.S. Department of Health, Education and Welfare
- *U.S. Department of Housing and Urban Development
- *U.S. Environmental Protection Agency
- Energy Research and Development Administration
- Federal Energy Administration
- *Federal Power Commission
- Federal Aviation Administration
- *Advisory Council on Historic Preservation
- *U.S. Department of the Army
- Army Corps of Engineers
- U.S. Department of Transportation

State Agencies

- Washington State
- Office of Program Planning and Fiscal Management
- Office of Community Development
- *Department of Ecology
- *Historic Preservation Officer
- *Parks and Recreation Commission

Local Agencies

- City Planning Commission, Friday Harbor, Washington
- City Planning Commission, East Sound, Washington
- *San Juan County Planning Department

Other

- Orcas Power & Light Company
- Washington Environmental Council
- Environmental Defense Fund
- Pacific Northwest Conservation Council
- *Sierra Club
- National Wildlife Federation
- North Cascades Conservation Council
- Federation of Western Outdoor Clubs
- Friends of Earth
- Natural Resources Defense Council
- The Wilderness Society
- Natural Resources Law Institute

COMMENTS RECEIVED DURING REVIEW PROCESS

USDI, Bureau of Land Management (November 2, 1977)

Comment: San Juan Island Area Service. No mention made of possible collision with power lines by the many varieties of birds using the islands for either alternative Plans A or B.

Response: The overhead line associated with Plan A could represent an additional obstacle to bird flights in the area. However, because it would be located adjacent to existing power lines and because the overhead conductors would be at or below the level of nearby trees, no significant bird collision mortality is expected. BPA would not be constructing any transmission lines in conjunction with Alternative Plan B (turbine generator), therefore, bird collisions would not be a problem. Appropriate revision has been made to the text.

USDI, Bureau of Outdoor Recreation (November 1, 1977)

Comment: Page 2: The next to last paragraph mentions a totally underwater route through Lopez Pass. However, we do not find this route discussed in relation to impacts under the various environmental topics. This route would seem to be the least environmentally damaging and, therefore, the most desirable from an environmental standpoint. We, therefore, urge that it be thoroughly discussed in the final statement regarding its comparative cost and relative environmental impacts.

Response: The Final Facility Planning Supplement has identified "corridor level" impacts of electrical Plan A (pages 19 to 37). The underwater route through Lopez Pass is a location or route alternative for implementing electrical Plan A. As such, it will be subject to a more comprehensive study during the location phase of the project.

USDI, Bureau of Outdoor Recreation (November 1, 1977)

Comment: Pages 18-35: There is insufficient information on the proposed turbine generator to give the reader an impression of its size, appearance, and environmental impact. Size and appearance could be illustrated graphically in the final statement. The statement also should contain information on the noise levels that would be produced at various distances and the audibility range under quiet conditions. The statement should discuss the probable impact of the generator on petroleum consumption (Appendix II, CEQ Guidelines).

Response: At this early planning stage, BPA does not have precise information as to the engineering requirements for a turbine generator, simply because we have not decided what type of turbine (portable or stationary) would be commensurate with our needs. General engineering characteristics

such as size, components, and fuel consumption are described on page 4 of the final planning supplement. Operational noise levels of a representative turbine generator are discussed on page 28 of the final supplement. Washington Maximum Environmental Noise Level Regulations would be met regardless of the final BPA Installation.

USDI, Bureau of Outdoor Recreation (November 1, 1977)

Comment: Pages 25-26: The discussion of Alternative A impacts on esthetic considerations is very brief considering the area's high scenic and recreation values. The final statement should contain more specific and quantitative information. For example, it is not clear how much of the proposed transmission line across Decatur Island would follow the existing corridor and how much new corridor, if any, would be required. If new corridor would be needed, probable impacts should be thoroughly discussed. Impacts of the turbine generator under Alternative B should also be treated in greater depth.

Response: At this time, BPA has not determined location and design requirements for the San Juan Island Area Service project. The facility location supplement will describe more localized (site-specific) and quantitative impact data relative to scenic and recreational resources.

EPA, Region X (November 4, 1977)

Comment: Page 15: The discussion of the "classes" of recreation areas should indicate what classifications mean and what the distinguishing characteristics among classes area.

Response: The recreational land use classifications used in the supplement are based on definitions developed by the Bureau of Outdoor Recreation. As referenced in the text, this material was obtained from the Columbia-North Pacific Region Comprehensive Framework Study of Water and Related Resources, PNW River Basins Commission, Vancouver, Washington. Definitions have been extracted from the report and are listed as follows:

Class I - High Density Recreation Areas

Types of areas found in this class are often associated with urban populations and are usually oriented toward day-use activities. The key to classification is the intensity of use and development. Capacity per acre averages 3,000 recreation days annually and includes a wide range of activities such as playing games and sports, swimming (pool and lakes or beaches), and picnicking. Examples of Class I include the urban parks and playfields

found in Seattle, Portland, Spokane, Boise, and other cities.

Class II - General Outdoor Recreation Areas

Areas included in this class are found in a wide variety of locations throughout the region. They are often nonurban in character and include manmade developments. Most developed nonurban camping areas, boat launching areas, winter sports areas, etc., are included. Many of the recreation sites located near reservoirs and lakes are in this class. Included also is the acreage of immediate buffer zones around the developed area. Annual capacity per acre is about 250 recreation days. Overnight and vacation use is often associated with these areas. Examples include portions of many county, state, and national parks, campgrounds in the national forests, and other public lands, and developed sites near reservoirs and lakes. Some of the lands have potential for development to Class I intensity.

Class III - Natural Environment Areas

Included in this category is the bulk of the national forests, parks, wildlife refuges, and other public lands. Developments are limited, with the primary uses including sightseeing, hiking, hunting, fishing, boating, canoeing, mountain climbing, and rock hounding. The annual use capacity is about one recreation day per acre. Some of the land in this class has the capability of becoming Class I or II by development of facilities. Some has the potential for shifts to Class IV, V, or VI depending on management direction.

Class IV - Outstanding Natural Areas

Areas in this category contain the superlative scenic, geologic, and natural features of the region such as mountain ranges, canyons, waterfalls, lavaflows and caves, unusual timber stands, scenic rivers, and other natural phenomena. Examples include the Columbia Gorge, Salmon and Snake River Canyons, Lost Forest in Oregon, Bruneau and St. Anthony Sand Dunes, portions of the Cascade Range, parts of the Skagit and Rogue Rivers, the Chetco Redwoods, and portions of Yellowstone National Park. Development includes only those facilities necessary to protect the natural features. Activities include sightseeing, outdoor photography, and study of the natural features. Capacity varies from 20 to 50 recreation days per acre depending upon the accessibility and the type of resource.

Class V - Primitive Areas

Areas in this class contain remote lands and designated wildernesses. The region contains about 40 percent of the National

Wilderness System. Examples are the Bob Marshall, Pasayten, Selway-Bitterroot, Anaconda-Pintlar, Three Sisters, and Mt. Jefferson Wildernesses and Idaho, Sawtooth, Salmon River Breaks Primitive Areas. Manmade developments are minimized, consisting primarily of foot and horseback trails. Major uses are hiking, sightseeing, photographing, fishing, hunting, horseback riding, and mountain climbing. Boating is restricted to hand-propelled craft or float boats and rafts. Depending on the size of the area, use of less than one recreation day per acre annually would be optimum.

Class VI - Historic and Cultural Sites

Sites in this class include those associated with the history, tradition, or cultural heritage of national, state, or local interest and are of enough significance to merit preservation or restoration. Sightseeing, outdoor photography, and study of history and prehistory are the primary uses. Since the sites are usually small in size, the annual use per acre may be similar to Class I sites when developed. Access, parking, and interpretation facilities are the primary developments associated with such sites. Examples found in the region include Fort Clatsop, Fort Vancouver, and Marcus Whitman national areas; state heritage sites; national historic sites; state areas such as Champoeg State Park in Oregon, Fort Columbia in Washington, Fort Casey, Washington; Cataldo Mission in Idaho, and numerous other memorials.

EPA, Region X (November 4, 1977)

Comment: Page 13: The land use discussion needs more detail to demonstrate that the local shoreline master programs, environment designations and implementing regulations do not rule out all of the service alternatives. A map of the shoreline designations and a summary of the implementing regulations might be appropriate.

Response: The Final Shoreline Master Program (FSMP) adopted by the San Juan County Planning Department on October 18, 1976 permits electric utility construction in all shoreline areas with the exception of those specifically designated as "natural areas." BPA facilities will not be built in or through a shoreline area with a "natural" designation. The San Juan County Planning Department has prepared maps of the FSMP designated shoreline environment areas. Because of space limitations, BPA has not included these maps in its EIS. Further information concerning FSMP shoreline maps may be obtained upon request by writing San Juan County Planning Dept., P.O. Box 947, Friday Harbor, Washington, 98250.

In addition, the Final Shoreline Master Program specifies certain implementing regulations for all types of utility construction within shoreline areas. These requirements are listed as follows:

Policies

1. Utilities and transportation facilities should be installed in the same rights-of-way when the effect will be to reduce the adverse impacts on the shorelines.
2. Disturbances of the shorelines resulting from the installation and/or maintenance of utilities should be minimized.
3. The planning of new utilities installations should be coordinated with county planning efforts so that growth can be encouraged in those areas where it is most desirable.

General Regulations

1. Immediately following the completion of utilities installation or maintenance projects on shorelines, disturbed areas shall be restored to pre-project configurations, replanted with local vegetation and the vegetation maintained until it is firmly established.
2. Utility lines, stations, plants and other apparatus shall not be installed in shoreline areas unless there is no feasible alternative.
3. Utility lines shall be installed underground where practical to do so.
4. Underwater cables which must cross shorelines shall be installed underground from the water line to the tree line, unless otherwise authorized by the county. The county shall authorize variances from this regulation only for good cause.
5. Where installation of utility lines or other apparatus in shoreline areas is approved, clearing shall be confined to that which is absolutely necessary to permit the installation and to prevent interference by vegetation once the system is in operation.
6. Where utility lines, or other apparatus must cross shoreline areas they shall do so by the route which will cause the least damage to the shoreline, both physically and visually.

BPA's utility construction will be consistent with these regulations.

Washington State Parks & Recreation Commission (July 1, 1976)

Comment: It would seem reasonable for the project sponsor to address the issue of potential oil spills if Alternative B of the San Juan Island Area Service proposal is chosen.

Response: If Alternative B is selected as the proposed plan of service, a more detailed analysis of site-specific impacts relating to potential oil spills will be discussed in the facility location supplement.

Washington State Parks & Recreation Commission (July 1, 1976)

Comment: The Washington State Parks and Recreation Commission would appreciate receiving a definite answer as to who is to be responsible for the gas turbines so that we may deal with them concerning potential impacts on our marine State parks.

Response: Although the local utility servicing the area is normally responsible for the installation of combustion turbines, BPA has a congressional authority to do so in emergency situations to maintain adequate reliability of power supply. The justification for this project has been explained under the "Description of the Proposal," pages 1 thru 7 of the text.

If Alternative Plan B is selected as the proposed plan of service, BPA will be the project sponsor. As such, BPA would identify site-specific detailed environmental impacts to marine State parks. Any further questions concerning the environmental impacts of this project should be directed to BPA's E&C Environmental Coordination staff in Portland, Oregon.

Sierra Club (July 29, 1976)

Comment: The proposed Alternative B involves the construction of a thermal generation facility by the Bonneville Power Administration. As stated on page 77 of BPA's GCMP, "BPA does not have congressional authorization to own or operate combustion turbines." There does not appear to be any authorization for such activities in any of the most recent legislation on BPA.

Response: See previous response: BPA's GCMP has been replaced by a comprehensive program environmental statement and planning report entitled, "The Role of BPA in the Pacific Northwest Power Supply System, Including Its Participation in the Hydro-Thermal Power Program," commonly referred to as the "Role EIS." Alternative roles for BPA, including the authority to construct thermal generation, are presently under congressional study. The five alternative roles identified by BPA are described in Part 2, Chapter XII, Section A of this document.

Sierra Club (July 29, 1976)

Comment: On page 1 of this service proposal it states "other BPA facilities used to serve OPALCO include diesel generators on Orcas Island." However, BPA has no authorization to own such generators.

Response: BPA has authorization to own the diesel generating facilities on Orcas Island. These units were installed by BPA as an auxiliary power source to provide emergency electric service to Orcas Island in the event of an unscheduled power outage.

Sierra Club (July 29, 1976)

Comment: In the alternatives to the proposed action there is no discussion of a conservation program that might eliminate the need for construction.

Response: Energy conservation and methods of limiting the consumption of electricity have been considered and are discussed in BPA's Role EIS (Part 1, Chapter IV, Section B and Appendix C, Chapter IV, Section H). The energy conservation alternative specific to this project is discussed on pages 33 and 34 of the final supplement.

EPA Region X Seattle, Washington (July 27, 1976)

Comment: We believe that the facility location supplement for the San Juan Island Area Service should contain a more extensive discussion of the potential and probable impacts on fish and shellfish of the undersea trenching operation for the new transmission cables.

Response: If Alternative A (submarine cable system) is selected as the proposed plan of service, a more extensive discussion of impacts to fish and shellfish resulting from trenching operations will be undertaken. This information will be provided in the facility location supplement.

USDI, Bureau of Land Management, Denver, Colorado (July 30, 1976)

Comment: Reviewers found the sections of the statement that deal with natural resources to be lacking in specificity and quantification. For example, the locations of soil types are not mapped, but are indicated by general statements like "southwestern corner of the study area." Water quality, sediment yields, erosion rates, soil losses, and streamflows are mentioned throughout the report but these parameters are not quantified.

Response: In the planning supplement phase, BPA normally looks at the general environmental situation as it relates to the planning study area. We are trying to anticipate the range of potential impacts which may result from the various alternatives that have been suggested for servicing the identified needs in this initial evaluation. Since we are

not dealing with specific line locations in the planning stage, it is not reasonable to talk in terms of detailed quantification and mapping. Once a plan of service has been decided upon, then we move into the location phase where more specific quantification and mapping is necessary.

San Juan County Planning Department (August 13, 1976)

Comment: As stated in the EIS, BPA's peakload estimates are based on an assumption of a future annual growth rate of 8 percent. To the extent that this predicted growth rate is related to the County's future rate of population growth (and we recognize that this may not be a one-to-one relationship), we feel that BPA should consider the findings and conclusions of a recent population and economic baseline study prepared for the County by Bernard H. Frerichs. In particular, we feel that BPA should consider the Frerichs' assertion that the extraordinarily high rate of population growth (7.7 percent) which the County has been experiencing for the last five years will not continue indefinitely into the future. According to Frerichs, increased population density will likely decrease the attractiveness to the islands, and as a result our population growth rate may level off. Other factors to be considered which will affect our future growth rate are the land use decisions made by local residents and the physical characteristics and limitations of the land (the extent of groundwater supplies, soil suitability for sewage disposal by septic tank and drainfield, etc.).

We understand that BPA's load estimates and projected 8 percent growth rate are based to large extent on increasing average use (including peak use) per consumer. However, San Juan County is in the process of developing a draft Land Use Plan which will include an Open Space and Recreation Element and a Circulation Element. The preliminary draft includes policies which would encourage and foster development that will conserve and minimize the consumption of electricity. Thus, the proposed land use plan upon implementation would affect our increasing rate of energy consumption and, therefore, is a factor that should be considered in making future load estimates.

Response: Refer to the "Energy Conservation Alternative" given in the text for a discussion of energy requirements vs. growth rate. Pages 33 and 34.

San Juan County Planning Department (August 13, 1976)

Comment: In light of the full range of designations which the siting areas for Friday Harbor and East Sound take in turbine site selection, planning for Alternative B will need to carefully consider the relevant designation and applicable shoreline policies.

Response: BPA recognizes that the San Juan County Planning Department has adopted a Shoreline Master Program in accordance with Washington Shoreline Management Act of 1971 (RCW 90.58) and Coastal Zone Management Act of 1972 as amended (16 U.S.C. 1451-1464). BPA's proposal will be consistent with the final Shoreline Master Plan.

San Juan County Planning Department (August 13, 1976)

Comment: Other rare birds of prey in the County include the golden eagle (listed by Game as "threatened with extinction in Washington) and the osprey (listed as "probably threatened in coastal Washington").

Considering the extensive habitat which San Juan County provides for these rare birds and the potential for bird electrocution problems associated with 34.5 transmission lines, we recommend that all applicable mitigating measures recommended by the Department of Game be incorporated into the BPA proposal for San Juan County. These mitigating measures are:

- 1) Transmission structures should be designed to discourage eagles from perching on them, for example by placing wooden roosts atop poles to prevent the birds from touching the wires on take-off.
- 2) The middle wire should be raised 38 inches (97 cm) or more, so that the birds will not touch the two wires simultaneously. If double-circuit structures are used, a problem does not exist.

Response: The information provided in the comment will be incorporated into the final supplement. BPA recognizes the importance of the area for large birds of prey and the possible electrocution hazard associated with 34.5-kV lines. This is pointed out in this draft supplement. At this planning stage, exact tower designs are not known. Design options and mitigating measures are available and will be evaluated in the final facility location supplement.

San Juan County Planning Department (August 13, 1976)

Comment: We do not agree with BPA's statement in the EIS that Alternative Plan B is not expected to impact the University of Washington Friday Harbor Laboratories' research areas. We find that the potential for oil spills associated with shoreside facilities for unloading and storing fuel oil under Plan B has a potential for adversely impacting three research areas of the Labs located in the Friday Harbor siting area (Argyle Lagoon, Minnesota Reef, and Turn Island as well as one other nearby area off Griffin Bay (Jakle's Lagoon). One research area in the East Sound siting area could also be adversely affected, namely Crescent Beach, an important sand dollar area.

Response: Fuel oil spills pose a potential problem with respect to the water environment. Therefore, if a shore-to-turbine pipeline is required in Plan B, a slight probability exists that oil handling operations could potentially affect the forementioned research areas of Friday Harbor Laboratories, Jakle's Lagoon, and Crescent Beach. Should Alternative Plan B be selected as the proposed plan of service, BPA will employ protective measures to prevent waste and spillage of fuel oil. This information has been included under the Hydrology impact section of the supplement.

San Juan County Planning Department (August 13, 1976)

Comment: The EIS gives no information on whether OPALCO will need to install additional lines, poles, or interisland cable crossings as a result of the BPA project.

Response: BPA doesn't have any knowledge of what facilities OPALCO may install as a result of BPA's proposal. However, at BPA's public meeting held July 21, 1976 at Friday Harbor, Washington, an OPALCO representative made the following statement. "Because the turbine generator or submarine cable would be built strictly for backup capability, OPALCO wouldn't be putting in any more lines for use of that power."

EPA, Region X (November 4, 1977)

Comment: Page 20: In addition to the information on impacts of submarine cable construction, which you have indicated will be provided in the facility location supplement, there should be a discussion of possible mitigation measures to reduce damages to aquatic biota and a description of the actual measures to be used.

Response: BPA considers impact to aquatic biota from the submarine cable trenching operations to be an unavoidable adverse impact. Unavoidable adverse impacts are discussed in detail on pages 37 and 38 of the final planning supplement. BPA, however, will continue to investigate mitigating measures which may be appropriate.

PUBLIC MEETING COMMENTS

Bill Ekstrom, Friday Harbor Journal (July 21, 1976)

Comment: The gas turbine alternative, would that be installed strictly as backup capability?

Response: That is correct. Justification for this project is based on "reliability of power supply". See previous response to Washington State Parks and Recreation Commission.

Ann Sato, Planning Department (July 21, 1976)

Comment: Could you elaborate in a little greater detail, how much of the average year, how many hours do you expect to have peakload conditions?

Response: The load profile shows a peak for the San Juan Islands in January. The peak, however, with relation to the facilities, varies from year to year. Peakloads are dependent upon the weather and time of day. It averages out at 1/10th of 1 percent or 8 hours per year.

George Lamb, Decatur Island (July 21, 1976)

Comment: One point I wasn't clear on, with regard to the cable from Fidalgo to Decatur, is it true that you have two basically good cables, one in '67 and one in '72, do you plan to put through 70 kV on those cables? Will that take care of the anticipated need?

Response: By October 1977, there will be 36 MW reliable capacity for the islands supplied by the two cables and local diesel generation. This will take care of the anticipated need until the winter of 1979-80 when the capacity of the cables will be exceeded. New facilities will then be required.

Bill Ekstrom (July 21, 1976)

Comment: When you're figuring your load growth, is it a combination of both more consumers and each consumer using more power?

Response: Yes. If you examine the San Juan Islands over the past 10 years, only about 20 percent of the load growth has been due to the increased population. About 80 percent of the growth has been caused by increased consumption from existing consumers.

Bill Ekstrom (July 21, 1976)

Comment: Do your estimates of this particular area include the fact that there are definite geological constraints and other constraints to this general development?

Response: BPA and OPALCO review their joint load forecasts every year to determine whether they should be raised or lowered. These load forecasts take into account the geography of the area as well as population increases and economic activity. If it appears geological or other constraints will result in reduced loads, our load estimates will be revised.

Louise Dustrude (July 21, 1976)

Comment: On page 42 in your book you talk about how you can change your rate structure and that would bring about perhaps more conservation. I recall when the two of you met with the Planning Commission, you mentioned something about Federal constraints on how much you can raise your rates. Could you talk a little about that?

Response: All power sold by BPA is set at rates established by BPA and approved by the Secretary of the Interior and the Federal Power Commission. The Bonneville Project Act requires that revenues from the sale of power generated at the Federal projects (and from other services rendered by BPA) shall be sufficient to pay all costs of producing and transmitting the power, interest on capital invested in the power facilities, and amortization over a reasonable period of years. Congress has established 50 years as the repayment period for power facilities at the projects (dams and generating equipment) and a reasonable period of years (40 years now used) for the transmission system, both periods commencing with the date of completion of each facility.

Consistent with its power sales policy, BPA provides Federal power for the benefit of the general public, particularly domestic and rural customers. In addition, it stipulates that electric power shall be made available to the ultimate consumer at the lowest possible rates consistent with sound business principles. For this reason, OPALCO is under contract to BPA not to charge artificially high rates to you or other residents of the San Juan Islands.

Ann Sato (July 21, 1976)

Comment: Are we now, in San Juan County, being supplied with nuclear power and if not, how should we expect to see our rates go up?

Response: The San Juan Islands as well as other portions of the Pacific Northwest, are being supplied with electric power which is a blend of

thermal and hydro energy. In the Pacific Northwest, this is approximately 85 percent hydro and 15 percent thermal, thermal energy being a combination of nuclear and coal-fired generation. The cost of hydroelectric power at the hydro projects in the Northwest is currently averaging slightly over 1/10¢ per kilowatthour. The cost of nuclear power in the mid-1980s, generated at the plant, will be approximately 2-1/2¢ per kilowatthour. As the percentage of thermal generated electric power in the Northwest's power mix is increased, the cost per kilowatthour will go up. Because nearly all acceptable hydro generating sites are now developed, any additional energy must come from thermal plants.

Ann Sato (July 21, 1976)

Comment: Will we in San Juan County, growing fairly fast, be affected sooner than other parts of the State?

Response: OPALCO has a firm contract with BPA which specifies that we will meet your load requirements until 1983. After 1983, BPA will no longer guarantee enough energy to meet your load growth. Beyond that point, Orcas Power and Light Company will have to purchase power from other sources to meet growing loads. Power from other sources of generation other than hydroelectric will be obtained at a much higher cost.

Lavinia Besola, Lopez Island (July 21, 1976)

Comment: On cutting down power usage, what is the prognosis on being able to do this when there has been no publicity in the San Juan area to reduce the peakload at any given time?

Response: Unless conservation is mandatory or there are a lot of cost incentives, the prognosis is not good. See previous response to Sierra Club for an explanation of BPA's on-going Energy Conservation Program.

Lavinia Besola (July 21, 1976)

Comment: Well, that's true, but specifically, I wonder if the rate increase is meant to encourage people to use less power in the San Juan area, as in other areas where your rate for less kilowatt usage is encouraged by being given a premium rather than the reverse of this?

Response: By law, BPA rates must be set high enough to produce revenues adequate to recover the costs of our power program, but low enough to encourage the widespread use of electric energy and provide the lowest possible rates to consumers. To do otherwise, such as artificially setting rates to constrain consumption, would require a change in BPA's congressional authority.

Impacts from different rate structures are discussed in BPA's Role EIS (Appendix C, Chapter IV, Section G).

Lavinia Besola (July 21, 1976)

Comment: It's not in your study to learn more about the encouragement in using less power?

Response: BPA has in the past and continues to pursue a program of encouraging voluntary reductions in nonessential electrical loads. See previous response to Sierra Club for an explanation of BPA's on-going Energy Conservation Program.

Lavinia Besola (July 21, 1976)

Comment: I wonder if you have looked at all the economic impact to San Juan County regarding the Plan A proposal taking land off the tax roll by condemnation (across Decatur)?

Response: If Alternative Plan A is selected as the proposed plan of service, BPA will obtain a right-of-way easement, if required, for the additional transmission line across Decatur Island. The landowner will retain ownership of the land with certain restrictions on its use. Consequently, it will not be taken off the tax rolls. While not totally off the rolls, the tax levied on the property subject to easement will be less than it would have been without the easement.

Lavinia Besola (July 21, 1976)

Comment: You're investigating going underground, also?

Response: Undergrounding of a transmission line circuit across Decatur Island is being considered as a design alternative. The feasibility of an underground cable installation will be thoroughly examined in the facility location supplement if Alternative Plan A is selected as the proposed plan of service.

Lavinia Besola (July 21, 1976)

Comment: I wonder, would it destroy the value of land as much? I think it would be worth investigating in an appraisal of the property.

Response: An underground line would require a dedicated right-of-way with its associated clearing. In case of a fault, the underground cable would have to be exposed by excavation, removed, and replaced with a new section. For this reason, houses or other structures, could not be constructed on it. An underground installation would, however, have

less visual or esthetic impacts than an overhead transmission line. This may have a reduced effect on the value of the land it crosses.

Ann Sato (July 21, 1976)

Comment: An earlier letter from BPA written to Mrs. Jones indicated that during this 1978 plan, you would consider removing all the facilities that are on the beach now.

Response: BPA's letter of May 21, 1975 indicated that Bonneville would consider relocation of some of the facilities presently on the Jones' beach. In this regard, BPA has installed approximately 800 feet (244 m) of underground cable on Jones' Beach, which extends Submarine Cables 2 & 3 terminations well up behind the Jones' house. This installation was completed in October of 1976.

Ann Sato (July 21, 1976)

Comment: Will Alternative A and B have any affect on OPALCO? Are the two alternatives different in the way they impact OPALCO?

Response: Alternative Plans A and B will affect OPALCO in a similar manner in that they will both tie in BPA's power system. Each plan has, however, a different point of delivery. Plan A will provide energy at a point of delivery on Lopez Island whereas Plan B (combustion turbine installation) will provide service at either Friday Harbor on San Juan Island or East Sound on Orcas Island.

Bill Ekstrom (July 21, 1976)

Comment: Do you have any ratio of cost in building Plan A versus Plan B?

Response: Economics, as well as engineering and environmental considerations, was a principal factor in the plan of service decision. Refer to pages 5-7 of the final planning supplement for a cost ratio of the two plans.

Louise Dustrude (July 21, 1976)

Comment: At a recent planning commission meeting, the chairman suggested it appeared to her, that you were offering San Juan County even more reliability than you do in an off case, someplace where they have ice storms and they have an outage, they don't have an extra cable there.

San Juan Island Area Service
Study Area 79-2

Response: BPA offers a relatively high standard of reliability to the San Juan Islands. Our reliability criteria are defined in BPA's Role EIS (Appendix B, Chapter III). The primary purpose of planning for reliability of power supply is to protect the customer against the loss of electrical service in the event of a power failure. This project is planned such that either one of the alternative plans (submarine cable system or combustion turbine installation) will provide emergency power to residents, businesses, and industries on the San Juan Islands should one of the two existing submarine cable systems go out of service.

Ann Sato (July 21, 1976)

Comment: What's the earliest point in time you will need that (facilities) to take care of your peakload; what is the earliest time OPALCO would have to increase their cable if you chose Alternative A?

Response: The earliest that new facilities can be constructed is October 1981. There exists a slight probability that the loss of one cable during the winters of 1979-80 and 1980-81 will require dropping some load to relieve the overload condition.

SA-79-3

Libby
Integrating Transmission



S T A T U S

LIBBY INTEGRATION AND NORTHWEST MONTANA/NORTH IDAHO SUPPORT

The Libby Integrating Transmission Project is being deferred several months to BPA's Fiscal Year 1980 Program in order to allow more time to review studies and public input. A proposed plan is to be selected in the spring of 1978. Economic, technical, and environmental factors as well as public concerns will be reported in the Final Planning Supplement.

The Facility Planning Supplement for the Libby Integration and Northwest Montana/North Idaho Support Project was filed with the President's Council on Environmental Quality September 1, 1977. Public information meetings were conducted at Noxon, Montana October 11, 1977; Libby, Montana October 12, 1977; and Sandpoint, Idaho October 13, 1977. An information center was held October 13, 1977 at Bonners Ferry, Idaho.

The planning document evaluated the potential environmental impacts of alternative plans to integrate additional power from Libby Dam and reinforce the transmission in Northwest Montana and North Idaho. Public and agency comments have been received and reviewed.

The Libby Integrating Transmission is one of several proposed additions to the northeastern section of Bonneville Power Administration's high voltage electrical grid system.^{1/} All of these proposals are being reviewed to determine how the regional power grid performs with different combinations of these plans.

When the decision is made on a preferred plan for the Libby Integration project, public notice will be given. Work can then proceed on the evaluation of alternative route and design options for the proposed plan. This information and the Final Planning Supplement will be issued jointly in a Facility Location Supplement. Public meetings will be held in the Northwest Montana and North Idaho area to describe potential impacts and again gather public comment.

The following revised schedule dates for this project are:

Select Plan of Service	Spring 1978
Evaluate Alternative Locations and Designs	Summer 1978 - Winter 1978/79
Issue Draft Facility Location Supplement	Winter/Spring 1979
Draft Location Supplement Public Meetings	Spring 1979
Location Surveys	Summer/Fall 1979
Land Acquisition	Fall 1980 - Summer 1981
Construction	Spring 1982 - Fall 1983
Energization	Fall 1983

^{1/} Proposals being reviewed currently include: a) the Libby Integrating Transmission which is to bring the new generation capacity from Libby Dam into the Pacific Northwest power grid; b) the Hot Springs-Bell 500-kV line, part of a proposed east-west system to transmit energy generated in Colstrip, Montana and reinforce service to Spokane and Northwest Montana load areas; and c) the Colstrip Transmission Project which is to tie power from the coal-fired generating plants in eastern Montana to western load centers.

SA-79-4

South Puget Sound Reinforcement



FINAL FACILITY LOCATION SUPPLEMENT

SOUTH PUGET SOUND REINFORCEMENT

FY 79-4

South Puget Sound Reinforcement
Study Area FY 1979-4

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2. The second part of the document is a report from the Secretary of the War Department, dated January 10, 1862. It contains a detailed account of the military operations of the Army during the year 1861.

3. The third part of the document is a report from the Secretary of the Navy, dated January 15, 1862. It contains a detailed account of the naval operations of the Navy during the year 1861.

4. The fourth part of the document is a report from the Secretary of the Interior, dated January 20, 1862. It contains a detailed account of the operations of the Department during the year 1861.

5. The fifth part of the document is a report from the Secretary of the Treasury, dated January 25, 1862. It contains a detailed account of the operations of the Department during the year 1861.

6. The sixth part of the document is a report from the Secretary of the War Department, dated February 1, 1862. It contains a detailed account of the military operations of the Army during the year 1862.

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18. The eighteenth part of the document is a report from the Secretary of the War Department, dated April 1, 1862. It contains a detailed account of the military operations of the Army during the year 1862.

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30. The thirtieth part of the document is a report from the Secretary of the War Department, dated June 1, 1862. It contains a detailed account of the military operations of the Army during the year 1862.

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South Puget Sound Reinforcement
Study Area 79-4

STATUS

In order to determine the electrical load on the transmission system in the south Puget Sound area, load estimates have been prepared by BPA in conjunction with Tacoma City Light Company and Puget Sound Power and Light. Based on those estimates and subsequent examinations of the system the South Puget Sound Reinforcement project has been identified for inclusion in the FY 1979 program.

Due to the nature of the foreseen overload problem, the alternative plans under examination all relate to one existing corridor. This Facility Supplement evaluates, at the location level, three plans. Alternative plans presented may involve long-range transmission developments in the general area; however, these additions are heavily influenced by many future variables i.e., timing and location of additional sources of generation, future load growth patterns, and interregional power exchanges. The long-range aspects presented in this supplement are reasonable given the existing conditions but are not necessarily pre-determined by implementation of this project.

This supplement is now in final form. It was first presented in draft form as a component of the FY 1979 Draft Program EIS which was filed with the Council on Environmental Quality on September 1, 1977. Tentative schedule dates for this project are:

Start Land Acquisition	-	Winter 1980
Start Construction	-	Spring 1981
Energization	-	Fall 1982

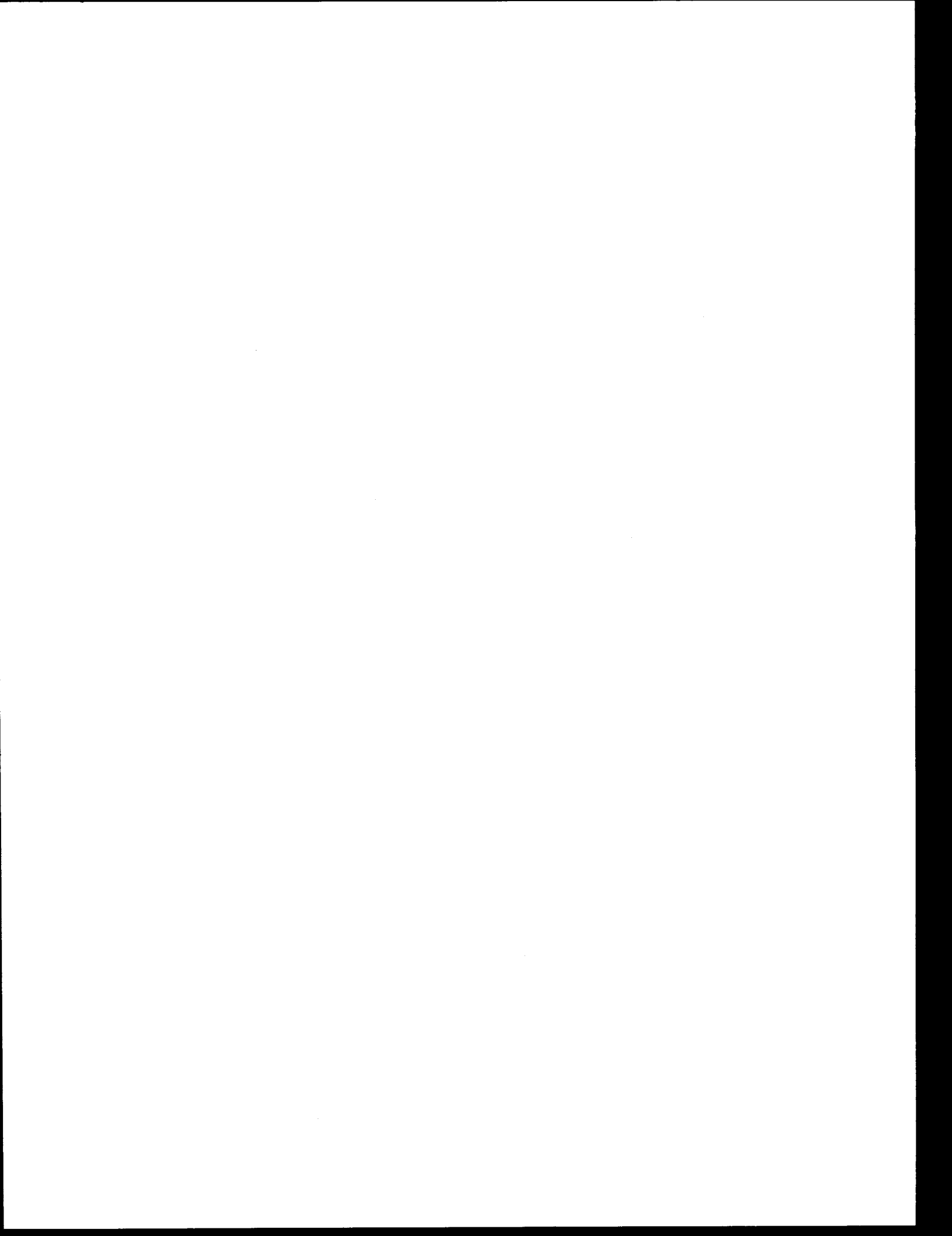
DESCRIPTION OF THE PROPOSAL

The South Puget Sound study which encompasses the area from Olympia to Tacoma is served by the Bonneville Power Administration (BPA), Tacoma City Light (TCL), and Puget Sound Power and Light (PSP&L). Load estimates have been prepared by BPA in conjunction with Tacoma City Light and Puget Sound Power and Light. These estimates are forecasts of the load for several years in the future. In order to determine the requirements for the transmission system, these loads must be properly combined, regardless of ownership. Within this area, BPA has a number of substation and transmission facilities. It is anticipated that by September 1981, BPA will have the new Frederickson Substation (which will replace the existing South Tacoma Switching Station) in operation to augment the existing Raver, Covington, Tacoma, and Olympia Substations. In addition, BPA has the following 500-kV transmission lines in this area: the 24-mile (38 km) Tacoma-Raver Line No. 1; the 69-mile (110 km) Raver-Paul Line No. 1; the 10-mile (16 km) Raver-Covington Lines No. 1 and No. 2; and the 20-mile (32 km) Paul-Olympia Line No. 1. The 230-kV transmission lines supplementing the 500-kV lines are the 15-mile (24 km) double-circuit Covington-Tacoma Lines No. 3 and No. 4; the 10-mile (16 km) double-circuit Covington-White River Line No. 1 (BPA) and No. 2 (PSP&L); the 69-mile (110 km) Chehalis-Covington Line No. 1 with a tap to Frederickson; the 51-mile (82 km) Olympia-White River Line No. 1 with a tap to Frederickson; and the 6-mile (10 km) Frederickson-Cowlitz (TCL) Lines No. 1 and No. 2. Pertinent BPA substation and transmission facilities and PSP&L White River Substation are shown in figure 1.

SYSTEM REQUIREMENTS

BPA's transmission system in the south Puget Sound area overloads with the loss of the 500-kV Raver-Paul Line No. 1, at any time when this line is carrying as much as 1,000 MW. Overload conditions are accentuated if the generation at the Centralia Thermal Plant is reduced, if there is no generation at Trojan Nuclear Plant, or if Grand Coulee Dam is peaking.

In particular, the Olympia-Frederickson and Frederickson-White River sections, which comprise the 230-kV Olympia-White River Line No. 1, and the Covington-Frederickson section of the 230-kV Chehalis-Covington Line No. 1 overload. The overload is caused by loads served from Frederickson and Olympia Substations and by through-flow via Chehalis and Olympia Substations to the Portland area. Prior to the fall of 1981, the overload can be relieved by switching transmission lines at Chehalis, Paul, and South Bremerton Substations. By the fall of 1981, however, switching transmission lines is no longer adequate because of an increase in loads throughout the Willamette-Puget Sound area. Additional transmission is required to solve the overload condition for loss of the Raver-Paul No. 1 Line.



THE PROPOSED PLAN OF SERVICE

Under the proposed plan the White River-Frederickson and Frederickson-Olympia sections of the single-circuit Olympia-White River 230-kV line would be removed. A 500-kV double-circuit line from White River to Frederickson to Olympia would be constructed using this right-of-way. This is shown in figure 1. Both sides of the new 500-kV line would be operated initially at 230-kV from White River through Frederickson to Olympia. Terminal additions and power system control and protective equipment would be required at Olympia, Frederickson, and White River Substations.

This could be the first step of a long-range plan to construct a 500-kV line from Raver to Olympia. In the future, one side of the 500-kV double-circuit line from White River to Olympia would be upgraded to 500-kV operation when the system requirements make it necessary to operate this facility at 500-kV, while the other side would remain at 230-kV. The long-range plans for this project would be to extend this circuit to either Covington or Raver Substation. If, in the future, BPA proceeded with the above steps, a 500/230-kV transformer would be necessary at Olympia and/or Frederickson Substation.

ALTERNATIVE PLANS CONSIDERED

In the draft EIS Supplement, three alternative plans were identified; one of them (Alternative Plan B) was selected and is now presented as the proposed plan. Alternative Plans A and C are described as follows:

Alternative Plan A

For this alternative, the Frederickson-White River section and the Olympia-Frederickson section of the single-circuit 230-kV Olympia-White River Line would be removed. This right-of-way would be used for a 230-kV double-circuit line from White River to Frederickson to Olympia as shown in figure 1. Terminal additions, along with power system control and protective equipment, would be necessary at White River, Frederickson, and Olympia Substations.

Alternative Plan C

This alternative differs from the other alternative in that a 500-kV single-circuit line would be constructed from White River to Olympia. As in the proposed plan, initial operation would be at 230-kV. Terminal additions and power system control and protective equipment would be required.

South Puget Sound Reinforcement
Study Area 79-4

Alternative Plan C could be also the first step of a long-range plan to build a 500-kV line from Raver to Olympia. Such a long-range plan might involve an additional 230-kV circuit from White River to Frederickson to Olympia when the 500-kV single-circuit line is upgraded to 500-kV operation. This would occur when system requirements make this step necessary. Other steps would be identical to those stated for the proposed plan.

NONCONSTRUCTION

Overloads on the transmission facilities between Olympia and Covington can be prevented until 1981 by switching between lines at Chehalis, Paul, and South Bremerton Substation. After 1981 the problem will become too severe to be solved by line switching. If no additional facilities were constructed, BPA reliability criteria could not be met for a summer outage of the 500-kV Raver-Paul No. 1 Line. Non-construction would eliminate the physical requirements and additional investment necessary when replacing the existing line with lines of higher voltage or increased capacity. Maintenance activities would remain unchanged under the nonconstruction alternative. During outage conditions the load would have to be restricted.

OTHER ALTERNATIVES CONSIDERED

Another option to the three alternatives previously discussed involves a variation of Alternative Plan A. Under this alternative the Frederickson-Olympia section of the single-circuit 230-kV Olympia-White River line would be removed. A 230-kV double-circuit line would be constructed from Olympia to Frederickson. Instead of BPA building additional transmission from Frederickson to White River, Tacoma City Light would have two options. TCL could split their 115-kV system by opening five 115-kV lines, two from TCL's Southeast Substation and three from TCL's Cowlitz Substation.

A second option is for TCL to rebuild their two lines between Northeast Substation (TCL) and Cowlitz Substation (TCL) from 115-kV to 230-kV. BPA has recently entered into a joint study with the City of Tacoma which could have a major impact on the need for the facilities proposed in this Item. The plan being studied requires removal of an existing City of Tacoma 115-kV, double-circuit transmission line to provide right-of-way for BPA to construct a 230-kV, double-circuit line. The City would have to advance construction of a 115-kV line and make other additions to its system to replace lost capacity. If an equitable sharing of costs and power transmission capacity can be negotiated, the new plan of service being studied could be substituted for the Frederickson Substation approved under Item 180, and would permit deferment of the facilities in the proposed plan.

D E S C R I P T I O N O F T H E E N V I R O N M E N T

PLANNING STUDY AREA

Geography

The planning study area is located in the Puget Lowlands of western Washington. It centers around an existing transmission line corridor that passes through parts of Thurston and Pierce counties (fig. 1). The area is south of Tacoma and Olympia and includes the City of Tumwater. Much of the land use is suburban and rural-suburban. Interstate Highway 5, a major north-south transportation artery, crosses the study area.

Elevations range from about 600 feet (185 m) west of Lake Tapps to about 100 feet (30 m) east of Tumwater. The Puyallup River Valley and the Nisqually River Valley are notable features of the landscape.

Climate

The study area has a mid-latitude, west coast marine climate typified by rainy winters and dry summers. Occasional dry continental air masses from the north cause more extreme hot or cold temperatures, but these air masses are normally blocked by surrounding mountain ranges.

Most rain occurs during the fall and winter months as air masses move inland off the Pacific Ocean. Persistent cloudiness and light to moderate rainfall over extended periods are normal. Most winter precipitation falls as rain. Annual snowfall averages only 15 inches. Overall annual precipitation, as shown on table 1, averages 40-50 inches (100-125 cm).

Prevailing winds are from the south or southwest during the winter and from the north or northwest in the summer months. It is not unusual to experience rather strong winds in the area with sustained windstorms of 50 mph (80 km/h) or more occurring approximately once every 2 years.

Temperatures remain moderate throughout most of the year because of marine air influences. Normally the last freeze of the year occurs in mid-April and the first freeze of winter can be expected in late September or early October. The growing season for the area ranges from 160 to 165 days.

South Puget Sound Reinforcement
Study Area 79-4

Table 1. Representative Climatological Data

Characteristic	Station	
	Olympia A.P.	Puyallup Exp. Stn.
Average Max. Temp.	62°F (17°C)	62°F (17°C)
Average Min. Temp.	39°F (4°C)	40°F (4°C)
Average Annual Precip.	53 in. (135 cm)	41 in. (104 cm)
Average Annual Snowfall	15 in. (38 cm)	5 in. (13 cm)
Source: Meteorological Committee, PNWRBC 1969. <u>Climatological Handbook</u> , Vols. I & II.		

NATURAL RESOURCES

Atmosphere

In general, air quality throughout the project study area is good. The principal type of air pollutant is suspended particulate matter. Some pollutant dispersion will occur as wind currents circulate around the Puget Sound industrial centers, particularly Tacoma. Tacoma's air pollution problems can be attributed to a large number of sources concentrated in an urban area. Kaiser's plant contributes most to carbon monoxide, however, even this contribution is fairly small; by far the greatest source of carbon monoxide in Pierce County is automobile traffic (Beck, No date, P. 94). A major source of SO₂ is a copper smelter located in Tacoma (Beck, Inc., No date, P. 85). Open field and slash burning, as well as farming operations are seasonal activities which all contribute to air pollution.

In 1974 suspended particulate standards for Washington State were exceeded at one station in Tacoma on the annual geometric mean basis, and at several stations in and near Tacoma on a daily average basis. In 1975, Washington suspended particulate standards were exceeded on the maximum daily average basis at one station in Tacoma. State SO₂ regulations were exceeded on several occasions at one monitoring station in Tacoma in 1974. Carbon monoxide standards were exceeded on 6 separate days during the last half of 1974, on the 8-hour average basis at one station in Tacoma. Ozone exceeded 0.08 ppm, the State hourly standard for photochemical oxidants for 5 hours at a station in Lakewood, a suburb south of Tacoma, during the last half of 1974 and for a total of 10 hours during 1975. (Puget Sound Air Pollution Control Agency, 1975, P. 14, 15, 36, 38, 40, Schmidt, 1976.)

Dispersion characteristics in the Puget Sound area are generally good; however, sea-breeze fumigation may cause high ambient concentrations

for short periods in localized areas (Equitable Environmental Health, 1976, p. 17). The Tideflats Industrial area of Tacoma where Kaiser is located is in a valley which inhibits dispersion. Analysis of data from a radiosonde station operated at Portage Bay shows 145 days during which morning ground level inversions occurred during a 39-month period. Morning ground level inversions occurred for up to 7 days in a row. These inversions were most frequent in January through March and September-October, and correlate well with high ambient measurements of pollutants (R. W. Beck, No date, p. 67-79).

Geology, Soils and Minerals

The existing Olympia-White River 230-kV transmission line corridor crosses the Puget Lowlands. During recent geologic history the topography of this area was modified by continental glaciation.

Two landforms are crossed by the existing transmission line. Approximately 15 percent of the existing right-of-way corridor is on nearly level silty and sandy alluvial sediments. Generally these sediments occur south of Patterson Lake and adjacent to the Puyallup River. Moderately deep, silty sandy soils which have a slight potential for water erosion have developed from these sediments.

The remaining 85 percent of the right-of-way crosses glaciofluvial deposits. These deposits consist of poorly to moderately sorted material ranging in size from silt to boulders. Shallow silty and sandy soils containing coarse rock fragments have developed from these deposits.

The slopes on this landform predominately range from nearly level (0-5 percent) to gently undulating (5-10 percent). Locally steep escarpments with slopes up to 60 percent occur adjacent to the Puyallup River Valley. The potential for soil erosion on this landform is slight to moderate.

Currently, gravel is being quarried from surface deposits along the corridor. The existing transmission line spans several of these quarries.

Hydrology

Several water resources are spanned by the existing Olympia-White River 230-kV transmission line. Rivers crossed are the Deschutes (mean annual flow - 388 cfs (11 m³/s)), the Nisqually (mean annual flow - 1,385 cfs (40 m³/s)), and the Puyallup (mean annual flow - 3,292 cfs (95 m³/s)). Notable small streams crossed are Muck, South,

Lacamas, and Murray Creeks. The existing line also crosses Trospers Lake, Lake Tapps, and the Centralia Power Canal. Locally, several seasonal wet areas formed by poor subsurface drainage are spanned. These small areas occur at various points along the right-of-way.

Vegetation

The vegetation within the corridor containing the existing Olympia-White River 230-kV line supports a growth of successional species that have responded to or invaded the area following previous construction activities. Dominant tree species growing back within the corridor include Douglas-fir, vine maple, red alder, willow, and some western redcedar and hemlock. Major shrubs, forbs, and herbaceous plants common along the corridor, include scotchbroom, salal, Oregon grape, blackberry, salmonberry, bracken fern, sword fern, fireweed, ticklegrass, and meadow fescue. Tansy ragwort and Canada thistle are noxious weeds that have succeeded other plants at places in the existing corridor.

Prairie areas or grasslands covering small acreages throughout the corridor are found primarily on glacial outwash plains near Yelm and south of Spanaway. Clumps of Oregon white oak are found at the margin of these grassland areas adjacent to the corridor.

Principal vegetation found adjacent to or within marshy areas consists of rushes, sedges, cattails, mosses, and wiregrass. Most marshy areas and water bodies are spanned by existing lines.

With regard to threatened and/or endangered plant species, once an approved list of these species has been published BPA will work with the U.S. Fish and Wildlife Service to explore appropriate mitigating measures.

Wildlife

The study area is within an important anadromous fishery region. The existing right-of-way crosses at least six streams which are utilized by anadromous fish. Species present include chinook, coho, pink, and chum salmon, steelhead, Dolly Varden, and searun cutthroat trout. Major fishery streams include the Puyallup, Nisqually, and Deschutes Rivers, and Muck, Lacamas, and Murray Creeks. These same waters are also inhabited by resident species including rainbow and cutthroat trout and mountain whitefish. Lowland lakes such as Lake Tapps and Trospers Lake also have trout in addition to warmwater species such as bass and crappie.

The above water resources and associated wetlands are also important to many other kinds of wildlife including waterfowl. Osprey and bald eagles are also seen near these areas. The bald eagle has been proposed by the U.S. Fish and Wildlife Service to be designated a threatened species in Washington (Federal Register July 12, 1976). Other birds characteristic to the area include blue and ruffed grouse, band-tailed pigeon, Steller jay, song sparrow, and black capped chickadee. Ring-necked pheasants occur in medium to high densities in and near agricultural lands in the eastern part of the area and near the Nisqually River.

The mixed woodland habitat found throughout the area supports large numbers of blacktail deer. Black bear may occasionally be seen in the area. A large number of smaller mammals are also present including snowshoe hare, Townsend chipmunk, mountain beaver, raccoon, mink, and weasel.

RESOURCE USE AND SOCIOECONOMIC RESOURCES

Demographic and Economic Resources

The existing transmission line corridor passes through areas of Pierce and Thurston Counties which are rapidly changing from rural to suburban in character. These areas are closely tied to the major urban areas of the state.

Roughly 14 percent of the state's population lives in Pierce and Thurston Counties and this percentage is expected to be maintained through 1985. The unincorporated areas of both counties are experiencing a population growth rate faster than the urbanized areas (table 2). In both counties, the population growth is most rapid in the area crossed by this right-of-way (Bill LeDrew, David Thomson, Paul Anstey, personal communications).

Residential building construction is rapidly expanding in both counties, especially in the areas near this transmission line corridor.

Local planners anticipate rapid development near this right-of-way will continue. The existing housing near the right-of-way is principally single family units and new residential construction is expected to be predominantly single family dwelling units (Thurston Regional Planning Council 1976:50). It is possible property near Frederickson presently held by the Port of Tacoma will be developed for heavy industry. If this occurs, additional residential and non-residential development will occur in that area.

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Pierce and Thurston Counties have unemployment rates somewhat lower than the state as a whole. The 1975 unemployment rate averaged 9.1 percent for the state, 8.8 percent in Pierce County, and 7.7 percent in Thurston County. Thurston County tends to have a more stable employment situation than the rest of the state because of the high concentration of state agencies in the capital at Olympia. Other major employment sectors in Thurston County include lumber and wood products industries, retail trade, and consumer services.

Major employment sectors in Pierce County include government, wholesale and retail trade, and services. Manufacturing accounts for about 15 percent of the jobs in Pierce County, as compared to only 8 percent in Thurston County. Consequently, national economic conditions have a more direct impact on Pierce County employment.

Table 2. Population - Pierce and Thurston Counties

	1960 Census	1970 Census	Percent Change	Estimate 1976 <u>1/</u>	1970-76 Change (Percent)	Projected 1980 <u>2/</u>	1976-80 Change (Percent)	Projected 1985 <u>2/</u>	1980-85 Change (Percent)
Washington	2,853,214	3,409,169	19.5	3,571,591	4.9	3,776,400	5.7	4,054,800	7.4
Pierce Co. Total	321,590	411,027	27.8	420,000	2.4	440,100	4.6	472,400	7.3
Pierce Co. Unincorporated	-----	213,627	-----	215,808	1				
Bonney Lake	645	2,313	258.6	4,187	81				
Puyallup	12,063	14,742	22.2	15,500	5.1				
Sumner	3,156	4,325	37	4,327	0.05				
Tacoma	147,979	154,581	4.5	156,500	1.2				
Thurston Co. Total	55,049	76,894	39.7	94,300	22.6	98,600	4.6	111,600	13.2
Thurston Co. Unincorporated	-----	36,132	-----	47,925	32.6				
Olympia	18,273	23,111	26.5	25,480	10.3				
Tumwater	3,885	5,373	38.2	5,894	9.7				
Yelm	479	628	31.3	740	17.8				

1/ Source: Population Studies Division, Office of Programming and Fiscal Management, Olympia, Washington.

2/ Source: Population, Employment and Housing Units: Projections to 1985 for Washington,
Bonneville Power Administration, 1976.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for ensuring the integrity of the financial system and for providing a clear audit trail. The document also highlights the need for transparency and accountability in all financial dealings.

In the second part, the document outlines the various methods used to collect and analyze data. It describes the process of gathering information from different sources and how this data is then used to identify trends and patterns. The document also discusses the challenges associated with data collection and analysis, such as ensuring the accuracy and reliability of the data.

The third part of the document focuses on the development of effective communication strategies. It discusses the importance of clear and concise communication in all aspects of the organization's operations. The document also provides guidance on how to develop and implement communication plans that are tailored to the specific needs of the organization.

Finally, the document concludes by emphasizing the need for continuous improvement and innovation. It encourages the organization to regularly review its processes and procedures to ensure that they are up-to-date and effective. The document also highlights the importance of fostering a culture of innovation and creativity within the organization.

Land Use

Agriculture

Few agricultural crops are grown near the Olympia-White River 230-kV transmission line right-of-way. These crops include raspberries, strawberries, Christmas trees, and New Zealand White Dutch clover and perennial rye grass for hay and pasture. In some areas, the farmers are pasturing the native grasses, managing the native pasture by clipping, seeding, and fertilizing. Livestock graze the pasture.

Most of the land along the right-of-way is not in production. Native grasses, forbs and woody shrubs such as Scotch broom comprise existing primary cover (see Vegetation Section).

Raspberries and some blueberries are grown in the Puyallup River Valley southeast of the town of Puyallup. Additionally, strawberries are grown near Alderton and east of Tumwater. These acreages generally produce above average yields.

The majority of Christmas trees are grown in the area between Tumwater and Kellys Korner. Species consist mainly of white fir and noble fir.

BPA has reviewed the Prime and Unique Farmland Proposed rules published in the Federal Register, Vol. 42, No. 163, August 23, 1977. At the present time the Department of Agriculture has not established a final inventory of prime and unique farmland in the study area. At such time that a final inventory is published BPA will comply with applicable final rules pertaining to it.

Rangeland

The majority of rangeland along the corridor is on the Fort Lewis Military Reservation south of Spanaway. Because much of this area is forested, the existing vegetation consists of successional species described in the Vegetation Section.

Most of the remaining pastureland and/or rangeland along the corridor is suited to hay or pasture. Most pastureland has been artificially seeded (see Agriculture Section). The grazing capacity of this pastureland varies greatly along the corridor depending on the amount of brush, stumps, and management practices.

Forestry

Merchantable timber is in scattered patches and small blocks adjacent to the Olympia-White River 230-kV line right-of-way. Douglas-fir is by far the most common species with alder, cottonwood and western

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redcedar also found in the stands. The existing line passes through a small area with native ponderosa pine not usually found in the Puget Sound area.

The stands of Douglas-fir average from 20 to 50 years in age, all second growth. Few of the old growth trees remain. The second growth stands vary from 8 to 20 inches (20-50 cm) in diameter at breast height. Some of the Douglas-fir could be used as piling, but most would be used as sawlogs.

The existing line crosses a number of active Christmas tree plantations. However, some lots with trees up to 20 feet in height have been abandoned. The alder has little value and like cottonwood trees are mostly scattered throughout the Douglas-fir stands. Some trees near the existing line, especially tall cottonwoods, have grown to a height that may enable them to fall into the conductors. These possible danger trees would be identified after construction of the new line as part of regular maintenance operations.

