RECORD OF DECISION
Third AC Intertie Project

Bonneville Power Administration (BPA), DOE

SUMMARY

SUMMARY: The U.S. Department of Energy, Bonneville Power Administration (BPA), has decided to construct, operate, and maintain the Third AC Intertie in the States of Oregon and Washington. This project will add about 1600 MW to the existing AC Intertie capacity. BPA's decision is based on the information contained in the documents listed below, which covered both the proposed action and alternatives to that action, as well as related actions:

The Intertie Development and Use (IDU) Draft Environmental Impact Statement (EIS). BPA. October 1986. (DOE/EIS-0125)

The Intertie Development and Use (IDU) Final EIS. BPA. April 1988. (DOE/EIS-0125-F)

The Eugene-Medford 500-kV Transmission Line EIS. Bureau of Land Management. 1983. (FEIS 83-23). Adopted by BPA. 1985. (DOE/EIS-0118)

The Eugene-Medford 500-kV Transmission Line Record of Decision. Bureau of Land Management. December 14, 1984.

Eugene-Medford 500-kV Transmission Line Record of Decision from Alvey Substation to Spencer Switching Station. BPA. October 28, 1985.

Hydro Operations Information Paper: Intertie Development and Use Environmental Impact Statement Information Update and Request for Comment. BPA. November 1987.

Long Term Intertie Access Policy Governing Transactions over Federally Owned Portions of the Pacific Northwest-Pacific Southwest (PNW-PSW) Intertie. BPA. May 17, 1988.

Administrator's Decision: Long Term Intertie Access Policy. BPA. May 17, 1988.

The DC Terminal Expansion Environmental Assessment. BPA. February 1985. (DOE/EA-0262)

The DC Terminal Expansion Supplemental Environmental Assessment. BPA. July 1986. (DOE/EA-0262S)

The DC Terminal Expansion Finding of No Significant Impact. BPA. August 29, 1986.

The DC Terminal Expansion Administrator's Decision Record. BPA. October 4, 1986.

Record of Decision to Operate the DC Terminal Expansion Project. BPA. August 31, 1988.

The California-Oregon Transmission Project (COTP) Draft EIS and Appendices. Western Area Power Administration (Western)/ Transmission Agency of Northern California (TANC).November 1986. (DOE/EIS-0128)

The California-Oregon Transmission Project (COTP) Supplement to the Draft EIS/Environmental Impact Report(EIR). Western/TANC. June 1987. (DOE/EIS-0128)

The California-Oregon Transmission Project (COTP) Final EIS and Appendices. Western/(TANC). January 1988. (DOE/EIS-0128)

The California-Oregon Transmission Project (COTP) Record of Decision. Western. April 22, 1988.

This Record of Decision (ROD) describes BPA's decision to construct and/or own, operate, and maintain the Oregon/Washington portion of the Third AC Intertie Project. Environmental impacts from construction actions are therefore covered for Oregon and Washington; environmental impacts from operation of the facilities are discussed for Oregon, Washington, California, the Inland Southwest, and British Columbia. Discussion of the environmental impacts associated with operation of the facilities in California is limited to air quality, thermal plants, and water use. These issues were not discussed in the COTP EIS and ROD, but were fully discussed in the IDU EIS. The need for this Third AC Project is to expand the bidirectional capability of the PNW-PSW Intertie transmission system; and to help serve California's need for economical power and the PNW's need to sell surplus power. BPA plans to carry out the following actions necessary to enable the Third AC Project to function:

1. In undertaking the planned Pacific Northwest (PNW) Reinforcement Project, BPA, Portland General Electric (PGE) and Pacific Power and Light (PP&L), will first sign a technical agreement with the California parties and proceed with preliminary work. Upon completion of further agreements on the terms of constructing, operating, and using the Third AC which enable the benefits listed above, BPA will undertake the following actions:
2. To complete its planned PNW Reinforcement Project, BPA will build a double-circuit line loop from its new Southern Oregon Substation to BPA's existing Grizzly-Malin #1 500-kV line (about 2 miles) and a single-circuit line loop (about 2 miles long) to PP&L's existing 500-kV Malin-Meridian transmission line; and will improve its existing facilities in Oregon and Washington.
3. To complete its planned PNW Reinforcement Project, BPA will exercise its option to acquire 50 percent of the incremental capacity of PP&L's proposed Eugene-Medford 500-kV line.
4. As part of the COTP, BPA will build a new Southern Oregon substation.
5. As part of the COTP, a 500-kV single-circuit line about 6 miles long will be built from the new Southern Oregon substation to the Oregon border, where it will connect with the line from California. BPA will own the Oregon portion of the line.

All practicable means to avoid or minimize environmental harm from the selected alternative have been adopted. Mitigation measures that apply to the BPA actions are listed in section 1.1.5 of the final COTP EIS. These measures will be incorporated into the proposed action through a Compliance Monitoring Plan. The proposed action is the environmentally preferred alternative, as compared to the No Action alternative.

SUPPLEMENTARY INFORMATION

Background

Additional Intertie capacity to California has been under study since at least the mid-1970's. The Third AC Intertie was proposed in the 1980 GAO report. In 1983, BPA's "Regional Marketing/Intertie Study Report" examined six Intertie alternatives with western utilities. Additional Intertie alter-

natives were evaluated in 1983. The GAO Report to the Secretary of Energy in 1983 stated that Bonneville "has been and should continue to play a big role in addressing the impediments." Title III of the Energy and Water Development Appropriations Act for Fiscal Year 1985 (P. L. 98-360) authorized the Secretary of Energy, through the Western Area Power Administration (Western), to "construct or participate in the construction of such additional facilities as he deems necessary to allow mutually beneficial power sales between the PNW and California and to accept funds contributed by non-Federal entities for that purpose."

A group of California public and private utilities developed, with Western, a proposal (COTP) to respond to the determination that additional transmission facilities were necessary. Congress requested that a Memorandum of Understanding (MOU) be developed among the interested parties. That MOU was executed in December 1984 by TANC, a group of 23 investor- and public-owned utilities in California; Western; and the California Department of Water Resources.

The COTP EIS was jointly prepared by TANC and Western to fulfill requirements under both the California Environmental Quality Act and the National Environmental Policy Act (NEPA). BPA was a cooperating agency for the COTP EIS. BPA kept PP&L and PGE informed and insured effective notification and involvement of Northwest parties. BPA, PP&L, PGE, and TANC worked closely with the Oregon Governor's Review Committee in 1986 to coordinate state agency and citizen participation in the project. The Final EIS was issued in January 1988. BPA adopts this final EIS and concludes that its comments and suggestions have been satisfied.

TANC and Western proceeded with their Notice of Determination and ROD respectively, indicating their intent to proceed with the project. BPA, through the IDU EIS, studied the operational and economic impacts of a Third AC Intertie. The Final IDU EIS was released in April 1988.

The proposal for this Record of Decision is that AC Intertie owners in the PNW (Bonneville Power Administration, PGE, and PP&L) take actions to enable successful operation of the facilities. The purposes of the proposed actions are to enable the expansion of the bidirectional capability of the PNW-PSW Intertie transmission system; to help serve California's need for economical power; to support the PNW desire to sell surplus power; and to maintain and increase the reliability of the existing transmission system.

The COTP will add about 1600 megawatts (MW) of additional transfer capability between the PNW and California. The COTP and the PNW Reinforcement Project would add to and strengthen the existing high-voltage transmission links between California and the PNW. The two actions were considered together in the COTP EIS, recognizing the cumulative impacts and the benefits.

The COTP EIS and the Eugene-Medford 500-kV Transmission Line Final EIS primarily addressed the impacts directly associated with the transmission lines themselves, such as impacts on land use, visual impacts, electromagnetic effects, noise, impacts of construction, and so on. The Intertie Development and Use (IDU) EIS addressed the impacts which were projected to arise from changes in the operation of the power system. Power system operations are

affected by the availability of additional Intertie capacity in conjunction with BPA policy regarding access to the Intertie by Northwest utilities and power marketing by BPA and Northwest utilities to California utilities, also topics of the IDU Final EIS. All three EIS's were relied upon in making BPA's decisions in this Record of Decision.