Urban and Residential

Much of the study area is undergoing rapid development of urbanized land uses, especially residential. This development is particularly evident near Lake Tapps, Bonney Lake and in the "South Hills" area west of the Puyallup River. Another concentration of residential development is occurring between Tumwater and Black Lake near Olympia Substation and east of Tumwater for about 5 miles (8 km). Other smaller areas of residential development are found at Nisqually Pine, northeast of Yelm, and at Evergreen Prairie just east of Lake St. Clair. At Evergreen Prairie there are a total of 129 lots that have received approval for development from the county. The Port of Tacoma has purchased 1 square mile (2.6 km²) of land near Frederickson for development of an industrial park. This industrial development will likely result in an increase in residential land use near Frederickson.

The most significant concentration of urban land is at Tumwater. Here the existing transmission corridor is in close proximity to residential and commercial land uses. A portion of the right-of-way is currently being used as a plant nursery and sales area. Olympia Municipal Airport is less than 1 mile (1.6 km) south of the transmission line. The existing towers are slightly below the glide path for the airport instrument runway.

An oil pipeline in the study area crosses the transmission corridor several times south of Spanaway.

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Several primary and secondary railroad routes are in the study area and offer opportunity for increasing development of commercial and industrial land use similar to the proposed industrial park near Frederickson.

There is an extensive system of Federal, state, and county roads which provide easy access for development of rural and agricultural land which predominates. Because of easy access and strong pressures for growth, Thurston and Pierce Counties are attempting through planning efforts to promote growth patterns retaining much of the rural/agricultural character. With regard to the Washington State Coastal Zone Management Act, the proposed facility will fall outside the defined first "tier".

Other

The study area includes portions of the Nisqually Indian Reservation near Yelm, and Fort Lewis Military Reservation. In these areas the existing transmission line parallels existing roads through nearly undeveloped portions of the reservations. There are several small commercial establishments operated by the Nisqually Indians adjacent to the transmission right-of-way.

Esthetic

The scenic quality of the study area ranges from low to high. The dense urbanization near Olympia, the scattered farmlands, forests, lakes, and rivers provide diverse and contrasting land patterns. Areas of high scenic quality can be found where these patterns interface and provide visual variety in the landscape. Conifer forests intermixed with deciduous trees and agricultural lands provide seasonal changes in the visual character.

Extensive urbanization is evident throughout much of the area. The natural character is being altered and in many cases has been lost where these developments have occurred.

A portion of Washington State Highway 510 has been given a scenic classification. This classification does not preclude the construction of a transmission line, but it does recognize areas where high scenic values exist.

Recreation

Recreational opportunities within the study areas are somewhat limited in scope because of the proximity of urban population centers and

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suburban developments. Two lakes and three rivers crossed by the existing corridor are easily accessible to local residents. Both Trosper and Tapps Lakes are fringed with private homes, and recreational activities are mainly limited to those living on the lakeshore.

Trosper Lake is a rather small lake offering swimming, warm-water fishing, non-power boating, and similar water oriented activities. The Nisqually, Deschutes, and Puyallup Rivers all serve as good fishing streams for salmon, steelhead and trout. Other numerous lakes and streams are near the existing line.

There are no federal or state sponsored recreational sites within the study area. Among the private recreational developments is the Tacoma Sportsmen's Club, a rifle and skeet range situated adjacent to the right-of-way south of Puyallup. Other recreational sites include the Skookum Archery Range, sited directly within the right-of-way south of Sumner; and a swimming pool and playground area adjacent to the right-of-way in the Nisqually Pines Estates development near the Nisqually River. Lacey Oaks Stables owns and operates a horse riding and training track which is on and adjacent to the right-of-way east of Tumwater. The Sumner Sportsmen's Association sponsors a facility on the Puyallup River for fishing. In addition to these organized recreation uses is the unauthorized use of the right-of-way for off-road vehicles (ORV) such as trail bikes and four-wheel drive units.

Historical, Architectural and Archeological

The National Register of Historic Places has been examined (Federal Register Volume 42, No. 21, February 1, 1977) and monthly supplements thereafter. No federally recognized properties are within the corridor area nor are any in the process of being nominated.

A request has been made of the Washington State Historic Preservation Officer to provide a list of properties on the Statewide Inventory of Historic Places.

Lakes, rivers, and drainages in the area provide a high potential for archeological discovery. A recent cultural resource overview was made by an officer of the Ft. Lewis Military Reservation. Sites identified by this officer have been added to those on file at the Washington Archaeological Research Center. However, no systematic survey of this general area has been conducted by the Research Center or other professional archeologists. Based on knowledge of both early history of the region, and pre-history, the likelihood exists additional evidence of former ethnic cultures may be unearthed by future generations. BPA will comply with the requirements of the National Historic Preservation Act of 1966 (P.L. 89-665), as well as Executive Order 11593.

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DESCRIPTION OF TRANSMISSION LINE
ROUTE DESIGNS, THEIR POTENTIAL
IMPACT AND MITIGATION

DESCRIPTION OF THE ROUTE DESIGNS CONSIDERED

Introduction

Only one route has been identified for this project. This is right-of-way made available by the removal of the 51-mile (82 km) Olympia-White River 230-kV single-circuit transmission line. Three design alternatives were considered for the construction of the replacement line. Plan B was selected as the proposed design.

Location Description

Each of the following design alternatives would follow the vacated right-of-way of the Olympia-White River 230-kV line between White River Substation (Puget Sound Power and Light), 5 miles (8 km) northeast of Puyallup, Washington, and Olympia Substation (BPA), 1.5 miles (2.4 km) west of Tumwater, Washington, as shown in figure 1.

Proposed Route Design

A double-circuit 500-kV line would replace the Olympia-White River line. Initially, both circuits would be energized at 230-kV. One circuit would be upgraded to 500-kV operation in the future.

Alternative Route Design A

Under this alternative the Olympia-White River 230-kV single-circuit line would be replaced with a double-circuit 230-kV line.

Alternative Route Design C

This alternative involves replacement of the Olympia-White River line with a single-circuit 500-kV line. Initial operation of the new line would be a 230-kV, but would later be operated at 500-kV. When the upgrade to 500-kV occurs, an additional 230-kV line between White River Substation and Olympia Substation might be considered.

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General Construction Requirements

Tower Design and Material Requirements

Material requirements are given in table 3.

Proposed Route Design - Double-circuit 500-kV towers shown in figure 2 would be used for the proposed design.

Alternative Route Design A - Double-circuit 230-kV towers shown in figure 2 would be used for Alternative A.

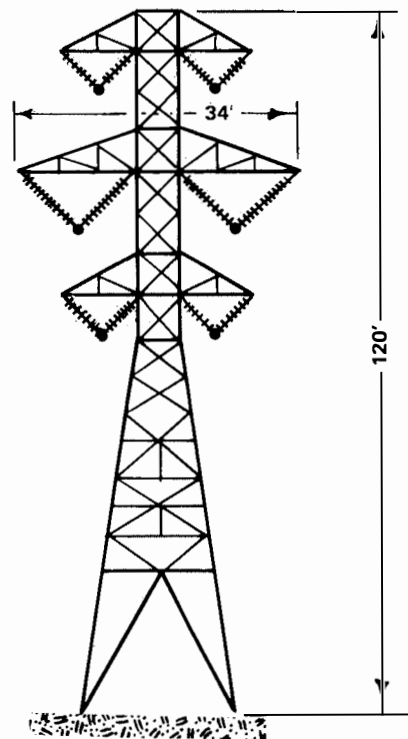
Alternative Route Design C - Single-circuit 500-kV towers shown in figure 2 would be used for Alternative C.

Table 3. Material Requirements

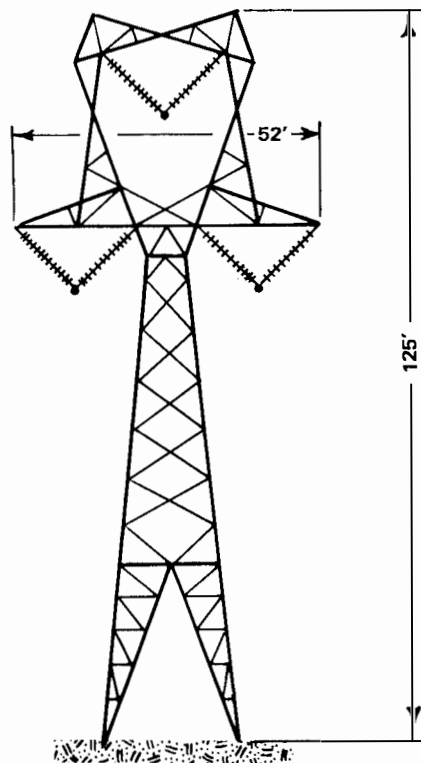
Route Design	Structure Type	Height	Acres Twr. Site	Struct/ Mile	Tons Steel/ Mile	Tons Conductor/ Mile
Proposed	500-kV Double-circuit	175-190 feet (53-57 m)	0.02-0.08	4.6	118	64
A	230-kV Double-circuit	110-125 feet (33-38 m)	0.01-0.05	4.6	82	23
C	500-kV Single-circuit	110-125 feet (33-38 m)	0.01-0.06	4.6	60	32

Right-of-Way Requirements

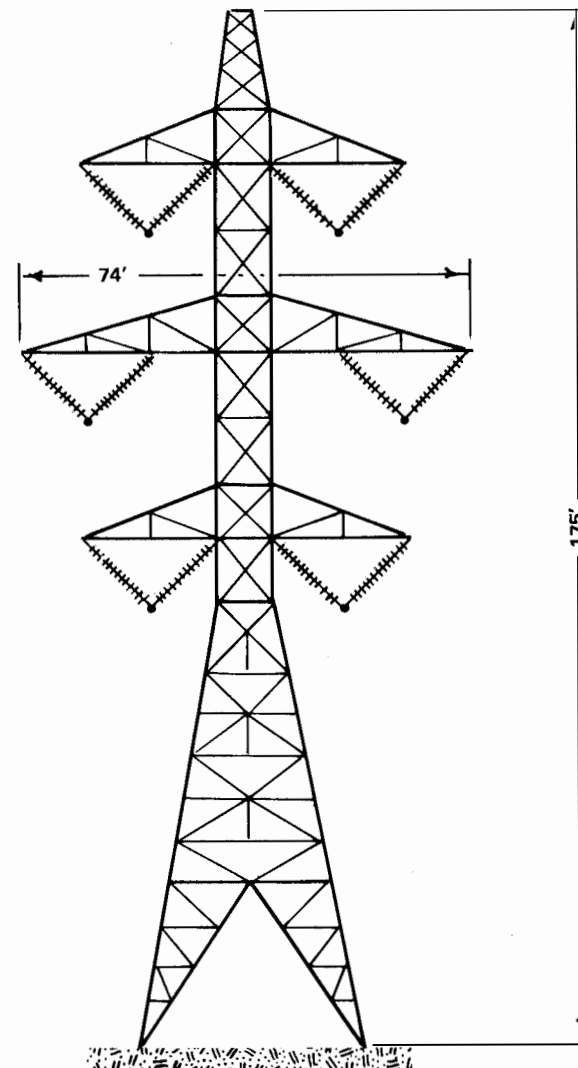
Proposed Route Design, Alternative Route Designs A and C - No new right-of-way would be required.



230 kV DOUBLE CIRCUIT TOWER

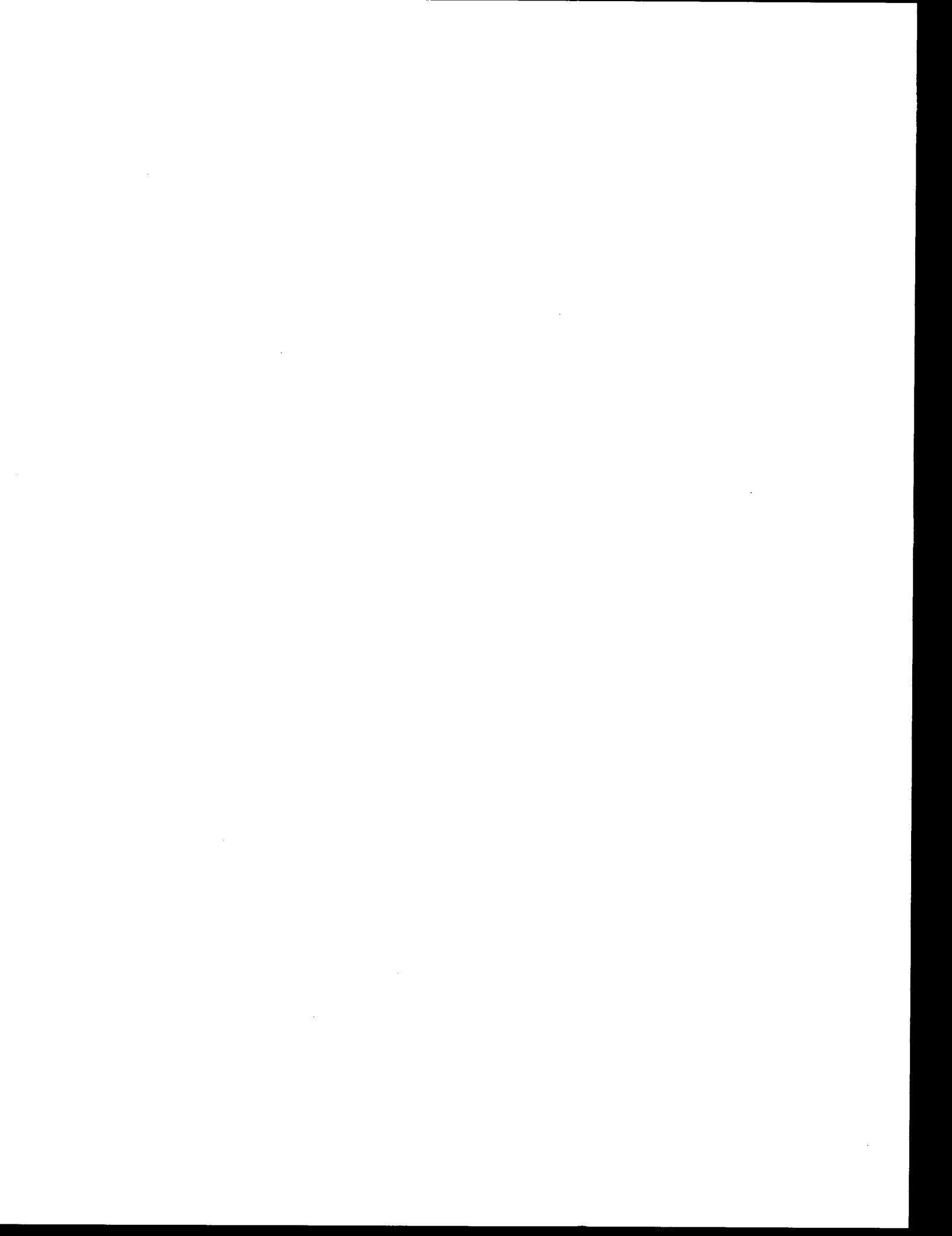


500 kV SINGLE CIRCUIT DELTA
CONFIGURATION TOWER



(PROPOSED)
500 kV DOUBLE CIRCUIT STACKED
CONFIGURATION TOWER

FIGURE 2
TYPICAL TOWER CONFIGURATIONS
SOUTH PUGET SOUND REINFORCEMENT
79-4



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Access Road Requirements

Proposed Route Design - No new road construction would be required. However, existing roads would need improvement at various locations along the length of the line, and easements to use existing recently built private roads would be necessary. In addition, two bridges across small creeks might need replacement - one is east of Tumwater (mile 5 from Olympia on the Olympia-White River line) and the other is at Lacamas Creek south of Spanaway (mile 25 from Olympia on the Olympia-White River line). Existing roads would be used in agricultural areas, but a few temporary roads may be needed. Access road requirements for all plans are summarized in table 4.

Table 4. Access Road Requirements

<u>New Construction</u>	
Off Right-of-Way	None
On Right-of-Way	None
<u>Improve Existing Roads</u>	
Off Right-of-Way	5,500 ft. (1,680 m)
On Right-of-Way	13,000 ft. (3,960 m)
<u>Acquire Easement for Existing Private Roads</u>	
Off Right-of-Way	22,000 ft. (6,700 m)
On Right-of-Way	None
<u>Rock Required</u>	1,850 cu. yd. (1,410 m ³)

Alternative Route Designs A and C - Access road requirements are the same as the proposed design.

Other Construction Characteristics

Proposed Route Design - The existing Olympia-White River 230-kV single-circuit line would be removed. In most cases, new tower sites would be close to the old tower footings except where space is limited such as at the top of a narrow ridge. Here, the old tower footings would be removed and new ones installed.

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Techniques for clearing and construction, site restoration, and other mitigating measures are described in The Role of the Bonneville Power Administration in the Pacific Northwest Power Supply System (Role EIS), Appendix B, Chapter V.

Alternative Route Designs A and C - Other construction characteristics are the same as the proposed design.

Cost Requirements

Proposed Route Design - Costs for the proposed design are shown in Table 5. These costs include removal of the existing line and construction of a line for each plan.

Table 5. Cost Requirements

<u>Alternative Route Design A</u>	<u>Proposed Route Design</u>	<u>Alternative Route Design C</u>
\$17.1 million	\$23.3 million	\$13.0 million

Costs are based on estimates completed May 17, 1977.

Alternative Route Design A and C - Costs are shown in Table 5.

Operation and Maintenance Requirements

Proposed Route Design, Alternative Route Designs A and C

Operation and maintenance of this line will be similar to the program described in Appendix B, Chapters VI of the Role EIS.

THE POTENTIAL IMPACTS OF THE ROUTE DESIGNS
AND THEIR MITIGATION

Natural Resources

Atmosphere

Proposed Route Design, Alternative Route Designs A and C - Construction, operation, and maintenance activities related to the proposed design would create relatively insignificant amounts of air pollutants. Primary pollutants would be dust and exhaust emissions from construction equipment used in the removal of the existing 51-mile (82 km) line and subsequent replacement of it with a new 500-kV double-circuit line. Some slash will undoubtedly result from right-of-way preparation and construction operations. BPA will allow contractors to use controlled open burning to dispose of these materials where and when permitted by local, state and federal air pollution regulations. Combustion by-products (particulate matter,

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gases, etc.) will result. The impacts to ambient air quality from these pollutant sources are normally localized and short-lived. The mitigating measures employed by BPA and/or our contractors in the performance of routine construction work are discussed in Appendix B, Chapter VII of the Role EIS.

Geology, Soils and Minerals

Proposed Route Design, Alternative Route Designs A and C - Impacts from the three designs would be similar. For general impacts and mitigation measures refer to Appendix B, Chapter VII of the Role EIS.

Construction activities related to this project would not impact the geology. During the tearing down and rebuilding operations, impacts to soil such as compaction and erosion would occur. Approximately 3.5 miles (5.6 km) of existing access roads would be upgraded and used during construction.

In some agricultural land temporary access would be required. Operation of equipment along temporary access and around existing and new tower sites could produce slight soil compaction and some wind and water erosion.

No significant disturbance to quarry operations would occur during the tearing down and rebuilding of the existing line.

Hydrology

Proposed Route Design, Alternative Route Designs A and C - Existing roads and bridges would be utilized during construction. This would eliminate the need for numerous stream fordings and disturbance of wet areas. If fording is necessary at small seasonal streams along the right-of-way during spring run-off, some short-term increases in stream turbidity could occur. For mitigation measures refer to Appendix B, Chapter VII of the Role EIS.

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Vegetation

Proposed Route Design, Alternative Route Designs A and C - Short-term disturbance to vegetation would occur at existing and new tower sites, pulling, reeling and stringing sites, and where any improvement of existing access roads is required. Seeding disturbed areas would help reestablish vegetation, and successional species should recover quickly, preventing any severe erosion problems. Species such as bracken fern, scotchbroom, salal, and fireweed should return to these areas within 1 to 3 years. Some danger trees may need removal.

Wildlife

Proposed Route Design - Construction activities during the spring could interfere with breeding and rearing activities especially with ground nesting species such as pheasant. Although several anadromous fishery streams would be crossed, existing access roads could be used and no significant impacts are expected on this resource. The additional set of conductors to be added by the double-circuit line would represent an additional obstacle in waterfowl flyways. This could result in an increase in mortality rates for waterfowl and other birds.

Clearing would result in both positive and negative impacts on wildlife depending on the species. Removal of forest vegetation would increase the amount of shrub/grass vegetation important to species such as deer. Some adverse effects could result to species which utilize forest vegetation. Because of the relatively small amount of clearing which would occur, and because a mix of both forest and non-forest habitat exists in the area, the overall impact on wildlife is not expected to be significant.

The increased audible noise and higher electric field strength of a 500-kV circuit would not be expected to result in any noticeable effects in the behavior of wildlife in the vicinity of the line.

Concerns have been expressed in recent years about possible long-term biologic effects which may result to wildlife due to exposure to electric fields. Past operating experience with 500-kV lines and the results of recent laboratory studies indicate that such effects due to electric field strength levels as found near power lines is remote. More information on this subject can be found in the BPA publication A Review of Electrical and Biological Effects of Transmission Lines.

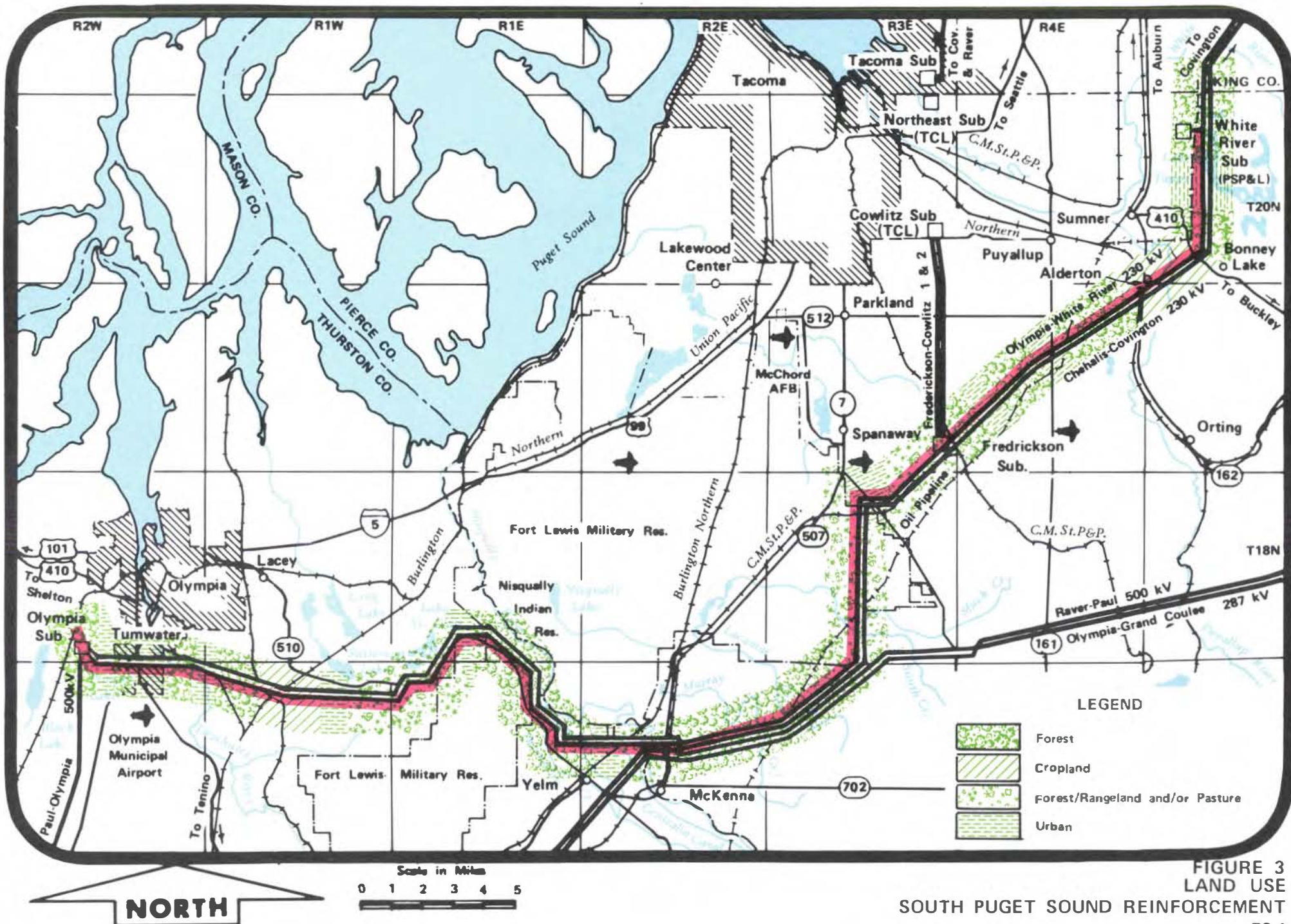


FIGURE 3
LAND USE
SOUTH PUGET SOUND REINFORCEMENT
 79.4



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Alternative Route Design A - This design plan is expected to have low short-term impacts on wildlife and no significant long-term impacts. Noise and disturbances from men and machinery during construction would cause wildlife to temporarily avoid the construction areas.

Alternative Route Design C - Alternative Route Design C would have the same impacts as the proposed design. The single-circuit line would have less potential for causing bird collision mortality than the double-circuit line of the proposed design or Alternative A. The discussion of possible impacts associated with 500-kV operation for the proposed design would apply.

Resource Use and Socioeconomic Resources

Demographic and Economic Considerations

Proposed Route Design, Alternative Route Designs A and C - The socioeconomic impacts are expected to be similar for the three alternative plans. Additional socioeconomic impacts will be limited mainly to the construction activities.

Although clearing of the right-of-way would be incidental for this transmission line, the existing conductor and towers must be removed before construction of the new line can begin. (See discussion of Construction Sequence in the Role EIS, Appendix B, Chapter V. Three seasons would ordinarily be needed to construct a 51-mile (82 km) line, however construction could be accelerated for completion in 2 or, possibly 1 1/2 seasons at a higher cost. (Weather is the limiting factor, but a season is generally considered to run from April 1 through October 31).

The community facilities existing within commuting distance of this line are easily adequate to serve the needs of the construction workers.

Similarly, the construction activity would have little impact on employment in the area, since the work force in the two counties exceeds 170,000. The wages paid the construction workers could exceed \$2.5 million, but this too would have only a minor effect on the local economy.

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The right-of-way is crossed by numerous roads which allow good access for the movement of equipment and material. Some delay to local traffic could result from the presence of construction vehicles near main roads.

Land under existing easements is in various productive uses including a nursery, Christmas tree farms, a thoroughbred horse training track, strawberry farms, pasture, an archery range, and open space in residential developments. These activities would be disrupted in varying degrees by construction activities. Efforts would be made to minimize these disruptions, and owners and occupants would generally be compensated for most business losses. Occupants of property immediately adjacent to the right-of-way would be unavoidably subjected to noise and dust for short, intermittent intervals during the 1 1/2 to 3 construction seasons. However, dismantling of the existing line and accompanying tower site preparation of the right-of-way would not be as disruptive to neighbors as clearing a new right-of-way.

Land Use

Agriculture - Proposed Route Design, Alternative Route Designs A and C - Typically, agricultural impacts from construction of transmission lines and related facilities would be potential restrictions on overhead sprinkler irrigation patterns in relation to tower structures and conductors. Increases in weed infestation and herbicidal control would occur.

With respect to irrigation practices in the area, replacement of existing structures would involve disturbances during and immediately following construction. New structures would generally have different placements than existing ones and some minor changes in irrigation sprinkling patterns would occur. Construction activities and equipment in the right-of-way would interfere with coincidental farming practices.

Increases in weed infestation would most likely occur immediately following construction. Herbicidal control would remain the same as for present maintenance and is described in Appendix B, Chapter VI of the Role EIS.

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Rangeland - Proposed Route Design, Alternative Route Designs A and C - In general the alternative plans would be compatible with rangeland and/or pastureland and associated livestock management practices. Little, if any, new change would occur from the loss of grazing in the area occupied by the towers. Improvement of access roads would have no significant impact to rangeland.

Weed infestations, as mentioned in the Agricultural Section, can be reduced by immediately seeding disturbed areas upon completion of construction. BPA will cooperate with the local weed control district and landowners to stop the spread of noxious weeds.

Forestry - Proposed Route Design, Alternative Route Designs A and C - Other than some danger trees that may need removal, no large amounts of timber would be cleared.

Urban and Residential - In general, each of the alternative plans would have similar impact on urban and residential land use. During construction activities, occupants of nearby residences and businesses may be disturbed by noise, dust, the visual impact of construction equipment and material, and the disturbance of vegetation and soil. In some locations there may be inconvenience or safety hazard caused by vehicular traffic associated with the construction. In a few instances the right-of-way is being used for backyards, vehicular parking, and in Tumwater for storage, display and sale of nursery plants. These right-of-way uses may be disturbed and fences may be temporarily removed.

Construction of transmission lines under each plan would raise towers and part of the conductors to be within the glide slope of the instrument runway at Olympia Municipal Airport. The FAA is being consulted to determine what measures must be taken to mitigate impacts. Mitigation may include special towers, lighting and marking of structures.

No adverse electrical impacts are anticipated to wire telecommunication facilities. If the utility determines a problem may be occurring because of the BPA transmission line, it will be investigated and mitigated according to BPA policy.

Proposed Route Design - Audible noise levels during rain would be about 50 decibels measured 100 feet (30 m) from the center line of the

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right-of-way. Past BPA experience indicates that these noise levels would elicit few if any complaints from nearby residents.

A 500-kV transmission line can induce voltages on metal objects near the line. To eliminate the possibility of persons receiving annoying shocks when touching such objects, BPA routinely grounds all wire fences, metal buildings, and other metal objects within specified distances of a 500-kV line. In recent years, questions have been raised about the possibility of biologic effects due to long-term exposure to transmission line electric fields. Based on BPA's operating experience with 500-kV lines, research conducted by BPA and others, and review of literature on this subject, it is believed the electric field of such lines do not pose a health hazard to man, plants, or animals.

Further information on the above subjects can be found in two BPA publications, Tips of How to Behave Near High-Voltage Power Lines, and A Review of Electrical and Biological Effects of Transmission Lines. These publications are free and can be obtained from the BPA Public Information Office, P.O. Box 3621, Portland, Oregon 97208.

Between Olympia Substation and Yelm, especially near Tumwater, there are several residences in close proximity to the existing lines. Television reception adjacent to a 500-kV transmission line is not affected during fair weather but as many as 138 dwellings adjacent to the line may suffer some television degradation during foul weather. The presence and degree of interference is dependent on station signal strengths, line to antenna separation, antenna orientation, operating line voltage, and design of the transmission line. Some television interference could occur as far as 500 feet (150 m) horizontally from the operating transmission line.

As with television reception, the previously mentioned variables determine the degree of AM radio interference. No radio interference is expected during dry weather. However, interference levels usually average 20 dBA higher during rain, and as many as 438 dwellings would have AM reception difficulties of varying degrees. Radio and television complaints would be investigated and mitigated in accordance with BPA policy.

Alternative Route Design A - After construction, long term impacts would be slightly different from the proposed design. Audible noise levels would be similar to existing levels. When energized the line noise will be below ambient levels. No impact to radio or television reception is expected.

Alternative Route Design C - Impacts would be similar to the proposed design.

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Audible noise from a single-circuit 500-kV line average 46 dBA measured 100 feet (30 m) from the center line of the right-of-way. Radio and television interference levels are essentially the same as for the proposed design.

Other - Proposed Route Design, Alternative Route Designs A and C - Other than the visual impacts discussed in the Esthetic section, no impacts to the Nisqually Indian Reservation or Fort Lewis Military Reservation are expected.

Esthetic

Proposed Route Design, Alternative Route Designs A and C - The visual character of the study area would not be changed by any of the alternative plans. Some modification to the right-of-way and tower configuration would occur, but this would not significantly add to the existing visual disruptions. Most long-term visual impacts would be minor with the possible exception to people living in close proximity to the line and to travelers on nearby roads where screening would be removed.

Many homes have been built or are currently being built near the existing lines. Most of these homes have foreground views of the transmission line and would be adversely impacted under most circumstances.

Approximately 1 mile of Washington State Highway 510, near Yelm, is designated scenic and is near the existing line. No impacts would occur. Numerous other city, county, state, and private roads would be paralleled or crossed by these plans with no increase in visual impacts expected.

Construction impacts, although temporary, detract from esthetic values wherever they occur. In areas of high viewer exposures, such as near Olympia and Sumner, the resulting impacts would be from construction equipment, crews, materials, and associated dust, noise, exhaust, and litter would provide additional visual distractions. Until dulled by weathering, the reflective qualities of the towers and conductors would increase the visibility of the facilities.

Recreation

Proposed Route Design, Alternative Route Designs A and C - Overall impacts to recreational resources from any of the designs should be minimal.

Some short term impacts would be noticeable during construction periods when equipment is in operation, but long term impacts should remain slight. The serene setting of Trosper Lake would be disrupted by heavy equipment operation during building periods. However, this would be for a short time as only two towers need replacement in the immediate area. Recreation at Lake Tapps would be disturbed only during construction periods. Since the new line would be replacing an existing line, visual intrusion should not be greatly altered (see the Esthetic section for further discussion of visual impacts).

Impacts on the fishery resources of the Nisqually River, Puyallup, and Deschutes Rivers are discussed in the Wildlife Section. Depending on the time of construction, very limited stretches of the rivers may be precluded as fishing spots.

The Lacey Oaks Stables thoroughbred horse training track and the Skookum Archery Range may be closed to use for short periods while construction crews are working in those areas. Other than noise and dust during construction, no other impacts to the Tacoma Sportsmen's Club Rifle and Skeet Range or the Nisqually Pines Estates Recreation Area should occur. No impacts are expected at the Sumner Sportsmen's Association facility.

Historical, Architectural, Archeological

None of the route designs will effect any properties listed in or eligible for the National Register of Historic Places as published in the Federal Register. The additions at White River, Frederickson, and Olympia Substations will also have no effect on historic properties. The Washington State Historic Preservation Officer has been contacted regarding identification of any properties nominated to or listed on the Statewide Inventory of Historic Places.

The Washington Archaeological Research Center has identified a number of sites near the present transmission line right-of-way. However, the land surfaces in this area have been extensively altered by agriculture and other development; therefore, the probability of further archeological site discovery is extremely low. If the proposed plan has a physical impact an historical and archeological survey will be initiated. Should any properties be discovered, BPA, in compliance with Executive Order 11593, will apply the criteria of the Advisory Council on Historic Preservation to determine if any sites found in this survey are eligible for inclusion in the National Register. Any such potential sites will be forwarded to the National Park Service for formal determination of eligibility. If any sites are determined to be eligible, BPA will make arrangements for nomination of sites in question for inclusion in the National Register, and advise the Advisory Council. BPA,

in compliance with Section 106 of the Historic Preservation Act, will determine the effect on sites on or eligible for inclusion in the National Register, and will take proper procedural steps as indicated in the Historical-Archeological Appendix to the Program EIS.

ROUTE ANALYSIS SUMMARY

Impact Summary

Resources and uses previously identified as highly important, critical or unique are given special attention in planning, location and construction of transmission facilities. Predictions of potential impacts to these important features are based upon past BPA experience, information from numerous agencies and individuals, and on the expertise of interdisciplinary environmental specialists within BPA.

In figure 4, two factors are considered in evaluating impacts: (1) the likelihood of an impact occurrence; and (2) the expected degree of impact.

The following designations are used to evaluate the likelihood of an impact:

- Low (L) - Resource or use is a point source or occupies a small portion of the study area and could be avoided in final alignment. "Low" includes those resources and uses in degree of impact category "none".
- Medium (M) - Resources or use partially occupies a route and may be impacted in final alignment.
- High (H) - Resource or use entirely transverses a route and would be impacted if final alignment were within the presently defined corridors.

These designations are used to evaluate the degree of impact.

- Slight (S) - Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.
- Moderate (M) - Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.
- None (N) - Due to the compatibility of the resource with transmission facilities, or the low likelihood of an interaction between the resource and the transmission facility, we expect no significant measurable adverse impacts.

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Unknown (U) - Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

High (H) - Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.

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ALTERNATIVE TRANSMISSION PLAN
SUMMARY IMPACT MATRIX

	ALTERNATIVE ROUTE DESIGN A					PROPOSED ROUTE DESIGN					ALTERNATIVE ROUTE DESIGN C				
	N*	S	M	H	U	N	S	M	H	U	N	S	M	H	U
<u>Impacts</u>															
Atmosphere	Low	Low				Low	Low				Low	Low			
Soil Erosion	Low	Low				Low	Low				Low	Low			
Soil Compaction	Low	Low				Low	Low				Low	Low			
Hydrology															
Number of Streams Crossed			13					13					13		
Number of Lakes Crossed			2					2					2		
Number of Canals Crossed			1					1					1		
Turbidity	Low	Low				Low	Low				Low	Low			
Sedimentation	Low	Low				Low	Low				Low	Low			
Vegetation Removal	Low	Low				Low	Low				Low	Low			
Wildlife Habitat Altered	Low	Low				Low	Low				Low	Low			
Wildlife-Overall Impact	Low	Low				Low	Low				Low	Low			
Population Characteristics	Low	Low				Low	Low				Low	Low			
Agriculture	Low	Low				Low	Low				Low	Low			
Esthetic	Low	Low	Low			Low	Low	Low	Low		Low	Low	Low		
Recreation	Low	Low				Low	Low				Low	Low			
Historic, Architectural, Archeological	Low	Low				Low	Low				Low	Low			
Likelihood of Impact Occurrence															

Low	- Low
Medium	- Medium
High	- High
Beneficial	- Beneficial

NOTE: Impacts are project specific and a direct comparison between different BPA projects is to be avoided. Impact predictions assume BPA standard mitigating measures, as outlined in the GCMP, are being carried out.

*N,S,M,H, and U refer to the degree of impact. Low, Medium and High refer to the likelihood of impact. Definitions of these designations are provided in the preceding section.

Figure 4. Summary of Potential Impacts and Requirements for Plan Alternatives (the nature of impacts is described in the narrative.

U N A V O I D A B L E A D V E R S E I M P A C T S

Temporary and permanent adverse impacts would result from the construction phase. Construction activities would create noise, dust, and visual impacts adversely impacting some residents. Short-term changes in irrigating and cropping practices can be expected. Some additional tree removal would increase the visibility of the corridor under one of the alternative plans. Disturbances would be most noticeable to the population concentration in the Tumwater area.

T H E R E L A T I O N S H I P B E T W E E N L O C A L
S H O R T - T E R M U S E S O F M A N ' S
E N V I R O N M E N T A N D T H E M A I N T E N A N C E
A N D E N H A N C E M E N T O F L O N G - T E R M
P R O D U C T I V I T Y

Based on present technology, the line and associated facilities needed for this project would have a useful life of approximately 50 years. Experience in past years has shown, in most cases, transmission corridors are upgraded to higher capacity in response to technological advancements and growing energy demands. This, along with the BPA policy of constructing new facilities on or parallel to existing corridors, may result in a long-term use of a corridor. The project covered in this facility supplement represents that result. The construction of this project implies a long-range commitment to use the existing corridor, but with a minimum change in land use.

T H E I R R E V E R S I B L E A N D I R R E T R I E V A B L E
C O M M I T M E N T O F R E S O U R C E S

Unreclaimable steel, aluminum, and other materials used for towers, conductors, and other hardware would be irretrievably committed. Manpower and fuel for construction and maintenance equipment would be irretrievably expended.

Although it would be possible to remove the entire facility including tower footings at a future time, it is likely the land use for transmission corridors can be viewed as irreversibly committed to use as a transmission line right-of-way. The land taken for tower footings would be unavailable for other land uses during the life of the transmission line.

The timber and other vegetation removed, animals eliminated, and any soil lost by erosion would be irretrievably committed.

C O N S U L T A T I O N A N D C O O R D I N A T I O N
W I T H O T H E R S

PLANNING COORDINATION

In order to plan the orderly development of an electrical transmission system, one must know the energy requirements, the resources to meet these requirements, and the transmission system necessary to connect the energy source with the load. These three elements are then studied by use of digital computer power flows to determine system additions that must be provided in the future.

Energy sources must be developed to provide power to the transmission system. The energy source may be a hydroelectric dam, a thermal plant, either fossil-fueled or nuclear, or an alternative source, such as solar, wind, or geothermal. They are made up of Federal, nonfederal public, and private ownership.

The transmission system data for all utilities must be combined to study the distribution of power over all of the electrical facilities by using power flow studies.

The System Planning Engineer discussed the power flow studies with planning personnel from Tacoma City Light and Puget Sound Power and Light, in addition to personnel from the various Branches within BPA. These joint discussions are undertaken to avoid the possibility of duplicate construction of facilities and to provide a time-table for their development.

The following agencies and organizations were contacted by BPA economists, engineers, and environmental specialists during the planning phase of this project.

State of Washington

State Parks and Recreation Commission (State Historic Preservation Officer)	Olympia, Washington
Washington State University (Archaeological Research Center)	Pullman, Washington
Washington Department of Fisheries	Tumwater, Washington

Other Organizations

Thurston County, Washington
Pierce County, Washington
City of Bonney Lake, Washington

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COORDINATION IN THE REVIEW OF THE DRAFT FACILITY LOCATION SUPPLEMENT

The FY 1979 Draft Facility Location Supplement was sent to federal agencies, state clearing houses, and to local clearing houses where these have been established by the state, or to county or metropolitan planning commissions and environmental agencies where local clearing houses have not been established. These agencies are listed below. A notice of availability of the draft facility location supplement was placed in the Federal Register to commence public/agency review.

AGENCIES REQUESTED TO COMMENT ON THE DRAFT LOCATION SUPPLEMENT
(An asterisk * indicates that comments were received)

Federal Agencies

U.S. Department of Interior
Fish and Wildlife Service
Bureau of Mines
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Outdoor Recreation
National Park Service
Geological Survey
Bureau of Reclamation
U.S. Department of Agriculture
Forest Service
Soil Conservation Service
U.S. Department of Housing and Urban Development
*U.S. Environmental Protection Agency
Energy Research and Development Administration
Federal Power Commission
Federal Energy Administration
Federal Aviation Administration
*Advisory Council on Historic Preservation
U.S. Department of the Army, Corps of Engineers

State Agencies

State of Washington
Washington State Advisory Council on Historic Preservation
Washington Archeological Research Center

Local Agencies

Thurston Regional Planning Council
Puget Sound Governmental Conference

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Others

Washington Environmental Council
National Wildlife Federation
Federation of Western Outdoor Clubs
Friends of the Earth, Northwest Coordinator
Natural Resources Defence Council
The Wilderness Society
Sierra Club
East Sound Planning Commission
Natural Resources Law Institute
Nisqually Community Council
Puyallup Tribal Council
Western Washington Agency

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Environmental Protection Agency, Region X (November 4, 1977)

Comment - Page 6: The discussion of current air quality in Tacoma should be expanded so that the reader has a better picture of Tacoma's standards, non-attainment problems and their principal causes. This is significant in that slash burning from right-of-way clearing, where necessary, could aggravate this problem.

Response - The description of existing environment for "atmosphere" has been expanded to include information relative to Tacoma's non-attainment air quality problems and principal causes. This information has been included on page 6 of the final planning supplement.

PRIOR FISCAL YEAR PROPOSALS



SA-77-2

Bonneville Dam
Integrating Transmission



STATUS

This facility was described as a draft facility planning supplement, Study Area 77-2, in BPA's FY 77 Draft Program Statement and filed with the President's Council on Environmental Quality (CEQ) on July 15, 1975. Subsequently, the draft planning supplement has been out for public and agency review and a public meeting was held at North Bonneville, Washington on September 9, 1975. During the public and agency review/comment period, which closed on September 28, 1975, comments were received and considered by BPA in the preparation of this document.

The Draft Facility Location Supplement for the Bonneville Dam Integrating Transmission was filed with the CEQ on January 22, 1976, and a public meeting was held in North Bonneville, Washington, on March 17, 1976. Subsequent to these dates, the plan of service was changed when the U.S. Army Corps of Engineers requested the new powerhouse lines be tied into North Bonneville Substation. The new plan of service, as developed in the planning supplement section is Alternative Plan B which brings power from the second powerhouse into North Bonneville Substation. The former proposed plan (Alternative Plan A) bypassed the substation. The new plan of service includes further development at North Bonneville Substation.

With the adoption of Alternative Plan B as the proposed plan of service, the location supplement section was changed to develop and analyze routes that could be brought into North Bonneville Substation.

BPA re-issued this statement in draft form describing the proposed plan, a proposed route, and feasible alternatives. The revised statement was filed with the CEQ on May 5, 1977, and another public meeting was held in Stevenson, Washington, on June 22, 1977.

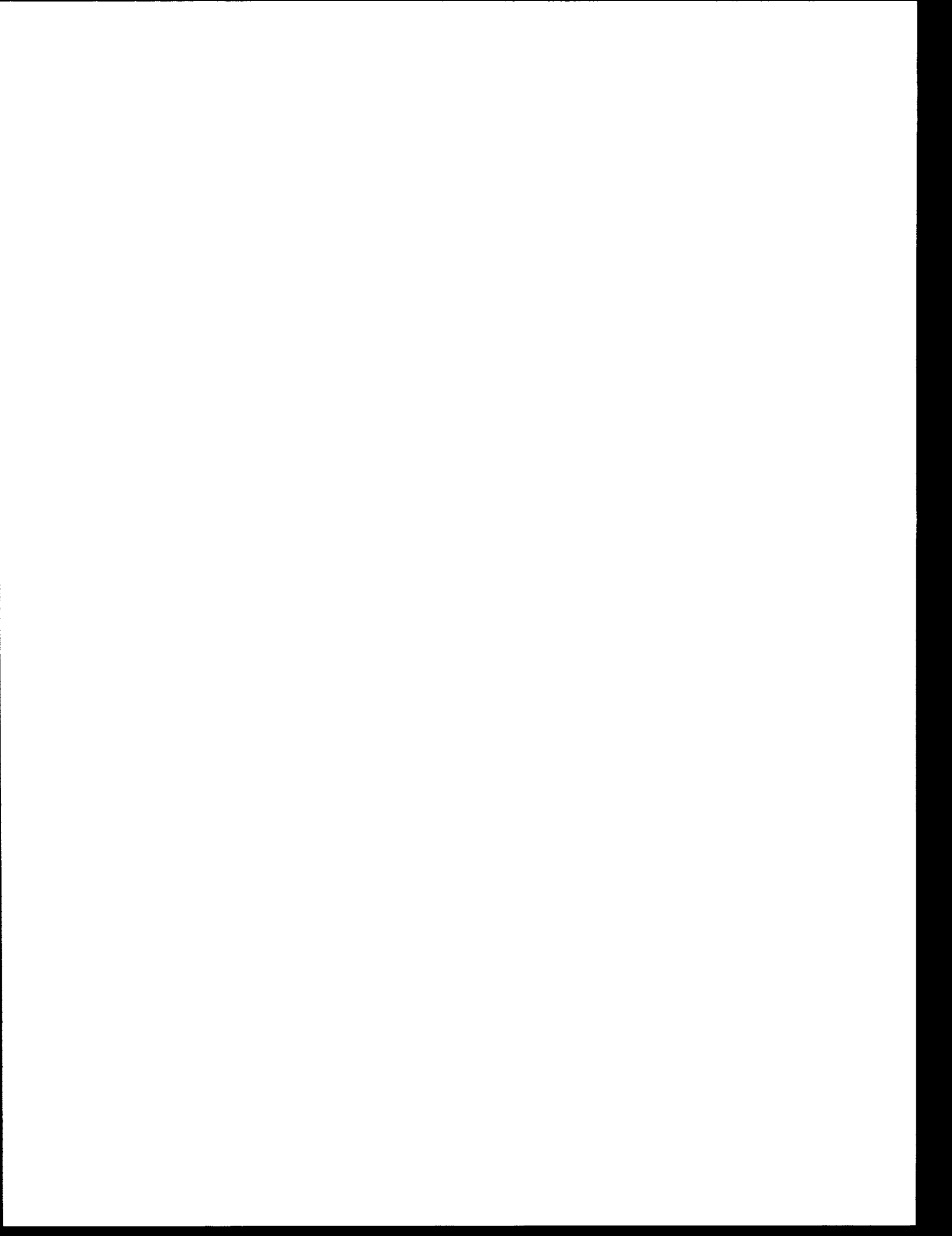


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FACILITY PLANNING SUPPLEMENT
BONNEVILLE DAM INTEGRATING TRANSMISSION

Bonneville Dam Integrating Transmission
Study Area 77-2

D E S C R I P T I O N O F T H E P R O P O S A L

Bonneville Power Administration (BPA), the marketing agent for the sale of electrical energy generated by Federal projects in the Pacific Northwest is to build transmission facilities integrating power from the second powerhouse at Bonneville Dam into their grid system. The study area for this project is shown on figure 1. The U.S. Army Corps of Engineers (USCE) will construct this second powerhouse. Generators are scheduled to begin operation between May 1981 and July 1982. A full description of this project has been given in the USCE's environmental impact statement, Second Powerhouse Bonneville Lock and Dam Columbia River, Oregon and Washington, 15 November 1971 (revised December 1974). Construction and maintenance of the dam and its justification is the responsibility of the Corps, as Federal lead agency, and will not be discussed here.

SYSTEM REQUIREMENTS

Power from the second powerhouse will increase Bonneville Dam's capacity by about 550 MW for a total of 1,124 MW. This energy will be delivered to many Pacific Northwest areas. However, most would be used in Clark County, Washington; and Clackamas, Columbia, Multnomah, and Washington counties in Oregon.

USCE will begin excavating the tailrace for the second powerhouse in January 1979. First, however, the town of North Bonneville will be relocated. Digging for the project will also require the relocation of certain underground cables and overhead distribution power lines extending between the existing powerhouse (first powerhouse), and BPA's North Bonneville Substation. This substation serves Skamania County Public Utility District (PUD) through two customer service transformers. The PUD and BPA will develop a new plan of service after details for the relocated town have been worked out. Provisions for supplying energy to the PUD and to BPA's North Bonneville Substation are described as Phase I of this two-part project. Phase II discusses the plan to integrate energy from the second powerhouse into BPA's grid.

THE PROPOSED PLAN OF SERVICE

ALTERNATIVE PLAN B

Alternative Plan B as presented in the draft planning supplement has been selected as the proposed plan. The proposed plan is described in two parts, Phase I and Phase II (fig. 2).

Phase I

Under Phase I construction, the Corps of Engineers is to excavate the tailrace for the second powerhouse. This will disrupt the existing

Bonneville Dam Integration Transmission
Study Area 77-2

13.8-kV powerline between the first powerhouse and North Bonneville Substation (fig. 3). This line feeds the two 13.8/12.5-kV customer service transformer banks at North Bonneville Substation that supply the PUD. The transformers will be removed. BPA would replace this service with a 115/12.5-kV transformer bank between its 115-kV system and the PUD's 12.5-kV service line.

Excavation will also disrupt BPA's communication and control cables along the same path as the 13.8-kV powerline. A microwave system is to replace these cables. Microwave structures are to be located at North Bonneville Substation and Bradford Island.

The 115-kV line that passes just to the west of North Bonneville Substation may be looped into a new customer service substation adjacent to the existing yard. A new 115/12.5-kV transformer bank will be added. Development will require switchgear, bus, and terminal equipment. No power circuit breakers would be added.

Construction activity would consist of building a 0.5-acre substation under the Underwood 115-kV tap line adjacent to the North Bonneville Substation yard. These actions will relocate customer service equipment and remove equipment around North Bonneville Substation..

Phase II.

Under Phase II, facilities will be constructed to integrate energy from the second powerhouse into BPA's grid system. 1/

Two 230-kV lines will be constructed on an approximately 1.3-mile right-of-way between the second powerhouse and North Bonneville Substation. The east side of North Bonneville Substation fenced area would be expanded by approximately 2 acres to receive these lines. Three additional 230-kV terminals including circuit breakers switchgear and bus will be required. The existing 230-kV North Bonneville-Ross No. 2 Line would be conductored from one of the new terminals to Troutdale Tap. The other two new terminals would connect to the second powerhouse lines.

1/ Each plan could use 230-kV underground cable to integrate the second powerhouse into BPA's grid system. Undergrounding is not another alternative plan of service. Rather it is a design option within each plan. Further discussion appears in the section entitled, "Other Alternatives Considered," in the table entitled, "Summary of Plan of Service Analysis."