Actions

The actions elected in this ROD are necessary to meet the needs listed above. Those actions include the PNW Reinforcement Project, a joint project by BPA, PP&L, and PGE to construct new and modify existing transmission lines and supporting facilities in southern Washington and Oregon. This project was identified as a result of studies of future transmission needs associated with increased power flows on the Intertie system. The proposed action includes all environmentally preferred alternatives, except where noted.

Specifically, those actions would include:

A. Interconnection Agreement.

An interconnection agreement will be required between BPA, PGE, and PP&L, and California parties participating in the COTP/Third AC Intertie Project. This agreement will define the physical aspects of the interconnection between the PNW-PSW Intertie systems and the parameters within which the line's operation will occur. The parties have agreed that the point of interconnection will be at the California-Oregon border.

B. Pacific Northwest Reinforcement Project.

Actions are detailed in Volume 2C of the Draft COTP EIS and in Volume 1 of the Final COTP EIS, as well as in the COTP Record of Decision. They include:

- BPA will construct a 2-mile double-circuit loop line from the new Southern Oregon substation to BPA's existing Grizzly-Malin #1 500-kV line and a 2-mile single-circuit loop line from the substation to PP&L's existing 500-kV Malin-Meridian line.
- BPA will modify its Ashe, Buckley, Malin, Slatt, Grizzly, and Alvey Substations by adding breakers, new series capacitors, and/or making relaying and protection system modifications. These modifications will be done within the existing yards for Ashe, Buckley, Alvey, and Malin Substations; expansion will be required for actions at Slatt (1 acre additional required) and Grizzly (2 acres additional). The fence line at Alvey would have to be moved to accommodate the additional equipment. Actions at Ashe, Buckley, and Malin have changed from the electrically preferred options described in Table 1.1.2-3 in Volume 1 of the Final COTP EIS. A change in plan-of-service indicates that less work is required and less equipment will be added at each of these substations. Environmental impacts would be equal to or less than those anticipated for the options designated in Table 1.1.2-3.
- BPA and PGE will replace series capacitor banks at Sand Springs, Fort Rock, and Sycan compensation stations; BPA will add a new series capacitor bank at each station. These actions will require expansion beyond the existing yards: a maximum of 9 acres at each locale.

- PP&L will add series capacitor banks at Dixonville and Meridian Substations. These actions will require expansion outside the existing yards: about 2 acres at Dixonville, and about 4 acres at Meridian.

C. Eugene-Medford.

After notification by BPA, PP&L and BPA will build a new 500-kV line from Alvey Substation near Eugene, Oregon, to Meridian Substation near Medford, Oregon. The line will serve PP&L customer loads in southern Oregon and northern California. In 1986, BPA and PP&L signed an agreement that provides BPA an option to acquire a 50 percent interest in the incremental capacity of PP&L's planned Eugene-Medford line to be used for Intertie purposes. The agreement also provides for present and future planning and joint use of PP&L's and BPA's high-voltage transmission facilities to serve PP&L's loads in southern Oregon, and for Intertie transactions to California. The agreement gives BPA the right to develop the plan-of-service for any upgrades of the AC Intertie to 4800 MW, including connection to the COTP.

Actions for Eugene-Medford are detailed in the Eugene-Medford Final EIS and Record of Decision (Bureau of Land Management) (FEIS 83-23), completed and published in 1983. BPA was a cooperating agency in preparation of the EIS and published its own Record of Decision for the project. Construction and operation of the Eugene-Medford line is a project separate from the COTP, but necessary for its operation at full capacity.

D. California-Oregon Transmission Project.

Actions are detailed in the Western/TANC COTP EIS/EIR and in the Western COTP Record of Decision. They include:

- Constructing a new BPA substation, with microwave equipment, in Southern Oregon, near Malin. This action would require about 46 acres of land, allowing for future expansion. (No expansion is currently planned; any future expansion would be covered in separate environmental documents.)
- Constructing a new 500-kV AC transmission line (about 146 miles long) from that new substation near the California-Oregon border to the proposed Olinda Substation near Redding, California. About 6 miles of the line are in Oregon and will be owned and operated by BPA.
- Other actions south of Oregon (see COTP Record of Decision for details).

The environmentally preferred alternatives were selected as the project preferred locations.

Relationship to Other Actions

A. DC Terminal Expansion.

The DC Terminal Expansion Project is being completed by BPA and the Los Angeles Department of Water and Power. The project is scheduled for commercial operation in Spring 1989 and will increase the transmission capacity of the DC Intertie from 2000 MW to 3100 MW. Like the COTP/Third AC Project, the Terminal Expansion Project will influence the operation of generating resources in the PNW, California, and the Inland Southwest, as well

as in British Columbia. It will enable additional sales of firm and nonfirm energy from the Northwest to California. Without this additional transmission capacity, more of this nonfirm energy might spill unused over Northwest dams during periods of high river flows. The increased capacity will also improve the ability of users to shape sales into hours when they are of greatest economic value.

B. Long-Term Intertie Access Policy.

BPA's Long Term Intertie Access Policy (LTIAP) became effective May 17, 1988. The Policy provides the parameters under which the Federally controlled portion of the Intertie shall be used by non-Federal parties. It defines methods for allocating Intertie access for both firm and spot market sales transactions. This Third AC Record of Decision assumes that access to the Federal portion of the additional capacity created by the COTP/Third AC Intertie in the PNW will be governed by the terms of the LTIAP.

C. Firm Marketing.

In the IDU EIS, BPA analyzed a variety of firm marketing scenarios involving Federal and non-Federal sales between the Northwest and California. These analyses were designed to assess the economic and environmental consequences of various uses of the Intertie system. The Third AC Intertie is cost-effective without additional firm marketing contracts.

Alternatives Not Selected

In arriving at a decision, BPA evaluated an Action and a No Action alternative.

No Action.

BPA could decline to (1) undertake negotiations for an interconnection agreement; (2) carry out any of the actions needed to reinforce the sub-stations in Oregon and Washington; and/or (3) implement its rights for capacity on the Eugene-Medford project. Environmental impacts from construc-tion would not then occur. The No Action alternative was not selected because it does not meet the needs to which BPA is responding: to enable sale and transfer of PNW surplus power to California and to provide California with economical power.

Factors Used in Making the Decision

In making a decision, BPA considered the following factors: ability to meet the need, engineering performance, economic factors, public and insti-tutional issues, and environmental effects.

A. Ability to Meet the Need.

Meeting California's need for economical power and the desire to market additional surplus power from the PNW and expanding the bi-directional capability of the PNW-PSW Intertie transmission system require additional transmission capacity between the regions. This project fully meets the three needs.

The DC Terminal Expansion Project is also being built to increase transfer capability, but does not meet the needs for the Third AC Project.

B. Engineering Performance.

The PNW Reinforcement Project and the Eugene-Medford Project consist of system facilities and reinforcements in the Northwest necessary to transmit an additional 1600 MW to the California-Oregon border. The interconnection point for the PNW Reinforcement Project and the COTP is at the California-Oregon border; the 500-kV line extends north from the border to the new Southern Oregon substation. The Northwest system additions are required to meet Third AC Intertie Project and Western Systems Coordinating Council (WSCC) reliability criteria for system design. The proposed actions were planned to enable interregional transfers and reliable service to central and southern Oregon and northern California loads.

Requirements include maintaining acceptable system voltages under normal and outage conditions, meeting transient stability and system performance requirements for AC single contingency outages without remedial actions and for AC double contingency outages with remedial actions, and to meet transient stability and system performance requirements for DC monopole and bi-pole outages.

The PNW Reinforcement Project, in conjunction with the COTP, is expected to improve the reliability of the WSCC interconnected system. This will be accomplished through special routing considerations for the new Southern Oregon-Olinda-Tracy 500-kV line. The new right-of-way will be widely separated from the existing two-line PNW-PSW AC Intertie, making it highly unlikely that all three lines would be lost due to a common event. Therefore, transmitting additional power reliably can best be done by the proposed action, which offers adequate capacity and adequate separation to meet reliability concerns.

C. Economic Factors.

The economic factors which BPA identified and considered in arriving at a decision concerning operation of expanded Intertie capacity include the following:

- Cost savings through displacing or deferring California resources;
- Cost of operating PNW and Canadian resources used to provide economy energy for displacement of California resources;
- Increases in PNW/BPA revenue requirements due to construction investment required for expanding Intertie capacity;
- Expected distribution of benefits to BPA and the PNW.
- Revenue to the PNW/BCH/BPA and cost to the PSW from economy energy sales.
- Wheeling revenue to the BPA/PNW and cost to British Columbia Hydro (BCH) for wheeling BCH economy energy.
- Costs or benefits to the PNW/BPA due to any increase or decrease in curtailment of the DSI top quartile.

The following economic issues, raised through public review, were also considered:

- The calculation of the net benefit of using expanded Intertie capacity to market additional power should take into consideration the costs of unmitigated environmental effects.
- The cost/benefit analysis should include the costs of measures that might be needed to mitigate environmental consequences.
- The economic analyses should address a range of potential values for critical factors underlying the structure of the economic analyses including assumptions concerning future Northwest and California electrical loads, resources, alternative fuel costs, types of sales, and Canadian prices.
- The impact of the FERC order disapproving the BPA SL-87 rate should be considered. The potential for FERC to disapprove the SP-87 rate leaving only the nonfirm standard rate for California transactions should be considered.

Mitigation costs for construction of the line were included as part of the cost of the Third AC project. Analysis presented in the IDU EIS (Chapter 4) found that the unmitigated environmental impacts related to power system operations were not significant for the Third AC Intertie. Therefore, there were no mitigation costs to consider in the economic analysis relative to power system impacts, and the environmental costs associated with these insignificant impacts were too small to warrant further evaluation.

Analyses presented in the IDU EIS considered the economic effects of various methods for allocating access to the Intertie (Section 4.5 and Appendix I, Part 3). This analysis assumes the application of BPA's LTIAP to all sales over the Third AC Project.

Analyses were completed assuming use of the Third AC Project for economy energy sales only. Additional analyses were prepared assuming Third AC Project use to enable long-term firm sales as well. The present value in 1987 dollars of the total net incremental benefits (incremental benefits minus incremental costs) of the Third AC Project for the PNW, California, and British Columbia were $661 million, assuming economy energy sales only (IDU Final EIS, Section 4.5 and Appendix I, Part 1). Of that $661 million, $253 million would go to the Northwest, of which $199 million would go to BPA. The present value of Third AC Project benefits, when assuming a 600 MW firm capacity sale, increased to nearly a $1 billion for the Westwide Region and to $390 million for BPA. (IDU Final EIS, Appendix I, Tables I.1-3 and I.1-4).

Another economic factor that was considered was the payback period, the point at which all investment and expended O&M costs have been recovered. The payback period for BPA was calculated at 2006. This means that the project investment cost is repaid in the fourteenth year of the forecasted Third AC Project life of 45 years.

BPA's internal rate of return, the discount rate that forces the net present value of benefits to 0, was also calculated to be about 12 percent. That is, BPA estimates that an alternative investment would have to return more than 12 percent in order to be a better investment than the Third AC Intertie. BPA's

benefit to cost ratio was calculated at about 1.7. That is, the total incremental benefit to BPA, $488 million, divided by the transmission cost, $289 million, is about 1.7.

The impact of the FERC decision disapproving the SL-87 rate does not directly impact the BPA analysis because the SP-87 rate was used to price firm surplus. If FERC were to rule that BPA were constrained to use only the NF standard rate for all economy energy sales, including firm surplus, then BPA benefits from the Third AC intertie would decrease by about $125 million. That is, the net present value of benefits for BPA would decrease from $199 million to about $74 million.

Because the future contains much uncertainty, those variables that BPA felt had the greatest impact on economic results were studied further. The sensitivity variables included California gas prices, California load forecasts, PNW load forecasts, the price that California is willing to pay (a percentage of California marginal cost), firming non-firm strategies in the PNW, environmental dispatch of thermal projects, BCH price decrease, real discount rate, and investment cost in the Third AC Project. See Section I.1.3 of Volume 4 of the IDU EIS for a full explanation of sensitivities.

The net incremental benefits to BPA ranged from a potential loss of $76 million to a potential benefit of $1,289 million.

The following table shows the extremes of benefits to BPA under five items of uncertainty, assuming economy energy sales.

SENSITIVITIES
MOST LIKELY SCENARIO - ASSUMES ECONOMY ENERGY SALES ONLY

Uncertainty	BPA 1987 $Millions Net Present Value			
	Low Forecast		High Forecast	
PNW load		1289		-76
PSW load		42		418
PSW gas price		-64		847
Marginal cost *	(50%)	-18	(85%)	556
Firming nonfirm **	(800 MW)	109	(1600 MW)	44

* The percent of its marginal cost that California is willing to pay for PNW energy.

** Non-firm can be "firmed up" by installation of, for example, combustion turbines which are displaced during good water conditions and run during critical water conditions.

The present value of net incremental benefits shows that the upside (positive) benefits far outweigh the downside (negative) costs. This skewness increases confidence in the positive benefits of building the Third AC Project.

The expected present value of net incremental benefits, taking into account the probabilities associated with PNW load and PSW gas uncertainty, showed a benefit of $516 million to BPA and over $1 billion to the Westwide region. (IDU EIS, I.1-3)

Even though the benefits of the Third AC over its forecasted life are significantly positive ($661 million in the economy energy sales case), there was concern that the annual benefits would bring adverse rate impacts in the early years. As a result, an initial analysis was developed for the economy energy medium forecast case, using a simple "home-mortgage type" approach for transmission costs. Transmission investments were assumed to be paid off in uniform payments over the life of the project at a nominal interest rate of 8.15 percent. Annual operation and maintenance costs were also forecasted. The combination of these transmission costs with benefits showed negative annual economics in the first few years for BPA.

To further refine the annual cost estimates, BPA developed a forecast of increases in BPA revenue requirements due to the Third AC project, which more closely conformed to the manner in which Third AC costs would enter into revenue requirements.

This revised analysis assumed investments and corresponding interest rates as shown below and assumed an online date of January 1992.

Fiscal Year	Plant Investment $millions	Interest Rate Percent
1991	35	9.5
1992	175	9.64
1993	15	9.72

The incremental revenue requirement forecast and the incremental benefits from the System Analysis Model were then used in the Supply Pricing Model to determine impacts to BPA's rates.

The following table shows the annual net incremental benefits for both the early "home mortgage" calculation and the final revenue requirement forecast, the allocation of the net incremental benefit to the wholesale rates and wheeling rates, and the resulting rate impacts.

	Millions of Nominal dollars Est. Incremental Net Benefits				RATE IMPACTS MILLS/KWH WHOLESALE RATES Nominal $			WHEELING RATES 1990 $	
Year	BPA Home Mortgage	Revised BPA	Revised BPA Wholesale	Revised BPA Wheeling	PF	IP	NR	IS	IN
1992	-29	-16	1	-17	0	0	0	.7	-.2
1993	-27	-41	-17	-24	.2	.1	0	.7	-.2
1994	-9	-18	3	-21	0	0	0	.7	-.2
1995	5	-4	18	-22	-.2	-.2	0	.7	-.2
1996	14	8	28	-20	-.3	-.2	0	.7	-.2
1997	11	6	27	-21	-.3	-.2	0	.7	-.2
1998	16	8	30	-22	-.3	-.3	0	.7	-.1
1999	24	14	38	-24	-.4	-.3	0	.7	-.1
2000	15	10	31	-21	-.3	-.3	0	.8	-.1
2001	13	4	27	-23	-.3	-.3	0	.8	-.1
2002	37	31	51	-20	-.5	-.5	0	.8	-.1
2003	27	20	42	-22	-.4	-.4	0	.8	-.1
2004	37	29	52	-23	-.5	-.4	0	.7	-.1
2005	25	16	42	-26	-.4	-.4	-.1	.7	-.1
2006	36	31	54	-23	-.5	-.5	-.1	.8	-.2
2007	40	33	58	-25	-.6	-.5	0	.8	-.2

The first two columns show that the revised revenue requirement analysis, which delayed the project until January 1992 and increased the interest rates to over 9 percent, generally resulted in a decrease in net incremental benefits. The second two columns show how the net incremental benefits were distributed between the wholesale rate and wheeling rate pools. All but one percent of the revenue benefits were assigned to wholesale rates. All of the capital investment-related costs were assigned to the Intertie South (IS) components of the wheeling rate. The O&M costs were assigned based on historical allocation of O&M costs through 1997. After 1997, the O&M costs were assigned to the wheeling rates. Thus, the IS rate is carrying the bulk of the cost, and the wholesale rates are deriving the bulk of the benefits.