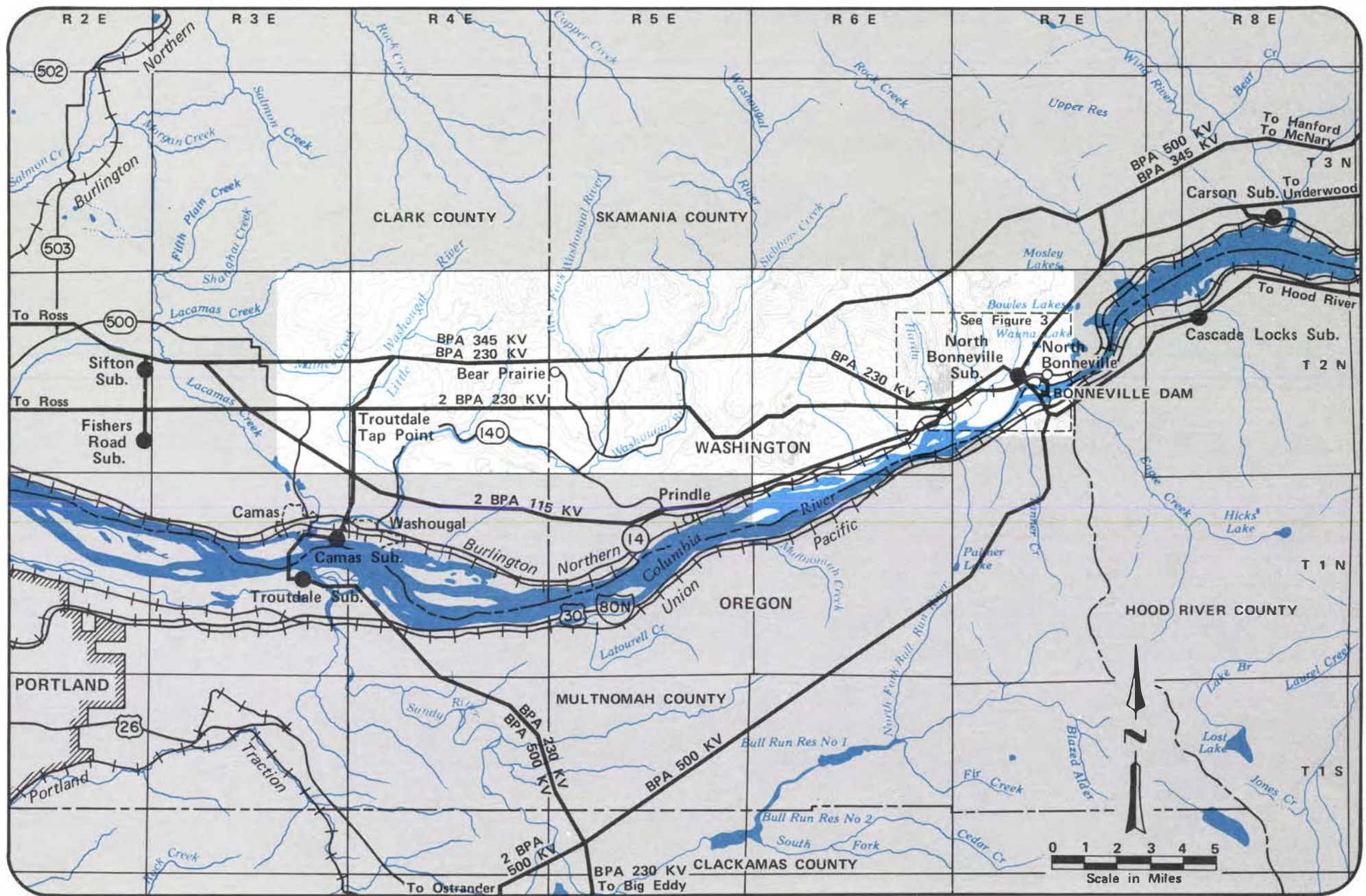
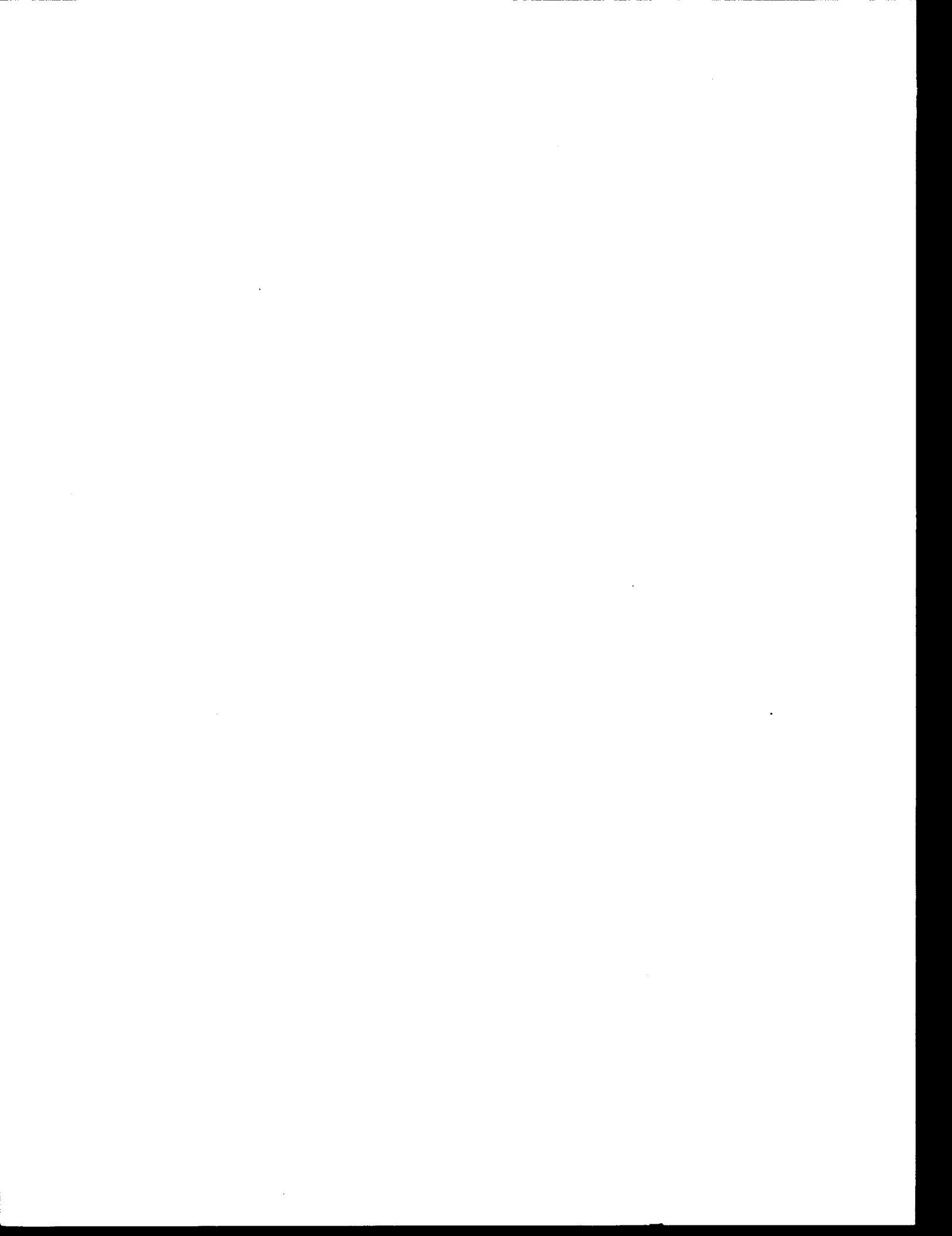
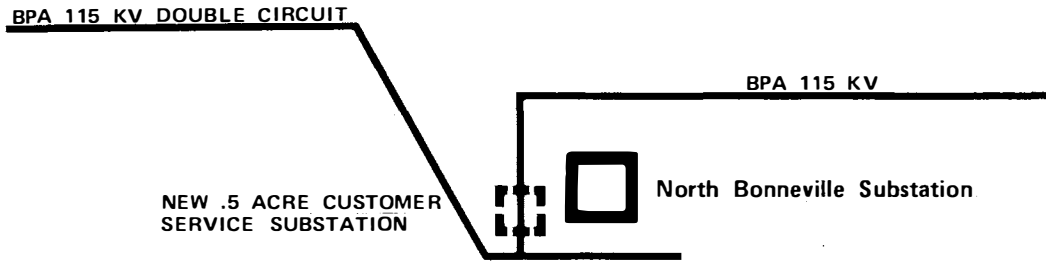


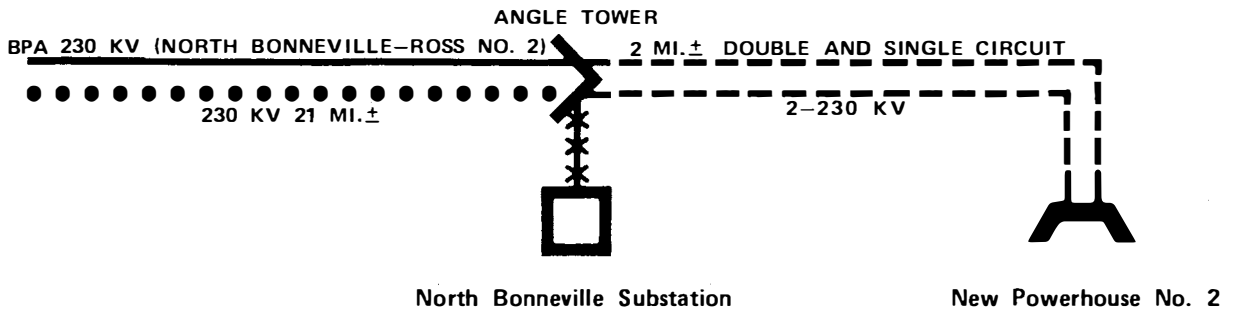
FIGURE 1
 PLANNING STUDY AREA
 BONNEVILLE DAM INTEGRATING TRANSMISSION
 77-2



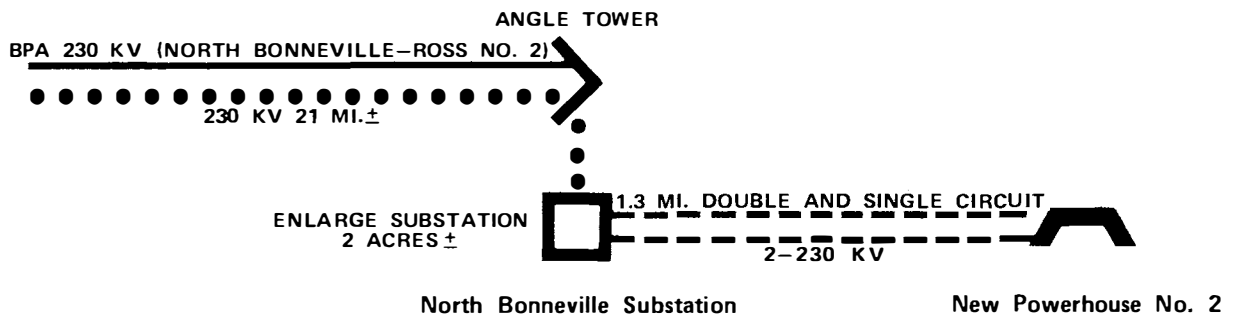
PHASE I
PROPOSED PLAN (ALT. B)
ALTERNATIVE PLANS A & C



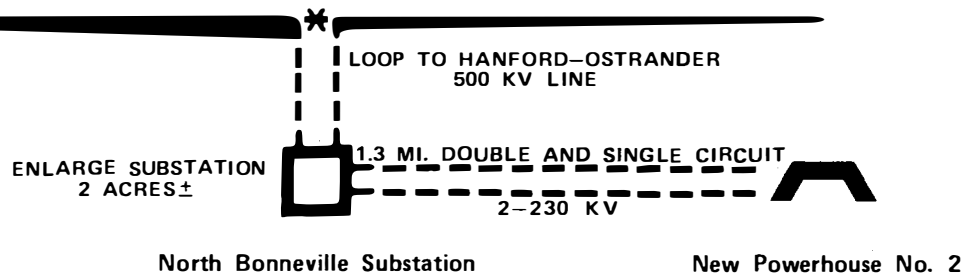
PHASE II
ALTERNATIVE PLAN A



PROPOSED PLAN (ALT. B)



ALTERNATIVE PLAN C



XXXXXXX EXISTING
----- RETIRE
- - - - - CONSTRUCT
..... CONDUCTOR

FIGURE 2
PLANS CONSIDERED
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



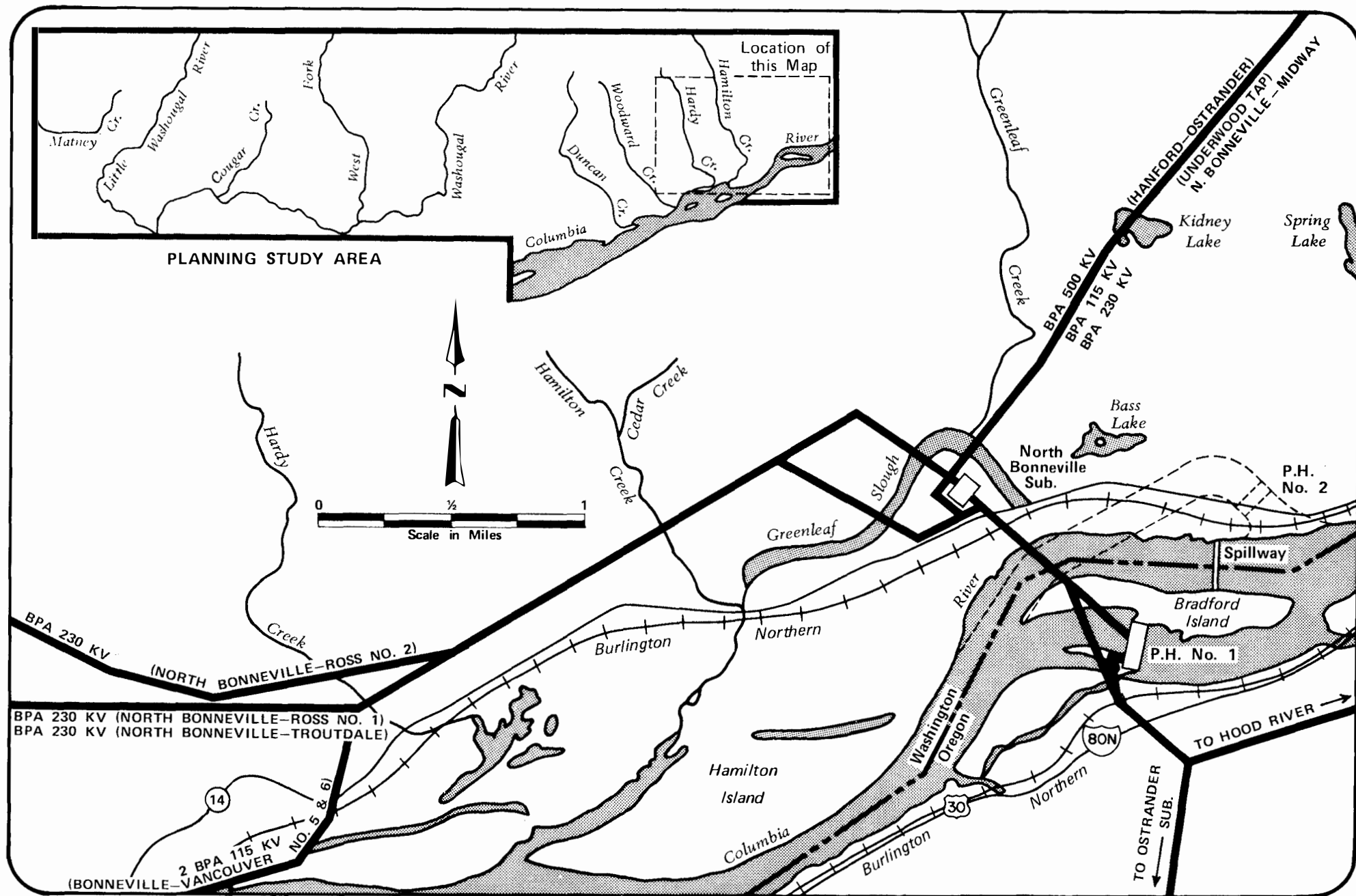
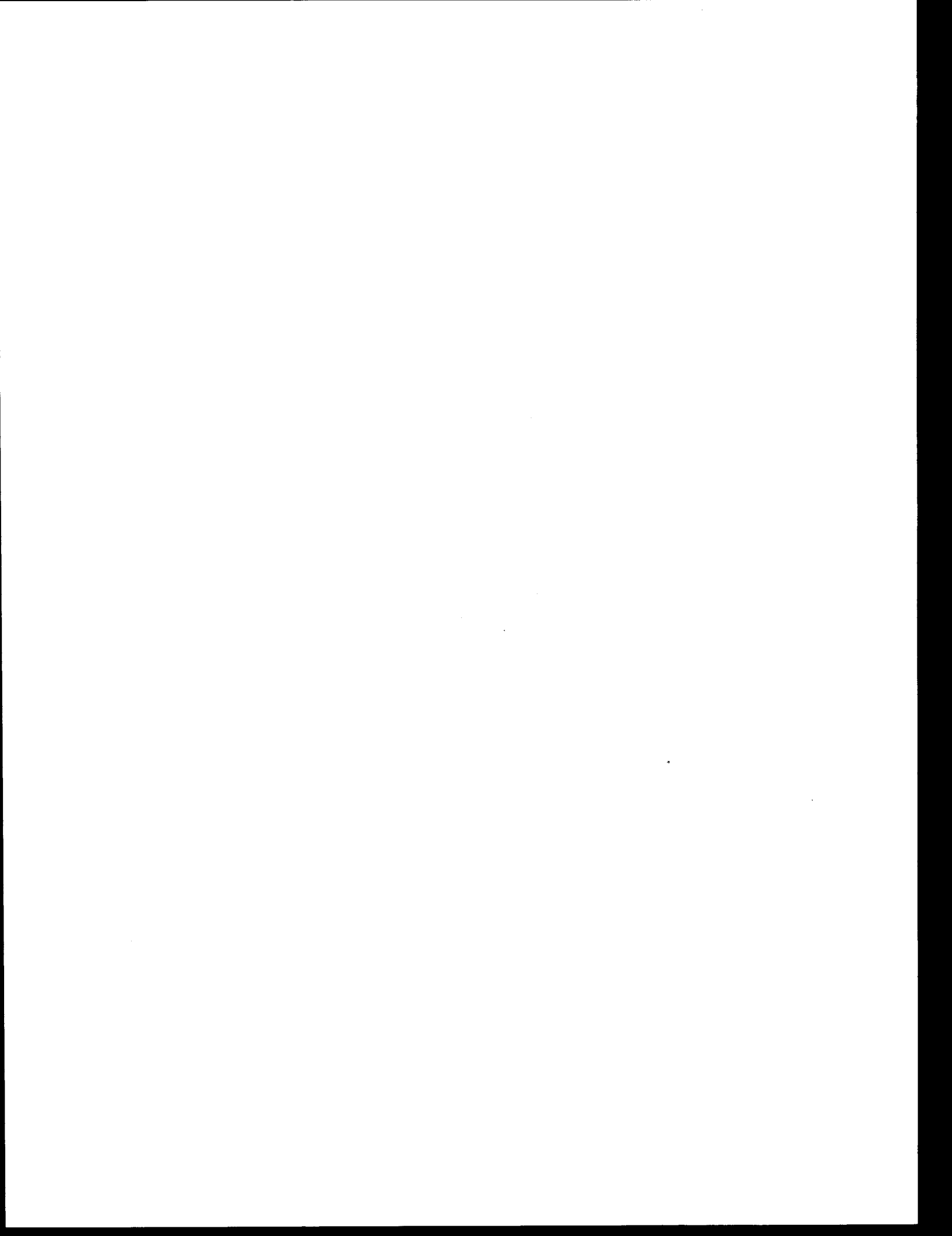


FIGURE 3
EXISTING CORRIDORS
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



Bonneville Dam Integrating Transmission
Study Area 77-2

ALTERNATIVE PLANS CONSIDERED

Two alternatives to the proposed plan were developed. They would be constructed in two phases, Phase I and Phase II (see fig. 2).

Alternative Plan A

Phase I is identical for all plans.

Two 230-kV lines will be constructed on an approximately 2-mile right-of-way between the second powerhouse and angle tower about a half-mile northwest of North Bonneville Substation for Phase II. Part of the line length will be single-circuit construction and part double-circuit construction. These lines are to parallel each other on steel towers. They will connect to the angle tower that supports the existing 230-kV North Bonneville-Ross No. 2 Lines. The No. 2 line is strung on only one side of double-circuit towers. The vacant side will be conductored at 230-kV to complete a 21-mile circuit to Troutdale Tap north of Camas. The No. 2 line and double-circuit towers will be retired between the angle tower and North Bonneville Substation as will the 230-kV terminal equipment in the substation.

Alternative Plan C

Phase I is identical for all plans.

Under Phase II two single-circuit 230-kV lines will be constructed as in Alternative Plan B, again with a combination of 1.3 miles of double-circuit and single-circuit towers. However, under this alternative plan, the lines will connect to compressed gas insulated (CGI) cables at North Bonneville Substation. The cables will connect to a 500/230-kV CGI transformer bank. The east side of the substation will be expanded by about 2 acres to receive the lines. New substation facilities, except the transformer bank, will be CGI constructed. This method of construction would reduce the size of substation equipment and additional yard area needed.

The 500-kV Handord-Ostrander Line will be looped into the substation from the north and connected to the 500-kV CGI substation. Several hundred feet of new right-of-way with steel tower construction will be required.

Microwave equipment will be designed and constructed as in the previous alternatives.

DESCRIPTION OF THE ENVIRONMENT

PLANNING STUDY AREA

Geography

The planning study area lies in southwestern Washington about 25 miles east of the Portland-Vancouver metropolitan area. It encompasses parts of Clark and Skamania counties (fig. 1).

Climate

The topography, prevailing westerly winds, and periodic marine air mass convergence with continental air influence the climate. Generally mild temperatures, a high percentage of cloudiness, and periodic strong winds, as well as the Columbia Gorge's climatic influence, prevail.

Precipitation ranges from 50 to 100 inches per year (SCS 1965) ^{1/}. It increases with rise in elevation and exposure to streamline wind convergence near the Gorge. Table 1 presents data for a low elevation (85 feet) station at Bonneville Dam, and indicates annual temperature and precipitation ranges and distribution. These averages vary with changes in elevation and exposure.

Table 1. Representative Climatological Data

<u>Characteristic</u>	<u>Station</u> Bonneville Dam
Average Maximum/Minimum January Temperature	41.7/31.9 $\frac{1}{4}$ F.
Average Maximum/Minimum July Temperature	78.8/56.8 $\frac{1}{4}$ F.
Mean Annual Temperature	52.3 $\frac{1}{4}$ F.
Mean January Precipitation	11.00 in.
Mean July Precipitation	.33 in.
Mean Annual Precipitation	54.98 in.

Source: Meteorology Committee, PNRBC 1969. Climatological Handbook.

NATURAL RESOURCES

The following sections describe the natural resources present and geographic location and distribution within the study area. The use of natural resources follows in the section, "Resource Use and Cultural Resources."

^{1/} References are cited using the author-date system. Refer to the "References" section for the complete citation.

Bonneville Dam Integrating Transmission
Study Area 77-2

Geology and Soils

The planning study area lies in the Cascade Mountains Physiographic Province and includes part of the Columbia River Gorge. Elevations range from 50 feet near the Columbia River to over 3,000 feet on surrounding mountains. The topography is generally hilly except for bottomlands and terraces near the Columbia River and former mass movement areas (fig. 4) where topography is hummocky and complex. Geology formations are mostly volcanic with some interbedded sedimentary rocks. Landslide and mudflow deposits (fig. 4), as well as alluvial material, cover parts of the study area.

Several earthquake epicenters with Richter magnitudes 6.3 or less have been recorded within a 50-mile radius of the study area. Predicted intensities between IV and VIII on the modified Mercalli Scale could be anticipated (Shannon and Wilson, 1972). Stability problems may be encountered in small sections of landslide debris deposits.

Table 2 summarizes information on the soils in the study area.

TABLE 2. Predominant Characteristics of Soil Associations

<u>Generalized Soil Association and Description</u>	<u>Location</u>	<u>Potential Erodibility Hazard</u>
<u>Olympia-Cispus</u> - Deep to very deep soils with loamy and clayey subsoils on strong to very steep slopes; formed from loess, basic igneous rock and sedimentary rock, in the uplands and mountainous uplands.	Central portion of study area, in Skamania County.	Medium
<u>Cinebar-Cispus</u> - Moderately deep to very deep, ashy soils with loamy and sandy subsoils on gentle to steep soils; formed from volcanic ash, pumice and basic igneous rock on terraces, and rolling, mountainous uplands.	Western and eastern portions	Low to Medium

Source: CNP Staff 1972. Columbia-North Pacific Region Comprehensive Framework Study: App. IV.

Hydrology

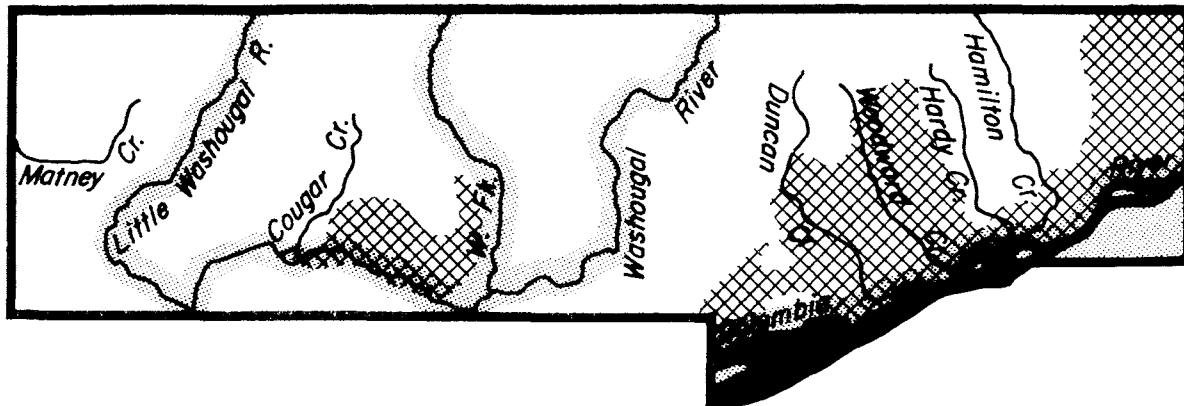
The Columbia River dominates the surface hydrology of the area and is one of the nation's major water arterials. Much of the study area, however, lies to the north of the Columbia and contains numerous rapidly flowing tributaries. These streams are relatively short and originate in the study area and in mountains to the north.

The major streams of the area are the Columbia River with a mean annual streamflow of 247,346 cfs at Bonneville, and the Washougal, West Fork Washougal, and Little Washougal Rivers. Smaller important tributaries include Matney, Cougar, Duncan, Woodward, Hardy, Hamilton, and Greenleaf creeks. Of the few lakes found in the study area the largest is Bonneville Lake created by Bonneville Dam. Other lakes are small and mostly grouped in the area north and east of Bonneville. Greenleaf Slough lies adjacent to North Bonneville Substation.

The State of Washington has classified the water quality of this reach of the Columbia River as excellent. The water is suitable for substantially all uses (WDOE 1972, WDOE 1973). Under state regulations the river temperature must not exceed 68°F (WDOE 1973). The other major streams in the area are also excellent in quality but a few local biological and turbidity problems exist. Some turbidity increase has been observed along the lower Washougal River and periodically at the confluences of other streams and the Columbia (WDOE 1972). Turbidity increases may affect water temperatures depending upon specific conditions. Erosion, transport, and deposition of sediment is probably insignificant. Any problems that occur are likely to be short-term and localized. Upstream erosion tends to be localized and partly caused by logging activities (WDOE 1972). Downstream erosion primarily occurs near the confluence of streams below Bonneville Dam (SRI 1971).

Natural Vegetation

The planning study area lies in the Douglas-fir/western hemlock vegetative zone (Franklin and Dyrness, 1973). Other tree species found in the area are western red cedar, bigleaf maple, and oak. Vine maple, wild rose, Oregon grape, salal, and bracken fern are also commonly found in the area. Plants near the margin of their range, like the golden chinkapin may be found in some parts of the Gorge. Riparian vegetation such as alder, oak, and willows may be found along drainage channels and the Greenleaf Slough. Due to complex topography in the region, vegetation patterns are diverse. The vegetation in the Columbia Gorge is unique due to local climatic influences. Additionally, the Gorge is the only major low-elevation plant migration route through the Cascade Mountains that divide Oregon and Washington into eastern and western areas.



XXXX GEOLOGIC LANDSLIDE AND MUDFLOW DEBRIS DEPOSITS
(POTENTIAL LOCAL STABILITY PROBLEMS)
XXXX IMPORTANT ANADROMOUS FISHERY STREAMS

SOURCES: WDNR & GS 1961; CNP STAFF 1972



-- SCENIC HIGHWAY
▲ NORTH BONNEVILLE
■ FUTURE NORTH BONNEVILLE TOWNSITE
● BEACON ROCK
XXXX BEACON ROCK STATE PARK
— BONNEVILLE DAM
/// RECREATION RIVER
XXXX FOREST

SOURCES: CNP STAFF 1971; CNP STAFF 1972; USCE 1974;
BPA AERIAL PHOTOGRAPHY 1974

FIGURE 4
IMPORTANT NATURAL AND CULTURAL RESOURCES
BONNEVILLE DAM INTEGRATING TRANSMISSION

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The document outlines the various methods used to collect and analyze data, including the use of statistical models and computer simulations. It also discusses the challenges of dealing with incomplete or noisy data and the importance of using appropriate statistical techniques to handle such data.

The second part of the document focuses on the development of new statistical models and methods. It describes the process of identifying the underlying structure of the data and the importance of choosing the right model for the data. The document also discusses the importance of validating the models and methods used, and the need to use a variety of techniques to test the models.

The third part of the document discusses the application of the statistical models and methods to real-world data. It describes the process of applying the models to the data and the importance of interpreting the results correctly. The document also discusses the importance of communicating the results of the analysis to the relevant stakeholders and the need to use clear and concise language.

The fourth part of the document discusses the future of statistical modeling and data analysis. It describes the challenges of dealing with large-scale data and the importance of developing new methods to handle such data. The document also discusses the importance of continuing to develop and improve statistical models and methods and the need to use a variety of techniques to test the models.

Bonneville Dam Integrating Transmission
Study Area 77-2

Wildlife

The Columbia River supports one of the most important anadromous fisheries in the west (fig. 4). Anadromous species inhabiting the river include chinook, coho, sockeye, chum salmon, and steelhead trout. Other anadromous species include American shad, Pacific lamprey and white sturgeon. Although chum salmon have been observed spawning in side channel areas of the Columbia River near Bonneville Dam, little salmon spawning occurs along the river in the study area. However, tributary streams within the area do provide some spawning habitat. Coho salmon are the most abundant species; the most significant run returns to the Washougal River Salmon Hatchery (WDOE 1973). Coho also return in good numbers to the Little Washougal River, West Fork Washougal River, Woodward Creek, and Greenleaf Creek near Bonneville Dam. These and other streams in the area support resident species including rainbow and cutthroat trout. Small lakes and ponds near the eastern edge of the study area also provide a habitat for resident species. Coho salmon and steelhead and searun cutthroat trout utilize Hamilton, Hardy, and Greenleaf Creeks for spawning and rearing. Chum salmon also inhabit Hamilton and Hardy Creeks. The Hamilton Island-Pierce Ranch area is an important goose brooding and wintering habitat, and up to about 1,500 wintering geese have been counted here. The abundant water resources also provide habitat for beaver, muskrat, otter, and mink. Blacktail deer are common throughout the area and especially on recently logged land. Smaller numbers of elk are also present. Band-tailed pigeon and grouse live in the forests. Numerous kinds of wildlife, including the bald eagle and osprey, inhabit the area at times. No Federally designated threatened or endangered species are known to be present.

RESOURCE USE AND CULTURAL RESOURCES

The following sections will relate man's use of natural resources previously described.

Agriculture

The study area has small and medium size family farms with both irrigated and non irrigated cropland. The farms are located on terraces and moderately sloping uplands of the Little Washougal and Washougal rivers and the Bear Prairie community. Other farms are found on the Columbia River bottoms and adjacent uplands between Prindle and North Bonneville.

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Crops and management practices are those associated with non irrigated and/or limited irrigated cropland. The main crops are cereals, hay, and pasture, associated with dairying and beef cattle production. Privately owned farm acreage is being divided into small rural-residential part time farms.

No rangeland exists in the planning study area.

Forestry

Commercial timber species occurring within the study area are Douglas-fir, western hemlock, and western red cedar (fig. 4). Site index is good throughout most of the forested land. No national forest lands lie in the study area. Forested blocks of State lands intermix with private lands in all but the western portion of the study area where private ownership prevails.

Visual

The Columbia River Gorge gets its international fame for scenic beauty from a variety of strong forms, the contrast between the color and texture of rock, and its vegetation, water, and sky. The views from many locations attract sightseers. Many are wide panoramic vistas or smaller, more intimate areas along the walls of the Gorge. A highway and a railroad parallel each bank of the river. Several locations, such as around Bonneville Dam, are intensively developed. Even with these man-made features, most views from the highway and trails are strongly dominated by natural elements.

From the south side of the river, existing BPA transmission lines can be seen. Because the lines are several miles away, the towers and conductors are not readily visible. The cleared right-of-way, however, can be seen much more easily.

Washington Highway 14 (fig. 3) passes through the town of North Bonneville a few hundred feet from Bonneville Dam. Man-made elements are quite evident at this point in the gorge. The dam, the town, North Bonneville Substation, the railroad tracks, and several BPA transmission lines stand near the highway. Most of the major construction activities will occur here. Washington Highway 14 (fig. 4) and Interstate Highway 80 within the study area are designated scenic highways (CNP Staff 1972).

Bonneville Dam Integrating Transmission Study Area 77-2

Urbanized Land Use

The only urban land in the study area is the town of North Bonneville. Its 1970 population declined 7.1 percent over the previous 10 years to 459. Construction of the second Bonneville Powerhouse will require the relocation of the town and its residents to a new townsite on and near Hamilton Island (fig. 4).

The balance of the study area is sparsely populated. In 1970 Skamania County's population stood at 5,845 with a density of 3.5 persons per square mile, among the lowest in the State. In the extreme west end of the study area, a rural residential development lies on the outskirts of the towns of Camas and Washougal.

Recreation

Within the study area, the Columbia River and Gorge are the primary recreational attractions (fig. 4). This portion of the river receives heavy fishing pressure for salmon, shad, and sturgeon. The river area is also popular with boaters, sightseers, picnickers, campers, and hikers. Beacon Rock State Park is a prominent recreational spot dominated by Beacon Rock, a monolith that rises over 800 feet above the river's shore. A scenic trail leads to the summit, and a park provides places for camping, picnicking, and boating. The Columbia and Washougal Rivers have been classified as potential candidates for designation as official recreation rivers (CNP Staff 1972).

Each year thousands of persons from all parts of the United States, as well as foreign countries visit Bonneville Dam. They come to see the fish ladders and nearby hatcheries and look through underwater fish viewing windows at salmon moving upstream. The U.S. Corps of Engineers is constructing more visitor facilities near the dam. Other streams within the study area provide fishing. Hunters see deer, grouse, and band-tailed pigeons throughout the area. Local residents frequent Greenleaf Slough, nearby ponds and small lakes for recreation. Bicycle, foot, and water trail corridors along the Columbia River have been identified for planning purposes by the Interagency Committee for Outdoor Recreation (IAC 1974). Additional recreation facilities are planned for the community of North Bonneville.

Historic-Archeologic

The planning study area contains one property listed in or eligible for the National Register of Historic Places (1977) or subsequent monthly addenda through June 1977. Consultation with the Washington State Historic Preservation Officer has indicated that there are no registered State or national historic sites within the study area. The Statewide Inventory of Historic Places identified:

Bonneville Dam Integrating Transmission
Study Area 77-2

Bonneville Dam
Beacon Rock State Park
Pioneer-Indian Cemetery
Lower Cascades Landing Site
Fort Cascades Site
Joseph Paquet Fish Wheel Site
William Sams, Sr. Fish Wheel No. 2 Site
Frank M. Warren Fish Wheel No. 3 Site
Cotrell Power Plant
Oregon Stream Navigation Company Cascades Portage Railway Route

Their determination of eligibility for the State Register of Historic Places is pending.

The Washington Archaeological Research Center (WARC) has indicated a high potential for site occurrence near the Columbia River. The entire area has not been extensively surveyed. However, both the Corps of Engineers and WARC have identified archeological sites.

Other Resource Uses and Cultural Resources

The major transportation route in the study area is Washington Highway 14 which parallels the Columbia River. It carries about 2,000 cars per day (WSHD 1973, Map). Washington Highway 140 along the Washougal River provides access to the south part of the study area for about 1,000 cars a day. The Burlington Northern Railroad parallels Highway 14.

The only mineral resources being used are sand, gravel, and basalt. The Washougal Mining District which borders on the north side of the study area contains ores of copper, gold, and silver associated with minor amounts of antimony, molybdenum, nickel, lead, zinc, tungsten, and vanadium. Some of these deposits may extend into the study area.

Oregon's Land Conservation and Development Commission (LCDC 1974) has proposed that the Columbia Gorge be studied as a possible Area of Critical Concern. The purpose of such a designation would be to study and possibly regulate land use to "prevent damage that would result from uncontrolled development within the area".

P L A N O F S E R V I C E A N A L Y S I S

POTENTIAL IMPACT OF THE PROPOSED PLAN OF SERVICE

Potential impacts on the environment from the proposed plan of service, should it be implemented, are described in this section. "Impact," as used in this document, is defined as a change in existing conditions whether beneficial or adverse.

Bonneville Dam Integrating Transmission
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For each resource and use category to follow, the narrative will include reference to both qualitative impact; i.e., what kind of change, and quantitative impact; i.e., the amount of change. At this stage of the facility evaluation, specific impacts are not discussed. Instead, typical impacts that could occur are briefly discussed along with the relative impact of different possible alignments associated with the proposed plan.

A more complete discussion of impacts typically associated with transmission facility construction and maintenance can be found in Appendix B, Chapters V, VI, and VII of BPA's Role EIS.^{1/} In addition, impacts to resources and resource uses which have been identified as highly important, will be summarized graphically in the section, "Summary of Plan of Service Analysis."

Natural Resources

Geology and Soils

For construction activities of the proposed plan that may occur on landslide and mudflow debris deposits (fig. 4), a possibility of encountering localized slope stability problems exists in the event that extensive disturbance occur on moderate to steeply sloping topography.

The line modification and construction activities for Phase I will probably be on level river terraces near the North Bonneville Substation. Potential soil erosion hazard is low on this terrain.

A slight degree of impact to soils would result from expected erosion and overall soil disturbance and compaction. However, mitigating measures could limit these hazards (see Appendix B, Chapter VIII of the Role EIS).

Impacts to soil for the proposed plan in the North Bonneville Substation vicinity resulting from conducting, new line construction, and substation enlargement should be slight. The terrain has gentle to moderate slopes with low to medium erosion hazard potential.

The portion of the proposal (Phase II) utilizing existing right-of-way between the angle tower and Troutdale Tap occurs on gentle to very steep slopes of terraces and mountainous uplands. Soils on the gentle slopes have a low erosion hazard, while the steeper slopes have a moderate erosion hazard potential. Since most construction activities would use existing BPA access roads, only a slight degree of impact to soils is expected from erosion, soil disturbance, and compaction due to transmission line conducting and limited clearing on existing right-of-way. Should major right-of-way clearing become a necessity on the steeper slopes, additional impacts to soil would occur.

^{1/} Appendix B is a volume on BPA Power Transmission. It is part of a draft program environmental statement and planning report on The Role of the Bonneville Power Administration in the Pacific Northwest Power Supply System Including It's Participation in the Hydro-Thermal Power Program (Role EIS).

Hydrology

Phase I of the project is not expected to noticeably change the quality of water resources. Should construction activities occur near Greenleaf Slough (fig. 3), minimal adverse impacts could result.

Phase II of Plan B would cross Greenleaf Slough. Adverse impacts to the slough would depend somewhat on where the right-of-way and town are located and how the substation is expanded. Even though a line would cross the slough, disturbance of riparian vegetation and soils would be minimized and existing water conditions basically would not be changed. If the substation is expanded to the east, it could create temporary erosion and increased turbidity in the slough. Because of the lack of flow, this resulting turbidity would be slowly reduced by natural settling of particles. Impacts from conducting could be expected to the west where many tributary streams are crossed. However, this would only result if vegetation and soils are disturbed and the likelihood of this occurring is slight.

Natural Vegetation

Adverse impacts to natural vegetation would be confined to forested areas. Impacts from the proposed plan under Phase I would be negligible. Approximately 1.3 miles of new corridor will have to be cleared for Phase II. Replacement vegetation will be brush, perennial and annual forbs, and grass. The proposal (Phase II) would require the removal of up to 60 feet of vegetation on existing BPA right-of-way for conducting operations at scattered points along the 21-mile line. Replacement vegetation would be the same as on the adjacent cleared right-of-way consisting of brush, perennial and annual forbs and grass.

Wildlife

Activities associated with Phase I of the proposal would modify the habitat somewhat. Some riparian habitat near Greenleaf Slough may be cleared.

The new transmission lines under the proposal could require clearing of some forest habitat as described under "Natural Vegetation." Regrowth of shrub/grass habitat would occur on the right-of-way, resulting in increased edge habitat and forage for deer. A small amount of cover habitat would be removed, however, such habitat is abundant in the immediate area. Construction of the new lines and retirement of a short section of existing line could cause short-term disturbances to wildlife in the area. However, most species should readily adapt to noise and human activity. Activities required to add a conductor to existing structures could modify habitat in the west part of the study area. The overall impact on wildlife should be low, because additional clearing would not be required in all areas. Although several anadromous fishery streams lie in the path of the conducting operation, no noticeable long-term impact on the fishery

Bonneville Dam Integrating Transmission
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resource in the streams is expected. In addition, Greenleaf Slough would be crossed with a possible adverse effect to riparian habitat. The substation expansion required would remove two acres of wildlife habitat. Small wildlife species inhabiting the area to be occupied by the substation would be subject to increased mortality as a result of the displacement.

Resource Use and Cultural Resources

Agriculture

Phase I of the proposed plan will not impact cropland. Agricultural land use does not occur in the vicinity of the North Bonneville Substation.

Similarly, Phase II integration for the proposal between the new powerhouse and the North Bonneville Substation does not impact agricultural land. Conductoring under the proposal (Phase II) between the North Bonneville area and Troutdale Tap involves existing right-of-way and only limited construction. Expected impacts to agriculture should be temporary and of a slight degree. These impacts would be limited to short-term interruption of farming practices, and minor loss of crop production due to compaction and soil disturbance.

Forestry

Impacts to forest land from Phase I of the proposed plan would be negligible. In Phase II an approximately 120-foot wide, 1.3-mile corridor, partially through urban-forest fringeland, would be cleared between the second powerhouse and North Bonneville Substation. The mixed forest cover, predominantly Douglas-fir and bigleaf maple, is presently of little or no commercial value. For parts of this new line, existing roads could provide access, thus reducing the need for new maintenance roads through forested areas. Activities required to conductor existing structures would necessitate some new clearing on BPA-owned right-of-way. Although additional right-of-way clearing through a forest environment causes an additional change in land use, only scattered trees which are now approaching commercial value will need to be removed. Trees requiring removal generally occur along ridge lines.

Visual

Phase I of the proposed plan would modify a short section of BPA transmission line and provide a new transformer bank to supply the PUD. This would slightly reduce the overall visual impact of BPA facilities along this portion of Highway 14.

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The transmission line to be constructed under Phase II of the proposal would cross the relocated Highway 14 near North Bonneville Substation. This line would add to the visual complexity of this area and would be noticeable to travelers on the scenic highway. Before it weathers, the new conductor on 21 miles of line may be visible to travelers on parts of Interstate 80 and from several trails on the south and north side of the Gorge. Portions of the corridor might require additional clearing which would be visible during revegetation. Also, the expansion of the substation could disturb nearby residents during construction. The expansion may require the removal of some surrounding vegetation and make the substation more visible from nearby homes. This would add to the present visual impact of BPA facilities in the area.

Urbanized Land Use

Phase I of the proposal may benefit the new North Bonneville townsite by slightly reducing the visual complexity of electrical facilities.

Under Phase II of the proposed plan, dust and noise caused by conducting of the transmission line may temporarily disturb rural residents in the extreme western portion of the study area.

Recreation

The additional line modification and possible clearing to serve the PUD would create a slight additional long-term visual impact. The new transmission line required for the proposal could interfere with recreation of local residents. The disturbances would result primarily from noise and dust from construction activities. Recreation along the Washougal River and at Beacon Rock State Park would also be affected. The additional conductor to be installed plus added clearing would increase the visual impacts.

Historic-Archeologic

No national or state register of historic resource sites will be affected by the proposed plan of service. Under Phase I there will be no physical or readily discernible visual affect on the statewide inventory historic sites.

The transmission line from the new powerhouse to North Bonneville Substation under the proposal (Phase II) would be visible from Bonneville Dam. These facilities, however, are considered compatible with the nature of the Dam and would not create significant new physical or visual problems. The conducting of the line in the proposal would be readily visible from Beacon Rock and would create short-term impacts until the conductor has weathered and revegetation of any new clearing is complete.

No other historic sites are likely to be affected by this Phase II plan.

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Although both Phase I and II will not disturb any identified archeological resource, the potential is high along the water for further site discovery. Final alignment and mitigating measures (see Appendix B, Chapter VIII.B of the Role EIS) allow latitude for avoiding known archeological sites. BPA contract specifications require that if a site is discovered during construction, work is halted until the site has been evaluated.

BPA will comply with the requirements of the National Historic Preservation Act of 1966 (P.L. 89-665), as well as Executive Order 11593. Procedures applicable to these laws are described in the Historic and Archeologic Appendix to the Fiscal Year 1978 Program Statement.

Other Resource Uses and Cultural Resources

Visual impacts to travelers on the highways in the study area were described earlier. No other impacts to these resources are anticipated.

ALTERNATIVES TO THE PROPOSED PLAN OF SERVICE

Potential Impact of the Alternative Plans

Natural Resources

Geology and Soils - For construction activities in Alternative Plans A or C that may occur on landslide and mudflow debris deposits (fig. 4), a possibility of encountering localized slope stability problems exists. This would be true should extensive disturbance occur on moderate to steeply sloping topography.

The line modification and construction activities for Phase I will probably be on level river terraces near the North Bonneville Substation. Potential soil erosion hazard is low on this terrain.

A slight degree of impact to soils would result from expected erosion and overall soil disturbance and compaction. However, mitigating measures could limit these hazards (Appendix B, Chapter VIII.A of the Role EIS).

The portion of Alternative A (Phase II) between the powerhouse and the angle tower (fig. 2) occurring on level terraces and steep foothills would have low to medium erosion hazard potential. A slight to moderate degree of impact to soils is expected from erosion, disturbance, and compaction as a result of new right-of-way clearing and transmission line construction.

The portion of existing right-of-way for Plan A (Phase II) between the angle tower and Troutdale Tap occurs on gentle to very steep slopes of the terraces and mountainous uplands. Soils on the gentle slopes have a low erosion hazard, while the steeper slopes have a moderate erosion hazard potential. Since most construction activities would use existing BPA access roads, only a slight degree of impact to soils is expected from erosion, soil disturbance, and compaction due to transmission line

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conductoring and limited clearing on existing right-of-way. Should major right-of-way clearing become a necessity on the steeper slopes, additional impacts to soil would occur.

Alternative Plan C (Phase II) should have a slight degree of impact to soils from line and substation construction. The terrain has gentle to moderate slopes and low to medium erosion potential.

Hydrology - Phase I of the project is not expected to noticeably change the quality of water resources. Should construction activities occur near Greenleaf Slough (fig. 3), minimal adverse impacts could result.

Phase II of Plan A could be expected to result in short-term turbidity increases in Greenleaf Creek if vegetation and soils along the streambank are disturbed. Additionally, increased turbidity could result from adding conductors on the existing towers to the west where many tributary streams are crossed. However, this would only result if vegetation and soils are disturbed and the likelihood of this occurring is slight.

Phase II of Plan C would result in the same likelihood of adverse impacts around Greenleaf Slough as Alternative Plan B.

Natural Vegetation - Adverse impacts to natural vegetation would be confined to forested areas. Impacts from Alternative Plans A and C under Phase I would be negligible. Approximately 2 miles of new corridor will have to be cleared for Alternative Plan A (Phase II). Replacement vegetation will be brush, perennial and annual forbs, and grass. Alternative Plan A (Phase II) would require the removal of up to 60 feet of vegetation on existing BPA right-of-way for conductoring operations at scattered points along the 21-mile line. Replacement vegetation would be the same as on the adjacent cleared right-of-way consisting of brush, perennial and annual forbs, and grass.

Phase II of Plan C would result in clearing 1.3-miles of new corridor between the second powerhouse and North Bonneville Substation. Replacement vegetation is likely to be brush, perennial and annual forbs, and grass.

Wildlife - Activities associated with Phase I, common to Plans A and C would modify the habitat somewhat. Some riparian habitat near Greenleaf Slough may be cleared.

The new transmission lines under the Alternative A would require clearing of forest habitat as described under "Natural Vegetation." Regrowth of shrub/grass habitat would occur on the right-of-way, resulting in increased edge habitat and forage for deer. A small amount of cover habitat would be removed, however. Such habitat is abundant in the immediate area. Greenleaf Creek would be crossed and riparian habitat affected. Although brief siltation could occur, no significant impact on the fishery resource is expected. Construction of the new lines and retirement of a short

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section of existing line could cause short-term disturbances to wildlife in the area. However, most species should readily adapt to noise and human activity. Activities required to add a conductor to existing structures could modify habitat in the west part of the study area. The overall impact on wildlife should be low because additional clearing would not be required in all areas. Although several anadromous fishery streams lie in the path of the conductoring operation, no noticeable long-term impact on the fishery resource in the streams is expected.

Alternative Plan C would have the same impacts as described for the proposal but impacts in the western part of the study area associated with adding a conductor would not occur. The impacts on wildlife from the short tap line would be minimal.

Resource Use and Cultural Resources

Agriculture - Alternative Plans A and C (Phase I) will not impact cropland. Agricultural land use does not occur in the vicinity of the North Bonneville Substation.

Similarly, Phase II integration for Plans A and C between the new powerhouse and the vicinity of North Bonneville Substation does not impact agricultural land. Conductoring under Alternative Plan A (Phase II) between the North Bonneville area and Troutdale Tap involves existing right-of-way and only limited construction. Expected impacts should be temporary and of a slight degree. These impacts would be limited to short-term interruption of farming practices, and minor loss of crop production due to compaction and soil disturbance.

Forestry - Impacts to forest land from Phase I which is common to Plans A and C, would be negligible. In Phase II of the Plan A an approximately 120-foot wide, 2-mile corridor of mixed forest land would be cleared between the second powerhouse and an angle structure on the North Bonneville-Ross No. 2 Line. The mixed forest cover, predominantly Douglas-fir and bigleaf maple is presently of little or no commercial value. However, this land would be removed from forest productivity for the life of the line. For parts of this new line, existing roads could provide access, thus reducing the need for new maintenance roads through forested areas. Activities required to conductor existing structure would necessitate some new clearing on BPA-owned right-of-way. Although additional right-of-way clearing through forest environment causes an additional change in land use, only scattered trees which are now approaching commercial value will need to be removed. Trees requiring removal generally occur along ridge lines.

Phase II of Plan C requires 1.3 miles of new transmission line like Plan B and would similarly result in removal of mixed forest cover. The short loop to the Hanford-Ostrander Line in this plan is not likely to affect additional forest land.

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Visual - Phase I of Plans A and C would require modifying a short section of BPA transmission line and providing new transformer bank to supply the PUD. This would slightly reduce the overall visual impact of BPA facilities along this portion of the highway.

The transmission line to be constructed under Phase II of Alternative Plan A would cross Highway 14 about 1 mile east of an existing BPA corridor. This line would add to the visual complexity of this area and would be noticeable to travelers on the scenic highway. Before it weathers, the new conductor on 21 miles of line may be visible to travelers on parts of Interstate 80 and from several trails on the south and north side of the gorge. Portions of the corridor might require additional clearing which would be visible during revegetation.

Impacts under Phase II of Plan C would be similar to the proposal, but impacts in the western part of the study area associated with adding conductor would not occur.

Urbanized Land Use - Phase I of Plans A and C may benefit the new North Bonneville Townsite by slightly reducing the visual complexity of electrical facilities.

Under Phase II of Plan A the dust and noise caused by conducting of the transmission line may temporarily disturb rural residents in the extreme west portion of the study area.

The visual impact of the expanding of the substation under Phase II of the proposal and Alternative C was discussed earlier. No other impacts are expected.

Recreation - The additional line modification and possible clearing to serve the PUD would create a slight additional long-term visual impact.

The new transmission line required for Plan A could interfere with recreation of local residents who at times use the Greenleaf Creek area. The disturbances would result primarily from noise and dust from construction activities. Recreation along the Washougal River and at Beacon Rock State Park could also be affected. The additional conductor to be installed plus added clearing would increase the visual impact.

Plan C would result in impacts on recreation similar to those for the Proposed Plan although impacts from conducting in the west part of the area would not occur.

Historic Archeologic - No national or state register of historic resource sites will be affected by the alternative plans of service. Under Phase I of these plans, there will be no physical or readily discernible visual affect on the statewide inventory historic sites.

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The transmission line from the new powerhouse to the vicinity of the North Bonneville Substation under Alternative Plans A and C (Phase II) would be visible from Bonneville Dam. These facilities, however, are compatible with the nature of the Dam and would not create significant new physical or visual problems. The expansion of North Bonneville Substation under Alternative C may be visible from the Pioneer Cemetery (Greenleaf Cemetery) and the Warren Fish Wheel Site. The nature of the expansion is such that changes from the existing situation would not be readily discernible.

No other historic sites are likely to be affected by the Phase II plans.

Although both Phase I and II will not disturb any identified archeological resource, the potential is high along the water for further site discovery. Final alinement and mitigating measures (see Appendix B, Chapters VII.B and VIII.B of the Role EIS) allow latitude for avoiding known archeological sites. BPA contract specifications require that if a site is discovered during construction, work is halted until the site has been evaluated.

Other Resource Uses and Cultural Resources - Visual impacts to travelers on the highways in the study area were described earlier. No other impacts to these resources are anticipated.

Nonconstruction

For Phase I some of BPA's transmission and control facilities will be disrupted when the U.S. Corps of Engineers begins construction of the tailrace for the second powerhouse. If no alternate service is provided, North Bonneville Substation will be without station service power, and Skamania County PUD will be without electrical power for the town of North Bonneville. Also, certain coordinating equipment between the substation and the existing powerhouse will not function, possibly jeopardizing the safe operation of the powerhouse.

BPA markets most electric energy produced by Federal hydro projects in the Pacific Northwest. If the second powerhouse were not constructed, integrating facilities planned for Phase II would not be required. The need for the second powerhouse is described in the Corps' Environmental Statement entitled, Second Powerhouse Bonneville Lock and Dam Columbia River, Oregon and Washington, November 15, 1971 (revised December 1974).

Even with the second powerhouse completed on schedule, Federal load resource analysis shows both peak and average energy deficits during Fiscal Year 1982, the Corps' scheduled energization date. The only other source of energy generation that could be made available by 1982 would be combustion turbine. However, these would require burning scarce fossil fuels such as oil or gas.

Other Alternatives Considered

No other feasible alternatives have been identified. Undergrounding would not be another alternative plan, but would be a Phase II design option for the proposed plan or Alternatives A and C. A 230-kV underground cable between the second powerhouse and the vicinity of North Bonneville Substation could be constructed. Additional study may be needed to determine the desirability of undergrounding. A 40- to 50-foot right-of-way for cable installation and maintenance would be required. It would pass beneath the Burlington Northern Railroad track and Washington State Highway 14.

Underground cable construction from the vicinity of North Bonneville Substation to Troutdale Tap would not be practical. The vacant side of the existing 230-kV North Bonneville-Ross No. 2 line could be conductored with little additional impact.

The underground design option of the proposed plan or for Alternative Plans A and C (Phase II) would change the nature of the impacts discussed earlier. Impacts and advantages associated with undergrounding for parts of these plans are discussed below. The modifications would occur between the new powerhouse and the vicinity of North Bonneville Substation (see fig. 3).

The proposed plan would bring energy from the new powerhouse into North Bonneville Substation. The underground cable could run from the powerhouse for more than a mile into the substation. Generally, the terrain crossed is more level and less complex than for Alternative A, although Greenleaf Slough does present an obstacle. The present surface is likely to be altered extensively by the construction of the new powerhouse. Additionally, the proposal has a greater potential for partially paralleling the highway and railroad. Impacts from this plan, although similar to those of Alternative A, could be substantially less due to the possibility of paralleling a transportation corridor, thus avoiding much new clearing, habitat destruction, erosion, and other impacts. Most visual impacts would be short-term. However, if transportation corridors were not paralleled, the proposal could involve an underground crossing of Greenleaf Slough. If this occurs, construction will disturb slough banks and bed and result in short-term increases in turbidity. Natural flows in the slough are minimal. Any increased siltation would disperse through natural settling with little overall impact on aquatic life.

Although underground cables would require less wildlife habitat clearing, the trenching operation would result in more noticeable short-term disturbances. Once the cables had been installed and vegetation reestablished the cleared right-of-way would be useful to many species of wildlife. However, not as much right-of-way would be required as for an overhead line. The trenching operation could increase the potential for short-term stream siltation causing adverse impacts to aquatic life over that expected from the construction of overhead lines.

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Esthetic improvement is one of the primary advantages of underground transmission. Undergrounding the transmission line from the second powerhouse, under Highway 14 and the railroad tracks would reduce the visual impact of that line. It would also reduce the overall visual complexity of electrical facilities in the area by avoiding a new separate overhead highway crossing. The clearing of a right-of-way for the line would create visual problems similar to the conventional transmission corridor. It would be about half the width. However, the construction to install the cable could result in more noticeable localized short-term visual impacts. There is also a higher probability for short-term visual impacts on recreation along the Columbia River.

For historic resource, the difference, as discussed above, between overhead and underground transmission would be primarily visual. There is a higher probability that archeologic resources could be encountered or disturbed as a result of trenching. This concern would be primarily limited to those places where strata and context have not been previously altered by town residences, highway, railroad, or construction activity for the new powerhouse.

Alternative Plan A would convey power from the second powerhouse to an angle structure about 1/2-mile northwest of the substation. The underground cable could run from the powerhouse for part of the 2-mile distance, then connect to an overhead line and go on to join existing double-circuit tower structures. The terrain to be crossed is steep in places and topographically complex. The construction of a continuous trench could be expected to result in moderate soil erosion, disturbance, and compaction in steep areas. This may cause localized changes in surface/subsurface drainage, as well as longitudinal erosion if steeply sloping areas were crossed. A lesser amount of right-of-way acreage would be cleared and maintained. However, the initial short-term disturbance from trenching and backfilling would result in more intense impacts as compared with an overhead line particularly if rock areas were blasted. Cable installation and operation activities affect soil moisture and thermal resistivity at and above the cable (EDAW 1975).

Alternative Plan C would integrate energy into North Bonneville Substation in the same manner as the proposed plan.

For further discussion on underground construction of transmission facilities, see Appendix B, Chapter X.B of the Role EIS.

In addition to this discussion, underground modifications are evaluated in figure 5. This figure shows graphically the environmental differences on important resources and uses within the planning study area.

SUMMARY OF PLAN OF SERVICE ANALYSIS

Introduction

Resources and resource uses previously identified as highly important, critical, or unique receive special attention in planning and construction of transmission facilities. Predictions of potential impacts to these important features (fig. 5) are based upon BPA experience, information from numerous agencies and individuals, and on the expertise of interdisciplinary environmental specialists within BPA. Predictions of possible impacts are meant to facilitate comparisons of the environmental aspects of system alternatives. More precise quantification is necessarily deferred until the actual alternative line locations are identified in BPA facility location supplements to the environmental statement.

Figure 5 considers two factors in evaluating impacts: (1) the likelihood of the occurrence of an impact, and (2) the expected degree of that impact.

Likelihood of Impact Occurrence

The following designations are used to evaluate the likelihood of an impact:

- Low - Resource or use is a point source or occupies a small portion of the study area and could be avoided in final alignment. Includes those resources and uses where degree of impact is "none".
- Medium - Resource or use partially traverses the study area and may be impacted in final alignment.
- High - Resource or use entirely traverses the study area and would be impacted were final alignment to occur within the presently defined corridor.

Degree of Impact

The following designations are used to evaluate the degree of impact:

- Slight - Modifications as a result of construction and/or maintenance activities with no noticeable long-term changes in conditions expected.
- Moderate - Modifications as a result of construction and/or maintenance activities with noticeable long-term changes in conditions possible.

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- High - Modifications as a result of construction and/or maintenance activities with highly noticeable long-term changes in conditions possible.
- None - Due to the compatibility of the resource or use with transmission facilities, or the low likelihood of an interaction with the transmission facility, we expect no significant measurable impacts either adverse or beneficial at this time.
- Unknown - Due to the nature of the resource or use, or lack of data, we are unable to adequately predict possible impacts at this planning stage.

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	ALTERNATIVE A									
	Overhead Transmission					Underground Modification				
	Impact Adverse					Impact Adverse				
	High	Mod	Sl	None	Unknown	High	Mod	Sl	None	Unknown
Natural Resources										
Geology			○				○			
Columbia River				○					○	
Columbia River Fishery				○					○	
Washougal River Fishery			○						○	
Resource Use and Cultural Resources										
Forestry		◐					◐			
Visual: Washington Highway 14	●						●			
Urbanized Land Use: North Bonneville (future town site)				○					○	
Recreation: Columbia River and Gorge				○					○	
Bonneville Dam				○					○	
Beacon Rock St. Park		◐							○	

Likelihood of Impact Occurrence:

○ = Low

◐ = Medium

● = High

Figure 5. - Potential Adverse Impacts on Important Resources and Uses Within The Planning Study Area (the nature of the impacts is described in the narrative).

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	PROPOSED PLAN (ALTERNATIVE B)									
	Overhead Transmission					Underground Modification				
	Impact Adverse					Impact Adverse				
	High	Mod	Sli	None	Unknown	High	Mod	Sli	None	Unknown
<u>Natural Resources</u>										
Geology			○					○		
Columbia River				○					○	
Columbia River Fishery				○					○	
Washougal River Fishery				○					○	
<u>Resource Use and Cultural Resources</u>										
Forestry		◐					◐			
Visual: Washington Highway 14	●						●			
Urbanized Land Use: North Bonneville (future town site)		○							○	
Recreation: Columbia River and Gorge				○					○	
Bonneville Dam				○					○	
Beacon Rock St. Park		◐							○	

Likelihood of Impact Occurrence:

○ = Low

◐ = Medium

● = High

Figure 5. - Potential Adverse Impacts on Important Resources and Uses Within The Planning Study Area (the nature of the impacts is described in the narrative).

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	ALTERNATIVE C									
	Overhead Transmission					Underground Modification				
	Impact Adverse					Impact Adverse				
	High	Mod	Sl	None	Unknown	High	Mod	Sl	None	Unknown
<u>Natural Resources</u>										
Geology			○					○		
Columbia River				○					○	
Columbia River Fishery				○					○	
Washougal River Fishery				○					○	
<u>Resource Use and Cultural Resources</u>										
Forestry		◐					◐			
Visual: Washington Highway 14	●						●			
Urbanized Land Use: North Bonneville (future town site)		○							○	
Recreation: Columbia River and Gorge				○					○	
Bonneville Dam				○					○	
Beacon Rock St. Park				○					○	

Likelihood of Impact Occurrence:

- = Low
◐ = Medium
● = High

Figure 5. - Potential Adverse Impacts on Important Resources and Uses Within The Planning Study Area (the nature of the impacts is described in the narrative).