The final five columns show the incremental changes in the Priority Firm (PF), Industrial Power (IP), New Resources (NR), Intertie South (IS), and Intertie North (IN) rates with and without the Third AC. The only year that the PF and IP rates show an increase is 1993. This is due primarily to the low California gas prices in the early years of the Third AC Project's life. Rate reductions in all other years range from .2 to .6 of a mill/kwh for the PF rate. The IN rate is reduced because no project costs are assigned to the IN rate and the Third AC Project enables Canada to send more energy to California, thus increasing the usage and allowing revenue credit to the Northern Intertie rate.

The project, from a rate standpoint, has no impact on the NR rate, is beneficial to the PF and IP rates (except in 1993), is beneficial to the IN rate, and increases the IS wheeling rate.

The results of the economic analysis show significant net present value benefits to BPA ($199 million), the PNW ($253 million) and the Westwide Region ($661 million). The benefits to cost ratio for BPA is a positive 1.7. The internal rate of return is about 12 percent for BPA. Rate impacts are positive for BPA wholesale rate customers in all but one year. BPA's IS wheeling customers, who will be using the interties, carry the bulk of the cost.

The ability to recover additional revenue through operation of the Third AC Project provides BPA with an opportunity to maintain its rates at the lowest possible levels consistent with sound business principles while also enhancing the agency's ability to repay the Federal government's investment in power facilities, as required by law.

While the Third AC is not a risk-free investment, we recognize that the probability of positive benefits substantially outweighs the probability of negative benefits.

Taking all of the above into account, we believe that the Third AC offers significant positive economic benefits to the Northwest as well as BPA and is a prudent economic investment.

D. Public and Institutional Issues.

A fourth factor entering into the decision is concerns and interests of the publics and of the regional and national institutions affected by the project. Opportunities for public comment were provided through meetings and invitations to submit written comments on the environmental documents and Hydro Operations Information Paper. The public comment period on the IDU Draft EIS was from October 22, 1986, to January 16, 1987. Public comment meetings on the IDU Draft EIS were held in Oakland, California; Portland, Oregon; and Klamath Falls, Oregon, in December 1986. Public comments on the Hydro Operations Information Paper were accepted November 13, 1987, through December 31, 1987. Public concerns on the COTP were received as written comments on the draft EIS and at public meetings held in Klamath Falls, OR; Newell, CA; Yreka, CA; and Dorris, CA. Concerns over the project(s) were responded to in Western's final EIS and ROD for the COTP [Section 2.3.1.] and in the final IDU EIS, Volume 2: Comments and Responses, and in other parts of this Record of Decision.

Public concerns were expressed in the IDU EIS process over the accuracy of the projections of economic benefits for the Third AC Project, and the economic analysis that assessed these benefits. Commenters focused on the sensitivity of the analysis to many assumptions of values for critical factors underlying it and on the relative consideration of costs of environmental impacts and mitigation in the analysis. (Responses to these issues are discussed in section C, preceding.)

Commenters on the IDU EIS were also concerned over the power system effects from the availability of additional Intertie capacity and the environmental consequences of these effects. The potential for significant, adverse effects from changes in power system operations on resident and anadromous fish and on wildlife was a major issue. Agencies and the public were also concerned about the method BPA used to project these effects. BPA's reliance on planned fish bypass facilities, to be installed by the U.S. Army Corps of Engineers to preclude significant, adverse effects on anadromous fish, was another public concern. Finally, the adequacy of planned environmental mitigation measures for power system-related impacts remains a public concern. (Responses to these issues are discussed in section E, following.)

In the COTP public involvement process, commenters in the PNW raised questions about impacts on a small private airstrip north of the city of Malin. The airstrip is used at times as an emergency runway when the Malin strip is closed. Other concerns included avoidance of irrigated and agricultural lands. These concerns were addressed by routing the line about 1/2 mile east of the first preferred route, in order to avoid agricultural land and the private airstrip that might have been affected by the proposed route. Other concerns included visual impacts of the line, as well some concerns about possible health effects from operation of the line. (Responses to this issue are discussed in section E, following.)

Issues raised by affected institutions included timing and size of the project. The California participants have studied and proposed a project providing 1600 MW to meet their needs. TANC and Western have completed studies and made decisions to go forward with the COTP providing 1600 MW. The Department of Energy has directed BPA to develop and explore a project enabling the same 1600 MW level of transmission capacity. (See page 4, Background, for additional information on the GAO Report and Secretary of Energy authorization, as well as institutional commitments, which have contributed to the generation of the project.)

There is surplus firm and nonfirm energy that can be marketed in California and there is thermal generation that can be displaced in California. California utilities currently without access to Northwest power could gain such access through the project. The most recent environmental and economic analyses favor action on this Intertie. This "level of readiness" and the institutional commitments that exist today are factors entering into the decisions documented in this Record of Decision.

E. Environmental Factors.

Since BPA construction activities would be restricted to PNW Reinforcement and COTP activities in Oregon and Washington, only these will be covered. Power system operational effects are discussed for Oregon, Washington, California, the Inland Southwest, and British Columbia. Environmental effects for the COTP are discussed in the COTP Final EIS/EIR and the ROD.

The following discussions, based on analyses presented in the three identified EIS's, indicate that environmental impacts, with the adoption of the described mitigating measures, will not be significant. All practicable means to avoid

or minimize environmental impacts of the proposed action have been adopted. The proposed action is the environmentally preferred alternative, since it would defer the resource development in California and possibly in the PNW which would occur if the No Action alternative were adopted. This action would also improve air quality in more sensitive and heavily populated regions in California and would cause only slight increases in air pollution in less populated areas in the PNW.

1. Line-Related Effects. PNW Reinforcement Project. In order for the existing system to support the demands on it for the COTP, improvements and modifications will be made to several substations in Oregon and to one in Washington. In some cases, work will be done only within the existing fenced yard. However, some site expansions will also be necessary. About 30 acres of shrub-steppe vegetation will need to be removed at those substations in Eastern Oregon. Since that type of vegetation is common, 30 acres is insignificant. In Western Oregon, PP&L will need to modify about 6 acres of land at their Dixonville and Meridian Substations. No significant impacts on any resources are expected.

Toxic substances would not be introduced into existing facilities. Non-polychlorinated biphenyl (PCB) capacitors will replace PCB capacitors at those facilities affected by the project. The use of PCB's and associated equipment would be in accordance with the Toxic Substances Control Act (TSCA) and State hazardous waste regulations. For more detail see section 3.15 of Volume 2C of the Draft COTP EIS.

Two line loops into the Southern Oregon substation are necessary. The single-circuit line loop to PP&L's existing Malin-Meridian line would be about 2 miles long. This would mean a right-of-way about 200 feet wide (or about 46 acres) to be cleared of trees. Not many trees would actually be removed, as they are few and widely scattered. Impacts would thus not be significant. Much of the site is covered by low-growing vegetation, which would be removed only where structure sites, roads, and construction-related activities are located. The second line loop would connect the substation with BPA's existing Grizzly-Malin 500-kV line and would require about 2 miles of new double-circuit line. This would require that about 46 acres of right-of-way be cleared of trees. Neither loopline is located on a floodplain or wetland. No impacts on water quality are expected and air quality impacts will only be short-term during construction. Impacts on wildlife would be short-term, as little habitat will be modified or removed from production.

There is continuing controversy about the possible health effects of electric and magnetic fields such as are produced by transmission lines. No hazardous effects of these fields have been confirmed by either laboratory or epidemiological studies. However, these studies have suggested the possibility for adverse effects, including increased risk of cancer in people who live or work near electrical power lines or equipment. At this time, there is no conclusive evidence to indicate that the electric and magnetic fields from the proposed transmission line will result in any adverse effects on human health. The line will be designed to meet the electric field standard set by the state of Oregon (see Volume 2C, draft COTP EIS, p. 31).