FACILITY LOCATION SUPPLEMENT
BONNEVILLE DAM INTEGRATING TRANSMISSION

DESCRIPTION OF THE PROPOSED
LOCATION AND ITS IMPACT

ROUTE 3

Introduction

The Draft Facility Location Supplement for the Bonneville Dam Integrating Transmission was filed with the CEQ on January 22, 1976, and a public meeting was held in North Bonneville, Washington, on March 17, 1976. Subsequent to these dates, further discussions with the Corps of Engineers resulted in a change of the proposed plan of service from Alternative Plan A to Alternative Plan B and the decision to deliver power from the downstream powerhouse face instead of the north end of the complex. The new proposed plan of service, as developed in the planning supplement section, involves a double-circuit 230-kV transmission line between the new powerhouse at Bonneville Dam and BPA's North Bonneville Substation 1.3 miles to the west instead of by-passing the substation as described in the prior Draft Facility Location Supplement. The new plan of service includes further development at North Bonneville Substation.

With the adoption of Alternative Plan B, the two alternative routes described in the previous statement were analyzed for compatibility with the new plan. Route 1 was determined to be incompatible, regardless of any modification. It does not accommodate a tie to North Bonneville Substation and is no longer a feasible engineering solution. Route 2, an underground route along the edge of the powerhouse tailrace, could be modified to enter North Bonneville Substation and was considered to be a feasible alternative route.

A new route was formulated for the proposed plan. For purposes of reference, this new route is designated as Route 3. Following approximately the same alignment as the underground route, Route 3 would utilize double-circuit, painted tubular steel poles instead of lattice steel structures.

Environmental, economic, and engineering analysis of Route 2 and Route 3 shows that Route 3 would have higher visual impact than Route 2, Route 3 would be less expensive, and Route 3 would have fewer engineering difficulties such as assurance of reliability and ease of access for operation and maintenance. Based upon this analysis, Route 3 was chosen as the proposed route because of the engineering and economic factors even though the visual impact was greater.

BPA re-issued this statement in draft form describing a proposed route and feasible alternatives. The revised draft statement was filed with the CEQ on May 5, 1977. Another public meeting was held at Stevenson, Washington on June 22, 1977.

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The study area analyzed for the location of transmission lines from the second powerhouse is centered around Bonneville Dam in the Columbia Gorge 35 miles east of Vancouver, Washington, and Portland, Oregon. This area is shown in figure 6, an aerial photograph. Extending west from the present site of North Bonneville, Washington, the study area reaches a point north of Camas, Washington. This entire area is shown in figure 7.

Planning Coordination

In order to further coordinate planning efforts, the location of this project was discussed with the following agencies and organizations during the reconnaissance phase:

Federal

U. S. Army Corps of Engineers, N.P.D. Portland District	Portland, OR

State of Washington

Department of Game	Vancouver, WA
Department of Fisheries	Vancouver, WA
Historic Preservation Officer	Olympia, WA
Washington Archaeological Research Center	Pullman, WA
Department of Anthropology, University of Washington	Seattle, WA

Municipalities

City of North Bonneville

Other Organizations

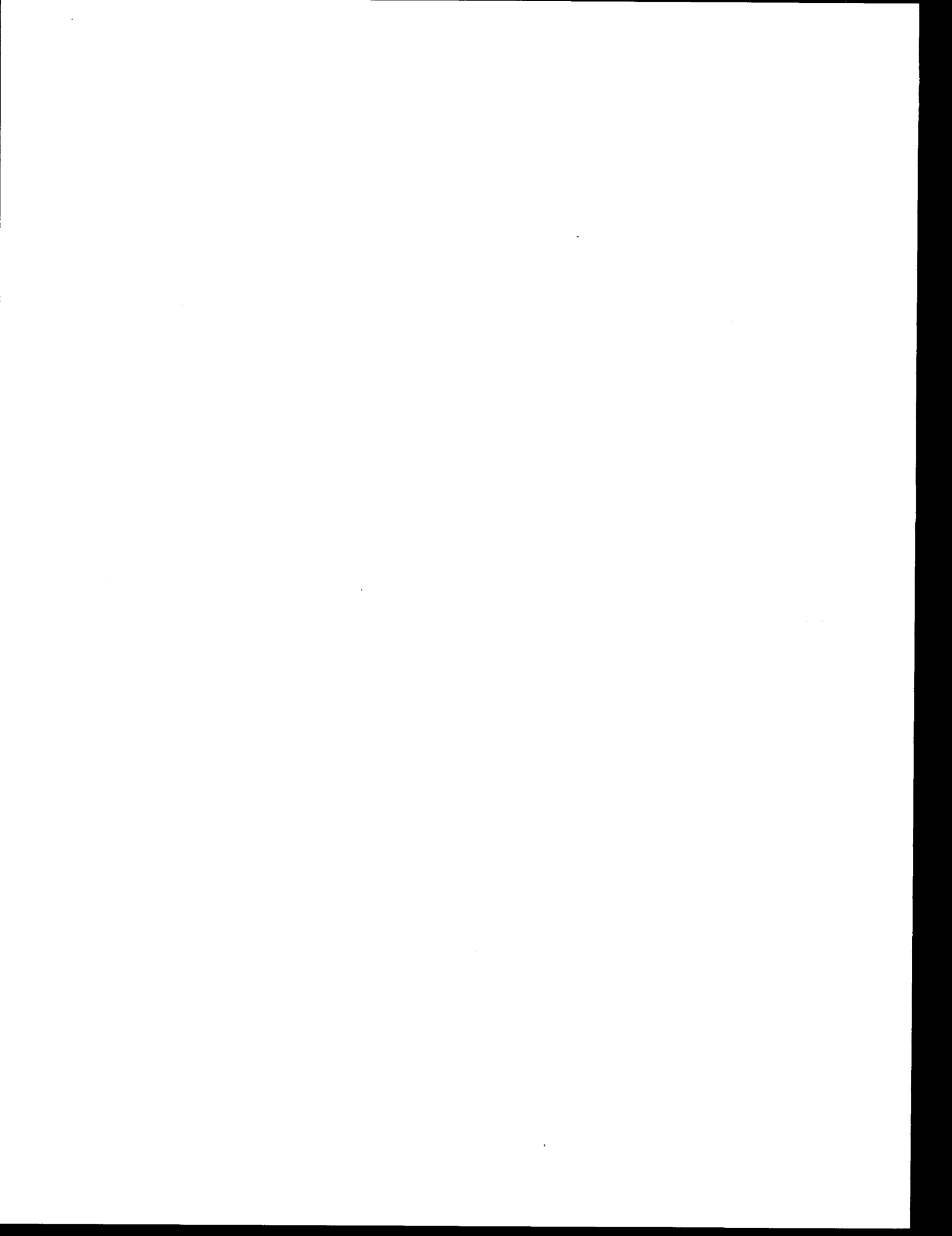
Columbia River Gorge Commission	Stevenson, WA
Skamania County Commissioners	Stevenson, WA

General Construction Requirements

Construction requirements for the transmission lines to integrate power from the second powerhouse at Bonneville Dam include clearing new right-of-way of trees and shrubs which could impair construction or operation of the line, construction and improvement of access roads on and off the right-of-way, excavation for tower footings, leveling of localized areas for conductor reel sites, assembling and erecting towers, and rearranging some existing transmission lines north of North Bonneville Substation. Typical clearing and construction practices for erection of transmission lines and associated facilities are described in Appendix B, Chapter V of the Role EIS. Additional information regarding the construction sequence, techniques, equipment and requirements for clearing, mitigating measures, construction, and maintenance activities can also be found in Appendix B of the Role EIS.



FIGURE 6
AERIAL PHOTO
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



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Location, Right-of-Way Requirements and Cost

Route 3 is composed of two segments: a portion of about 1.3 miles involving new construction, as shown in figure 8, and a section of 21 miles, shown in figure 7, involving the addition of conductor to the vacant side of double-circuit lattice steel towers which presently carry only the North Bonneville-Sifton 230-kV line.

The proposed route would be an overhead double-circuit 230-kV transmission line between the new second powerhouse and the existing North Bonneville Substation. It would begin at the downstream face of the second powerhouse where the Corps of Engineers would provide a delivery point. From this point the line would span the tailrace to an angle structure between the highway and the tailrace. To insure clearances required by the Corps of Engineers between the conductor sag and the tailrace water surface, this angle structure would be approximately 175 feet high. From this point the line would be located close to the north edge of the powerhouse tailrace until it reaches the existing BPA right-of-way and lines into North Bonneville Substation as shown in figure 8. The proposed route would then be parallel and adjacent to the east of the existing 115-kV and 230-kV lines into the substation.

To accommodate the double-circuit transmission line, North Bonneville Substation will need expanding to the east. Description of substation modifications and impacts is included in a separate section of this document.

Rearrangement of several lines north of the substation is necessary for integrating the second powerhouse. This rearrangement is shown on figure 9.

From North Bonneville Substation, the vacant side of the double-circuit towers would be conductored for energization at 230-kV to the Troutdale Tap, 3.5 miles northeast of Camas, Washington, shown on figure 7. At the Troutdale Tap point, the new side of the double-circuit line would tie into existing lines with slight rearrangement of several lines at an existing structure.

Approximately 7,100 feet of right-of-way 90 feet wide would be required for the new transmission line between the powerhouse and the substation. This amounts to less than 15 acres. However, most of this right-of-way will be on federal land under the jurisdiction of either BPA or the Corps of Engineers. Only for approximately 800 feet along the eastern edge of the existing lines where the proposed route will cross the Burlington Northern Railroad, State Highway 14, and a small amount of private land, would new right-of-way need to be acquired.

Estimated cost of Route 3 including new construction, conductoring the vacant south side of the existing towers, and rearrangement of lines around North Bonneville Substation is \$1.36 million based on estimates current as of November 1976. Costs are itemized in table 3.

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Table 3 - Cost of Route 3 (Millions of Dollars)

New double-circuit, steel pole line (1.4 miles)	\$.59
Rearrangement of existing lines (0.5 miles)	.05
Add conductor to existing towers (20.9 miles)	<u>.72</u>
Total Cost	\$1.36

Access Roads

Existing roads will be utilized where possible. Where existing roads do not meet current BPA requirements, they will be upgraded or additional access roads will be designed, surveyed, and constructed. Construction and use of access roads is outlined in Appendix B, Chapter V.A of the Role EIS.

Table 4 outlines estimated access road requirements. Exact quantities or locations of needed roads for the new sections of transmission line cannot be determined until a route has been surveyed and tower sites located.

Table 4 - Estimated Access Requirements

	<u>New Construction</u>	<u>Conductor Existing Line</u>
<u>New Roads</u>		
On Right-of-Way	400 Feet	200 Feet
Off Right-of-Way	0	0
<u>Improve Existing Roads</u>		
On Right-of-Way	0	800 Feet
Off Right-of-Way	0	2500 Feet
<u>Rock Required (cubic yards)</u>	500	1050

Design

Double-circuit, painted tubular steel pole structures, as shown in figure 10, would be used on Route 3 between the powerhouse and substation.

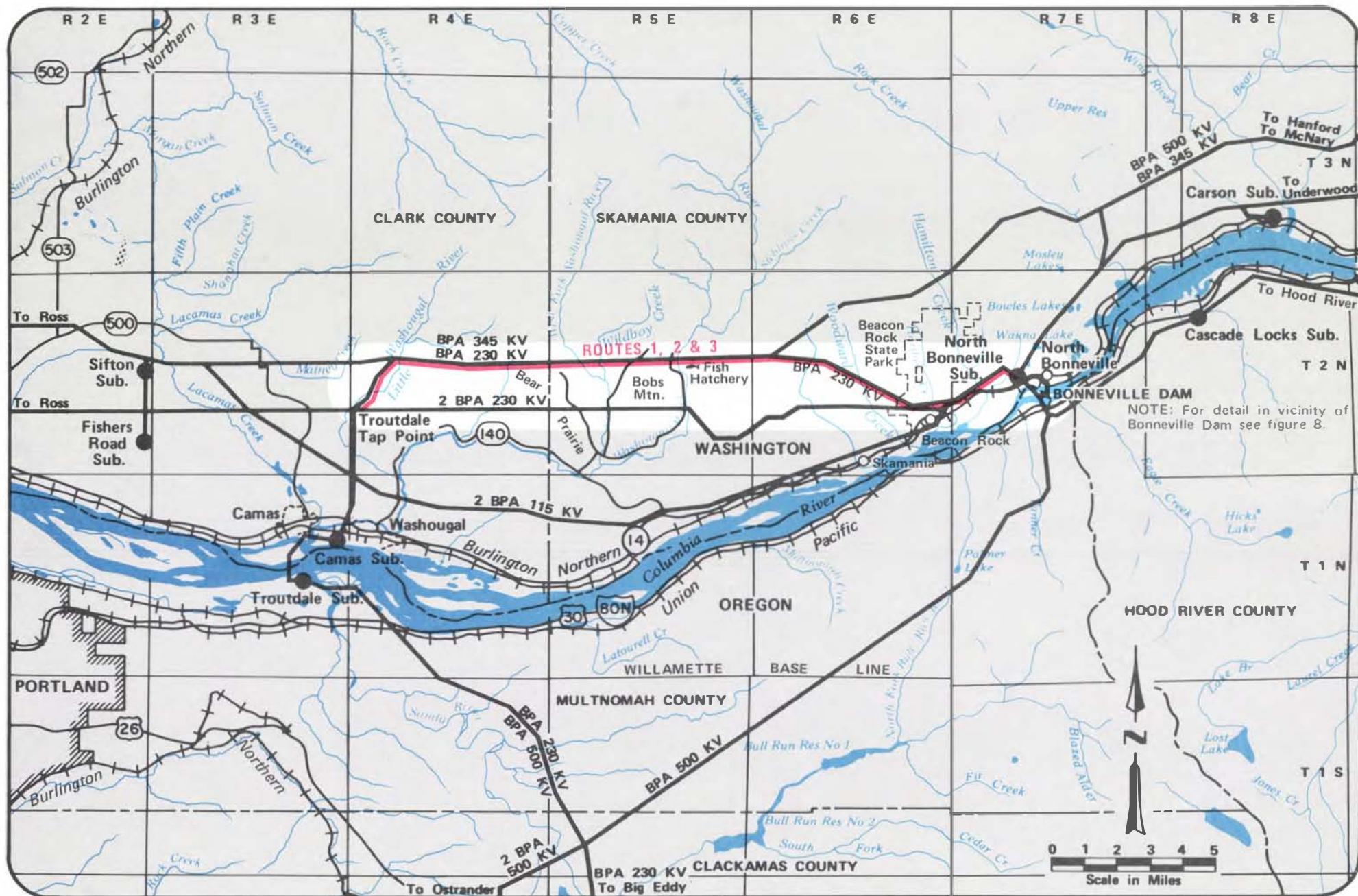


FIGURE 7
KEY MAP
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



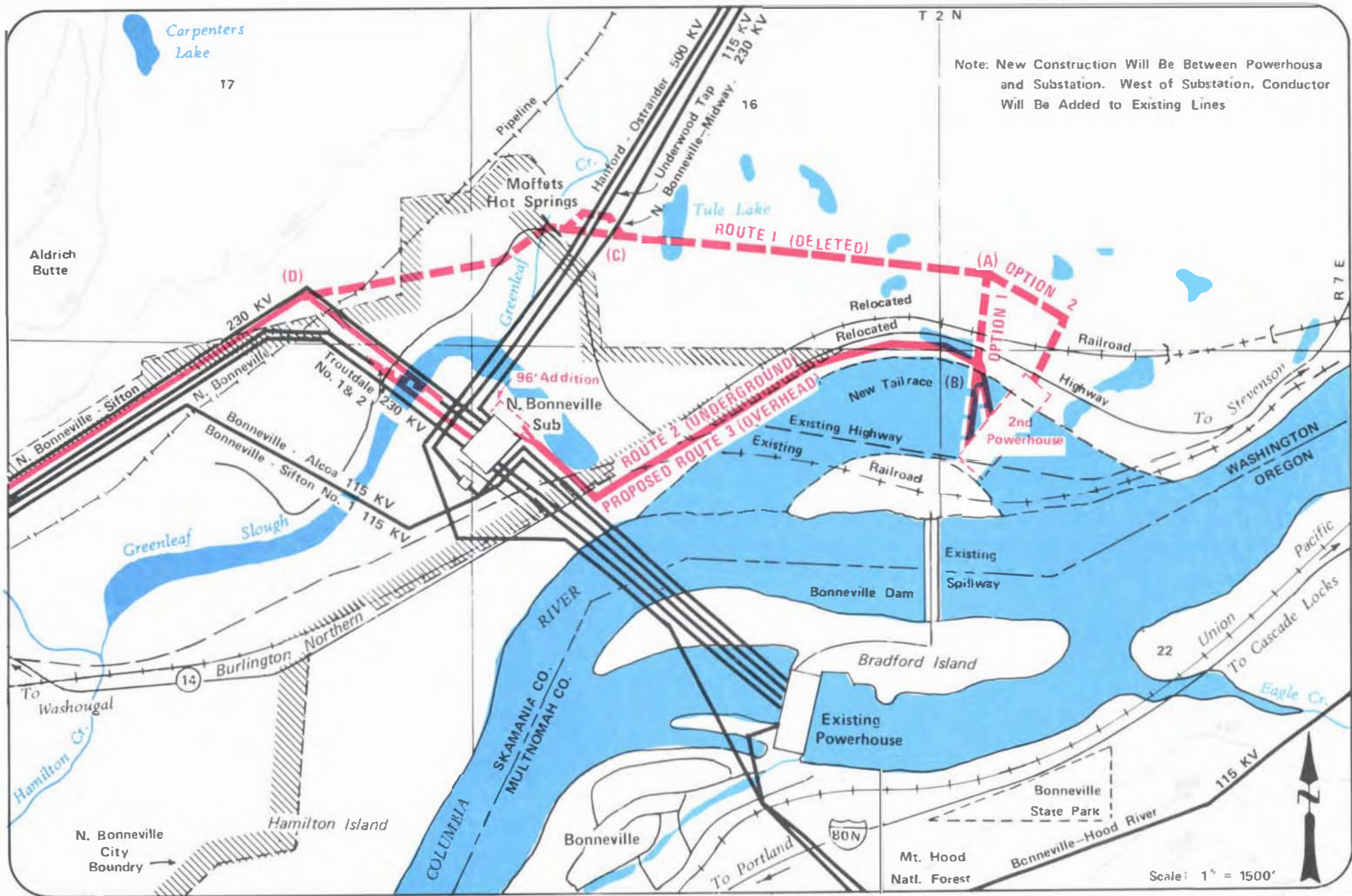


FIGURE 8
PROPOSED ROUTE. DAM AREA DETAIL
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



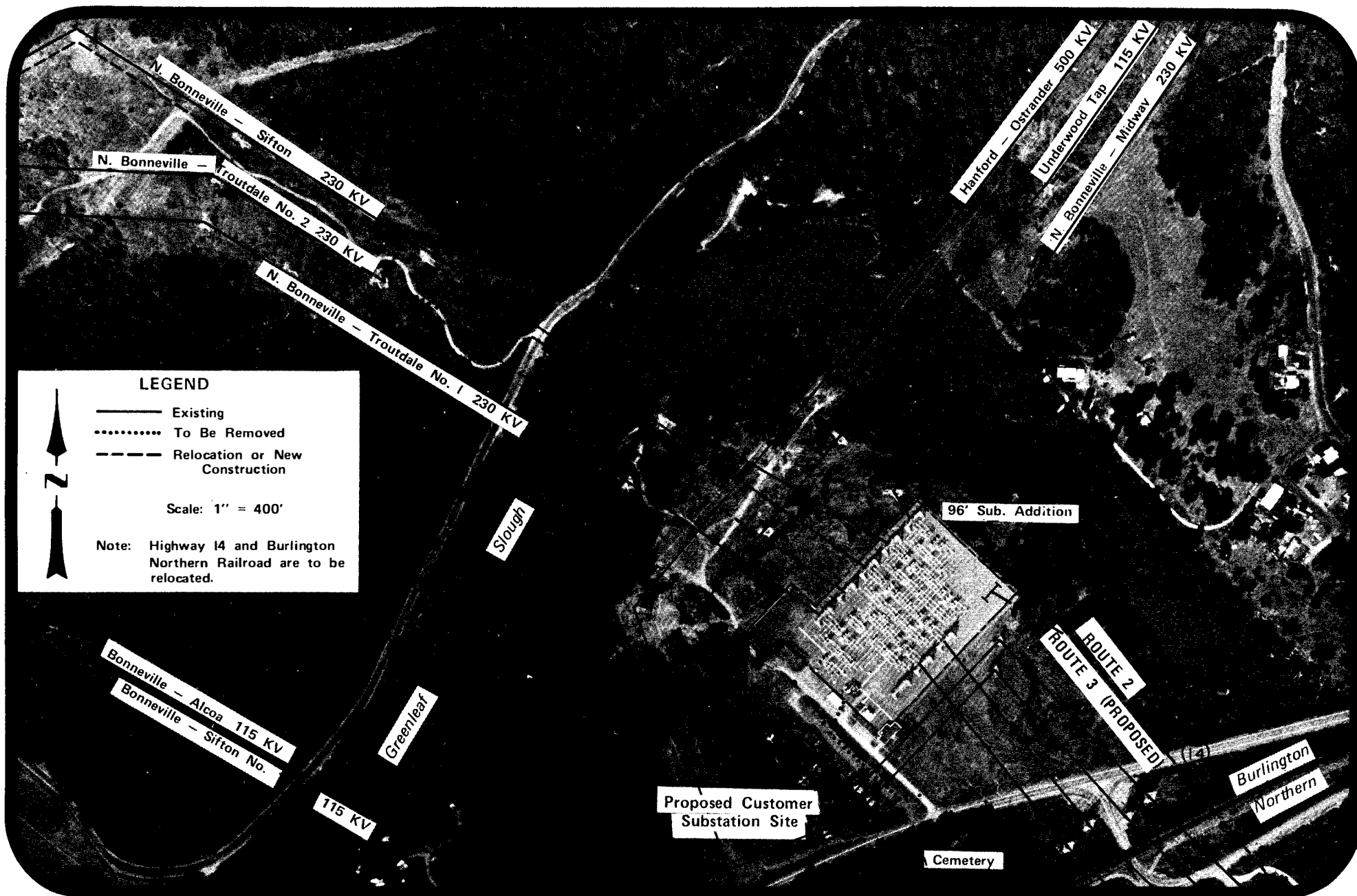


FIGURE 9
NORTH BONNEVILLE SUBSTATION VICINITY DETAIL
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



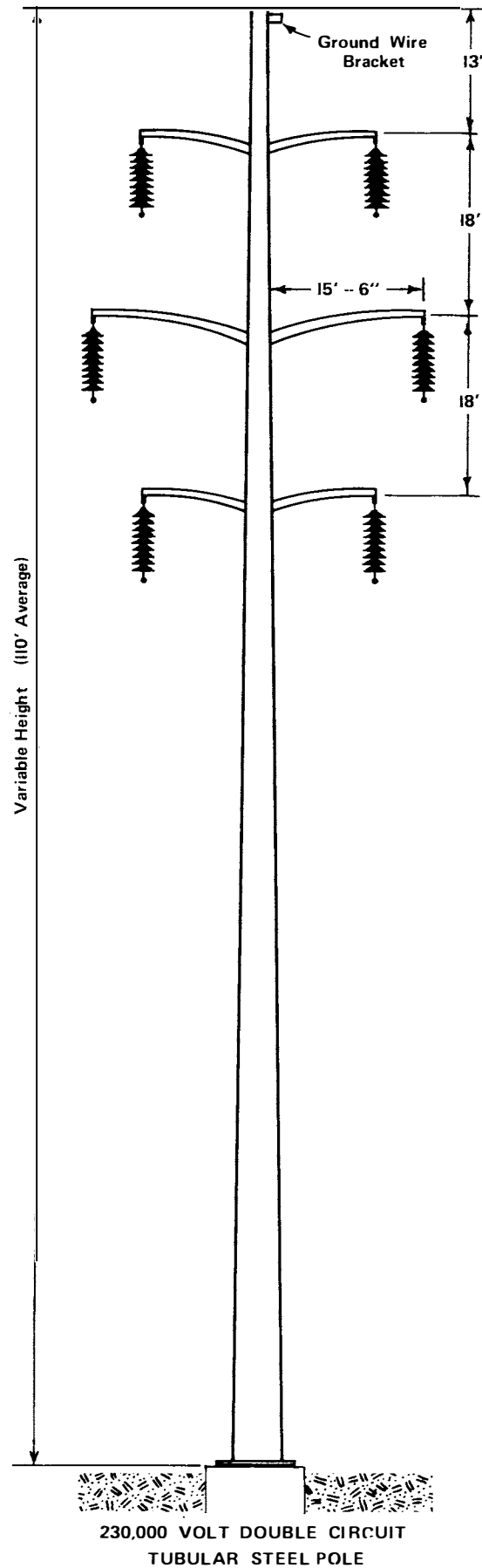
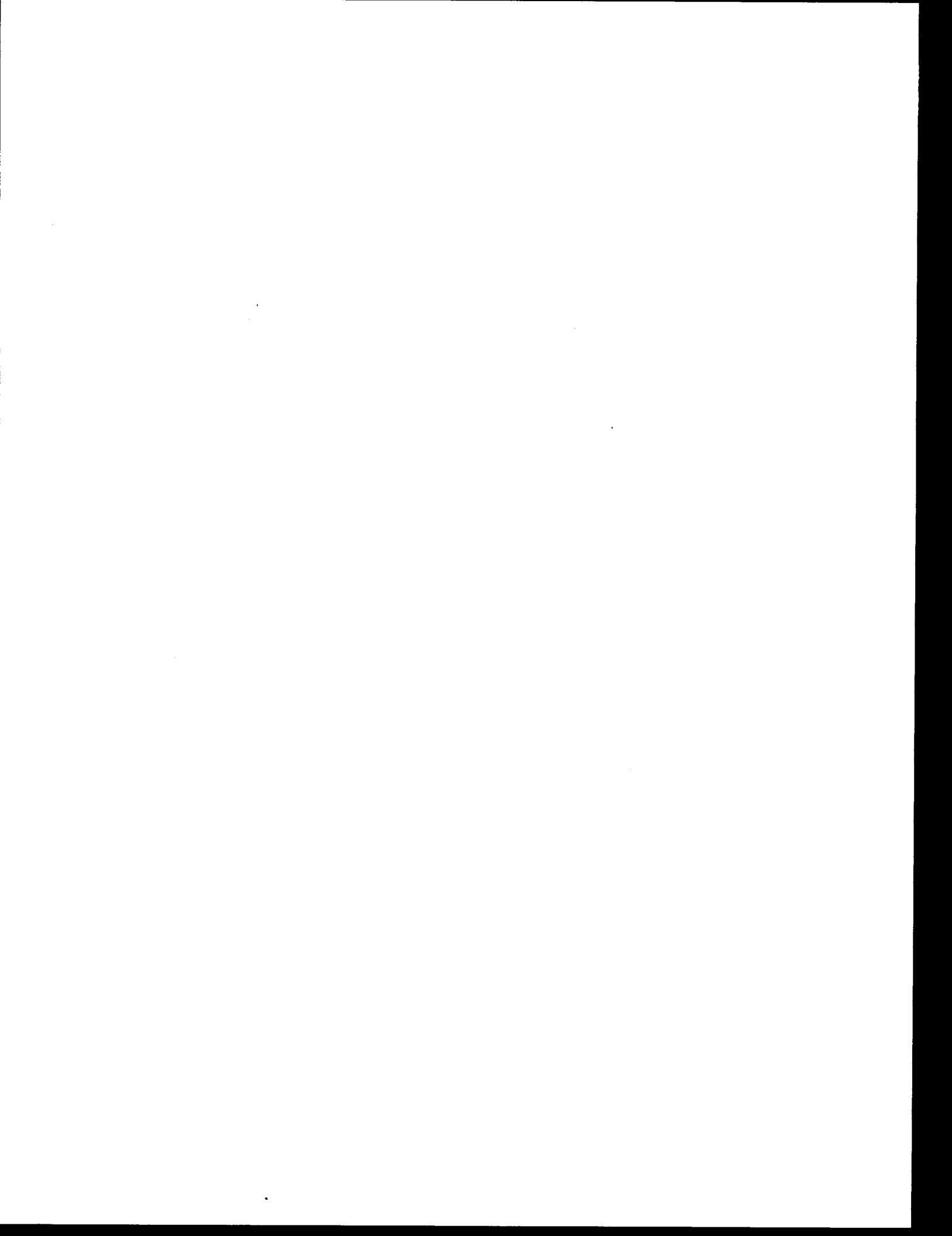


FIGURE 10
TOWER CONFIGURATION
NORTH BONNEVILLE INTEGRATION
77-2



Bonneville Dam Integrating Transmission Study Area 77-2

To reduce the visual impact of existing transmission lines north of North Bonneville Substation while efficiently integrating the second powerhouse, several lines would be rearranged. These changes are shown in figure 9. To accommodate the rearrangement of lines north of the substation, a 230-kV single-circuit, steel lattice structure will be erected just to the north of the substation. This tower will be similar to the one shown on the right side of figure 12.

Customer service and North Bonneville Substation alterations under the proposal are described in a separate section.

THE ENVIRONMENTAL IMPACT OF THE PROPOSED ROUTE

Natural Resources

The following sections assess and attempt to quantify impacts to those natural resources identified in the Facility Planning Supplement which could be affected by the alternative routings.

Geology and Soils

Much of the new construction of Route 3 will be in an area that will be modified during the excavation for the second powerhouse and tailrace. Erosion potential along this section will be slight, especially if construction occurs during summer or fall and if seeding of disturbed areas is done soon after construction.

In the vicinity of the substation, along the new overhead portion of Route 3, and along the existing line to the Troutdale Tap, erosion potential ranges from slight to moderate depending upon the degree of slope. Only temporary, low impacts are expected from erosion and soil disturbance because existing access will be used and very little clearing will be done.

Hydrology

Construction between the new powerhouse and North Bonneville Substation will produce slight, short-term turbidity increases to the Columbia River along the new tailrace. This slight increase will be insignificant compared to turbidity caused by the Corps of Engineers during excavation and construction of the new powerhouse and tailrace.

Bonneville Dam Integrating Transmission
Study Area 77-2

Impacts described above will increase to moderate intensity or more if construction occurs during the rainy season. Runoff from disturbed construction areas will carry larger amounts of soil into these water bodies than under drier conditions. Procedures to keep turbidity and siltation to a minimum are described in Appendix B, Chapter VIII.A of the Role EIS.

Between North Bonneville Substation and the Troutdale Tap, Texas Creek and several smaller streams which might have no flow during the dry season, will be forded during the stringing of conductor on the vacant side of the existing towers. These existing fords, however, are on bedrock and any stream turbidity will be caused by vehicles carrying soil into the stream. This will be quickly dispersed and present only slight, short-term impacts. No perennial streams will be forded.

Additional turbidity or siltation to streams between North Bonneville and the Troutdale Tap could be caused by runoff from equipment areas if work occurs during the rainy season. Impacts would be low to moderate.

Natural Vegetation

Clearing for the new construction portion of the proposed route will be minor. Most of the area between the powerhouse and substation will have already been cleared for tailrace construction and relocation of State Highway 14 and the Burlington Northern Railroad as shown in figure 11.

Construction activities for adding conductor to existing structures will result in less than 75 acres of clearing.

No threatened or endangered plant species are known to be present along Route 3.

Wildlife

Impacts to wildlife from the proposed route will be slight. No aquatic wildlife is expected to be impacted along the new construction section of Route 3.

Most wildlife will vacate the vicinity of North Bonneville before BPA construction equipment and crews begin work because of prior Corps of Engineers construction activities. During the period of construction by the Corps, 400 to 600 acres will be uninhabitable to most wildlife present before construction because of elimination of habitat.

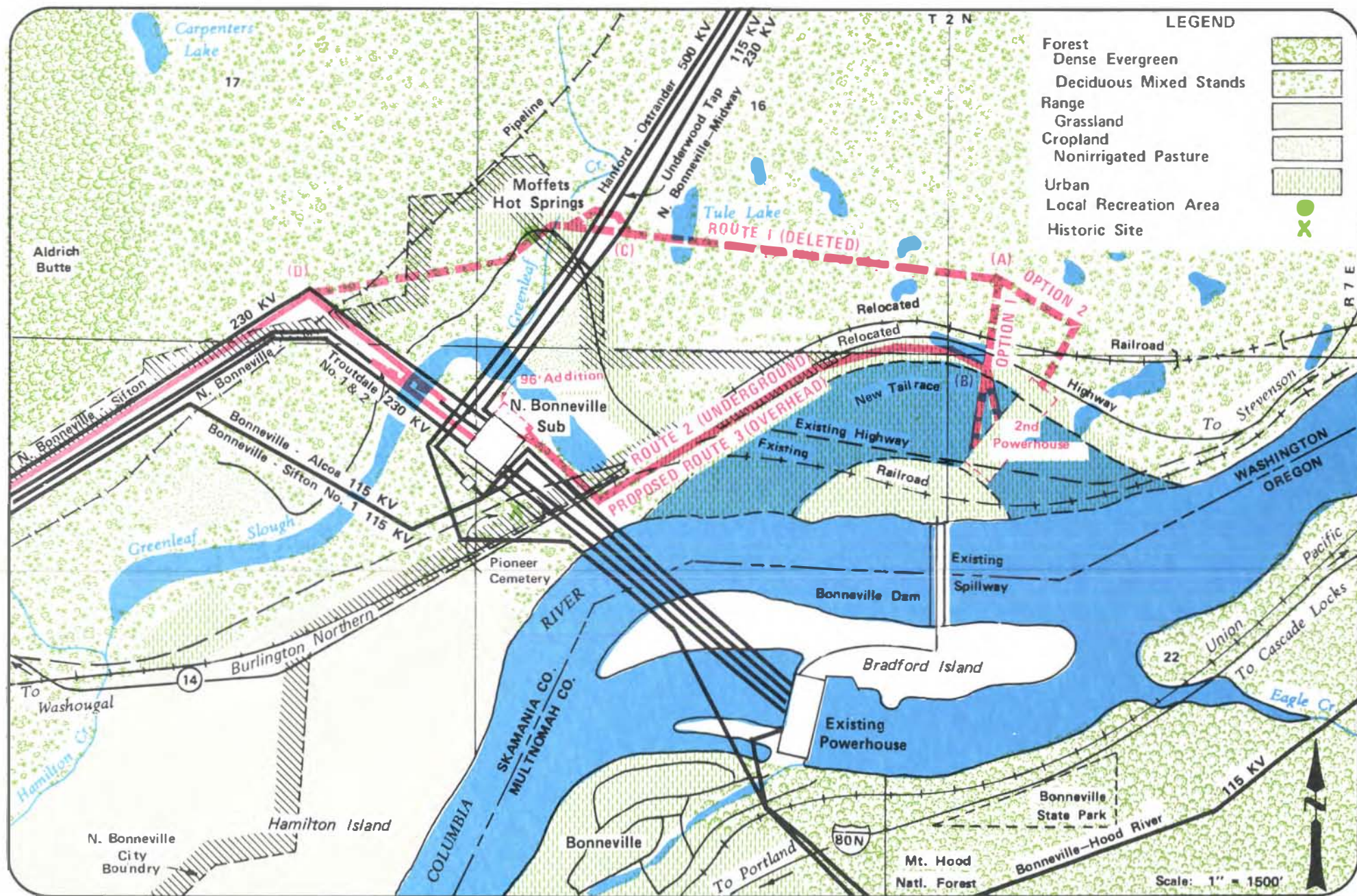
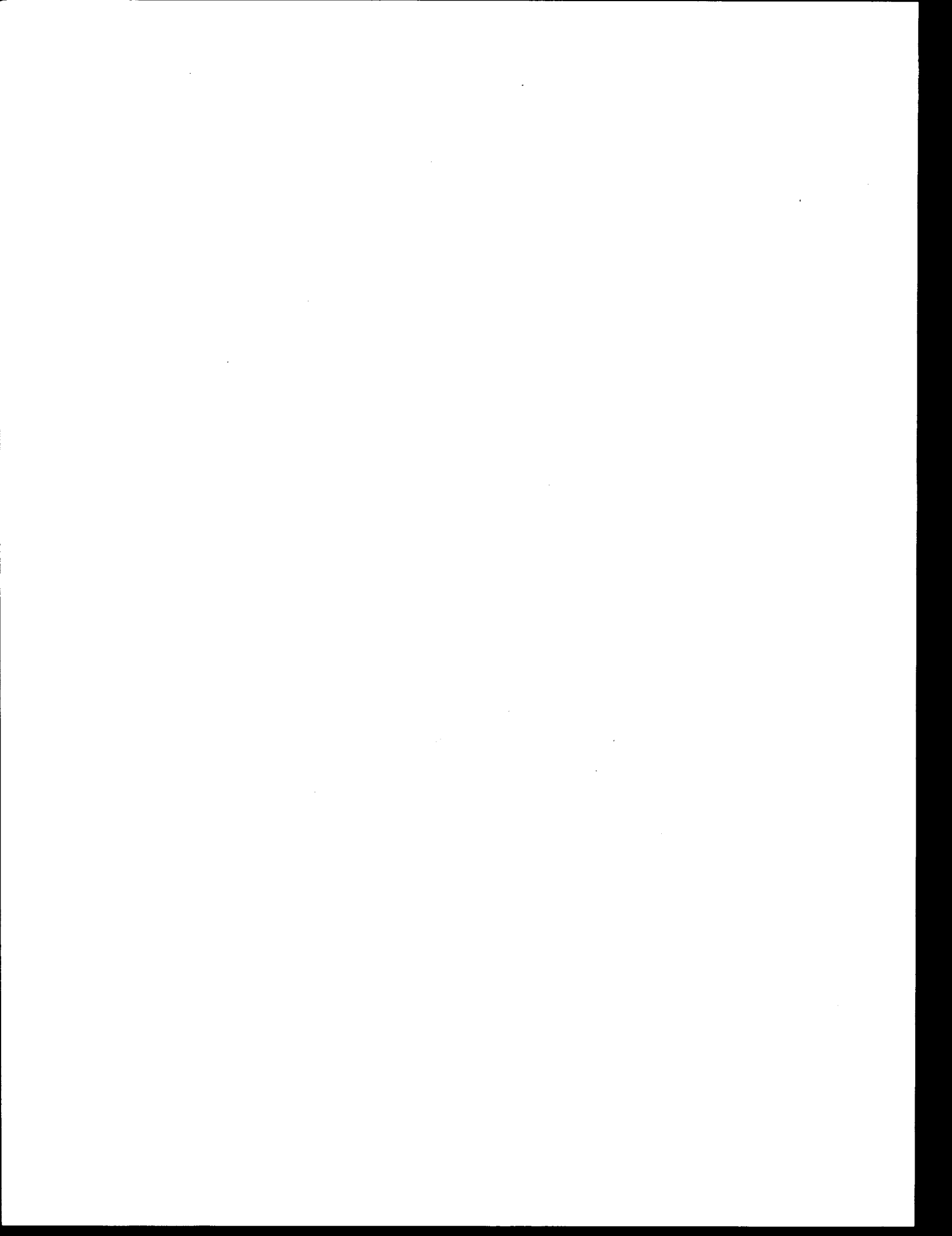
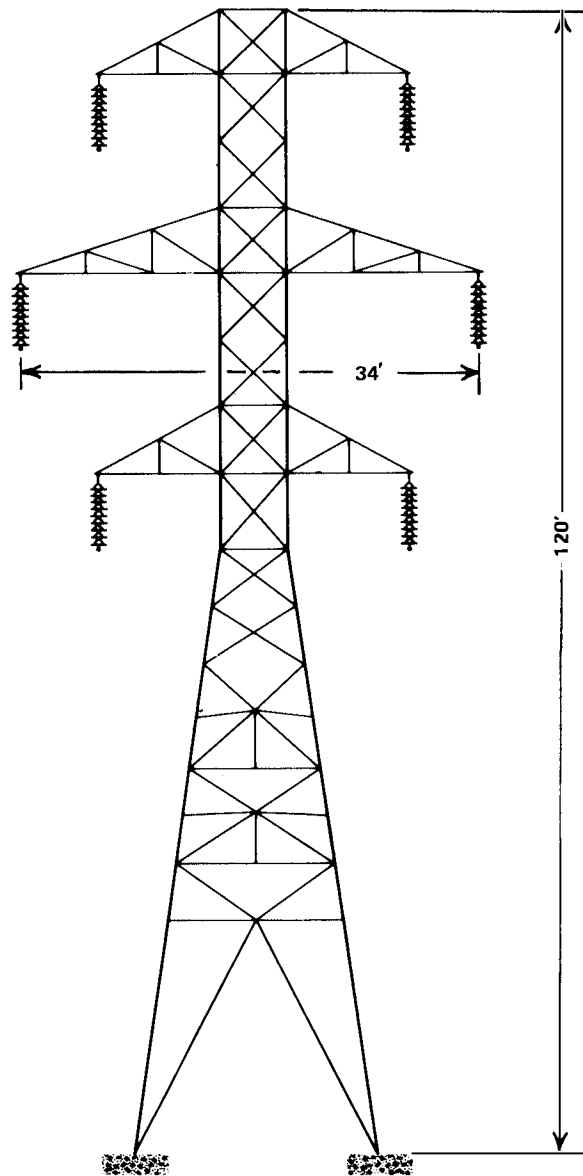


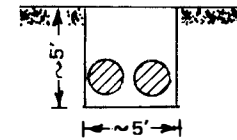
FIGURE 11
VEGETATION AND LAND USE, NATURAL AND CULTURAL RESOURCES
BONNEVILLE DAM INTEGRATING TRANSMISSION





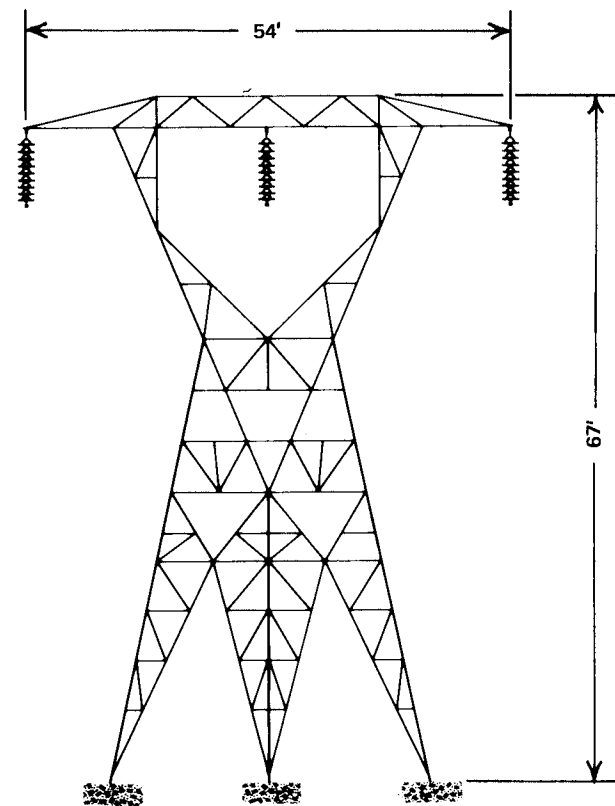
TYPICAL 230KV DOUBLE CIRCUIT TOWER

100' R/W



TYPICAL DOUBLE CIRCUIT UNDERGROUND CABLE

50' R/W



TYPICAL 230KV SINGLE CIRCUIT TOWER

125' R/W

FIGURE 12
UNDERGROUND CABLE AND TOWER CONFIGURATIONS
BONNEVILLE DAM INTEGRATING TRANSMISSION
77-2



Bonneville Dam Integrating Transmission
Study Area 77-2

Several anadromous fishery streams along the section of existing line might be forded, but no significant siltation should occur. An existing ford is presently used for maintenance activities where the route crosses the Little Washougal River but a new access bridge north of the existing line will be used instead of the ford. The Washington Department of Fisheries has identified anadromous spawning streams and will be consulted prior to construction.

Construction activities required for adding conductor to existing structures along Route 3 will clear approximately 75 acres of forest habitat. Slight, short-term disturbances to wildlife will occur from clearing, construction noise, and human activity.

Most of the study area is considered winter range. Herbivores such as blacktail deer would benefit most from the additional forage since most of the forest habitat would be modified to a shrub/grass habitat. Regrowth of vegetation would provide additional habitat for song birds and upland birds.

As mentioned in the Facility Planning Supplement, no threatened or endangered species are known to be in the study area.

Resource Use and Cultural Resources

The following sections assess impacts to cultural resources and resource uses in proximity to the proposed route.

Agriculture

Minor amounts of agricultural lands will be affected by adding conductor to existing towers near the west end of the route at Bear Prairie. All agricultural lands crossed by the existing line are hay crops or pasture and less than 10 acres are within the right-of-way. Minimal impacts are expected to croplands since this portion of the project will consist of stringing new conductor on existing towers.

Possible short-term impacts could occur to crops if heavy equipment is used during the growing season. Easements now being used provide that in addition to payment for the easement, the landowner will be compensated for any crop damage caused by and during the construction, operation and maintenance of the transmission line. Following construction any areas disturbed for stringing or pulling/reeling sites will be restored by subsoiling and contouring. These sites will return to their previous use.

Weed introduction can be a problem on recently disturbed sites, especially if cover vegetation is removed. Nevertheless, prompt seeding should preclude the growth of undesirable species. No land is expected to be permanently lost to production and existing management practices and irrigation systems will not be affected.

Forestry

Although commercial timber occurs in much of the study area, little of it will be affected. Most of the route is on existing right-of-way which requires little clearing, and most of the existing trees south of North Bonneville Substation and toward the second powerhouse site would be removed before BPA construction activities commence.

Along the 21-mile western segment of Route 3, approximately 75 acres within existing rights-of-way plus identified danger trees will need clearing. No interference to logging or present timber land management practices along the proposed route is expected.

Disposal of timber salvaged during clearing operations is covered in Appendix B, Chapters V.A and VI.B of the Role EIS. Tree growth within all areas cleared for rights-of-way will be controlled to prevent interference with power lines.

Visual

Bonneville Dam, supporting facilities and the Columbia River are strong visual interest points attracting thousands of visitors yearly. In addition, Washington State Highway 14 and Interstate 80N, both scenic highways, offer many viewing opportunities of the dam and surrounding land. These highways are major travel routes with high traffic volumes.

The visual presence of the line cannot be avoided. The close proximity of this route to Highway 14 and the lack of vegetative screening will expose travelers on this highway to foreground views. The necessary size of the 10-12 tower structures and their nearness to the highway will make them a somewhat adverse element disrupting views of Bonneville Dam and the Columbia Gorge.

Because of the extensive excavations required for construction of the tailrace and relocation of Highway 14, much of the vegetation between the powerhouse and the Bonneville Substation will be removed. Vegetation will be reestablished in accordance with the Corps of Engineers comprehensive plan for the entire area. However, until all construction has been completed and until exact tower locations are known, the nature and extent of any vegetative screening cannot be determined.

As indicated in figure 10, BPA will utilize improved appearance tubular steel structures of a clean and simple design instead of the traditional lattice steel towers in an effort to reduce visual impacts.

In addition, the intensive use of manmade structures around Bonneville Dam, distance, and any possible vegetative screening will effectively reduce the visual contrast created by the proposed transmission facility when viewed from the Oregon side of the river.

Bonneville Dam Integrating Transmission
Study Area 77-2

Crossing the highway before entering the substation will be visible for approximately 1 mile in either direction. It is not known presently how many trees will be cut for the relocation of the highway and railroad, or possible modification of the substation.

From the substation to its junction with the Ross No. 2 lines, visual impacts will be minimal because of the existing complexity of the area and the lack of viewing opportunities.

Adding conductor to 21 miles of the vacant side of the North Bonneville-Sifton line will clear less than 75 acres of small trees and brush along the right-of-way increasing visibility at various places until revegetation takes place. The highly reflective qualities of the new conductors will create additional visual impacts over a period of several years until dulled by weathering. Portions of Washington State Highway 14, Interstate 80N, hiking trails on both sides of the Columbia River, and local roads and residences will have limited views of the line.

The Washougal River, with high scenic character, is spanned by 2 transmission lines at this crossing and adding a conductor to one of the existing lines will not increase the impact.

Urbanized Land Use

The new site of the town of North Bonneville is centered between Washington State Highway 14 and the Columbia River in an area known as Hamilton Island. The optimum city limits are shown on figure 8. The new town will not be affected by the proposed route. A small proposed industrial development site north of the town will not be affected.

Whispering Hills River Estates, a subdivision of 20 lots developed within the last 10 years, lies on the east side of the Washougal River where the existing line crosses the river valley. Adding another conductor to the existing towers for the proposed route should not constitute a major impact to other future developments along the river.

Five homes on Bear Prairie lie within 500 feet of the existing lines. No interference with television and AM radio reception is expected from the energization of the additional line at these homes or any others nearby. Should interference be evident it will be inspected by BPA and mitigating measures will be taken if the interference is caused by the addition of the new conductor. Construction noise, dust and general activities may temporarily disturb nearby residents.

Recreation

Major recreational resources are described in the Facility Planning Supplement. The proposed route should not affect visitors to Bonneville Dam or recreationists on the Columbia River. New construction will not affect Moffet's Bonneville Hot Springs but construction noise may temporarily disturb recreationists in the Greenleaf Slough area.

Bonneville Dam Integrating Transmission
Study Area 77-2

The new conductor and associated cleared right-of-way, visible at a distance of 2/3 mile north from Beacon Rock, will cause negligible impact to viewers atop the monolith. The new conductor will span the Washougal River on existing towers and will be visible at only one short stretch, creating no impact to river recreationists.

Historic-Archeologic

The study area, especially that which contains new construction, has historic significance. The Columbia River and its early inhabitants were described in the journals of the Lewis and Clark expedition and much history of early white settlers has been recorded. Pioneer Cemetery (Greenleaf Indian Cemetery), south of the present Washington State Highway 14 and across from North Bonneville Substation, is not eligible for the National Register of Historic Places. Although Route 3 will be visible from the Pioneer Cemetery, as shown in figure 11, the proposed route will not create any additional impact because of existing lines and the substation in the foreground. Adding new conductors to the existing towers will not affect any historic sites or the historic significance of Beacon Rock.

Most of the area around North Bonneville has been surveyed for historic/archeologic significance by the University of Washington for the U.S. Army Corps of Engineers. The proposed route of the line will cross an archeological site identified in the University of Washington study in the vicinity of North Bonneville. This site has been damaged by previous construction and relic hunters, and is covered by dredging spoil. It is doubtful this site could qualify for National Register eligibility since test pits and auger holes made by the University have failed to locate and subsurface artifacts. Salvage archeology will not take place without first consulting the National Advisory Council if construction reveals the presence of artifacts.

An extensive archeological site (44 SAll), determined to be eligible for the National Register has been fenced off on the east side of Greenleaf Slough across from North Bonneville Substation. This site, south of the existing BPA corridor to the east would not be affected by the proposed route.

Since the area crossed by the proposed route has been surveyed, Washington Archaeological Research Center has determined no additional surveys are needed.

Other Resource Uses and Cultural Resources

The proposed route will cross Washington State Highway 14 and the Burlington-Northern Railroad tracks which are to be relocated to allow for the building of the new powerhouse and tailrace at Bonneville Dam. Construction of the line can be done without interrupting traffic along either facility and no adverse impacts are expected. Visual impact of a new transmission line will be the only impact.

Bonneville Dam Integrating Transmission
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No adverse electrical impacts are anticipated to wire telecommunications and signal facilities of the railroad or public telephone utilities along the route. If it is determined that a problem may be occurring because of the transmission line, it will be investigated and mitigated according to BPA policy in cooperation with the affected utility.

A Northwest Natural Gas pipeline will be crossed by the proposed route north of the substation. Existing transmission lines already parallel the gas line and have no effect upon it. No additional impacts are expected.

The 21-mile western segment of this route will cross within $\frac{1}{4}$ mile of the Washington State Fish Hatchery on the Washougal River but will have no effect upon its operation. No other cultural resources will be affected by Route 3.

DESCRIPTION OF THE
ALTERNATIVE LOCATIONS
CONSIDERED AND THEIR IMPACTS

ALTERNATIVE ROUTES CONSIDERED

Location, Right-of-Way Requirements and Cost

Routes 1 and 2 are composed of two segments: a portion of about 2 miles involving new construction, as shown on figure 8, and a portion of 21 miles, shown on figure 7, involving the addition of conductor to the vacant side of double-circuit towers which presently carry only the North Bonneville-Sifton 230-kV line. This latter segment is common to each alternative route.

Route 1

Route 1 would be an overhead double-circuit 230-kV transmission line between the second powerhouse and the existing double-circuit line. Two options are considered for a point of delivery from the new powerhouse for Route 1.

As shown by the dashed lines in figure 8, option 1 would begin directly from the downstream face of the new powerhouse, crossing the tailrace to a double-circuit tower north of the tailrace. This option would continue north, crossing the relocated Burlington Northern Railroad and Washington State Highway 14, to point A, common to both options, approximately 1,400 feet north of the tailrace. To insure clearances required by the Corps of Engineers between the conductor sag and the tailrace water surface, the first tower, a lattice steel structure just north of the tailrace at point B, would be approximately 175 feet high.

Bonneville Dam Integrating Transmission
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Option 2 would begin at the north end of the powerhouse where the Corps of Engineers would construct a delivery point. From the powerhouse this option would cross the relocated highway and railroad and turn west to point A.

From point A, the route would go west, cross the right-of-way for the North Bonneville-Midway No. 1 230-kV line, the Underwood Tap 115-kV line, and the Hanford-Ostrander 500-kV line at point C and connect to the existing North Bonneville-Ross No. 2 230-kV double-circuit line at point D, the fourth tower north of North Bonneville Substation. The existing line between this tower and the substation and other lines in the immediate vicinity would be rearranged to accommodate the new double-circuit line. This rearrangement is shown in figure 9.

The vacant side of the double-circuit towers would be conductored for energization at 230-kV from point D to the Troutdale Tap, 3.5 miles north-east of Camas, Washington. At the Troutdale Tap, the double-circuit line would tie into existing transmission lines.

Approximately 8,900 feet of right-of-way 100 feet wide would be required for most of the new construction of Route 1 as shown in table 5. The 100-foot width may vary in places because of terrain or design factors. Crossing the existing lines at point C, Route 1 would require a variable right-of-way from 100 feet to 250 feet wide in order to accommodate the 2 single-circuit lines involved as shown in figure 8. Total length of this new variable width right-of-way is approximately 900 feet.

Estimated cost of Route 1 including new construction, conductoring the vacant south side of the existing towers, and rearrangement of lines around North Bonneville Substation is \$2.17 million based on estimates current as of March, 1976. Costs are itemized in Table 6.

Route 2

Route 2, a combination of 7,700 feet of underground cable and 2,200 feet of overhead lines between the second powerhouse and the existing double-circuit line would begin at the north end of the new powerhouse where the Corps of Engineers would provide an underground cable transition vault. Two 3-phase cables would be placed underground to the north of the tailrace from the powerhouse to existing BPA right-of-way into North Bonneville Substation as shown in figure 8. From here, the underground cables would parallel the existing lines in to the substation. The substation would be expanded 96 feet to the east to accommodate new equipment associated with the termination of the underground lines.

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From the substation, new lines would connect to the existing North Bonneville-Sifton double-circuit line in the manner described for the proposed route. The conductoring of the vacant side of the existing towers would be the same as Route 1.

Underground cable would require approximately 5,400 feet of new right-of-way 50 feet or less in width along the tailrace to the existing BPA right-of-way extending into North Bonneville Substation as shown in table 5. New construction for the remainder of Route 2 would be on existing BPA right-of-way or within the North Bonneville Substation boundary.

Estimated cost of Route 2 including new construction, conductoring existing towers and rearrangement of lines around North Bonneville Substation is \$3.44 million based on estimates current as of September, 1976. Costs are itemized in Table 6.

TABLE 5 - Right-of-Way Requirements for New Construction

	<u>Route 1</u>	<u>Route 2</u>
New 100-foot Right-of-Way	8,900 ft. (20 acres)	0
New 50-foot or less R/W	0	5,400 ft. (6.2 acres maximum)
Variable width Right-of-Way	900 ft. (3.6 acres)	0

TABLE 6 - Cost (in millions of dollars)

	<u>Route 1</u>	<u>Route 2</u>
New Construction		
Overhead	\$1.45	\$.50
Underground	-----	2.22
Conductor Existing Towers	<u>.72</u>	<u>.72</u>
Total	\$2.17	\$3.44

Access Roads

Existing roads would be utilized where possible. Where existing roads do not meet current BPA requirements, they would be upgraded or additional access roads would be designed, surveyed, and constructed. Construction and use of access roads is outlined in Appendix B, Chapter V.A of the Role EIS.

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Table 7 outlines estimated access road requirements. Exact quantities or locations of needed roads for the new sections of transmission line cannot be determined until a route has been selected, surveys completed, and tower sites located.

TABLE 7 - Estimated Access Road Requirements

	<u>New Construction</u>		<u>Conductor Existing Line</u>
	<u>Route 1</u>	<u>Route 2</u>	
<u>New Roads</u>			
On Right-of-Way	2500 feet	0	200 feet
Off Right-of-Way	4100 feet	0	0
<u>Existing Road Improvement</u>			
On Right-of-Way	800 feet	0	800 feet
Off Right-of-Way	1700 feet	0	2500 feet
<u>Rock Required (cubic yards)</u>	500	0	1050

Design

Double-circuit, stacked configuration towers, as shown in figure 12, would be used for overhead lines on both routes except where Route 1 would cross the existing right-of-way northeast of North Bonneville Substation at point C. Here, the double-circuit line would split into 2 single-circuit lines to pass under the 115-kV line, 230-kV line, and 500-kV line. Two new towers would be inserted in the existing 230-kV and 115-kV lines to raise the conductor to provide clearance for this undercrossing.

The underground portion of Route 2 would consist of two buried cables. Each would be a 3 phase, oil insulated, 230-kV cable as shown in figure 12.

To reduce the impact of existing transmission lines north of North Bonneville Substation while efficiently integrating the second powerhouse, several lines would be rearranged or removed completely. All of these changes are shown in figure 9. Customer service and substation power alterations for Phase I are described in the "Planning Supplement" section.

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THE ENVIRONMENTAL IMPACT OF THE ALTERNATIVE ROUTES

Route 1 has been determined not to be feasible for a tie into North Bonneville Substation. Since it is not compatible with the proposed plan, all descriptions of Route 1 impacts have been deleted from this section.

Natural Resources

The following sections assess and attempt to quantify impacts to those natural resources identified in the Facility Planning Supplement which could be affected by the alternative routings.

Geology and Soils

Route 2 - Much of the underground portion of Route 2 would be in an area that would be modified during the excavation for the second powerhouse and tailrace. Erosion potential and chance of instability along this section during trenching and backfilling would be slight, especially if construction occurs during summer or fall and if seeding is done soon after construction. Seeding, however, may or may not be done depending upon the Corps or Engineers revegetation program.

In the vicinity of the substation, along the new overhead portion of Route 2, and along the existing line to the Troutdale Tap, erosion potential ranges from slight to moderate depending upon the degree of slope. Only temporary, low impacts would be expected from erosion and soil disturbance.

Hydrology

Route 2 - Trenching and backfill operations from underground cable placement between the new powerhouse and the substation would produce slight, short-term turbidity increases of no more than a few days to the Columbia River along the new tailrace. This increase would be slight and quickly dispersed by the flow of the river. Construction between the substation and point D would cause slight, short-term turbidity increases of less than a few days to Greenleaf Slough.

Other impacts would be the same as the proposed route.

Natural Vegetation

Route 2 - The clearing for the underground section would be minor since most of the area would be already cleared as shown on figure 11.

Seeding with shallow rooted plant species could be considered to prevent deep rooted plants from invading the area over the underground portion. This would change the plant composition from a tree/shrub to a predominantly low shrub/grass type along the right-of-way.

Construction activities for adding conductor to existing structures would result in less than 75 acres of clearing.

No threatened or endangered plant species are known to be present in the study area.

Wildlife

Route 2 - Impacts to wildlife from Route 2 would be slight. As discussed in the "Natural Vegetation" Section, new construction would clear only minor amounts for the underground portion and the 21 mile segment of the route would clear less than 75 acres.

Most wildlife would vacate the vicinity of North Bonneville before BPA construction equipment and crews begin work because of prior Corps of Engineers activities. During the period of construction by the Corps, 400 to 600 acres will be uninhabitable to most wildlife present before construction because of elimination of vegetation.

Several anadromous fishery streams along the section of existing line might be forded, but no significant siltation should occur. An existing ford is presently used for maintenance activities where the route would cross the Little Washougal River but a new access bridge north of the existing line would be used instead of the ford. The Washington Department of Fisheries has identified anadromous spawning streams and will be notified prior to construction for consultation.

Construction activities required for adding conductor to existing structures along Route 2 would clear approximately 75 acres of forest habitat. Slight, short-term disturbances to wildlife would occur from clearing, construction noise, and human activity.

As mentioned in the Facility Planning Supplement, no threatened or endangered species are known to be in the study area.

Bonneville Dam Integrating Transmission
Study Area 77-2

Resource Use and Cultural Resources

The following sections assess impacts to cultural resources and resource uses in proximity to the alternative routes.

Agriculture

Route 2 - All impacts detailed for the proposed route would apply to Route 2.

Forestry

Route 2 - Route 2 would cross very limited forest land over its portion of new right-of-way and remove only minor amounts of trees.

This deciduous/conifer forest is of low commercial value and no logging operations are active. No interference with planned logging activities or management practices is expected.

Additional areas may require clearing for installation of the new conductor along the existing line, but would total less than 75 acres.

Disposal of timber salvaged during clearing operations is covered in Appendix B of the Role EIS. Tree growth within all areas cleared for rights-of-way would be controlled to prevent interference with power lines.

Visual

Route 2 - Route 2 would have diverse visual impacts upon the landscape, primarily because of the route location and methods of construction, but it would have the least visual impact. The underground segment would be mostly in land that would be disrupted by prior construction, but excessive clearing at the east side of the substation would reduce screening and increase visual impacts to residents living on the east side of Greenleaf Slough. The overhead segment would be within an existing corridor, reducing the amount of clearing and minimizing visual contrasts that would occur from a new corridor. The remainder of Route 2 is identical to the proposed route.

Urbanized Land Use

Route 2 - The underground portion of Route 2 would not impact the new town site for North Bonneville. Impacts to the Whispering Hills River Estates and rural residences on Bear Prairie would be the same as those for the proposed route.

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Recreation

Route 2 - The impacts of Route 2 would be negligible. The new construction would not affect Tule Lake or Moffets' Bonneville Hot Springs but construction noise may temporarily disturb recreationists in the Greenleaf Slough area. Effects of the new conductor are identical to those of the proposed route.

Historic-Archeologic

Route 2 - Visual impacts to Pioneer Cemetery would be the same as the proposed route. The underground portion of the line would cross two archeological sites identified in the University of Washington study in the vicinity of North Bonneville. Both have been damaged by previous construction and relic hunters, and are covered by dredging spoil. It is doubtful these sites could qualify for National Register eligibility since test pits and auger holes made by the University have failed to locate any subsurface artifacts. If this route is chosen, salvage archeology would not take place without first consulting the National Advisory Council.

Other Resource Uses and Cultural Resources

Route 2 - Immediately south of North Bonneville Substation, the cable would cross under both Washington State Highway 14 and the Burlington-Northern Railroad tracks. Installation of the cable could be done without interrupting traffic along either facility and no adverse impacts are expected.

Impacts to the Northwest Natural Gas pipeline and Washington State Fish Hatchery on the Washougal River would be the same as for the proposed route.

Interference to the railroad and telephone wire communication facilities would be more likely for Route 2 because of the close proximity of the underground cables to these facilities for approximately 1 mile. Coordination of the design of the new wire communications and railroad signal systems would be undertaken to achieve a compatible system with the underground power facilities.

Bonneville Dam Integrating Transmission
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DESCRIPTION OF THE PROPOSED SUBSTATION
SITE AND ITS IMPACT

Introduction

The facility planning supplement identified the need for new electrical facilities to serve Skamania County Public Utility District and North Bonneville Substation. It discussed this item as Phase I of a two part project to integrate new power from Bonneville Dam. Phase II of the project requires expansion of the existing North Bonneville Substation to accommodate the two new circuits from the second powerhouse and install terminal equipment, circuit breakers, and switchgear. This section of the draft facility location supplement discusses the proposed substation development.

Most site characteristics are essentially as indicated in the "Description of the Environment" section in the facility planning supplement. Information in this section is an expansion of that regional information to provide site-specific data. This portion of the supplement will identify impacts and mitigating measures as they are related to resources and resource use characteristics of the substation study area.

General Construction Requirements

The customer service substation will consist of a 105' x 160' fenced area containing a 115-12.5-kV transformer, bus and switching equipment. North Bonneville yard will be expanded by about 100 feet to the east (fig. 9). Partial rearrangement of facilities in the existing yard will be made installing one new terminal to send power to the Troutdale Substation. Additions in two new bays will accommodate two more terminals required to receive the new lines from the second powerhouse. A summary of costs and land requirements are included in table 8.

TABLE 8 - Project Cost and Land Requirements Summary

	<u>Customer Service Substation</u>	<u>North Bonneville Substation Expansion</u>
Land Requirements (acres)	0.50	2.00
Estimated Cost (in millions of dollars)	0.42	1.18

Location and Land Requirements

North Bonneville Substation is located in Sec. 39, T. 2 N., R. 7 E., Skamania County, Washington. It is about 500 feet north of the relocated Burlington Northern Railroad and approximately 700 feet north of relocated State Highway 14. The land required for the new customer service substation (Phase I) will be about 0.5 acre. Expansion of the existing

Bonneville Dam Integrating Transmission
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North Bonneville yard (Phase II) involves an additional 2 acres of land. The land for these facilities is owned by BPA. Existing access road will be used for the development.

Site Characteristics

North Bonneville Substation is located adjacent to the relocated town of North Bonneville. The land surrounding the substation is in forest and forest-shrub land cover. A frontage road (formerly State Highway 14) runs south of the site. Across this road is Pioneer Cemetery (Greenleaf Indian Cemetery) and the relocated Burlington Northern Railroad and State Highway 14. The site is at least partially visible from nearby residences and from the transportation routes that pass by the substation.

THE ENVIRONMENTAL IMPACTS OF THE PROPOSED SUBSTATION SITE

Natural Resources

The following sections assess and discuss impacts of the proposed substation site to natural resources.

Geology and Soils

The customer service substation land area is essentially level and will require only minimal grading.

The expansion of the North Bonneville Substation about 100 feet to the east in Phase II involves 2 acres and approximately 15,000 cubic yards of land fill. Soil erosion will have a short term effect. Erosion control measures will be required. These measures will be installed on both the new substation and the substation yard expansion.

Natural Vegetation

One-half acre of shrubs and grasses will be removed for the customer service substation. About 2 acres of grasses, forbs, a few small deciduous and coniferous trees would be removed for expansion of the existing substation yard.

Golden Chinkapin Castanopsis Chrysophylla (Dougl.) D.C. has been identified by local residents as a rare plant. This evergreen shrub will not be disturbed by this construction.

Wildlife

Construction of the substation could cause some temporary disturbances to wildlife. The 0.5 acres of habitat to be removed for the new customer service substation is not expected to noticeably affect wildlife populations in the area. A buffer of riparian vegetation will remain between the substation and Greenleaf Slough.

The 2 acre expansion of the North Bonneville yard is not expected to result in a significant loss of wildlife habitat. Similar habitat is abundant in the surrounding areas.

RESOURCE USE AND CULTURAL RESOURCES

The following sections discuss and assess impacts of the proposed substation site upon resource use and cultural resources.

Visual

There are several residences on the east shore of Greenleaf Slough about 600 feet from the existing substation. Views of the substation from the residences are screened by deciduous and evergreen trees and shrubs. During the winter months screening is slightly reduced but still quite effective. Substation expansion will remove some vegetation and cause an increase in the visibility of the substation. A buffer of vegetation will remain between the substation and Greenleaf Slough.

The new customer service facilities will be visible from the road adjacent to the substation. This road is currently designated Washington State Highway 14. Because of the new powerhouse, highway traffic will be rerouted, leaving the old roadway for local use only.

The new customer service facilities and substation expansion will increase the visual complexity of the substation as seen from the road. This effect will be somewhat offset by removal of several transmission structures near the substation. After completion of construction the casual viewer on the roadway will probably not notice the changes at the substation.

Urbanized Land Uses

The most significant long term impacts to urbanized land uses are visual and were discussed in the preceding section.

During construction, vehicles and other equipment and activities may cause localized noise and dust problems and potential safety hazards for local residents. The significance of these impacts will be slight when viewed in contrast to the powerhouse construction activities.

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It is unlikely that the new facilities at the substation will create any TV or radio interference. Should BPA facilities cause any TV or radio interference, mitigating measures will be taken.

Recreation

Neither Phase I nor II of the required substation additions should have any direct impact on recreational activities. Some visual impacts are possible to recreationists and these are addressed in the "Visual" section.

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T H E A D V E R S E E F F E C T S O F T H E P R O P O S A L

Certain limitations on land use and productivity could be an unavoidable result of the construction of this facility. Landowners would be compensated.

Some loss of soil by erosion and some siltation in the small streams would occur. Removal of forest habitat and the resultant elimination of wildlife dependent of this particular habitat could occur to a limited extent. Similar habitat is abundant within and around the study area.

Temporary unavoidable impacts include the noise, dust and visual impact of the construction equipment, and disturbances to residents and wildlife. Other adverse effects are described in the section, "Potential Impact of the Proposed Plan of Service."

T H E R E L A T I O N S H I P B E T W E E N L O C A L
S H O R T - T E R M U S E S O F M A N ' S E N V I R O N M E N T
A N D T H E M A I N T E N A N C E A N D E N H A N C E M E N T
O F L O N G - T E R M P R O D U C T I V I T Y

Based on present technology, the facilities needed for the proposed plan will have an expected useful life of 50 years. Experience in past years has shown that, in most cases, transmission corridors are upgraded to higher capacity in response to technological advancements and energy demands. This, along with BPA's policy of constructing new facilities parallel to existing corridors, will likely result in a long-term use of this corridor. However, if required, complete removal of these transmission facilities, including the tower footings, would be possible in order to make the land available for other uses.

T H E I R R E V E R S I B L E A N D I R R E T R I E V A B L E
C O M M I T M E N T S O F R E S O U R C E S

Unreclaimable steel, aluminum, copper, and other materials used for structures and other hardware would be irretrievably committed. Manpower and fuel for construction equipment would be irretrievably expended.

It would be possible to remove the entire facility at a future time, it is unlikely that the land used would irreversibly be committed but could be available for other land use.

The timber and other vegetation removed during construction, the wildlife eliminated, and the soil lost by erosion would be irretrievably committed.

C O N S U L T A T I O N A N D C O O R D I N A T I O N
W I T H O T H E R S

CONSULTATION AND COORDINATION IN THE DEVELOPMENT OF THE PROPOSAL

This Final Facility Location Supplement for Bonneville Dam Integrating Transmission discusses newly proposed facilities that are needed to integrate power from the second powerhouse at Bonneville Dam into the main BPA grid system since the first Draft Facility Location Supplement was filed with the CEQ on January 22, 1976. Anticipated environmental impacts associated with each alternative location are again discussed and a proposed route indicated. This project was described for the first time in the Fiscal Year 1977 Program Environmental Statement which was filed as a draft with the Council on Environmental Quality (CEQ) on July 15, 1975.

In preparing the draft environmental statement for Fiscal Year 1977, BPA consulted with various Federal, regional, and local planning agencies. A Draft Planning Supplement for this facility was sent to numerous Federal, state and local agencies, environmental groups, and the public for review and comment. A public information meeting was held in North Bonneville, Washington on September 9, 1975. Comments received during the review period were considered in the preparation of the Final Planning Supplement.

Public meetings concerning the Draft Facility Location Supplements were held in North Bonneville on March 17, 1976, and in Stevenson on June 22, 1977. Comments received during review of the first Draft Facility Location Supplement are also included with this statement.

COORDINATION IN THE REVIEW OF THE DRAFT FACILITY LOCATION SUPPLEMENT

The draft facility location supplement was sent to Federal agencies, state clearinghouses, and to local clearinghouses where these have been established by states, or to county or metropolitan planning commissions and environmental agencies where local clearinghouses have not been established. These agencies are listed below. A notice of availability of the draft facility location supplement was placed in the Federal Register and in local news media in advance of the proposed public meeting.

AGENCIES REQUESTED TO COMMENT ON THE DRAFT STATEMENT
(An asterisk * Indicates comments were received)

Federal Agencies

U.S. Department of the Interior
*Fish & Wildlife Service
*Bureau of Mines
*Bureau of Indian Affairs
*Bureau of Land Management
*Bureau of Outdoor Recreation
*National Park Service
Geological Survey
Bureau of Reclamation

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Federal Agencies (continued)

U.S. Department of Agriculture
 *Forest Service
 *Soil Conservation Service
U.S. Department of Health, Education, and Welfare
*U.S. Department of Housing and Urban Development
*U.S. Environmental Protection Agency
*Energy Research and Development Administration
*Federal Power Commission
 Federal Aviation Administration
*Advisory Council on Historic Preservation
*U.S. Department of the Army
 Army Corps of Engineers
U.S. Department of Transportation

State of Washington

*Office of Community Development
*Parks and Recreation Commission
*Highway Commission
*Department of Game

*Town of North Bonneville

Local Agencies

Regional Planning Council of Clark County
Skamania Regional Planning Council
*Columbia River Gorge Commission
Mid-Columbia Economic Development District
Columbia Region Association of Governments

Others

National Wildlife Federation
Washington Environmental Council
Federation of Western Outdoor Clubs
Oregon Environmental Council
Friends of the Earth, Northwest Coordinator
National Resources Defense Council
The Wilderness Society
Sierra Club: Northwest Representative
 Northern Rockies Chapter
 Pacific Northwest Chapter
Northwest Steelheaders Council of Trout Unlimited
Environmental Defense Fund
Mazamas
Washington State Advisory Council on Historic Preservation
Washington Archaeological Research Center

R E F E R E N C E S

- Bond, C.E. 1966. Endangered Plants and Animals of Oregon I. Fish. Agricultural Experiment Station, Oregon State University, Corvallis. Special Report 205. 8 pp.
- Bureau of Sport Fisheries and Wildlife (BSFW). 1973. Threatened Wildlife of the United States. Resource Publication 114. Washington, D.C. 189 pp.
- Columbia-North Pacific Technical Staff (CNP staff). 1969-72. Columbia-North Pacific Region Comprehensive Framework Study. Pacific-Northwest River Basins Commission, Vancouver, Washington. 16 Appendixes.
- Dunnell, R.C. and D.E. Lewarch. 1974. An Assessment of the Archaeological Resources of North Bonneville, Skamania County, Washington and Environs, University of Washington.
- EDAW, Inc. 1975. Study of Environmental Impact of Underground Electric Transmission Systems. San Francisco, California. 191 pp.
- Franklin, J.F. and C.F. Dyrness. 1973. Natural Vegetation of Oregon and Washington. Pacific Northwest Forest and Range Experiment Station. Forest Service General Technical Report PNW-80. 417 pp.
- Highsmith, R.M. (ed.). 1969. Atlas of the Pacific Northwest. Oregon State University Press, Corvallis, Oregon. 168 pp.
- Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle, Washington. 730 pp.
- Interagency Committee for Outdoor Recreation (IAC). 1974. Washington State Recreation Trails Program. Tumwater, Washington.
- Land Conservation and Development Commission (LCDC). 1974. Draft State Land Use Goals, Guidelines, and Critical Areas. Salem, Oregon. 8 pp.
- McKee, Bates. 1972. Cascadia: The Geologic Evaluation of the Pacific Northwest. McGraw-Hill Book Company. 394 pp.
- Meteorology Committee, PNRBC 1969. Climatological Handbook.

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- National Park Service. 1975. "National Register of Historic Places." Federal Register. Vol. 40, No. 24 and subsequent monthly addenda through May 1975.
- National Park Service. 1975. "National Register of Natural Landmarks." Federal Register. Vol. 40, No. 87.
- Shannon and Wilson, Inc. 1972. Seismic Regionalization Studies. Portland, Oregon. 43 pp.
- Soil Conservation Service (SCS). 1965. Mean Annual Precipitation Map: State of Washington.
- Soil Conservation Service and Oregon Agricultural Experiment Station. 1970-71. General Soil Map.
- Stanford Research Institute (SRI). 1971. Bonneville Environmental Impact Study. Prepared for U.S. Army Corps of Engineers, Portland, District. Menlo Park, California.
- U.S. Army Corps of Engineers (USCE). 1971 (revised 1974). EIS. Second Powerhouse Bonneville Lock and Dam Columbia River, Oregon and Washington. Portland, Oregon.
- U.S. Geologic Survey. V-502 Topographic Map Series.
- Washington State, Dept. of Ecology (WDOE). 1972. Water Resources of Southwest Washington. Olympia, Washington. 206 pp.
- Washington State, Dept. of Ecology (WDOE). 1973. Water Quality Standards. Olympia, Washington.
- Washington State, Dept. of Highways (WSHD). 1973. Traffic Flow-Washington State Highways (Map). Highway Planning Division.
- Washington State, Dept. of Natural Resources and U.S. Geologic Survey (WDNR & GS). 1961. Geologic map of Washington. Olympia, Washington.

COMMENTS RECEIVED DURING
THE REVIEW PROCESS
(1976)

City of North Bonneville (March 25, 1976)

Comment - In our discussions, the Council felt that three areas must be addressed, should the underground route be constructed:

- 1) A reasonable measure of safety.
- 2) Prevention of electrolysis in the earth corroding other utility lines which might someday be laid in the vicinity outside the 50 foot corridor.
- 3) Fishing access to the river bank be maintained across the corridor.

Response - 1. This system would be fabricated and installed according to applicable U.S. standards and codes. In general, an underground transmission system presents fewer and less severe hazards to the public than an overhead transmission system.

2. There would be no AC corrosion of utility lines caused by an underground transmission line. However, the cathodic protection of an underground transmission line to prevent corrosion may effect the DC corrosion rate of other buried utilities. While this generally is not a problem, any effects would be mitigated as necessary.

3. An underground transmission line would be buried and would not affect access to the river banks.

Mr. & Mrs. John E. Sullivan (March 23, 1976)

Comment - Wherever possible underground cable should be used.

Dr. M.W. Evans (March 23, 1976)

Comment - We are indeed for progress, but when an alternate route of underground lines is available, there should be no further thought.

Edward and Mary Jane Hewitson (March 23, 1976)

Comment - The only way to transmit the power is underground and we sincerely request you to abandon any thought of overhead wires and more towers, particularly in an area that can and should be enjoyed for generations to come.

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Study Area 77-2

Response - A basic discussion describing underground cable can be found in Appendix B, Chapter X.B of the Role EIS, and the EDAW, Inc. study mentioned under References.

Several points mentioned in the above publications include:

- 1) Situations where underground transmission is appropriate and not appropriate;
- 2) Cost factors of overhead lines vs. underground lines;
- 3) Reliability of underground lines;
- 4) Duration of outages for underground lines;
- 5) Capacity of underground lines;
- 6) State of technology for underground lines.

USDI, Fish and Wildlife Service (March 8, 1976)

Comment - Page 33 - Natural Vegetation. Attached is a list of rare and threatened candidate plant species which may be found in the project area. Although the exact locations of these plants are not known at the present time, attention should be drawn in the supplement to the possibility of their presence.

Response - As stated in the supplement, no rare or threatened plant species are in the immediate vicinity of the proposed line.

USDI, Fish and Wildlife Service (March 8, 1976)

Comment,- There is a stand of golden chinquapin at Moffet's Hot Springs. This is one of only two stands of this species in Washington which have been identified. The area should be avoided if Route] is selected.

Response - A precursory field investigation of the area revealed no golden chinquapin in the vicinity of any alternate route.

USDI, Fish and Wildlife Service (March 8, 1976)

Comment - Page 34 - Natural Vegetation. Transmission corridors and areas disturbed by construction should be seeded immediately after work is completed; this would help prevent soil erosion and stream turbidity as well as restore wildlife habitat in a much more timely fashion than natural revegetation. The Washington Department of Game should be consulted to determine which plants might be used to benefit those wildlife species which reside within the corridors. The adverse effect on wildlife would be lessened if the work were done as early in the year as possible to maximize the establishment of vegetation on the reseeded areas.

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Study Area 77-2

Response - During the data collection process for the environmental statement, the Washington Department of Game was contacted concerning wildlife inventory, critical winter ranges, restoration of disturbed areas, important spawning streams and critical times of the year for wildlife. The only reseeded areas would be along the new tailrace. Reseeding may or may not be done, depending upon the Corps of Engineers revegetation program.

North Bonneville Planning Commission (March 25, 1976)

Comment - Route 1, if constructed, would have a significant visual impact when viewed from State Route 14, a scenic highway, the Moffets-Bonneville Hot Springs recreational area, and wilderness areas. Route 2 being an underground line would have a minimal visual impact.

Response - This is discussed on page 36 of the earlier Draft Facility Location Supplement.

USDA, Forest Service (March 12, 1976)

Comment - In order to reduce any possible visual impact, we recommend you consider dull coating the towers for the above ground alternatives.

Response - BPA will attempt to mitigate visual impacts wherever possible by using techniques such as vegetative screening or painted structures. Galvanized steel weathers naturally to a dull coating after exposure. Mitigating measures are described in Appendix B, Chapter VIII.B of the Role EIS.

Mr. & Mrs. John E. Sullivan (March 23, 1976)

Comment - The mention of "700-750 feet from the hot springs property" is incorrect, as the present east-west line crosses a west entrance to the property. It is our understanding that if this route is chosen this east-west line corridor will be enlarged for additional towers. At present B.P.A. has no right-of-way to such a corridor. Nowhere on the Hot Springs property would those new transmission lines be "mostly screened" and/or 700 feet away from the edge of the property.

Response - When Route 1 was investigated in Spring, 1975, the closest existing buildings were estimated to be 300-350 feet from the approximate centerline location. The error in the text is noted and will be corrected. Since the original reconnaissance, several mobile homes and a four-plex apartment have been moved into the area just west of the hot springs.

During the 1975 reconnaissance, Route 1 was determined to be screened partially from most of the buildings in the hot springs complex.

Bonneville Dam Integrating Transmission
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Mr. & Mrs. John E. Sullivan (March 23, 1976)

Comment - We have received information-encouragement from the Washington State & County Extension Service Representatives. They identify Moffets Hot Springs (Bonneville Hot Springs Resort) as a historical landmark.

This unique natural resource should receive its due consideration in your planning and constructing transmission lines.

Response - The State Historic Preservation Officer has been contacted. He has determined that Moffets Hot Springs is not eligible for the National Register of Historic Places.

Edward and Mary Jane Hewitson (March 23, 1976)

Comment - Mr. McLeod, why were the property owners not formally advised of the Public Hearing.....

Response - BPA published a series of paid newspaper ads announcing the public meeting that was conducted on March 17, 1976, at North Bonneville, Washington. These ads appeared in both the legal and display sections of the Columbian on March 1 and 15; the Oregonian on March 1; and the Skamania County Pioneer on March 12.

COMMENTS RECEIVED AT
THE PUBLIC MEETING
(1976)

Mike Mills (March 17, 1976)

Comment - I was just curious to see what the other benefits you could weigh that extra additional cost as opposed to putting the lines on the overhead- what environmental costs and what costs of maintenance or upkeep, you know, would be more favorable, as spending that extra money in putting it underground?

Response - Direct comparisons of maintenance costs for underground and overhead systems are difficult to make. Conditions which favor underground systems as opposed to overhead systems, like lightning, ice loading, or high winds, etc., may make its maintenance costs relatively lower. When these factors are not involved, overhead transmission will usually have lower maintenance costs. A detailed analysis has not been made since maintenance costs are a small part of the total project costs.

Lorena Tol (March 17, 1976)

Comment - Why did you consider underground?

Response - Because of the nature of the area and type of construction planned for the powerhouse, the visual impact of the project would be reduced with an underground installation.

John Tol (March 17, 1976)

Comment - These people that do have to use these transistor-type gadgets, whatever they are, apparently they don't work if they are too close to a tower.

Response - We are not aware of any operational difficulties for commercially available equipment, other than communication devices such as television or radio receivers. Current information indicates that high voltage lines will not interfere with the performance of presently - designed pacemakers for heart patients. A paper titled "Electrical Effects of Transmission Lines" is available from BPA on request.

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Gil Kelley (March 17, 1976)

Comment - Do you have any information of whether either overhead or underground lines would affect TV reception for adjacent homes, for instance, in the area that the second route may cross?

Response - We do not expect any difference in radio and television reception where the second route parallels adjacent homes. Underground facilities do not affect reception, but overhead lines occasionally do.

John Hatton (Burlington Northern) (March 17, 1976)

Comment - We were wondering if you have done any studies on the ground currents which would result from this underground line being adjacent to our tracks and communications system.

Response - The design and final location of BPA circuits will be coordinated with the Burlington Northern Railroad Seattle office in accordance with BPA's inductive coordination policy. The design options being considered, overhead line or underground cable, are expected to have little or no influence on the railroad's signals and communications.

Gil Kelley (March 17, 1976)

Comment - Yes, I wondered if the generation from the underground lines would affect the vegetation on the surface?

Response - Surface vegetation outside the right-of-way would not be affected. The cleared right-of-way would be reseeded with shallow rooted plants to prevent drying of the soil around the cable.

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COMMENTS RECIEVED DURING
THE REVIEW PROCESS
(1977)

USDI, Bureau of Mines (June 29, 1977)

Comment - The concise descriptions of geology and geologic hazards along proposed alternative transmission line routes would be adequate if accompanied by more detailed maps or strip-logs.

Response - In the Geology and Soils section on page 32 it is stated that the proposed route is expected to cause few impacts. No geologic hazard areas will be crossed by either new construction or adding conductor to the existing line. Mitigating measures described in the Role EIS, Appendix B, Chapter VIII are referenced in the text on page 11.

Washington Department of Fisheries (June 30, 1977)

Comment - On page 33, paragraph 2, you indicate small streams, such as Texas Creek will be forded at bedrock areas. Where and how will important salmon producing streams such as Hamilton, Hardy, Woodard, Washougal and the West Fork Washougal be crossed. Are temporary bridges going to be constructed?

Response - Existing bridges will be used for crossing the above mentioned streams as well as the other larger flows. Where bridges do not exist near the line, access would be along existing roads to the streams, but not across them.

UDSA, Soil Conservation Service (July 18, 1977)

Comment - Pages 6 and 7 - There is no discussion of threatened plant or animal species on natural vegetation or wildlife.

Response - Pages 33 and 34 contain statements that there are no threatened or endangered plants or animals in the vicinity of any of the alternatives.

Washington Department of Fisheries (June 30, 1977)

Comment - Page 7, Wildlife. To our knowledge, little if any fall chinook spawning occurs in the Little Washougal, West Fork Washougal, Woodard Creek or Greenleaf Creek. These streams are utilized by coho salmon however.

Response - The statement has been changed to reflect this information.

Bonneville Dam Integrating Transmission
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Washington Department of Fisheries (June 30, 1977)

Comment - Access road construction, right-of-way clearing, excavation of tower footings, and other construction activities which disturb the soil and create potential spawning ground contaminants should be during the dry season.

Response - The bulk of the new construction will be for 1.3 miles between the second powerhouse and North Bonneville Substation in an area which will be modified by the Corps of Engineers. Therefore the excavation for the steel poles, and related activities during construction would cause few, if any, problems. The remainder of the line will require only minor clearing and some improvement of existing access.

USDI, National Park Service (June 21, 1977)

Comment - It is unclear from the statement whether or not an archeological survey of the proposed transmission lines will be conducted prior to ground-disturbing activities.

Response - Washington Archeological Research Center (WARC) has determined that no additional surveys are needed. The narrative on page 36 describes a prior survey and sites in the vicinity.

USDI, National Park Service (June 21, 1977)

Comment - The latest "National Register of Historic Places" appeared in the Federal Register on February 1, 1977, and periodic updates have appeared since then. Since the National Register undergoes constant revision, the latest publications, rather than those 1975, should be consulted.

Response - The National Register has been consulted through June 1977. An archeological site (44 SALL), discussed on page 36, has been listed as "eligible for inclusion" since May 4, 1976. No other new listings are within the study area.

USDA, Soil Conservation Service (July 18, 1977)

Comment - Page 5 - There is no discussion of prime and unique farmlands as called for in Washington Notice EQ-18 issued by the Council of Environmental Quality, August 30, 1976. Although there are no known prime or unique lands located within the study area, a discussion of prime and unique farmlands should be included in this section.

Response - BPA normally does not discuss items in an environmental analysis that are outside the study area unless they are affected directly by the project or vice versa. As stated on page 33 of the text, no farmland is expected to be permanently lost to production or existing management practices affected.

USDI, Bureau of Mines (June 29, 1977)

Comment - The brief discussion of "Irreversible and Irretrievable Commitments of Resources" (page 50) should be supported by quantitative information. A table of the estimated quantities of metals and other construction materials would be appropriate.

Response - It is difficult to quantify the items mentioned in this particular section. Most of the tower steel, conductor, and various other metallic concerns can be salvaged and reused or recycled. Manpower and fuel are also difficult to quantify.

Statements following a more recent format (this statement was written according to Fiscal Year 1977 format) do include a table indicating amounts of tower steel and conductors. This project will need approximately 130 tons of steel for towers and approximately 260 tons of steel reinforced aluminum conductor.

Town of North Bonneville (July 11, 1977)

Comment - Because the new transmission corridor will form a key element in the entrance to the new town of North Bonneville, run adjacent to a scenic highway and the Columbia River, and integrate a new powerhouse project the line should be placed underground.

Response - The Corps of Engineers has made the decision to deliver the power from the downstream face of the powerhouse which would not accommodate an underground design option. This fact, as well as space limitations between the edge of the tailrace and the relocated highway, for transition from overhead wires to underground cable, do not make undergrounding a feasible alternative. BPA has selected painted, tubular steel poles for the new line to mitigate the visual intrusion.

COMMENT RECEIVED AT
THE PUBLIC MEETING
(1977)

Shirley Brenner (June 22, 1977)

Comment - I'm concerned with the visual impact, and also to your expansion that you're talking about. What will that do to the lake edge? Will the natural vegetation along the lake be preserved, or will it be like other contracts - it will be cleared?

Response - Lakeside vegetation will be preserved. Clearing will be done approximately 100 feet to the east of the substation leaving a zone of about 100 feet between the new construction and the lake.

SA-78-2

Ellensburg Area Service



STATUS

ELLENSBURG SERVICE

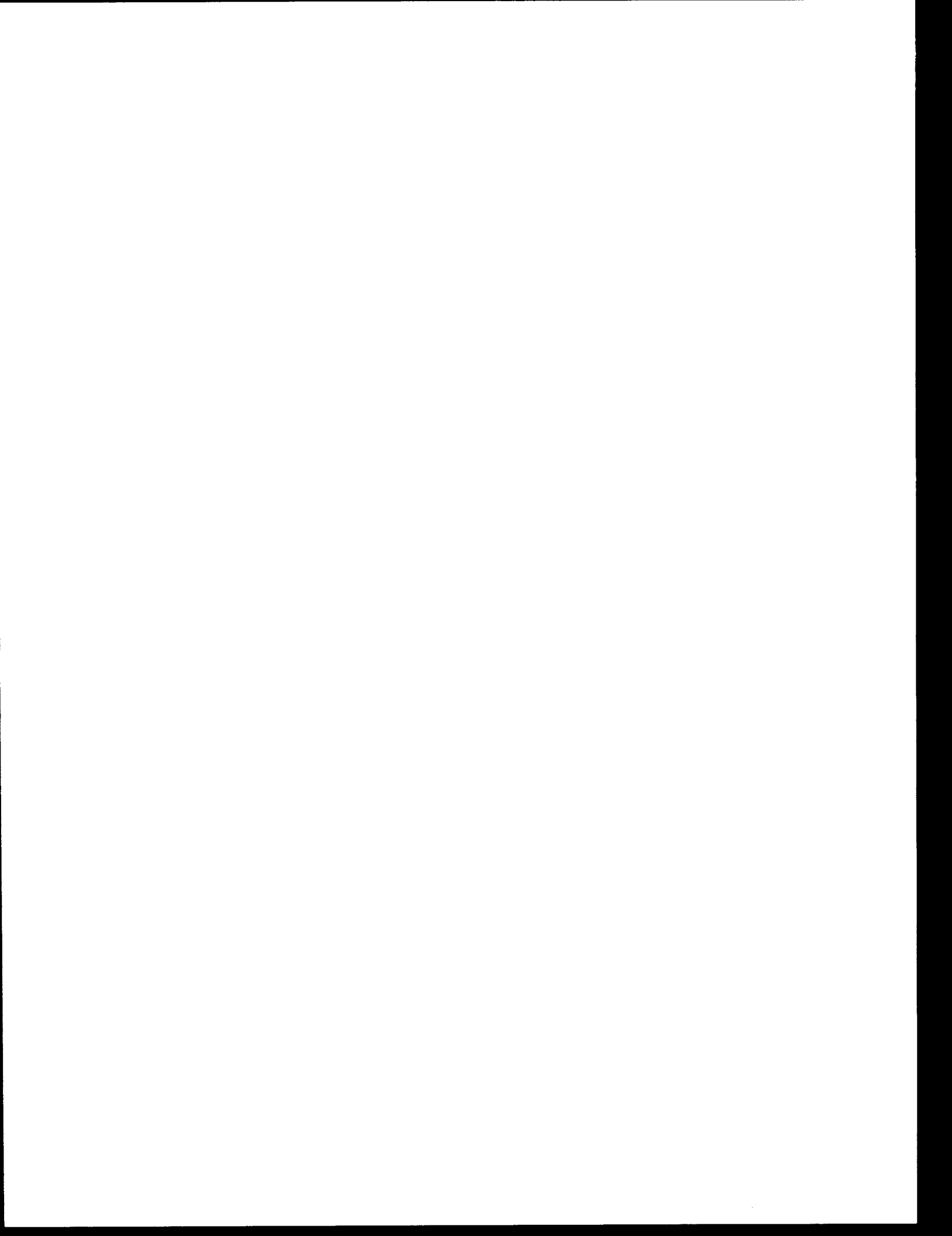
The facility was first described as a draft facility planning supplement Study Area 74-2, in BPA's Fiscal Year 1974 Program Statement which was filed with the President's Council on Environmental Quality (CEQ) on April 3, 1973. A public information meeting on the draft planning supplement was held at the Ellensburg City Hall on October 26, 1972. Subsequent to the issuance of the draft, loads did not develop as forecasted and the installation of additional facilities was delayed. In the interim, however, planning evaluations were continued and in June 1975 a joint BPA-City of Ellensburg plan of service study was completed which concluded that one of the previously-identified BPA plans of service would be required.

A new draft facility planning supplement (Study Area 78-2) was prepared and presented in BPA's FY 1978 Draft Program Statement, which was filed with the CEQ on June 1, 1976. Although a public meeting was held previously in October 1972, a second public meeting was held at a regularly scheduled meeting of the Ellensburg City Council on July 19, 1976, to solicit comments on BPA's updated project plans. After evaluating the principal economic, engineering, and environmental factors associated with this project, and review of public and agency comments received on the draft planning supplement, Alternative Plan A was selected as the Proposed Plan of Service by the Bonneville Power Administration. This decision was made September 17, 1976. A compilation of all correspondence received during the comment period was included in Section XIV of the BPA's Fiscal Year 1978 Final Program Statement.

Studies of possible locations for the facilities involved in the proposed plan of service were initiated. A draft location supplement was prepared which presented alternative transmission routes. It was filed with the CEQ on March 21, 1977. A public information meeting on the draft facility location supplement was held on May 5, 1977 at the City-County Silver Circle Community Center in Ellensburg, Washington. All comments received during the review process were considered in the selection of the proposed route (Route 1).

This final facility location supplement combined the facility planning supplement, pages 1 through 29 with the location section which deals with the environmental impacts of the alternative transmission line locations identified for the proposed plan of service, pages 30 through 53. The environmental impacts of the proposed substation site are described on pages 54 through 63.

Subsequent to the public meeting, Puget Sound Power & Light Company (PSP&L) was granted Federal Power Commission approval to acquire the Taunton-Cedar Falls 115-kV line from the Milwaukee Railroad. BPA as a result has initiated discussions with PSP&L as to the possibility of utilizing their facility for transfer service. This possible new plan



was presented as Alternative Plan B in the Facility Planning Supplement. If a satisfactory arrangement can be agreed to, this plan will be selected, delaying the need for construction and subsequent impact of the proposed 3¼-mile direct service tap line. In such an event, an addendum to this supplement and news release will be issued, notifying all recipients of the change in plan of service. The environmental impacts of the new plan would consist of those related to the substation and short tap line (approximately 500 feet in length) that would interconnect with the PSP&L 115-kV line, formerly owned by the Milwaukie Railroad.

The following are tentative schedule dates of this project:

Location Surveys	Fall 1977
Land Acquisition	1978
Construction	Spring 1979 - Summer 1979
Energization	October 1979

ELLENSBURG SERVICE
STUDY AREA 78-2

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DESCRIPTION OF THE PROPOSAL

SYSTEM REQUIREMENTS

Bonneville Power Administration (BPA) supplies the wholesale electrical power requirements of the City of Ellensburg from two points of delivery located at the existing Ellensburg Substation. One point of delivery consists of two 115-12.5-kV transformers having a combined rating of 33,300 kVA. The other point of delivery consists of a 115-34.5-kV transformer which serves a city-owned substation at Whitney Park rated 34.5-12.5-kV, 5,000 kVA, by means of a transfer over a 34.5-kV sub-transmission line owned by Kittitas County PUD. From Ellensburg Substation, the City owns and operates approximately 45 miles of power distribution lines to service approximately 4,800 customers.

Growth of commercial, industrial, and residential electric loads have imposed increased requirements on the existing transmission and distribution system. Commercial growth can be attributed to expansion of existing businesses, conversion from fossil fuels to electric heating, and the development of new businesses. Industrial growth will principally consist of building expansions of the two large power loads of Central Washington State College and Twin City Foods Processing and Freezing Plant. This growth principally involving Central Washington State College will be moderate compared with the recent past. Growth of residential loads is resulting primarily from construction of all-electric homes and the conversion from fossil fuels to electricity. Much of the past residential growth was associated with student housing in the northeast area of the city. The electric load center for the City of Ellensburg is located adjacent to the Central Washington State College campus.

Load forecasts for the City of Ellensburg as tabulated below indicate that the thermal capability of the electrical facility will be exceeded between the winters of 1979-1980. A 32 percent increase in load is forecasted between the winters of 1976 and 1986. This yields an average annual increase of approximately 3.55 percent.

Load Estimate

<u>Winter</u>	<u>Peak Load (kW)</u>
1976-77	40,700
1977-78	42,130
1978-79	43,580
1979-80	45,030
1980-81	46,490
1981-82	47,940
1982-83	49,390
1983-84	50,840
1984-85	52,290
1985-86	53,750

To prevent the overloading of existing facilities, the damaging of equipment, and the probable loss of service, additional 115-12.5-kV transformation will be required.

PLANNING COORDINATION

The following agencies and organizations were contacted by BPA economists, engineers, and environmental personnel during the planning phase of this project. Specific planning functions include engineering-economic studies and environmental reconnaissance.

Federal

U.S. Department of Agriculture Soil Conservation Service	Ellensburg, Wa.

State of Washington

Washington State Advisory Council on Historic Preservation (State Historic Preservation Officer)	Olympia, Wa.

Washington State University (Washington Archaeological Research Center)	Pullman, Wa.

Other Individuals and Organizations

Kittitas County Regional Planning Office	Ellensburg, Wa.
City of Ellensburg	Ellensburg, Wa.
Central Washington State College	Ellensburg, Wa.

. THE PROPOSED PLAN OF SERVICE

The proposed plan for Ellensburg Service consists of a new 20,000/33,000-kVA, 115-12.5-kV substation served by a 115-kV transmission line that would interconnect (tap) with the existing BPA Columbia-Ellensburg-Moxee 115-kV line. The new transmission line will be 2 to 5 miles in length depending upon the route location selected. It will be constructed utilizing a design composed of pole-type structures. If a line route is selected along the railroad corridor, double-circuit steel pole structures would most likely be used. The new substation will require approximately 2 acres for facilities with some additional land required for an entrance road and land use buffer depending upon site requirements. See figures 1 and 2.

New facilities to be constructed by the city will consist of a 12.5-kV switching station adjacent to the proposed BPA substation. It will have initially three distribution feeder positions that would interconnect with the existing city distribution system. Whitney Park Substation will be retired.

Construction of the transmission line for the Proposed Plan will include building a limited number of access roads; excavation of footing holes and guy anchor placement; erection of structures, and stringing conductor. The 2 to 5 mile 115-kV transmission line will require 10 to 40 structures

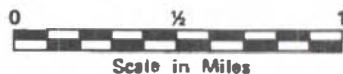
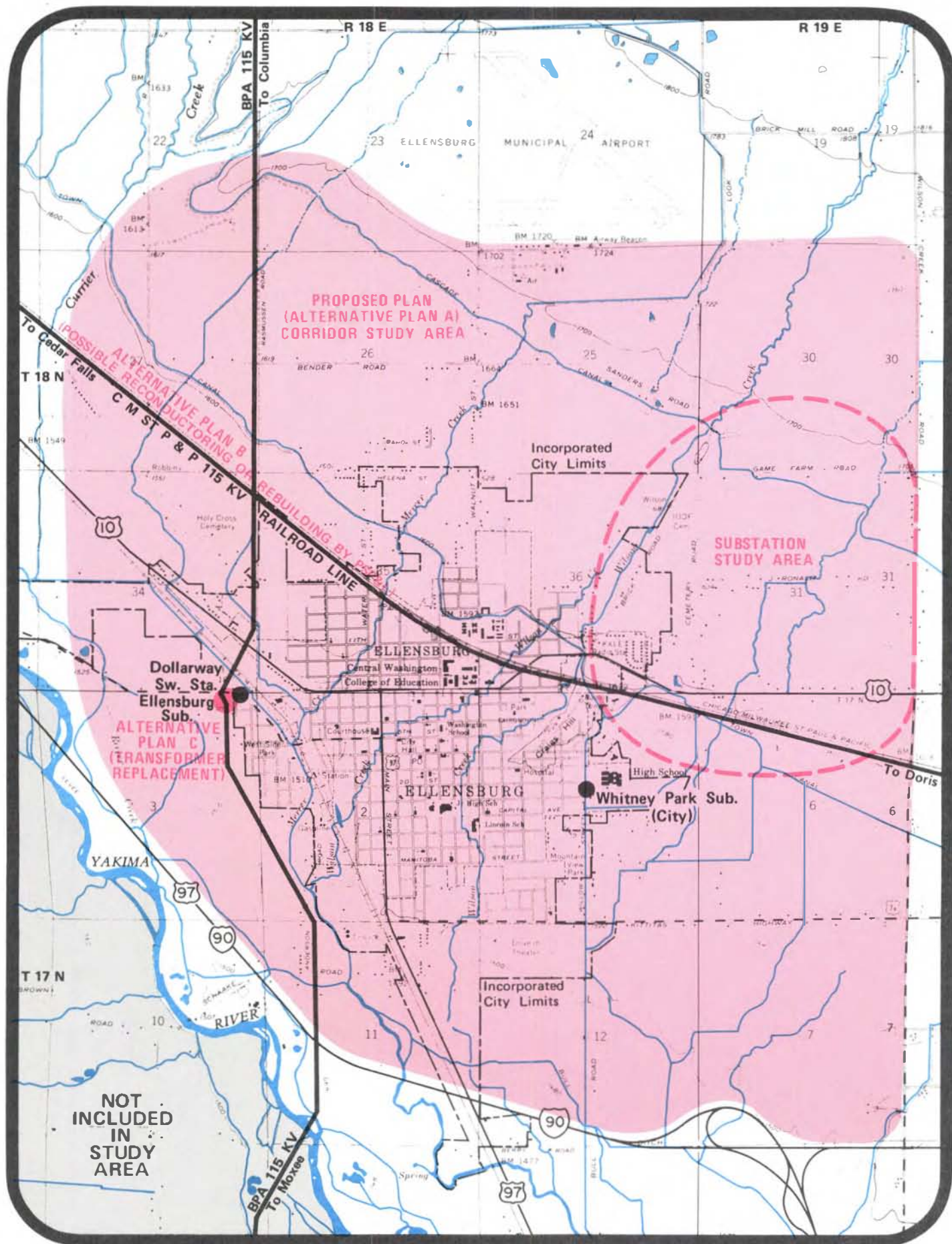


FIGURE 1
PLANNING STUDY AREA
ELLENSBURG SERVICE
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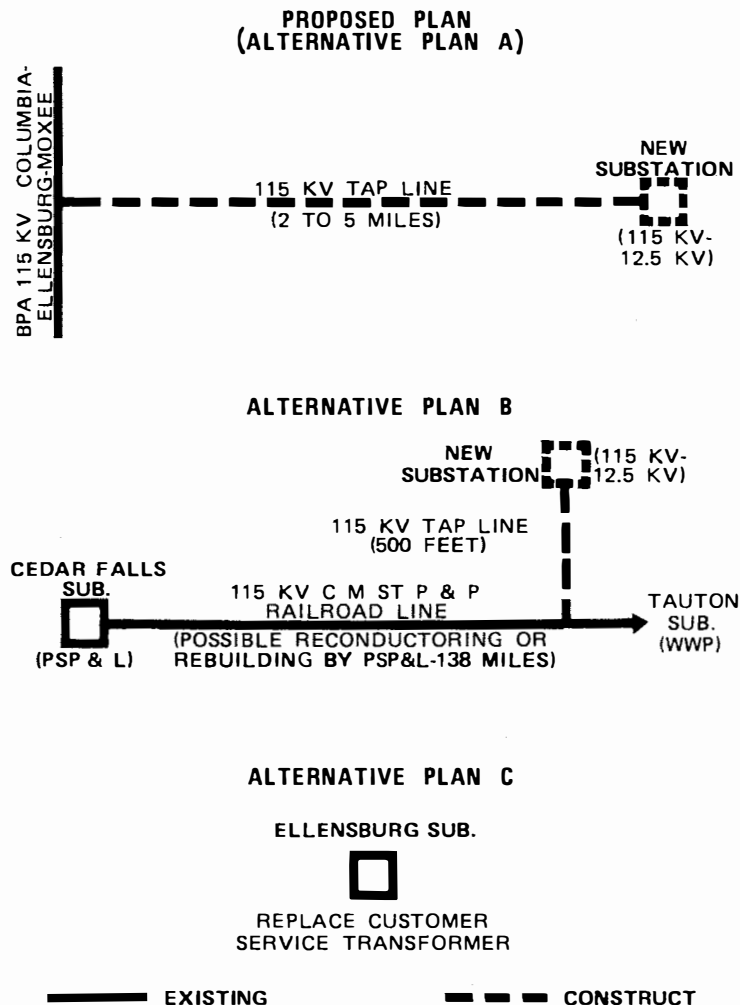
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utilizing up to 30 tons of aluminum conductor. If the transmission line is routed along the railroad corridor, or through the city, very little, if any new easement would be required. Otherwise, a right-of-way approximately 50 feet wide would be required utilizing from 12 to 30 acres of easement. Audible noise levels for the 115-kV transmission line when energized, will be below ambient and for all practical purposes are not detectable above natural background noise (leaves rustling, wind blowing, traffic passing on a road, etc.).

FIGURE 2 PLANS CONSIDERED



Construction of the 2-acre substation will include grading and surfacing the site, installation of metal chain-link fence around the periphery, placement of concrete footings and metal equipment, including transformers, power circuit breakers and associated electrical switching gear. Audible

Ellensburg Service
Study Area 79-2

noise levels for a 20,000/33,000-kV 115-12.5-kV transformer when energized will be about 49 dB(A) measured at a distance of 100 feet from the noise source, 43 dB(A) at 200 feet and, 37 dB(A) at 300 feet. These noise levels are within the requirements of the State of Washington Maximum Environmental Noise Levels (WAC 173-60).

Maintenance requirements typical for transmission lines and substation facilities are outlined in Appendix B, Chapter VII, Sections A and B of The Role of BPA in the Pacific Northwest Power Supply System, Including Its Participation in the Hydro-Thermal Power Program (Role EIS).

Detailed facility design and location requirements will be discussed in the facility location supplement.

ALTERNATIVE PLANS CONSIDERED

In the draft facility planning supplement, three alternative plans of service were identified for this project; one of them (Alternative Plan A) was selected and is now presented as the proposed plan. Alternative Plans B and C are described as follows (see figures 1 and 2):

Alternative Plan B

Alternative Plan B for Ellensburg Service would involve the construction of a new 115-12.5-kV East Ellensburg Substation served by a short (approximately 500-foot) 115-kV tap line that would interconnect with the Puget Sound Power and Light Company (PSP&L) 115-kV line, formerly owned by the Milwaukee Railroad. This existing line is routed along the railroad, through the city and interconnects with PSP&L's Cedar Falls Substation to the west and the Washington Water Power's (TWWP) system to the east. The substation in Plan B would have the same physical and electrical characteristics as the substation described in the Proposed Plan.

PSP&L was granted Federal Power Commission (FPC) approval to acquire the 138-mile Taunton-Cedar Falls 115-kV line from the Milwaukee Railroad. PSP&L's purchase of the Milwaukee Railroad transmission line was approved by the FPC on July 1, 1977. This prompted BPA to initiate discussions with PSP&L as to the possibility of utilizing their facility for transfer service and thereby deferring BPA's construction of a direct service tap line. There are several engineering and power management matters that need to be resolved before BPA and PSP&L can arrive at a satisfactory agreement. Until this happens, Plan B can not be considered feasible. BPA will continue discussions with PSP&L. If satisfactory transfer agreements can be worked out, Plan B would be selected as the Proposed Plan. This would delay the construction of the direct service tap line associated with the Proposed Plan (Plan A).

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It is essential that BPA proceed with the filing of the Facility Location Supplement at this time in order that the project can be energized by the fall of 1979.

Alternative Plan C

Alternative Plan C consists of BPA replacing an existing transformer bank at Ellensburg Substation with one of the larger capacity and the City of Ellensburg building several additional 12.5-kV distribution feeder lines.

Construction of facilities for Plan C would include the removal of the existing transformer and replacement with a unit rated 20,000/33,000 kVA. Modification to existing bus work and other substation equipment may be required to accommodate the higher-capacity transformer. Operating audible noise levels of the new transformer would be the same as those listed previously for the Proposed Plan.

PLAN OF SERVICE DECISION

Alternative Plan A (new 115/12.5-kV East Ellensburg Substation and 2 to 5 mile 115-kV tap line) has been selected as the proposed plan of service. The following is a summary of the principal factors used in the selection of the proposed plan:

Cost and Economic Considerations

A joint cost and economic study conducted between Bonneville and the City of Ellensburg determined that Proposed Plan (Alternative Plan A) has approximately \$310,000 less annual costs^{1/} than Alternative Plan C. This study covered the 10 year period from 1978 through 1987. Revenue received from the sale of power over either of the alternative plans is adequate to recover costs. Net BPA revenues (annual revenues minus annual costs) for the Proposed Plan is estimated at about \$2.5 million. A cost comparison of Alternative Plan B has not been provided because BPA has not concluded negotiations with PSP&L concerning the possibility of utilizing their facility for transfer service.

Engineering Factors

These alternative plans were developed through a joint study between Bonneville and the City of Ellensburg. Use of a transmission plan (Proposed Plan) rather than the use of a distribution plan (Alternative Plan C) is more efficient and saves approximately \$70,000 in power losses during the 10 year study period. Further, the Proposed Plan provides adequate service to the area through and beyond the study period and increases the reliability of the distribution service to the City of Ellensburg.

Environmental Factors

The degree and likelihood of environmental impact associated with the construction of facilities in the Proposed Plan are relatively similar to those of the other alternatives at this stage in the environmental

^{1/} Annual costs include the capital investment for electrical facilities, interest on the capital investment, operation and maintenance expenses, and amortization of the capital investment over a reasonable period of years. Congress has established 50 years as the repayment period for power facilities at the projects (dams and generating equipment) and a reasonable period of years (40 years now used) for the transmission system, both periods commencing with the date of completion of each facility.

statement process. Refer to Figure 6 for a plan-by-plan comparison of potential impacts to important resources of the area.^{3/} The specific impacts of the proposal are described in "The Potential Impacts of their Routes and their Mitigation" and "The Environmental Impacts of the Proposed Substation Site and Its Mitigation" of this document (pages 30-62).

Alternative Plan C (transformer replacement at the existing Ellensburg Substation), is a short term solution and within 5 years, additional facilities similar to those in Proposed Plan would be required. Alternative Plan B would delay the construction of the direct service tap line associated with the Proposed Plan. Therefore, adoption of the Proposed Plan in 1979 would minimize the future requirements for additional facilities and related environmental impacts. Esthetics and Urbanized Land Use are the resource uses most likely to be impacted by construction of the new facility. More ownerships and, therefore, more people would be affected in these resource classifications. Primary impacts within these categories include: temporary physical disturbances (noise, dust, etc.) resulting from construction activities; adverse affect on the desirability of adjacent land for residential development; visual intrusion of the transmission line and power substation; and possible audible noise, TV, and radio interference from energized facilities.

Public and Agency Comments and Compatibility with State and Local Planning

A public meeting was held at Ellensburg, Washington, on July 19, 1976, to present these plans to the public. No adverse public comments were received. No comments were received from Federal, state and local agencies concerning plan differences and their compatibility with local land use and comprehensive plans of the area. Sierra Club was the only privately-sponsored environmental group that provided comments. These were responded to in the appendix of the facility planning supplement.

Consideration of the above factors indicate that the Proposed Plan (Alternative Plan A) is more economical, the superior engineering plan as compared to Plan C, and a better long-range environmental plan. All public and agency comments received during the review process were considered in the selection of the Proposed Plan.

^{3/} In interpreting the potential impacts of Alternative Plans B and C, it should be noted that only those impacts associated with initial facilities have been evaluated. The environmental analysis does not include impacts of future facilities for Plans B or C which would be similar to the Proposed Plan.

DESCRIPTION OF THE ENVIRONMENT

PLANNING STUDY AREA

The planning study area (fig. 1) describes the area which encompasses all resources of significance which could influence the planning and location of facilities. Included within the planning study area are two smaller regions referred to as the corridor study area and substation study area.

The corridor study area is the area which encompasses the feasible route locations required for transmission line facilities. It is determined based on an analysis of the planning study area resources and first approximation evaluation of routes between the substation study area and the source of generation of the Columbia-Ellensburg-Moxee transmission line. The substation study area encompasses all potential substation sites, as well as, affected resource and resource uses.

Geography

The Ellensburg planning study area is located in Kittitas County, south-central Washington approximately 28 miles north of Yakima and 31 miles southwest of Wenatchee. Located in the central portion of the Kittitas Valley, the study region is about 9 square miles in area. Basically, it encompasses the entire community of Ellensburg with a population of approximately 14,000. The elevation varies from around 1,500 feet near the Yakima River, the southwestern corner of the planning study area, to over 1,800 feet in the northeastern corner (fig. 1).

The East Ellensburg substation study area is located in the eastern section of the planning study area. Today, the predominant land use is agricultural with areas adjacent to the highways and in the southwestern section of the substation study region largely residential. The Lower Kittitas County Comprehensive Plan anticipates that the land use for the entire substation study area will be either urban or suburban residential. These land use classifications do not preclude the construction of power substation and transmission facilities. The use of appearance structures and substation landscaping considerations will be evaluated during the facility location stage. The substation study area covers about 1,300 acres.