The line will also be designed to meet requirements of the National Electrical Safety Code to minimize the potential for electric shocks.

2. Line-Related Effects. COTP. Southern Oregon substation site E-3, identified as the preferred alternative in the Supplement to the Draft EIS, was selected to reduce visual impacts and to keep impacts on agriculture to a minimum. Other advantages are: no conflicting land uses and no residences to relocate. About 46 acres (allowing for future substation expansion) will need to be cleared of vegetation and graded in order to construct the substation. Vegetation is annual grasses and forbs, with scattered juniper trees, typical of the interior basins of central Oregon. The removal of 46 acres of this type of habitat is insignificant compared to the thousands of acres available. Impacts are discussed in more detail in Section 3 of Volume 2C of the Draft COTP EIS.

About 6 miles of new 500-kV line will be built from the new substation site to the Oregon-California border, where it will connect with the California segment of the project. For construction efficiency, the line in Oregon will be built as a continuation of the California portion of the project. However, it will be built in accordance with designs approved by BPA. BPA will own the line after construction. This 6-mile segment will require removal of some widely scattered trees on about 144 acres.

The environmental impacts have been discussed in the Supplement to the COTP EIS on pages 3.1-4 through 3.1-6 and are listed in Table 2 of the FEIS. The only residual impact remaining after mitigation was visual incompatibility (contrast). As only 6 miles occur in Oregon and the land for the most part is devoid of residences, this one impact in context with the line is not significant.

3. Environmental Factors Related to COTP/PNW Reinforcement Project Power System Operations. The Third AC Intertie Project, and related projects being addressed in this Record of Decision, is the second Intertie capacity increase upon which BPA has made a decision recently. A Record of Decision on the decision to operate the DC Terminal Expansion Project was signed by the Administrator on August 31, 1988. Because this is the second such decision, BPA must base its decision on the cumulative environmental impact of the COTP/ Third AC as a second-added facility, in addition to the other decision factors addressed previously. The IDU Final EIS addressed the environmental impacts deriving from changes in operation of the power system in order to use the increased Intertie capacity under varigus assumptions concerning firm marketing and intertie access policy, including the Long-Term Intertie Access Policy (adopted May 17, 1988). Environmental impacts were presented in the IDU Final EIS on a cumulative basis for all projects, as well as for the DC Terminal Expansion Project alone, and for the Third AC Intertie Project and related projects without the DC Terminal Expansion. The following findings are based on information from the IDU Final EIS for "maximum" Intertie capacity, that is, with both the DC Terminal Expansion Project and the Third AC Intertie Project and related projects.

4. Impacts on Fish, Wildlife, and Vegetation Related to Operation of Pacific Northwest Hydroelectric Resources. Under the Pacific Northwest Electric Power

Planning and Conservation Act (Pacific Northwest Power Act), BPA must protect, mitigate and enhance the fish and wildlife, including related spawning grounds and habitat, of the Columbia River and its tributaries.

BPA performed extensive analyses on how operating the Third AC Intertie Project is expected to affect fish (reported in the IDU Final EIS). BPA believes that the System Analysis Model (SAM) and the FISHPASS model used for the IDU Final EIS constitute the best available methodology for analysis of impacts of operation of the hydrosystem on anadromous fish. Sensitivity analyses were performed to test the uncertainty of the model results with respect to key parameters and assumptions. These analyses showed that variations in the key assumptions tested made little difference, when comparing fish survival under one alternative versus another. Therefore, much of the uncertainty of the FISHPASS model parameters is not critical to the study results for changes in survival associated with the alternatives addressed in the IDU Final EIS. (See IDU Final EIS, Pp. 4.2.3-23 through 4.2.3-32, and Appendix E, Part 6.) The combined effect of operating the Third AC and DC Terminal Expansion Projects on anadromous fish survival was found to be small and is not expected to be significant, provided planned fish passage improvements are made. (See IDU Final EIS, P. 4.2.3-36.)

BPA's reliance on these planned fish passage improvements to preclude significant impacts on anadromous fish was an issue raised by several agencies, groups, and individuals in the IDU EIS process. Four sensitivity analyses addressed the effects of not installing passage facilities as planned. Delaying all installations for three years did not significantly alter the study results. (See IDU Final EIS, Pp. 4.2.3-33 and 4.2.3-34.) Three analyses did show potential results of significant adverse effects on several anadromous fish stocks as a result of operating both Intertie Projects: not installing planned new bypass systems at (1) The Dalles and Ice Harbor dams or at (2) The Dalles, Ice Harbor, and Lower Monumental dams or (3) not installing any new fish bypass systems and not improving any existing systems. (See IDU Final EIS, P. 4.2.3-38.)

Congress has recently directed the Secretary of the Army, acting through the Chief of Engineers, to use $8.7 million previously appropriated for FY 88 and an additional $9.6 million appropriated for FY 89 for the design, testing, and construction of fish bypass facilities at Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, and The Dalles. BPA is confident that the Congress will continue to appropriate funds for bypass improvements at these dams.

If any of the passage improvements are not carried out to completion, it seems most likely that they would be the ones for The Dalles and Ice Harbor. These two projects have shown poor benefit/cost ratios in recent Corps analyses of fish bypass alternatives. Improved passage facilities at Ice Harbor Dam are not necessary to prevent significant impacts on any fish stock from increases in Intertie capacity. (See IDU Final EIS, p. 4.2.3-40.) Assuming fish passage improvements are not carried out at The Dalles, there is a potential for significant adverse effects on four stocks of anadromous fish, John Day spring chinook, Umatilla summer steelhead, Deschutes spring chinook, and Warm Springs spring chinook with both the DC Terminal Expansion and the

Third AC Intertie operating. (See IDU Final EIS, Pp. 4.2.3-38, and 4.2.3-40.) The conclusions of potential, significant adverse impacts on these stocks were based on BPA's analyses, using the System Analysis and FISHPASS models, which showed decreases in downstream passage survivals with combined operation of the Third AC Intertie with the DC Terminal Expansion Project when no fish bypass was assumed in place at The Dalles.

The John Day spring chinook is a natural stock which has improved substantially, having increased from about 1,000 fish in the 1970s and early 1980s to about 5,000 fish in 1987. Recovery has resulted from numerous habitat improvements in the John Day River basin and modernization of diversion screens. Further rapid increases are expected as a consequence of recent installation of bypass facilities at John Day Dam. The stock is managed strictly for natural production. There has been no terminal sport fishery (i.e., no fishing at or near the point to which fish are returning to spawn). An Indian subsistence fishery has been started, but will be limited to less than 5 percent of the run. (See IDU Final EIS, Appendix E, p. E.7-36.)

The Umatilla summer steelhead runs have decreased over the long term, but have remained stable for the last 5 years. Habitat and passage enhancement, better screens on irrigation diversions, increased hatchery supplementation, and, perhaps, flow enhancement have improved or are planned to improve production. This stock is managed as a natural stock with substantial hatchery supplementation. Terminal sport and Indian fisheries occur in the Umatilla River basin for marked hatchery fish. (See IDU Final EIS, Appendix E, p. E.7-9.)

The Deschutes spring chinook fish counts have increased from less than 20 in 1978 to above 1,500 in 1987, with particularly significant increases in the last few years. Improvements in hatchery production are believed to be the cause of this increase. Further increases in hatchery production are proposed. The stock is managed as a hatchery stock. There is a terminal sport fishery and Indian subsistence fishery most years at Shearer's Bridge, but fishing is closed in the rest of the basin. Columbia River fisheries are regulated to minimize harvests of upriver stocks. Therefore, the Deschutes River spring chinook are assumed to not be in critical condition. (See IDU Final EIS, Appendix E, p. E.7-40.)

The Warm Springs spring chinook runs have increased from less than 1,500 fish in the early 1980s to over 2,000 fish in 1984-1987. Planned fish passage improvements are expected to improve downstream migration survival by 7.8 percent. The stock is managed as a supplemental stock with all hatchery fish marked at release. Only unmarked adults are passed upstream of the hatchery for natural production and a portion of the unmarked fish are retained for hatchery broodstock. There is a terminal sport fishery and Indian subsistence fishery at Shearer's Bridge, but fishing is closed in the rest of the basin. Columbia River fisheries are regulated to minimize harvests of upriver stocks. Based on this information, it is assumed the Warm Springs spring chinook are not in a critical condition and are being managed as a natural stock with limited harvest. (See IDU Final EIS, Appendix E, Pp. E.7-40 and E.7-41.)

A fifth fish stock, the John Day fall chinook, would also be affected. However, the fate of this stock is directly related to management practices which do not include efforts to enhance this stock through habitat improvement or artificial production, and which permit heavy harvesting in the ocean and in Columbia River fisheries. The small effects of an increase in Intertie capacity are not significant relative to the effects of these management policies for this stock. (See IDU Final EIS, Pp. 4.2.3-6 and 4.2.3.8, and Appendix E, Pp. E.7-37 and E.7-38.)

If the planned bypass facilities are not installed by the Corps in a timely fashion, BPA would expect to continue to operate both the Third AC Intertie and the DC Terminal Expansion. Even with both operating, BPA would have some flexibility to pursue other mitigative action, such as adjusting its power marketing activities, transporting fish around dams, or using other means to achieve fish passage. Further, it is highly unlikely that entities with responsibilities to protect and enhance fish and wildlife would permit serious deterioration of the four potentially affected stocks described above when a variety of means exist to prevent such effects.

All stocks of mid-Columbia anadromous fish originating above Rock Island Dam could be significantly affected by operating the Third AC Intertie in conjunction with the DC Terminal Expansion Project if bypass systems are not installed at the mid-Columbia dams. (See IDU Final EIS, p. 4.2.3-38.) However, design and testing of bypass facilities at the mid-Columbia dams is proceeding. BPA is confident that these bypass improvements will be completed within the time projected in the IDU Final EIS analyses.

An analysis also was conducted to assess the impacts of Third AC operation in conjunction with the DC Terminal Expansion on the ability to coordinate fall and spring flow levels in order to facilitate successful adult spawning and fry emergence within the Hanford Reach. No significant effects were found. (See IDU Final EIS, p. 4.2.3-41.)

The analysis of effects of operation of both the Third AC and the DC Terminal Expansion on resident fish showed no significant impacts since mean changes in end-of-period reservoir elevations were small, and there was only a small frequency of relatively large reservoir elevation changes. (See IDU Final EIS, p. 4.2.3-14.)

Wildlife and vegetation around the reservoirs are not expected to be affected significantly because changes in reservoir operations are expected to be small and are within reservoir operating constraints. (See IDU Final EIS, p. 4.2.5-2.)

The fish and wildlife impacts of operating the Third AC Intertie with the DC Terminal Expansion relative to hydro operations in the PNW were all found to be not significant in the IDU Final EIS, assuming installation of planned bypass facilities. BPA believes that the probability of these facilities being installed approximately as planned is very high considering recent actions by Congress and actions by the Mid-Columbia Public Utility Districts. Further, BPA believes that even if all the passage facilities are not developed, there are sufficient opportunities available to a number of

entities, including BPA, to take action to protect fish that the potential adverse effects on the fish stocks of concern are not a certainty. Therefore, such potential effects provide an insufficient basis for adopting the No Action alternative. Because impacts of operating Federal hydroelectric facilities would not be significant, and considering the need to assure an adequate, efficient, economical, and reliable power supply, and considering BPA's ongoing and substantial investments in fish and wildlife protection, mitigation, and enhancement (in particular considering the continuing increases in fish passage survival), BPA is meeting its requirement to provide equitable treatment for fish and wildlife.

5. Operational Impacts on Water Quality and Fish in British Columbia. Intertie capacity increases would probably beneficially decrease dissolved gas concentrations downstream of Keenleyside Dam. Dissolved gas concentrations have not been noted as a concern at other British Columbia dams assessed in the IDU Final EIS. Significant changes in water temperature or pollutant concentrations are not expected. (See IDU Final EIS, P.4.2.4-2.) Effects on channel stability on the Peace River and on the Columbia River downstream of Keenleyside Dam are not expected to be significant. Channel stability effects on the Columbia River downstream of Revelstoke Dam where water transport of logs may have been impaired and sediment deposition has occurred cannot be assessed with available information. The City of Castlegar's water supply would not be affected. In the past, flooding and damage to shore property has occurred due to the lifting and grounding of ice slabs as reservoir levels fluctuate on the Peace River. These occurrences would not be made worse. (See IDU Final EIS, Pp. 4.2.4-3 and 4.2.4-4.) Anadromous fish do not exist in the Columbia or Peace River systems within British Columbia. Because operation of the Project has only minor effects on reservoir levels and flows on the Peace River reservoirs and Columbia River reservoirs in British Columbia, impacts on resident fish in British Columbia are not expected to be significant. (See IDU Final EIS, Pp. 4.2.4-4 through 4.2.4-8.)

6. Operational Impacts on Irrigation. Levels of allowable irrigation withdrawals are determined by the states and are established water rights. Hydro operation planning is developed around flows that include authorized irrigation withdrawals. Therefore, operation of the Project would not affect the amount of water available for irrigation. Fluctuations in reservoir levels need to be coordinated with irrigators, however, so that pump intakes can be moved if necessary. The Third AC Intertie Project would not affect the need for this coordination. At Grand Coulee, the reservoir may not fall below 1240 feet elevation at the end of May, in order to provide for pumping for the Columbia Basin Project. BPA's analysis for the IDU final EIS shows no difference in the probability of meeting this constraint with operation of the Third AC. (See IDU Final EIS, Pp. 4.2.2-4 through 4.2.2-6.)

7. Operational Impacts on Recreation. Projected changes in reservoir levels associated with operation of the Third AC Intertie Project are small, especially during the summer recreation season. There would be minimal impacts on recreation at all the reservoirs studied. The largest projected changes in recreational index for any reservoir were less than one percent. (The recreational indices were based on different factors for different reservoirs, but are indicators of recreational use with reservoir elevation.)

The operation of the Third AC will have no effect on the ability to achieve the desired elevation of Lake Pend Oreille for the annual Kokanee and Kamloops Derby. Changes in downstream flows associated with the operation of additional Intertie capacity are also projected to have no significant effects on recreation. (See IDU Final EIS, Pp. 4.2.2-3 and 4.2.2-4.)

8. Operational Impacts on Cultural Resources. Increases in Intertie capacity have no projected effect on cultural resources on both annual and monthly bases. The operations of the Third AC Intertie will not adversely affect cultural resources. (See IDU Final EIS, P. 4.2.2-7.) There may be adverse impacts on cultural resources from firm marketing transactions taken under the LTIAP. BPA is taking measures, in coordination with the Bureau of Reclamation and the US Army Corps of Engineers, to mitigate these impacts. (See IDU Final EIS, Pp. 4.2.2-9 and 4.6-1.)

Operating changes at hydroelectric projects might have effects on cultural resources in and around Federal storage reservoirs in the PNW. These reservoirs are: Grand Coulee (Lake Roosevelt), Dworshak, Libby (Lake Koocanusa), Albeni Falls (Lake Pend Oreille), and Hungry Horse. Many cultural resource sites in the areas of potential effect have already been and continue to be affected by erosion and vandalism, and in other ways. Changes in reservoir elevations may change the rate of site erosion and may make sites more or less accessible to vandals.

Known properties on or eligible for the National Register of Historic Places on the aforementioned reservoirs are the Middle Kootenai River Archaeological District at Lake Koocanusa, Montana, and the Kettle Falls Archaeological District and the Fort Spokane Historic District at Lake Roosevelt, Washington. Information about the existence and significance of cultural resources within the area of potential effect is incomplete and it is very possible that other potentially affected properties may be eligible for the National Register.