Climate

The climate of the planning study area is best described as semi-arid. Although most precipitation results from moist marine air masses that move in from the Pacific Ocean, the study area is distinguished by a low annual precipitation because it is in the rain shadow of the Cascade Mountains (table 1). The mean annual precipitation is 8.86 inches, with approximately 13 percent or 1.19 inches received during the summer months of June, July, and August. During the warm season, precipitation, frequently occurs as showers and is associated with thunderstorm activity. During the 6-month period from October through March, about 69 percent or 6.15 inches of

precipitation are normally observed. The planning study region typically receives about 31.4 inches of snow annually. This represents about 25 to 30 percent of the mean annual precipitation total. Snow can be expected by the first of December and a few inches will normally remain on the ground for periods ranging from a few days to several weeks between mid-December and the end of February.

Daily and annual temperature fluctuations can be considerable with cold winters and hot summers characteristic of the study area (table 1). Recorded temperature extremes for the region are a maximum of 107°F and a minimum of -29°F. The frost-free growing season is about 150 days per year.

Table 1. - Representative Climatological Data (1931-1960)

Characteristic	Ellensburg Station
Mean Maximum/Minimum January Temperature	35.2/19.3°F
Mean Maximum/Minimum July Temperature	83.9/52.8°F
Mean Annual Temperature	47.7°F
Mean January Precipitation	1.26 in.
Mean July Precipitation	0.13 in.
Mean Annual Precipitation	8.86 in.

Source: Meteorology Committee, PNRBC 1969, Climatological Handbook.

NATURAL RESOURCES

The following sections describe natural resources present, and their geographic location and distribution within the planning study area. Man's use of natural resources will be presented under the section, "Resource Use and Social/Economic Resources".

Geology and Soils

The planning study area lies in the Yakima Folds section of the Columbia Basin Physiographic Province (Highsmith 1973).^{1/} This province is characterized by the extensive Columbia River Basalt formation of middle to late Tertiary age which underlies the entire region to great depths. The Yakima Folds result from the deformation of this Columbia River Basalt into anticlinal ridges and closed basins during the Pleistocene epoch (McKee 1972). The major streams of the region deposited coarse, heavy sediments in the depressions while cutting deep, steep-walled canyons through the ridges (CNP Staff 1970). The deeper basins, such as Kittitas Valley, were probably flooded during glacial times and thick deposits of silty to sandy sediments accumulated. Since the disappearance of these glacial flood waters, windblown materials have blanketed most of

^{1/} References are cited using the author-date system. Refer to the "References" section for the complete citation.

the region. Much of the soil throughout the area has developed from the interaction of this wind-deposited mantle with the glacio-fluvial materials previously deposited (CNP Staff 1970).

A few earthquake epicenters with Richter magnitudes of 5.0 or less have been recorded within a 50-mile radius of the planning study area. Seismic intensities anticipated from earthquakes of the magnitude experienced near the study region do not exceed IV on the Modified Mercalli Scale (Shannon and Wilson 1972).

The soils throughout the planning study area were formed under a bunchgrass vegetative complex from loessial and glacio-fluvial materials. In general, this has resulted in soils of sandy to clay loam texture of variable depth.

These soils all have heavy loam or clay loam subsoil which impairs the internal drainage (CNP Staff 1971). The soils have developed under scant rainfall and are relatively fertile due to the high mineral content. They are very suitable for agricultural production provided sufficient water is available for irrigation. The loose, crumbly nature of the dry soil makes for easy wind and water erosion in areas where the soil is exposed through cultivation or other disturbance. Frost action can be a problem in exposed areas.

Hydrology

The Ellensburg Service Planning Study Area is situated in the central portion of a basin that has a northwest to southeast orientation. This basin, referred to as the Kittitas Valley, is drained by the Yakima River in the southwestern corner of the study area (fig. 1). The mean annual flow for this river at Umtanum (10 miles downstream from Ellensburg) is 2,325 cubic feet per second (CNP Staff 1970). Currier, Mercer and Wilson Creeks are streams of lesser importance in the planning study area that drain the southeast-facing side of the Kittitas Valley. Town and Cascade Canals cross the planning study area in a general northwest to southeast direction and provide irrigation water for the surrounding agricultural land. In addition to these features, several small lakes and streams are included in the planning study area. In general, the surface water resources of the region provide an adequate supply of irrigation water for the planning study area.

The hydrologic characteristics of the planning study area watershed are typical of streams east of the Cascade Range. The majority of the runoff results from the melting of the accumulated snowpack in the higher mountains. The annual peak flows normally occur in May and June. Flows then decrease through the summer and fall responding somewhat to early winter rains and mid-winter snowmelt events. The groundwater table in Ellensburg Valley during the irrigation season is rather shallow due to inputs from irrigation water but drops during the fall and early winter as the soil mass drains. Winter floods generally occur from December through February when there is a snowpack in the valley and a warm air mass, possibly accompanied by rain, moves through the valley. Runoff is rapid and, because of the low gradients, affects large areas. Frozen soils, inadequate channel capacities, and saturated soils can aggravate the flooding problem considerably (JARA 1975).

While winter floods are not uncommon, high spring flows are an annual event requiring only a snowpack and normal spring temperature. High flows become of concern only when they exceed the capacity of the existing channel and overflow onto adjacent lands. A substantial portion of the planning study area is subject to occasional inundation by these flood waters (JARA 1975). This occurs primarily in the areas of lower elevation along the Yakima River flood plain. Careful consideration, including special construction, would have to be given to any facilities located in this flood susceptible zone.

The principal aquifer unit which underlies the planning study area consists of glacio-fluvial materials that form valley fills along most of the streams and extensive basin fills in the Kittitas Valley. The thickness may exceed 500 feet at some places. Gravels that are tightly cemented yield little water, but properly located and constructed wells in the unconsolidated or lightly cemented sand and gravel can yield several hundred gallons per minute (CNP Staff 1970). Municipal and rural domestic water supplies rely primarily on these underground resources (JARA 1975).

Vegetation

Nearly all of the natural vegetation in the study area has been displaced by irrigated cropland or other land development. A very limited number of ornamental trees are found near farms and urban residential areas. Major species include elms, black locust, cottonwood, poplars, and willow; with willow being the dominate native species. Roadside shrubs, weeds, and grasses make up the remainder of the vegetation. Principal natural species include bunchgrass, sagebrush, rabbitbrush, bitterbrush, and hopsage (JARA 1975).

Wildlife

Aquatic wildlife habitat within the planning study area consists of the Yakima River, several smaller streams and canals, and several ponds. The Yakima is a high priority river in Washington having medium to high aquatic wildlife diversity (U.S. Army Corps of Engineers 1975, fig. 3). Both anadromous species, e.g., steelhead and salmon; and resident species, e.g., rainbow trout and bass, inhabit the Yakima. Most of the other water bodies in the study area contain resident fish populations.

Waterfowl, including several species of ducks, geese, and waterbirds utilize the aquatic and riparian habitat; however, no large waterfowl concentration areas are present. Osprey are occasionally seen along the Yakima River. Fur-bearing animals, muskrat and otter, are found along the water course.

Most of the land outside of the Ellensburg urban area consists of irrigated cropland habitat. This habitat contains fair populations of upland game birds including ring-necked pheasant, California quail, and mourning dove. Characteristic songbirds include horned lark, killdeer, redwinged blackbird, meadowlark, and magpie. Birds of prey include redtailed, marsh and sparrow hawk, and possibly the endangered American peregrine falcon (FWS 1974). Several small mammal species including jackrabbits, cottontails, and ground squirrels are found throughout the study area. Cover is limited primarily to riparian vegetation and consequently larger mammals such as deer are scarce.

Other Natural Resources

There do not appear to be any other significant natural resources within the study area.

RESOURCE USE AND SOCIAL/ECONOMIC RESOURCES

The following sections relate man's use of the natural resources previously described.

Population Characteristics

The population of Ellensburg was 13,568 in 1970 (table 2). This was a 57.3 percent increase over the 1960 population and more than double the growth rate experienced by Kittitas County as a whole. This increase is largely attributed to the growth of Central Washington State College which is located in Ellensburg and provides a large number of jobs for the local population. Of the city's total 1970 population, 43 percent were enrolled in the college. In the immediate future, population gains will be a direct consequence of the growth of the college. The planning study area population density is about 1,507 persons per square mile or 2.36 persons per gross acre.

Table 2. - Population Statistics

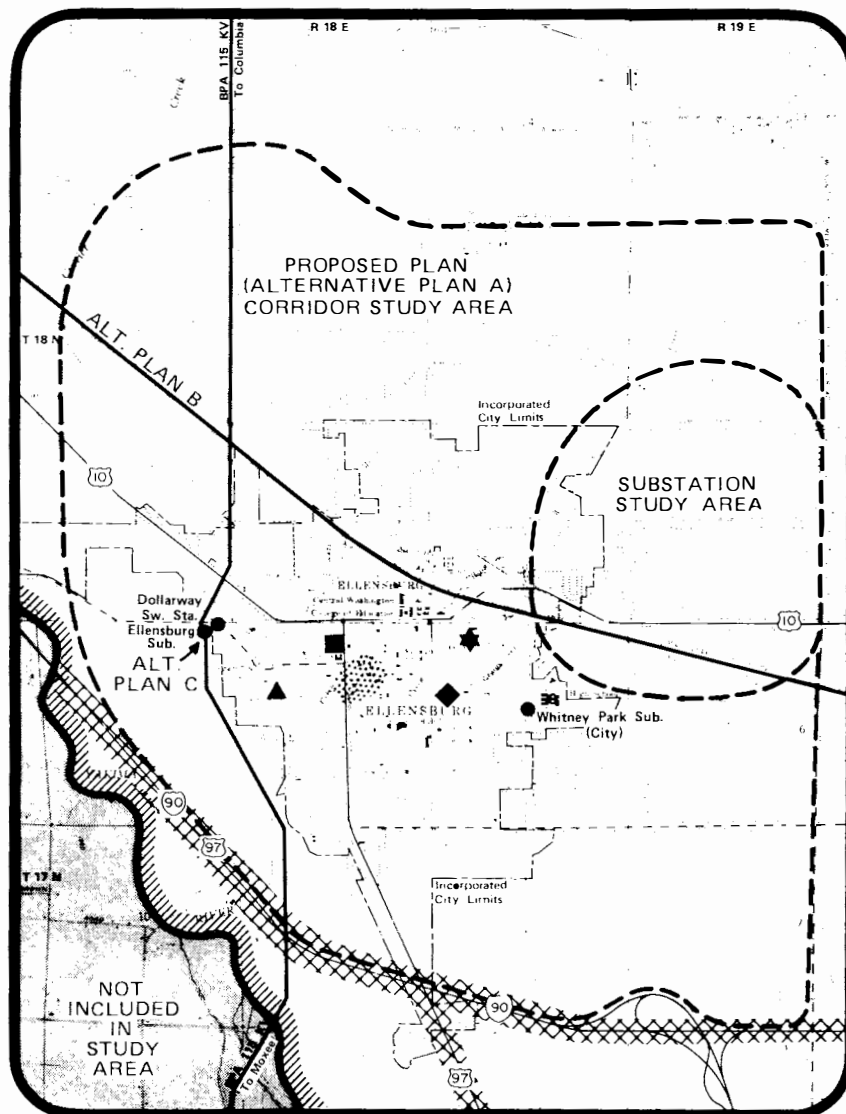
Location	1940	1950	1960	1970	Percent Change Between 1960 & 1970
Kittitas County	20,230	22,235	20,467	25,039	22.3
Ellensburg	5,944	8,430	8,625	13,568	57.3

Source: U.S. Bureau of Census, 1970, Vol. 1, Characteristics of the Population Part 49, Washington, 910 pages.

Agriculture

Agriculture is the third largest employment category for Kittitas County, preceded only by educational services and retail trade (Load Study 1974).

Beef cattle is the major farm product marketed in Kittitas County. Three main irrigation canals: Town Canal, Cascade Canal, and North Branch Canal supply water to the study area. An uninterrupted flow of irrigation water has been delivered since 1932. Ranchers have upland dry grazing land and require irrigated hay and pasture in the low lands to complete their farming units. Alfalfa hay is the major crop grown. Typical production is 5 to 6 tons of alfalfa hay per acres. This production compares favorably with irrigation production on lands in the Columbia Basin in a similar climatic zone. The average size cattle ranch is approximately 800 acres. Average size irrigated farm is about 75 acres.