BPA has initiated procedures to develop a Programmatic Agreement with the Advisory Council on Historic Preservation, the Idaho, Montana, and Washington State Historic Preservation Officers, the Bureau of Reclamation, and the U.S. Army Corps of Engineers. Also consulted in developing the Programmatic Agreement are the Confederated Tribes of the Colville Reservation, Washington; the Spokane Tribe of the Spokane Reservation, Washington; the Kalispel Indian Community of the Kalispel Reservation, Washington; the Coeur D'Alene Tribe of the Coeur D'Alene Reservation, Idaho; the Nez Perce Tribe of Idaho, Nez Perce Reservation, Idaho; the Kootenai Tribe of Idaho; the Confederated Salish and Kootenai Tribes of the Flathead Reservation, Montana; the Blackfeet Tribe of the Blackfeet Indian Reservation of Montana; the Bureau of Indian Affairs; the U.S. Forest Service; and the National Park Service.

The Programmatic Agreement was initiated as mitigation for potential effects of firm marketing transactions, but will satisfy BPA's responsibilities under section 106 of the National Historic Preservation Act (16 U.S.C. 470, et seq.) for all Federal actions taken with respect to operation of the Columbia and Snake River Federal hydroelectric facilities for power production. Terms of

the Agreement may include provisions for further identification and evaluation of potentially affected cultural resources.

The Programmatic Agreement will also be designed to ensure consistency with the American Indian Religious Freedom Act (42 U.S.C. 1996), by providing for BPA participation in the relocation or other treatment of Native American burials when such sites are discovered through the resource survey and evaluation that will occur as part of the Agreement.

Other hydroelectric project reservoirs in the Federal Columbia River Power System are operated either as run-of-river or primarily for flood control and are generally independent of power marketing activities. Alternative actions with regard to the Interties would, therefore, not affect cultural resources at hydroelectric projects other than the five listed above.

9. Operational Impacts on Nonrenewable Resource Use and Land Use. In the IDU Final EIS, nonrenewable resource use impacts were primarily found to be related to projected changes in fuel consumption at coal-fired generating plants which serve the PNW and the Inland Southwest, and at gas or oil-fired generating plants in California. With operation of the Third AC Intertie Project, the amount of coal used annually by the PNW plants is expected to increase by about eleven percent, or by up to about 1.8 million tons annually. The incremental amount of land mined to supply this coal is about 90 acres per year. (See IDU Final EIS, Pp. 4.3.1-3 and 4.3.1-8.)

In the Inland Southwest, annual coal use is projected to decrease with operation of the Third AC Intertie Project by about 195,000 to 636,000 tons per year. Land use requirements for mining are reduced in the Inland Southwest by about 23 acres per year in 1993, and decrease thereafter. (See IDU Final EIS, Pp. 4.3.1-5 and 4.3.1-17.)

Gas and oil consumption in California would be expected to be reduced by about 5 to 10 percent with operation of the expanded Project, saving about 27,000 to 84,000 barrels of oil per year, and about 16 to 52 billion cubic feet of natural gas per year. (See IDU Final EIS, Pp. 4.3.1-4 and 4.3.1-12.)

Several sensitivity analyses were conducted to test the conclusions about environmental impacts under assumptions different than those used for the base case analysis. These analyses showed that the nonrenewable resource consumption and land use impacts described above were skewed further in the same directions by higher California gas prices, higher California loads, or lower PNW loads. A higher limit on the rate for nonfirm energy has little effect on coal consumption in the PNW. (See IDU Final EIS, P. 4.3.1-6.)

10. Operational Impacts on Air Quality and Solid Waste. Air quality impacts related to power system operational effects of the Third AC Intertie Project were found to derive from changes in the operation of coal-fired power plants serving the PNW and those located in the Inland Southwest, and changes in the operation of gas and oil-fired generating plants in California.

All projected ambient air quality changes due to operation of the Third AC are small. For ambient Total Suspended Particulate and sulfur dioxide, projected

changes are much less than the Class II Prevention of Significant Deterioration increments. Increasing Intertie capacity would lead to small increases in air pollution from coal-fired generating plants serving the PNW, and would allow generation from California gas and oil-fired generating plants to be reduced, thus improving air quality slightly in heavily populated areas near plants in California. Air quality in the Inland Southwest would also be expected to improve slightly because of lower demand for power from plants there. (See IDU Final EIS, Pp. 4.3.2.-1, 4.3.2-11, 4.3.2-12 and Appendix G.) An analysis of acid deposition within California, Oregon, Washington, Montana, and Wyoming showed insignificant effects compared to base levels. (See IDU Final EIS, Pp. 4.3.2-3 through 4.3.2-6.) Expected changes in monthly ambient ozone concentrations in the Los Angeles basin were also determined to be not significant. (See IDU Final EIS, Pp. 4.3.2-13 and 4.3.22-14.)

Solid waste impacts change in response to changes in coal-fired generating plants' annual generation. Solid wastes produced are primarily ash and scrubber sludge. Solid waste impacts from altering coal plant operations to operate the Third AC Intertie Project at its expanded capacity are not considered significant because changes in generation are relatively small and because adequate means to dispose of solid wastes are provided at the plants. (See IDU Final EIS, P. 4.3.2-7.)

Air quality impacts are not expected to be substantially affected by higher California gas prices, higher California loads, or lower PNW loads than assumed in the principal analysis. (See IDU Final EIS, Pp. 4.3.2-14 through 4.3.2-17.)

11. Operational Impacts of Thermal Plants on Water Use and Quality. Operation of thermal power plants may affect water use, through consumption of water for cooling and other purposes, and water quality through the discharge of water containing heat and/or chemical pollutants to surface waters. Chemical water pollutant discharges from power plants are generally well regulated and controlled, resulting in little potential for significant impacts, and so were not specifically addressed in the IDU Final EIS.

A conservative analysis was conducted to screen for potential, significant impacts from consumption of water for those PNW and Inland Southwest coal-fired generating plants which showed substantial changes in annual generation, and for three California gas or oil-fired plants which use ground or surface waters. For these plants, changes in water consumption were conservatively estimated using a linear relationship to the change in annual generation. These changes in consumption were related to flows of the river or stream which served as the supply (where that was the case) or to aquifer recharge or pumpage where such data were available when groundwater was the supply. No potential for significant impacts related to surface water or groundwater consumption was found in these cases. (See IDU Final EIS, Pp. 4.3.3-4 through 4.3.3-7.) Groundwater data were not available for two California plants which pump groundwater for cooling. Impacts for these plants were assessed through estimating the percentage change in water consumption using a linear relationship with projected changes in annual generation. Both of these plants showed environmentally beneficial reductions in water consumption on this basis.

Several California coastal power plants, which showed potential for substantial changes in annual generation in the analysis, use once-through cooling, i.e., they pump water from a bay or estuary through their condensers and discharge the heated water back to its source. The two principal concerns with this type of cooling system are (1) mortality of aquatic life through entrainment in the water stream being pumped to the condenser or through impingement on screens at the point of withdrawal; and (2) water temperature changes because of the discharge of heated water, and the consequences for aquatic life. These impacts were addressed in the IDU Final EIS through a literature search to identify potential problem areas, and an assessment of how changes in the plants' annual generation may affect those problems. The only potentially significant problem areas identified were entrainment at the Pittsburg and Contra Costa plants. It was not possible to determine quantitatively how operation of the Third AC Intertie Project would affect the entrainment problems at these plants. However, since the average annual generation at these two plants is reduced with operation of the Third AC Intertie Project, it is unlikely that the entrainment would be made worse. (See IDU Final EIS, Pp. 4.3.3-8 through 4.3.3-13.)

Sensitivity analyses were conducted to determine whether effects described above might be different with different assumptions. High California gas prices would increase water consumption impacts at PNW plants, although they would still be small, and would reduce water-related impacts at California plants. High California loads would have similar effects, but would phase out after a time. Low PNW loads could help alleviate some water-related impacts in California and the Inland Southwest but would have little effect on water use by PNW coal plants. (See IDU Final EIS, P. 4.3.3-14.)

12. Impacts on Vegetation and Wildlife Related to Thermal Plant Operational Changes. Changes in thermal plant operation can affect vegetation and wildlife through changing the amount of habitat taken up for mining of fuels and through discharges of air and water pollutants which damage habitat or have direct effects on vegetation and wildlife.