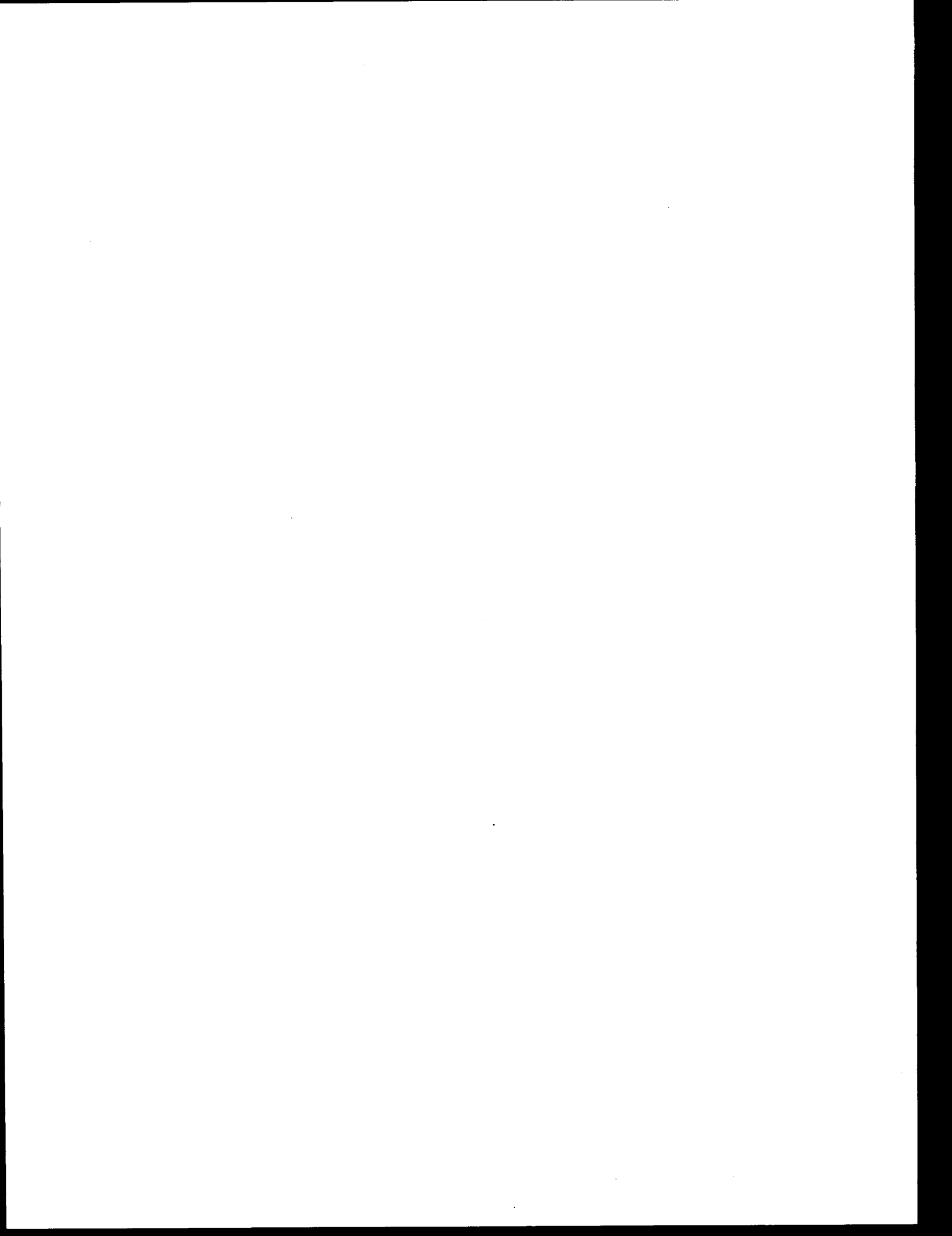


- XXXX SCENIC ROAD
- ~~~~~ HIGH PRIORITY RIVER WITH MEDIUM QUALITY WILDLIFE DIVERSITY
- ▲ RAILROAD DEPOT (BURLINGTON NORTHERN)
- MASONIC TEMPLE
- ★ ELLensburg RODEO AND KITTITAS COUNTY FAIRGROUNDS
- ◆ CASTLE APARTMENTS (PROPOSED GOVERNOR'S MANSION)
- HISTORIC PROPERTIES (ELLENSBURG BUSINESS AREA)

SOURCES:

State of Washington Highway Dept., "Utility Accomodation Policy";
 U. S. Army Corps of Engineers 1975; Statewide Inventory of Historic Places.

FIGURE 3
IMPORTANT RESOURCES
ELLENSBURG SERVICE
 78-2



Forestry

There are no forest related lands or activities located within the study area.

Urbanized Land Uses

The study area includes the entire city of Ellensburg and its adjacent areas. The distribution of land use is shown in figure 4.

A comprehensive plan for Kittitas County was approved by the Kittitas County Planning Commission on November 15, 1971 and adopted by the Board of County Commissioners on June 5, 1972. This plan is consulted for all requests for zoning changes. Figure 5 illustrates the land use planned within the study area. The plan indicates that the study area will be almost completely developed with urban land uses. Most of the substation study area is, in fact, zoned for suburban land use. However, these zoning classifications do not preclude the construction of power substation or transmission facilities. The use of appearance structures and substation landscaping considerations will be evaluated during the facility location stage.

Esthetic

Visually, the study area is dominated by urban and rural residential development situated on the broad floor of Kittitas Valley. Agriculture provides changing land patterns which visually enhance this area. There is little vertical relief except along the Yakima River and in the hills in the background which border the valley. The flatness and openness of the landscape is emphasized by the lack of natural vegetation.

Undeveloped areas of riparian vegetation along the Yakima River and small creeks and canals offer some of the most scenic locations in the study area. Much of this land has been designated as "community park" in the Kittitas County Comprehensive Plan.

Interstate 90 and U.S. Highway 10, which parallel the Yakima River in some portions, has been given a "BX" classification by the 1974 State of Washington Highway Department "Utility Accommodation Policy". U.S. Highway 97 has been given a "B" classification. Class "B" includes areas where valuable scenic and environmental amenities exist and are enjoyed by the public and deserve serious consideration for preservation and protective measures. Sub Class "X" includes areas where based on design alternatives, such as configuration, color and location, an aerial facility could be allowed without changing the landscape quality. These qualifications are based on the scenic value of the view from the roadway and will be given careful consideration in the location and design of transmission facilities.

Refer to the section on Other Resource Uses and Social/Economic Resources for 1976 traffic flow data relating to the above mentioned transportation systems.

Recreation

The entire area is designated a potential recreational development zone (CNP). Popular pastimes include photography, bicycling and driving for pleasure, fishing, and other river-oriented activities along the Yakima. The study area is within the most popular subregion in the State for hunting upland game. Within Ellensburg, recreationists enjoy local parks and events at Ellensburg Rodeo and Kittitas County fairgrounds, the most popular event being the annual rodeo held on Labor Day Weekend.

U.S. Highway 97 is identified as a scenic route south of Ellensburg and the Yakima, a recreational river (CP). U.S. Highway 10 and 97 are often used by local residents and tourists.

Cultural Resources (Historical, Architectural, and Archeological)

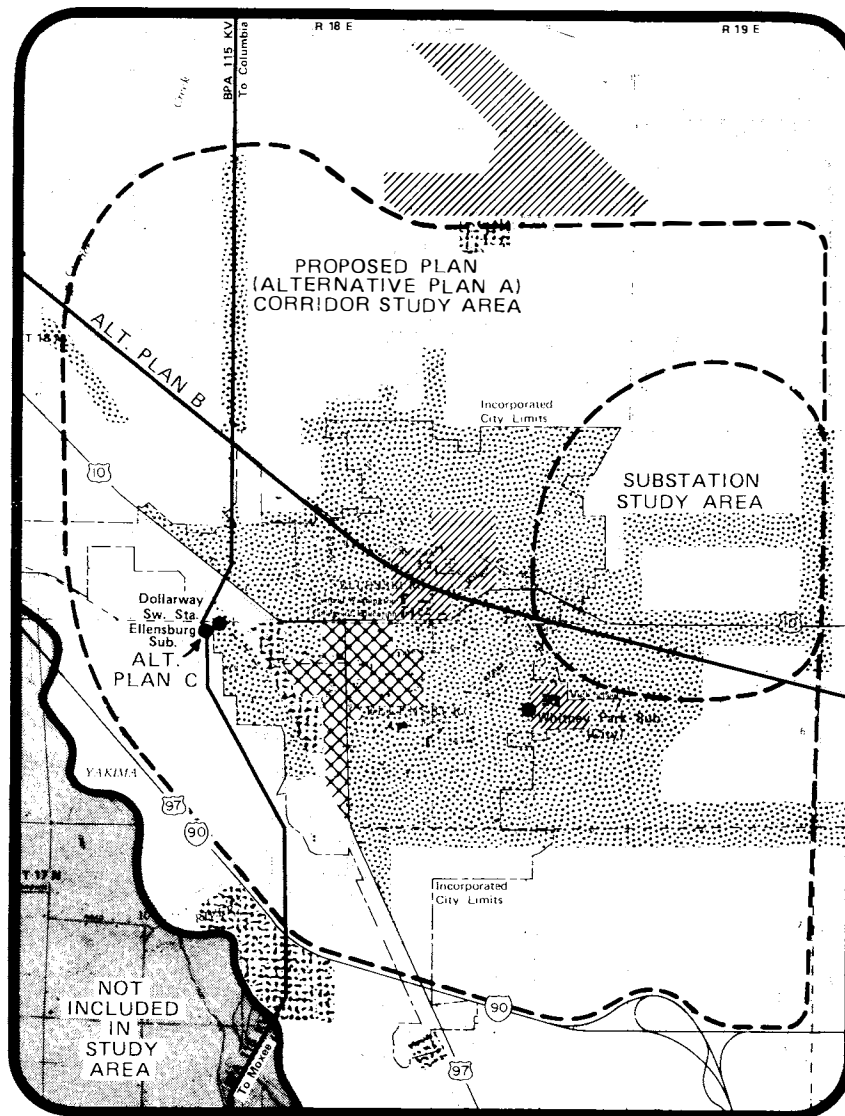
The National Register of Historic Places and subsequent monthly addenda through November 29, 1977, have been reviewed. National Register Addendum Vol. 42, No. 148, dated August 2, 1977, lists the Ellensburg Historic District bounded by Third and Sixth Avenues and Main and Ruby Streets on being an addition to the National Register. This is the only National Register property located in the planning study area.

Consultation with the Washington State Advisory Council on Historic Preservation has confirmed that there are no other registered national historic sites within the study area. The Statewide Inventory of Historic Places lists a total of 38 historic buildings in the Ellensburg business area. These properties commemorate local history, development, politics, art and education, and commercial activities.

Included in this inventory are Robbers Roost Site, important in the community as a local historical site; the Norling Mural, a locally significant painting; a lodge building, bank, city hall; and the remaining buildings are characterized as commercial. Other properties of historical significance within the city limits include the Ellensburg Rodeo and Kittitas County Fairground Arena.

Consultation with the Washington Archeological Research Center indicates no known archeological sites. However, a systematic survey has not been made of this area. A professional archeological review will be made at the facility location stage.

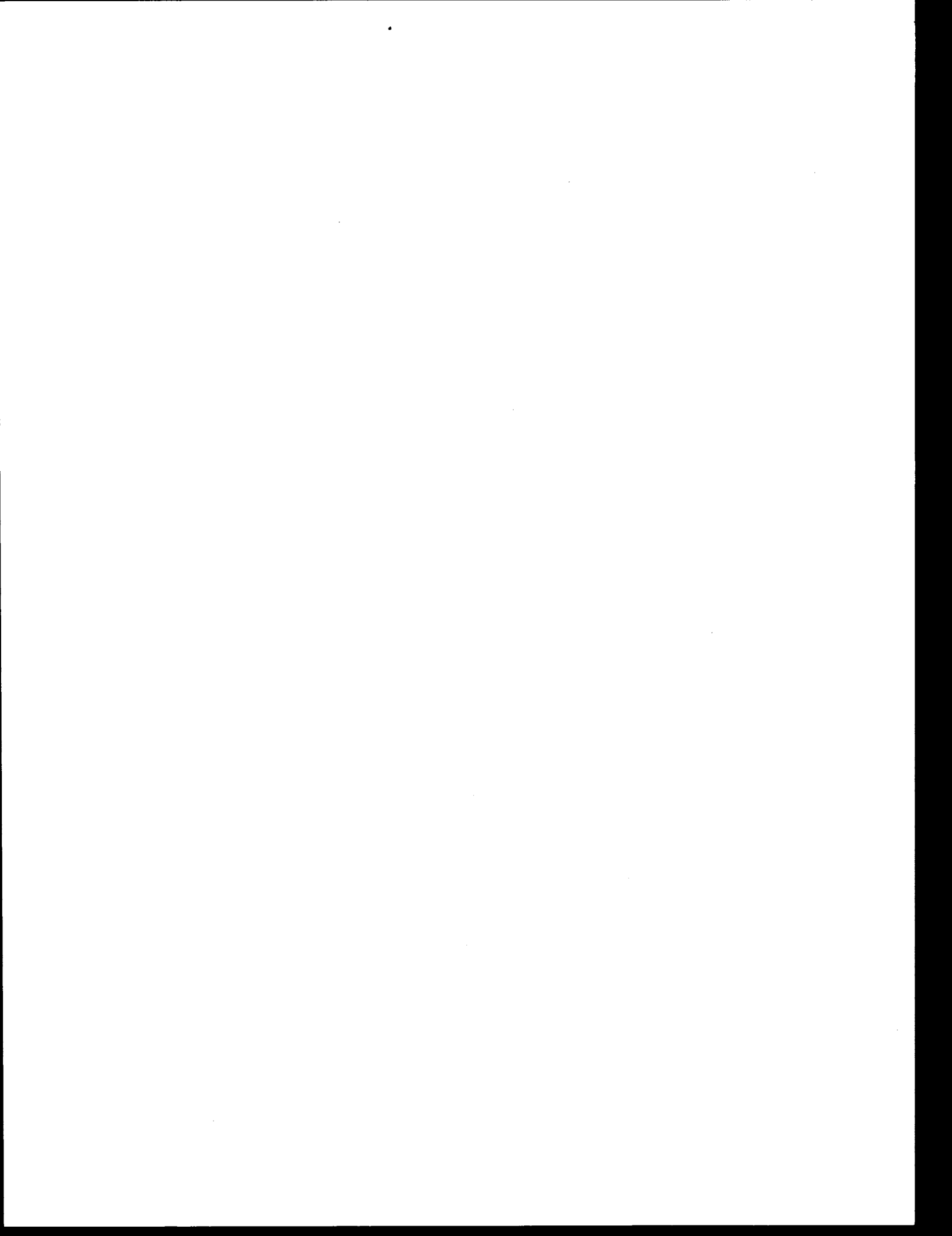
BPA will comply with the requirements of the National Historic Preservation Act of 1966 (P.L. 89-665), as well as Executive Order 11593. Procedures applicable to these laws are described in Section XII, Historic and Archeologic Appendix to the Fiscal Year 1979 Program Statement.

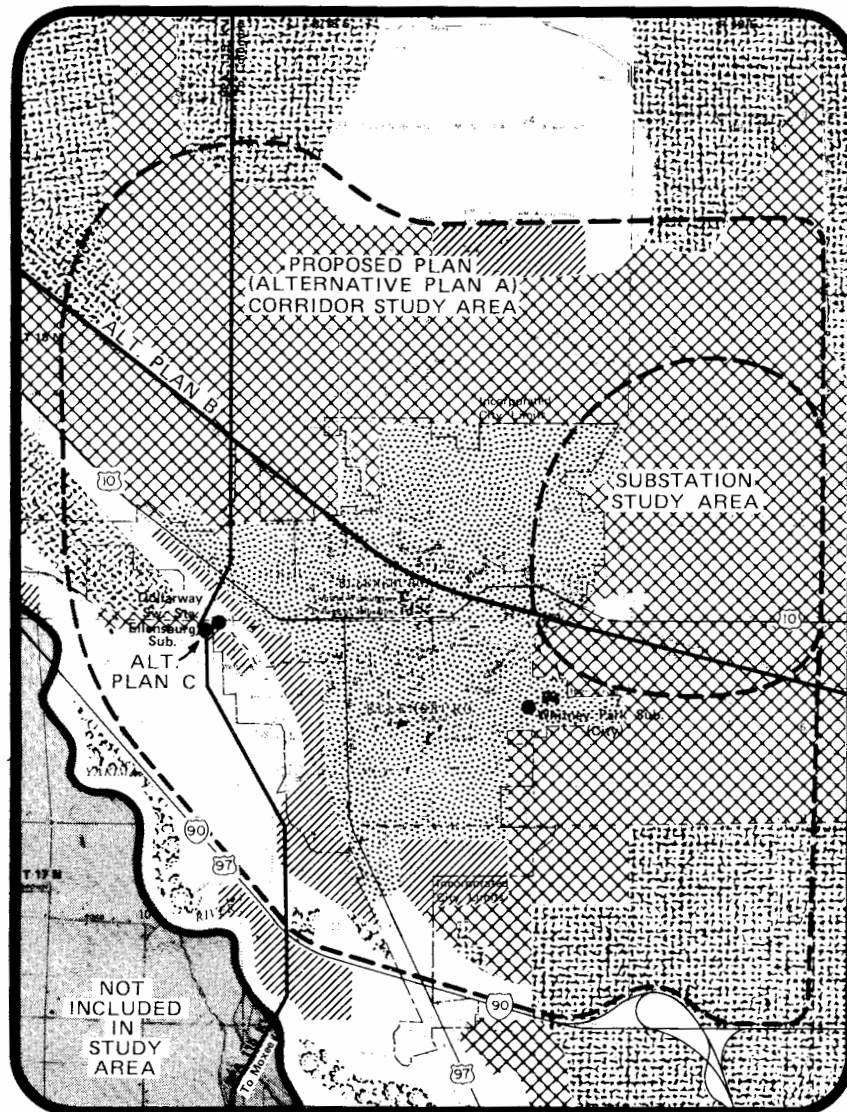


- RESIDENTIAL
- COMMERCIAL
- INSTITUTIONAL & PUBLIC USE
- INDUSTRIAL
- AGRICULTURE, RURAL RESIDENTIAL & OTHER

SOURCE:
Aerial Photography, February 20, 1973.

FIGURE 4
GENERALIZED LAND USE
ELLENSBURG SERVICE
78-2

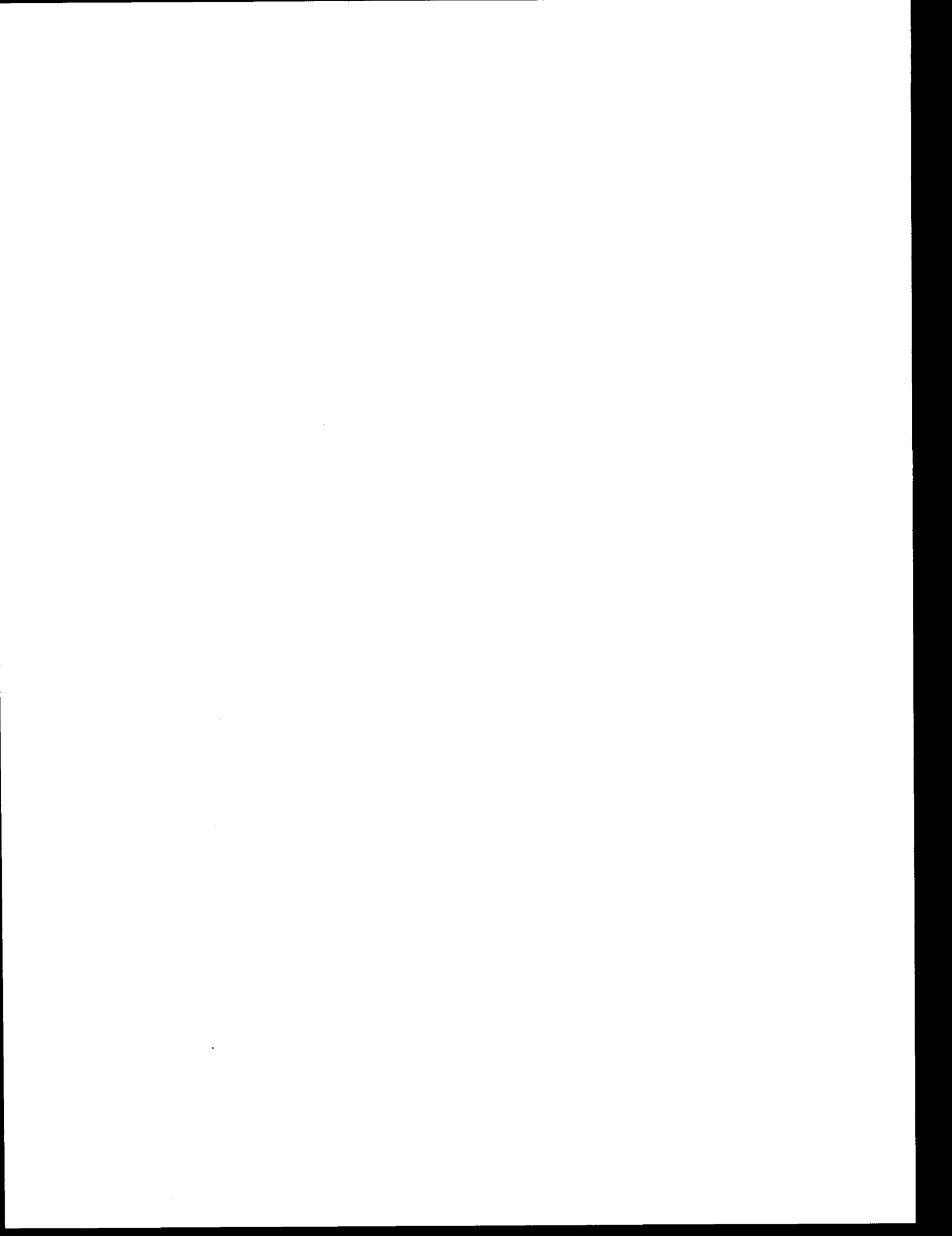




EXISTING URBAN LAND
 URBAN RESIDENTIAL & SUBURBAN
 AGRICULTURE
 INDUSTRIAL
 COMMUNITY PARK

SOURCE:
 Lower Kittitas Co. Comprehensive Plan
 Map June 5, 1972.

FIGURE 5
 PLANNED LAND USE
 ELLENSBURG SERVICE
 78--2



Other Resource Uses and Social/Economic Resources

Major transportation routes within the study area include U.S. Highway 10 and 97. Interstate 90, which crosses the southern and western edge of the study area, averaging 13,200 vehicles per day usage, is the principal eastwest highway across the northern part of the United States. U.S. 97, averaging 8,000 vehicles per day usage, is a main north-south highway through central Washington. U.S. Highway 10 has an average daily traffic flow of 1,000 (Washington State Department of Highways, 1976). Numerous other smaller roads provide uniform access to most parts of the area. Two intercontinental railroads providing freight service to Ellensburg also cross the study area, the Burlington Northern, and the Chicago, Milwaukee, St. Paul and Pacific. Other important occurrences include Ellensburg Municipal Airport in the northern part of the study area and Wilson Creek Cemetery about 1 mile northeast of Ellensburg.

Mineral production in Kittitas County in 1969 was valued at approximately \$1.2 million. Minerals produced in order of value were: sand and gravel; stone; clays; and pumice (BPA and City of Ellensburg Plan of Service study, 1974).

P L A N O F S E R V I C E A N A L Y S I S

POTENTIAL IMPACT OF THE PROPOSED PLAN OF SERVICE

The draft facility planning supplement was submitted for public and agency review in June 1976. At that time, a plan of service had not been decided upon. Subsequent to that review, BPA has identified Alternative Plan A as the Proposed Plan. The following discussion of impacts relate to that plan. The remaining Alternative Plans B and C retain their original letter designations and are still discussed under "Alternatives of the Proposed Plan of Service."

The potential impacts to the environment from the proposed plan of service are described in this section.

A more complete discussion of impacts typically associated with transmission facility construction and maintenance can be found in Appendix B, Chapters V, VI, and VII of the Role EIS. In addition, impacts to resources and resource use which have been identified as highly important will be summarized graphically in the section "Summary of Plan of Service Analysis." (See pages 25 to 29 of this document.)

Natural Resources

Geology and Soils - No impacts to the geology of the study area are expected from the construction of the Proposed Plan. In general, the impacts to the soils in the corridor and substation study areas should be minor. Compaction would be a problem where heavy construction equipment crosses agricultural land. Some wind and/or water erosion will undoubtedly occur in construction areas where the soil is exposed for any length of time. Although there normally is not enough excess moisture in this semi-arid environment for water erosion to be a serious problem, the occasional spring and late fall flooding that does occur can remove a considerable amount of soil if it is not properly protected. The ground is frozen for much of the winter. However, spring and fall can be critical times because frost action can cause soil disturbances, especially where the soil is exposed.

Because the transmission line for the Proposed Plan will most likely utilize existing roads, field lines, irrigation ditches and/or utility corridors, construction of new access roads is expected to be minimal. Thus, impacts to the soil resources would be limited to the placement of 10 to 40 pole-type structures, conductor stringing and tensioning operations, construction of a few new access roads, and grading and earth work required to construct the 2-acre substation. The mitigating measures normally taken by BPA to keep impacts to a minimum while constructing these facilities are discussed in BPA's Role EIS, Appendix B, Chapter VIII, Section A.2.

Hydrology - The irrigation canals in the corridor or substation study areas are not expected to be adversely impacted by construction of the facilities for the Proposed Plan, provided proper location siting techniques are utilized. Irrigation waterways and agricultural drains can be spanned with proper location and installation of poles.

Some turbidity may result from possible construction crossings at streams and roadside drainages in the study area. Wilson and Mercer Creeks are the main streams that could be impacted by transmission line construction. If construction activities require crossing these waterways, State and local water quality standards will be maintained. Mitigating measures taken by BPA to reduce water quality impacts are discussed in Appendix B, Chapter VIII, Section A.3. of BPA's Role EIS.

Vegetation - In the Proposed Plan, if a route around the city is taken, clearing would be limited to individual or isolated groups of trees in the route path which would interfere with the construction or operation of approximately 5 miles of transmission line. Temporary disturbance of vegetation could be expected at guy anchor placements, structure sites,

conductor stringing and pulling sites, crane sites and access roads. Permanent loss of vegetation material would occur at approximately 40 pole sites and at the 2-acre substation site. If a route along the railroad corridor or through the city is taken, approximately 2 miles of transmission line construction will be required. Impacts to vegetation in this case would be relatively minor, limited primarily to the building of access roads and temporary disturbance from construction activities.

The spread of noxious weeds could result from disturbance of soil by equipment during transmission line construction. Noxious weeds are plants designated by weed control agencies as a hazard, nuisance or injurious to man, animal or desired crops. Russian thistle, cheatgrass and mustard are now found along road rights-of-way and disturbed areas. BPA will cooperate with local weed control districts and landowners where necessary to control this hazard.

Wildlife - The substation required in the Proposed Plan will remove approximately 2 acres of wildlife habitat. A small amount of additional habitat will be removed for construction of a permanent substation entrance road. Small mammals and birds inhabiting the area to be occupied by the substation and entrance road could experience increased mortality as a result of displacement. The overall impact on wildlife populations in the area will be low. Clearing of riparian habitat would further reduce the amount of this important habitat type, which is already limited within the area. Noise and human activity during construction could disturb individual wildlife, especially during the spring upland bird and waterfowl nesting season. No impacts are expected to any threatened or endangered species.

If a route around the city is taken, approximately 5 miles of transmission line would cross a small amount of wildlife habitat. Construction of a 115-kV transmission line through this type of habitat will cause relatively little habitat modification. A small amount of habitat could be disturbed at each structure site and any access roads that may be required would disturb additional habitat. Permanent access roads, however, are generally not required in cropland areas. A number of small streams and canals could potentially be crossed by the line. Some riparian habitat may have to be cleared at the crossing sites. Where well-defined waterfowl flight patterns exist, such as along watercourses, the line crossing may slightly alter such patterns and cause some mortality due to bird collisions with conductors. No noticeable effect on waterfowl populations is expected. No significant physical impact is expected to aquatic habitat. Construction activities could result in temporary disturbances to individual wildlife. This would be more noticeable if construction occurred during the spring upland bird and waterfowl nesting seasons. Construction of a 2-mile line along the railroad corridor could permanently remove a small amount of wildlife habitat as a result of access road construction. Some short-term physical disturbances could also occur. A transmission line built through the city would have a negligible impact to wildlife.

Ellensburg Service
Study Area 78-2

Resource Use and Social/Economic Resources

Population Characteristics - The temporary population increase expected from the construction of the facilities proposed in the Proposed Plan is estimated to be between 10 and 20 people (table 3.). These individuals will require housing for a 2 to 3 month period. Motels are normally used by construction crews if they are available. It is also estimated that some 5 to 11 temporary jobs will be available to local residents for the duration of the construction projects. If these people are not available locally, they will have to be recruited elsewhere. The potential income from these jobs to the planning study area is estimated to be approximately \$45,000. The multiplier effect of providing services and supplies to these construction personnel has not been taken into consideration,

Table 3. - Socio-Economic Considerations Related to Construction*

Considerations	<u>Proposed Plan</u>	
	Substation Construction	Line Construction
Total Number Employed	10-12	10-20
Number Hired From		
Local Area	3-6	2-5
Length of Job	2-3 months	2-3 months
Average Wage	\$8.00/hour	\$9.00/hour
Est. Potential Income to Local Area**	\$23,400	\$21,600

* Although this information is very general in nature, it is intended to provide some indication of the potential socio-economic impacts associated with substation and line construction.

** This does not take into consideration the income derived from services (i.e., food, entertainment, etc.) provided to construction crews by local businesses.

Source: Line and Substation Construction Sections, Branch of Construction, BPA.

Agriculture - If a route around the city is taken, a right-of-way easement approximately 50 feet wide would be required for the approximate 5-mile transmission line. The right-of-way alignment for the line would be selected so as to, wherever possible, parallel field lines, irrigation ditches, and utility corridors. The extent of agricultural land crossed could vary from 0 to 5 miles depending upon line location. The substation could remove approximately 2 acres of land from agricultural production depending upon final site location. Alternative line locations and substation sites will be examined in the facility location supplement. If a route along the railroad corridor is taken, impacts to agriculture would be negligible to non-existent.

Urbanized Land Use - The transmission line and substation in the Proposed Plan would be constructed in an area that is presently urbanized or most likely will be in the future. Because of the relatively low voltage, it is unlikely that the transmission line will increase audible noises, TV or radio interference. However, if residents experience television and/or AM radio interference, mitigation measures in accordance with BPA policy will be undertaken to restore reception.

The 2-acre substation may affect the desirability of adjacent land for residential development by the visual intrusion of the facilities; however, appearance measures will be evaluated to alleviate this impact. BPA's proposal will be in cooperation with the comprehensive plan for Kittitas County.

Occupants of homes will be exposed to temporary physical disturbances (noise, dust, etc.) resulting from construction operation.

Esthetic - A decision as to the transmission line design has not been made at this time. Transmission lines at 115-kV normally utilize wood-pole structures similar to those found adjacent to many roads throughout this region. Appearance improvements for these structures are feasible. One alternative being considered is to use double-circuit steel-pole structures along the railroad.

The 2 to 5-mile transmission line will be visible from several roads and adjoining homes in the study area. Visual exposure to residents and travelers is unavoidable because of the flat topography characterized by very little natural vegetation. The degree of visual impact from the line will vary depending upon the land uses adjacent to its final location.

The substation will be more noticeable than the transmission line because of the greater concentration of electrical equipment. It will be located near a road and complete screening by existing vegetation, landscaping, or topography does not appear possible. Since the load requirement is concentrated in the northeast portion of the study area, the location of the substation will not affect U.S. Highway 97 or Interstate 90. It is likely, however, that the substation will be visible from U.S. Highway 10.

Recreation - Temporary noise and dust from construction activities associated with the Proposed Plan could be annoying to recreationists involved in fishing, photography, bicycling and other forms of personal recreation.

The 2-acre substation will most likely be exposed to travelers using U.S. Highway 10. A permanent impact of this plan upon recreationists will be the visual intrusion of the line and substation.

Cultural Resources (Historical, Architectural and Archeological)

Ellensburg Historic District, the only National Register property in the planning study area is not expected to be affected by the Proposed Plan. This federal register site is approximately one mile from proposed transmission facilities. Because of intervening structures and topography, there is a very low likelihood that it will be visually affected.

The study area contains numerous historic properties included in the Washington State-wide Inventory of Historic Places. For the most part, these are grouped closely together near the city center. There is a low likelihood of impact to these inventory sites by either the transmission line or substation facility. Depending upon the location of the proposed 2-acre substation, there will be little or no effect to the Ellensburg Rodeo and Kittitas County Fairgrounds Arena, the only historical property in the substation study area. If final location of the substation is near the fairgrounds, mitigating measures as outlined in the Role EIS, Appendix B, Chapter VIII, Section B.4. will be taken to alleviate impact on this locally significant resource.

Consultation with the Washington Archaeological Research Center indicates no identified archeological sites will be disturbed by the Proposed Plan. A professional archeologic and historic review will occur at the facility location stage. Should any properties be discovered in this process, procedural steps and protective measures as described in Section XII, Historic and Archeologic Appendix, of the Program Statement would be taken. Additionally, contract specifications require that if a site is discovered during construction, work would be halted until the site has been evaluated.

Other Resource Uses and Social/Economic Resources - No significant physical impacts are expected to the resources previously described in this section. If the 2-acre substation is built in an area near Wilson Creek Cemetery, people visiting the cemetery may experience some temporary disturbances from noise and dust associated with construction activities.

ALTERNATIVES TO THE PROPOSED PLAN OF SERVICE

Potential Impact of the Alternative Plans

Natural Resources

Geology and Soils - Under Alternative Plan B, impacts to the soil environment would be similar to the line and substation construction in the Proposed Plan. Because Alternative Plan C involves the replacement of a transformer in an existing substation, any impact to soils would be negligible.

Hydrology - Potential impacts to hydrological resources associated with Plan B would be similar to those described for the Proposed Plan. The region's groundwater resources are not expected to be impacted by the construction and maintenance of the facilities for Alternative B or C. Poor drainage is a problem in some locations, because of moderate to slow soil permeability and a high water table. Standing water frequently results during times of high runoff. Special construction procedures would most likely be required during these periods.

Vegetation - Alternative Plan B would require the removal of approximately 2 acres of vegetative ground cover for the new substation facility. The tap line for Plan B would involve permanent removal of vegetation at structure pole sites, and temporary disturbance from construction operations and access roads.

The replacement of a transformer at an existing substation for Plan C would result in a negligible impact to vegetation.

Wildlife - The 500-foot tap line in Plan B would cause impacts to wildlife similar to those discussed under the Proposed Plan, but of lesser magnitude because of the shorter transmission line.

The transformer replacement in Plan C would create some short-term impacts to wildlife. These would be limited to the noise and human activity associated with the construction phase.

Resource Use and Social/Economic Resources

Population Characteristics - Alternative Plan B would probably require a temporary increase of 5 to 10 people. These individuals would require room and board for 2-3 months. It is estimated that 3 to 6 temporary jobs may be available to local residents. The potential income from these jobs to the planning study area is estimated to be approximately \$37,800. See table 4.

Alternative Plan C would require a temporary increase of 5 to 10 people. These individuals would require lodging services for approximately one month. All of the personnel needed for this project would most likely be supplied by BPA or the contractor they engage. The provision of services and supplies for this project and its personnel would result in some income for the local business. See table 4.

Table 4. - Socio-Economic Considerations Related to Construction*

Considerations	Alternative Plan B		Alternative Plan C
	Substation Construction	Line Construction	Transformer Replacement
Total Number Employed	10-12	5-10	5-10
Number Hired from Local Area	3-6	1	1
Length of Job	2-3 months	1 month	1 month
Average Wage	\$8.00/hour	\$9.00/hour	\$8.00/hour
Estimated Potential Income to Local Area**	\$23,400	\$14,400	\$12,800

* Although this information is very general in nature, it is intended to provide some indication of the potential socio-economic impacts associated with substation and line construction.

** This does not take into consideration the income derived from services (i.e., food, entertainment, etc.) provided to construction crews by local businesses.

Source: Line and Substation Construction Sections, Branch of Construction, BPA.

Ellensburg Service
Study Area 78-2

Agriculture - The substation in Alternative Plan B would have an impact on agricultural land use similar to the Proposed Plan. The tap line in Plan B would cross up to 500-feet of marginally productive agricultural land dependent upon final location.

No impact agricultural land is expected from the transformer replacement in Alternative Plan C.

Urbanized Land Use - The 500-foot tap line and 2-acre substation in Plan B would result in impacts to urbanized land use similar to those described for the Proposed Plan, but of lesser magnitude because of the shorter transmission line.

In Alternative Plan C, the changes at Ellensburg Substation would probably not be noticeable after construction.

Noise and dust resulting from construction of Alternative Plans B and C could cause temporary disturbance at nearby residences.

Esthetic - Visual impacts resulting from Alternative Plan B would be similar to those of the Proposed Plan.

The impact of the transformer replacement to users of Dollarway Road in Plan C would be a temporary condition and would probably not be noticeable after installation.

Recreation - Recreational impacts associated with Plan B would be similar to those of the Proposed Plan.

The transformer replacement required for Plan C may create some minor visual impacts to recreationists using Dollarway Road. These impacts are described in the "Esthetic" section.

Cultural Resources (Historical, Architectural, and Archeological) - No historic or archeological resources listed in the *National Register of Historic Places* will be affected by Alternative Plans B or C.

Other Resource Uses and Social/Economic Resources - Alternative Plans B and C are not expected to significantly impact the resources previously described in this section.

Nonconstruction

Nonconstruction of the facilities described in this supplement could result in load curtailment which would have varying effects upon electric power customers, depending upon the intensity of each curtailment and its imposition. If electrical facilities are not added, initial impacts

to this central Washington community would be to curtail the installation and conversion of electric heat for residences and commercial enterprises, forcing the use of scarce and higher-cost fossil fuels. Disruption of electric power to residences and commercial businesses would most likely occur during winter peak loads. If the mandatory limitation of consumption were imposed by rotating power outages, the effect other than the obvious inconveniences, could be loss from spoilage, other damage from lack of electric service, and hazards from lack of adequate heating, lighting and operation of safety devices such as street lights and alarm systems.

Future building expansions at Central Washington State College and Twin City Foods would be deterred because of the lack of a reliable power supply. If this were the case, enrollment and employment at the college would decrease, adversely affecting the area's economy.

Construction of required BPA facilities could be avoided and postponed if additional generation were added in the load areas. With the short leadtime available, the only generation that could be added would be a combustion turbine. Such generation would have the environmental impacts typical for units of this kind as described in the Role EIS, Chapter V, Section B.4.c. of Part 1 and Chapter X, Section A.1.a. of Appendix B. In addition, impacts would occur from the construction of local transmission facilities required for integration of the power.

Other Alternatives Considered

Three other alternatives have been considered. These alternatives are listed as follows:

One alternative described in BPA's FY 1974 EIS involved the construction of a 4-mile tap line running from the existing Columbia-Ellensburg-Moxee 115-kV line, south of Ellensburg to a new 115-12.5-kV substation, east of Ellensburg. Because of the engineering and environmental constraints associated with this route, it was not given further consideration.

BPA also examined the possibility of constructing a new substation north of the existing Ellensburg Substation. A new substation in northwest Ellensburg would be located at a considerable distance from load centers. Therefore, while eliminating 115-kV transmission, it would require the construction of multiple express distribution feeders by the City of Ellensburg to serve the loads at the college and in the northeast and southeast parts of the city. This alternative was not given further consideration because it involved a higher cost than the proposed plan and esthetic impact of multiple express distribution feeders would be far greater than the construction of a single transmission line.

Ellensburg Service
Study Area 78-2

Another alternative considered increasing the transformer capacity in the city's Whitney Park Substation. This alternative was shown to also require either increasing the capacity of the 34.5-kV transmission line and installing a larger transformer at BPA's Ellensburg Substation, or uprating the 34.5-kV line to 115-kV and constructing a new 115-12.5-kV substation at the Whitney Park Site. This location was determined to be undesirable for a high voltage substation because of its proximity to the high school and adjoining residences.

SUMMARY OF PLAN OF SERVICE ANALYSIS

Introduction

Resources and uses previously identified as highly important, critical, or unique are given special attention in planning and construction of transmission facilities. Predictions of potential impacts to these important features (see Fig. 6) are based upon past BPA experience, information from numerous agencies and individuals, and on the expertise from interdisciplinary environmental specialists within BPA. Predictions of possible impacts are meant to facilitate comparisons of the environmental aspects of system alternatives which, at this planning stage, are represented by broad corridors. More precise quantification must necessarily be deferred until the actual alternative line locations become known and are then proposed in BPA Facility Location Supplements to the environmental statement.

In figure 6, two factors are considered in evaluating impacts: (1) the likelihood of an impact occurrence; and (2) the expected degree of impact.

Likelihood of Impact Occurrences

The following designations are used to evaluate the likelihood of an impact:

- Low - Resource or use is a point source or occupies a small portion of the study area and could be avoided in final alignment. "Low" includes those resources and uses in degree of impact category "none".
- Medium - Resource or use partially occupies a corridor and may be impacted in final alignment.
- High - Resource or use entirely transverses a corridor and would be impacted if final alignment were within the presently defined corridors.

Degree of Impact

These designations are used to evaluate the degree of impact:

- Slight - Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.
- Moderate - Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.
- High - Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.
- None - Due to the compatibility of the resource with transmission facilities, or the low likelihood of an interaction between the resource and the transmission facility, we expect no significant measurable adverse impacts.
- Unknown - Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

Proposed Plan
(Alternative Plan A)

<u>Resource/Use</u>	<u>Impact</u> <u>Adverse</u>				
	High	Moderate	Slight	None	Unknown
<u>Natural Resources</u>					
Geology and Soils					
Erosion			○		
Compaction			○		
Hydrology					
Turbidity			○		
Groundwater				○	
Wildlife					
Yakima River				○	
Upland Birds			○		
<u>Resource Use and Cultural Resources</u>					
<u>Agriculture</u>		◐			
Urbanized Land Uses					
Ellensburg		●			
Esthetic					
I-90				○	
U.S. 97				○	
U.S. 10		◐			
Yakima River				○	
<u>Recreation</u>			○		
Historic-Archeologic					
Archeological Sites				○	
Historic Sites			○		
Other Cultural Resources					
Ellensburg Airport				○	
Railroads				○	

Likelihood of Impact Occurrence:

- = Low
◐ = Medium
● = High

Figure 6 - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

Alternative Plan B

Impact

Adverse

Resource/Use

	High	Moderate	Slight	None	Unknown
<u>Natural Resources</u>					
Geology and Soils					
Erosion			○		
Compaction			○		
Hydrology					
Turbidity			○		
Groundwater				○	
Wildlife					
Yakima River				○	
Upland Birds			○		
<u>Resource Use and Cultural Resources</u>					
Agriculture		○			
Urbanized Land Uses					
Ellensburg		◐			
Esthetic					
I-90				○	
U.S. 97				○	
U.S. 10		◐			
Yakima River				○	
Recreation			○		
Historic-Archeologic					
Archeological Sites				○	
Historic Sites			○		
Other Cultural Resources					
Ellensburg Airport				○	
Railroads				○	

Likelihood of Impact Occurrence:



= Low



= Medium



= High

Figure 6 - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

Alternative Plan C

<u>Resource/Use</u>	<u>Impact</u>				
	<u>Adverse</u>				
	High	Moderate	Slight	None	Unknown
<u>Natural Resources</u>					
Geology and Soils					
Erosion				○	
Compaction				○	
Hydrology					
Turbidity				○	
Groundwater				○	
Wildlife					
Yakima River				○	
Upland Birds			○		
<u>Resource Use and Cultural Resources</u>					
Agriculture			○		
Urbanized Land Uses					
Ellensburg			○		
Esthetic					
I-90				○	
U.S. 97				○	
U.S. 10				○	
Yakima River				○	
Recreation			○		
Historic-Archeologic					
Archeological Sites				○	
Historic Sites				○	
Other Cultural Resources					
Ellensburg Airport				○	
Railroad				○	

Likelihood of Impact Occurrence:



= Low



= Medium



= High

Figure 6 - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).



Ellensburg Service
Study Area 78-2

FINAL FACILITY LOCATION SUPPLEMENT

FOR

ELLENSBURG SERVICE
Study Area 78-2

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DESCRIPTION OF THE
TRANSMISSION LINE ROUTES,
THEIR POTENTIAL IMPACT AND MITIGATION

DESCRIPTION OF THE ROUTES CONSIDERED

Introduction

The Facility Planning Supplement for Ellensburg Service dealt in terms of the need to establish a new point of delivery in east Ellensburg. This would require transmission facilities from the existing BPA facilities, in western Ellensburg, Washington, to a new substation site in eastern Ellensburg as shown in figure 7. Electrical alternatives including the proposed plan of service (Alternative Plan A) were identified and impacts evaluated in the Facility Planning Supplement. Alternative routes required to implement the proposed plan of service were discussed in the Draft Facility Location Supplement. After evaluating the principal economic, technical, and environmental factors associated with each transmission line route, and review of public and agency comments received on the draft location supplement, Route 1 was selected as the proposed route.

The study area used for the Facility Location Supplement is the same as for the Facility Planning Supplement shown in figure 7. For an aerial view of the study area see figure 8. The natural and cultural resource information presented in the Facility Planning Supplement will be expanded in the impact discussions to follow.

As discussed under "Status", BPA is working with the Puget Sound Power and Light Company (PSP&L) to determine if the existing transmission line along the Milwaukee Railroad can satisfactorily serve the proposed East Ellensburg Substation. If arrangements are made to serve East Ellensburg Substation from this transmission line, Plan B would be adopted. Under this plan only a short tap line (approximately 500 feet long) from the existing line into the new substation would be required.

Planning Coordination

The location alternatives are almost entirely on existing or proposed transportation and utility corridors and are compatible with existing and projected land use plans.

Agencies and organizations contacted during the location phase include those listed in the Facility Planning Supplement, page 2 and the following:

Puget Sound Power and Light	Ellensburg, WA
Chicago, Milwaukee, St. Paul and Pacific Railroad	Seattle, WA
Kittitas County Engineer	Ellensburg, WA
Washington State Department of Natural Resources	Ellensburg, WA

Location Description

In order to minimize environmental impacts the transmission line would, wherever possible, be either overbuild on existing electrical distribution systems or be constructed within transportation corridor rights-of-way.

For a graphical illustration of the following discussions, see figure 7.

Proposed Route

Route 1 - The 3-1/4 mile proposed Route 1 would tap the existing BPA Columbia-Moxee 115-kV line approximately 1 mile north of the existing BPA Ellensburg Substation.

Proposed Route 1 would proceed east for 2 miles as follows: On new right-of-way for 1/4 mile to Helena Avenue, overbuild an existing electrical distribution facility along Helena Avenue for 3/4 miles, on new right-of-way for 1/4 mile, and on existing city road right-of-way for 3/4 mile to Game Farm Road. No road or above ground facilities exist within this city road right-of-way. Proposed Route 1 would then continue proceeding south along Cemetery Road (Phenning Road) for 1 mile overbuilding an existing overhead distribution facility. This route would turn west along the Vantage Highway (Highway 10) for 1/4 mile to the East Ellensburg Substation Site. No overhead distribution lines exist along this stretch of the Vantage Highway.

Alternative Routes

Route 2 - The 2-1/4 mile Route 2 would tap the existing BPA Columbia-Moxee 115-kV line approximately 1 mile north of BPA's existing Ellensburg Substation. Route 2 would proceed southeasterly along the north side of the Chicago, Milwaukee, St. Paul and Pacific Railroad Tracks replacing the existing Puget Sound Power & Light (PSP&L) 115-kV single pole wood line to the East Ellensburg Substation Site. The C. M. St. P & P Railroad Company recently sold this 138-mile Taunton-Cedar Falls transmission line to the PSP&L

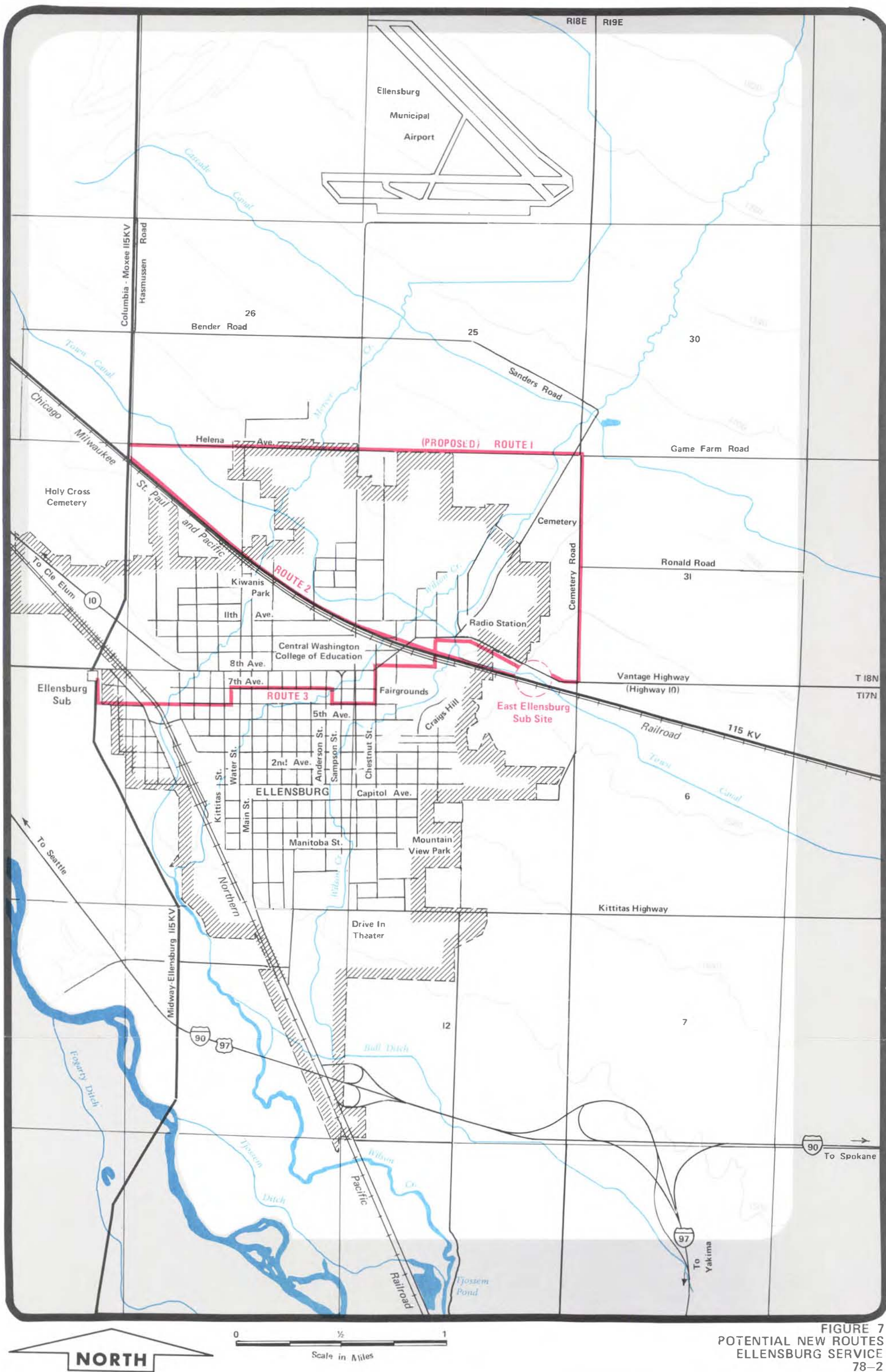


FIGURE 7
POTENTIAL NEW ROUTES
ELLENSBURG SERVICE
78-2

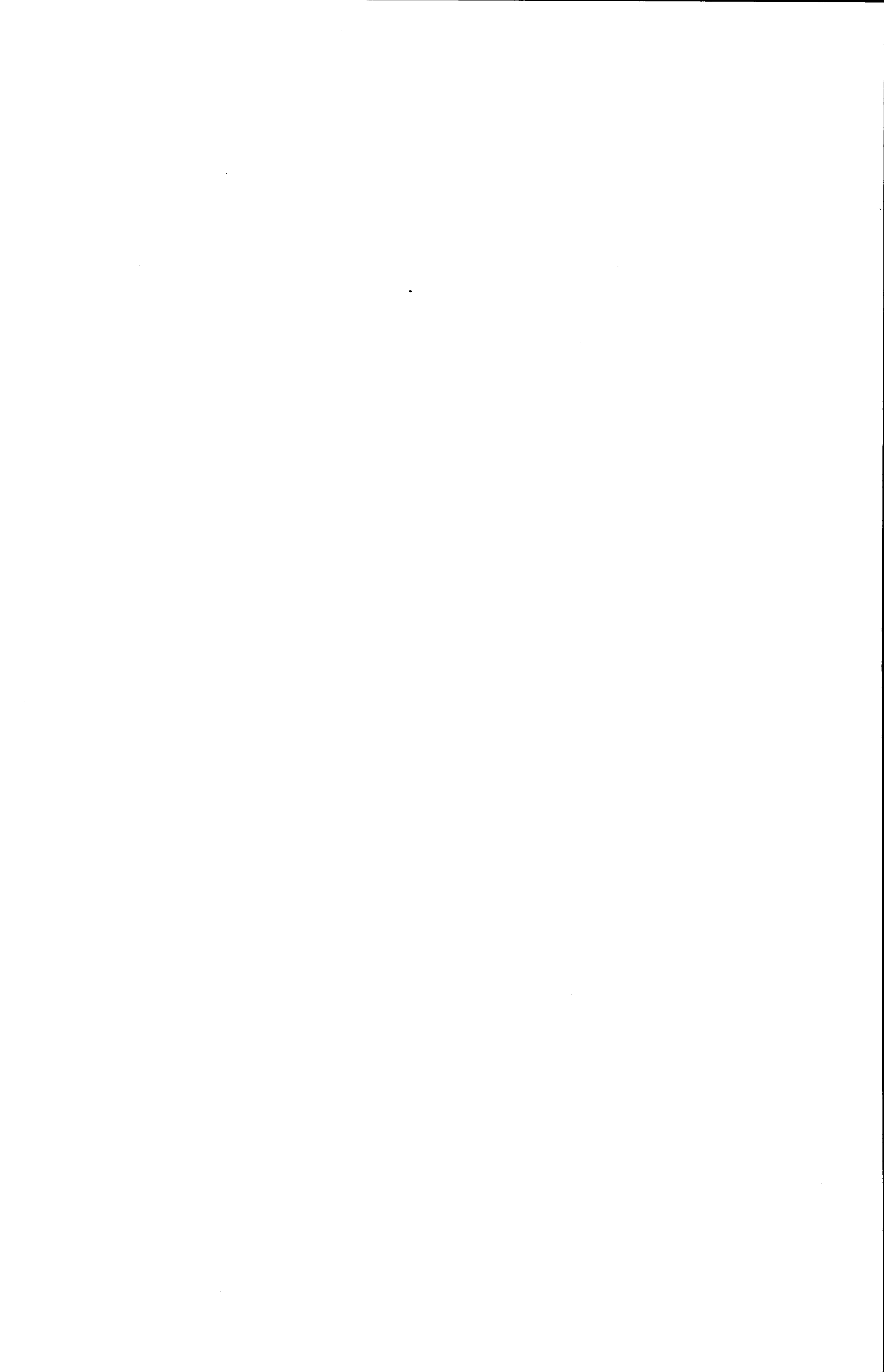
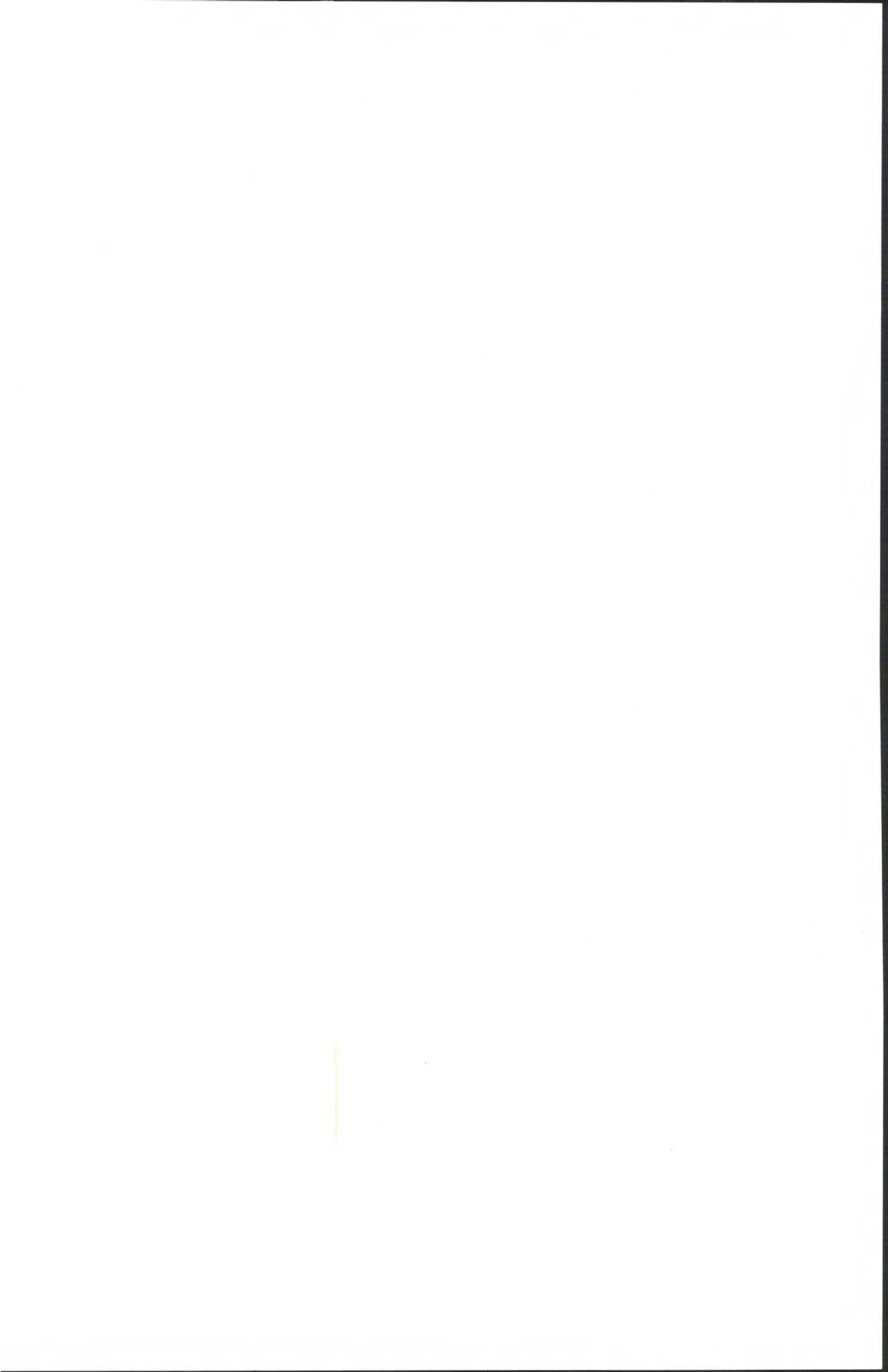




FIGURE 8
AERIAL PHOTO
ELLENSBURG SERVICE
78-2



Company. The Ellensburg Service line would be constructed on one side of a double-circuit single-pole steel structure while the PSP&L Company's 115-kV line would be constructed on the other side.

Route 3 - The 2-1/2 mile Route 3 begins at the Ellensburg Substation and proceeds south parallel to BPA's existing 115-kV line to 6th Avenue. Route 3 then proceeds east along 6th Avenue where no existing overhead utilities exist to Railroad Avenue. This route would continue while overbuilding existing above ground local distribution facilities as follows: East along 6th Avenue to the alley between Kittitas and Water Streets, north to 7th Avenue, east to the alley between Anderson and Sampson Streets, south to 6th Avenue, east along Chestnut Street, north to the alley between 8th and 9th Avenues, and east to end of the alley before crossing the C. M. St. P. & P. Railroad. Route 3 would then continue where there are no above ground utilities, north across the railroad to 10th Avenue (Vantage Highway) and proceed easterly along the highway to the new substation site. The Ellensburg Service line would be underground for 1/4 mile while passing adjacent to the State of Washington Department of Natural Resources heliport. An alternative to undergrounding would be possible routing along an adjacent street.

Route 4 - This route would be the same as Route 2 except it would be underground. It was determined Route 4 was economically unfeasible. Route 4 would cost \$1,030,000, almost twice the price of the next highest, Route 2. Route 4 will therefore not be discussed further in this document.

General Construction Requirements

Tower Design and Material Requirements

See illustration figure 9.

Proposed Route 1 - Single pole wood structures with standoff insulators will be used for the proposed route. Where it would overbuild on existing facilities, the existing wood poles would be replaced with taller wood poles. In areas with no existing above ground utilities, the new wood poles will be tall enough so future local distribution lines could also be attached as an underbuild. Final design will not be completed until surveys have been completed. Presently it appears favorable to replace every other pole where the proposed line would overbuild an existing facility. The new poles would be taller than the existing poles.

Route 2 - Single pole tubular steel double circuit structures would be required from a structural standpoint for Route 2.

Route 3 - Similar to proposed Route 1.

Ellensburg Area Service
Study Area 78-2

Table 5 - Approximate Structure Requirements 115-kV

Route	Structure Type	Structure Height	Span Between Structures	Replace Existing Above Ground Facilities	No Existing Above Ground Facilities
1*	Single Pole Wood	60 ft.	350 ft.	2 Miles	1-1/4 Miles
2	Single Pole Tubular Steel Double Circuit	80 ft.	350 ft.	2-1/4 Miles	None
3	Single Pole Wood	60 ft.	350 ft.	1-1/2 Miles	1 Mile

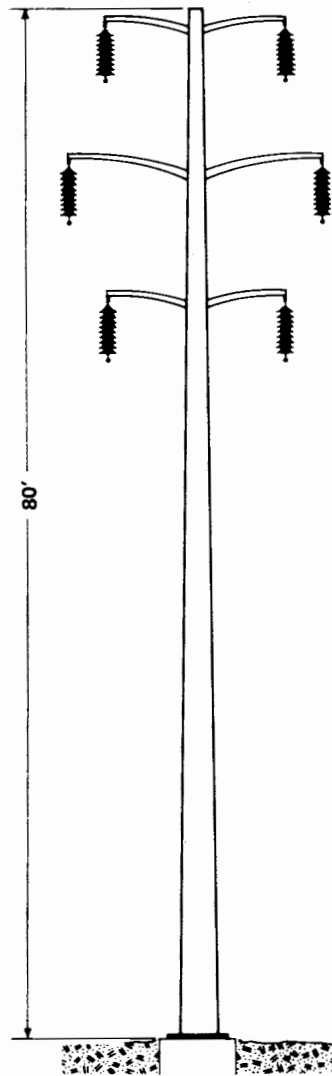
Right-of-Way Requirements

Along public road corridors, no right-of-way easement would be purchased for the Ellensburg Service line. Where no public road right-of-way exists, a 50 ft. wide right-of-way would be required. Along the railroad, the Ellensburg Service line would be within existing railroad right-of-way. Generally, no additional right-of-way would be required although easement would still have to be obtained from the C. M. St. P. & P. railroad.

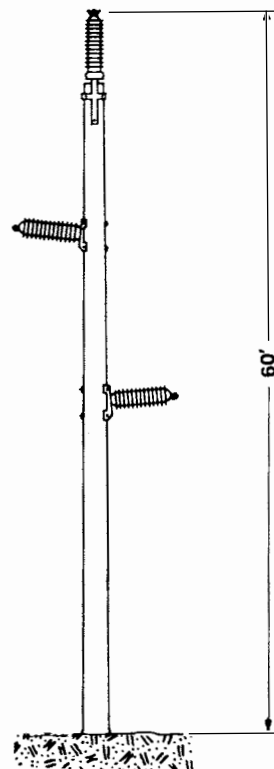
Table 6 - Right-of-Way Requirements

Route	New Right-of-Way (Miles)	Existing Road Right-of-Way (Miles)	Existing Railroad Right-of-Way (Miles)	Total Right-of-Way Acreage Required
1*	1/2	2-3/4	None	3
2	None	None	2-1/4	None
3	1/4	2-1/4	None	1.5

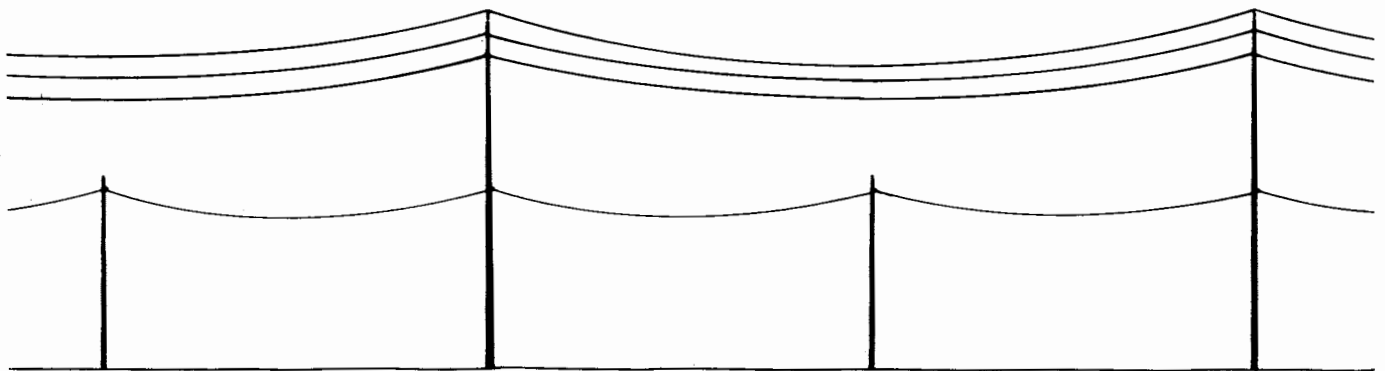
*Proposed Route



TUBULAR STEEL DOUBLE CIRCUIT



SINGLE WOOD POLE



OVERBUILD OF EXISTING DISTRIBUTION LINE



Access Road Requirements

Proposed Route 1 - Where proposed Route 1 parallels an existing street, new access roads will not be needed. Construction and maintenance will be performed from existing streets. In areas with no streets, travel will be within the right-of-way. If travel is over cropland, the soil will be returned to its original condition as near as possible.

Proposed Route 1 crosses Town Canal. An existing bridge will be used to accommodate the construction vehicles. If heavy equipment is required to be transported across the bridge, shoring will be added to increase its structural integrity. One mile of this route parallels the possible future extension of Helena Avenue to Game Farm Road. Through this 1 mile, travel within right-of-way will be needed for construction. However, if the road extension is constructed, maintenance will be performed from the new road.

Route 2 - This route would use the railroad right-of-way for access. A permanent 12 ft. wide gravel road within the railroad right-of-way would be needed from the tap point to 1/2 mile east because of wet areas.

Route 3. This route would use existing roads for construction and maintenance. Travel within right-of-way would be used for three-tenths miles, two-tenths of which is through irrigated pasture land. The soil within the travel way and pasture would be restored.

Ellensburg Area Service
Study Area 78-2

Table 7 - Estimated Access Road Requirements

Route	<u>Within Right-of-Way of</u>			<u>Cropland</u>	<u>Access</u>			
	Existing Roads (Miles)	Future Public Roads (Miles)	Railroad (Miles)	Travel Within Right-of-Way (Miles)	<u>Permanent</u>		<u>Travel within R/W</u>	Rock Cubic Yards
					On R/W (Miles)	Off R/W (Miles)	(Miles) (Miles)	
1*	2	1	None	1/4	None	None	1-1/4	None
2	None	None	2-1/4	None	1/2	None	1-3/4	160
3	2.2	None	None	2-1/10	None	None	3/10	None

*Proposed Route

Other Construction Characteristics

Proposed Route 1 - - Two disconnect switches will be installed near the existing structure of the Columbia-Moxee 115-kV line south of Bendor Road 1/2 mile north of the tap point. These switches will be necessary so the line north of the switch could be taken out of service for maintenance without interrupting power to the proposed East Ellensburg Substation.

For general construction procedures, see Appendix B, Chapter V of BPA's Role EIS. The construction sequence for proposed Route 1 will be as follows:

Holes approximately 9 feet deep are dug by a large auger or backhoe impacting only the area immediately around the structure site. A truck or tractor is used for this process.

Wood poles with insulators would be raised and put into the holes using a truck with a "A" frame or a crane.

It may be necessary to trim some trees. No trees would be removed.

Conductor wires would be strung using either trucks or bulldozers. Pulling and reeling sites will be at the tap point and each major angle structure. Existing road shoulders would be used for pulling and reeling sites wherever possible.

Disturbed soils within cropland would be restored. Other disturbed land will be restored if erosion or damage to property would result. Where overbuilding occurs, existing facilities will be removed from existing wood poles and attached to the new wood poles.

Route 2 - This route would require two identical disconnect switches at the same points as described for proposed Route 1. Construction sequence of Route 2 would be as follows:

Construct 1/2 mile permanent access road. Vegetation within access road would be destroyed.

Dig a hole 5 feet in diameter and up to 30 feet deep for each structure. Holes may be dug by auger or backhoe, impacting only the area around structures.

Install casings in holes that fill with water. Pour concrete into hole and attach anchor pads and bolts.

Tubular structures are lifted into place by a crane and secured to anchor pads.

Ellensburg Area Service
Study Area 78-2

It may be necessary to trim some trees. Only those trees in the way of the permanent access road will be removed.

Conductor wires would be strung using trucks or bulldozers. Pulling and reeling sites would be at the tap point and new substation site with possibly one site inbetween. The railroad right-of-way would be used for this purpose.

Disturbed land in areas other than permanent access roads would be restored if erosion or damage to property resulted.

Route 3 - Similar to Route 1, except additional pulling and reeling sites would be needed due to several major transmission line angles. In addition, a $\frac{1}{4}$ mile trench would be dug for undergrounding the proposed 115-kV line near the new substation site. This approximate 4 feet wide, 5 feet deep trench would be dug by a backhoe. The 115-kV cables would be laid in so they would be 4 feet below ground surface and the trench would be back filled. Concrete covers would protect the cables and above ground signs would provide warnings. Where the cable enters the ground and where it exits, special tubular steel single pole structures would be needed. These steel poles would be approximately 5 feet taller than proposed wood poles.

Cost Requirements

Proposed Route 1 - \$329,000

Route 2 - \$534,000 Double circuit tubular steel poles greatly increase costs.

Route 3 - \$483,000 Including $\frac{1}{4}$ mile of undergrounding and substation terminal costs.

These costs are based on design estimates prepared by Branch of Transmission Engineering, dated November 1976.

Operation and Maintenance Requirements

For general operation and maintenance requirements see Chapter VI of Appendix B of the Role EIS. Once a year the transmission line would be inspected for possible damages. If damage is detected, equipment similar to that used for construction could be necessary to make repairs. Standard easements provide that in addition to payment for the easement the landowner will be paid for any crop damage caused by and during the construction, operation, and maintenance of the transmission line. Trees would need to be trimmed periodically. It is unlikely herbicides would be used.

THE POTENTIAL IMPACTS OF THE ROUTES AND THEIR MITIGATION

Natural Resources

Discussions to follow will describe impacts and cite specific mitigation measures to important natural resources found in proximity to each alternative route.

Geology and Soils

Proposed Route 1 - Nearly level alluvial deposits of clay, silt, sand and gravel several hundred feet thick will be crossed by this route. The dominant soil textures developed from this material are loams, fine sandy loams and clay loams. Most are underlain by clay sub-soils or cemented gravels and have poor drainage. The erosion potential of these soils is slight along this route.

Construction activity will produce no significant impacts to the geology since excavation for pole footings would not require blasting. These deposits have no geologic hazards and would provide a suitable foundation for the transmission line facilities.

Soil impacts along this route will be slight. Proposed Route 1 will replace wood pole structures for 1-3/4 miles along city and county roads. The remaining 1-1/2 miles of this route will be new construction requiring travel within right-of-way for construction and maintenance of the line. This temporary access will result in minor soil disturbances. Minimal rutting could occur if construction equipment is operated during periods of high soil-moisture content. The disturbances will be mitigated wherever necessary as discussed in Chapter V of Appendix B of the Role EIS.

Route 2 - The alluvial deposits described under Route 1 would also be crossed by this route. Even though Craig Hill, an old terrace escarpment, is crossed by this route the topography is nearly level since a corridor excavated by the railroad would be paralleled. The soils along this route are similar to proposed Route 1.

Impacts along this route would be moderate. It parallels the railroad replacing an existing wood pole line. In existing wet areas, soils would be permanently impacted by construction of 1/2 mile of permanent access road from the tap point east. The remainder of the route would require temporary access. Geology and soil impacts along this section would be similar to proposed Route 1.

Route 3 - The geology and soils are similar to proposed Route 1. Of this route, 1-1/2 miles would replace existing structures within city limits. Geologic and soil exposures are rare in the urban areas and no impacts would occur. Approximately 1 mile of this route would be within an area with no existing overhead facilities.

The only area where permanent access does not exist is through agricultural land south of the Ellensburg Substation. Impacts from temporary access here, and from undergrounding a short section of the line along Highway 10, would be slight.

Hydrology

Proposed Route 1 - Wet areas formed by excess irrigation water and poor soil drainage will be crossed. New Mercer and Wilson Creeks seasonal flooding is common. Existing roads could be utilized along most of the route and no impacts to the hydrology are expected. East of the tap point this route will cross Town Canal. The line crossing will be designed to prevent interference with canal operation and maintenance activities.

Both Mercer and Wilson Creeks will be spanned by this route. There is no access across Wilson Creek near the line crossing. However, adequate access exists on both sides and there will be no need for equipment to cross the stream.

Construction of this line will not increase the turbidity or sedimentation of these streams.

Construction of this line will not impact ground water resources.

Route 2 - This route would cross Mercer Creek and two forks of Wilson Creek. Slight impacts would occur to these streams since they flow through culverts in the railroad bed and have limited exposures. East of the tap point, approximately 1 mile of this route would cross areas subject to occasional ponding of excess irrigation water and seasonal flooding. A road 12 feet wide and 1/2 mile long would be constructed through this wet area. Road construction would require placing a fill at least 2 feet deep adjacent to the railroad bed. This would result in removal of .7 of an acre of aquatic vegetation. Bonneville Power Administration will consult with the Army Corps of Engineers in conjunction with the Water Pollution Control Act Amendments of 1972. Slight impacts to the hydrology would result from this road construction.

East of Ellensburg, Town Canal would be crossed with no resulting impacts. The water table is near the surface along the railroad and special construction techniques would be necessary for pole footings. No impacts would occur to the ground water.

Route 3 - Several creeks are crossed by this route in a developed urban environment. No impacts would occur to these streams from construction since they have been previously impacted by relocation and channelization. No increase in turbidity or sedimentation would occur.

Vegetation

Proposed Route 1 - A grass/brush vegetative type existed prior to the introduction of farming in the study area. Dominant vegetation included bunchgrass, sagebrush, rabbitbrush, bitterbrush, and a few native trees like willow. Most of this vegetation has been displaced by irrigated agricultural land except where soil type, topography, and access by machinery makes farming impractical.

Domestic trees such as black locust, English maple, boxelder, blue spruce, weeping willow, Norway spruce, cottonwood, and lombardy poplar are highly valued by landowners. It may be necessary to prune some of these domestic trees for adequate clearance along proposed Route 1.

The original riparian vegetation was eliminated as stream channels were altered or relocated. Riparian vegetation such as cottonwoods, willows, cattails, and sedges are found intermittently along drainages, irrigation canals, and marshy areas.

As discussed in the Facility Planning Supplement, noxious weeds introduced during construction could pose additional problems to landowners. The county agent said Canada thistle and diffused knapweed were the most serious.

Construction of the transmission line will cause little change or modification to existing vegetation. The greatest disturbance will be where proposed Route 1 taps the existing 115-kV line and at the new substation site. Within fields, permanent loss of natural vegetation will occur at each pole site. Existing roads along much of Route 1 will keep disturbance from construction to a minimum. Equipment may move through pasture land temporarily disturbing 1/3 acre. More damage to pasture land could occur if construction equipment is used during or soon after the areas are irrigated or in times of heavy rainfall. Total acreage of vegetation permanently removed along proposed Route 1 would be less than one-tenth of an acre.

BPA will follow noxious weed programs as identified by local agencies. Some trees will have to be trimmed periodically.

Route 2 - Impacts to vegetation along Route 2 adjacent to the railroad would be similar to those outlined under proposed Route 1. Between where Route 2 taps into the existing 115-kV line and Mercer Creek, across from the Kiwanis Park, the major vegetative species are aquatic because of standing water from irrigation and high runoff during rainfall. Cattails, sedges, willows, wildrose, giant wildrye, quackgrass, and orchardgrass make up the dominant species. A 1/2 mile permanent access road 12 feet wide would be constructed destroying less than 1 acre of the aquatic vegetation. Permanent vegetation removed for pole sites along Route 2 would total less than one-tenth of an acre.

The remainder of the route includes drier sites with species such as Russian thistle, lupine, mustard, yellow sweetclover, and cheatgrass.

Route 3 - Much of the natural vegetation along Route 3 has been displaced by urban development. Pruning of domestic trees would be necessary along portions of new rights-of-way; however, the majority of the route would be overbuilding an existing line. Less than one-tenth of an acre would be permanently removed for pole sites. Up to four-tenths acres of vegetation would be temporarily disturbed during the construction period of the 1/4 mile of underground.

Wildlife

Proposed Route 1 - Pasture land and roadside vegetation make up the major wildlife habitat along proposed Route 1. Small amounts of aquatic and riparian vegetation also occur. Domestic trees described in the Vegetation section are scattered along this route. Town Canal, smaller irrigation ditches, Mercer and Wilson Creeks, plus excess water from irrigation provide the main aquatic and riparian habitat.

As outlined in the Facility Planning Supplement impacts to wildlife and associated habitats are expected to be slight and short term. Noise and human activity during construction could cause temporary changes in wildlife behavior, particularly small mammals and birds, along the route. Wildlife may move away from the area for a short distance but should return after construction. A large portion of the route has existing roads or is driveable by construction equipment. Less than one-tenth of an acre of habitat will be displaced for total structure sites. Construction may disturb some upland birds inhabiting irrigated agricultural fields and the edge of road rights-of-way.

Construction is presently scheduled between April and September and will occur during the spring upland bird and waterfowl nesting seasons. Topping of some trees for adequate transmission line clearance could cause impacts on nesting song birds. After construction, disturbed areas will be restored to as near their original condition as possible and seeded if necessary to replace wildlife cover.

Route 2 - Route 2, 2-1/4 miles in length, would be within the railroad right-of-way and consists of a double circuit with the existing 115-kV line.

Wildlife habitat would include vegetation as described under the Vegetation section for Route 2. Construction scheduled from April to September would cause disturbance to wildlife during spring nesting periods and when water levels are high. The 1/2 mile permanent access road between the tap point and Mercer Creek would permanently remove seven-tenths acres aquatic habitat.

Route 3 - Route 3, approximately 2-1/2 miles in length, would primarily cross urban development within the city of Ellensburg. Much of the wildlife habitat along the route has already been disturbed and any additional construction activities would not impact wildlife significantly.

The short segment of the route northwest of the new substation site would be underground to get past the Department of Natural Resource's heliport. A trench approximately 4 feet wide and 5 feet deep would be needed for undergrounding within the highway right-of-way. This would result in a temporarily disturbed 12 foot wide, 1/4 mile long corridor. The four-tenths acre area would be restored. Impacts to overall wildlife populations would be insignificant.

Resource Use and Social/Economic Resources

The following discussions will describe impacts to socioeconomic resources and resources found in proximity to each alternative route. Regional discussions in the Facility Planning Supplement will also be expanded where necessary.

Demographic and Economic Considerations

See the Facility Planning Supplement, pages 15 and 16 for impacts to population characteristics from construction of the Ellensburg Service line. Because of the proximity and similar lengths of the alternatives, there is not a distinguishable difference in impacts to population characteristics between the alternative routes.

The alternative routes cross the following land ownerships shown in Table 8.

Table 8 - Land Ownership

Route	Private (Miles)	Public (Miles)	Railroad (Miles)
1*	1/2	2-3/4	None
2	None	None	2-1/4
3	3/10	2.2	None

*Proposed Route

Agriculture

Land within the study area is irrigated. Three main canals; Town, Cascade and North Branch supply the water. Farms are developed for surface rill type irrigation. However, recent trends are to side-roll sprinkler irrigation development.

Hay and pasture are the major crops. Timothy alone or mixed with a legume and alfalfa are the principal hay crops. Timothy hay, in this area, has superior quality and is in great demand. Farm ownership is small, 5 to 80 acres, with the main family income derived from non farm employment.

Proposed Route 1 - This route crossed 3/4 mile of irrigated agricultural land. From the tap point to 1/4 mile east, Route 1 crosses pasture land. Up to four single pole wood structures will be placed immediately adjacent to an existing fence. No long term impacts are expected. Soil disturbed during construction or maintenance would be restored.

From where Helena Avenue ends to Game Farm Road, the single pole wood structures will be on the southern extreme of existing or extended road right-of-way. This location will place 8 poles at a distance of 30 to 40 feet south of existing fences into farm land. The poles are an obstacle to the farmer and his equipment, however, most of this land is used for pasture and the impact would be minimal. Disturbed soil within agricultural lands would be returned to as near as possible its original productivity.

Route 2 - Route 2 has no impact on agriculture.

Route 3 - Route 3, parallel to an existing BPA line would cross 900 feet of pasture land. Up to three single pole structures would be in the pasture. No permanent road would be required and disturbed soils would be returned to as near their original condition as possible.

Urbanized Land Use

A comprehensive plan for Kittitas County was approved by the Kittitas County Planning Commission November 15, 1971 and adopted by the Board of County Commissioners June 5, 1972.

It has been noted (City of Ellensburg, 1974) vacant land available for new residential development within the City of Ellensburg is relatively limited. Consequently, it is reasonable to assume at some point, lands outside the city will become prime for development. New rural residential development is presently occurring in the area northeast of the city.

All three routes would follow existing or proposed transportation or utility corridors through urbanized areas as shown in table 9. They are compatible with present land use plans. A small rental home will be removed from the

parcel of land directly west of the proposed substation/transmission line egress point, common to all routes. The occupant of this house will be relocated.

No adverse electrical impacts are anticipated to the existing electrical and wire communication (telephone and railroad signal) facilities adjacent to any of the three routes. If a utility determines that a problem may be occurring because of the BPA transmission line, BPA would investigate and mitigate according to BPA policy in cooperation with the affected utility.

Refer to the Facility Planning Supplement Urbanized Land Use section for general urbanized land use impacts including radio and television interference. Table 9 summarizes specific impacts for all three routes.

Ellensburg Area Service
Study Area 78-2

Table 9 - Urbanized Land Use Impacts

Route	<u>Number of (Within 100 Feet)</u>		Existing Urban Land	<u>Number of Miles Through 1/</u>		
	Dwellings (Approximate)	Cemeteries		Urban Residential & Suburban	Industrial	Unspecified Planned Land Use
1*	60	1	1-3/4	1-1/2	None	None
2	15	None	1-1/2	3/4	None	None
3	130	None	2	None	1/4	1/4

1/ Lower Kittitas County Comprehensive Plan Map June 5, 1972.

*Proposed Route

Esthetics

Proposed Route 1 - Visual impacts associated with this route will be moderate. In those areas where the line will be overbuilt the existing utility lines have become an accepted part of the rural/suburban setting. Overbuilding every other pole will change this character. By replacing every other pole where the proposed line will be overbuilt a picket fence appearance will result. The taller structures would be uncoordinated with the shorter poles and would appear unorderly.

The segments of new line will be additional elements in the landscape; however, they will form an extension of the existing lines and eventually become an accepted intrusion. The most significant adverse impact will come from the trimming of trees along the route. These trees are an important part of the landscape providing screening, visual relief, and shade. The disconnect switches required will appear as a disorganized array of structures and would draw attention. Their locations near the intersection of Rasmusson and Bender Road will be highly visible to road users and to two homes near the intersection.

Although the impacts upon the landscape are not great, the proximity of the line to view sources will affect the significance of these impacts. Several homes are along this route and many local roads and city streets would be crossed or paralleled. Near the substation site this route will cross Highway 10. Once a major cross state route, it now serves as a link between Ellensburg and Kittitas. This portion of Highway 10 is not recognized by the State of Washington as having high scenic quality. Traffic on it is moderate. The 1975 daily traffic count was 930. Since no screening is available at the crossing the line will be a highly visible element.

Route 2 - This route would have the least impact to the visual quality of the area. A utility corridor has already been established along the railroad right-of-way and is visually cluttered with wood poles and overhead lines. Contributing to this clutter is an outmoded trolley system, a railroad communication system, and a single circuit 115-kV single pole wood powerline. By replacing the single circuit line with a double circuit steel pole, the existing conditions would be upgraded.

Impacts of the disconnect switch installations would be the same as those described for proposed Route 1.

Views of the line from city streets would be limited to those that either cross the railroad or go under it and would be of short duration. Distant views of this route such as from Mt. Stewart Grade School would remain unchanged.

Most users of Kiwanis Park are engaged in sports as participants or spectators and would not be affected by this route.

central Washington State College is the main focal point of Ellensburg. The character of this highly scenic campus has remained intact even though the unity of it is disrupted by the railroad and existing utilities.

Campus activities and buildings have been directed away from the railroad corridor to minimize its presence. Trees and parking areas near the railroad would provide a buffer zone between the line and the campus reducing its visibility. Most viewing opportunities would be from circulation routes used for cross campus pedestrian and bicycle traffic.

Residents near Euclid Way and Shady Brook Trailer Park and travelers on Highway 10 would have views of the line but as previously stated the overall visual quality would remain unchanged.

The remainder of the route is well screened by the cut through Craigs Hill and would not be readily visible.

Route 3 - Unlike proposed Route 1 and 2 this route would pass through a highly urbanized area. Although the scenic quality along this route is low, the large number of people exposed would increase the relative visual impact.

The segment of new line near the Ellensburg Substation would not change the overall character of this neighborhood. It would affect the views from individual homes depending upon the placement of poles. Where the new line parallels Highway 10 it would be a highly visible addition to the landscape. Travelers along this highway would be subject to foreground views for approximately 1/2 mile. This distance would be less with undergrounding near Department of Natural Resources offices. Above ground transition structures would be required at underground terminal points. The increased size, complexity and visual impact of these structures would be offset by the reduced number of above ground poles required.

Overbuilding through downtown Ellensburg would require intermittent replacement of the already overburdened utility poles with larger ones. Impacts would be similar to those described for proposed Route 1. Although the present disarray of lines have become an accepted part of the downtown scene it would be unlikely that more lines could be added without increasing the visual problem that currently exists.

Recreation

Proposed Route 1 - Recreational impacts are negligible.

Route 2 - Recreational impacts are negligible.

Route 3 - Recreational impacts are negligible.

Historical, Architectural and Archeological

Proposed Route 1 - It does not appear any of the cultural resources listed in the Planning Supplement will be impacted by this route. A review by the State Historic Preservation Office has not revealed any sites that might be effected by this transmission project. BPA will comply with the National Historic Preservation Act of 1966 (P.L. 89-665) and Executive Order 11593 as outlined in section IV.B of the Fiscal Year 1978 Final Program Statement. Arrangements will be made for a professional archeological evaluation of the proposed route.

Route 2 - Similar to proposed Route 1.

Route 3 - Similar to proposed Route 1.

ROUTE ANALYSIS SUMMARY

Resources and uses previously identified as highly important, critical or unique are given special attention in planning, location, and construction of transmission facilities. Predictions of potential impacts to these important features (see fig. 10) are based upon past BPA experience, information from numerous agencies and individuals, and the expertise of interdisciplinary environmental specialists within BPA.

Within the Ellensburg Service Study Area, the relative significance of impacts to the different resources (summarized in figure 10) was determined. Impacts to the following resources are indicated by decreasing order of magnitude: Esthetics, Agriculture, Soils, Vegetation, Wildlife, Population Characteristics, Hydrology, Recreation and Historic-Archeologic.

In figure 10, two factors are considered in evaluating impacts: (1) the likelihood of an impact occurrence; and (2) the expected degree of impact.

Likelihood of Impact Occurrences

The following designations are used to evaluate the likelihood of an impact:

<u>Low</u>	- Resource or use is a point source or occupies a small portion of the study area and could be avoided in final alignment. "Low" includes those resources and uses in degree of impact category "none".