Because of permitting requirements and their enforcement (which includes protection against effects on threatened and endangered species and on water quality), the operation of thermal plants for the Third AC Intertie Project will not cause significant adverse effects on any threatened or endangered species, despite the fact that mining of more coal to supply certain power plants is expected if the Third AC Intertie Project is operated. These effects are considered and mitigated, if necessary, during the permitting process. (See IDU Final EIS, P. 4.3.4-2.)

Significant impacts on vegetation and wildlife from changes in the actual operation of coal-fired generating plants which are projected with operation of the Third AC are not expected. This is primarily because air quality, acid deposition, solid waste, and water consumption impacts of the coal-fired plants considered in the analysis are not significant.

With respect to California's gas and oil-fired power plants, no significant impacts on vegetation and wildlife are expected with operation of the Third AC Intertie Project, since these plants will continue to operate within design

limits, with insignificant changes in air quality impacts and little likelihood of oil spills. (See IDU Final EIS, P. 4.3.4-5.)

Nuclear plant operations are not expected to be affected by operation of the Third AC Intertie Project. (See IDU Final EIS, P. 4.1-14.) Therefore, operation of the Third AC should not change the impacts on vegetation and wildlife of operation of nuclear plants.

13. Impacts Related to Development of New Power Resources. Operation of both the Third AC Intertie and the DC Terminal Expansion project was found to have virtually no effect on the development of future resources in the PNW, regardless of which of the three contract configurations analyzed in the IDU Final EIS was assumed. (See IDU Final EIS, p. 4.4-4.) Operation of both projects, given only economy (i.e., nonfirm) energy sales, would also be expected to have little effect on resource development in California and the Inland Southwest. (See IDU Final EIS, p. 4.4-8.)

The ability to negotiate firm contracts between PNW utilities and California utilities under the Long-Term Intertie Access Policy may result in resource deferrals or development depending on the nature of the firm contracts. The amount of firm contracts that non-Federal Northwest utilities can enter into with California utilities is limited by the Assured Delivery provisions of the Long-Term Intertie Access Policy which reserves 800 MW of Intertie capacity for such transactions. Thus, the total amount of Intertie capacity available is not a factor in the amount of firm contracts Northwest non-Federal utilities can negotiate, and the resource development implications of such contracts are constrained by the Policy.

Intertie capacity in excess of the 800 MW is available for Federal firm sales, joint ventures, and nonfirm sales in that priority. BPA has further discretion regarding joint ventures. Such transactions would be subject to a separate decisionmaking process, and are not covered by this Record of Decision. BPA's firm export sales to date do not commit BPA to acquire resources to support those sales and, therefore, do not necessarily result in resource development, although they may defer resources. Any decision for BPA to acquire resources to support an export sale would be a consequence of a separate decisionmaking process. Thus, resource development impacts of BPA export sales are a consequence of marketing and contract decisions rather than the total amount of Intertie capacity available. However, to the extent that BPA may in the future amend its Long-Term Intertie Access Policy or change its practices concerning resource acquisitions for export sales, the increase in Intertie capacity represented by the Third AC Intertie and the DC Terminal Expansion affords more potential for resource deferral or development than without the increase.

14. Eugene-Medford Environmental Effects. The environmental effects of the Eugene-Medford Project essentially result from the right-of-way and access road requirements. Effects are related to construction disturbance, to interference with agriculture, and to removal of forest land from production. These effects and mitigation for them are discussed in detail in Chapter 3 of the Eugene-Medford 500-kV Transmission Line EIS. A decision was made in 1984 to construct this line (see Eugene-Medford Record of Decision).

Mitigation

Several mitigation and monitoring actions are being taken in conjunction with the Long-Term Intertie Access Policy which are pertinent to the decision on the Third AC Intertie Project. These include programs to survey and evaluate cultural resource sites surrounding Federal storage reservoirs on tributaries to the Snake and Columbia rivers and to survey resident fish populations at Hungry Horse Reservoir to assure that an adequate food supply is maintained for the bald eagles living in or passing through the area. While the provision of firm marketing transactions under the Long-Term Intertie Access Policy was the reason for undertaking this mitigation, this mitigation will to some degree limit impacts from all Intertie actions and power marketing actions in general.

BPA is consulting with the Bureau of Reclamation, the Corps of Engineers, the Advisory Council on Historic Preservation, the National Park Service, affected Indian tribes, the Bureau of Indian Affairs, and the Washington, Idaho, and Montana State Historic Preservation Officers to develop a Programmatic Agreement. This Agreement will provide for full satisfaction of BPA's obligation under the National Historic Preservation Act. (See IDU Final EIS, Sections 4.2.2.5 and 4.6.)

BPA expects to preclude adverse impacts on resident fish by undertaking measures to increase resident fish use of Hungry Horse tributaries. These efforts will include funding of imprint planting of westslope cutthroat trout and mountain whitefish in four tributaries over a 5-year period and funding of off-site fish habitat improvements including cleaning of spawning gravels and imprint planting of cutthroat trout, kokanee, and mountain whitefish. (See IDU Final EIS, P. 4.2.3-13.). If monitoring studies at Hungry Horse reservoir indicate significant adverse effects are occurring to resident fish as a result of Intertie actions, including the Third AC Intertie Project, information from these monitoring studies will be used to develop and implement additional effective mitigation measures.

All practicable means to avoid or minimize environmental harm from the selected alternative have been adopted. The mitigation measures that have been adopted from the COTP are listed in section 1.1.5 of the final EIS. These measures are incorporated into the proposed action and will be written up in a Compliance Monitoring Plan being developed by TANC and Western. BPA adopts the provisions of the Plan. The Plan will be prepared during project design, to include engineering designs and construction plans. It will be developed through additional consultation with state and Federal agencies that will be involved in monitoring its implementation. BPA will develop a Compliance Monitoring Plan to cover both COTP and PNW Reinforcement Project actions.

Implementation of the mitigation measures will be assured through several means. First, the lead agencies will ensure that the applicable mitigation measures are included in the construction contracts. The construction inspectors will verify that the mitigation measures are implemented and will have the authority to enforce the measures by redirecting activities of the construction contractor to the extent necessary to meet the mitigation

requirements included in the construction specifications. Second, BPA will monitor the implementation of the mitigation measures. Third, cooperating and responsible agencies and other local, State, and Federal agencies may also monitor the implementation of the mitigation measures under their jurisdiction. Details of the coordination and reporting mechanisms for this monitoring will be included in the Compliance Monitoring Plan.

Integration with Other Requirements

The Oregon and Washington portion of the COTP and the PNW Reinforcement Project will not have any non-mitigable effect on floodplains, wetlands, or coastal zones.

The activities connected with the Oregon and Washington portion of the COTP and the PNW Reinforcement will be in accordance with the following Federal laws: Federal Water Pollution Control and Safe Drinking Water Act (Clean Water); Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Resource Conservation and Recovery Act (RCRA); Toxic Substances Control Act (TSCA); and all applicable State hazardous waste regulations.

A. Prime and Unique Farmlands.

About 2 acres classified as Prime farmlands will be removed from production at the Malin Substation. These 2 acres are isolated from other productive farmland, so the effects are judged insignificant.

B. Threatened and Endangered Species and Critical Habitat.

The U.S. Fish and Wildlife Service (USFWS) has agreed with the conclusion that the PNW Reinforcement Project will not affect any Threatened or Endangered Species or their habitat.

Western Area Power Administration has submitted its Biological Assessment on the COTP to the USFWS. At this time, the USFWS has not completed its review of the Assessment. Western's and BPA's obligations under Section 7 of the Endangered Species Act of 1973, as amended, will be completed prior to construction.

Informal consultation on threatened and endangered species has also been conducted with the U.S. Fish and Wildlife Service relative to the power system effects of the Third AC Intertie Project. They agreed with BPA's conclusion in the Biological Assessment that the project is not likely to affect any Federally listed threatened and endangered species.

C. Cultural Resources.

Since publication of the EIS, cultural resource surveys in the area of the proposed loop line from the new Southern Oregon substation to the Grizzly-Malin 500-kV line and on the substation site and 6 miles of COTP line

in Oregon have found no resources which might be affected by construction. No other construction impacts on cultural resources in Oregon and Washington have been identified.

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Administrator