<u>Medium</u>	- Resources or use partially occupies a route and may be impacted in final alignment.
<u>High</u>	- Resource or use entirely transverses a route and would be impacted if final alignment were within the presently defined corridors.

Degree of Impact

These designations are used to evaluate the degree of impact:

<u>Slight</u>	- Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.
<u>Moderate</u>	- Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.

<u>High</u>	- Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.
<u>None</u>	- Due to the compatibility of the resource with transmission facilities, or the low likelihood of an interaction between the resource and the transmission facility, we expect no significant measurable adverse impacts.
<u>Unknown</u>	- Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

DECISION FACTORS

At this time plans for the joint occupancy of the Milwaukie railroad transmission line are unclear. So that the project may proceed, Route 1 was selected as the preferred route because it is away from the urban area, follows existing roads and is built over existing and proposed facilities for the greater part of its length. Route 1 has less overall impact than Route 3 and is the least costly of all alternative routes.

ALTERNATIVE TRANSMISSION LINE ROUTING SUMMARY IMPACT MATRIX

Resource Impacts	Proposed Route 1					Route 2					Route 3				
	*N	S	M	H	U	N	S	M	H	U	N	S	M	H	U
Soil Erosion	////					////					////				
Soil Compaction	XXXX	XXXX				XXXX	XXXX	XXXX			XXXX	XXXX			
Hydrology															
Number of Streams Crossed	2					3					4				
Number of Canals Crossed	1					1					1				
Turbidity	////					////					////				
Sedimentation	////					////					////				
Vegetation Removal	XXXX	XXXX				XXXX	XXXX	XXXX			XXXX	XXXX			
Alteration of Wildlife Habitat	////	////				XXXX	XXXX	XXXX			////	////			
Wildlife Population	////	////				////	////	////			////	////			
Population Characteristics	////					////					////				
Agriculture	XXXX	XXXX				////					////				
Esthetic	XXXX	XXXX	XXXX			Beneficial					XXXX	XXXX	XXXX		
Recreation	////					////					////				
Historic-Archeologic	////					////					////				

*Likelihood of Impact Occurrence

////// - Low

XXXXXX - Medium

■ - High

- Beneficial

NOTE: Impacts are project specific and a direct comparison between different BPA projects is to be avoided. Impact predictions assume BPA's standard mitigating measures, as outlined in the GCMP, are being carried out.

*None, Slight, Moderate, High, and Unknown refers to the degree of impact. //, XXXX and ■ refers to the likelihood of impact. Definitions of these designations are provided in the preceding section.

Figure 10. Summary of Potential Impacts and Requirements for **Route Location** Alternatives (the nature of impacts is described in the narrative).

Ellensburg Area Service
Study Area 78-2

	Proposed Route 1	Route 2	Route 3
<u>Requirements</u>			
Length (Miles)	3-1/4	2-1/4	2-1/2
New, No Existing			
Overhead Facilities	1-1/4	None	1
Rebuilding Existing			
Overhead Facilities	2	2-1/4	1-1/2
Percent of Route Utilizing Existing Overhead Facilities	62	100	60
Right-of-Way (Miles)			
New	1/2	None	1/4
Existing Transportation Corridor Right-of-Way	2-3/4	2-1/4	2-1/4
Access Roads (Miles)			
New	None	1/2	None
Travel Within Line Right-of-Way Where No Road Exists	1-1/4	1-3/4	0.3
Single Pole Structure Total	50	35	40
Single Circuit	Yes	No	Yes
Double Circuit	No	Yes	No
Disconnect Switch Required	Yes	Yes	No
Tons of Conductor (Penguin)			
(@ 2.3 tons per mile)	7	10.4	5.8
Time to Construct Project (Months)	5	5	5
Work Force (# of People)	10-20	10-20	10-20
Cost (\$000)	\$329,000	\$534,000	\$483,000

Figure 10 (Cont.). Summary of Potential Impacts and Requirements for Route Location Alternatives (the nature of impacts is described in the narrative).

PROPOSED SUBSTATION SITE

Introduction

The facility planning supplement identified the need for additional electrical facilities to serve the City of Ellensburg. It discussed a proposed and two alternative plans for providing this service. This final of the facility location supplement discusses the proposed substation site for the proposed plan of service.

On May 24, 1973, a preliminary site investigation for East Ellensburg Substation was conducted east of Ellensburg, in an area north and south of U.S. Highway 10. The Ellensburg-Kittitas County Planner and Electrical Superintendent for the City of Ellensburg, as well as BPA personnel participated in this field investigation. Several sites in the substation study area were examined at this time, but only one site was found to be suitable from an electrical standpoint, primarily because of its close proximity to the City of Ellensburg's electrical load center. These sites were re-examined in December of 1975 by BPA personnel, who found the previously determined site to be the most acceptable. After evaluating all economic, technical, and environmental considerations a proposed site was selected. A discussion of the major environmental and engineering considerations influencing this decision are provided under the "Site Selection Factors" section.

Most site characteristics are essentially as indicated in the "Description of the Environment" section in the facility planning supplement. Information in this section is an expansion of that regional information to provide site-specific data. This portion of the supplement will identify impacts and mitigating measures as they are related to resource and resource use characteristics of the substation study area.

Location Factors

The proposed site is located in the SE $\frac{1}{4}$, Sec. 36, T 18N, R 18E, Willamette Meridan, Kittitas County, Washington (see figure 11). It is about 200 feet north of the CM STP&P Railroad and approximately 150 feet south of U.S. Highway 10. It is a new site, not previously occupied by substation facilities. The land requirements for the substation, land use buffer, and entrance road will be about 2 acres. This site will require from 150 to 500 feet of entrance road which would connect the substation to the existing paved road (U.S. Highway 10) to the north.

General Construction Requirements

The substation will consist of approximately 100' x 200' fenced area containing BPA's 115-12.5 kV transformer, a power circuit breaker, and switching equipment as well as the City of Ellensburg's distribution facilities. The substation yard will be graded to a 1-2 percent gradient.

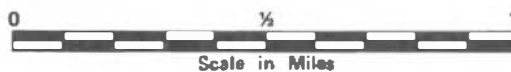
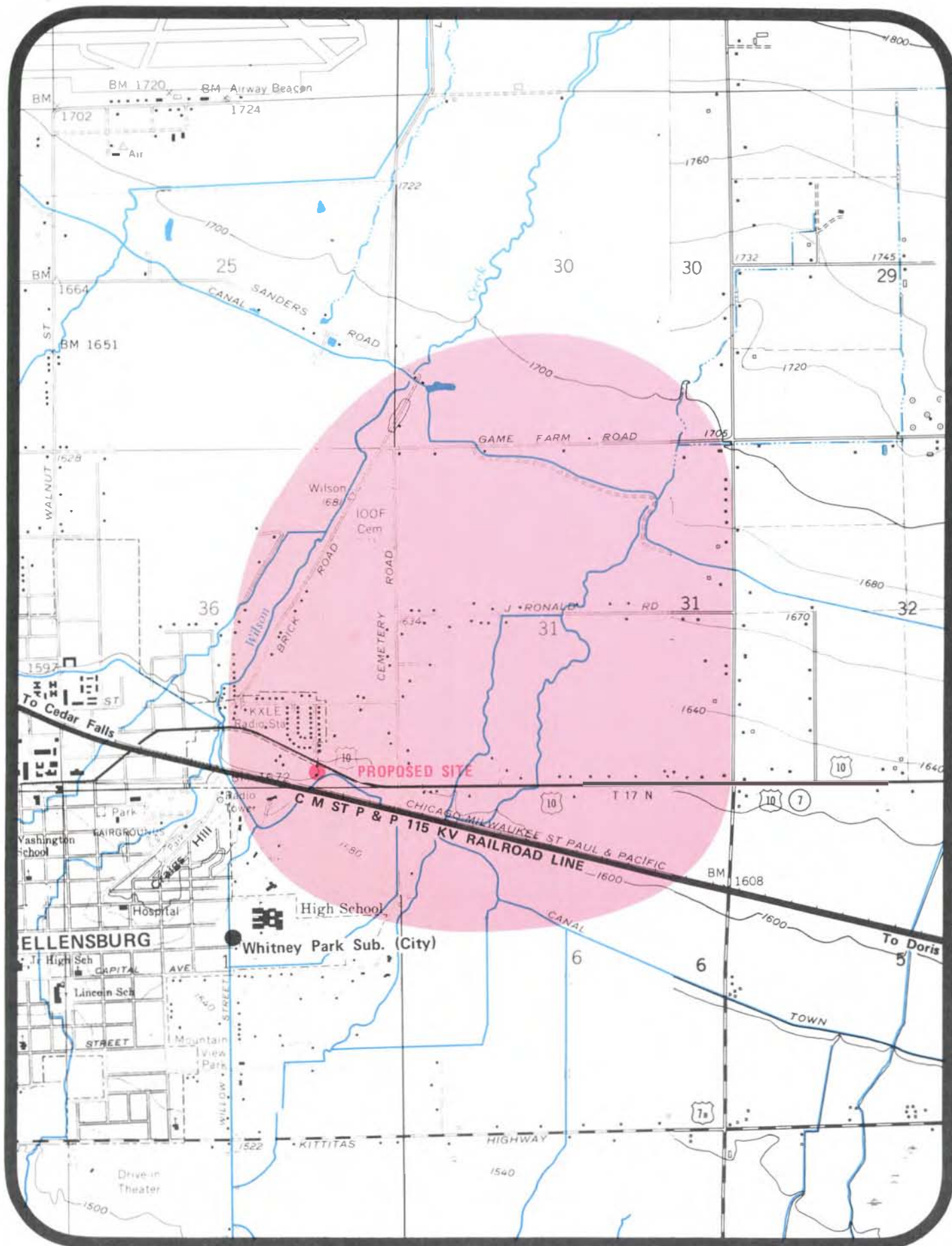
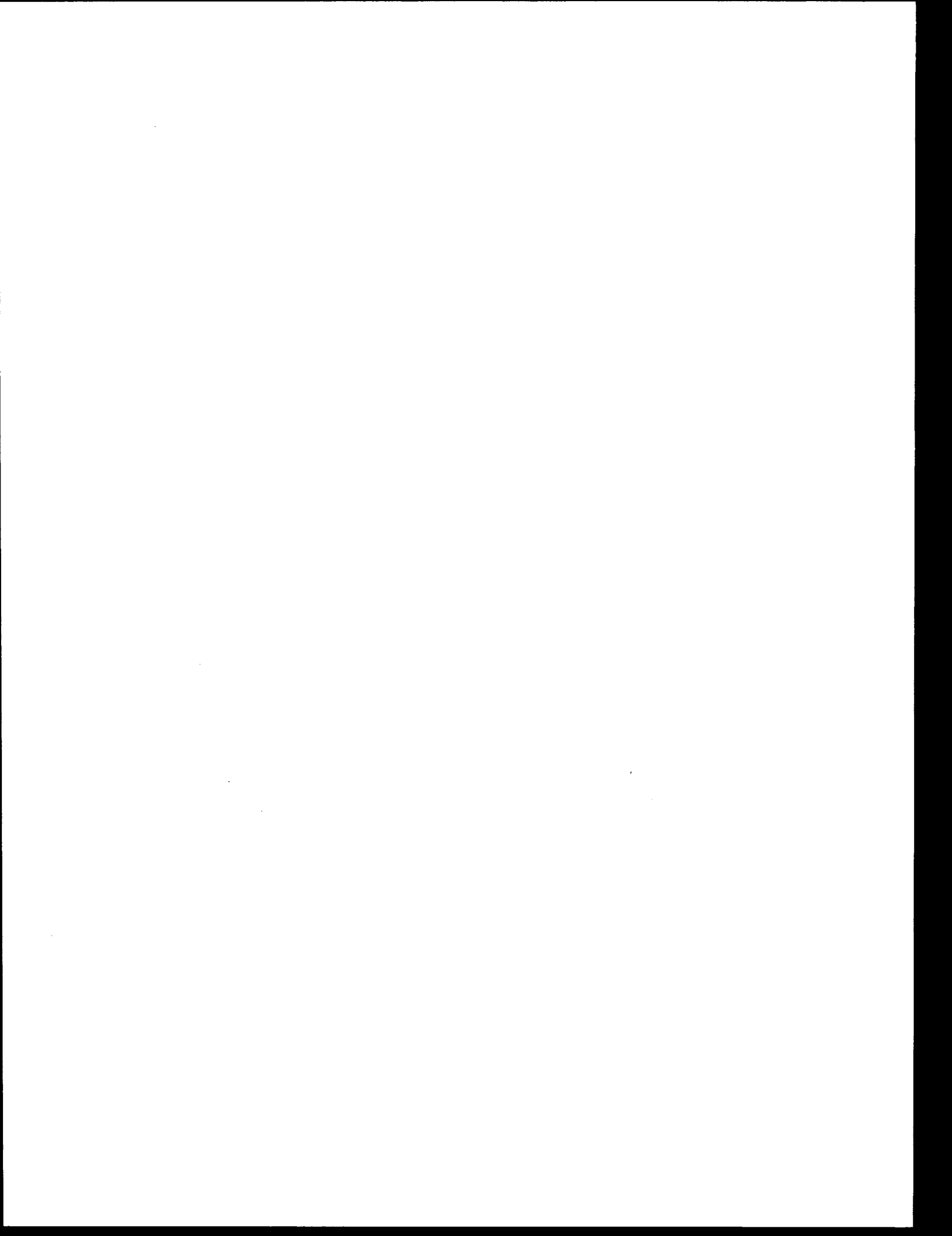


FIGURE 11
SUBSTATION STUDY AREA
ELLENSBURG SERVICE
78-2



Design and Material Requirements

The following estimated material requirements will be needed for construction of the substation facility: a control house building, 500 to 700 cu. yd. of crushed rock surfacing, 10 to 12 tons of asphaltic concrete, 500 to 700 ft. of concrete drainage pipes, 40 to 50 ft. of road culvert, 600 to 800 ft. of metal chain-link fence, a power circuit breaker, disconnect switches, 1800 to 2000 ft. of grounding cable, a 115-12.5 kV power transformer, several instrument transformers, a metering panel, phone service and 900 to 1000 ft. of control cable, a station service transformer, battery and battery chargers, 400 to 500 ft. of aluminum bus, 30 to 50 cu. yd. of concrete, and approximately 10 to 12 tons of structural steel. A conceptual design including simplified appearance structures and landscaping plantings is being proposed for this facility to enhance its compatibility with the surrounding environment.

Site Characteristics

The proposed site is located in an undeveloped area between the CM STP&P railroad and U.S. Highway 10 rights-of-way and about 1300 feet west of Cemetery Road. The substation will be partially hidden from view of travelers commuting to points east on U.S. Highway 10. It will, however, be visible to travelers commuting to points west.

BPA will provide maximum flood protection for its facilities and will comply with Executive Order 11296, "Evaluation of Flood Hazard in Locating Federally Owned or Financed Structures." A balanced cut-and-fill method will be used to bring the proposed site to its desired grade. To avoid any possible flooding conditions, the finished grade of the substation would most likely be raised to match that of the railroad grade. Vegetation on the site and surrounding area consists of native shrubs, weeds, and grasses.

Other Construction Characteristics

Construction of the substation would involve the establishment of a permanent entrance road about 20 feet wide with specified cut-and-fill slopes, clearing the site of brush and vegetative matter; grading and crushed rock surfacing a 2-acre substation site; placement of concrete foundations; installation of a small control house building (meter shelter); installation of underground conduit runs and a grounding system; assembly and erection of metal equipment supports and a dead-end tower; installation of electrical equipment such as transformers, circuit breakers, switch gear, and buses; and installation of metal chain-link fence around the periphery of the substation equipment. This substation will be painted with BPA's standard color scheme. Each color is used to identify specified equipment by its operational function.

Cost Requirements

The total cost of this facility including material and equipment, material handling, land acquisition, location surveys, design, and construction is estimated at \$538,000.

Operation and Maintenance Requirements

Herbicide would be applied annually on switchyards to prevent the growth of weeds. Initially, Pramitol 5PS would most likely be used. Application rate of Pramitol 5PS for this locality would be about 250 pounds per acre. This is slightly higher than the average application rate, however, it is required to control the rapid regrowth of vegetation, characteristic of the ecological conditions prevalent at the site. Different types of herbicide and corresponding application rates would be used alternately from year-to-year. Information on herbicide application including an analysis of its environmental effects is provided in Appendix B, Chapters VI and VII of BPA's Role EIS.

Manual maintenance would be required during the summer months to maintain any landscaping.

Painting of substation equipment is required about every 8-10 years.

Routine maintenance of substation equipment would occur periodically.

This substation is unmanned. A substation operator from another station would visit it once or twice per month to read meters and inspect the station.

THE ENVIRONMENTAL IMPACTS OF THE PROPOSED SUBSTATION SITE AND ITS MITIGATION

Natural Resources

The following sections will assess and discuss impacts of the proposed substation site to the natural resources identified in the facility planning supplement. Site-specific mitigation measures will also be discussed.

Geology and Soils

Construction of the substation and entrance road for the proposed site would not result in any geological impacts. Approximately 2 acres of soil would be directly disturbed by grading and other earth work operations related to the construction of the substation and access road. Some short-term wind and/or water erosion will undoubtedly occur in the construction area where the soil is exposed for short lengths of time. Occasional spring and/or winter flooding will not be a problem at this site. Site specific mitigation measures to be taken by BPA include:

(1) the finished grade of the substation and entrance road will be raised by a balanced cut-and-fill method to very nearly match those corresponding grades of the existing railroad and highway, respectively. This will bring the elevation of the completed facility above the high water table; (2) all excavated slopes will be appropriately rounded at the top and bottom to prevent raveling and separation of material; and (3) top soil will be stripped during site preparation and saved for reuse on cut-and-fill slopes. These slopes will be seeded with a cover crop as soon as possible to reestablish vegetation and prevent erosion.

Hydrology

Construction of the substation and entrance road for the proposed site should have little impact on hydrologic resources. Some minor turbidity and sedimentation may result from soil erosion in the area where construction operations have disturbed the soil. Although this site is adjacent to Town Canal, the canal is not expected to be adversely impacted. Irrigation ways, agricultural drains, and highway ditches can be spanned with proper location and installation of transmission line structures near the substation. In addition, culverts will be used at the entrance road. Poor drainage could be a problem during a portion of the year because of moderate to slow soil permeability and high water table. Construction procedures, such as raising the elevation of the site, installing a drainage system, etc., will be required to help overcome this problem. The ground water resources of the proposed site are not expected to be impacted. Mitigating measures taken by BPA to reduce the potential water quality impacts that can result from these activities are discussed in Appendix B, Chapter VIII, Section A.3. of BPA's Role EIS.

Since herbicides will be used to control all plant growth in the substation yard, there is a possibility that some of these chemicals may be washed into the drainage system during periods of heavy runoff. However, treatment cycles and chemicals will be adjusted to the local situation to keep this type of impact to a minimum.

Vegetation

Construction of the substation and entrance road for the proposed site would remove about 2 acres of native grasses and shrubs. Species to be removed include bunchgrass, sagebrush, bitterbrush, and hopsage. Substation cut-and-fill slopes will be seeded with a cover crop as soon after construction as possible to reestablish vegetation and prevent erosion. The impact to vegetation may be further mitigated through the use of appropriate landscaping plantings which are native or adapted to this locale.

Wildlife

A substation and associated access road located at the proposed site would remove up to 2 acres of shrub/grass wildlife habitat. This habitat supports many small mammals which are an important food source for birds of prey. Ground-nesting birds, including the ring-necked pheasant, would also be impacted.

The preproject wildlife populations are spatially distributed in relation to the type, location, configuration, and juxtapositioning of existing vegetative communities. Since every unit of habitat is assumed to be at its carrying capacity, any displaced animals would cause stress and ultimate mortalities in adjacent habitat areas.

With the planting of trees and shrubs for substation landscaping purposes it is anticipated that partial mitigation for these wildlife losses may be made. This new habitat type has the potential to support songbird populations.

During construction, noise, dust, and human activity could disturb wildlife in the immediate area. Most species would adapt to such disturbances and no long-term effects should result. No impacts are expected to any threatened or endangered species.

Resource Use and Social/Economic Resources

The following sections will discuss and assess impacts of the proposed substation site upon the social/economic resources identified in the facility planning supplement.

Population Characteristics 1/

The temporary population increase expected from the construction of the facilities in the proposed site is estimated to be between 10-12 people. These individuals will require housing for a 2 to 3 month period. Motels are normally used by construction crews if they are available. It is also estimated that some 3 to 6 temporary jobs would be available to local residents for the duration of the construction project. If these people are not available locally, they will have to be recruited elsewhere. The potential income from these jobs to the local area is estimated to be approximately \$23,000. The multiplier effect of providing services and supplies to these construction personnel has not been taken into consideration.

1/ Information for this section was obtained from the Substation Construction Section, Branch of Construction, BPA.

Agriculture

Although soil on this site may be suitable for agriculture, the small clearing size and its location near shop/commercial buildings and the railroad makes such use unlikely.

Forestry

Construction will not require removal of any merchantable timber.

Urbanized Land Use

Land use around the proposed site is a mixture of low density residential and commercial. Development at the proposed site would create a minimal impact on existing and/or future land use due to the close proximity of U.S. Highway 10 and the railroad. One small rental house located in the parcel of land directly west of the proposed substation site will be purchased by BPA and the tenant will be relocated.

The substation should have little interference with commercial land use. There could be some audible noise impacts or TV/radio interference to nearby residents. If residents experience television and/or AM radio interference, mitigation measures in accordance with BPA policy will be undertaken to restore reception.

Esthetics

The substation would be located near U.S. Highway 10 where it would be seen from approximately 1,000 vehicles per day. (Washington State Department of Highways, 1976.) Because Interstate 90 carries the bulk of East-West traffic in the area, many of the viewers will be local residents. The substation will be visible from nearby residences to the north. Future residential development in the area will increase the extent of this impact. The location of the substation between a major road and a railroad on the south will tend to reduce the degree of impact to viewers. A conceptual design for the facility including simplified appearance structures and landscaping plantings is being proposed to mitigate the esthetic impacts.

Recreation

A substation located at the proposed site would be highly visible from U.S. Highway 10. Visual impacts would result to some recreationists (bicycling, pleasure driving) and these are described in the "Esthetic" section. No impacts to any developed recreational areas are expected.

Cultural Resources (Historical, Architectural and Archeological)

No historic properties listed in or eligible for the *National Register of Historic Places* will be affected by the proposed substation site. The Ellensburg Rodeo and Kittitas County Fairgrounds are locally significant historical resources near the substation study area. Kittitas County Fairgrounds, identified in the Washington State Historic Inventory, is pending a determination of eligibility for inclusion in the State Register of Historic Places. This state register nomination is approximately one-half mile from the proposed substation site. Because of intervening structures and topography, there is a very low likelihood that either the rodeo or fairgrounds will be visually affected by the proposed site. The proposed substation site is not out of character with a radio tower, State Department of Natural Resources shops, and other buildings located in the area which might be viewed by spectators at the Fairgrounds.

BPA will comply with the procedures required by the National Historic Preservation Act of 1966 (P.L. 89-665), as well as the requirements of Executive Order 11593. Should any properties be discovered, procedural steps and protective measures as described in Section IV of the Fiscal Year 1978 Program Statement would be taken. Additionally, contract specifications require that if a site is discovered during construction, work will be halted until the site has been evaluated.

In compliance with Section 106 of the National Register Preservation Act of 1966 and Executive Order 11593, the Washington Archeological Research Center (WARC) has been requested to conduct a professional historic/archeologic review of the substation study area. Whether or not an archeological survey will be required will depend upon the results of the professional review. Should sites be identified, they would be considered for eligibility to the *National Register of Historic Places*.

Other Resource Uses and Socio/Economic Resources

Telecommunication facilities are located along the railroad corridor adjacent to the substation. If it is determined that an interference problem is occurring from the operation of a BPA substation or transmission line, the problem will be investigated and mitigated according to BPA policy, in cooperation with the affected utility.

No impacts are expected to other resources previously described in this section.

LOCATION ANALYSIS SUMMARY

Introduction

Resources and uses previously identified as highly important, critical or unique are given special attention in planning, location, and construction of substation facilities. Predictions of potential impacts to these important features (see fig. 12) are based upon past BPA experiences, information from numerous agencies and individuals, and on the expertise from interdisciplinary environmental specialists within BPA.

In figure 12, two factors are considered in evaluating impacts: (1) the likelihood of an impact occurrence; and (2) the expected degree of impact.

Likelihood of Impact Occurrences

The following designations are used to evaluate the likelihood of an impact:

<u>Low</u>	-Resource or use is a point source or occupies a small portion of the substation study area and could be avoided in final location. "Low" includes those resources and uses in degree of impact category "none."
<u>Medium</u>	-Resource of use partially occupies the substation study area and may be impacted in final location.
<u>High</u>	-Resource or use entirely transverses the substation study area and would be impacted if final location was within the presently defined study area.

Degree of Impact

These designations are used to evaluate the degree of impact:

<u>None</u> (N)	-Because the compatibility of the resource or resource use with transmission facilities, or the low likelihood of an interaction between the resource and other transmission facility, we expect no significant measurable adverse impacts.
<u>Slight</u> (S)	-Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.
<u>Moderate</u> (M)	-Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.
<u>High</u> (H)	-Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.
<u>Unknown</u> (U)	-Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

PROPOSED SUBSTATION SITE IMPACT MATRIX

Resource Impacts	Proposed Site				
	*N	S	M	H	U
Soil Erosion	///				
Soil Compaction	///				
Hydrology	///				
Vegetation	///				
Wildlife Habitat Altered (Acres)			2		
Agriculture	///				
Urbanized Land Use	■				
Esthetic (U.S. 10)	◆◆◆				
Recreation	///				
Historic-Archeologic	///				
Other Resource Uses					
Wilson Creek Cemetery	///				
<u>Requirements</u>					
Land Req. (acres)			2		
Entrance Road (ft.)			150-500		
Low Profile Structures			yes		
Crushed Rock Surfacing (cu. yd)			500-700		
Asphaltic Concrete (tons)			10-12		
Concrete Drainage Pipe (ft.)			500-700		
Road Culvert (ft.)			40-50		
Metal Chain-link Fence (ft.)			600-800		
Copper grounding cable (ft.)			1800-2000		
Aluminum Bus (ft.)			400-500		
Concrete (cu yd.)			30-50		
Structural Steel (tons)			10-12		
Time to Complete Project (months)			3		
Work Force (# of people)			10-12		
Cost			\$538,000		

*Likelihood of Impact

 - Low
 - Medium
 - High

NOTE: Impacts are project specific and a direct comparison between different BPA projects is to be avoided. Impact predictions assume BPA's standard mitigating measures, as outlined in the GCMP, are being carried out.

*N,S,M,H, and U refers to the degree of impact. ,  and  refers to the likelihood of impact. Definitions of these designations are provided in the preceding section.

Figure 12. Summary of Potential Impacts and Requirements for the Proposed Substation Site (the nature of impacts is described in the narrative).

SITE SELECTION FACTORS

Alternative sites were reviewed, but only one site was found in close proximity to the City of Ellensburg's electrical load center. The environmental impact of alternative sites were found to be similar to those described for the proposed site. The following is a summary of the principal engineering and environmental factors supporting BPA's site selection:

Engineering Factors

The proposed site meets the criteria for locating a source of supply at or as near as possible to a customer's load center so as to minimize transmission and distribution losses.

The proposed site is located close to existing distribution facilities owned by the City. Only a minimal amount of new construction would be required to interconnect with these distribution facilities. Other sites investigated would have required extensive construction of multiple distribution feeders outside the existing service area of the City of Ellensburg.

The proposed site has adequate physical size to enable future installations of a second transformer and additional low-voltage distribution feeder positions.

The proposed site with proper engineering design will have good drainage and flood control protection.

The proposed site is located adjacent to a main public thoroughfare, thus providing good access for the transportation of heavy equipment to be installed in the substation. It would also be used in the construction and maintenance of the facilities.

Environmental Factors

The proposed site is located in an area that has become commercially developed, and the proposed use would be compatible with the other uses now in existence.

Other sites investigated were found to be in areas more suitable for suburban, residential development.

Visual impacts of the proposed site was lessened by the topography of the surrounding land. A natural screen of high ground is located to the west for travelers using U.S. Highway 10.

Other Factors

The proposed site has been discussed with both representatives of the City Light Department and the Kittitas County Planning Department and meets with their approval and has been recommended by them for selection.

THE ADVERSE EFFECTS OF THE PROPOSAL

Certain limitations on land use and productivity could be an unavoidable result of the construction of any of these alternatives. These limitations include farm use adjacent to the tower sites where agricultural productivity is affected, and the restriction of construction of buildings or other structures on the right-of-way. Landowners would be compensated for the loss of crops in accordance with standard government policy.

Loss of soils by erosion, limits or changes in present irrigation practices, and elimination of some wildlife habitat could occur within the planning study area.

The addition of new structures and conductors will add to the visual impact associated with construction activities. These are often considered to be an annoyance to nearby residents.

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Based on present technology, the line and associated facilities needed for the alternative locations will have an expected useful life of 40 years. Experience in past years has shown transmission corridors are upgraded to higher capacity in response to technological advancements and energy demands. Also, BPA policy of constructing new facilities on or parallel to existing rights-of-way will likely result in long-term use of these transmission facilities.

THE IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Unreclaimable steel, aluminum, and other materials used for substation structures, conductors, and other hardware will be irretrievably committed. Manpower and fuel for construction equipment will be irretrievably expended.

Although it would be possible to remove the entire facility at a future time, it is likely the land used for transmission line poles will be irreversibly committed.

C O N S U L T A T I O N A N D C O O R D I N A T I O N
W I T H O T H E R S

CONSULTATION AND COORDINATION IN THE DEVELOPMENT OF THE PROPOSAL

The facility location supplement for Ellensburg service (78-2) discusses the proposed and alternate locations for the new facilities and the environmental impact associated with each location. This project was proposed for the first time in the Fiscal Year 1974 Annual Appropriations Request and was subsequently discussed in BPA's Fiscal Year 1974 Environmental Statement filed with the Council on Environmental Quality (CEQ) on April 3, 1973. It was dropped from the FY 1974 Program and later proposed in the Fiscal Year 1978 Program. It was discussed in BPA's Fiscal Year 1978 EIS filed with CEQ on June 1, 1976 and March 21, 1977.

In preparing the final location supplement for Fiscal Year 1978, BPA consulted with various Federal, regional, and local planning agencies. Draft planning supplements for this facility were sent to numerous Federal, State, and local agencies, environmental groups, and the public for review and comment. Public information meetings were held in Ellensburg, Washington on October 26, 1972, July 19, 1976 and May 5, 1977. Comments received during these review periods were considered in the preparation of the final location supplement.

COORDINATION IN THE REVIEW OF THE DRAFT FACILITY LOCATION SUPPLEMENT

The draft facility location supplement was sent to Federal agencies, State clearinghouses, and to local clearinghouses where these have been established by states, or to county or metropolitan planning commissions and environmental agencies where local clearinghouses have not been established. These agencies are listed below. A notice of availability of the draft facility location supplement was placed in the Federal Register.

AGENCIES REQUESTED TO COMMENT ON THE
DRAFT PLANNING AND LOCATION SUPPLEMENTS
(An asterick * indicates that comments were received)

Federal Agencies

U.S. Department of the Interior
 *Fish & Wildlife Service
 Bureau of Mines
 *Bureau of Indian Affairs
 *Bureau of Land Management
 *Bureau of Outdoor Recreation
 *National Park Service

Ellensburg Service
Study Area 78-2

- *Geological Survey
 - Bureau of Reclamation
 - U.S. Department of Agriculture
- *Forest Service
- *Soil Conservation Service
 - U.S. Department of Health, Education and Welfare
- *U.S. Department of Housing and Urban Development
- *U.S. Environmental Protection Agency
- *Energy Research and Development Administration
 - Federal Energy Administration
- *Federal Power Commission
 - Federal Aviation Administration
- *Advisory Council on Historic Preservation
- *U.S. Department of the Army
 - Army Corps of Engineers
- U.S. Department of Transportation

State Agencies

- Washington State
 - *Office of Program Planning and Fiscal Management
 - Office of Community Development
- *Department of Ecology
- *Department of Game
- *Historic Preservation Officer
- *Parks and Recreation Commission

Local Agencies

- Kittitas County Conference of Governments
- Kittitas County
- Ellensburg City Planning Commission

Other

- Washington Environmental Council
- Environmental Defense Fund
- Pacific Northwest Conservation Council
- *Sierra Club
- National Wildlife Federation
- Federation of Western Outdoor Clubs
- Friends of Earth
- Natural Resources Defense Council
- The Wilderness Society
- Natural Resources Law Institute
- North Cascades Conservation Council

COMMENTS RECEIVED DURING REVIEW PROCESS

USDA, Soil Conservation Service (April 29, 1977)

Comment: Our only comment has to do with the proposed East Ellensburg Substation site, Figure 7. The general area in the vicinity of the proposed site is influenced by high water tables. Depending upon the exact location, consideration needs to be taken concerning the provision for adequate drainage of the site and access road in your final plans.

Response: Provision for adequate drainage of the substation site and entrance road will be considered in BPA's final design. The major drainage provisions to be used are described in the "Geology and Soils" and "Hydrology" sections of the facility location supplement. These include:

1. The finished grade of the substation and entrance road will be raised by a balanced cut-and-fill method to very nearly match those corresponding grades of the existing railroad and highway, respectively. Consequently, the elevation of the completed facility will be above the high water table.
2. All excavated slopes will be appropriately rounded at the top and bottom to prevent raveling and separation of material.
3. Top soil will be stripped during site preparation and saved for reuse on cut-and-fill slopes. These slopes will be seeded with a cover crop as soon as possible to reestablish vegetation and prevent erosion.

A topographic survey and subsurface investigation will be needed to verify further design requirements. Undoubtedly such requirements will include the installation of concrete catch basins interconnected by a system of perforated and nonperforated drainage pipe and road culverts.

State of Washington, Dept. of Game (May 5, 1977)

Comment: It is unclear from the DEIS whether a hydraulics permit (issued by Department of Game and Department of Fisheries) would be required. Contact should be made with Mr. Jay Hunter of this office regarding construction of power line routes alongside and over waterways. We prefer, of course, selection of a route which is either an expansion of an existing route or one which disturbs as little vegetation, particularly riparian, as possible.

Response: BPA's contractor will obtain a hydraulics permit, if required for construction of the substation and tap line. Potential impacts to fisheries and riparian vegetation were considered in the selection of the proposed route.

State of Washington, Dept. of Game (May 5, 1977)

Comment: It would be more accurate to state that faunal populations currently existing would be lost, not "displaced" (page 53, Wildlife). Although the existing small animal population on the project site may be "displaced" into surrounding habitats, the carrying capacity of adjacent habitats is not increased by the introduction of additional animals but may actually decrease from overuse.

USDI, Fish & Wildlife Service (May 10, 1977)

Comment: Page 53, Wildlife. We suggested revising this paragraph to more accurately reflect project impacts somewhat in the following manner:

A substation and associated access road located at the proposed site would remove up to 2 acres of shrub/grass wildlife habitat. This habitat supports many small mammals which are an important food source for raptors. Ground-nesting birds, including the ring-necked pheasant would be impacted.

The preproject wildlife populations are spatially distributed in relation to the type, location, configuration, and juxtapositioning of existing vegetative communities. Since every unit of habitat is assumed to be at its carrying capacity, any displaced animals would cause stress and ultimate mortalities in adjacent habitat areas.

Response: We agree with the comments presented. The supplement has been revised to reflect this additional information. See discussion of impacts to wildlife on page 58 of the final supplement.

State of Washington, Dept. of Game (May 5, 1977)

Comment: The statement, "...Yakima River...(has) a medium quality aquatic wildlife diversity..." (page 10) is inaccurate. Our studies indicate the resident trout fisheries on streams of the Yakima Basin, supported by significant hatchery releases, attract heavy weekend and vacation campers from both sides of the state. Spiny-rayed fishing on lower Yakima River has gained in popularity in recent years, and Basin waters support some of the finest whitefish angling in the state. The winter steelhead fishery sustains an avid, hearty clientele. In short, the streams of Yakima Basin are among the more popular and heavily fished of any in the state.

Response: The supplement has been revised to more accurately reflect the importance of the Yakima River. See description of the existing environment-wildlife on page 11 of the final supplement.

State of Washington, Dept. of Game (May 5, 1977)

Comment: Load figures (page 1) may be somewhat misleading. A 32 percent increase in load over nine winters yields an average annual increase of approximately 3.55 percent, as opposed to your reported 3 percent. This .55 percent difference annually represents a significant amount of energy. Our figures indicate a projected national average of "nearly 3 percent" (U.S. Government), which suggests BPA is preparing for a greater growth rate in the Ellensburg area. In addition, both of these percentages are in excess of the President's goal to cut growth on U.S. energy demand to less than two percent a year.

Response: The supplement has been revised to more accurately reflect the estimated annual growth rate of 3.55 percent.

The growth rate forecasted for Ellensburg is not greater than the national average. An executive summary of the national energy outlook published by the Federal Energy Administration (January 15, 1977) indicates that electricity demand and generation is projected to grow at an annual rate of about 5 percent from 1975 to 1985 compared to the historical rate of about 7 to 8 percent. The overall or "total" energy growth rate is projected at 2.5 percent from 1975 to 1985.

USDI, Bureau of Outdoor Recreation (May 17, 1977)

Comment: When public planning and construction agencies are involved with urban projects near recreation centers, we encourage them to discuss with local recreation planners the possibility of enhancing existing or potential recreation resources. In Ellensburg, there exists a fairground, park and college near the transmission corridors. These are the types of resources which a corridor may complement by permitting access through previously unsafe or restricted right-of-way or planning transmission facilities which could easily incorporate future recreation provisions.

Response: BPA will cooperate with public agencies and/or private land-owners having control of lands along its transmission line rights-of-way for any beneficial use of that land, provided such use does not conflict with maintaining a safe and reliable transmission system.

USDI, Bureau of Outdoor Recreation (May 17, 1977)

Comment: The possible reconstruction of the Town Canal Bridge is an example of how a local recreation agency may benefit from Bonneville's activity. The city may wish to include some design features in the bridge to safely accommodate bicycling over the bridge. If the city is able to work with Bonneville now before bridge reconstruction, a considerable savings of time and money may be realized.

Response: BPA does not believe its construction activities will necessitate the reconstruction of Town Canal Bridge. The existing bridge will be utilized to accommodate most construction vehicles. If heavy equipment is required to be transported across the bridge, shoring will be added to increase its structural integrity.

USDI, Bureau of Outdoor Recreation (May 17, 1977)

Comment: It appears that the data used to describe the recreation setting was derived from the Columbia-North Pacific Region Comprehensive Framework Study (CNP). The objective of the CNP was to provide a very general analysis of water and related land resource problems and needs. Much of the recreation data contained in the study is at least 11 years old. We recommend that you use more localized and current information to discuss the recreation conditions in future facility location evaluations. Review of the pertinent Statewide Comprehensive Outdoor Recreation Plan may be helpful but more specific data is available in individual river basin plans, such as the current Yakima Level B Study. City and county recreation plans and computer printouts are obtainable from the Recreation Data Subcommittee of the Pacific Northwest River Basins Commission.

Response: In addition to the CNP Study, the Washington State Parks and Recreation Commission, Kittitas County Regional Planning Office, and City of Ellensburg were consulted concerning recreational resource data. Contacts were made with these agencies during the planning and location phases of this project. "Planning Coordination" is described on pages 2 and 30 of the final location supplement. "Consultation and Coordination" with other agencies is described on pages 65-70.

Public Meeting Comments

Tom Chini (May 5, 1977)

Comment: The City would like to go on record as saying a substation in the northeast area is very close to or at the proposed site where all our planning to date has evolved around.

Response: BPA has worked with the City of Ellensburg to insure that its project plans are compatible with the local land use and comprehensive plans of the area.

Marvin Schroeder (May 5, 1977)

Comment: Can you be more specific about the location? You have given us a general idea about where you plan to locate the substation. My reason for asking is rather obvious, because I own property in that area. I am not certain exactly where it is you propose to locate this substation. Can you be more specific?

Response: Yes, the proposed substation site is located in the SE $\frac{1}{4}$, Sec. 36, T18N, R18E, Willamette Meridian, Kittitas County, Washington. It would be located in the undeveloped area between the Milwaukee Railroad and U.S. Highway 10, just east of Department of Natural Resource Buildings.

Charles Gruhl (May 5, 1977)

Comment: I am speaking for the College. We too, are in favor of the substation. We do not notice an immediate increase in power usage. I think we see more flattening out from a conservation mood right now; however, we would support the construction of a transmission line other than Route 2, down the railroad track, the route you describe. We have worked very hard to get the poles out of there.

Response: Your suggestion was considered in the selection of the proposed route.

R E F E R E N C E S

- Aerial Photograph. 1973.
- City of Ellensburg Load Study, BPA. June, 1975.
- Columbia-North Pacific Technical Staff (CNP) Staff). 1969-72. Columbia-North Pacific Region Comprehensive Framework Study. Pacific-Northwest River Basins Commissions, Vancouver, Washington. 16 Appendices.
- Federal Register. National Register of Historic Places and Monthly Addenda through November 29, 1977. Vol. 42, No. 229.
- Fish and Wildlife Service (FWS). 1974. United States List of Endangered Fauna. U.S. Department of the Interior, Fish and Wildlife Service Washington, D.C. 22 pp.
- Highsmith, R. M. (ed.). 1973. Atlas of the Pacific Northwest. 5th edition. Oregon State University Press, Corvallis, Oregon. 168 pp.
- JARA (A Division of Sasaki, Walker, Robers Associates, Inc.). 1975. Environmental Assessment of Ellensburg Valley in the Wilson Creek Watershed, Washington. (Planning Document) prepared for the USDA Soil Conservation Service. 2 volumes.
- Jewett, S. G., W. P. Taylor, W. T. Shaw, and J. W. Aldrich. 1953. Birds of Washington State. University of Washington Press, Seattle in cooperation with the U.S. Fish and Wildlife Service, Washington, D.C.
- Kittitas County Comprehensive Plan Map, June 5, 1972.
- Load and Plan of Service Study, (Blue Book), BPA and the City of Ellensburg, January 1974, Ellensburg, Washington.
- McKee, Bates. 1972. Cascadia: The Geologic Evolution of the Pacific Northwest. McGraw-Hill Book Company. 394 pp.
- Pacific Northwest River Basins Commission. 1969. Climatological Handbook, Columbia Basin States. Temperature, Vol. 1, Parts A and B, 540 pp. Precipitation, Vol. 2, 262 pp.
- Shannon and Wilson, Inc. 1972. Seismic Regionalization Studies, Portland Oregon. 43 pp.
- State of Washington Highway Department - Utilities Accommodation Policy, December, 1974.
- U.S. Army Corps of Engineers. 1975. Washington Environmental Atlas. U.S. Army Corps of Engineers, Seattle District with assistance of the Institute for Environmental Studies, University of Washington.

U.S. Bureau of Census. 1979. Census of Population. Vol. 1, Characteristics of the Population. Part 49, Washington. 910 pp.

Washington Game Department. 1975. Big Game Status Report 1974-1975. Olympia, Washington. 248 pp.

Washington State Department of Highways - Traffic Flow Count. 1976.

West Group Forecast. 1975 through 1995 entitled Long Range Projection of Power Loads and Resources for the Pacific Northwest Subcommittee on Loads and Resources of Pacific Northwest Utilities Conference Committee. March 28, 1975.



Glossary



VII. Glossary

ALLUVIUM - Soil material, such as sand, silt, or clay, that has been deposited by water.

ANADROMOUS FISH - Species that are hatched in fresh water, mature in salt water, and return to fresh water to spawn.

ANDESITE - A fine-grained, drak-gray rock of volcanic origin.

AQUIFER - A geologic rock formation, bed, or zone that may be referred to as a waterbearing formation or waterbearing bed.

ARABLE LAND - Land suitable for plowing and, hence, for producing crops.

BASALT - A dark, tough, fine-grained to dense, extrusive volcanic rock commonly occurring in sheetlike lava flows.

BEDROCK - Solid rock beneath the soil and superficial rock.

BROWNOUT - An intentional reduction of loads in an area by the partial cutting down of lighting loads.

BROWSE - Woody shrubs or trees, the sprouts, twigs, stems, vines, and leaves, of which are cropped by livestock and wildlife.

BUS - Metal tubing used to conduct electricity within a substation.

CALCAREOUS - Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with hydrochloric acid. Soil alkaline in reaction owing to the presence of free calcium carbonate.

CLIMAX VEGETATION - The terminal community of a succession, which maintains itself relatively unchanged unless the environment changes.

COLDWATER FISH - Salmonid species that spend their entire life cycle in a freshwater environment.

COMMERCIAL FOREST - Forest land which is producing, or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation.

CONFLUENCE - A flowing together of two or more streams; the place where they join.

CONIFEROUS - Referring to fir, pine, or other conifers (cone bearing).

CORONA - Electrical discharge caused by ionization of air near a high-voltage conductor. Sharp edges, points, abrasions, etc., precipitate discharge causing radio and TV interference. Extreme care in handling large conductors is required to avoid damage. All hardware is designed to eliminate as much corona as possible.

CORRIDOR - A broad path within a study area identified during early stages of transmission line planning and environmental analysis which represents a plan of service within which a line could be located as a result of further evaluation.

COULEE - A deep gulch or ravine, usually dry in summer.

CROPPING SEQUENCE - Growing crops in combination with needed cultural and management measures.

DOUBLE-CIRCUIT - Two single-circuits mounted on the same towers.

DRIFT - Detrital deposits. Any rock material, such as boulders, till, gravel, sand, or clay, transported by a glacier and deposited by or from the ice, or by or in water derived from the melting of the ice.

ECOLOGY - The interrelationships of living things to one another and to their environment or the study of such interrelationships.

ECOSYSTEM - The interacting system of a biological community and its non-living environment.

EHV - (Extra High-Voltage) Commonly refers to voltages in the range of 500,000 to 700,000 volts.

ENVIRONMENT - The sum of all external conditions and influences affecting the life, development, and ultimately, the survival of an organism.

EPICENTER - The point on the earth's surface directly above the focus of an earthquake.

ESTUARY - An area where the fresh water meets salt water. For example, bays, mouths of rivers, salt marshes, and lagoons.

ETHNOGRAPHIC - The anthropological description of specific cultures, especially those of non-literate peoples or groups.

EVAPOTRANSPIRATION - Water dissipated from a land area by evaporation from water surfaces, moist soil, and plant transpiration.

GLACIO-FLUVIAL - Pertaining to streams flowing from glaciers or to the deposits made by such streams.

GRADIENT - Ascending or descending with a uniform slope.

HABITAT - The sum total of environmental conditions of a specific place that is occupied by an organism, a population, or a community.

HARDPAN - A hardened or cemented soil horizon, or layer. The soil material may be sandy or clayey, and it may be cemented by iron oxide, silica, calcium carbonate, or other substance.

HERBIVORE - An animal that feeds chiefly on plants.

HOLOCENE - The time period from present to about 15,000 years before present.

HYDROELECTRIC - Producing, or having to do with the production of electricity by water power or by the friction of water or steam.

IGNEOUS - Rocks formed by solidification from a molten or partially molten state.

IMPACT - To cause changes in something or the results of such changes.

INTERFACE - A surface that lies between two parts of matter or space and forms their common boundary.

INTERMONTANE - Between mountains.

INUNDATION - The covering by water of lands not normally so covered.

KILOVOLT-AMPERE - (kVA) 1,000 volt-amperes.

KILOWATT - (kW) A unit of electrical power equal to 1,000 watts.

LANDFORM - A terrain feature formed by natural processes that has a definable composition and range of characteristics that occur wherever that landform is found.

LACUSTRINE - Of or having to do with a lake or lakes.

LITHOLOGY - The physical character of a rock.

LITHOSOLS - Well-drained, shallow, generally stony soils over bedrock.

LOESS - Soil material consisting primarily of uniform silt particles that were transported and deposited by wind.

LOOP - To tie a substation into an existing line in such a manner as to complete the circuit along that line.

MEAN - Essentially the average; the sum of a set of individual values of any quantity divided by the number of values in the set.

MEAN ANNUAL RUNOFF - Average annual runoff adjusted for length of record by comparison with record at pivot stations.

MEGAWATT - (MW) 1,000 kilowatts or 1,000,000 watts.

METAMORPHIC ROCK - Rocks which have been altered from their original composition, texture, or internal structure by heat and/or pressure with or without the introduction of new chemical substances.

METASEDIMENTARY - Partly metamorphosed sedimentary rocks (rocks originally formed from the accumulation of sediment that have been partly altered in composition, texture, or internal structure by pressure, heat, and with or without the introduction of new chemical substances).

MITIGATE - To lessen the extent of an impact or to compensate for unavoidable impacts.

OUTWASH - Drift deposited by meltwater streams beyond active glacier ice.

OZONE - A form of oxygen, O₃, having three atoms to the molecule. It is a blue gas with a penetrating odor formed by the passing of an electrical charge through air or oxygen.

PACIFIC FLYWAY - One of the four major routes followed by migratory birds through the United States which connect breeding grounds with wintering areas. The Pacific Flyway is defined as the region between the crest of the Rockies and the Pacific, between the borders of Canada and Mexico.

PERENNIAL GRASS - Grasses in which the underground parts last more than 1 year.

PERIGLACIAL - Refers to areas, conditions, processes, and deposits adjacent to the margin of a glacier.

PHYSIOGRAPHIC PROVINCE - A region of similar structure and climate that has had a unified geomorphic history.

PLANT SUCCESSION - The process of vegetational development whereby an area becomes successively occupied by different plant communities of

PLEISTOCENE - The time period from 15,000 years to about 3 million years before present.

PRECIPITATION REGIME - The distribution of precipitation through the year.

PYROCLASTIC - Made up of rock material broken into fragments through volcanic or igneous action.

RAINSHADOW - The area of diminished rainfall on the lee side of a mountain or mountain range, where the rainfall is noticeably less than on the windward side.

RANGE MANAGEMENT - The art and science of planning and directing range use to obtain sustained maximum animal production, consistent with perpetuation of the natural resources.

RESIDUE MANAGEMENT - Using plant residues to protect cultivated fields during critical erosion periods.

RIGHT-OF-WAY - A strip of land acquired or used by an electrical utility for its transmission lines.

ROW CROP - Crops raised in rows designated by tilled soil between the rows.

SALMONID - Refers to fish of the family salmonidae. Includes salmons, trouts, whitefish, and char.

SCABLAND - Used in the Pacific Northwest to describe areas where denudation has removed or prevented the accumulation of a mantle of soil and the underlying rock in exposed or covered largely with its own coarse, angular debris.

SEDIMENTARY - Descriptive term for rock formed of sediment, sediment being solid material, both mineral and organic, that is in suspension, is being transported or has been moved from its site or origin by air, water, or ice, and has come to rest on the earth's surface either above or below sea level.

SEMIARID - Characterized by little yearly rainfall and by the growth of short grasses and shrubs; said of a climate or region.

SHUNT REACTOR - A device to reduce the voltage rise on transmission lines to acceptable limits.

SILVICULTURE - The science and art of growing and tending forest crops, based on a knowledge of the life history and general characteristics of forest trees.

SINGLE-CIRCUIT - A transmission system made up of three separate conductors with each conductor carrying one phase of the power transmitted.

SOFTWOOD TIMBER - Wood produced by coniferous trees, such as larch, pine, cedar, spruce, and fir; characterized by absence of vessels.

SPINYRAY FISH - Fish such as bass, sunfish, perch, and others which typically have hardened spines in their fins.

SUBSTATION - A distribution point on an electrical transmission system. It serves the following purposes: (1) to reroute electric energy, (2) to reduce high-voltage to lower voltages, (3) to serve an individual customer, in BPA's case, private or publicly owned utility or a heavy industry such as an aluminum plant.

TERMINAL FACILITIES - (A) Full terminal facilities - A complete bay including an overhead bridge, power circuit breakers, connecting bus, and power system control equipment which terminates the overhead line; (B) partial terminal facilities - a partial bay consisting of an overhead bridge and disconnect switches which terminates the overhead line.

TERTIARY AGE - Designating or of the first period preceding the Quaternary age in the Cenozoic Era comprising the Paleocene, Eocene, Oligocene, Miocene, and Pliocene Epochs.

THERMOGENERATION - A process of generating power utilizing heat to produce energy. Fossil fuels or nuclear energy may be used to produce the necessary thermal energy.

TOPOGRAPHY - The physical features of a district or region, such as are represented on maps, taken collectively, especially the relief and contour of the land.

TRANSMISSION GRID - An interconnected system of electric transmission lines and associated equipment for the movement or transfer of electric energy in bulk between points of supply and points of demand.

TURBIDITY - A condition of a liquid due to fine visible material in suspension which may not be sufficient size to be seen as individual particles by the naked eye, but which prevents the passage of light through the liquid.

UHV - (Ultra High-Voltage) Commonly refers to all voltages above 700,000 volts.

UNDERSTORY VEGETATION - Plants growing beneath the canopy of another plant. Usually refers to grasses, forbs, and low shrubs under a tree or brush canopy.

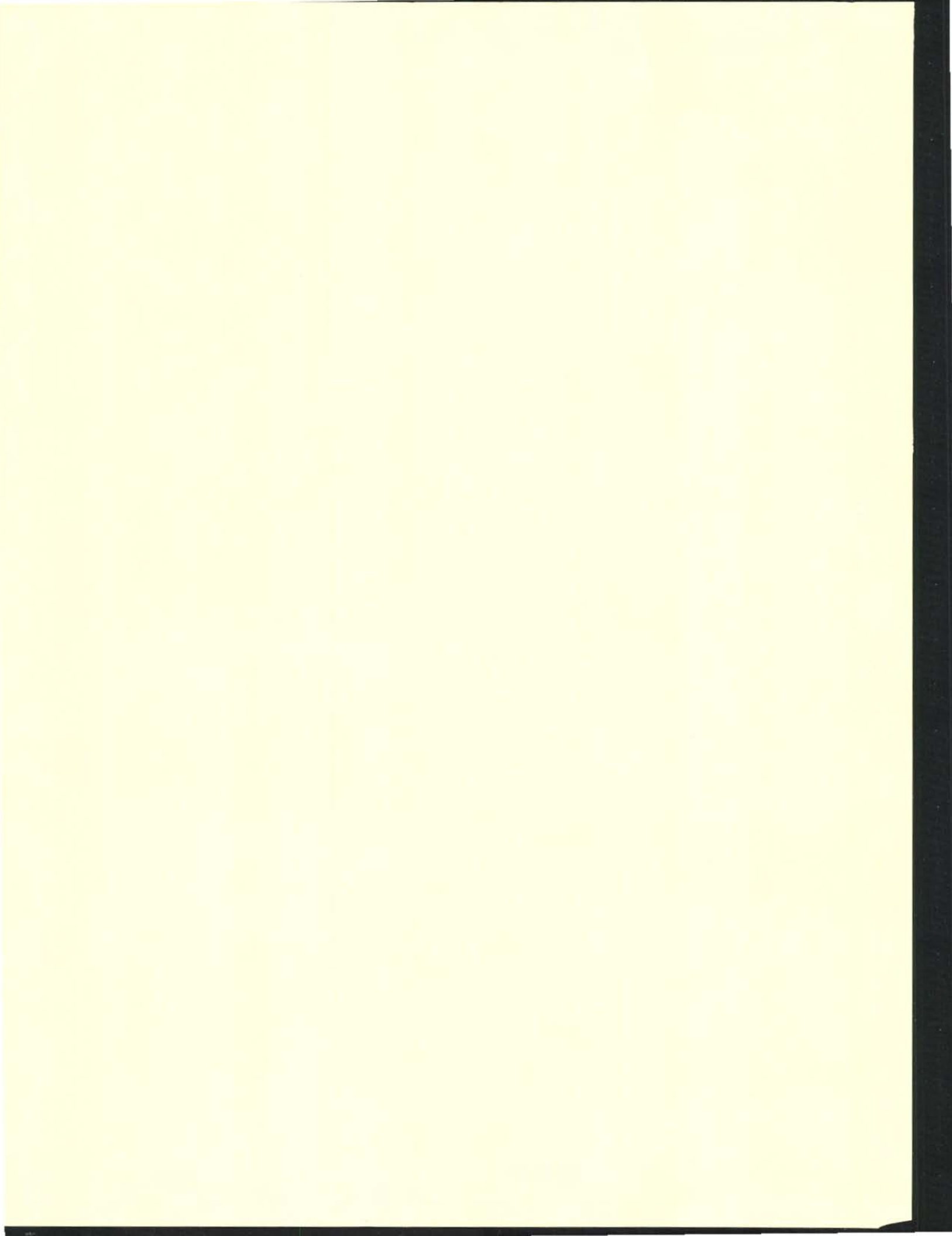
VISITOR DAY - A day or any part of a day spent visiting a feature or site in a particular region.

VOLTAGE - A measure of the difference in electrical potential between two points; the driving force that makes current flow in a circuit.

WATT - A unit of electrical power measurement that is the product of voltage and current.

WATERSHED - A term to signify drainage basin or catchment area.

Bibliography



VIII BIBLIOGRAPHY

- Anstey, Paul, 1976. Telephone Conversation on March 18, with City Engineer for City of Bonney Lake.
- Arnold, Arnold and Associates and Dames and Moore. 1975. Logging Roads and Protection of Water Quality. U.S. Environmental Protection Agency, Region X. Seattle, Washington. 300 pp.
- Artim, E. R. 1973. Geology in Land Use Planning: Some Guidelines for the Puget Lowlands. State of Washington, Dept. of Natural Resources, Division of Mines and Geology. Information Circular No. 47. 18 pp.
- Bartsch, A. F. 1967. Biology of Water Pollution, a Collection of Selected Papers on Stream Pollution, Waste Water and Water Treatment. USDI Federal Water Pollution Control Administration. 300 pp.
- Blair, William. 1976. Visual Impact on High Voltage Transmission Facilities. Jones and Jones and BPA. 157 pp.
- Brown, George W., and James T. Krygier. 1967. Changing Water Temperatures in Small Mountain Streams. Journal of Soil and Water Conservation. Vol. 22, No. 6, pp. 242-244
- Dyrness, C. T. 1967. Mass Soil Movements in the H. J. Andrews Experimental Forest. Research Paper PNW-42. USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 12 pp.
- Electric Light and Power Magazine. August 1974. T/D Edition.
- Federal Register. 1976-1977. Vols. 41, 42. U.S. Government Printing Office, Washington, D.C.
- Franklin, J. F. and C. F. Dyrness. 1973. Natural Vegetation of Oregon and Washington. USDA, Forest and Range Experiment Station. Portland, Oregon. 417 pp.
- Frederiksen, R. L. 1965. Sedimentation After Logging Road Construction in a Small Western Oregon Watershed. In Proceedings Federal Inter-Agency Sedimentation Conference, 1963. USDA Miscellaneous Publication 970, pp. 56-59.
- Goodwin, John G. 1975. Big Game Movement Near a 500-kV Transmission Line in Northern Idaho. Western Interstate Commission for Higher Education (WICHE) and Bonneville Power Administration. Portland, Oregon. 56 pp.
- Goodwin, John G. Jr. 1975. A 500-kV Transmission Line and Elk Movement. Unpublished paper.

- Habeck, James R. 1967. The Vegetation of Northwestern Montana. University of Montana, Missoula. 57 pp.
- Harlow, William M. and Harrar, Ellwood S. 1968. Textbook of Dendrology. McGraw-Hill, San Francisco. 512 pp.
- Hartman, Cynthia, Records Librarian (personal conversation). Washington Archaeological Research Center. Washington State University. Pullman, Washington.
- Highsmith, Richard M., Jr. (editor), 1973. Atlas of the Pacific-Northwest (5th ed.) Oregon State University Press, Corvallis, Oregon. 168 pp.
- Idaho Department of Parks and Recreation (IDPR). 1973. Idaho Outdoor Recreation Plan. Boise, Idaho. 388 pp.
- Idaho Fish and Game Department (IF&GD). 1972. Hunting and Fishing in Idaho. Information Leaflet No. 6. Boise, Idaho
- Idaho Fish and Game Department. 1971. Annual Report. Boise, Idaho. 106 pp.
- Idaho Fish and Game Department. 1968. Idaho Stream Classification. Boise, Idaho.
- Jewett, S. G., W. P. Taylor, W. T. Shaw, and J. W. Aldrich. 1953. Birds of Washington State. University of Washington Press, Seattle, in Cooperation with the U.S. Fish and Wildlife Service, Washington, D.C.
- Johnson, Robert H. 1972. Gas Turbines and the Environment. Paper presented at the General Electric State-of-the-Art Seminar, Asheville, North Carolina.
- Johnson, D. R. and Melquist, W. E. 1973. Unique, Rare, and Endangered Raptorial Birds of Northern Idaho. University of Idaho and U.S. Forest Service. Moscow, Idaho. 42 pp.
- Lantz, Richard. 1971. Guidelines for Stream Protection in Logging Operations. A Report of the Research Division. Oregon State Game Commission.
- LeDrew, Bill. 1976. Conversation on March 22 with Planner for Pierce County.
- Leege, Thomas A. 1975. Question: Timber or Elk in Northern Idaho. Idaho Wildlife Review. Vol. XXVII, No. 4, Jan.-Feb.
- Litton, R. Burton, Jr. 1971. An Aesthetic Overview of the Role of Water in the Landscape. Prepared for the Natural Water Commission, Department of Landscape Architecture, University of California. Berkley, California.

- Logsdon, R. L. 1975. A Report of Archaeological Investigations, San Juan County Site, 45 SJ 169 Decatur Island.
- McKee, Bates. 1972. Cascadia: The Geologic Evolution of the Pacific-Northwest. McGraw-Hill Book Company. 394 pp.
- Maykut, N. and Ruthford, J. 1976. Air Quality in Metropolitan Seattle. 96 pp. R. W. Beck & Associates.
- Montgomery, James M., Consulting Engineer Inc. 1975. Idaho Environmental Overview. State of Idaho, Boise, Idaho. 261 pp.
- Moore, Gerald L., et al. 1976. Some Management Implications of Habitat Type Classifications. Olson-Elliott and Associates. Helena, Montana. 80 pp.
- Mullison, W. R. 1970. Effect of Herbicides on Water and its Inhabitants. Weed Science. Vol. 18, No. 6, pp. 738-750.
- Munsell, David. 1975. Archaeological Study to Support an Environmental Impact Statement for a Proposed Bonneville Power Administration Transmission Corridor, Decatur-Lopez Islands. San Juan County, Washington. Unpublished paper submitted to BPA.
- Mussehl, T. W. and Howell, F. W. (editors). 1971. Game Management in Montana. Federal Aid Project W-3c. Montana Fish and Game Department. Helena, Montana. 238 pp.
- Norris, Logan A. 1971-75. Herbicide Residues in Soil and Water from Bonneville Power Administration Transmission Line Rights-of-Way. Reports of 8-24-71, 5-19-72, 2-14-73, 5-9-74, and 8-25-75.
- Odum, Eugen P. 1971. Fundamentals of Ecology (3rd Edition). W. B. Saunders Company, Philadelphia. 574 pp.
- Pacific Northwest River Basins Commission (PNRBC). 1969. Climatological Handbook, Columbia Basin States. Temperature, Vol. 1, 268 pp; Precipitation, Vol. 2, 262 pp.
- Pacific Northwest River Basins Commission. 1969-1972. Columbia-North Pacific Region Comprehensive Framework Study of Water and Related Resources. Vancouver, Washington. 16 Appendixes.
- Pacific Northwest Utilities Conference Committee. Subcommittee on Loads and Resources. 1976. West Group Forecast of Power Loads and Resources. July 1976-June 1987. Sections I-VI.
- Pierce County Planning Department, Parkland-Spanaway Project Office. 1976. Attitude Survey, Technical Report No. 19. Pierce County Planning Department, Tacoma, Washington. 44 pp.
- Pierce County Planning Department, Parkland-Spanaway Project Office. 1976. Community Form & Action, Technical Report No. 12. Pierce County Planning Department, Tacoma, Washington. 44 pp.

- Pierce County Planning Department, Parkland-Spanaway Project Office. 1976. Sprawl, Technical Report No. 17. Pierce County Planning Department, Parkland-Spanaway Project Office. 50 pp.
- Portland State University. Center for Population Research and Census. 1975. Population Estimates: Oregon Counties and Incorporated Cities. 5 pp.
- Puget Sound Air Pollution Control Authority. 1976. Air Quality Data Summary. 44 pp.
- Retfalvi, L. I. 1965. Breeding Behavior and Feeding Habits of the Bald Eagle (Haliaeetus leucocephalus L.) on San Juan Island, Washington. Master of Forestry Thesis. University of British Columbia, Vancouver. 193 pp.
- Rothacher, Jack. 1969. Managing Forest Land for Water Quality. In Proceedings of Joint FAO/USSR International Symposium on Forest Influence and Watershed Management, Moscow, USSR, pp. 232-244.
- Salo, Leo. J. 1975. A Baseline Survey of Significant Marine Birds in Washington State. For the Washington Departments of Game and Ecology.
- Schulz, Helmut W. 1975. Cost/Benefits of Solid Waste Reuse. Environmental Science and Technology. Vol. 9, No. 5, May, pp. 423-427.
- Shannon and Wilson, Inc. 1972. Seismic Regionalization Studies: BPA Service Area. Portland, Oregon. 43 pp.
- Smiley, Robert. 1976. Conversation on March 22 with Planner for Pierce County.
- Smith, David Martyn. 1962. The Practice of Silviculture. John Wiley and Sons, Inc., New York. 578 pp.
- Southard, A. R. 1973. Soils in Montana. Montana State University. Bozeman, Montana. 42 pp.
- Spritzer, Donald E. 1973. Waters of Wealth: The Story of the Kootenai River. Unpublished manuscript written for the U.S. Army Corps of Engineers, Libby Dam Visitor Center. The Montana Historical Society. 105 pp.
- Thomson, David. 1976. Conversation on March 22 with Planner for Thurston County.
- Thornbury, W. D. 1965. Regional Geomorphology of the United States. John Wiley, New York. 609 pp.
- Thurston Regional Planning Council. 1976. Thurston Regional Housing Inventory and Market Analysis. Thurston Regional Planning Council, Olympia, Washington. 129 pp.

- Thurston Regional Planning Council. 1974. Thurston Regional Employment & Population Forecast. Thurston Regional Planning Council, Olympia, Washington. 66 pp.
- Tillman, David A. 1975. Fuels from Recycling Systems. Environmental Science & Technology. Vol. 9, No. 5. May, pp. 418-422.
- Tsao, Albert and Wicks, Gary J. 1974. Draft Environmental Impact Statement on Colstrip Electric Generating Units 3 and 4, 500-kV Transmission Lines, and Associated Facilities. Volume 1-Summary. Montana State Department of Natural Resources, Energy Planning Division. Helena, Montana.
- U.S. Army Corps of Engineers. 1975. Washington Environmental Atlas. U.S. Army Corps of Engineers, Seattle District with assistance of the Institute for Environmental Studies, University of Washington.
- U.S. Department of Agriculture. 1969. U.S. Census of Agriculture.
- U.S. Department of Agriculture, Agricultural Research Service. 1963. 16 Plants Poisonous to Livestock in the Western States. USDA Farmer's Bulletin No. 2106. U.S. Government Printing Office, Washington, D.C. 49 pp.
- U.S. Department of Agriculture, Forest Service. 1973a. New Wilderness Study Area, Roadless Area Review and Evaluation. USDA Forest Service Current Information Report No. 11.
- U.S. Department of Agriculture, Forest Service. 1973b. Roadless and Undeveloped Areas. (Final Environmental Impact Statement.)
- U.S. Department of Agriculture, Soil Conservation Service (SCS). 1962. Soil Survey: San Juan County, Washington. 72 pp. and maps.
- U.S. Department of Agriculture, Soil Conservation Service. 1958. Soil Survey: Thurston County, Washington. Washington, D.C.; 79 pp.
- U.S. Department of Agriculture, Soil Conservation Service. 1955. Soil Survey: Pierce County, Washington. Washington, D.C.; 88 pp.
- U.S. Department of Agriculture, Soil Conservation Service. 1946. Soil Survey: Upper Flathead Valley Area, Montana. Montana Agricultural Experiment Station. 67 pp.
- U.S. Department of Agriculture, Soil Conservation Service. 1939. Soil Survey: Bonners County, Idaho. 67 pp.
- U.S. Department of Commerce, Bureau of Census. 1976. Population Estimates (Idaho, Montana, and Washington). U.S. Government Printing Office, Washington, D.C.
- U.S. Department of Commerce, Bureau of Census. 1973. 1970 Census of the Population, Vol. 1, Parts 14, 28, 39, 49. U.S. Government Printing Office, Washington, D.C.

- U.S. Department of Commerce, Bureau of Census. 1970. Census of the Population, 1970. Vol. I. Characteristics of the Population: Part 14, Idaho; Part 28, Montana; and Part 49, Washington. U.S. Government Printing Office. Washington, D.C., 910 pp.
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). 1975. Tide Tables 1976. West Coast of North and South America.
- U.S. Department of the Interior, Bonneville Power Administration. 1976. Population, Employment. Portland, Oregon.
- U.S. Department of the Interior, Bonneville Power Administration. 1975. Draft Facility Location Supplement for Hot Springs-Bell 500-kV Line. Supplement to the Environmental Statement, FY 1977 Proposed Program. 69 pp.
- U.S. Department of the Interior, Bonneville Power Administration. 1974. General Construction and Maintenance Program (GCMP). An Environmental Statement. 126 pp. and 4 Appendixes.
- U.S. Department of the Interior, Bonneville Power Administration. November 1973. Tips on How to Behave Near High-Voltage Power Lines.
- U.S. Department of the Interior, Bonneville Power Administration and Orcas Power & Light Co. April 1972. Load and Plan of Service Study (Blue Book). Eastsound, Washington.
- U.S. Department of the Interior, Bonneville Power Administration. December 1971. The Hydro-Thermal Power Program: A Status Report. Portland, Oregon. 60 pp.
- U.S. Department of the Interior, Bureau of Reclamation Columbia Basin Project. 1976. Proposed Columbia Basin Project, Final Environmental Statement.
- U.S. Department of the Interior, Fish and Wildlife Service. 1976. Proposed Determination of Critical Habitat for the Grizzly Bear. Federal Register. Vol. 41, No. 215, pp. 48757-59.
- U.S. Department of the Interior, Fish and Wildlife Service. 1974. United States List of Endangered Fauna (and Additions as Appear in the Federal Register). Washington, D.C. 22 pp.
- U.S. Department of the Interior, Fish and Wildlife Service. 1973. Threatened Wildlife of the United States. Resource Publication 114. Washington, D.C., 289 pp.
- U.S. Department of the Interior, Fish and Wildlife Service. 1968. National Wildlife Refuges of Puget Sound. Refuge Leaflet 544.
- U.S. Department of the Interior, National Park Service, 1976. "National Register of Natural Landmarks." Federal Register Vol. 40, No. 87.

- U.S. Department of the Interior, National Park Service, 1975-1977.
"National Register of Historic Places." Federal Register. Vol. 42,
No. 21 and subsequent monthly addenda through November, 1977.
- Vernberg, W. B. and F. J. Vernberg. 1972. Environmental Physiology
of Marine Animals. Springer-Verlag, New York. 346 pp.
- Vossler, Dan. 1976. Conversation on March 22 with Planner for Thurston
County.
- Warren, Charles E. 1971. Biology and Water Pollution Control. W. B.
Saunters Publishing Co., Philadelphia, Pennsylvania. 434 pp.
- Washington State Archaeological Research Center. 1977. Informational
Letter re Sites. Pullman, Washington.
- Washington State Inventory of Historic Places.
- Washington State Department of Ecology. 1977. Washington State Laws
& Regulations - Air Pollution. 27 pp.
- Washington State Department of Ecology. 1976b. Air Monitoring Data
for 1975. Washington State 56 pp.
- Washington State Department of Ecology. 1976a. Air Monitoring Data
Summary - 1976 Quarterly. 27 pp.
- Washington State Department of Ecology. 1975. Environmental Impact
Statement, Proposed Certification of the Camran Burner, pp. 18-19.
- Washington State Department of Fisheries. 1968. Washington State
Shellfish. Olympia, Washington. 16 pp.
- Washington State Department of Game. 1975. Big Game Status Report,
1974-1975. Olympia, Washington. 248 pp.
- Washington State Department of Natural Resources, Division of Mines
and Geology. Olympia, Washington. 2 sheets.
- Washington State Interagency Committee for Outdoor Recreation (IAC).
1974. Washington State Trails Program. Olympia, Washington. 41 pp.
- Washington State Interagency Committee for Outdoor Recreation. 1973.
Washington Statewide Comprehensive Recreation and Open Space Plan.
Olympia, Washington. 2 Vols.
- White, Robert and Cochnauer, Tim. 1975. Stream Resource Maintenance
Flow Studies. Idaho Department of Water Resources, Idaho Department
of Fish and Game, and Idaho Cooperative Fishery Unit. Boise, Idaho.
136 pp.
- Wise, M. I. 1974. Socioeconomic Effects of Major Construction Activities
on Small, Isolated Communities, in Economics of Natural Resources
Development in the West. Western Agricultural Economic Research
Council.

